STRATEGIC SUSTAINABILITY AND INDUSTRIAL ECOLOGY IN AN ISLAND CONTEXT, WITH CONSIDERATIONS FOR A GREEN ECONOMY ROADMAP: A STUDY IN THE TOURIST ACCOMMODATION SECTOR, GRENADA

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ABSTRACT

The purpose of this research is to show how business and enterprise can align sustainability and sustainable development to create strategic sustainability (SS) procedures, which can be used for planning towards sustainability in an island context. Even with the 3Ps depiction of sustainable development (SD), the idea continues to be difficult to make operational (Azar, Holmberg and Lindgren 1996) and has failed in many of its applications (Baumgartner and Korhonen 2010). Moreover, businesses wishing to operate in perpetuity are challenged by the socio-ecological system that constitutes sustainability. But all businesses have materials, energy and waste flows, (MEWFs) and a more strategic approach to managing these flows can assist businesses with the sustainability challenge. Firstly however, sustainability described as a successful socio-ecological system must be understood. Secondly the process of reducing the MEWFs within the business, referred to as sustainable development actions must be seen as separate but congruent to sustainability. By adapting the framework for strategic sustainable development and using a mixed methods approach, the necessary strategy content for the SS procedures are researched in the tourist accommodation sector-Grenada. It is shown that in an island context, defined as an isolated system with scarce resources, (Deschenes and Chertow 2004) the challenges of sustainability, especially for businesses such as the tourist accommodation sector, are exacerbated.

The research concludes with three important groups of steps for the SS procedures: 1) visioning and vision linking; 2) developing sector strategic actions and 3) monitoring and evaluation. A tourism symbiosis was proposed as a critical action for reducing MEWFs. Considerations for implementing aspects of a proposed green economy roadmap using the SS procedures are addressed. The research can assist both policy makers and business leaders to operationalise sustainable development and to do so with some degree of certainty of achieving sustainability in an island context.

Key words: sustainable development; sustainability; industrial ecology; island context; strategy process, content and context; green economy; tourist accommodations

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ABBREVIATIONS AND ACRONYMS

AD	Anaerobic Digester
AIMS	Africa, Indian Ocean, Mediterranean and South China Seas
ASIDS	Africa, Indian Ocean, Mediterranean and South China Sea Small Island Developing States
BPoA	Barbados Plan of Action
BTH	Blekinge Institute of Technology
BVI	British Virgin Islands
CBA	Cost Benefit Analysis
CSIDS	Caribbean Small Island Developing States
CO^2	Carbon Dioxide
CSR	Corporate Social Responsibility
CTO	Caribbean Tourism Organisation
ECCB	Eastern Caribbean Central Bank
EERE	Energy Efficiency and Renewable Energy
EEMs	Energy Efficiency Measures
EU	European Union
FSSD	Framework for Strategic Sustainable Development
GDP	Gross Domestic Product

GBT	Grenada Board of Tourism
GHTA	Grenada Hotel and Tourism Association
GHG	Greenhouse Gas Emissions
GRENLEC	Grenada Electricity Services Ltd
GSWMA	Grenada Solid Waste Management Authority
GOG	Government of Grenada
ICC	International Chamber of Commerce
ISPs	Island Sustainability Principles
IE	Industrial Ecology
IRENA	International Renewable Energy Agency
LCA	Lifecycle Analysis
LPG	Liquid Petroleum Gas
MEWFs	Material Energy and Waste Flows
MEFA	Materials and Energy Flow Analysis
MFA	Material Flow Analysis
MSI	Mauritius Strategy of Implementation
MSLS	Masters in Strategic Leadership towards Sustainability
NAWASA	National Water and Sewage Authority
NEPMS	National Environmental Policy and Management Strategy
NGO	Non-Governmental Organisation
OECS	Organisation of Eastern Caribbean States
PSIDS	Pacific Small Island Developing States
RES	Renewable Energy Sources
RETs	Renewable Energy Technologies
SGD	St. George's Declaration of Principles for Environmental Sustainability
SIDS	Small Island Developing States
SPs	Sustainability Principles
STD	Sustainable Tourism Development
SURAP	Sustainability Responsibility Plan

SS	Strategic Sustainability
UN DESA	United Nations Department of Economic and Social Affairs
UNFCC	United Nations Framework on Climate Change
UNCED	United Nations Conference on the Environment and Development
UN	United Nations
UNDSD	United Nations Department for Sustainable Development
UNEP	United Nations Environment Program
WTE	Waste-to-Energy
WTO	World Tourism Organisation
WTTC	World Travel and Tourism Council
WECD	World Council for Environment and Development

UNITS

C_i	Per capita data of 'I' indicator
G	Grams
Gg	Giga-grams
Kg	Kilograms
L	Litres
Mj	Mega joules
P_j	Number of tourists
S_i	Amount of Loads per 'i' indicator
T_j	Length of stay

CHAPTER1: INTRODUCTION

1.0 Background of the research

Globally, the idea of sustainable development, conceptualized as the interaction of the triple pillars of society (people), economy (profit) and environment (planet), or the 3Ps, is widely accepted and entrenched. Moreover, this conceptualization is generally regarded as the solution to the global conflict which exists between economic growth and development and environmental protection (UNDESA 1992; WCED 1987). However, and despite this global acceptance, the idea of sustainable development still remains highly contested (Robinson 2004). More critically, the idea has been problematic to make operational (Azar, Holmberg and Lindgren 1996) and has failed in its application as solutions may lead to problem shifting and displacement (Baumgartner and Korhonen 2010). These challenges have been especially problematic for business and enterprise or businesses. This research therefore, seeks to address these issues by comprehensively demonstrating how businesses can operationalise or apply sustainable development through strategy planning.

From a general perspective, and despite the 3Ps depiction of sustainable development and their interaction as the perceived solution to the environment/development conflict, the challenges and issues with the implementation of sustainable development still remain a global concern in the 21st century. According to UNDESA (2012a p. 5) "... there are continuing concerns over global economic and environmental developments in many countries". In this regard there was an apparent attempt to shift towards the green economy and Sprangenberg (2012) notes that the green economy appeared to be taking centre stage and is replacing the idea of sustainable development. It will be shown that businesses also play a critical role in the green economy.

However, the green economy and sustainable development are described similarly as the 3Ps interaction (see for example ICC 2011). The United Nations Environment Programme (UNEP 2011 p.01) defines "... a green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities"; a definition that is embedded in the pillars of sustainable development. More importantly and from a business

perspective, “The business community believes the term “Green Economy” is embedded in the broader sustainable development concept” (ICC 2011 p. 1) and requires the pillars (economic, social, and environment) of sustainable development to work in a mutually reinforcing fashion” (ICC 2011 p. 2) .

As a consequence, this research takes the view that the green economy is similar to that of sustainable development, at least from the perspective of the 3Ps interaction. As such, the challenges presented by the idea of a green economy should be treated as those associated with the application of sustainable development. More importantly, strategies applied by businesses to deal with sustainable development and sustainability are applicable to a green economy. The case study island-Grenada developed a green economy roadmap which focuses on the smaller island of Carriacou (see UNDESA 2012b). Using this roadmap as an example, the relevant content is presented in chapter 3 and how the proposed SS procedures, the ultimate outcome of this research, can be applied to its implementation is discussed in chapter 9.

Therefore, the research attempts to address the debate, problems and issues surrounding sustainable development and the green economy and specifically their operationalization and application into practice, especially in businesses. (The island context will be addressed subsequently in this introduction) In so doing the research first proposes that sustainable development must be considered to be a process. It is common practice to view sustainable development as ‘something’ to be achieved. However, sustainable development should be viewed as a strategic process to achieving the outcome of sustainability (e.g. Korhonen 2004; Porritt 2007). From this perspective the WCED (1987 p.46) describes sustainable development as “a process of change that directs resources [etc] towards a goal of meeting the needs of both present and future generations”. In this research the practical description of this goal is the reduction of the impact on or improvement in the state of the social and environmental pillars collectively referred to as the socio-ecological system (Doppelt 2003; Boyd and Frears 2008; Korhonen 2004).

But although sustainable development and sustainability are presented as differing ideas they must be considered to be congruent. The research further proposes that efforts to make sustainable development operational, must be done

from a strategic perspective (Baumgartner and Korhonen 2010), and that these efforts should lead to the sustainability goal. Additionally, this argument can be extended to the problem associated with the green economy, due mainly to the already proffered argument that the green economy must be considered in the context of the 3Ps interaction.

To demonstrate how the process of sustainable development and the sustainability goals can be made congruent, the strategy planning process within organisations is invoked. Global organisations have the ability to lead the world towards a vision of sustainability (Hart 2007b). It is argued that business has the 'global reach' to move towards sustainability and to transition to a green economy (ICC 2011; Hart 2007b). However, planning towards the sustainability goal, or creating what can be described as a sustainable enterprise has been problematic (Hart 2007b; Harmon et el. 2009). From this perspective, businesses wishing to embark on strategy planning towards sustainability must be equipped with the knowledge and skills to mesh the sustainable development process with the sustainability goals. To do so a set of procedures referred to as strategic sustainability (SS) (a term which draws on work originally done by Robèrt et al. 2004 and the contributions and differences of that work and this research will be fully discussed in chapter 4) is proposed. Strategic sustainability is defined for this research as 'the linking of the internal strategic planning process of a business to that of external sustainability goals'. The main focus will be on strategy content, process and context (Baumgartner and Korhonen 2010). This definition will be refined later to include 'island sustainability' to indicate the critical island context of this research.

A first critical step in the development of the SS procedures is an understanding by organisations of the limitations that the social and environmental systems impose on them. According to Boyd and Frears (2008), businesses wishing to operate in perpetuity must effectively do so within the limitations imposed by the socio-ecological system. It is critical therefore, that businesses wishing to embark on SS are clear on how they can do so and maintain their operations in perpetuity within these socio-ecological limitations. This requires an understanding of how these limits can be defined or envisioned-a vision of sustainability-and how business can align their internal operations and strategies to ensure that they are meeting the

envisioned understanding. More critically sustainability goals can be created to guide the planning towards the vision. In this regard material, energy and waste flows or MEWFs between the socio-economic system in which the business operates and the socio-ecological system is targeted. By reducing these flows it is proposed that the business can move towards sustainability, while operating in perpetuity

Strategy planning frameworks therefore, can assist with providing a 'generic' but robust approach to aligning business strategic processes for sustainable development to that of sustainability. Many such frameworks have been developed globally, for example the Framework for Strategic Sustainable Development (FSSD) and the Sustainability Business Scorecard (see Baumgartner and Kohonen 2010) and the Helmholtz concept (see Hartmuth, Huber and Rink 2008). However, the FSSD is one of the most robust, hierarchical, but simple in its application and thus it is chosen for this research. Additionally, the FSSD adequately separates sustainable development from sustainability, but supports their congruence. Moreover, the FSSD seamlessly aligns with the 'normal' strategy management and planning processes used by businesses and other organisations.

The proposed formulation of the SS procedures is conceptualised in the tourist accommodation sector on the small island in the Organisation of Eastern Caribbean States (OECS) - Grenada. The Government of Grenada suggests that 'beach resort tourism has the greatest environmental impact on Grenada's environment (GOG 1984). Moreover tourism has the greatest impact on the social and environmental attributes upon which the sector depends (see e.g. Gossling and Wall 2007; McElroy & Dodds 2007). But tourists, especially stay-over tourists bring tremendous economic benefit to such small islands. However, Tourtellot (2007) and Jansen et al. (1993), suggest that as more tourist stay on islands, the environmental attributes are eroded and the tourists will disappear, resulting in a phenomenon referred to as 'progression to destruction'. Small islands therefore are particularly susceptible to this phenomenon and present a unique challenge to the operations of tourism accommodation units on islands.

This challenge is mainly due to the island context, described as an 'isolated system with scarce resources that is subject to the pressures of external shocks such as climate change and high importations and internal dynamics, such as waste

disposal (see e.g. Deschenes and Chertow 2004). From this perspective, sustainability is critical to the very survival of the small island system. Considering the island system to be connected by MEWFs between the socio-economic and socio-ecological systems, then how sustainability can be achieved is demonstrated. The operation of the tourist accommodation units will impact the sustainability of the island as more tourists will need more materials and energy and generate more waste which can exacerbate the challenges presented by the island context. In this regard, the reduction in MEWFs in the accommodation sector can lead towards the sustainability in the island context. Additionally, the reduction in these flows will also be critical to implementing the green economy roadmap for Grenada. From this perspective, the SS procedures in an island context are considered for this research, as 'the linking of the internal strategic planning process of businesses in the tourism accommodation sector to that of external **island sustainability goals and vision**'.

To effectively formulate the proposed SS procedures or to operationalise sustainable development, the FSSD will be reconceptualised or adapted. Using this 'adapted FSSD' the strategic content will be created by conducting research amongst key island stakeholders. Additionally, the concepts of policy and corporate social responsibility (CSR); industrial ecology (IE) and especially industrial symbiosis and material flow analysis (MFA) and strategic management are applied. These concepts will be comprehensively reviewed and made operational within the context of the research. The critical contributions that these concepts make to the adaptation of the FSSD are briefly analysed below.

Policy which can dictate the direction towards or away from sustainability is considered to be important for the development of strategy content. More specifically, policy direction pertaining to sustainable development in Grenada has to be considered. According to Kruijsen et al. (2012), in addition to the three Ps of sustainable development, a forth P or policy is needed to change society towards sustainable development (sustainability in this research). It is critical therefore that the tourist accommodation sector is aware of the policy direction towards sustainability established by Grenada. This will be further developed and incorporated into the adapted FSSD.

Secondly, corporate social responsibility (CSR) is also used by organisations to embark on the activities and actions that demonstrate their commitment to the society and environment in which they operate. Moreover, Blowfield and Murray (2008 p. 231) argue that "... issues of sustainability [and sustainable development] lie at the theoretical heart of corporate responsibility: if we ruin our biosphere, as scientific evidence suggests, then all other corporate responsibility initiatives become irrelevant". CSR therefore is critical to the adapting of the FSSD in that it considers the actions the tourist accommodation sector can take to move towards island sustainability.

The third concept is that of industrial ecology and more specifically industrial symbiosis and MFA. The critical importance of industrial ecology to the island context has been articulated by researchers such as Deschenes and Chertow (2004) and Chertow and Miyata (2010). Additionally Korhonen (2004) suggests that IE should be applied within the context of frameworks such as the FSSD. More importantly however, the conceptualisation of an industrial symbiosis as a strategy to reduce material flows in the sample of accommodation units studied is a critical output of the research. In this regard, the tool of MFA will be applied to quantify the flows in the sector. According to Posch, Agarwal and Strachan (2011 p. 421), with the implementation of industrial symbiosis "... it is anticipated that the industrial impact on the natural environment can be reduced. In addition, the competiveness of the participating companies can be improved as a result of the savings in raw materials and/or waste disposal". The IS therefore appears to be an essential strategy which can be applied in the tourism accommodation sector for reducing MEWFs and thus moving towards the vision of island sustainability, while improving the competitiveness of the participating tourist accommodation units.

It was argued in the opening paragraph that the implementation of sustainable development has generally failed in practices. In this regard Baumgartner and Kohonen (2010 p. 71) propose that "... one of the main explanations is that the approaches used in sustainable development are reductionist and often lead into problem shifting and problem displacement. In this regard, they further propose that 'strategic thinking' and its incorporation into sustainable development work in general" is needed. In so doing Baumgartner and Kohonen (2010 p. 71) suggest that strategy content, process and context are three "dimensions" that must be

considered. The applications of strategy content and process and to some extent context will be fully considered.

The research concludes that three important groups of steps should constitute the proposed SS procedures: 1) visioning and vision linking; 2) developing sector strategic actions and 3) monitoring and evaluation. Under each of these steps the relevant strategy content is analysed. In this regard, the most important action for sustainable development was the conceptualisation of a 'tourism symbiosis' for the four accommodation units participating in the research. Additionally, how the steps align to the 'normal strategy planning processes' is comprehensively demonstrated.

The research aim, questions to be answered and objectives are presented in the following section.

1.1 Research aim, questions and objectives

The research aim is to:

make operational an 'adapted framework for strategic sustainable development (adapted FSSD)' that applies industrial ecology concepts and tools and the strategic management approach, to develop strategic sustainability procedures for the tourist accommodation sector in an island context and with a roadmap for a green economy.

Table 1-2 summarises the research questions and related objectives.

Table 1-2: Research questions and related objectives

No.	Research Questions	Related Objectives
1	How do some key stakeholders/actors in Grenada define sustainability and sustainable development and what are their views on the island sustainability goals?	To determine the views of some key stakeholders in Grenada on the four proposed island sustainability goals.
2	What are the estimated MEWFs in the tourism accommodation sector?	To estimate the MEWFs in a sample of tourism accommodation units in Grenada.

No.	Research Questions	Related Objectives
3	How do the actors in the tourism accommodation sector feel about a triple win vision for reducing MEWFs for achieving the island sustainability goals?	To determine the views of stakeholders in the sample of tourism accommodation units, on a triple win vision for reducing the MEWFs for achieving the island sustainability goals.
4	What concrete actions can be taken by actors in the tourism accommodation sector to reduce MEWFs?	To determine what actions the tourism accommodation unit stakeholders in the sample are willing to take to reduce their MEWFs.
5	Are the actors in the tourism accommodation sector willing to act-individually or collaboratively to implement the proposed actions to reduce these flows?	To determine the willingness of the actors, in the sample of tourism accommodation units, to act collaboratively or individually to implement the actions to reduce these flows.
6	What factors can be considered for making the decision to act individually or collaboratively to reduce MEWFs in the tourism accommodation sector?	To analyse the factors that may affect the willingness of the stakeholders in the sample, to act either collaboratively or individually to reduce MEWFs.
7	What level of importance do the actors place on a matrix within which indicators can be used to measure the impacts of policy and other decisions on the island sustainability goals?	To analyse the importance of a matrix which tourism accommodation stakeholders can use to measure the impacts of policy and other decisions on the island sustainability goals.

1.2 Overview of the methodology

The research questions require answers that may transcend the mere extremes of the epistemological and ontological positions of the positivist and

constructivist paradigms of quantitative and qualitative research strategies. For example, many of the questions ask for people's opinions and interpretations or re-interpretations of statements (e.g. question 1), which may fit into the category of interpretivism. On the other side of the coin, questions ask for measureable data such as material flows (e.g. question 2) and these are objectively obtained and may fall in the positivist category of knowledge claim. Therefore the research questions dictate that an alternative research paradigm and epistemological stance are considered.

Within the extremes of these research paradigms lies the possibility of mixing these approaches to achieve, what is now widely referred to as a mixed methods approach. In this approach, the idea is to "... use a method and philosophy that attempts to fit together insights provided by qualitative and quantitative research into a workable solution" (Johnson and Onwuegbuzie 2004 p. 16). In the mixed methods approach, the claims to knowledge are anchored in pragmatism, which is "... consequence oriented, problem centred and pluralistic" (Creswell 2003 p. 18).

The research is also pitched within the island context. From this perspective islands are widely conceived as places to be used as research type laboratories where any conceivable experiment can be conducted (Deschenes and Chertow 2004; Baldacchino 2006; Kerr 2005). This is postulated for many reasons, for example, Gough et al. (2010 p. 1) notes that in the global crisis of 2009/2010 "... it may even be that small islands offer messages of hope and lessons for sustainability"; "... the apparent clarity of boundaries, the very insularity of islands, makes them a tempting object of study (Kerr 2005 p.504).

The "… study of islands on their own terms" or "*nissology*" (Baldacchino 2008 p. 37 citing Mc Call) was put forward as a framework for the study of islands. However, this idea has been criticised (see for example Christensen and Mertz 2010). Islands are a part of the global world and as such the effects of global phenomena must be considered when islands are studied. Hence Baldacchino (cited in Christensen and Mertz 2010 p. 280) provide an alternative framework to nissology that is, "... the 'globalisation of locality'. This perspective is aligned to the island context previously defined. Additionally the global and local flows of materials and energy into and within islands and the impacts that they have on the islands' socio-ecological system can be fully supported by this perspective. So as an 'island

researcher' located on the object of study-the island, the 'alternative' approach of nissology or 'refined nissology' is adopted.

In this regard the pragmatic paradigm appears to offer the 'best' grounding for the claims to knowledge. Nissology, which does not make any claim to knowledge and which in many ways is a framework for the study of islands in a 'real world' context, provides an excellent setting for a 'pragmatic' research design. In other words and as an island researcher attempting to understand the dynamics within islands and their interactions with the global systems, pragmatism is required.

Moreover form the philosophical perspective, the pragmatic approach offers a more comfortable position for an acceptable outcome of this research. For example, a few key strengths of the approach point to the ability to corroborate results, increase the ability to generalize these results and more importantly, it provides the opportunity to "… produce more complete knowledge necessary to inform theory and practice" (Johnson and Onwuegbuzie 2004 p. 19), especially in the island context. On the other hand, one may argue that the weaknesses of the two pure approaches may be amplified in the mixed approach. However, the strengths of one method can negate the weaknesses of the other method while mixing (see Johnson and Onwuegbuzie 2004).

Further some of the key weaknesses of the mixed method concerned time, learning new methods from both pure methods, and other logistical problems (Johnson and Onwuegbuzie 2004). In fact learning from both pure methods provides an excellent opportunity for the 'island researcher' to be equipped with the skills from each of the methods. However, the logistical issues were adequately considered and the strengths widely out-weighed the weaknesses of the approach.

In sum it is believed that the philosophical merits of the mixed methods approach, that is, pragmatism, support the research design on the following bases: the need to generate diverse 'types' of knowledge and to corroborate results to create a practical solution in the case and the need to support 'refined nissology' and the islander as researcher's perspective.

Secondly, the mixed method inquiry strategy employed is the concurrent triangulation procedure. 'In this design, the investigator collects both forms of data at the same time during the study and then integrates the information in the interpretation of the overall results (Creswell 2003). Additionally, Creswell (2003)

notes that equal priority is usually given to the two methods, but in practical situations one of the methods can be given priority. In this research, the quantitative data is given priority. It is regarded that this approach will allow for a more comprehensive and structured approach to exploring the case proposed. Semi-structured interviews are conducted with stakeholders selected, using quantitative and qualitative sampling plans. The interviews are done using one questionnaire that includes both quantitative and qualitative questions.

1.3 Scope and limitations

The scope of this research is to make operational an adapted FSSD, that is, using it to demonstrate how organisations can align their strategic planning and management activities for sustainable development, to that of an external vision and goals of sustainability. This is argued from the perspective that organisations faced with the challenge of socio-ecological limitations must remain in business in perpetuity. Moreover, as the green economy in the context of sustainable development begins to take root globally, the need to ensure that sustainability is achieved by organisations is becoming more important. Therefore the sustainable enterprise should be one that effectively links their strategic activities and actions to that of the overall sustainability of the globe or island context-the focus of this research.

More specifically, MEWFs are used to first show how the (island) sustainability goals can be described and secondly, strategic actions to reduce these flows within the accommodation sector in Grenada is researched. It follows therefore that MEWFs will be the main focus of the research. In this regard the social aspects of the socio-ecological system is mostly considered as actions to be applied by the tourist accommodation sector in the context of making decisions to reduce MEWFs. From this perspective the concept of corporate social responsibility is applied.

With this scope in mind, two main outcomes are envisioned from the research. The first outcome is a set of SS procedures aligned to the normal strategy management process of organisations wishing to move towards sustainability. Secondly, a tourism symbiosis which can be used as a strategic action by the tourist accommodation units for reducing MEWFs and for moving towards the island sustainability goals is proposed. Only four units participated in the research and

based on the definition of IS, it was decided that this was sufficient for developing a possible pilot of a tourism symbiosis.

Although the research draws on the global context, especially as it relates to the literature review, the main scope is limited in a sense to the island context. From this perspective, the nature of the businesses targeted is 'small'. For example, the room capacities of the tourist accommodation units do not exceed three hundred (300) persons. Additionally, the economic contributions of these accommodation units compared to that of mega style resorts may be miniscule. This limitation may hinder the ability to generalise the procedures developed to larger tourism units and to some extent to islands that are outside the smaller jurisdiction found in the Organisation of Eastern Caribbean States. However, the 'glocal' approach adopted and the global nature of the 'adapted FSSD', provide the foundation and potential for further study in more expansive organisations and in other geographic contexts.

1.4 Layout of the thesis

This thesis is divided into nine chapters, including this introductory chapter.

The main purpose of chapter two is to present the case for how organisations can link their strategic management planning to sustainability vision and goals. This is considered from a 'glocal' perspective. A framework for strategic sustainable development (FSSD) is proposed as the main planning framework.

Chapter three comprehensively presents the case study region, country and the impacts of tourism on the region and case. Specific attention is paid to the tourist accommodation sector in which the study is pitched. The island context and sustainable development issues are woven together through-out the chapter. Important aspects of the green economy roadmap, which are related to this research, are introduced.

The main focus of chapter four is to generate the research aim and questions and to draw-out critical themes and sub-themes that will serve as the headlines for the strategy content to be considered.

Chapter five presents the research methodology and strategies. The quantitative and qualitative results are presented in chapters 6 and 7, respectively.

The answers to the research questions are comprehensively discussed and interpreted in chapter eight; while the research findings are concluded and recommendations made in chapter nine.

CHAPTER 2: SUSTAINABLE DEVELOPMENT, BUSINESS AND THE GREEN ECONOMY-A 'GLOCAL' PERSPECTIVE

Chapter Introduction

The main purpose of this chapter is to present a general case for how businesses wishing to plan towards sustainability can do so by linking their internal sustainable development actions to an external sustainability vision and goals. It argues in the first section, that the green economy and sustainable development can be viewed as an interaction of the three pillars of sustainable development. In section 2 it proposes that sustainable development, which should be considered as a process, is a separate but congruent concept to sustainability, a vision. With this foundation it is shown that businesses which have the global reach to achieve sustainability are also challenged by socio-ecological limits. From this perspective it is further argued that the material, energy and waste flows (MEWFs) link the socio-economic system in which organisations operate to that of the socio-ecological system. The reduction in MEWFs can be used to create a vision for sustainability. Therefore businesses can embark on MEWFs reduction strategies, considered as sustainable development actions, to meet that vision. In the final section it concludes that organisations can operationalise the sustainable development actions by using a proposed framework for strategic sustainable development (FSSD). Public policy can drive the island sustainability vision, and organisations can use its corporate social responsibility plans to development strategic sustainable development actions that can move them towards the vision. The arguments presented herein are applicable to both global and local situations or is premised on a 'glocal' perspective.

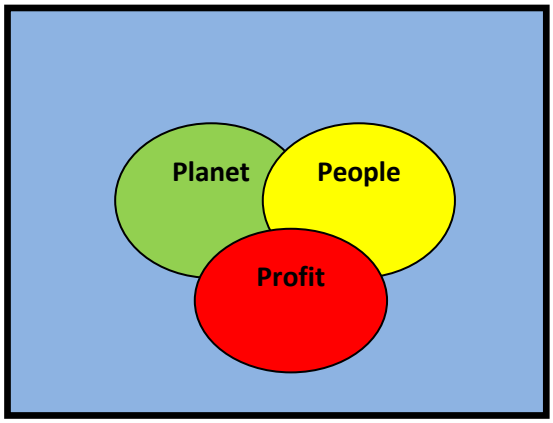
2.1 Sustainable development (SD) and the green economy

2.1.1 Sustainable development as the pillars of people, planet, profit

Sustainable development is a very well entrenched and accepted global idea. From this perspective the depiction of sustainable development as the interaction of the three pillars of environment, economy and society is widely known and accepted. The triple pillars of sustainable development appears to have its beginnings pinned down in the "... late 1960s and 1970s [when] the melting pot of different ideas about progress, sustainability, growth and development which had developed over many

years started pointing in a new direction that of sustainable development" (Du Pisani 2010 p. 89). In these two decades it appeared that many commentators began to focus their attention on sustainable development and that such development "... should not only focus on economic and social matters, but also on matters related to the use of natural resources" (Du Pisani 2010 p. 92). Sustainable development therefore has had its roots buried deeply in what is known as the triple interactions of people, planet and profit or society, environment and economy, respectively. The very well established interaction indicates that sustainable development lies at the intersection of these three pillars (see figure 2-1).

Figure 2-1: The triple pillar of sustainable development



Notwithstanding these humble beginnings and the first attempt to propose sustainable development as the triple interactions observed, the inequalities that existed between the northern developed nations and that of the southern developing nations still remained a challenge going into the 1980's. Moreover, it was further recognized that the approach to development in the developing poor nations, did lie in the pattern of development that existed in the North. To this end the World Commission on Environment and Development (WCED) was tasked by the United Nations to create a global agenda for change and as such 'to propose long term environmental strategies for the international community to achieve sustainable development'. With the publication of the WCED's report, sustainable development was in a sense propelled further into global prominence and popularized by the oft cited definition: "... development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987 p. 43). In essence, a more concerted effort was made to unite the triple pillars

of sustainable development and this was made more explicit by the WCED's report. The report effectively solidified the weaving together of social, economic, cultural and environmental issues.

Additionally, the United Nations which is one of the foremost global bodies that has been at the cutting edge of sustainable development work, sought to solidify the triple pillars depiction of sustainable development. At the United Nations Conference on the Environment and Development (UNCED) held in 1992, this was further crystallized into Agenda 21: A Programme of Action for Sustainable Development, which reaffirmed that "sustainable development was delimited by the integration of the economic, social and environmental pillars" (United Nations, 2011).

Despite this well established and grounded conceptualisation of sustainable development, the concept is criticised on various grounds and even more so the ability to translate it into everyday operations has remained elusive. Robinson (2004 pp. 373-377) summarizes some of the concerns and criticisms of sustainable development as having many meanings and hence it is vague; the use of the term can promote what may be unsustainable activities which engenders "hypocrisy"; the concept is an oxymoron and that the wrong agenda is pursued, collectively referred to as "delusions". More importantly however, is that the concept was not always easy to bring into the everyday operations of the actors in the economic system. More specifically the idea remains highly debateable, especially in its ability to be made operational within global organisations.

As Azar, Holmberg and Lindgren (1996 p. 91) point out, since the advent of the WCED definition "... much effort has been made to define and operationalize the concept of sustainability". Moreover, Baumgartner and Kohonen (2010) note that sustainable development may have even failed in its application as solutions may have led to problem displacement and problem shifting. This research will address these critical concerns with sustainable development, and proposes a strategic approach to it application especially for organisations (see for example Baumgartner and Kohonen 2010; Robèrt 2004).

2.1.2 The three pillars of sustainable development and the emergence of the green economy

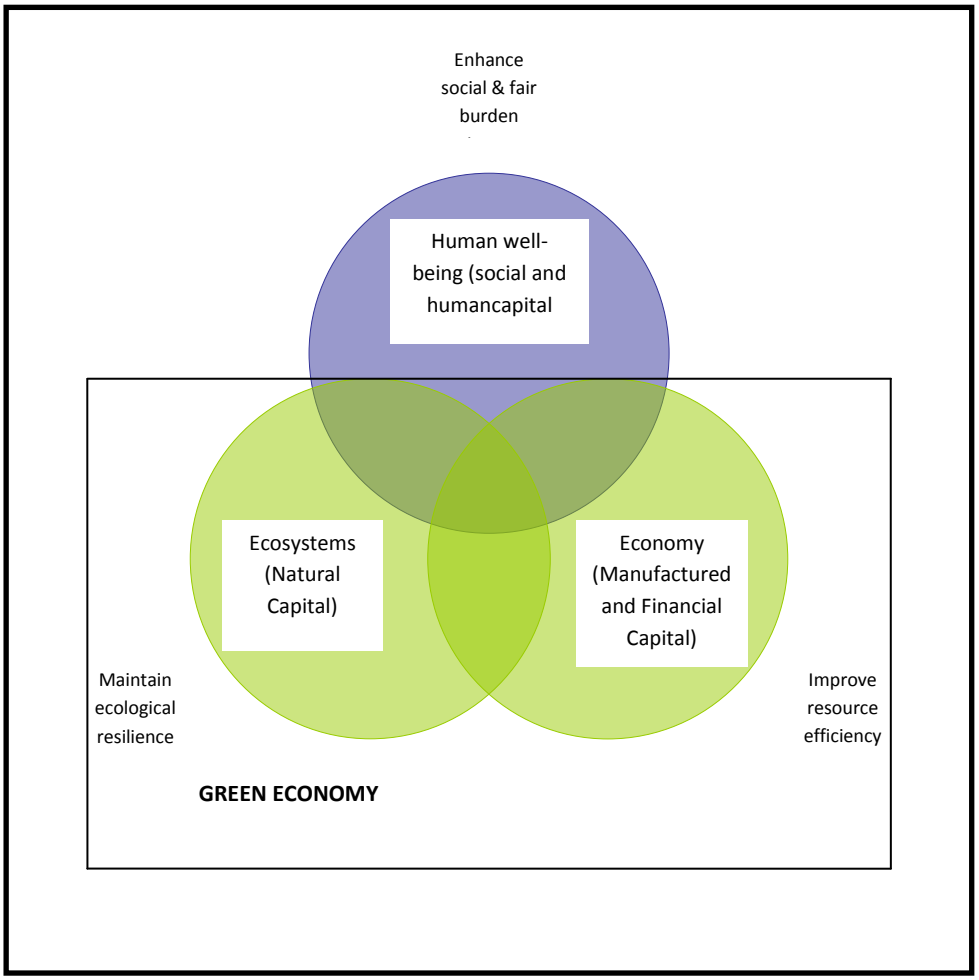
From a general perspective and despite the 3Ps depiction of sustainable development and their interaction as the perceived solution to the environment/development conflict, the challenges and issues with the implementation of sustainable development still remain a global concern in the 21st century. According to UNDESA (2012a p. 5) "... there are continuing concerns over global economic and environmental developments in many countries". In this regard there was an apparent attempt to shift towards the green economy and Sprangenberg (2012) notes that the green economy appeared to be taking centre stage and is replacing the idea of sustainable development. Spangenberg (2012 p.3) concludes: "... the discussion has lost its focus on sustainable development, and the "Green Economy" (UNEP) threatens to shift the focus even further away from it".

But a critical investigation of the green economy idea revels that the concept is depicted similarly to that of sustainable development. The United Nations Environment Programme (UNEP 2011p. 01) defines "... a green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". This definition recognizes the fact that humans and society are at the forefront of the green economy, while also recognising environmental concerns. The ecological scarcities go to the core of economic development, in that industry depends on the ecological system for its existence. This definition therefore, is firmly rooted in the three pillars depiction of sustainable development. In this regard the green economy appears to have some similarities to the well-entrenched, although difficult to implement, sustainable development idea. It follows therefore that the green economy can also be considered as an interaction amongst people, planet and profit. This case will be further developed in the context of 'business' which is the key focus of this research.

Additionally, the European Commission (2011p. 5), drew on the triple pillars of sustainable development and depicted the green economy (see figure 2-2) as including fully the interaction between the ecosystem (natural capital) and the economy (manufactured and financial capital). There appears to be a legitimate reason for presenting the green economy in this context, for as the World Bank

(2012 p. 2) notes growth within the economic system "... has come largely at the expense of the environment". In this regard the green economy should focus on strengthening the link between the economy and the environment.

Figure 2-2: A three pillars depiction of the green economy



Source: European Commission 2011 p. 5

However, this depiction is slightly flawed since it does not consider the social system and the consumption and other social activities and more importantly its links to the environmental system (this goes to the core of the research and will be fully developed subsequently). In other words the socio-ecological system is side-lined. In this light Sprangenburg (2012 p. 4) concludes that the green economy which seems to exclude the social aspect of the pillars of sustainable development, that is, the satisfaction of human needs, has also failed in "respecting the limits" to economic activities imposed by the environmental carrying capacity" and more specifically from

this research perspective, the limits imposed by the socio-ecological system (a debate I will return to in a subsequent section).

Like sustainable development, the idea of a green economy appears to be plagued by how it can be made operational. In this regard Spangenberg (2012 p. 3) notes that it is not convincing how the good intentions of the green economy- "conserving nature, over-coming poverty, creating jobs, are to be achieved" and further notes that "... the concept is vague and in particular the ways how the social objectives are to be achieved remain either unspecified or incredible". Considering these challenges and placing them in the context of the green economy depicted as the 3Ps of sustainable development, then the proposed approach to making sustainable development operational can also apply to that of the green economy.

As such the challenges presented by the idea of a green economy should be treated as those associated with the application of sustainable development. More importantly, strategies applied by businesses to deal with sustainable development and sustainability are applicable to a green economy. Moreover, the researcher takes the view that the green economy is considered to be a pathway towards sustainable development (see e.g. UNEP, 2011; World Bank, 2012), and in the context of this research towards sustainability (see next section). From this perspective, the case study island-Grenada developed a green economy roadmap which focuses on the smaller island of Carriacou (UNDESA 2012b). Using this roadmap as an example, the critical aspects that apply in principle to the larger island of Grenada and more specifically to resources and tourism will be comprehensively discussed in chapter 3. How the proposed SS procedures developed in the context of this research can be applied to the implementation of the relevant aspects of the roadmap is discussed in chapter 9. In other words how the roadmap can serve as a pathway to Grenada's sustainability is considered or demonstrated through the SS procedures proposed by this research.

2.2 Making sustainable development (SD) and the green economy operational

2.2.1 Sustainable development and sustainability-congruent but differing ideas

An initial critical point, which must be made before the operationalisation of sustainable development is embarked upon, is that sustainable development and sustainability should be considered as separate but congruent concepts. It is very normal in the discourse of sustainable development to use sustainability synonymously with sustainable development and as such the terms are used interchangeably, conveying one and the same meaning. However, researchers and academics (see e.g. Kohornen 2004; Porritt 2007; Reeve 2011) have distinguished between the concepts, by indicating that sustainability is a goal, while sustainable development should be considered a process. Korhonen (2004 p. 810) aptly supports this differentiation when he notes that "sustainable development is a continuous process, and only the general direction toward sustainability or the direction away from un-sustainability can be known". Moreover, sustainable development can be considered as a strategy or "… a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change" are directed towards the goal of meeting both the current and future needs of human beings (WCED 1987 p. 46).

In a general sense, the current through-put growth system in which (materials) resources are extracted from the ecological system, processed and used in the socio-economic system, and then unused resources are discarded back into the ecological system is unsustainable. Then attempts to transform this into a circular model in which the socio-economic impacts on the other two subsystems (society and environment) are minimized or totally eliminated (Doppelt 2003 and Boyd; Frears 2008; Korhonen et. al. 2004), can be considered to be a process of sustainable development. However, this transformation should not be an end in itself, but rather an activity that should lead towards a path of sustainability. In other words the process of sustainable development must be made to 'match' the vision and goals of sustainability. Defining the vision of sustainability and demonstrating how the process of sustainable development can be aligned with this vision is the

central theme and argument of this research. The ‘how’ of this will be demonstrated in the tourist accommodation sector on the small island of Grenada.

However, a general but ‘glocal’ approach using organisations is offered in this chapter, while a more detailed analysis is offered in chapter 4 after the case study is presented in chapter 3.

2.2.2 Businesses, sustainable development and the green economy

Global businesses have the ability to lead the world towards a vision of sustainability. It is argued that business has the ‘global reach’ to move towards sustainability and to transition to a green economy (ICC 2011; Hart 2007b, Welford 2012). Firstly, many academic commentators agree that business has a very important role to play in developing and furthering the sustainable development agenda (Hart 2007b; Welford 2012). For example, Hart (2007b p. 3) takes:

“... the contrarian view that business-more than either government or civil society-is uniquely equipped at this point in history to lead us toward a sustainable world in the years ahead. [He argues] that corporations are the only entities in the world today with the technology, resources, capacity and global reach required” to do so.

While Welford proposes the idea of “privatising of development”, which is “... taking the best of what we have (... some excellent work being done in parts of the UN, World Bank, development agencies and NGO’s) and supplementing it with the resources and management disciple that the private sector offers” (Welford 2012 p. 56). The fact that businesses are identified as the entities with the most resources and expertise to lead the global thrust towards implementing sustainable development processes and sustainability, is a fundamental premise used to pitch this research from a business perspective.

But as businesses seek to implement sustainable development, the idea of a green economy can also be addressed. It was previously argued that the green economy can be similarly considered as the 3Ps interaction of sustainable development (see figure 2-4 previously presented). In further recognising this depiction the International Chamber of Commerce (ICC), proposes the following definition of a green economy, in the context of business:

"The business community believes the term "Green Economy" is embedded in the broader sustainable development concept. The "Green Economy" is described as an economy in which the economic growth and environmental responsibility work together in a mutually reinforcing fashion while supporting progress on social development. Business and industry has a crucial role in delivering the economically viable products, processes, services and solutions required for the transition to a Green Economy" (ICC 2011 p.2).

In this regard the definition further suggests that economic growth and environmental responsibility should be equally treated with social progress being supported in this context. The ICC further recognises the critical role that the business community has to play in supporting the green economy. Moreover, this role is solidly based on economic, social and environmental perspectives. Businesses therefore have comprehensive roles to play in implementing sustainable development processes and the green economy idea and as such can demonstrate how this can be successfully done from a strategic perspective (this will be further developed in section 2.2.4). However and in spite of the global influence on sustainable development and the green economy ideas, businesses are still challenged by them, especially sustainable development and sustainability.

2.2.3 Sustainable development and the green economy-the challenge for global businesses

Although businesses are normally established to operate in perpetuity and they play a critical role in the economic growth and development of global and local economies, they normally operate within social and ecological constraints or limitations. These limitations are premised on sustainable development as they are two of the pillars upon which the concept rests. According to the WCED (1987 p. 43), besides the concept of "needs", which emanated from the definition of sustainable development, "the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and future needs", is also a critical concern. The idea of 'limitations' and more specifically limitations imposed by social organisation, poses a particular challenge for business.

Moreover, many if not all organisations depend on the environment for their existence. But Boyd and Frears (2008 p 2-1) note that, "... the environmental

challenge ... confronts all business to some extent". Additionally, Holliday, Schmidheiny and Watts (2002 p. 19) suggest that although "... sustainable development was largely a green agenda"-implying dealing with environmental challenges, "In the mid-1990s, this changed. It was not that companies suddenly noticed they were ignoring the social side of the concept; it was more that many companies' problems were shifting from being environmental to social." This shift to the social issues such as 'sweat shops, union bashing, etc' goes to the core of the corporate social responsibility concept" (Holliday, Schmidheiny and Watts 2002 p. 19). (Planning for social responsibility in the business is considered in chapter 4).

In essence therefore businesses must operate within socio-ecological limits and must overcome the challenges presented by these limits. As Boyd and Frears (2008 p 2-1) note "... industrial growth in perpetuity is jeopardised by both bio-physical and ethical-social constraints". According to Boyd and Frears (2008 p 2-1) "In effect, business must operate in the long term subject to a dwindling supply of natural resources and increasing social concern for intergenerational equity". This imposes socio-ecological limits on the operations of businesses. So on one hand, business operations are subject to the bio-physical limits imposed by a finite earth due to the laws of 'thermodynamics and the conservation of mass', which in effect limits the quantity of non-renewable resources and sources of energy available to support industrial growth (Boyd and Frears 2008). While on the other hand there are ethical-social limits, which deals with decisions on satisfying the needs for industrial growth through the continuous depletion of energy and materials and by take-over, which deals with industrial expansion at the expense of other non-human species (Boyd and Frears 2008).

Businesses wishing to embark on sustainable development processes and strategies must therefore be clear on how they can do so and maintain their operations in perpetuity within these socio-ecological limitations. This requires an understanding of how these limits can be defined or envisioned and how business can align their internal operations and strategies to ensure that they are meeting the envisioned understanding. From a general perspective, this can be considered as linking the strategic actions and activities occurring in the socio-economic system in which the business operates to socio-ecological vision and goals. This link is established by MEWFs and the ultimate reduction of these flows between the socio-

economic and socio-ecological systems can lead to a defined sustainability vision. A detailed debate on how this can be achieved, which is the central theme of this research is subsequently presented.

2.2.4 Towards addressing the business challenge

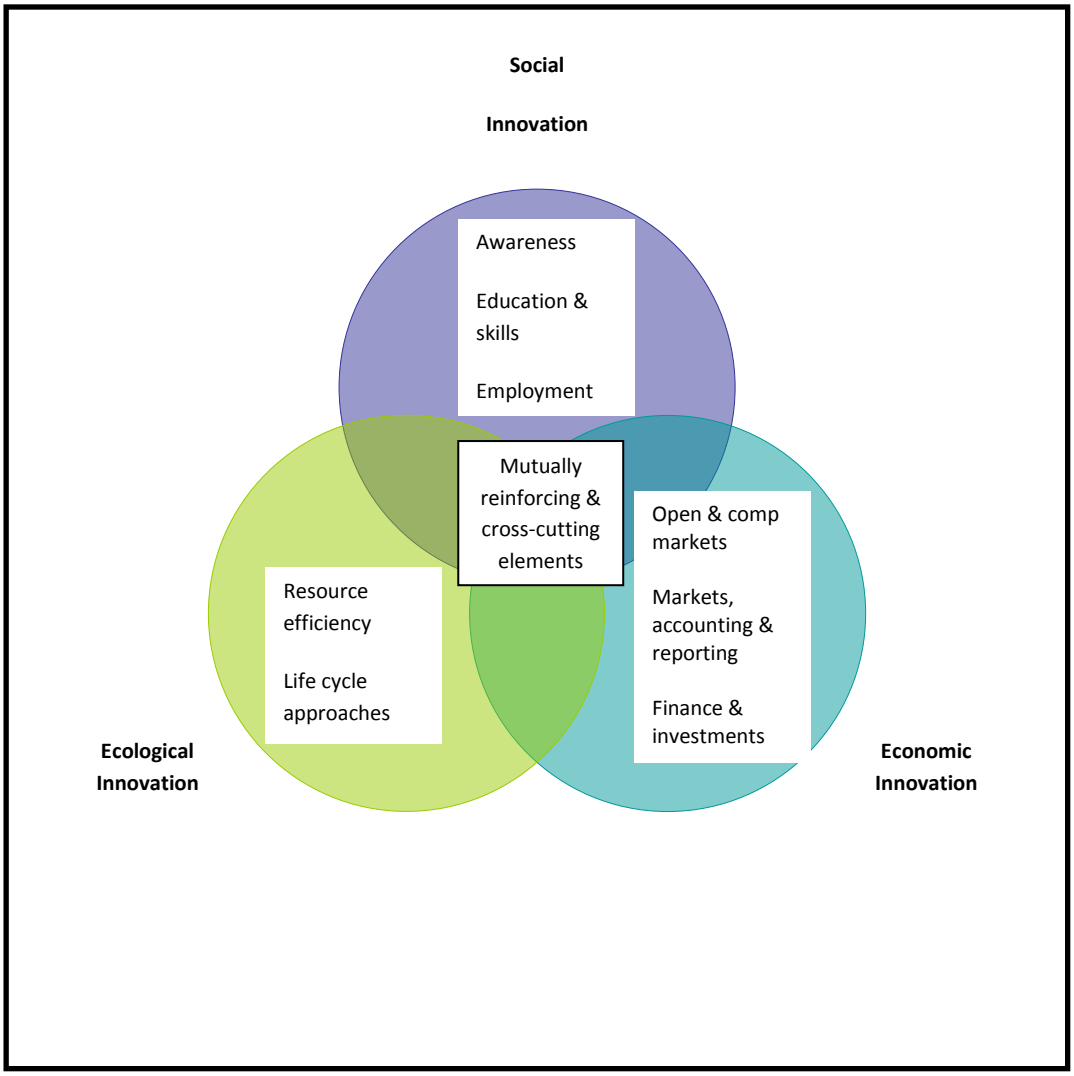
It was previously proposed in section 2.1.2 and in figure 2-2 that the depiction of the green economy as including fully an interaction of ecology and economy and excluding the human system was myopic. In this depiction it was revealed that the goals of the green economy were: the maintenance of ecological resilience and the improvement of resource efficiency. However, the activities occurring in the socio-economic system and the impacts of such activities on the socio-ecological system are critical, especially for businesses that may wish to address the limitations imposed by the socio-ecological system. In this regard a more comprehensive depiction of the green economy, initially proposed in section 2.2.2 can assist with addressing the challenge to business imposed by the socio-ecological system.

From this perspective, the ICC (2011) suggests a more comprehensive depiction of the green economy and in this regard further suggests ‘ten conditions required for the transition to such an economy’. The depiction covers all the pillars of sustainable development. Each of the pillars is labelled as ‘social innovation’, economic innovation’ and ‘environmental innovation’. These are meshed together by two ‘mutually reinforcing and cross-cutting elements’ or conditions: ‘Integrated environmental, social and economic policy and decision making’ and ‘Governance and partnership’. Figure 2-3 demonstrates how the ICC perceives this interaction. In each of the pillars the relative conditions are recorded.

By using figures 2-3 and comparing it to figure 2-2 a more holistic and adjusted depiction of the green economy, considered in the context of the limitations imposed by the socio-ecological system is developed. From figure 2-2 the objective to be met within the ecological system, is to maintain ecological resilience, which requires the maintenance of resource efficiency, with specific emphasis on materials and energy extraction or natural capital. In other words, with resources used more efficiently in the economy, the need to extract more resources from the ecological system would be decreased. However, resource efficiency requires a high level of social awareness and to meet the objective of ecological resilience, the ethical-social

limitation must be invoked. For example, the maintenance of the bio-diversity of the planet's ecosystems, a necessary condition for maintaining ecological resilience, requires some level of social consciousness. This is akin to the ICC's 'awareness condition', which is required for social innovation (see figure 2-3). According to the ICC (2011p. 4):

Figure 2- 3: The conditions for a green economy embedded in the pillars of sustainable development



Adapted from ICC 2011p.4

"The shifting towards a Green Economy requires awareness about the depth of global economic, environmental and social challenges... Awareness and understanding are pre-requisites for setting priorities and action and require a shift in

the global debate. It is a shared priority and challenge for all actors, whether government, inter-governmental bodies, business or civil society and consumers"

With a high level of social awareness, decision makers and business leaders would be wary of making decisions that would jeopardise the goal of ecosystem resilience. Moreover, environmental problems such as the degradation of ecosystem resilience are effectively social constructs, in that societal actors (communities, businesses, governments) impact on the environment and in turn they are the ones who observe environmental problems and deal with them when they occur (Korhonen 2000). It follows therefore that a great deal of awareness and social-ethical acumen are required by decision makers to deal with decisions relating to the ecological system.

But the European Commission (see figure 2-2) also points out that the improvement of resource efficiency is a goal of the economy (manufactured and financial capital). Resource efficiency as a goal for economic development is intricately linked to the environmental innovation suggested by the ICC (see figure 2-3). From the latter perspective the ICC (2011p. 5) suggests that, "A Green Economy recognises that the world's resources are finite and must be managed with scarcity in mind. It [therefore] enhances the resource efficiency of material flows through the principle of "more from less"". As was initially discussed the idea of material flows and more specifically MEWFs link the socio-economic and socio-ecological systems. More specifically therefore MEWFs can be used to suggest a sustainability vision and demonstrate how the sustainability vision and sustainable development processes can be linked in a very practical way.

2.2.5 MEWFs- linking socio-economic activities to the socio-ecological system

Material flows on a global scale (in chapter 3 it will be further discussed in the island context) are a function of production and consumption in the socio-economic and socio-ecological systems. According to Boyd and Frears (2008 p. 2-2) business draws materials and energy from the environment and they "... are transformed into economic products by production processes, and eventually consumed by consumers. The purpose of consumption by ***members of society*** (author's emphasis) is to create welfare or utility". The environment also provides utility to

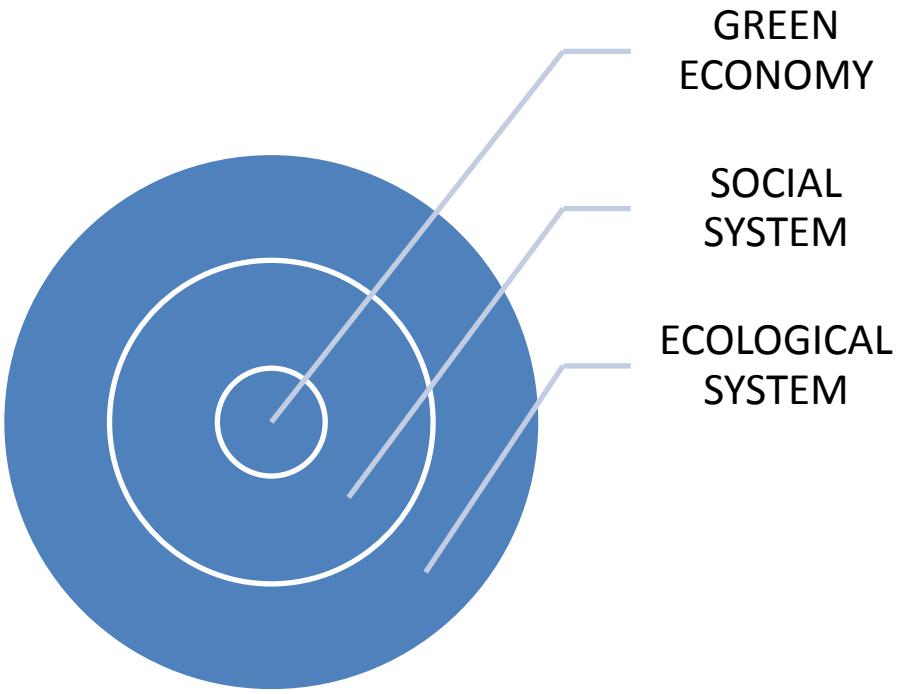
members of society through amenities such as clean air and white sand beaches. Waste is also generated from the extraction of materials and energy, the production process and from consumption and these waste streams are 'usually' discarded into the environment (Boyd and Frears 2008). According to Dittrich et al. (2012 p. 9) "Whatever materials human extract from their socio-economic system, sooner or later becomes waste".

Material flows therefore are critically important to the linking of the socio-ecological system to the activities of the socio-economic system. This however, is essentially lacking in the discourse on sustainable development and the green economy. According to Dittrich et al. (2009 p.10) despite the fact that "... the interconnectedness between society and nature has been increasingly analysed and acknowledged ... the physical dimension of development has yet to receive adequate attention in the debate about green economies and sustainable development." Therefore, material flow analysis is important form "... the perspective of increasing resource scarcities..." in a finite environment (Dittrich et al. 2012 p. 10). As the quest for more production and consumption in the socio-economic system increases, resources and energy are depleted thus exacerbating the scarcities. Therefore, sustainable development and the green economy require a reduction in the global flows of materials. In this regard and more importantly to this research, is what Dittrich et al. (2012 p. 10) herald as the need for "... an absolute dematerialisation of production and consumption if a green economy is to be achieved". They (Dittrich et al. 2012) further reiterate that "... a radical reduction in scale, volume and rate of human resource use [and] At the same time, it is essential that green economies satisfy the material needs of the population and achieve a high level of well- being." Kruijsen et al. (2012 p. 6) further argue "… that for a sustainable development, population needs can only develop within the limits of available resources".

It follows therefore that there appears to be a strong and practical link between the socio-ecological and socio-economic systems that is embedded in the MEWFs between them. More importantly the resource use reduction called for by Dittrich et al (2012) and the satisfaction of humans' material needs and well-being is aligned to the socio-ecological limitations which underlies the concept of sustainability (here the separation of sustainable development and sustainability is invoked), although some argue that the field of *sustainable development* has "...

emerged in response to the mounting ecological and social challenges stemming from the traditional economic paradigm" (Doppelt 2003 p.2). In fact Haberl et al (2004 p. 201) reaffirm that "Sustainability (un-sustainability) is an attribute of a social-ecological system". So in the context of this research, a vision and goals of sustainability are embedded in the socio-ecological system, which in turn places limits on the economic activities that occur in the socio-economic system. MEWFs reduction therefore, can assist with the development of a vision and goals for sustainability, which is also an essential consideration for implementing a green economy roadmap both globally and on local spheres.

Figure 2- 4: The green economy embedded within the socio-ecological system



Author's conceptualisation

With this perspective in mind the idea of a green economy and sustainability can be re-thought. While businesses may still wish to embark upon the conditions required for a green economy proposed by the ICC, it is very critical that the idea of socio-ecological limitation is considered. Figure 2- 4 shows this concept as the green economy embedded within the social and ecological system, which implies the socio-ecological limitations of these sub-systems. However, re-introducing the green

economy as being embedded in the socio-ecological system is not sufficient for implementing sustainable development and the transition towards a green economy. The implementation or the 'how' goes to the core of the business's strategic planning and management.

2.3 Operationalising sustainability and SD through business strategy

2.3.1 Aligning a principle-based vision of sustainability to a business vision and mission

Aligning the sustainable development processes and actions to a sustainability vision and goals and by extension implementing the green economy roadmap, can be achieved through the 'normal' strategy planning process of the business. Historically, the impact of business operations on the socio-ecological system or sustainability was mainly viewed from the perspective of pollution prevention and reduction and "... greening [was] framed in terms of risk reduction, re-engineering or cost cutting" and rarely companies linked greening to strategy (Hart 2007a p. 102). However, this has changed, as many organisations embark on what is referred to as sustainability strategies (Harmon et al. 2009) and strive towards becoming global sustainable enterprises (Hart 2007a).

With this new thrust, the global sustainable enterprise and business, referred to in the reminder of this thesis as the sustainable enterprise, seeks to align its sustainability strategy to its organisational strategic management and planning process. According to Harmon et al. (2009 p.90), "Viewed through a sustainability lens, a sound, well-aligned organisational strategy ... must be green and socially responsible if it is to succeed in the moderate to long term". However Hart (2007b pp. 237-238) argues that the "Pursuit of a sustainable global enterprise is often thwarted by inconsistencies or even conflicting elements in organizational infrastructure. Strategies cannot be realised unless the organisational structure and formal system enables it". He further points out some fundamental organisational infrastructures that are critically needed to be aligned. The first infrastructure is the mission/vision for sustainability of the organisation. Hart (2007b p. 238) notes that "There is no question that setting a compelling and challenging vision and mission for corporate sustainability is a key to success". A good vision/mission he (Hart 2007b) further argues cannot stand on its own and therefore there is a need for "...

clearly stated and measureable goals" to assist the organisation to move towards the vision"

Vision/mission and goals are apparently a critical first step in developing a sustainability strategy that is closely aligned to the organisational quest to becoming a sustainable enterprise. Harmon et al. (2009 p. 91) note that "A wise strategy adopts a mission and goals that continually position the organisation favourably in the outside world and that guides the creation and re-creation of the competencies necessary to succeed there in a sustainable manner". Although the need for a vision/mission and goals are clearly articulated, it is apparent that the sustainability of the enterprise and not the sustainability of the socio-ecological system is the main focus. In other words there is not an attempt to first of all develop a 'principle-based understanding of the 'socio-ecological system' to which the organisational vision/mission and goals are to be linked (see for example Robèrt 2000; Robèrt et al. 2001, 2004). For example, Interface CEO once established the vision or goal "to never take a drop of oil from the Earth" (Hart 2007b p. 238). This very well intended and ambitious vision of a company that relies on the petrochemical industry to survive, could cause the company to embark on alternatives that may not support the socio-ecological system, an issue of problem displacement and shifting (Baumgartner and Kohonen 2010) usually associated with a lack of a clear principled based understanding of the socio-ecological system (Robèrt et al. 2004).

In this research therefore it is proposed that a necessary and urgent first step for planning a sustainability strategy is to develop a clear and principle based understanding of the socio-ecological system. In previous sections (2.2.3 and 2.2.4) the socio-ecological system was suggested as the limiting aspect of development within the socio-economic system and that it should be used to shape the vision and goals for sustainability. Moreover, the socio-ecological system places the idea of a green economy into the context of sustainability. So it is very important that this first step is clarified and understood so that organisational strategic planning towards sustainability and strategic management within organisations can be done with some degree of certainty. The principles and goals of sustainability which are required to guide organisational strategic planning are further developed and discussed in chapter 4. Additionally, strategy content themes will be drawn out.

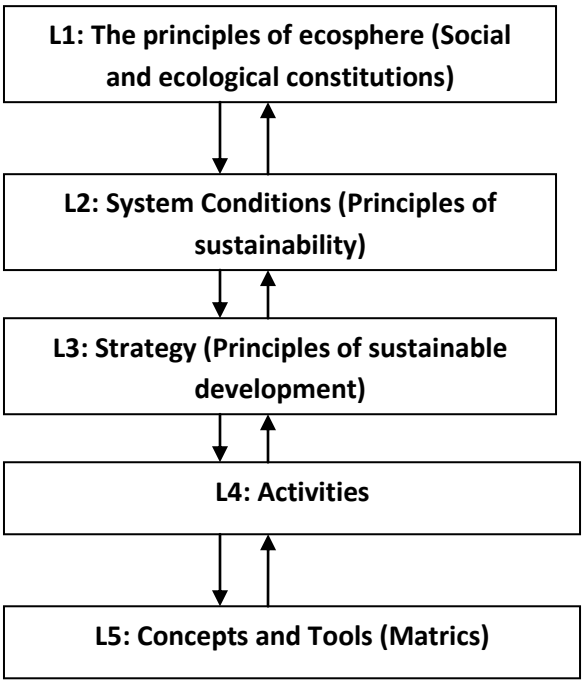
The remainder of this chapter provides the foundation and framework upon which this alignment can be done. The framework for strategic sustainable development or FSSD is introduced.

2.3.2 The planning framework for aligning sustainability to sustainable development in a business context

The outcome of planning for sustainability within business seems to be focused on financial performance. For example Epstein (2008 p. 36) highlights this importance by indicating that “To become a leader in sustainability, it is important to articulate what sustainability is, develop processes to promote sustainability throughout the corporation, measure performance on sustainability, and ultimately link this to corporate financial performance” However, in the context of this research, the first three aspects are considered. But the ultimate outcome would not be the linking to firm performance but rather to demonstrate a more robust approach to how the business can link their strategic activities to that of the articulated vision and goals for sustainability. In other words the ‘how’ of linking the vision and goals of sustainability to the organisations’ strategy for sustainable development or the organisation’s strategy process is not always clear or maybe has not been the focus of other researches. So although financial performance is of critical importance to the existence of the organisation, with the emergence of the green economy it is becoming equally important that organisations take a more strategic approach to linking their activities to an ‘external’ sustainability vision and goals. With this approach, more focus is placed on the delicate link between the socio-economic system and the socio-ecological system. Additionally, and as was pointed out previously, this approach can minimise the prospects of problem displacement and problem shifting associated with applying sustainable development.

Strategy planning frameworks therefore can assist with providing a ‘generic’ but robust approach to aligning organisations’ strategic actions for sustainable development to that of sustainability. Many such frameworks have been developed globally, for example the Framework for Strategic Sustainable Development (FSSD) and the Sustainability Business Scorecard (see Baumgartner and Kohonen 2010) and the Helmholtz concept (see Hartmuth, Huber and Rink 2008).

Figure 2-5: The Framework for strategic sustainable development (FSSD)



Source: Robèrt 2004

However, the FSSD (see figure 2-5) is one of the most robust, hierarchical, but simple in its application and thus it is chosen for the following reasons. Firstly the FSSD addresses the socio-ecological system at level 1. At this level the principles of the social system and to a greater extent that of the ecological system are addressed. This will provide the sustainable enterprise wishing to embark on a sustainable strategy with the necessary first step of understanding the socio-ecological system. At level 2 the principles that govern the socio-ecological system or the principles of sustainability are considered. These principles further aid with the understanding required at level 1. With an understanding of the socio-ecological system and the principles that govern it, the requisite sustainability vision and goals can be created. Additionally, the transition towards a green economy can take place within the limits of the socio-ecological system and may lead towards the sustainability vision and goals.

Secondly, the FSSD effectively separates the concepts of sustainable development and sustainability by clearly defining where they sit in the framework. From the FSSD, sustainability can be envisioned as encapsulating levels 1 and 2,

while sustainable development is placed at levels 3 to 5. This separation also assists in providing clarity on the issue of the oxymoronic nature of sustainable development. That is it places sustainability as a goal to be achieved at the upper levels 1 and 2 and sustainable development can be considered as the process to get there at levels 3 to 5.

The framework also addresses what Baumgartner and Kohonen (2010) refer to as reductionism and problem shifting and displacement in the application of sustainable development, which are the main reasons for failure in applying sustainable development. In other words it provides a principle based idea of sustainability or overview of the goal to be achieved, before the detailed strategic processes to be embarked upon by the sustainable enterprise are considered (Robèrt 2004).

Finally the FSSD can be seamlessly aligned to the normal strategy planning process. This will be comprehensively discussed as an important output of this research.

In sum therefore the FSSD will be applied to this research for these reasons and the case in which it will be tested is presented in chapter 3. However, the framework is not sector specific and is very generic thus lending itself to applications in businesses, economic sectors, regions and whole islands as example. However, it will be adapted in the context of islands for this research. In this regard other concepts are applied and two of these are presented here. The remainder are discussed in chapter 4.

2.3.3 Linking sustainability to sustainable development using policy and Corporate Social Responsibility (CSR)

It is important at this point to introduce at first, a ‘theoretical’ discussion on policy which can drive the direction towards island sustainability and assist with implementing the green economy roadmap (Levels 1 and 2 of the FSSD) and corporate social responsibility (CSR), which are effectively using sustainable development processes (Levels 3, 4 and 5), to strategically move the business towards sustainability. In other words, these concepts provide a basis for ‘how’ the

sustainable enterprise, can apply the FSSD to link sustainability to sustainable development (in chapter 4 a more detailed debate is developed).

Firstly, policy can drive the thrust towards sustainability. Kruijsen et al (2012) note that in addition to the three 'Ps' depiction of sustainable development, a forth 'P' or policy is needed to change the society towards sustainable development. But public policy is outside the remit of the sustainable enterprise in that it is not created nor developed by the enterprise, although the development of such policies can be intended to chart the direction of the sustainable enterprise and may include participation by the decision makers within the enterprise. Additionally, the sustainable enterprise may also seek to shape the direction of such polices. However, in the formulation of public policy the sustainable enterprise should be involved. In this regard Robèrt et al. (2004 p. 171) suggest that:

"... as an experiment of thought, it is possible and useful, to imagine decision makers from all political parties, businesses and other institutions focused on, and capable of developing a public policy infrastructure and tool box within ecological and social sustainability constraints. In such an imagined situation, policy makers attempt to influence human behaviour towards sustainability..."

This 'imagined experiment' although difficult and complex can be used to direct the enterprise towards sustainability. However, the critical first step of creating a sustainability vision and goals must be embarked upon. As Robèrt et al. (2004) indicate this should be done 'within the constraints of the socio-ecological limits', a position previously established. Further consideration of environmental and sustainable development policy, relevant to the case, is provided in chapter 3.

However the sustainable enterprise itself will have to consider inwardly the strategies, actions and plans that are necessary to move towards the path of sustainability. In other words the process of sustainable development will have to be invoked within the organisation. This can be achieved through the idea or concept of 'corporate' social responsibility.

But the study of 'corporate' social responsibility (CSR) is still quite elusive and as sustainable development, Moon (2007) notes that if sustainable development and CSR are still contested concepts, then they may as well be discarded. But simply

discarding the concepts of social responsibility and sustainable development can be problematic since they are still important issues (Moon 2007 p. 298). Moreover, Blowfield and Murray (2008 p. 231) argue that "... issues of sustainability [and sustainable development] lie at the theoretical heart of corporate responsibility: if we ruin our biosphere, as scientific evidence suggests, then all other corporate responsibility initiatives become irrelevant".

It follows therefore that CSR should be considered in the context of sustainable development within the sustainable enterprise and that sustainable development processes and actions can be implemented through the CSR activities of the sustainable enterprise. For example, reducing the flows of materials from the socio-ecological system into the socio-economic system invokes the idea of eco-efficiency (see for example Blowfield and Murray 2008) or what was previously described as resource efficiency (see section 2.2.1). As a consequence, resource use reduction strategies, or resource use efficiency, or MEWFs reduction strategies, can be considered to be sustainable development actions and these can go to the heart of CSR 'planning' within the sustainable enterprise. These strategies in turn can be directly linked to the socio-ecological or sustainability vision and goals agreed to by ALL actors.

With this perspective in mind, the sustainable enterprise must first consider an understanding of the sustainability vision and goals and then attempt to link the internal strategies and actions to this external vision. In chapter 4 the key aim of the research and the research questions are generated from further literature review that is focused on a re-conceptualisation of the FSSD. The re-conceptualised FSSD or adapted FSSD will be tested in the tourist accommodation sector on the small island of Grenada or more generally in an island context.

It is envisioned that the main outcome of this exercise will be a set of strategic sustainability (SS) procedures which can be used in the normal business strategic planning process. Additionally, strategy content that will be necessary for use when the sustainable enterprise is conducting strategy planning is also suggested. How the SS procedures can be used to implement an example of a green economy roadmap is also demonstrated.

Chapter summary

This chapter concludes that the FSSD can be used to demonstrate how global businesses wishing to plan strategically towards island sustainability can link its internal strategic sustainable development processes/actions to a vision and goals for sustainability. How this can be done is demonstrated in the tourism accommodation sector on the small island-Grenada.

MEWFs are the critical link between the sustainability vision and goals and the internal strategic actions of the organisation. And the reduction of these flows is the critical factor needed to create the vision of sustainability and are critical for the implementation of the example of a green economy roadmap. However, businesses must embark on internal MEWFs reduction strategies to achieve MEWFs reduction on a holistic (global and local) basis. Additionally corporate social responsibilities (CSR) activities can be used within the organisation to implement the sustainable development processes. Further organisations must be conscious of the public policy direction for sustainability.

CHAPTER 3: SUSTAINABLE (TOURISM) DEVELOPMENT AND THE GREEN ECONOMY IN THE ISLAND CONTEXT-THE CASE OF THE OECS &GRENADA

Chapter introduction

In the preceding chapter the general context of the research was presented and it was concluded that a reconceptualised or adapted FSSD will be tested in the tourism accommodation business sector in an island context. In this chapter the case study island is fully developed and presented. In this regard the island context is developed and a general overview of sustainable development in that context is presented. Since the business chosen for 'testing' the adapted FSSD' is the tourism accommodation business, in Grenada, an overview of sustainable development and more specifically sustainable tourism development will be integral to the chapter.

The chapter is divided into six sections. In the first section the foundation for establishing an island sustainability vision is presented. This argument is based on the special case of Small Island Developing States (SIDS) as espoused by the United Nations. In the second section the island is proposed as a microcosm of a complex system consisting of interactions amongst the triple pillars of sustainable development. These sub-systems it is suggested are linked by MEWFs and information. It is further argued that the socio-ecological system was the limiting factor on socio-economic activities on the island. Thirdly sustainable tourism development is discussed. In sections four and five the case study region is presented in the context of tourism and sustainable development. The case study island is then presented in a similar context in section six.

3.1 The special case of Small Island Developing States (SIDS)

Together (including Greenland) all islands account for approximately 6,263,612 km^2 and these islands are home to about 588,807,050 persons or 10% of the total population of the globe (Baldacchino 2010). Compared to continents, the population density of all islands (approximately 144 persons/km^2) is three times that of the total continental landmasses (including Australia) (48 persons/km^2); with the highest population densities found on islands (Baldacchino 2010). Islands therefore can be exceptionally stressed as the authorities and people grapple with the MEWFs

within the finite confines of the island landmasses. In this regard the need to embark on development approaches towards sustainability that optimise and reduce MEWFs is of critical and immediate concern for island decision makers. Compared to continents therefore, 'the need to bring human industry [in which materials and energy are used and waste generated], within' the socio-ecological limits of the island 'is of immediate importance for island systems' (Deschenes and Chertow 2004).

From this basis the argument put forward in chapter 2, in which it was proposed that MEWFs can be used to link the vision and goals of sustainability to that of the sustainable development actions of a business, can be applied in island systems. In this regard it was further presented that MEWF reduction strategies within businesses can result in the reduction of these flows on a global basis resulting in a movement towards global sustainability. This general perspective can be brought to bear on an island basis. However, it is first important to create the foundation for developing the idea of island sustainability which is akin to global sustainability. This opening section will first develop a model for defining island sustainability, based on the UN's special case of SIDS and in this context from the perspective of sustainable development.

It was recognised that Small Island Developing States (SIDS), were facing unique and special challenges in the context of sustainable development (UNCED 1992). Chapter 17, paragraph 123 of Agenda 21 states:

"Small Island Developing States, and islands supporting small communities are a special case both for environment and development. They are ecologically fragile and vulnerable. Their (islands) small size, limited resources, geographic dispersion and isolation from markets, place them at a disadvantage economically and prevent economies of scale" (UNCED 1992).

This was reaffirmed in the outcome document of the RIO+12 Conference, held in 2012, 'The Future We Want' (United Nations 2012 p. 33).

Recognising the special case of islands the Barbados Programme of Action or BPOA was developed and in keeping with the focus on materials and resources fifteen key areas of concern to the sustainable development of SIDS were

comprehensively addressed. It is critical to discuss and analyse the ones relevant to this research as a precursor to establishing the case for moving SIDS on to a path of sustainability or towards an 'island sustainability vision and goals'. Moreover, the focus on resources and its reduction are important to the formulation of an island sustainability vision and goals and in assisting island communities to implement green economy roadmaps (in-keeping with the case made in chapter 2). In this regard an overview of the following six aspects of the BPOA is presented: climate change and sea level rise, management of waste, fresh water resources, land resources, energy resources and tourism resources. These focus areas are discussed and analysed with a view to contextualise island sustainability and to build synergies amongst the topics.

3.1.1 Climate change and sea level rise

Climate change and the sea level rise, which is only one of the many changes that will occur with it, is of critical importance to small island states since most of these states are low lying and have relatively high coastline to land mass ratios. The BPoA therefore, calls for both mitigation of and the adaptation to the impacts of climate change. Specifically, the BPoA (UNDSD 1994 p. 10) concludes that "The development and use of renewable sources of energy and the dissemination of sound and efficient energy are seen as having a central role to play in mitigating the adverse impact of climate change". The BPoA further recognizes that these events "... will have profound effects on both the economies and environments of [SIDS]" (UNDSD 1994 p. 10). One critical action that the UNDSD (1994) suggests that SIDS should take to deal with the effects of climate change is to:

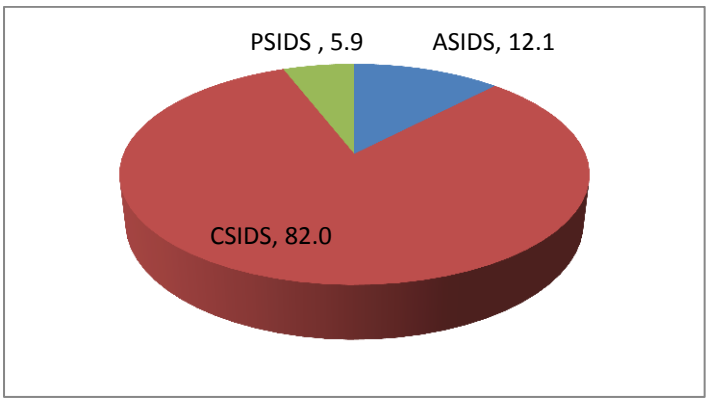
- Promote a more efficient use of energy resources in development planning and use appropriate measures to minimize (mitigate) the adverse effects of climate change on the sustainable development of these resources.

Mitigation and adaptation to climate change in SIDS are critically important for establishing and achieving an island sustainability vision and goals.

3.1.2 Energy resources

As was suggested previously, the issue of climate change is intricately linked to energy. The majority of SIDS still depends on fossil fuel based sources of energy for electricity generation and transportation and about 90% of the source of energy comes from oil (UNDESA 2010).This high dependence on oil not only drains the foreign reserves of SIDS, it also contributes to the emissions of carbon dioxide, "... the most important anthropogenic greenhouse gas (GHG) (UNEP 2008). SIDS emitted about 166,900 tMT of CO^2 equivalent to the atmosphere in 2010 (Millennium Development Goals Indicators 2013). Arguably this minuscule quantity of carbon dioxide emitted by all SIDS is dwarfed compared to the world emissions. However, an investigation amongst the three groups of SIDS reveal that Caribbean SIDS (CSIDS) contributed about 82% of these emissions compared to Pacific SIDS (PSIDS) and ASIDS (AIMS-Africa, Indian Ocean, Mediterranean and South China Seas) (see figure 3-1). This scenario provides CSIDS with an opportunity and the motivation to reduce on the use of fossil fuels through the implementation of energy efficiency measures and the deployment of renewable energy resources, in their efforts to mitigate the impacts of climate change. However, it is argued that the adaptation to climate change is also critical to SIDS's survival and that they are the ones to feel the full impacts of climate change despite their minimal contributions to it (UNFCC 2005). But according to Cameron (2009 p. 73) 'Adaptation without mitigation will result in little more than a temporary respite, postponing catastrophic climate change to a later date".

Figure 3-1: Carbon dioxide emissions from all SIDS



Source: Data taken from: mdgs.un.org/unsd/mdg/Data.aspx

Moreover, many SIDS are endowed with renewable energy sources (RESs) such as wind, solar and geothermal (UNFCC 2005), but these RESs are yet to find favour with the market for various reasons, thus hindering efforts by SIDS to mitigate climate change. The BPoA notes that:

"Several constraints to large-scale commercial use of renewable energy resources remain, including technology development, investment costs, available indigenous skills and management capabilities [and that] ... use of renewable resources as substantial commercial fuels by [SIDS] is dependent on the development and commercial production of appropriate technologies" (UNDSD 1994 p. 22).

Additionally, the BPoA advocates that in the case of fossil fuel resources "Increased efficiency through appropriate technology and national energy policies and management will reap both financial and environmental benefits for [SIDS]" (UNDSD 1994 p. 22).It is concluded therefore, that SIDS and especially CSIDS should embark on strategies such as energy efficiency and renewable energy (EERE) deployment in their efforts to mitigate climate change. This focus on EERE strategies would also assist SIDS in achieving the island sustainability vision and goals.

The BPoA further recommends, amongst others the following national actions, (see UNDSD 1994) which can assist SIDS in implementing their mitigation strategies:

- Appropriate public education and awareness programmes to promote energy conservation should be implemented;
- The efficient use of energy and the development of environmentally sound sources of energy and energy efficient technologies should be promoted;
- The research capabilities in the development and promotion of new and renewable sources should be established and strengthened; and
- Research capabilities in the efficient use of non-renewable sources should also be strengthened

3.1.3 Management of waste

Another critical concern to be considered in the development and creation of an island sustainability vision and goals for SIDS is waste. Land size constraints and the location of landfills, increasing populations and the high dependence on the importation of products that are consumed and discarded conspire in making the management of waste a critical issue for SIDS, and hence waste disposal can place significant limitations on the sustainable development of SIDS. The BPoA concludes that, “Given that long-term disposal options are limited and will constrain sustainable development, small island developing states will need to look for ways of minimizing and/or converting wastes,... into resource” (UNDSD 1994 p.). Herein lies an opportunity to create a link between energy and waste, in that waste streams on SIDS can be used for the generation of electricity and the production of biogas for cooking.

However, generally, SIDS may need to consider other actions such as eliminating waste at the source or upstream, which is in the case of SIDS looking at the materials imported and downstream in the eventual act of disposal. According to the UNDSD (1994 p. 14) SIDS may take actions “... ranging from limiting imports of non-biodegradable and hazardous substances to changing community attitudes to the disposal and use of [waste]” (UNDSD 1994 p. 14). Some of these specific actions, policies and measures recommended in the BPoA to deal with waste management are (see UNDSD 1994):

- The development of fiscal and policy incentives and other measures to encourage environmentally sustainable imports and local products with low waste or degradable waste content;
- The development and implementation of appropriate regulatory measures for the reduction, prevention, control and monitoring of pollution at all sources;
- The formulation and implementation of public awareness and education programmes designed to gain local recognition of the need to control waste at the source; of the value of reuse, recycle of packaging; and the possibilities for converting wastes to resources;

- The introduction of clean technologies and treatment of waste and the appropriate technology for solid waste treatment; and
- The development of baseline data for waste management and pollution control.

3.1.4 Fresh water resources

Another critical resource that needs adequate attention in moving SIDS on to a path of sustainability is water. The basis for this concern is built on the general premise that humans need fresh water for drinking and that water is also needed for sanitation purposes. SIDS, especially those that are low-lying, with coral topologies, are plagued with limited quantities and poor quality of fresh water (UNEP 2008). Even in cases where there is an abundance of rainfall, the inadequate management of watersheds and the lack of storage facilities affect SIDS. UNEP (2008) further notes that many Caribbean SIDSs were below the international limit of 1,000 m^3 per capita of fresh water supply. With the advent of climate change, these issues can be worsened. The BPoA concludes that “Freshwater resources are vital for meeting basic needs and the inadequate protection of the quality and supply of freshwater resources can set important limits to sustainable development” (UNDSD 1994 p. 19).

Some recommended actions at the national level are inter alia (see UNDSD 1994):

- The development, maintenance and protection of watershed areas, catchment areas and the promotion of water conservation programmes;
- Strengthen procedures to monitor and respond to the impacts of water resources due to climate change;
- Strengthen national capacities to deal with the competing demands for the limited water resources

The next two resources are not considered in the context of physical flows, but like climate change, are presented as they would have a profound impact on the flows and the recommended strategies for their reduction. More importantly it is argued that the tourism resources form an integral unifying factor for the resources presented.

3.1.5 Land resources

The competition for the use of land in SIDS is intense. According to the BPoA (UNDSD 1994 p. 20) “The small size of most [SIDS]... limit the area available for urban settlement, agriculture, mining, commercial forestry, tourism and other infrastructure and create intense competition between land use options”. Another competing component for the use of land is the deployment of large scale wind farms and geothermal technologies (see for example IRENA 2012). This latter consideration becomes very critical if SIDS are to embark on the large scale deployment of renewable energy as a strategy to reduce fossil fuel flows and to mitigate climate change. This is a real challenge to the island sustainability vision as it can limit to a certain extent the recommended strategies for material flow reductions that would emanate from this research. Some recommended actions for dealing with this challenge are presented below (UNDSD 1994):

- To develop and disseminate data bases of land use planning and management, including estimates of carrying capacity, economic and environmental values of land
- To prepare and/or review land use plans with key stakeholders, such as agriculture, tourism, mining, (renewable energy technologies) with a view of developing comprehensive land use plans and zoning

3.1.6 Tourism resources

The tourism sector in SIDS is chosen as the ‘test’ sector for this research, since it a major economic sector of Caribbean SIDS (UNEP 2008). According to the (UNDSD 1994 p. 24) “Tourism has contributed much to the development of small island developing States and, as one of the few development options for small States, will continue to be very important for their future growth”. But despite the tremendous economic contribution of tourism to islands, the sector can have negative impacts on the socio-ecological system of islands (this will be discussed further in a subsequent section). However, the various concerns previously discussed above can all be integrated into the tourism sector. Specifically and in the context of this research energy and water resources and waste generation are all concerns that are critical for the development of the tourism sector and their use can be exacerbated by the sector. On the other hand climate change and sea level rise

can impact negatively on these resources and hence hinder the development of the sector.

In sum therefore tourism depends very heavily on the natural environment and culture of the society of SIDS but on the other hand can have negative impacts on these aspects, while positive impacts are associated with the economic development of the island. The national actions, policies and measures recommended in the BPoA are critical for not just sustainable tourism development, but more so for island sustainability or the sustainability of the island as whole system. The BPoA presents some important relevant actions that can be taken as follows: (see UNDSD 1994):

- Ensure that tourism development and environment are mutually supportive;
- Adapt integrated planning and policies to ensure sustainable tourism development, with particular attention to land use planning and coastal zone management, EIAs with continuous monitoring, guidelines and standards for design and construction taking into account energy and water consumption and the generation of waste.

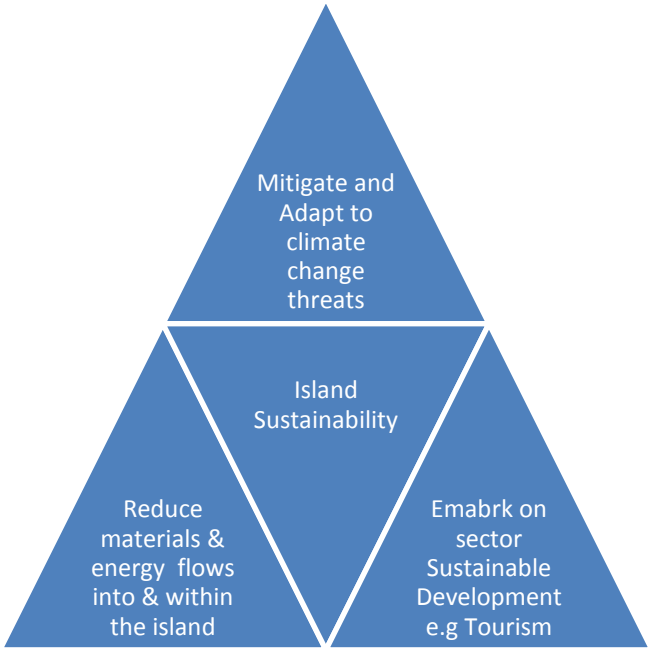
3.1.7 The concept of an island sustainability vision- a resource use perspective

This overview has led to the following observations: that there is a need to consider an integrated approach to planning towards island sustainability and the sustainable development of sectors, such as tourism. Secondly, national actions, measures and polices and/or planning should be geared towards a holistic vision and goals of sustainability as the ultimate outcome and as a consequence of sector specific sustainable development planning, in other words linking sustainability to sustainable development. These planning perspectives can be adequately supported by the quantification of MEWFs. The model (see figure 3-2) is an attempt to demonstrate the integrated planning that is required.

This introductory model displays the suggested conceptualization of the approach to be used to move SIDS on to a path of sustainability. Tourism is used as the example sector and is the locus of the study in this research, and as such

sustainable tourism development would be addressed subsequently. At the core of the model is island sustainability, the ultimate goal which is NOT the sustainability of separate sectors, but the sustainability of the island as a whole system, which is constituted of three main sub-systems: the ecological, social and economic systems. Although the island system can be viewed as an interaction of the pillars of sustainable development, it was already argued that the sustainability, and now more specifically the island sustainability vision and goals must be based on socio-ecological limits (see chapter 2 and the subsequent section in this chapter).

Figure 3-2: Modelling the approach to island sustainability



Author's Conceptualization

Further the interaction of the external threat of climate change and its association with energy were previously presented. It is critical that these are considered and as such they form an important aspect of the model. The threat of climate change can hinder the achievement of island sustainability and these must be mitigated and adapted to if island sustainability is to be achieved. Additionally, both local and imported resources and energy which are needed to serve the needs within the socio-economic system of the island must be used efficiently and reduction strategies embarked upon if the move towards island sustainability is to occur. The reduction of resources (materials) and more precisely water, energy, waste, CO^2 emissions and effluents within the tourism sector on the island is a

necessary requirement for meeting the island sustainability vision and goals. These aspects woven together in the model are critically needed to move the island on to a path of sustainability and can also be used to implement a green economy roadmap. It must be reiterated that island sustainability is the ultimate goal and sustainable development processes/actions in the island must be geared towards achieving this goal.

This general overview of the sustainable development of SIDS and the resulting proposed model needs to be further solidified within the context of the interacting three pillars of sustainable development and by extension the green economy presented in chapter 2. Additionally, the preceding section provides some important points that establish a foundation for discussion in chapter 8. In the next section the island context and system are comprehensively developed and discussed.

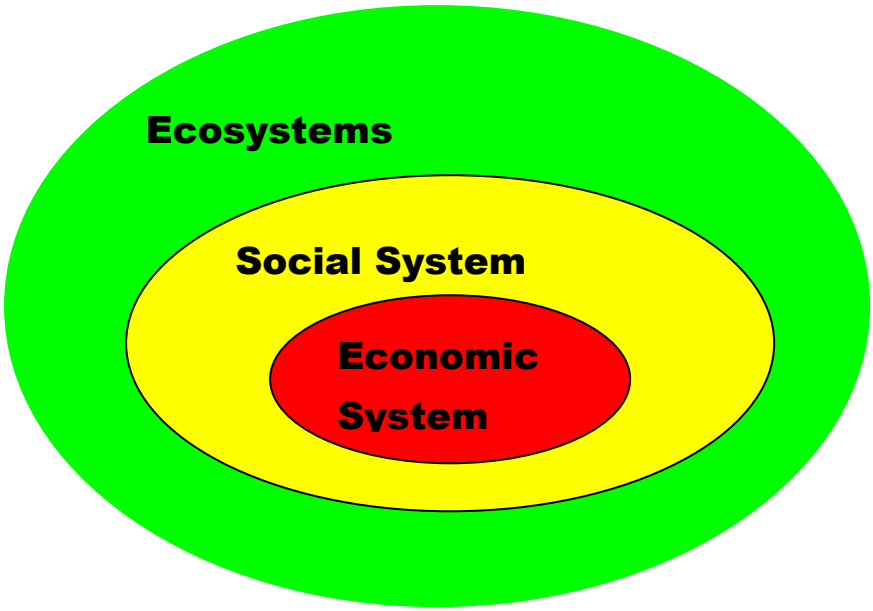
3.2 The island system and context

Islands can be viewed from the global perspective of the three interacting pillars of sustainable development, with the red 'island' economy embedded within the limits of the socio-ecological system of the island. The idea of the island system can therefore be viewed as the 'man in the biosphere' model (Robert et al. 2004). This model is similar to the global model of the green economy embedded in the socio-ecological system (see chapter 2) in which the economic system of the post-modernist world is now restricted by the society and ultimately by the physical laws of the ecosphere (Korhenen 2004; Pantin 2008; Boyd and Frears 2008) see figure 3-3 (the case for socio-ecological limits was already made in chapter 2).

The global model can be further viewed as a complex system in which the three layers of the system are interacting in such a way that the whole system may be difficult to understand (see Greadel and Allenby 2003). However, Greadel and Allenby (2003 p. 299), suggest that "A system may be thought of as a group of interacting, interdependent parts linked together by exchanges of energy, matter and/or information". From his perspective therefore the three interacting layers of the model can be linked together by the materials and energy flows identified in the previous section (the case of information will be discussed in chapter 4).

Considering the global model from the perspective of islands and being cognisant that islands are surrounded by water and as such they have marked system boundaries and are closed in many ways (Deschenes and Chertow 2004), this global model can be translated into an island system. In this regard and in keeping with figure 3-2, the specific industry of interest in the economic sub-system is tourism. The flows of materials (resources), energy and waste, including emissions and effluents link together the socio-economic and socio-ecological system thus forming the proposed island system. Land resources and climate change are given consideration within the socio-ecological system. The island system therefore can be considered as complex and can be viewed as a microcosm of the system proposed in Figure 3-3.

Figure 3-3: A systems view of the limiting factors to economic development on the Island



Adapted from Korhonen 2004

But islands do not exist in a vacuum and as such the mere interaction of the constituent systems is shorted-sighted. Islands therefore are affected by and do affect the global system in which islands exist, for example through the importation of

materials and by climate change. Deschenes and Chertow (2004 p. 203) studied industries on islands and presented in this regard, the 'island context', which is "... an isolated system with scarce resources... that is subject to internal dynamics as well as pressures from the larger system in which it exists". Although the case of isolation can be refuted by the introduction of wireless technologies, borderless capital, air and sea transport, etc (Mertz 2010), the 'island context' still holds since the focus of this research is to understand the economic, or 'human constructed' system and its interaction and impact on the other two systems-environment and society, and vice versa. Of critical concern therefore is to assess the impact of the humans and human constructed artefacts that penetrate the islands' boundaries and those that are extracted from within the island and discarded into the island's environment. From this perspective the system boundary selected for this research is within the island system itself. Therefore issues such as the emissions of CO2 associated with the transportation of tourists and materials into the island would not be considered in this research.

3.2.1 The island system and sustainability

But the island context presents some unique challenges for island policy makers and business leaders. Generally the socio- ecological system and especially the ecosystems of islands are delicate and vulnerable to internal and external shocks. According to Rapaport (2006 p. 118), the "Island ecosystems have unique characteristics and are easily impacted by disturbances". Moreover, Deschenes and Chertow (2004 p. 204) point out that "Limited resources, tenuous resource security and a fragile natural environment are inherent to the island context". With these in mind, islands ecosystems can be very sensitive to the actions taken in the socio-economic system, especially in light of the current nature of the economic setup, with its linear mode of functioning. Thus the current chronic un-sustainable practices in the economy can surmount the already fragile nature of the island ecosystem.

Additionally, Lenzen (2004 p. 2018) states that "Regarding sustainability, most island communities face two challenges: energy supply and waste disposal", which are mainly environmental issues. But as was argued previously (see chapter 2) the issue of waste was hinged solidly on the production/consumption nexus in the linear economic system. Moreover, it was also shown that the current use of fossil based

fuels lead to the disproportionate emissions of carbon dioxide by Caribbean SIDS. Additionally water extraction and use were also considered to be under threat in many CSIDS.

But Korhonen (2004) points out, that environmental problems only become so when society brings them to the fore. This link between society and the environment was established in chapter 2 and it is very important in the island context. Like the global perspective therefore, island sustainability must be embedded in the socio-ecological system and can also be driven by MEWFs in the island context. This approach is even more critical in the island context, as the study of sustainability takes on a holistic view so that the solution of one problem does not result in another problem and that these problems are conceptualized as meta-problems as proposed by Korhonen (2004). To ignore the interaction of the socio-economic system with that of the socio-ecological system and the limits it can place on economic activity can lead to un-sustainability in the island context.

It is further proposed therefore, that the FSSD (see chapter 2) is also applicable to the study of island sustainability and that it should be adapted for developing a framework for the proposed integrated planning in complex systems such as islands (see chapter 4). This framework will be used to develop the island sustainability vision and then drill down into the tourism sector and more specifically the tourism accommodation sector on the small island of Grenada located in the Caribbean. The case study will be fully presented in subsequent sections in this chapter, but before the case is fully presented a look at sustainable tourism development is instructive, to establish the case study from the perspective of the chosen sector-tourism.

3.3 Sustainable Tourism Development (STD)

There was an apparent shift in the approach to the study of tourism and according to Lu and Nepal (2009 p. 13) the study of tourism "… has shifted from [been] project-oriented to destination-oriented…", with many authors arguing that tourism should be studied within the context of the destination as a whole integrated and dynamic system (Farrell and Twining-Ward 2003; Liu 2003; Farrell and Twining-Ward 2005). Lee (2001 pp. 314-315) proposes that 'holistic' destinations should have a meaningful physical boundary; autonomous political system and

accommodation facilities. The majority of the island systems in the Caribbean and specifically Grenada meet all of Lee's holistic criteria and can therefore be considered as 'holistic tourism destinations' to which the island context is applicable.

But stemming out of the concerns for the impact of tourism on the destination and/or island system, there was a concerted effort to align tourism with the sustainability concept, which evolved into the study of sustainable tourism development (STD). The oft-cited definition of sustainable tourism development is:

"... meeting the needs of the tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems" (Lu and Nepal 2009 p. 6 citing the WTO).

But like its parent, the STD concept has been critiqued on many grounds (see for example Liu 2003; Lu and Nepal 2009; Sharpley 2009) and one of the major concerns of the concept was what is referred to as tourism's "... own specific-centric agenda which may even work against sustainable development" (Lu and Nepal 2009 p 6 citing Hunter). While Liu (2003 p. 459 citing Wheeller) highlights the issue of problem shifting and the 'meta-problem issue' which must be avoided in the delicate socio-ecological system of islands. Liu (2003 p. 459 citing Wheeller) further observes that in an attempt to apply sustainable tourism development into practice the solutions were at best micro, "... to what is essentially a macro problem". Therefore, as it relates to islands and especially Grenada, the narrow focus on tourism and the tendency to focus on 'inward looking' can have long term and even immediate repercussions on the whole island system. For example, in Grenada the need for accommodation units to facilitate the stay-over tourists can impact heavily on the limited resources and space, resulting in more stress on land for waste disposal sites, water extraction, and energy flows and the related carbon dioxide emissions from within the island (this is further developed in chapter 4).

As a consequence a holistic approach to the study of problems relating to specific industries such as tourism must be adopted and the proposed adapted FSSD provides the necessary framework for so doing. Within this context therefore the idea of sustainable tourism development is not discarded but should be viewed

as necessary for planning in the tourism sector, but with the ultimate outcome of island sustainability. In other words the study of the tourism business and more specifically the accommodation sector should be linked to the island sustainability vision and goals through the proposed framework (this will be fully developed in chapter 4).

The case study region that is, the Organization of Eastern Caribbean States (OECS) to which Grenada belongs is now introduced. The OECS is used since as a region the issues are similar and so any proposed solutions may be applicable to the region as a whole. This is important to ensure that the works that occurred and are occurring in the OECS are adequately considered in the development of the adapted FSSD and the proposed SS procedures. The discussion is presented in the context of sustainable development and the tourism sector.

3.4 The case study region- the Organization of Eastern Caribbean States (OECS)

3.4.1 Key characteristics of the OECS islands

The Organization of Eastern Caribbean States (OECS) is a political and economic grouping of small Islands within the Caribbean. The islands are: Grenada, St. Vincent and the Grenadines (St. Vincent), St. Lucia, Dominica, Antigua and Barbuda (Antigua), St. Kitts and Nevis (St. Kitts), Montserrat, Anguilla and the British Virgin Islands (BVI) (see map in figure 3-4). There are seven full and 2 associate members in the OECS. Three of the members (Montserrat, BVI and Anguilla) are sub-national jurisdictions, with their parent country being the United Kingdom. The remainder of the islands are independent. Together the islands cover a land mass of approximately 3,000 km^2 and have a population of just above 0.5 million persons. Eight out of the nine members have populations of below 150,000 persons. With the exception of the BVI, the members of the OECS have a single currency, which is governed by the Eastern Caribbean Central Bank. Their economies are divided into twelve sectors (ECCB, 2003, 2008). The OECS has its own Secretariat.

The OECS has many other aspects in common: the islands are mostly volcanic Islands; they have similar governance systems and like the rest of the Caribbean, the majority depends on the sea, sun and sand tourism or resort based

tourism for their development (see www.oecs.org). Table 3- 1 provides a brief overview of some characteristics of the OECS. Grenada is highlighted in yellow for ease of reference.

Figure 3-4: The Caribbean Region

Source: http://go.hrw.com/atlas/norm_htm/caribean.htm

Table 3-1: Key characteristics of the OECS islands

Names of Islands	Area (km^2)	Population	Population Density	GDP 2012 US$	GDP per capita 2012 US$
Anguilla	91	14,436	159	175.4M[1]	12,200
Antigua	441	85,632	194	1,535B	17,500
BVI	153	24,004	157	500M [2]	42,300
Dominica	750	72,514	97	1,035B	14,600
Grenada	344	103,000	299	1,471B	14,100
Montserrat	102	5,097	50	43.78[3]	8,500
St. Lucia	616	159,585	259	2,234B	13,300
St. Kitts	261	40,131	154	890M	15,500
St. Vincent	386	118,432	307	1.301B	11,900

Source: www.oec.organd Central Intelligence Agency 2009

Notes: GDP is based on purchasing power parity in 2012 US$, except 1, 2 and 3, which are based on 2009, 2008 and 2006 estimates.

3.4.2 The contribution of tourism to the economies of the OECS islands

The OCES economies are built on three key economic pillars: agriculture, industry and services (see Central Intelligence Agency 2009). In this regard services dominate the contributions to GDP. Additionally, within the OECS and the Caribbean, tourism has contributed significantly to the services sector and hence the

GDP of the islands (table 3-1). Another critical indicator in this regard is the employment that is generated within the economy from the direct and total contributions of travel and tourism (World Travel and Tourism Council (WTTC) 2013). Table 3-2 provides this information; and Grenada is again highlighted for ease of reference.

Table 3-2 Contributions of travel and tourism to the OECS island economies and the Caribbean economy in 2012

Names of Islands	Contributions of travel & tourism to GDP (%)		Contribution of travel & tourism to employment (%)	
	Direct	Total	Direct	Total
Anguilla	22.9	66.4	24.1	68.1
Antigua	18.5	77.4	18.8	71.4
BVI	27.1	77.3	32.8	89.3
Dominica	9.5	30.0	8.8	27.7
Grenada	6.4	21.8	5.9	20.2
Montserrat	No data	No data	No data	No data
St. Lucia	13.3	39.0	18.6	42.3
St. Kitts	7.5	25.9	7.3	24.6
St. Vincent	6.0	21.8	5.5	19.9
Caribbean	4.6	14.0	3.9	12.3

Source: WTTC 2013

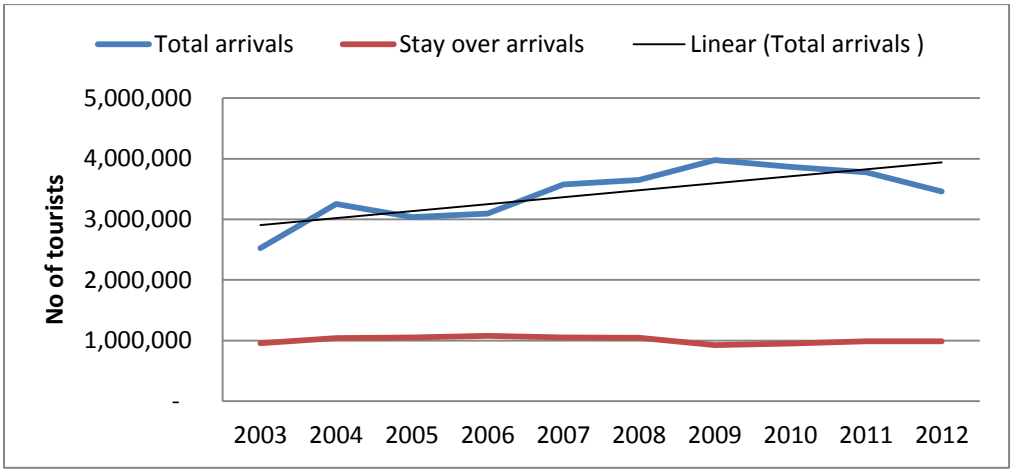
From a historical perspective, it is very well documented that after 1960 with the advent of the jet-aircraft, decolonization, globalization and internationalization, islands, especially in the Caribbean, restructured their economies away from the exporting of staples, to one that depends on tourism which exploited their natural and cultural assets of sea, sun and sand (Aspotolopoulos & Gayle 2002; Oberst & McElroy 2007; Gossling& Wall 2007; Duval 2004). Tourism based on the Islands' key environmental features- warm climate, clear waters, white beaches and lush vegetation (Gossling & Wall 2007) became the locus of development. The contribution by tourism to the economic development of these Islands became very significant (Meyer 2006; McElroy 2005; Duval & Wilkinson 2004). The impact of tourism on the economies of the Islands especially in the Caribbean was tremendous. According to the Caribbean Tourism Organization (CTO 2005) and Harrison (2007), tourism accounted for 14.4% of GDP and 15.5% of total employment in the Caribbean. While Graci and Dodds (2010) report that tourism's contribution to the GDP of the OECS islands range from as high as 82.1% to 27.6%.

One of the most recent studies on the contribution of travel and tourism to the Caribbean economy as a whole shows that tourism is still a significant contributor to the Caribbean economy. According to table 3-2 the total contribution of tourism to the Caribbean's GDP in 2012 was 14.0%, and to employment that was 12.3%.

Moreover, within the OECS region these contributions were even more significant. From table 3-2 it is observed that the direct and total contributions of tourism to GDP and employment to all the OECS island economies were much higher than that of the Caribbean as a whole. In fact the UNCSD (2010) also notes that amongst the SIDS, the share of international tourism receipts was larger than 50% of exports for 12 SIDS. Six of the nine OECS islands are classified as SIDS and they all fall into that category.

These relatively 'good' economic performances in the OECS are backed by robust tourist arrivals. Figure 3-5 shows that the total arrivals of tourists in the OCES have trended upwards during the period 2003 to 2012. However, from 2009 there was a marked decline which could be due mainly to the global economic recession. Additionally the stay-over tourists (which are the focus of the research) accounted for about 24% to 37% of the total tourist arrivals. The number of stay-over tourists however, remained constant during the same period (see figure 3-5). The ECCB (2012) further estimates that the expenditure from the approximately 3.5M tourists visiting the OECS in 2012 was about US$1,181M

Figure 3-5: Total and stay-over tourist arrivals trends in the OECS



Data form ECCB 2013

3.4.3 Assessing the impact of tourism on the environment in the OECS

But despite the significant economic contributions by tourism, the physical developments such as accommodation; support infrastructure such as roads, airports, seaports; the concern for the carrying capacity of the islands' environments and the burden placed on resources such as water and energy and the need to handle more 'waste', have led to research that reported on the concern for environmental degradation and change to the fragile characteristics of the islands (Gossling& Wall 2007; McElroy &Dodds 2007; McElroy 2005; Andriotis 2001; Twining-Ward & Butler 2002; Sasidharan & Thapa 2002; McElroy & de Albuquerque 2002; Apostolopoulos& Gayle 2002). There were signs that the adverse impacts began to compromise the natural or environmental assets and features that attracted the tourists to the Islands in the first place, chasing tourists away and eroding the economic benefits (Tourtellot 2007; Jansen Kiers and Nijkamp 1993), a phenomenon referred to as the "progression to destruction".

It is apparent that due to these concerns the National Geographic Centre for Sustainable Destinations' (CSD) Destination Scorecard programme undertook a survey in 2007 of 111 Islands worldwide. According to Tourtellot (2007) the survey employed some 522 experts in the field of tourism to review the conditions in the selected Islands. The score thus decided reflects the opinions of these experts. For this research the scores of the OECS are noted and compared to the score guide as provided by Toutellot (2007). These scores are captured in table 3-3 with the general expressions on the state of the island environment.

Since the main focus of this exercise is to illustrate the impact of tourism on the islands' environment, an analysis of the causes of these ratings would not be provided. What is seen however from table 3-3 is that the OECS island environments have minor to moderate difficulties and a mix of negative and positive impacts. The OECS islands seem to be in a sustainability/un-sustainability balance, and as such 'poor' decisions can tip the balance towards un-sustainability. This can result in the erosion of the natural assets and cultural assets and the eventual loss of the destination's attraction to the tourists. Generally, the study concluded that most of the islands were experiencing conflict between ecosystem preservation and

development for tourism as they embarked on capturing the economic benefits from resort based tourism (National Geographic Traveller 2008).

Table 3-3: Illustrative Information on the State of the OECS Islands' Environment

Island	Sore	Comment
Antigua	50	Moderate trouble; all criteria medium-negative or a mix of negative and positive
Anguilla	70	Minor difficulties
British Virgin Islands	61[+]	Same as Antigua
Dominica	77	Minor difficulties
Grenada	59	Same as Antigua
Montserrat	-	Was not rated due to volcano
St. Lucia	54	Same as Antigua
St. Kitts	59[*]	Same as Antigua
St. Vincent	68	Minor difficulties

*Source: Adapted from Tourtellot, 2007****; Note: + Score for Tortolla only; * Nevis was scored separately and had a score of 70.***

Additionally, McElroy (2003) compared the impact of tourism on the state of the island environment, society and economy. He (Mc Elroy 2003) used the phases 'most tourism developed', intermediate tourism developed' or 'least tourism developed' to describe the various states of the impact of tourism on the islands. Mc Elroy observed that eight out of the nine OECS Islands were intermediate in their tourism development, while the BVI was in the 'most developed' category. Mc Elroy (2003 p. 231) concludes that the 'intermediate group' was made up of "Caribbean Islands advancing to the high density stage and other destinations experiencing rapid growth and resource conflict". In the OECS, Anguilla and Antigua are examples of the former and St. Lucia, Dominica and Grenada are examples of the latter (Mc Elroy 2003).

Mc Elroy's findings appear to confirm that the OECS islands are in 'a sustainability/un-sustainability balance or in some cases experience a conflict between development and growth and the environment, which provides the

resources needed for that development and growth. Although this conclusion is made in the context of tourism, in a more general sense, it can be translated into a need to embark on a sustainable development path which was recognised within the OECS. In this regard a comprehensive document, the St. George's Declaration of Principles for Environmental Sustainability, from herein referred to as the SGD was developed and attempts were made to implement it.

The subsequent section draws on this document in an effort to present a picture of the work of the OECS as it relates to sustainable development. This is critical as it has implications for developing the island sustainability vision and goals and the implementation of the sustainable development strategy within the tourism sector.

3.5 Towards sustainable development in the OECS-the St. Georges' Declaration (SGD)

3.5.1 The goals and principles of the SGD

The OECS was obliged to develop in line with Agenda 21, the BPoA and the (Mauritius Strategy for Implementation) MSI, a set of guiding principles for environmental sustainability of the islands. According to the OECS (2006 p. 1), the OECS Members are "COGNISANT of the commitment and obligation to uphold past and future regional and international agreements related to environmental protection and sustainable development, particularly in the context of Small Island Developing States...". The Rio Declaration and Agenda 21, the Millennium Development Goals (MDGs) and the BPoA and MSI were recorded as some of the regional and international agreements the OECS members were committed to (OECS 2006). Twenty-one (21) guiding principles were formulated into the SGD and the original document which was signed by the Ministers of the Environment in the OECS in 2001was revised in 2006.

In its revised form, these principles were grouped under one aim and four major goals. Table 3-4 summarizes the grouping of these principles under the four goals. The main aim of the SGD is to "Foster Equitable and Sustainable Improvement in the Quality of Life in the OECS Region" and this is aligned to

principle 1 in the SGD, which is to “Foster Improvement in the Quality of Life” (OECS 2006 p. 4). The main goals of the SGD are to:

1. “Build the capacity of Member States and Regional Institutions to guide and support processes of sustainable development.
2. Incorporate the objectives, perspectives, resources and talents of all society in environmental management.
3. Achieve the long-term protection and sustained productivity of the region’s natural resource base and ecosystem service it provides.
4. Ensure the natural resources contribute optimally and equitably to economic, social and cultural development” (OECS 2006 p.4).

Table 3-4: The SGD Goals

SGD Goal #	Principles as numbered in the SGD
1	2- Integrate social, economic and environmental consideration into national development policies, plans and programmes 3 – Improve on legal and institutional frameworks 8 – Address the causes and impacts of climate change 15 – Promote co-operation in Science and Technology
2	4- Ensure meaningful participation by Civil Society in decision making 5- Ensure meaningful participation by the private sector 7 – Foster broad-based environmental education, training and awareness 15- Promote co-operation in Science and Technology
3	10- Prevent and control pollution and manage waste 11- Ensure the sustainable use of natural resources 12- Protect cultural and natural heritage 13- Protect and conserve biological diversity 16- Manage and conserve energy
4	6- Use economic instruments for sustainable environmental management 8- Address the causes and impacts of climate change 9- Prevent and address the causes and impacts of disasters 14- Recognize the relationships between trade and environment

Source: OECS 2006

Principles 1 and 17, 18, 19, 20, 21 do not relate to any of the four objectives, but rather to the overall aim, of fostering improvements in the quality of life and to the implementation, report and review sections of the SGD. These principles, and the

relation to the principles to be considered in the adapted FSSD are discussed further in chapter 4.

Each goal and the group of principles are accompanied by desired outcomes, targets, indicators and supportive actions. Considering the priority areas for sustainability laid out in the BPoA and more specifically those reviewed in the first section of the this chapter, the SGD does not explicitly address them, however, they are implied in many of the principles. So, tourism resources, which is the core of this research is not explicit, but the resources that tourism depends upon and will impact, for example energy, waste, natural heritage are expressed in the principles. However, climate change is explicitly recorded as one of the principles of the SGD.

Recall the model in figure 3-2 which proposed island sustainability as the main vision for sustainable tourism development in islands. The fact that the SGD has a 'main goal or aim' to be achieved is very commendable. However, the aim does not consider the socio-ecological limits that were proposed in the island context and system and specifically those islands in the OECS. The case was made in chapter 2 and reinforced here for a thorough comprehension of the human (social) and ecological dimensions to sustainable development and the green economy. The human-ecological interaction is at the core of sustainability and should be the basis of an island sustainability vision. In this regard it is extremely important that the aim of the SGD should include socio-ecological limitations to fostering the high quality of life required in the OECS. There is great fair that in pursuit of a high quality life that the ecological system and its various services and functions can be destroyed thus threatening human survival in these small islands. In this regard the adapted FSSD would address this fear and could assist the OECS policy makers and business leaders to collaboratively create a vision and goals for island (OECS) sustainability.

3.5.2 Implementing the SGD and measuring progress

Moreover, in an attempt to implement the SGD, the call was made for collaboration amongst states and outlines actions that States should embark upon to implement the SGD. This call should be investigated in an effort to uncover the approach and to suggest possible areas for improvement through the adapted FSSD. In this regard, the SGD called on OECS member states to (OECS 2006 pp. 22-23):

- amongst other things set national targets and establish standards and best practices against which to monitor progress;
- work concertedly together to achieve the regional goals and targets enunciated in the SGD;
- develop National Environmental Management Strategies to guide actions aimed at achieving the national commitments and targets of the Declaration;
- establish bodies for coordination and implementation and provide adequate financial, human and technical resources to effect the National Environmental Management and Strategy.

Secondly the SGD outlined a number of indicators that member states should agree to and establish baselines for monitoring. Indicators will form a critical component of the framework proposed to deal with sustainability in this research. Therefore the indicators for each goal in the SGD are presented in table 3-5.

The SGD can be useful to the implementation of sustainable development and indeed in addressing the challenge presented by the impact of tourism on the environments of the OECS islands. However, there are some key issues that are not adequately considered within the SGD which this research can address. Firstly the goal presented by the SGD as was indicated before provides a holistic vision for the sustainable development of the OECS. However, it lacks the concept of socio-ecological limits to be considered as the quality of life within the OECS societies is improved. In this regard the proposed adapted FSSD would attempt to address this short-coming.

Secondly, although there is a vision, there is no clear suggested pathway to move the islands towards that vision. In fact the SGD does not separate sustainability form sustainable development and as such the sustainability of sectors and the sustainable use of resources were the main goals to be achieved. This was already addressed in the first section of this chapter and the model thus presented (see figure 3-2) would be adequately translated into the adapted FSSD.

Table 3-5: The SGD Goal and Indicators

Goal #	Indicators
1	1. Budget allocation for environmental management 2. Effectiveness of environmental regulations and enforcement 3. Participation in major international and regional environmental conventions 4. Extent, quality and availability of date in nations state of the Environment Report
2	1. Status and effectiveness of national consultative councils and forums 2. Use of collaborative arrangements for management of natural resources and sites 3. Number of companies using ISO 14001 4. Levels of environmental responsibility evidenced by different sectors of society
3	1. Maintain or increase water availability, supply and quality 2. Improve soil conservation practices to reduce soil loss 3. Reverse the in the extent of key ecosystems 4. Halt the loss of biological species 5. Halt the pollution in fresh water supply 6. Increase the use of clean technologies, recycling and reuse 7. Increase the portion of solid and liquid waste that are properly treated and disposed off 8. Manage hazardous and chemical waste environmentally sound 9. Provide legal protection to nationally important natural sites 10. Make more efficient use of energy
4	1. Number of economic trade agreements signed that have environmental safeguards attached 2. Extent of capacity to deal with natural and environmental disasters and emergencies 3. Existence of legal provisions to guarantee access to sites and resources of public importance 4. Proportion of population with access to adequate sanitation and water supply

Source: OCES 2006

The third issue that could be addressed is the linking of proposed indicators (see table 3-5) to that of the vision and goals enshrined in the SGD. One may suggest that the goals are linked to the aim and hence the indicators which are linked to the goals will automatically link them to the aim. This may be so however, there must be a more comprehensive method of doing so. Additionally there must also be buy-in for the indicators by the various sectors that the SGD principles will impact. As it appears now and as with all other thrust of the United Nations, sustainable development is ‘something’ for the Government to develop and implement, a view which may be detrimental to the paradigm shift needed towards

sustainability and the green economy concepts . In fact sustainable development indicators should be owned by the sectors that they affect and as such they should participate in their development and implementation. Moreover, indicators should be aligned to public policy stand points (see Nijkamp and Vreeker 2000) so as to ensure that the intent of the policy standpoints is achieved. In sum the principles as proposed by the SGD appear to be too many and the indictors derived from them are owned by no one except maybe the Government?

Finally, the proposed adapted FSSD would attempt to merge policy, sectors, resources and indicators and may provide a simple, but robust strategic approach for each economic sector and sub-sector in the OECS to move towards island sustainability. Moreover, MEWF reduction strategies in the tourism accommodation sector would be sought and how these can lead to island sustainability would be demonstrated. A key strategic approach is that of a tourism symbiosis (eco-system).

The proposed adapted FSSD would be 'tested' or made operational in the tourism accommodation sector on the small OECS Island of Grenada. It is envisioned that due to the similarities of challenges and approaches to deal with them in the OECS though the SGDs, that the demonstration in Grenada can be applicable to the rest of the OECS islands. A similar approach to the analysis for the OECS is now done for Grenada.

3.6 The Case Study for the OECS-Grenada

3.6.1 Key characteristics of Grenada

Granada is the southern-most Island in the OECS and some of the key characteristics were already presented in table 3-2. The island state consists of three islands; Grenada, Carriacou and Petite Martinique. Together they cover 344 km^2 and house a total population of about 103, 000 persons. Compared to its OECS neighbours Grenada has the second highest population density of about 299 persons per km^2. The island is generally mountainous with the highest peak, Mount Saint Catherine located in the middle of the island. Figure 3-6 is a map of Grenada.

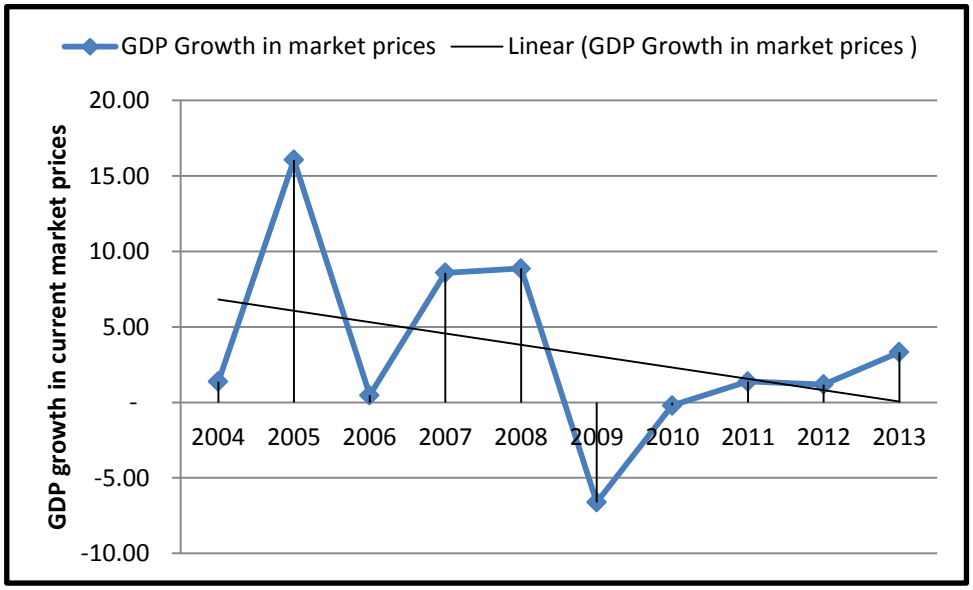
According to the ECCB (2012) Grenada experienced robust economic growth in 2005, the year in the aftermath of hurricane Ivan, which totally devastated the country. Notwithstanding this robust growth in 2005 there was a generally declining

rate of growth in GDP for the period 2004 to 2013, for which growth of about 1.23% was predicted for 2013 (see figure 3-7). However, due to the current economic recession this growth rate may not materialise. Despite the negative trend in the growth rate of GDP in Grenada, there was positive growth in all but two of the years, 2007 and 2008, in the period 2004 to 2013. The lowest growth was recorded in 2009 and this can be attributed to the global economic recession. Minimal growth occurred in the preceding period, as shown in figure 3-7.

Figure 3-6: Map of Grenada

Source:
http://www.worldatlas.com/webimage/countrys/namerica/caribb/lgcolor/gdcolor.htm

Figure 3-7: GDP growth rate in market prices (constant prices) 2004 to 2013



Data form ECCB 2012

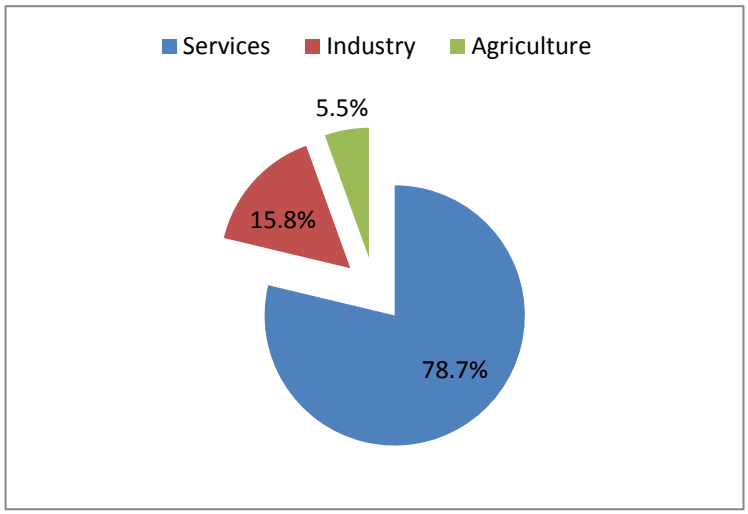
3.6.2 The contribution of tourism to Grenada's economy

Like the OECS the three main contributors to the economy of Grenada are: agriculture, services and industry. Historically, and like the OECS the economic growth and development of Grenada depended mainly on the primary industry of agriculture. However, the economic development drive shifted to the tertiary sector, driven mainly by services. Figure 3-8 reveals that in 2011 the services sectors accounted for about 78% of Grenada's economy. The key services constituting the sector are education (23.4%), transport and communications (17.6%), real estate (17.6%), financial services (10.3%) and hotels and restaurants (5.1%) (Eastern Caribbean Central Bank (ECCB) 2011).

Although the contribution of tourism to the services sector in Grenada is relatively small, the overall contributions of travel and tourism to GDP and employment were quite modest compared to the other islands in the OECS group (see table 3-2). In 2012, the direct and total contributions of travel and tourism to the GDP of Grenada were 6.4% and 21.8% respectively; the dollar value of these contributions were US$53.7M and US$183.9M, respectively (WTTC 2013). The WTTC (2013) further projects that the direct and total contributions to GDP will

increase by 2.1% and 2.8% respectively in 2013 and that they will further increase by 4.0% per annum (pa) and 3.9% p.a. between 2013 and 2023.

Figure 3-8: GDP contribution by main economic sector



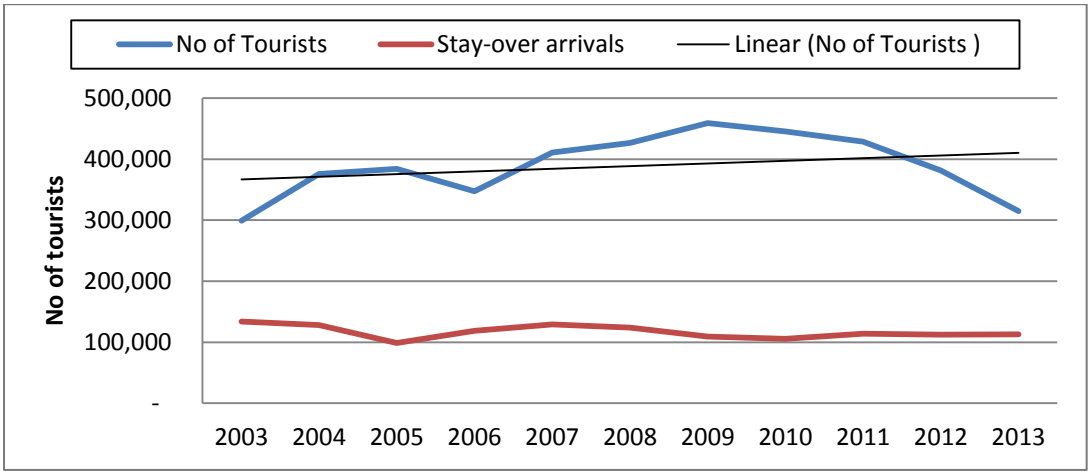
Data from ECCB 2012

Another key indicator of the contribution of travel and tourism to the economy of Grenada was its contribution to employment. According to the WTTC (2013) travel and tourism contributed 2,500 direct jobs and total jobs of 9,500 to the Grenadian economy in 2012, which accounted for 5.9% and 20.2% respectively of all employment in Grenada. In the case of direct contribution to employment it is projected that the number of jobs contributed would rise by 1.9% in 2013 and would remain stable at 3,000 jobs into 2023. However, as regards the total contribution to employment, it is projected to grow by 2.5% in 2013 to 9,500 jobs and would slightly increase by 0.7% pa to grow to 10,000 jobs in 2023 (WTTC 2013).

Total tourist arrivals in Grenada has tended slightly upwards between 2003 and 2013 (see figure 3-9), but with a sharp decline in 2009; while stay-over tourists arrivals remained almost stable. The percentage of stay-over tourist to the total arrivals was about 30% per year. The average stay-over arrivals during the ten year period was 117,285 tourists. There was a marked downward trend in arrivals of all tourist form 2009, apparently due mainly to the global economic recession. Tourist arrivals are however cyclical or seasonal as shown in figure 3-10. The figure shows that there is normally a decline in arrivals between January and April and increase in arrivals between September and December with the peak in stay-over arrivals being

in January during the winter season. The peak in stay-over arrivals in August coincides with the Grenada carnival activities which attracts a large number of stay-over tourists.

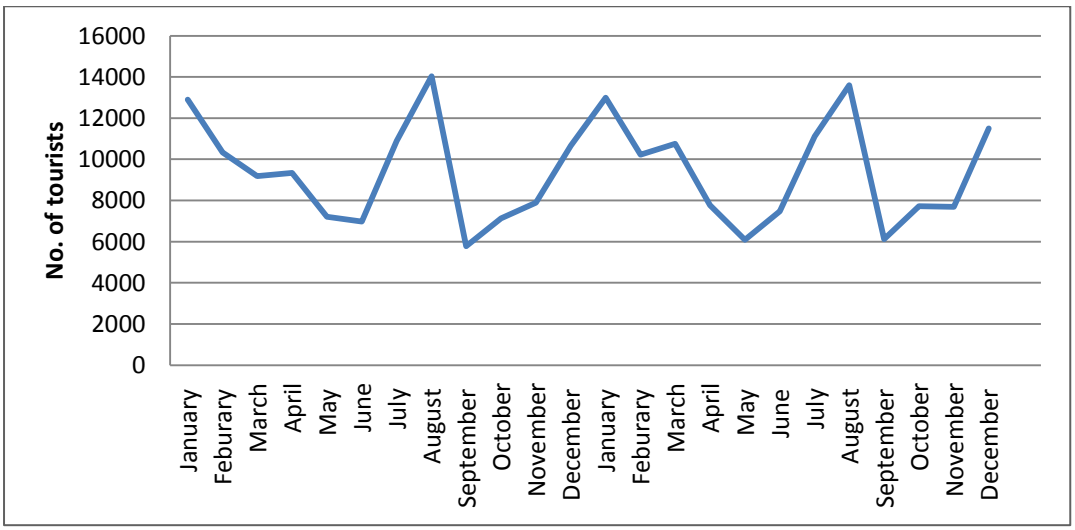
Figure 3-9: Total and stay-over tourist arrivals in Grenada-2003 to 2013



Data from ECCB 2013

More importantly all tourists arrivals considered in the context of visitor exports contributed approximately US$101.7M or 52.4% of all exports from Grenada (WTTC 2013). The WTTC (2013) further projects that the total contribution to all exports can grow by 4.0% p.a. between 2013 and 2023 to US$153.7 in 2023.

Figure 3-10: No of stay-over arrivals in Grenada- Jan to Dec 2012 &2013



Data from ECCB 2013

To ensure that there are high quality facilities and infrastructure for tourists, especially accommodation units for stay-over tourists, investments are required. Although it was difficult to disaggregate the actual capital investments in accommodation units, “Travel and tourism investment in 2012” was US$19.4M or 11.1% of total investments. This is expected to increase by 4.2% p.a. between 2013 and 2023 or US$31.9M or 14.3% of the total investments.

3.6.3 Tourism accommodation development in Grenada

The need for accommodation units has historically been a critical concern for the Grenadian authorities. The Tourism Master Plan and Policy of 1997 provides the most detailed and accurate reflection of development for tourism in Grenada for the period 1986 to 1995.Although there was a recent attempt to revise the plan the main policy components that should drive future development are still been used. According to the Master Plan (GOG 1997), the tourism sector experienced a steady increase in cruise tourists, stay-over arrivals and expenditure in the period 1986 to 1996. As the tourist numbers grew, stay-over tourists also grew by approximately 100%, resulting in a parallel growth in the accommodation sector of approximately 100%, in the ten year period. During the same period the number of stay-over tourist in Grenada was approximately half the number of cruise tourists. Growth in stay-over arrivals however, tapered out at a minimal 18% in the ten year period after 1995 and no further new resorts were constructed. In 2012 there were about 59 accommodation units in Grenada (Grenada Board of Tourism).

As is shown in figure 3-9, between 2003 and 2013 stay-over tourist arrivals were between 100,000 and 150,000. Moreover, the Grenada Board of Tourism (GBT) which has the responsibility for marketing the Grenada destination established some key ‘growth objectives’ for the destination. According to the GBT (2011 p. 16) key objectives relating to tourist arrivals and accommodation units were to:

- “...increase the average length of stay per visitor from 8.5 in 2010 to 9.25 by 2014”
- “... increase tourists arrivals by 4.25% per annum over 2010 figures up to 2014”

These key objectives are focused on the economic development of the tourism sector and Grenada as a whole destination. For example, it is envisioned

that the more tourists that visit the island and would stay longer then receipts would increase and the number of jobs should increase (see GBT 2011). However, it is important that these objectives are considered form the island sustainability perspective and especially in the context of the emerging green economy. Moreover these objectives can impact the environmental load of the island's socio-ecological system and may affect the MEWFs reduction strategies embarked upon by the tourism accommodation sector. It is important therefore to analyse these environmental loads for their potential impact on the island sustainability vision and the linking to the strategic actions of the tourism accommodation sector. In this regard the incremental increases of environmental loads will be determined and analysed in subsequent chapters.

However, it is apparent that the Tourism Master Plan and Policy attempted to address the dual issues of economic development and environmental degradation. Two key policy objects called for the maximization of the economic benefits from stay-over tourists and the preservation and conservation of the natural environment. However, it was not explicit as to how that could be done. Relating to the first policy objective, the plan suggests that two new resorts be constructed. Additionally, the GBT (2011 p. 4) "... concludes that with regard to accommodation, optimal benefit to the destination could be derived from a mix of high quality, quaint boutique properties and at least one brand name property in Grenada". The GBT further suggests that an additional 500 rooms were required by 2014 (GBT 2011). But it was noted that beach resorts were the category of tourism that "... impacts most heavily on the environment" both in terms of infrastructural development (physical facilities) and resource use and waste generation (GOG 1997 pp. 97).

Regarding the environmental concerns, the GOG (1997) further suggests that 'zoning, carrying capacity analysis and environmental impact assessments', were necessary actions that can be taken to deal with the ecosystem impact of resort development. All these components can be used to understand and mitigate the impact of the 'accommodation development' on the society and environment. The Physical Planning and Development Control Act 2002 (GOG 2002) deals with some of the issues mentioned, for example, EIAs are required by law for the development of facilities that may have environmental impacts. Infrastructural development will not

be considered in this research, and only the operational stage of the accommodation units is targeted, the stage at which MEWFs is managed on an on-going basis.

In this regard, resource and energy use and waste generation within the tourism accommodation units were also identified as having a heavy impact on the environment. Unlike the need for EIAs which is enshrined in law, the critical issues of resource and energy use and waste generation are not explicitly addressed by law. In this regard, the research seeks to understand how buildings that accommodate tourist impact on the sustainability of the whole island system previously defined as a complex interacting system of environment, society and economy. Since the study is focused on resource and energy use and waste generation the concept and tools of industrial ecology (IE) will be employed (see chapter 4). Moreover, the study will also take a strategic approach to sustainable development and sustainability and hence the strategic management concept will also be used, within the previously proposed (FSSD) (see also chapter 4). The main focus will be the consideration of how accommodation unit managers can address the issue of resource and energy use and waste generation reduction strategies. From this perspective, the accommodation sector is used to demonstrate how MEWFs reduction strategies and actions (sustainable development process) can be linked to the island sustainability vision and goals (sustainability), using the proposed 'adapted FSSD'.

Moreover, the economic benefits from tourism can conflict with the need for socio-ecological development and protection. This was recognised in the OECS, and in Grenada, the picture is quiet similar. In fact McElroy (2003) notes that Grenada is one of the Islands that is facing 'rapid growth and resource conflict' and the GoG (1987) acknowledges that tourism resort development in particular has environmental impacts especially as it relates to resource use and waste generation. There is therefore the need for some comprehensive analysis of the situation with developments that are taking place for tourism in Grenada. This research will seek to provide this analysis and to present a planning framework through the adapted FSSD. As was previously noted the similarities of the other islands in the OECS should render this planning framework suitable to the rest of the OECS Islands. But before this framework is developed and similar to the investigation of the sustainable development work in the OECS, a brief analysis of sustainable development work is done for Grenada. More specifically, policy considerations in this regard is the focus,

since it was argued in chapter 2 that policy is needed to direct the island sustainability vision.

3.6.4 Sustainable development in Granada

Ensuring that the country adheres to the implementation mandates of the SGD, Grenada produced the National Environmental Policy and Management Strategy (NEPMS) (Government of Grenada 2005). This document (NEPMS) is the most general policy document that governs socio-economic development in the context of the socio-ecological system. Moreover, the document is not sector specific, and thus provides a more holistic approach to the sustainable development process and can direct the sustainability vision of Grenada. The NEPMS however, is now over eight years old, and came on the heels of the major tropical storm-Hurricane Ivan which totally devastated the island. The NEPMS notes that "This disaster has created a number of severe environmental problems, but it has also presented Grenada with the unique opportunity to integrate environmental management concerns into the country's development vision, strategies and programmes" (Government of Grenada 2005 p. 1). However, Grenada has almost fully recovered from the hurricane, but the need to consider the environment within developmental vision still remains a concern. For example, the need to manage sources of waste from within and out with the country, with the expressed view of restoring natural cycles and reducing chemical hazards is still very critical in 2013 and beyond (Government of Grenada 2005).

More importantly, and in the context of this research, the NEPMS suggests the development of "... a coherent framework to ensure that development is environmentally sustainable, while optimizing the contribution of that environment to economic, social and cultural development in the short, medium and long terms" (Government of Grenada 2005 p. 7). The framework as proposed should consist of: the policy process; institutional arrangements; legal planning instruments; economic instruments; financing, technology; research and communications and policy monitoring and evaluation (see Government of Grenada 2005 pp 13-19). To support the framework eight strategies for the implementation of the environmental policy were developed (see Government of Grenada 2005 pp. 19-20). The strategies can

be considered as strategic policy standpoints, and the six relevant ones are shown below:

Standpoint 1: Maintain and enhance the natural productivity of ecosystems and ecological processes

Standpoint 2: Optimise the contributions of natural and environmental resources to economic development

Standpoint 3: Optimise the contribution of natural and environmental resources to social and cultural development

Standpoint 4: Prevent and mitigate the negative impacts of environmental change and natural disasters and build resilience to these

Standpoint 5: Maintain and enhance the contribution of the environment to human health

Standpoint 6: Fulfil regional and international responsibilities and capitalize on opportunities that accrue from regional and international networking

However, the NEPMS, like the SGD for the OECS has similar draw-backs. These issues were previously presented and in sum they were the need to: 1) set an island sustainability vision within socio-ecological limits; 2) clearly establish a pathway for business enterprise and now the tourism sector to move towards that vision and 3) generate sector specific indicators form policy standpoints and then ensuring that they can meet the intended policy direction. The adapted FSSD therefore can address these short-comings and more importantly it can assist with 'how' the tourism accommodation sector can align the strategic actions for sustainable development with the agreed island sustainability vision. The policy standpoints above which are intended to drive the direction towards sustainability will form a critical part of the adapted FSSD and is comprehensively analysed and discussed in chapter 4.

3.6.5 Green economy in the Grenadian context

More recently the Government of Grenada has turned its attention towards the international trend of the 'green economy'. As was debated in chapter 2, the idea of a green economy appears to be taking on renewed focus. To this end the Government of Grenada embrace the design of a comprehensive roadmap for

mapping the way towards a green economy for the smaller island of Carriacou. Although this roadmap was specific to the smaller island, the considerations provide a view of what may be required to transition Grenada to a green economy. In this regard the roadmap can serve as a template for not only Grenada but all SIDS including the OECS islands in this study, that are hoping to transition to green economies. According to the UNDESA (2012b pp.1-2):

"The primary objective of this study is to design an integrated strategy, ... for the transformation of the economy of [Grenada], Carriacou and Petite Martinique into a greener and more sustainable economy. The study seeks to design an approach for a transition to sustainable development... The experiences and lessons learned from this study will provide valuable information and awareness for other SIDS. The study will generate knowledge about the most important development blocks necessary for sustainable economies of SIDS with similar challenges and objectives".

Additionally, in presenting the roadmap, the UNDESA (2012b) suggests that with a transformation of the economy to a green one, that an approach for transitioning to sustainable development or more specifically sustainability can also be achieved. This is instructive and is aligned to the argument put forward in chapter 2 in which the green economy is proposed as the interaction of the three pillars of sustainable development and the considerations that must be afforded them in the transition to a green economy. Moreover, and in the context of the proposal by the UNDESA, the green economy can also be considered as an enabler of the sustainable development and cuts across the three pillars of sustainable development (ICC 2011).

More specifically, there are some critical aspects of the roadmap that are relevant to the context of this study. Firstly, the roadmap focuses on critical resource development similar to the issues addressed in section 3.1, and are considered for further study in this research. These are energy resources and water resources UNDESA (2012b). Secondly, tourism and environmental sustainability are two areas further considered. In this regard opportunities and challenges of ecotourism are analysed; while environmental sustainability addresses critical concerns such as coastal and hillside erosion (UNDESA 2012b).

But the roadmap appears to suffer from the short-comings associated with sustainable development and sustainability. The roadmap appears to have the green economy as the main outcome of the implementation of the projects identified. For example, 'the primary aim to transform the economy of Carriacou and Petite Martinique to a greener and more sustainable economy is testimony to this observation. From this perspective the island sustainability vision and goals, which includes the socio-ecological system and the limitations it imposes is not explicit. The green economy roadmap can therefore benefit from the island sustainability vision and the planning approach proposed can be adapted for this roadmap.

For example, it is noted in the roadmap that water and energy and wastewater treatment were considered as limitations to a proposed ecotourism development on the island. According to the UNDESA (2012b: 85) "Water and energy system viability, wastewater treatment and the disposal of waste while minimising external costs on the environment are indispensible in areas of physical tourism development facilities". The transition to a green economy therefore should not exclude the development of the island sustainability vision, even when embarking upon ecotourism development. This is akin to the outcome of this research, which is to provide a planning framework that links these activities for ecotourism development, albeit in the accommodation sector, to the island vision for sustainability. How this implementation can occur is demonstrated in chapter 9.

Chapter summary

This chapter laid the foundation for establishing the island sustainability vision and goal and comprehensively presented the case study region and island. The Organisation of Eastern Caribbean States (OECS) which is a group of small islands in the Caribbean was the chosen region, while Grenada which is an island in the group was presented as the case study island. The chapter presented the cases from the perspectives of sustainable development and specifically to tourism and the tourism accommodation sector in Grenada.

Three critical conclusions were drawn. These is the need to 1) establish an island sustainability vision and goals based on MEWFs and within socio-ecological limits; 2) clearly establish a pathway for business organisations and specifically the tourism accommodation sector to move towards that vision and 3) generate sector

specific indicators form policy standpoints that can be used to measure the impact of the tourism accommodation sector activities on the island sustainability vision and goals.

CHAPTER 4: FROM SUSTAINABLE (TOURISM) DEVELOPMENT (S[T]D) TO STRATEGIC SUSTAINABILITY (SS)

Chapter Introduction

The main focus of this chapter is to generate the research aim and questions and to draw-out critical themes and sub-themes that will serve as the headlines for the strategy content to be considered. The chapter is grouped into two sections. The first group consists of sections 4-1 to 4-3, while the second group consists of sections 4-4 to 4-10.

Section 4-1 to 4-3 begins with an argument for moving from sustainable (tourism) development to embrace a more strategic approach. To build on the strategic approach, the first order principles, that govern the success of the global socio-ecological, system are presented and explained. The generic framework for strategic sustainable development or FSSD (Robèrt 2000) is further discussed. In the final section of this group; the FSSD is reconceptualised and renamed for this research as the 'adapted FSSD'.

The second group of sections focuses on making the adapted FSSD operational. That is putting the strategy content onto the framework. As a precursor, a comprehensive analysis of the contributions that strategic management theory and industrial ecology tools and concepts make to the operationalization of the adapted FSSD is presented. Stakeholder theory literature and its use for selecting key stakeholders/actors in the island context is also analysed. The final section in the group is a critical and comprehensive analysis of the literature from which key research questions, themes and sub-themes are generated.

The chapter ends with a summary of the key outputs of this analysis, vis-a-vis: a summary of the key research questions, objects and themes and sub-themes generated from the literature review. These research questions and themes will guide the development of the strategy content and process, which will be further formulated into a set of procedures for applying strategic sustainability.

4.1 Why strategic sustainable (tourism) development

An introduction to the complexity of the island system was previously done in chapter 3 and the commentators on the STD concept have recognized the critical importance of an understanding of complexity within a tourism destination. The argument was also made for an understanding of the island system and by extension the tourism destination, in the context of the key principles that govern the socio-ecological sub-systems.

Therefore the island system which is regarded in the tourism lexicon as a tourism destination is complex. In making the case for driving the study of tourism towards a more multi-disciplinary approach and in the face of new knowledge, Farrell and Twining-Ward (2005 p. 109) admonishes the tourism academe to consider the concept of complex adaptive systems or social-ecological systems in their research. And Schianetz and Kavanagh (2009) produced research that encapsulates sustainability indicators within this complex adaptive system. However, the system as a whole and the understanding of the principles that define the socio-ecological aspects of the system are not always explicit. With a principle-based approach the activities of the tourism sector which operates in the socio-economic system can be addressed.

Robèrt et al. (2000) developed an innovative and scientifically sound method of studying complex systems. They coined the term “simplicity without reduction” to describe this concept (Robèrt et al. 2000 p. 4). It is apparent that a search of the literature has not revealed an application of this approach to island studies. However, to some extent, the approach was applied in the tourism academic domain as two unpublished theses from the Masters in Strategic Leadership towards Sustainability (MSLS) of the BTH have addressed two tourism projects. These however, have not been addressed within the island context.

As the authors and thinkers of this concept reiterated, the use of the reductionist approach to understanding problems in a system, isolates certain sections of the system for study, while ignoring certain realities or making close approximations on the impact of the system (Robèrt et al. 2000, Robèrt et al. 2004). As the authors point out the simplicity without reduction method is used “... out of respect for complexity, in contrast to ignoring parts of reality to (seemingly) reduce

complexity" (Broman, Holmberg and Robèrt 2000 p. 4). The method is further explained through the use of the 'trunk and branches metaphor' (Robèrt et al. 2000). This metaphoric depiction is applicable to this research, in that the research seeks to determine the impact of tourism accommodation operations in an island system. Now it is very easy to begin looking at the details of the accommodation sector, especially through the STD lens, without been mindful of the principles that define and dictate the socio-ecological factors of the island system in which the accommodation units are located. Robèrt et al. (2000 p 5) notes that:

"It is understandable that environmental, economic and other societal problems have been tackled by studying a few details, while neglecting or making rough assumptions about other details at the same or close levels of detail. In complex systems it is impossible to keep every detail in mind at the same time. But to efficiently handle complex systems it is helpful to first look for the principles that define the system and then, if necessary, move to higher levels of detail without neglecting the first order principles".

Invoking again the trunk and branches metaphor, the first order principles that govern the island system must first be established. These principles can be used to establish the foundation for crafting the island sustainability vision and goals. The socio-ecological system which can be used to craft the island sustainability vision is embedded in these principles. Additionally, the activities of the accommodation sector can be accessed through indicators that are linked to the socio-ecological system, and as such may ensure that these actions are not impinging on the principles that govern the island system. The indicators can be referred to as the leaves in the metaphor used to determine and assess "... various symptoms that are actually due to neglect of the first order principles, or measures such as technical designs or changes in behaviour as attempts to comply with the first order principles" (Robèrt et al. 2000: p 5). It is therefore critical to establish the 'trunks and branches', in this case the first order principles that establish the limits of the island system and fully accounts for the island context, before the leaves of analysing the accommodation sector and its attendant impacts are addressed. Robèrt et al. (2000 p 5) note that: "once the 'trunk and branches' are established, decision makers within various fields of expertise can undertake the measures required to meet the

principles “put on the leaves” without lost at the higher levels of detail than necessary for decisions makers.

An understanding of the first order principles is critically important for establishing the island sustainability vision, since without that understanding activities in the socio-economic system can lead to problem shifting in the system, a real and present danger for the system, especially within the island context. In this research therefore, the concept of island sustainability based on the first order principles of the socio-ecological system is proposed.

This approach provides a more robust method for all the actors in the island system, including those in the tourism accommodation sector, wishing to plan towards island sustainability.

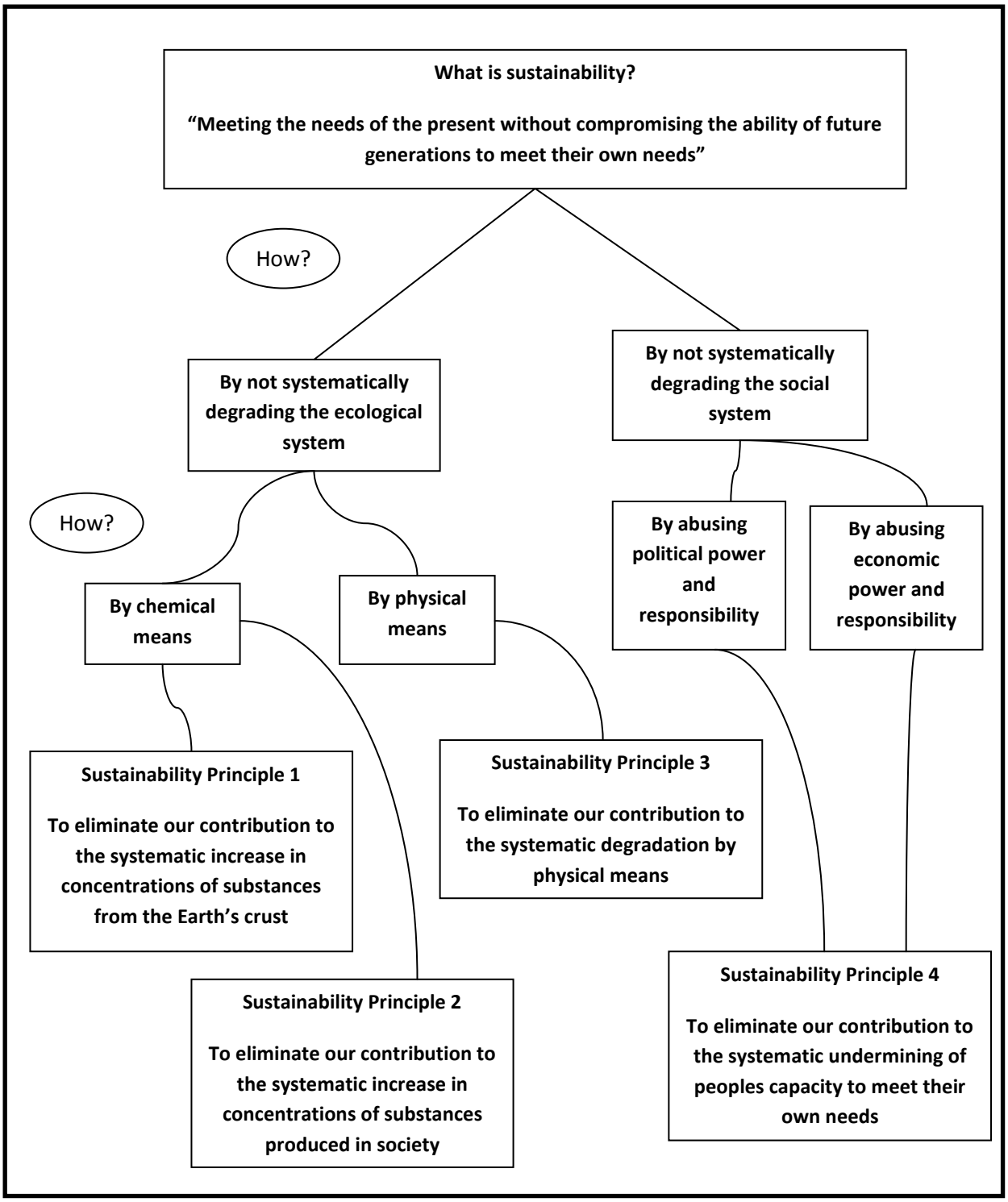
4.2 The First Order Principles

Two sets of first order principles are considered from the literature. Deschenes and Chertow (2004) and Kohonen (2004) note three principles postulated by Goodland and Daly, which are mainly focused on the environmental quality of the global system. The fact that the principles are only environmental can be problematic since it ignores the crucial social component that was discussed previously (see chapter 2). The social system is critical to the success of the global and island systems as a whole and if one considers the WCED’s definition of sustainable development, which in essence considers the use of resources in such a manner that present and future generations have equal access to them, it will be unwise to ignore the social system. In fact Robèrt et al. (2004 p. 30) note that the sustainability of any society, system, region, or business “... relies on two basic fundaments, a robust ecosystem and a robust social fabric or the socio-ecological system”.

In this regard, Robèrt and his colleagues at The Natural Step developed four principles based on the classical definition of sustainable development (Robèrt et al 2004). Before these are presented, the principles from Goodland and Daly were compared in a paper ‘A compass for sustainable development’ (see Robèrt et. al. 1997). In this regard Korhonen points out that the Daly and Goodland principles were not designed for the strategic sustainable development framework that was derived

from the Robèrt et al.'s (2000, 2002) principles and originally selected for use in this research (see chapter 2).

Figure 4-1: The derivation of the global sustainability principles



Adapted from BTH.se

Therefore in Figure 4-1 the basic premise upon which these global principles were derived is presented. It is shown that the ecological system can be degraded by both chemical and physical means and due to these understandings, principles 1 to 3 were derived. Similarly the social system was shown to be affected through the abuse of political and economic power. These abuses it is suggested led to the development of principle 4. The sustainability principles or SPs as developed by Robèrt et al, (2004: p xxv) are:

In “a sustainable society, nature is not subject to systematically increasing...

I ... concentrations of substances extracted from the Earth’s crust,

II ... concentrations of substances produced by society,

111 ... degradation by physical means

and in that society...

IV ... people are not subject to conditions that systematically undermine their capacity to meet their needs”.

These principles will be conceptualised and re-worded as island sustainability principles in a subsequent section of this chapter.

4.3 The framework for strategic sustainable development (FSSD)

The framework for strategic sustainable development (FSSD) (previously presented in chapter 2), which was developed from the first order principles, has provided a fresh and solidly academic approach to the conceptualization and operationalization of sustainable development and sustainability. Korhonen (2009 p. 335) notes that “Robèrt’s group has done ground-breaking work in getting pioneers of sustainability science to achieve a scientific consensus on the definition of sustainability and sustainable development”. The framework differentiates between sustainable development and sustainability and the debate on this was already presented in chapter 2. In the context of islands the determination of the general movement towards sustainability is urgently needed. But sustainability is not an end-sate in itself, for once the sustainability principles are achieved then all other activities within the sub-systems “... can continue in an on- going development

process (note that is not the same as economic growth" (Korhonen 2004 p. 810). The first order principles presented previously can be used to establish goals for ALL the actors in the island system to achieve, but they do not indicate how they can be achieved. The goals can be considered as the island sustainability goals and this will be comprehensively developed in a subsequent section in this chapter.

The FSSD therefore is an excellent tool which will be used to define the island sustainability goals and to align the strategic sustainable development actions and/or processes in the tourism accommodation sector to the proposed goals. The FSSD is therefore proposed for planning, achieving and maintaining a sustainable socio-ecological system in complex systems such as Islands. However, the FSSD should be adapted to suit the purposes of the island context and to include the theoretical aspirations of this research. The subsequent section presents a detailed analysis and synthesis of the re-conceptualised or 'adapted FSSD'.

4.4 Re-conceptualizing the FSSD-Introducing an 'adapted FSSD'

The FSSD has been comprehensively developed and applied in many contexts and the strategic methods and processes are well defined (see Robèrt et al. 2004). But it was further shown when the original FSSD was introduced in chapter 2, that the FSSD has the ability to link public policy standpoints that can drive island sustainability goals, with the strategic actions and activities of the tourism accommodation sector. Additionally, the impacts of these actions on the island sustainability goals can be measured using indicators that are generated from public policy standpoints. So for the purposes of the research it is important to adapt the FSSD.

More importantly, public policy standpoints can provide the relevant direction for sustainable tourism development. Moreover, this development should be in sync with the general direction towards island sustainability. Simão and Partidário (2012) conclude that "... tourism development should be guided by principles of sustainability". These principles are proffered as the first order principles that govern the socio-ecological system of the island.

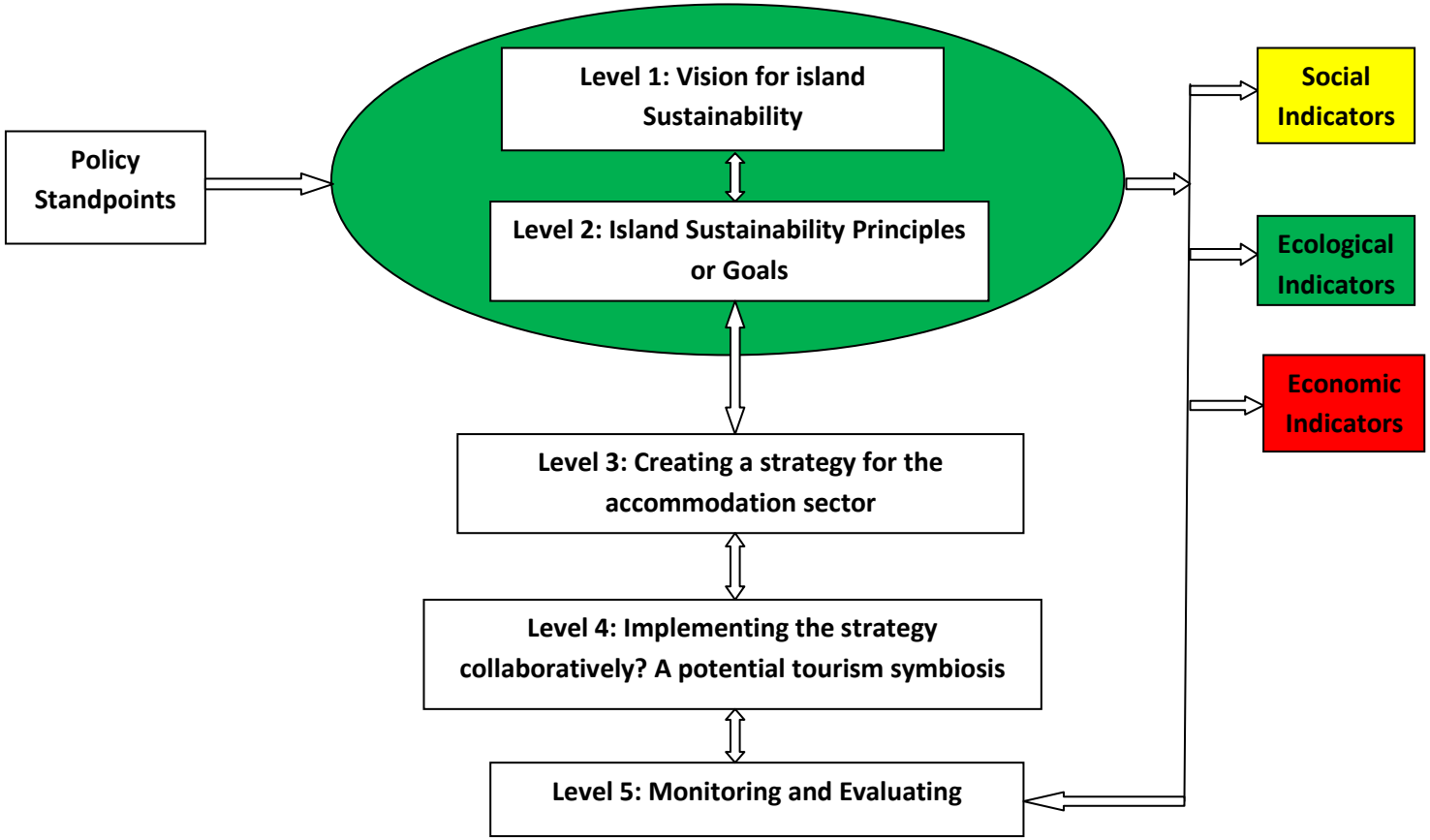
The adapted FSSD is shown in figure 4-2 and it is divided into two main parts. Part 1 consists of levels 1 and 2 where the island system and vision for island

sustainability are defined. These two levels although their must remain separate and maintain their hierarchical nature, are theoretically combined to provide the overall picture of the ultimate vision of a successful island system and the goals that each sector, business, organization must work towards to ensure that the island system is successful at moving towards sustainability. The two levels are therefore encapsulated into a green circle that suggests the ecological and social limits that define a successful (island) system.

Suffice it to say at this point, that policy and management decisions, can affect the island sustainability vision, both negatively and positively as decision-makers seek to achieve economic, social and ecological development. It is critical in this regard to evaluate and monitor the impacts of these decisions so that they do not violate the success of the system and to also prevent excessive deviation from the island sustainability goals. The box to the left demonstrates the impact on the system or the stimuli, which were already identified as policy standpoints in chapter 3 and are subsequently developed. These can generate outcomes or responses in the form of indicators that may hopefully be fed into the monitoring and evaluation required at level 5 of the adapted framework (see also subsequent section in this chapter).

Together, levels 3, 4 and 5form the second part of the adapted FSSD and they are specific to the strategic approach that the tourism accommodation sector may embark upon to align with the island sustainability vision and goals. Collectively these levels are referred to as the ‘sector strategic levels’. At level 3, the sector vision is established and is created to be congruent with the goals of island sustainability. At this level a comprehensive understanding of the flows of materials within the sector is also determined. Thus the sector vision is supported by the MEWFs. Moreover, this level is crucial, since it serves as the link between the principle based levels of the model (Levels 1 and 2)-the vision and goals for Grenada’s sustainability and the sector actions aspects of the model (Levels 4 and 5).

Figure 4-2: The re-conceptualized 'adapted FSSD'



Author's conceptualization using Robèrt 2004

At level 4 the potential for ‘un-covering’ MEWFs reduction opportunities in the sector is done. The tourism actors may wish to consider a collaborative approach to the reduction of material flows in the sector, which may lead to the possible conceptualization of a ‘tourism symbiosis (ecosystem)’, a key output of the research. Finally at level 5 an evaluation and monitoring regime is established. The indicators which form a critical part of this regime are linked back to the indicators generated by the policy standpoints.

Based on the nature of the research, that is to study the MEWFs on both an island scale and within the tourism accommodation sector and to develop a strategic approach to doing so, three concepts are applied: strategic management, stakeholder theory and industrial ecology. In the case of the former the strategy process, content and context are considered (see Baumgartner and Kohonen 2010). Relating to industrial ecology materials flow analysis (MFA) is used to develop the strategy content, or in other words, operationalize the adapted FSSD. Additionally, industrial symbiosis, a key concept within industrial ecology is drawn upon in the conceptualised tourism symbiosis (ecosystem).

4.5 Strategy Process, Content and Context

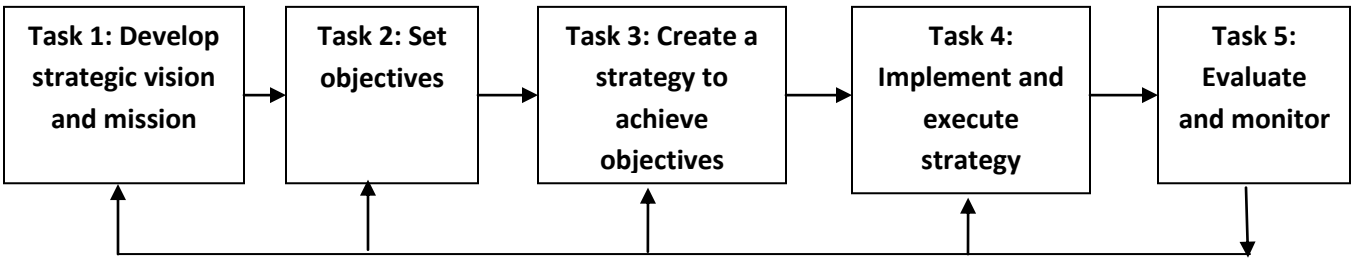
In further support of the adapted FSSD (FSSD) to be used as a tool to address the failures of the applications of sustainable development and sustainability, Baumgartner and Kohonen (2010 p. 71) propose that “... one of the main explanations is that the approaches used in sustainable development are reductionist and often lead into problem shifting and problem displacement (already debated). In this regard they further propose that ‘strategic thinking’ and its incorporation into sustainable development work in general” is needed and that strategy content, process and context are three “dimensions” that must be considered (Baumgartner and Korhonen 2010). The applications of strategy content and process and to some extent context will be fully applied in the research and will be the first set of concepts used for operationalizing the adapted FSSD.

But bearing in mind one of the issues addressed by this research, which is to consider a solution to the environment/development conflict manifested in the

operations of the tourism accommodation units in the OECS and Grenada, and being cognizant of the problem shifting scenario previously discussed, the strategy content "... dimension secures that the framework, ..., in question contributes to sustainability" (Baumgartner and Korhonen, 2010 p.74). In this regard the adapted FSSD both provides the 'skeletal framework' for ensuring that proposed planning can lead to island sustainability. However, the framework needs to be further developed and this will be done at each level. The various themes and sub-themes of the strategy content are developed subsequently. **This outcome will be fully researched, discussed and debated.**

The strategy process dimension "... outlines the way in which the entire strategy of the framework, ..., in question is formulated and constructed to achieve the intended content and purpose (Baumgartner and Korhonen, 2010 p. 74). Thompson and Strickland (2001 p 7) list five tasks of strategic management and these are presented in figure 4-3. These tasks moves form a vision and mission development to the last task of evaluating and monitoring, with feedback points back to each task.

Figure 4-3: The five tasks of strategic management



Source: Adapted from Strickland and Thompson (2001 p. 7)

It is apparent that the FSSD is similar to the five tasks shown in figure 4-3. These tasks capture the important steps that are needed to guide the process of developing the substance required for the strategy content. In other words the 'process of placing the meat' on to the framework in the context of the research is also outlined in figure 4-3. These tasks will be applied at each level of the adapted FSSD, while the content will be gathered from the surveys.

Additionally, Simão and Partidário (2012 citing Wheelen and Hunger) suggest that tourism strategic planning should occur within the general strategic management process, which involves four key steps: analysis, formulation, implementation, and performance evaluation. From a general perspective these steps align with both the adapted FSSD and the 'five tasks of strategic management'. However, these strategic planning frameworks **do not explicitly show how the island sustainability vision and goals can be made congruent with the strategic development processes in the tourism accommodation sector. Hence this research will seek to further demonstrate how the strategy process can be enhanced to address this concern. This is the second main outcome of this research (see chapter 2).**

Baumgartner and Korhonen (2010 p. 74) further suggest, that "It is important to include all primary stakeholders ... "in the formulation and construction of the framework to "achieve the intended content and purpose". Additionally, the strategy context dimension considers "... the perception of the secondary stakeholders". That the perception, influence and input of all actors/stakeholders are vitally important to the success of this research merits a review of stakeholder theory and selection, especially within the island context. This review is done to inform the careful selection of a sample of stakeholders for developing the strategy content, especially at part 1 of the adapted FSSD.

4.6 Stakeholder theory and Islands

Island stakeholders are required to gather strategy content and to address strategy process. The island has been compared to the organizational setting of a company, as "... islands are a group of resources just like companies" (Graci and Dodds, 2007 p. 19 citing Ryan). Within this context the stakeholder organization relationship can be applied to the study of islands and is also applied in this research. As it relates to tourism destinations, Graci and Dodds (2007 p. 18 citing Bramwell and Lane and Ioannides) note that "... sustainable tourism is the responsibility of all stakeholders and because of this, there is a need to understand stakeholder roles and their role in sustainable tourism practices". The idea of stakeholder theory, not only in the tourism domain, has transcended from studying an organization's responsibility to

its stakeholders towards stakeholder identification, responsibilities and power (Graci and Dodds 2007 p.18). An understanding of the stakeholder and been able to effectively identify and determine their responsibilities and power is critical to making the proposed adapted FSSD operational.

A stakeholder is defined as:

"*any group or individual who can affect or is affected by the achievement of an organization's objectives. Thus a group or individual qualifies as a stakeholder if it has a legitimate interest in aspects of the firm's activities and has either the power to affect the firm's performance or has stake in the firm's performance*" (Graci and Dodds 2007 p. 19 citing Freeman).

All stakeholders can be categorized as having three attributes: power, legitimacy and urgency and based on these attributes, a typology of stakeholders can be identified (see Graci and Dodds 2007 pp. 20-21). For the purposes of this research the identification of stakeholders based on these typologies was suggested by Graci and Dodds, (2007 p.23) and a stakeholder map for island tourism destinations was developed. An abridged list with stakeholders that are relevant to the research is provided in table 4-1.

Table 4-1: Identified stakeholders

List of Island Stakeholders relevant to the Grenada
1. Tourism Planners (Grenada Board of Tourism)
2. Destination Marketing Association (Grenada Board of Tourism)
3. Local Business Association (Grenada Hotel and Tourism Association)
4. National Government (Ministers of Government for Environment, Tourism, etc)
5. Activist Groups (Non-Governmental Organizations)

However, the research is not only concerned with the stakeholder's that are primary to the sector. The island sustainability vision and goals at levels 1 and 2 are the concerns of a wider cross-section of stakeholders. In this context the secondary stakeholders, for example academics who claim to be involved with the sustainable development of Grenada are also included. This brief introduction is used to develop an appropriate sampling plan for selecting stakeholders to participate in the research.

4.7 Industrial Ecology

As was presented in earlier chapters, MEWFs in the accommodation buildings in the tourism sector is one of the main focuses of this research. In this regard the second concept applied to glean more content for the adapted FSSD is industrial ecology (IE). To provide a rationale background of the application of IE to the island context and adapted FSSD a critical literature analysis is first provided.

Deschenes and Chertow (2004) and more recently Chertow and Miyata (2010) defined the island context (discussed fully in chapter 3) and they have also established the link between the island context and system to industrial ecology. In the Authors' opinion industrial ecology can learn from its application in the island context and vice versa (Deschenes and Chertow 2004). The study of IE and the application of IE within the island context can be critical to the achievement and maintenance of sustainability in islands. According to Deschenes and Chertow (2004) and Chertow and Miyata (2010), due mainly to their scarce resources, energy availability and waste assimilative capacity, island sustainability was of importance to industrial ecologists. This is deeply rooted in the MEWFs.

Lenzen (2008) further studied material flows from a life cycle perspective on Norfolk Island and he was able to "... demonstrate exceptional sustainability performance in terms of material flow ..." (p. 2018). Two critical conclusions from Lenzen's (2008 p. 2034) work are noted: "Attempting to reduce the material metabolism of an island community has at least one critical advantage over short-term solutions: it reveals to the decision maker the real magnitude of scarce resource needs and constraints of an island-setting, ...". Secondly, he concludes that "In a future of depleted resources, ..., island communities will sooner or later focus their attention on these real issues: to understand and live within the limits posed by their finite paradise". These very important conclusions further demonstrate the need for islands to urgently investigate the material flows of the whole island and within sectors as decision-makers strive towards sustainability in island societies. This is done for Grenada and discussed in section 4.8.1.

More specifically, the 'theoretical' application of IE within the FSSD and by extension the adapted FSSD was attempted by Korhonen (2004). From this application, many suggestions were applied in practice for this research (see Korhonen 2004 p. 817 for details of the suggestions). More importantly, one critical conclusion emanating from the study was that, "... if IE is used outside the systems model, four risks and difficulties are generated that can lead to suboptimal solutions, problem displacement and problem shifting" (Kohonen 2004 p.809). It was apparent that "... IE has been developed without a strategic perspective and [The] lack of strategic thinking and understanding can lead to reductionism and costly piecemeal approaches..." (Korhonen 2004 p. 820). Drawing on this conclusion IE can contribute to the development of the required strategy content for the adapted FSSD and the IE concept can benefit from its application within the FSSD.

Moreover, the IE concept is rooted in a systems and resource perspectives. Its roots can be traced to the manufacturing sector and the concept was made popular by the Frosch and Gallopoulos (1989) article: *Strategies for Manufacturing*. From the resource perspective the applications of IE include amongst its repertoire, materials and energy and waste flow analyses (e.g. Gallopoulos 2006; Krones 2006; Ramasswamy 2004; Erkman 1997; Greadel and Allenby 2003). From the systems view, IE proposed that the neoclassical concept of economic activity or 'throughput' is replaced by 'round-put' or a closed loop system Korhonen (2004). The system therefore is akin to what the IE literature described as a Type 111 industrial ecosystem, in which solar energy and limited resources enter the system; waste is recycled and energy cascades occur and thus limited waste and pollutants exit the system (Korhonen et al., 2004; Krones 2007). The conceptualisation of round-put and the important tool of material and energy flow analysis (MEFA) are applied to the adapted FSSD and are further developed in subsequent sections. Kronenberg (2006) summarizes the key issues and principles that stem from the definitions of IE and those that are applicable to this research at part 1, the 'vision and goals level of the adapted FSSD, include: 'learning from nature'; 'the economic system is embedded in nature', 'closing the loop' 'focus on life cycle' and 'systems perspective to studying the environment-economy nexus'.

Additionally, MEWFs are addressed at levels 2, 3 and 4. In this regard one of the central concepts of industrial ecology is applied, that is industrial symbiosis (IS). According to Sokka, Melanen and Nissinen (2008 p. 519 citing Chertow), “An ideal IS utilises the waste materials and energy between actors of the system and thereby reduces virgin material and energy inputs and waste and emissions output”. Additionally, Chertow and Miyata (2010 citing Chertow 2000), define Industrial symbiosis as “... a collective approach to competitive advantage involving physical exchange of materials, energy, water and/or by-products by clusters of companies in geographic proximity”. According to Posch, Agarwal and Strachan (2011p. 421) with the implementation of industrial symbiosis “... it is anticipated that the industrial impact on the natural environment can be reduced. In addition, the competiveness of the participating companies can be improved as a result of the savings in raw materials and/or waste disposal”. The IS therefore appears to be an essential strategy which can be applied in the tourism accommodation sector for reducing MEWFs and thus moving towards the vision of island sustainability, while improving the competitiveness of the participating tourism accommodation units.

From a practical perspective a “3-2 heuristic” is used to differentiate an industrial symbiosis form other types of clusters or exchanges of materials (Chertow 2007 p.11). In this regard, the industrial symbiosis is for example, ‘a wastewater treatment plant supplying cooling water to a power station which in turn provides steam to an industrial user’ (Chertow 2007). Additionally, exchanges that do not meet this basic criterion were described as a ‘kernel’ or ‘precursor’ which is used to describe “bilateral or multilateral exchanges ... and has the potential to expand...” (Chertow 2007 p.11). Since compared to industries such as manufacturing, the tourism sector is not considered to be a ‘dirty’ industry (Schendler 2007), this heuristic may be difficult to achieve. However, it was debated in chapter 3 (section 3.6.3) that resort tourism has tremendous impact on the environment and as such symbiosis will be a useful strategy for reducing the impact of the resorts on the environment. In this regard a ‘tourism symbiosis’ will be conceptualised as a critical part of the proposed strategy content and process step. For the purposes of this research the proposed tourism symbiosis is defined as ‘**an exchange of materials, energy and information amongst tourism accommodation**

units and other external organisations in an effort to reduce material flows and achieve island sustainability while maintaining competitive advantage of the individual units'.

4.7.1 Industrial Ecology- bridging the engineering/social sciences gap

But IE is buried deep in the engineering/physical science domain and addresses these with many tools and actions (MFA and industrial symbiosis) that can lead industry and the tourism accommodation sector to use resource and energy and deal with industry waste in a manner that depicts the natural ecosystem. In this regard, recycling of materials (resources) and energy cascades are suggested as key strategies. These actions are considered subsequently as a part of the proposed tourism symbiosis. However, this research is also interested in the social sciences perspective, that is, the social aspects of the socio-ecological system that limits sustainable development processes in the socio-economic system and which can be used to craft the vision of island sustainability. Island stakeholders/actors' views and perspectives concerning the flows are critical to the achievement of island sustainability. Additionally, the exchange of management information and decision making are critical to the success of the proposed tourism symbiosis. Sokka, Melanen and Nissinen (2008 p. 519 citing Mirata and Emtairah) suggest that "An IS can also include the exchange of information..." and this was already considered in the definition of the proposed tourism symbiosis. However, the critical point of this research is to first determine the factors that are necessary to make the decision to collaborate in the proposed tourism symbiosis. This will be debated in a subsequent section.

In this regard management decisions and policy standpoints impact the island system (see figure 4-2: adapted FSSD). The social system is also a vital component of the island sustainability vision. Rosenthal-Cohen (2000 p. 246), argues that "… industrial ecology is a social construct" and problems within the environment are problems only when "… the societal actors, engage in a societal response to deal with the problem" (Korhonen 2000 p. 253). These actors operate at both the regional and organizational fields (Ashton 2008). "Industrial (societal, including consumption) actors would implement this material and energy flows through cooperation in an inter-

dependent manner and within a holistic systems approach" (Korhonen, Savolainen and Ohlström 2004 p 1087).

But most industrial ecologist focus on quantitative approaches and tools and have ignored to some extent the management and policy aspects that are critical to making the approach more 'strategic'. But in recent times the need to bridge the original engineering/physical science disciplines to that of the social sciences has been promulgated. Korhonen et al. (2004 pp. 296-300) and Korhonen, (2005 p. 150), suggest three themes that can be used to bridge this gap:

1. *'Inter-organizational management studies;*
2. *Development and management of industrial ecosystems;*
3. *Industrial ecology as a vision and source of inspiration for management strategy.'*

More importantly also is the suggestion by Baumgartner and Korhonen (2010 p. 73), that the use of strategic thinking applied to the FSSD can initiate "... the combining of social science theoretical and conceptual work to natural science tool, indicator, modelling and metrics work". They identified the gap between the natural science/engineering tools and the social sciences as "... been one of the main causes of fragmentation, reductionism and problem shifting in sustainable development" (Baumgartner and Korhonen 2010 p. 73) . The re-conceptualised adapted FSSD would not only attempt to bridge the identified gap, but in this regard would also be an excellent tool for planning towards sustainability in the complex island system and context

The interplay and complementary nature of IE, the island context and the adapted FSSD is vitally important to the development of the strategy content needed as the main outcome of the research. More importantly, recognizing the island context, the MEWFs to be considered, the fair of problem-shifting and the attendant strategic approach to sustainable development that the literature review have previously revealed, bridging the engineering/physical sciences and management and business gap is a further critical outcome for this research. In this regard the research will draw on and attempt to apply and discuss the bridging themes proposed above. The need for

a more strategic, pragmatic and academically sound approach to defining the island context and for providing a framework for doing planning towards its sustainability is also revealed. This researcher humbly hopes that this research can meet these needs.

Been cognisant of the arguments in chapters 2 and 3 and the proposals previously articulated in this chapter, the aim of this research is to:

make operational an 'adapted framework for strategic sustainable development (adapted FSSD)' that applies industrial ecology concepts and tools and the strategic management approach, to develop strategic sustainability procedures for the tourist accommodation sector in an island context and with a roadmap for a green economy.

4.8 Generating research questions and themes

This final section of the chapter considers in comprehensive detail the critical components at each level of the adapted FSSD with the expressed view of drawing out themes and sub-themes and developing research questions that will guide the field work of the research. This effectively establishes the theoretical strategy content to be researched and analysed.

4.8.1 Theme 1: Vision and goals for island sustainability

4.8.1.1 Level 1 in the FSSD- 'Society in the Biosphere'

The vision for island sustainability is developed based on the global perspective of biogeochemical flows and the need to remain within 'safe operating space for humanity' (Rockström 2009). The first consideration is to understand the nature of the 'whole' system and how 'society' and all its components operate within it. The global system provides an excellent example of this operation in terms of materials and energy flows into and within it. The reality of the system is that in a sustainable society, which is encapsulated by a closed ecosystem, only energy is allowed to be exchanged. The biogeochemical flows and exchanges in the ecosystems are governed by laws and as such waste is non-existent and energy only is allowed to enter the system. The natural system operates thus.

"In the global system matter is extracted from the lithosphere and is used by society; waste is generated and absorbed by the ecosphere; energy enters the system and provides structure to matter and society should use resources in such a manner that it is within the constraints of the laws of nature. These flows occur in delicate balance controlled by nature" (Robèrt et al. 2004 pp. 32-33).

Robèrt et al. (2004) further summarize the principle understanding of the conditions on which we live on earth:

- the conservation laws
- the second law of thermodynamics
- material value is concentration, structure and purity
- photosynthesis is the primary producer in the system
- humans are inherently a social species

These principles have provided the bird's eye view of the system. In a sustainable system as the 'island system' which this research is attempting to envision, the limits of the ecosystem and the social fabric must be considered. Coupled with this the island context was previously described in chapter 3 and the limiting control placed on economic activity by the ecological system was explained. However, the island system can also be aligned with the global system. Theoretically, the island can be viewed as been open only to energy from the sun and any other organization, sector, etc, within the island can be viewed from the 'society in the biosphere' perspective. Although other resources such as materials and energy from fossil fuels cross into the island system, it is still possible to subject the island system to these laws. If this subjection is not done then the manipulation of sectors within the economic subsystem would not ensure that the actors are moving towards a successful island system that equates to 'island sustainability'. The fact that the materials that flow into the island system can be controlled, due to the bounded nature of the island, also supports the assumption that energy is the only natural 'substance' that should flow into the island system.

In this regard, the sustainability concern of material flows into and within the island of study should be described so as to obtain an upstream and holistic perspective of the island system. The concerns of MEWFs within the tourism sector and amongst the sub-systems subsequently discussed can be more realistically understood from this perspective. It is instructive to consider that a significant portion of waste is generated from the consumption in the economic system, which in turn is generated from the importation of materials across the island boundaries.

The vision then for island sustainability, like the global system already discussed, should be to reduce MEWFs on a 'whole island' basis, if the general direction towards island sustainability is to be achieved. The case was made in chapter 3 (section 3.2) for an understanding of island sustainability from the following perspectives: (1) the island system is constituted of three interacting sub-systems-ecology, society and economy and (2) that success of the island system depends on the reduction of MEWFs within the island system; with the socio-ecological sub-system being the limiting system. The vision of island sustainability is built on this premise, and to be able to gain a picture of the system and the interactions amongst the sub-systems, descriptive models are constructed. Figures 4-4 and 4-5 are the two proposed descriptive models for Grenada. These models develop further the conceptualisation of the island system at part 1 of the adapted FSSD.

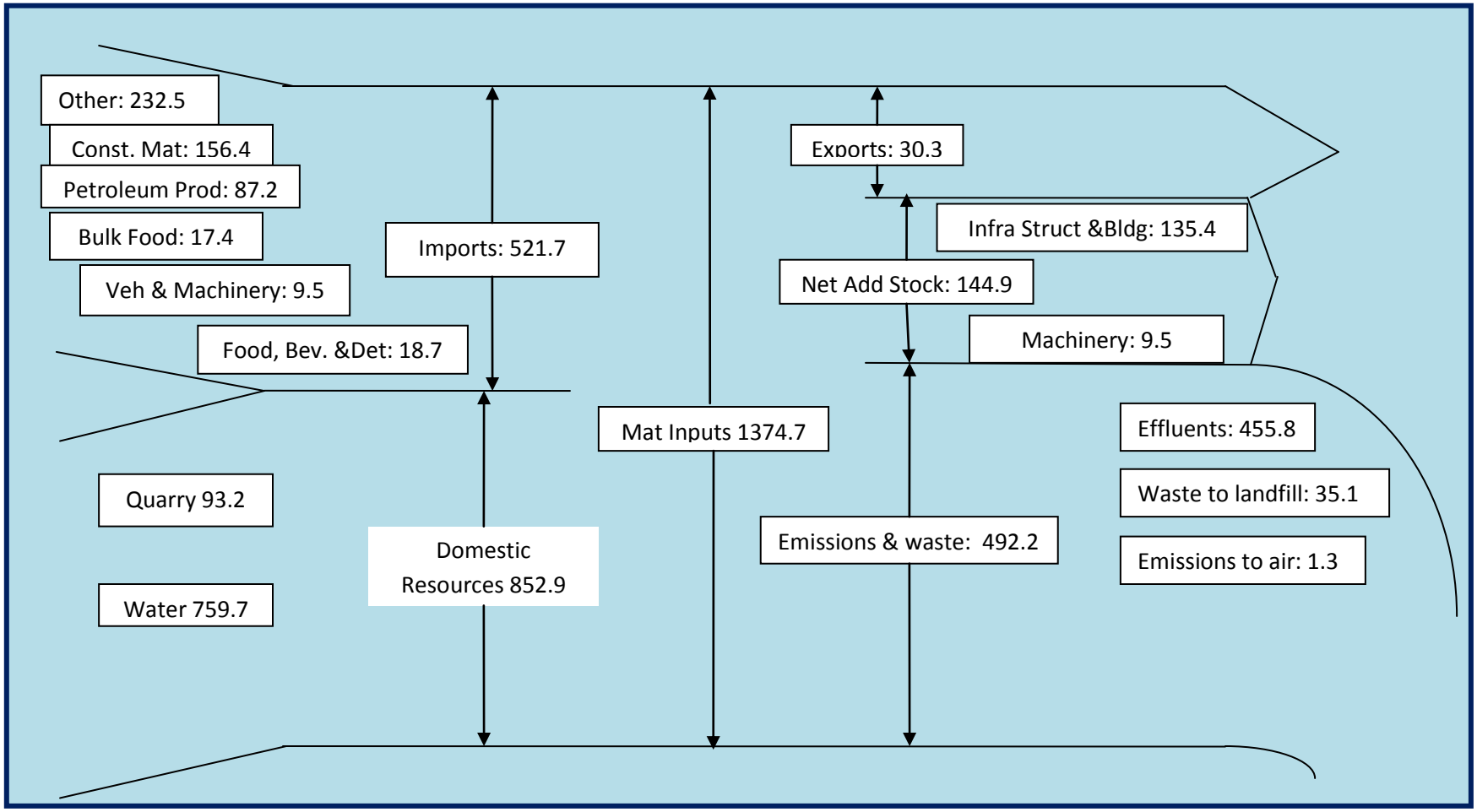
Figure 4-4 shows a materials flow diagram for Grenada, using 2010 data. The data used to develop the diagram were sourced from the main seaport of entry, water authority, waste management authority and estimates from the author's perspective. The materials and energy flows diagram was constructed, using Houseknecht et. al (2006 p.2), who describe a simple but robust method for data gathering and for calculating material flows on the Big Island of Hawaii. They propose the gathering of qualitative data through interviews and that of gathering quantitative data from published reports. This research used to the extent possible both approaches. To develop the qualitative description of material flows on the island level: data on imports gathered by the Main Port of Entry were collected. Waste flows were gathered from the only authority on the island that deals with solid waste, the Grenada Solid Waste

Management Authority (GSWMA). The National Waste Management Strategy for Grenada (2003), is the only existing comprehensive report on waste management in Grenada at the time of conducting the research. Water supply data were sourced from the only authority in Grenada that deals with water supply and sewage disposal, the National Water and Sewage Authority (NAWASA). Energy data were obtained from the only electricity supplier of energy, the Grenada Electricity Services and the importation of petroleum products was comprehensively recorded at the port of entry. All these secondary sources of literature provided estimates that were used to develop a description of the flows of materials in Grenada. All data are reported in Gigagrams and Excel was used to aid with the computations involved.

An example of how the data was manipulated to create the diagram is as follows. In the energy sector, the import data were verified using a top-down/bottom-up analysis technique (see Houseknecht 2006 p. 2). For example, the petroleum imports were record as 88 Gg of imported products. This is a top down analysis. The Grenada Electricity Services (GRENLEC) reported that 208, 728, 250 kWh of electricity was generated in 2010 at a fuel consumption rate of 16.22 kWh/gal (GRENLEC 2010); which equates to a consumption of approximately 12,865,579 gal of fuel. Using simple conversion factors of: 1 gal of diesel = 7.5 lbs and that 1 lb = 0.4563 kg, then the estimated use of fuel by the electricity company was 44.4 Gg of fuel. Indicating that about 51% of diesel is consumed for the generation of electricity, a figure that is consistent with the just about 40% of imports being used in that sector, with the other portion being consumed for transportation and other domestic and commercial uses (see Government of Grenada, 2011 p.13). The material flows table, showing quantities and assumptions is in appendix A.

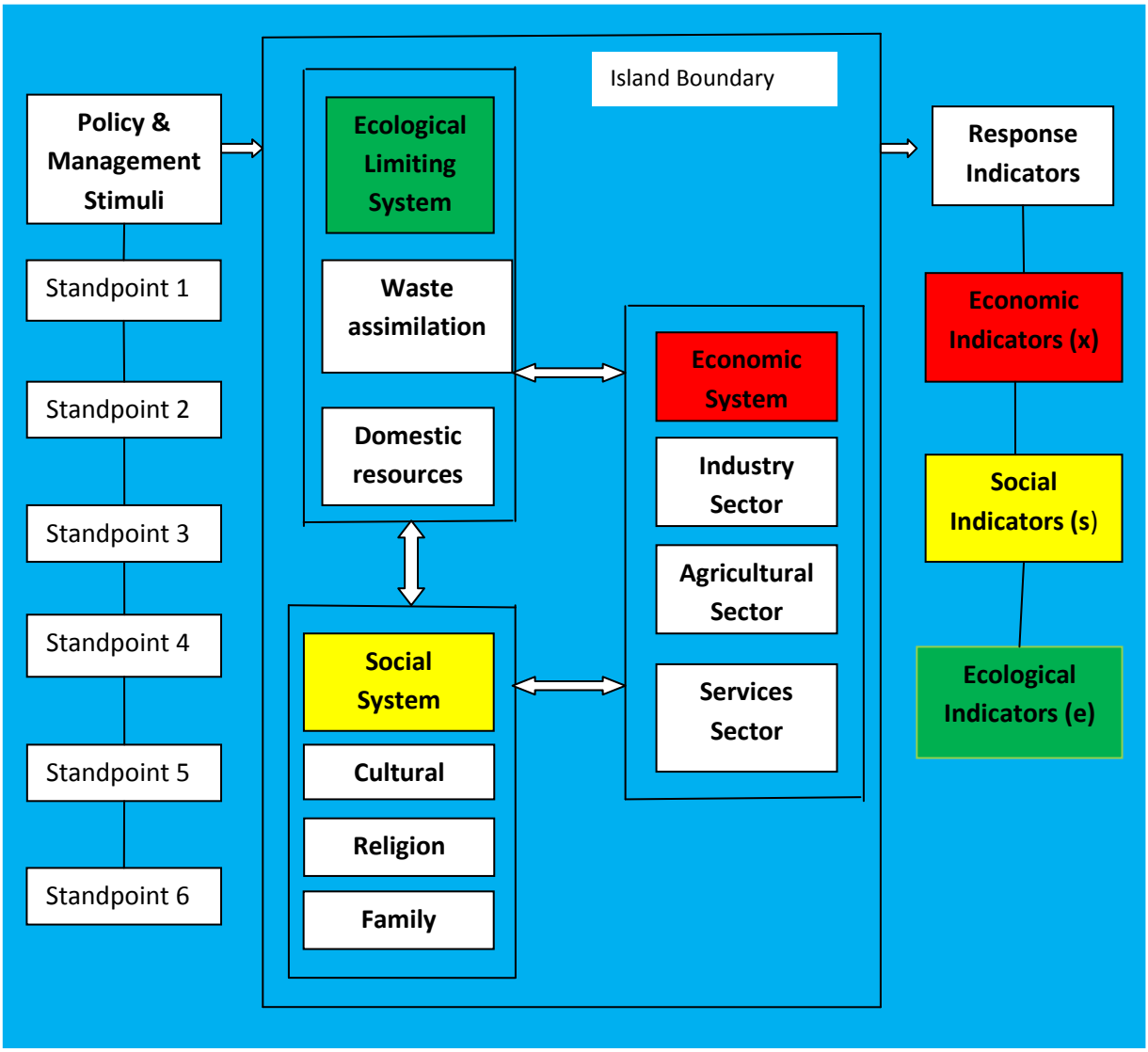
In sum the data gathered for the whole island MFA were from secondary sources. As far as is practical, the data are the best estimates for 2010, considering the lack of high quality data and statistics, especially in small island economies. However, the discrepancy in the water inflow and eventual effluent out flow can be attributed to the accumulation of water used for agriculture and losses due to leaks in the transmission and distribution of water on the island.

Figure 4-4: Material Flows for Grenada, 2010 **Units: Gigagrams**



Created by Author

Figure 4-5: The theoretical interactions of the Island's sub-systems



Adapted from Nijkamp and Vreeker 2000

Note: Policy stand points and indicators are subsequently presented

According to figure 4-4, approximately 1,374.7 gigagrams of materials flow into the socio-economic sub-systems of Grenada. Of this 62% is classified as domestic resources which are extracted from within the island, with water accounting for approximately 89.1% of the materials extracted. The remaining 38% of the inflows was from materials imported, while petroleum products accounts for about 16.7% of the imports. Emissions and waste accounts for 94.2% of all material outflows, while the export of materials, which are mainly crops and light manufactured products, accounts for only 5.8% of the outflows. It should be noted

that 92.6% of the emissions outflow is effluents, which includes grey water and sewage.

The inflows of focus in this research are water and energy in the form of petroleum products which are used for electricity generation and direct use in cooking. While on the outflows side, emissions, effluents and waste are the focus. These quantities provide an influential premise upon which a vision of island sustainability based on the reduction or optimisation of MEWFs can be designed. Such a vision could focus on the optimization of these flows or even reduction in some cases, especially in energy and water inflows and emissions and waste outflows. Moreover, the island sustainability vision can be made clearer if an understanding of the sub-system interaction is developed.

Figure 4-5 seeks to further solidify the conceptualisation of the island system as the interaction of economy, society and environment (see chapter 3: section 3.2). This model seeks to demonstrate the sub-systems interactions from the perspective of the tourism accommodation sector, the sector under scrutiny in this research. Further, the model is used to describe the flow and use of materials amongst the sub-systems. The model also includes for completeness the policy standpoints and the indicators which are necessary to measure the impact of these standpoints on the island system as a whole (see section 4-4). The generation of these indicators using a stimuli/response mechanism adapted from Nijkamp and Vreeker (2000) is further developed in section 4.8.4.4. Together with the model in figure 4-4, this model is important in that it can assist with describing and clarifying the island system and with developing the proposed island sustainability vision.

The descriptive model in figure 4-5 divides the island system into its three subsystems. In this model however, a simplistic representation of some of the key relevant components/sectors within each of the sub-systems is provided. There are usually three main economic sectors within islands: services, which include banking, transportation, education, tourism; agriculture and industry. The ecological system which provides sources of raw material such as sand and water and which also serves as a sink for waste. The social system comprises of the people and all social activities and services. Examples of the various components within the social system are family, culture and religion.

The majority of the activities in the social and economic sub-systems depend on the ecological sub-system and do impact on it. In keeping with the research however, the tourism sector has a profound impact on the ecological sub-system and depends on it for the provision of services such as utility to the visitors of the islands. The waste generated by the tourists has to find some place to be disposed. Water is harvested from naturally occurring sources such as underground wells and watersheds for use in the tourism sector. Other resources such as sand and gravel are extracted and accumulated in the construction of hotels. Resources such as fuels and food are imported to support the needs of the tourists. So there is a constant dynamic interaction amongst the sub-systems and resource flows play a critical role in this interaction.

On the social side, the needs for recreation, local and imported foods, interact with the ecological and economic systems in many ways. For example, beach goers and other outdoor activities seekers, such as hikers can impact the ecosystems associated with these activities. Poor waste disposal while engaging in a recreational activity can have adverse effects. The taste for certain foods, which can be influenced by local and/or foreign cultures, may impact the ecological system. Imported food products are done so with packaging that is discarded as waste; while local foods can be cultivated and harvested in such a manner that damages ecosystems.

Further, the economic system supports many activities that require the movement of materials into and within the island, and this was previously described in chapter 2. So as was discussed previously, there is a linear flow of materials or through-put approach to dealing with material flows in the island system. These flows can occur upstream in the form of imported products and internally from the ecological system such as the harvesting of water. There is a net accumulation of materials in the socio-economic system, usually referred to as socio-economic stocks (see for example Haberl et al. 2004). The inflows of materials are critical, in that they are used to support social and economic development. However, as was indicated previously, the flows of materials can have damaging effects to the ecological system, in the form of emissions and waste outflows.

As a consequence, both business and policy makers can drive sustainability if a more comprehensive approach is taken to understating the flows of materials and to measure the impacts that policy directives and management decisions have on the island system from a holistic perspective. In this regard, indicators that are sector specific and which can be deduced from policy standpoints can play a critical role. This is the second part of the model, in which some key policy standpoints were used to suggest some indicators that can be used to measure the social, ecological and economic impacts of the sector.

The diagrams proposed in figures 4-4 and 4-5, further supports the literature which suggests that material flows can be used to craft a vision for island sustainability and support goals for moving towards the vision. Moreover the limitations imposed by the socio-ecological subsystems on the activities in the socio-economic system (see chapter 2) imply that a critical component of an island sustainability vision can be: 'to reduce MEWFs, within the socio-ecological limitations of the island system'. (Another critical portion of this vision, which considers the people in society is proposed subsequently). The key reasons in support of this first portion of the island sustainability vision are provided.

Firstly, there is a need to move the island away from 'through-put growth' towards, what was referred to as 'round-put' in section 4.7. That is, within the island system as a whole, MEWFS should be reduced as strategies such as recycling, waste avoidance and energy cascades are embarked upon in the socio-economic system and specifically by the tourism accommodation sector. In this regard Lenzen (2008 p. 2034) observes that "... what has received little attention so far are measures aimed at island-friendly solutions by reducing their material metabolism, for example by recycling and re-use". He further adds that "... vision and creativity can work wonders in achieving "more for less' (Lenzen 2008 p. 2034). This goes to the core of the argument presented in chapter 2, in which an understanding of resource needs and the scarcities of these resources was of critical concern for sustainability.

Secondly, a tangible foundation for ALL stakeholders to move towards is created. That is the model in figure 4-4, depicts the estimated quantities of flows in, within and out of the island as a whole. This graphic was not done for Grenada

before and although it is static, it paints a tangible picture of quantities of material flows that each stakeholder can understand. This through-put graphic is a starting point that shows, that if materials are imported into the system, extracted from the system and discarded to the system in such a manner, then the success of the socio-ecological system can be jeopardised in the face of the island context and threats of climate change and resource scarcities. Lenzen (2008 p. 2034) concludes that: “In a future of depleted resources, climate change and sea level rise, island communities will sooner or later focus their attention on these real issues: to understand and live within the limits posed by their finite paradises”. This shared platform provided by the vision may lead ALL stakeholders to ‘walk the same walk’ towards the visionary path of island sustainability, that is ‘living within the limits of the finite island paradise’. .

However, people in society are the ones using the materials and energy that flow into the island. Additionally, the outflows are a consequence of the consumption of material and energy inflows by the people on the island. Therefore, the vision must consider the ‘quality of life’ of the current and future generations of people in the society (see subsequent section). In this regard, concrete principles or goals are necessary to map the way towards such a vision. These are discussed in the next section.

Additionally, a static vision or picture of a vision for sustainability and island sustainability can be problematic, as people in society will have varying ideas and conceptualisations of sustainable development and sustainability, which can shape this vision. In this regard, Robèrt et al. (2004) suggest, that this can be avoided if a principled based approach is applied. Heeding this suggestion, the vision thus developed was not further researched, in terms of finding consensus amongst the island’s stakeholders. Instead the stakeholders’ views on sustainable development and sustainability were sought, and how this corresponds to the proposed vision will be discussed in chapter 8. The next section further argues this position and presents the ISPs which are linked to the vision and these were further researched.

4.8.1.2 Level 2- Island Sustainability- Can the 4SPs apply?

At this level the main goals for moving towards the vision of island sustainability are developed. These goals stem from the science briefly described at

level 1. Robèrt et al. (2004) were able to coin four sustainability principles (SPs) previously described as the ‘first order principles’. These principles were developed from a comprehensive understanding of what must not happen in the socio-economic system, in order to maintain a sustainable society. In other words, organizations, businesses, economic sectors, within the economic sub-systems, should not embark on activities that will violate these principles. Considering it from the perspective of level 1, organizations and sectors in the economic system should ensure that their activities are in sync with these principles if success in system level 1 is to be achieved (Robèrt et al. 2004). A successful system assumes that MEWFs are optimised and reduced, in-keeping with the vision proposed in the previous setcion.

But because of the ‘economic set-up’ previously cited, the society has been rendered ‘un-sustainable’ (Robèrt et al. 2004). According to Robèrt et al. (2004), what dominates the ‘society in the biosphere model’ is a linear flow of materials extraction and the resulting accumulation of and lack of matter in various parts of the system. This has led to disruptions in the balance of the natural biogeochemical ‘flows’ previously described. Materials are continuously extracted from the lithosphere and allowed to systematically increase in the ecosphere. New chemicals are created in society, that are not familiar to nature and the accumulation of natural materials are allowed to continually increase. Nature’s ability to produce new resources is eliminated by encroachment, destruction, overproduction or manipulation of natural resources. And finally, failure to meet the basic human needs of the society is compromised. (see Robèrt et. al. 2004 for a comprehensive overview).

Robèrt et al. (2004) conclude that for success to be achieved in the system these disrupted flows must be curbed. The 4 SPs were developed as a principle-based definition for a sustainable society. As it relates to ‘island sustainability’ the 4 SPs are re-worded to make them applicable to the ‘island system’. These principles it is hoped can assist planners in the island to ensure that the activities of the economic sub-system are adhering to the principles and as such is leading to the island sustainability vision. The sustainability principles are therefore adapted below and the ‘I’ is placed in front of the SP to denote the ‘island’. Therefore the island sustainability principles or goals (ISPs) are:

ISP 1: In sustainable island systems, the island system must not be systematically subjected to increasing concentrations of materials extracted from the earth's crust. Note this does not only apply to the extraction of materials from within the island boundaries, but will also consider the importation of these materials form without the boundaries. One critical example of this is the predominant use of fossil fuel based energy sources that allows the accumulation of carbon dioxide in the ecosphere.

ISP 2: In sustainable island systems, the system is not systematically subjected to increasing concentrations of materials created in society. Small manufacturing is a feature of the economies of islands. All the materials such as plastics, bottles, etc are a prominent part of the island economy.

ISP 3: In sustainable island systems, the island is not subjected to degradation by physical means. Large clearing of lands for construction, excessive sand mining are features of the economic sub-systems on islands.

ISP 4: In sustainable island systems, the people are not subjected to conditions that would systematically undermine their capacity to meet their own needs. A common feature of the island economic subsystem is the lack of 'meaningful' employment for islanders.

However, in chapter 3 the SGD principles were defined and it is instructive to consider these four goals in this context. In this regard, an attempt is made to align these goals with the SGD principles. Table 4-2 demonstrates this alignment. It is noted here that the SGD principles are quite a few in number and their can assist with leading towards the overall achievement of island sustainability. These principles however, are not suited to the adapted FSSD and in some instances are worded as strategies and actions that can lead towards sustainability. These action/principles however are not lost if the ISPs are considered as the overarching goals for island sustainability and they can actually contribute to and support the achievement of the ISPs and the island sustainability vision.

Table 4-2: SGD Goals and Principles matched to the ISPs

SGD Goal #	Principles as numbered in the SGD	Relation if any to the ISPs
1	2- Integrate social, economic and environmental consideration into national development policies, plans and programmes	None
	3 – Improve on legal and institutional frameworks	SP 4
	8 – Address the causes and impacts of climate change	SP 1
	15 – Promote co-operation in Science and Technology	SP 4
2	4- Ensure meaningful participation by Civil Society in decision making	SP4
	5- Ensure meaningful participation by the private sector	SP4
	7 – Foster broad-based environmental education, training and awareness	SP4
	15- Promote co-operation in Science and Technology	SP4
3	10- Prevent and control pollution and manage waste	SP2
	11- Ensure the sustainable use of natural resources	SP2
	12- Protect cultural and natural heritage	SP4
	13- Protect and conserve biological diversity	SP3
	16- Manage and conserve energy	SP3
4	6- Use economic instruments for sustainable environmental management	None
	8- Address the causes and impacts of climate change	SP1
	9- Prevent and address the causes and impacts of disasters	SP4
	14- Recognize the relationships between trade and environment	

Author generated using OECS 2006

These ISPs can enhance and assist with streamlining the research on island sustainable development and sustainability that has been on-going for decades. For example, Chambers (2010 p. 126) suggests that “Instead of concentrating on sustainable development, which for many is an unreachable target, a concept of sustainable island living is evolving, which attempts to personalize sustainable development”. She goes on to reiterate the point by adding that “a definition for sustainable island living is emerging: A process that enables everybody to enjoy a decent living and good quality life in terms of satisfying their needs ... and creates an enabling environment for the next generation to fulfil its aspirations” (Chambers 2010 p. 126). Chambers (2010 p, 127) further adds that

“Sustainable island living is based on core values such as culture of partnership based on shared vision, good governance, people’s rights, autonomy of

community, and participatory approaches. Furthermore, it attempts to bring the concept to the person level ....

Chambers captures sustainable development as a process and 'rightly' notes, that as a target, sustainable development is un-reachable. On the latter observation the separation of sustainability from sustainable development can provide 'the reachable target for islanders'. Secondly, the island living concept aligns fully with the four ISPs proposed and aptly captures the need for shared vision, participation, etc.

However, it was previously argued that the sustainable society is premised on both a robust ecosystem and a robust social fabric. So Chambers' 'sustainable island living' can be further developed to include the socio-ecological limitations they can impose on sustainable living. Secondly, it is the opinion of this author that sustainability viewed as a target and based on the 4 ISPs can contribute to the work of 'sustainable island living' providing an overall goal for all individuals and communities to aim towards.

From this perspective a second part can be added to the island sustainability vision to include the quality of life or sustainable living of the island people. This can ensure that as MEWFs are reduced or optimised, the quality of life of the people in the island is not compromised**.** The second part of the vision therefore is to ensure a successful island system, while ensuring that the quality of life of the island people is not compromised, within the limits previously described. Moreover as MEWFs are reduced the quality of life must be enhanced and improved. The island sustainability vision can be re-written to include this second part. The vision therefore becomes**: 'to reduce MEWFs, while achieving and maintaining a high quality island living, within socio-ecological limitations of the island system.** With such a vision a successful island socio-ecological system or island sustainability can be achieved.

To put the island on to a path of this vision the ISPs developed previously are needed. These goals are measurable and as such island stakeholders can use them to ensure that the path towards island sustainability is maintained. Additionally, the stakeholders can use the goals to check for diversions away from island sustainability. Moreover many stakeholders/actors in the island's economic sub-

system are concerned with the activities that are occurring in that sub-system. These actors in general can be found in organizations (managers, employees, shareholders), non-governmental organizations (NGOs), Government and the general population (consumers). Drawing on the work of Korhonen (2004 p. 814), actors in the economic system were identified as "(industrial firms, other private and public organizations, agriculture and consumers)". These actors were carefully described in section 4.6 of this chapter and a sample of actors will be fully selected in chapter 5.

The literature review however, has not explicitly revealed a conceptualization of island stakeholders' views on what island sustainability is and more importantly how it can be achieved. Additionally, a proposed vision for island sustainability can be shaped by the varying views of stakeholders' on sustainability in general. As such, these views need to be drawn-out of the island stakeholders. The lack of stakeholders' views on island sustainability in general is identified as a critical gap in the extant island studies literature. However, once these views are clarified the more important aspect of this research of determining how island sustainability can be achieved through the proposed island sustainability goals can be executed. This provides a practical approach to moving towards island sustainability as defined previously.

As a consequence the stakeholders' views on the proposed goals are also determined. This is necessary to ensure that ALL the island stakeholders are on the same path towards island sustainability. From this perspective the views of the stakeholders will be sought. Additionally, Korhenen (2007) proposes critical criteria for analysing the 'original' sustainability principles proposed by Robèrt and his team; these criteria are, inter alia:

- Spatial scale- considers intra-generational equity
- Temporal scale- considers inter-generational equity
- Flexibility, participation and democracy- provides for ownership of all stakeholders and ease in agreement about the direction of sustainability
- Creativity
- Direction

These criteria are needed to ensure that the sustainability goals are robust and yet flexible. This provides the actors with some level of confidence that they are moving in the direction of sustainability. The analysis in this section and more specifically the criteria for analysing the sustainability goals have led to the identification of the following four sub-themes to be further investigated:

1. Goals can address current and future generations' needs
2. Ease of finding agreement amongst stakeholders
3. The creativity of the goals
4. Adherence to goals can lead towards island sustainability

Based on these findings the first research question is formulated below:

Research Question1:

How do some key stakeholders/actors in Grenada define sustainability and sustainable development and what are their views on the island sustainability goals?

Objective 1:

To determine the views of some key stakeholders in Grenada on the four proposed island sustainability goals.

4.8.2 Theme 2: Sector vision for island sustainability

4.8.2.1 Level 3 in the adapted FSSD- Sector visioning and material flows

At the third level of the FSSD the strategic application is proposed by its founders and developers (Robèrt et al. 2004). They propose the concept of back-casting from principles and the employment of flexible platforms for moving the system closer and closer to socio-ecological sustainability (see Robèrt et al. 2004). Here a principle-based sector vision is proposed as opposed to one that paints a static picture of the future. Robèrt et al. (2004) note that due to the rapid changes occurring in the system and the tedious process that is needed to derive consensus on agreeing with the picture makes back-casting from principles the preferred technique. Robèrt et al. (2004) further propose the ABCD steps which assists the planners to set the vision, establish the current situation, brainstorm priorities and

select priorities for moving towards the vision step by step. In setting priorities three minimum questions should be asked ‘are they flexible platforms on which future plans can be built, is there good return on investment and are these priorities taking us in the right direction towards the sustainability principles’? (see Robèrt et al 2004 for a detailed description).

The ABCD approach is widely used and accepted. However, in establishing the vision, understanding the current situation of the problem and deciding on actions and more importantly how to implement these actions, the ABCD can benefit tremendously from MEWFs analysis. More importantly and in the context of this research, where the island sustainability vision hinges firmly onto materiel and energy flows, the ABCD has fallen short. This is identified as a gap in the literature and application of the FSSD. In this research therefore the application of the MEWFs to level 3 of the FSSD and adapted FSSD is demonstrated. However, before the sector vision is developed and because it is hinged on the flows of materials within the accommodation sector, an analysis and understanding of the sector’s MEWFs is presented. This in the opinion of this researcher is the detailed approach needed to enhance sector vision setting and for providing a more comprehensive understanding of the current situation within the sector under investigation-the accommodation sector. Additionally, the analysis can provide some further insight as to how the actors in the sector may choose to implement current and future actions for reducing MEWFs.

4.8.2.2 The Accommodation Sector

The focus therefore, is to consider the performance of tourism accommodation units in relation to how they use materials (resources) and energy and how they generate solid waste. Bohdanowicz and Martinac (2007) note, that the hotel sector accounts for a significant portion of the tourism sector’s resource consumption and has an equally significant impact on the environment. This study can provide profound insight into the impacts of the current stock of hotels on Grenada’s environment and provide a platform for analysing the impacts of future operations of accommodation units on the Island. This future analysis is considered within the context of the growth objectives discussed in chapter 3. The focus of the

study will be in the operation phase, which is one stage in the life cycle of a building (see for example Agarwal and Strachan 2006).

Becken, Frampton and Simmons (2001p. 371) suggest that every tourist relies on the accommodation sector and as such it is "... a core sub-sector within tourism". But this sub-sector is quite different to the many types of buildings that exist in the general building sector. Deng and Burnet (2000 p.7) identify these buildings as been "unique, compared to other types of commercial buildings". Deng and Burnet (2000) further identify some of these differences as having varying operational functions for varied facilities; different facilities such as restaurants, in-house laundry, etc; variability of occupancy levels; and varied indoor requirements by different types of guest. As a consequence, the energy consumed by these types of facilities and the quantities and types of waste generated by them will vary through-out the year and to other types of commercial buildings. This led to the observation that "The resource consumption profile of hotels differs from the patterns of other types of commercial buildings" (Bohdanowicz and Martinac 2007 p. 83), making them excellent objects of study.

But not much study has been done on the impacts that these types of buildings have on the sustainability of small islands. In the research specific to islands, Weisser (2004a) took an economic perspective to the study of electricity consumption on Small Island Developing States, while seeking to promote the role of renewable energy technologies in the mix. Specifically to Grenada Weisser (2004b p. 189), addresses a similar topic, in which he concludes, that "Grenada's power sector is fully dependent on fossil fuel imports for meeting the country's electricity demand".

Additionally, Kuo and Chen (2009) quantified energy use, carbon dioxide emissions and other environmental loads on Penghu island around Taiwan. They were able to provide a quantitative analysis of these loads along the lifecycle of a tourist's travel, from home to destination and back home. These loads were considered for the key tourists activities of travel, recreation and accommodation. This work will be drawn upon to analyse the growth objectives, albeit within the accommodation sector only.

Also Rosselló-Batle et al. (2010) consider energy use, carbon dioxide emissions and waste throughout the lifecycle of some hotels in the Balearic Islands. They conclude that the operating phase of the hotels had the greatest impact in terms of energy use.

Similarly, Georges (2006 p.126) conducted an analysis of solid waste generation and management on the island of Tortola and conclude that several Caribbean islands have neglected to consider the role of waste in "monitoring and assessing progress towards sustainability".

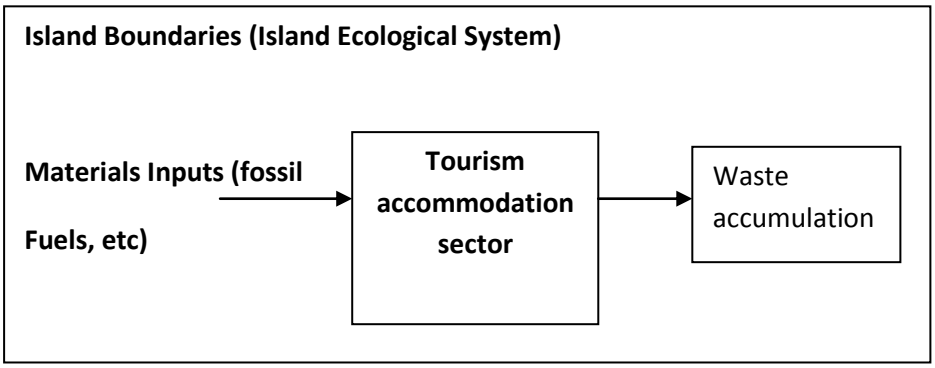
These researches, coupled with the support provided in the previous sections and the argument put forward when the case study was presented in chapter 3, point toward the need to analyse these impacts of MEWFs and resource use, using the operations of the tourism accommodation sector as a proxy.

However, none of these studies have comprehensively studied and analysed the impacts of the MEWFs in these hotels on the socio-ecological system of the Island. In this regard Georges (2006 p. 127) makes the very important observation "... that absent from the available literature on island sustainability is any evidence that Caribbean island governments have attempted to monitor the biophysical aspect of sustainability". In fact it was previously argued in this review that sustainability equates to the principles that govern the interaction of society with the biophysical aspects of the island. It is concluded therefore that if MEWF indicators are developed and framed into a matrix that incorporates the ISP previously proposed then this can be a start to a more strategic approach to planning towards island sustainability. But before this can be achieved, a 'generic type' principle-based vision should be developed for the sector, as a critical component at level 3 in the adapted FSSD. Korhonen (2004) proposes that with respect to the 'hard engineering indicators' to be dealt with in the hotel sector, that the IE metaphor of "learning from nature" is applicable. This learning would be comprehensively supported by MEWFs of the island as a whole and of the sector under consideration, that is, the tourism accommodation sub-sector.

4.8.2.3 Material, energy and waste flows in the accommodation sector on islands

Material and energy flow analysis (accounting) (MEFA) on the Island of Hawai'i was conducted by Houenecht et al. (2006), while energy flow analysis was done in the Island context by Sundkvist (1999). These two papers have provided excellent methods to conduct materials flow in the island context, and the method is outlined in section 5.5.3.2, chapter 5. More importantly though Houenecht et al. (2006) investigate material flows in the visitor industry sector and a conceptualization of these flows is shown in figure 4-6. Basically, the accommodation sector inflows come from the importation of materials, foreign foods, cleaning materials and sources of energy such as fossil fuels. Other local materials such as locally grown food and more critically water harvested from watersheds within the island boundaries also flow into the accommodation sector. Solid waste, effluents and emissions constitutes the outflows. The following conclusions are drawn from the MEFA of the largest hotel on the Hawai'i island, which had 1,240 guest rooms (Housenecht 2006 p.10):

Figure 4-6 Model of Material flows in the proposed Tourism ecosystem



Author's conceptualisation

- Materials used were centred around inputs from hotels and fuel use in rental cars;
- Material flows were dominated by water use for custodial services, cooking, and general operations, and this was estimated to be around 23 percent of water supplied by the country;

- Oil used for the generation of electricity was estimated to be another significant input. The hotel sector on the island has been estimated to consume about 18% of the electricity supplied on the Island;
- Materials for cleaning were noted for their contribution towards environmental problems in regards to how they are disposed;
- The other important energy related material input was propane or liquid petroleum gas (Grenadian context).

There was no information in Housenecht (2006) on the solid waste outputs or on the emissions to air from the use of oil and gas to produce electricity and energy. However, Rosselló-Batle et al. (2010) identify the following indexes for measuring these flows for hotels in the Balteric Islands: carbon dioxide emitted due to energy use; waste throughput based on occupancy levels and energy consumed. More importantly however is that Kuo and Chen (2009) quantify the annual environmental loads in the accommodation sector on a small island and these were based on some key indicators. They are summarized as: annual energy use- 7.18 $x10^7$ MJ; annual CO emissions- 3.66 x 10^9 g; annual water demand- 2.78 x 10^8 L; annual electricity use- 1.57 x 10^7 MJ; annual solid waste generation- 8.96 x 10^5 kg; and annual waste water discharge- 1.91 x 10^8 L. These loads can be used as benchmarks to analyse the performance of the hotel accommodation sector in this research. The material inflows and outflows sought are summarized in table 4-3.

Table 4-3: In and out flow of materials in the tourism accommodation sector

Material Flows	
In-flow	**Out-flow**
a. Fossil fuels for electricity	a. Solid waste
b. Energy source for heating (Natural Gas)	b. Emissions
c. Water	c. Effluents
d. Other materials (cleaning)	
e. Other materials (food)	

4.8.2.4 Developing the vision

In the tourism accommodation sector the material (resource) and waste flows are not self-driven. In fact the IE literature admonishes the IE practitioners and theorists, who are the ones focused on the use or MEFA information, for neglecting

the human aspects of the industries, those are the actors and their decision making regarding the observed flows (see previous sections in this chapter). Additionally, Paton (2006 p. 149) identify the shortfall in the "...Efforts to integrate management concepts and practices with the contributions of industrial ecology ...", vis-a-vis, bridging the gap between the materials flow quantitative information and the management decisions and policies that are needed to ensure that the sector under study is moving toward sustainability".

This bridging is attempted at level 3 as the material flows are integrated into a sector vision. In this regard Korhonen (2004) proposes the triple win of environmental win, social win and economic win and suggest that the concept of corporate social responsibility plays a key role, which will be further developed in the section dealing with level 5. So the question that can be asked is: how can the material and energy use and waste generation in the buildings inspire action by the actors to move towards island sustainability? This strategic vision as proposed by the IE metaphor seeks to provide the 'vision for management and other stakeholders', one proposed bridging concept of the engineering/natural science and social sciences disciplines. The IE metaphor of 'round-put' which equates to the utilization of waste material, renewable energy and waste energy in corporation, can result in this triple win outcome. The outcomes of the triple wins suggested by Korhonen (2004 p. 814) are:

Environmental win: reduction in virgin materials and energy input from fossil fuels by substituting materials with waste and fossil fuels with renewable energy. And as a corollary waste and emissions from fossil fuel use are reduced.

Social win: new employment opportunities through local utilization and management of the materials and energy flows for example recycling of materials and new energy companies in renewable, and increased corporation between and amongst firms and participation by employees, stakeholders etc.

Economic win: reduction in cost to manage waste and for the utilization of energy; reducing cost from environmental legislature and improved ROI through image, that may attract tourists that are 'green minded'.

Drawing on this work a vision of a triple win, is coined below as a principle based vision as proposed by Robèrt et al. (2004). Effectively this vision attempts to link the accommodation units' strategic approaches to sustainable development to the overall goals of island sustainability.

> ***We (name of company) will endeavor to contribute to island sustainability by ensuring that the way we generate waste and use materials and energy can result in a triple-win for: environment, society and economy. We will take appropriate actions in these areas as part of our strategic efforts towards our island's sustainability.***

The actors that are targeted for this vision will be those in the tourism sector only, since the vision is from the perspective of those stakeholders. Can such a modelled vision be accepted by the actors as the vision for the project under consideration? This would be determined from the field work. However, the research questions for this theme are:

Research question 2:

What are the estimated MEWFs in the tourism accommodation sector?

Research question 3

How do the actors in the tourism accommodation sector feel about a triple win vision for reducing MEWFs for achieving the island sustainability goals?

Objective 2

To estimate the MEWFs in a sample of the tourism accommodation units in Grenada

Objective 3:

To determine the views of stakeholders in the sample of tourism accommodation units, on a triple win vision for reducing the MEWFs for achieving the island sustainability goals

The main theme for consideration under this section is 'agreeing to the win-win-win vision' proposed. Moreover the analysis of the materials flows within the

accommodation sector is needed to assist with the development of the vision. More importantly the vision is firmly hinged on to the fact that strategies for their reduction within the sector can lead to island sustainability. Together the sector vision and MEWFs are strategy content needed at level 3.

4.8.3 Theme 3: Actions for island sustainability in the accommodations sector

4.8.3.1 Level 4: Actions- the steps to move towards sustainability

In the generic FSSD, level 4 "... describes what tangibly occurs", and in a sense takes us to the leaves of the 'trunks and branches' established at the previous three levels (Robèrt et al. 2004 p. 45). At this level the accommodation sector has the flexibility to establish their concrete actions. From the perspective of IE, Korhonen (2004) suggests that "... waste materials and waste utilization are considered in networks and collaborative partnership in a system approach ....". In the more 'industrial type' industries, such as manufacturing, this collaboration is referred to in the IE literature as 'industrial symbiosis or IS' , which was previously introduced. Analyses of these symbioses have been conducted in the island context. The most recent study of such a symbiosis was investigated by Chertow and Miyata (2010), to determine whether 'companies were better off acting collectively in sharing resources, such that one company's waste becomes another company's feedstock, or was it strategically preferable to act individually to minimize resource'. In the context of this research-tourism accommodation in the island context however, this is new ground for the IE concept, from the perspective of conceptualizing and un-covering the potential for an industrial symbiosis in what can be referred to as a 'tourism ecosystem akin to an 'industrial ecosystem' which obtains in the manufacturing domain. This conceptualisation is an important strategic consideration by the accommodation sector for leading on to island sustainability.

To contribute to the literature of industrial ecology applied to a 'non-industrial' sector in the island context, the bridging concept of intra-organisational management can be discussed at this level of the adapted FSSD. However, since this will be a conceptualization of a proposed tourism ecosystem or symbiosis, this investigation will be limited. So using the suggested concrete actions of the actors, an attempt is made to solicit their ideas and views on the 'possibility of establishing an 'island

tourism ecosystem'. In essence the main outcome would be a strategic approach to the 'reduction of material and energy flow'.

Literature on industrial ecology was already presented in previous sections of this chapter. Additionally, however, Ashton (2008) studied the structure, function and evolution of industrial ecosystems on the island of Puerto Rico. Wolf et al. (2005) has however, studied the development of industrial symbiosis in a small Swedish forestry based industrial region; while Agarwal (2011) comprehensively analysed the formation of the National Industrial Symbiosis Programme (NISP) in the UK.

However, Wolf, Eklund and Söderström (2005) note that the human dimensions on making the decision on whether or not to cooperate in an IS programme has been widely ignored. And although the concrete actions can be instructive, Wolf, Eklund and Söderström (2005 p. 187citing Cohen-Rosenthal) note that "Knowledge of the kinds of waste streams can provide a means to determine potential linkages. But this does not link them; decisions by people do". Bearing this in mind and again focusing on the actors targeted at level 3, Wolf, Eklund and Söderström. (2005 p. 187 citing various sources) have identified the following factors that were important for a decision whether to or not to participate in an intra-organizational relationship. According, to Wolf, Eklund and Söderström (2005 p. 187citing Alter and Hage), "... the most important factor is a willingness to cooperate; without it, any cooperation is doomed to fail". The other identified factors are:

- Personal contacts;
- Trust (or the lack of it)
- Good relations;
- Long-term strategies;
- Goodwill;
- Enthusiasts on all sides;
- Need for new investments;
- Improvement of quality; and
- Access to specific knowledge and technologies

In the context of attempting to conceptualise a tourism symbiosis, the decision to collaborate is of most importance. If the tourism accommodation actors are not

willing to cooperate, then the possibility of a tourism ecosystem is lessened. The theory thus expounded at level 4, leads to the following research questions:

Research questions 4:

What concrete actions can be taken by actors in the tourism accommodation sector to reduce MEWFs?

Research question 5:

Are the actors in the tourism accommodation sector willing to act individually or collaboratively to implement the proposed actions to reduce these flows?

Research question 6:

What factors can be considered for making the decision to act individually or collaboratively to reduce MEWFs in the tourism accommodation sector?

Objective 4:

To determine what actions the tourism accommodation unit stakeholders in the sample are willing to take to reduce their MEWFs

Objective 5:

To determine the willingness of the actors, in the sample of tourism accommodation units, to act collaboratively or individually to implement the actions to reduce these flows

Objective 6:

To analyse the factors that may affect the willingness of the stakeholders in the sample, to act either collaboratively or individually to reduce MEWFs.

Three main sub-themes emerge out of the literature review and are deemed critical to the strategy content needed to develop this level of the adapted FSSD; they are:

- actions for material flow reduction
- intra-organizational collaboration
- inter-organizational collaboration

4.8.4 Theme 4: Monitoring the move towards island sustainability

4.8.4.1 Level 5- Tools to measure success in the system

Robèrt, et al (2004: 44-46), presented three (3)-system tools for measuring the success (or failure) of the global socio-ecological system due to actions in the socio-economic system. These were:

The ***strategic tool*** which ensures that the actions at level 4 are agreeing with the strategic principle at level 3, thus improving the likelihood of achieving island sustainability and hence a successful and robust 'society in the biosphere' island system. An important example of a strategic tool is the indicator. These tools are used to analyse, measure, report/audit, and communicate whether the actors in society are systematically complying with its own plan.

The ***system tool*** which makes direct measurement in the system to ensure that actions were strategic, and that they were moving towards success and benefits to the system. A system tool may answer for example did unemployment go as a result of say some policy decision. These tools must not be confused with the strategic tools for they are used to make direct measurements and to monitor the state of system level 1.

The ***capacity tool*** which can help people to learn about system levels 2 and 3. For example, this research thesis can act as such a tool for capacity building in use of the FSSD.

The focus of the research in the tourism accommodation sector and the applications of the IE concept within the FSSD, leads to the consideration of a strategic tool to measure the upward movement in the FSSD. The strategic tool and more specifically indicators, is chosen, since it is more applicable than the system tool, which is used to measure the actual impact of an intervention that has led to success (or failure) in the system. In this research, no actual interventions are made, and the interest is to provide a planning tool that has strategic rigor for measuring proposed actions. The tourism sector has focused heavily on the use of indicators, concepts and tools in the study of sustainable tourism (see for example: Schiannetz et al. 2007; Schianetz and Kavanagh 2008; Gossling 2002). From the perspective of islands and sustainability and sustainable development, indicators have been variously studied (see for example, McAlpine and Birnie 2006). Considering resource (waste) and energy flows in the accommodation sector, some studies are available (see for example, Bohdanowicz and Martinac 20007; Rossello-Batle 2010; Becken et

al. 2001). But it is the opinion of this author that none of these researches have explicitly addressed the use of these tools and specifically the use of indicators from a strategic perspective. At best most of the indicator studies, with the exception of the research by Schianetz and Kavanagh (2010) which focused on indicators in a complex adaptive system, have failed to strategically address the use of indicators in a complex island system. However, Azar, Holmberg and Lindgren (1996) have studied indicators from a strategic perspective on the global level.

4.8.4.2 Developing a strategic approach to using indicators

The steps to consider when developing a proposed 'strategic' approach to measuring the impact of the proposed actions determined at level 4 are: to first determine the material and energy flows in the sample; consider indicators that can be used, for an approach applicable to islands, (see McAlpine and Birnie 2006) and then implant the indicators within a framework for linking the indicators to the sustainability principles, (see for example Azar, Holmberg and Lindgren 1996). Indicators have been applied in the sustainable development and sustainability work for decades. However, Hilden and Rosenstrom (2008 p. 237) identify three challenges with the use of indicators; one of which is the "... lack of clear and simple frameworks for presenting the indictors". Azar, Holmberg and Lindgren (1996 p. 90) note that: "Most set of indicators developed so far have focused on the state of the environment rather than on the relationship between society and ecosystems". These observations leads one to conclude that the need for a framework or matrix for using indicators is critical to ensuring that the chosen indicators are meeting their intended goals-that is measuring the success of the island system.

Based on the literature reviewed it is apparent that Azar, Holmberg and Lindgren (1996) embarked on the first attempt to produce indicators that are linked to the sustainability principles. Table 4-4 shows the indicators that were developed by the Authors. This matrix was captured at the inception stages of the FSSD and these principles have since evolved as was previously presented. For example, the concept or idea of efficiency in SP 4 has since been revoked. But the demonstration of the concept is necessary to build up the strategic framework proposed by this research.

It was previously discussed that to address the issue of problem displacement with strategic thinking, Korhonen (2010) linked the indicators at level 5 to the success of the system at level 1, through the principles of sustainability at level 3. However, in the adapted FSSD, indicators are also linked to policy and management decisions that may also disturb, in a sense, the success of the island system and these will have to be measured. Therefore, the selected indicators and the development of a strategic matrix to implement them are comprehensively presented in a subsequent section.

Table 4-4: Socio-ecological indicators based on socio-ecological principles

Principle 1 Substances extracted from the lithosphere must not systematically accumulate in the ecosphere	**Principle 2: Society-produced substances must not systematically accumulate in the ecosphere**	**Principle 3: The physical conditions for production and diversity within the ecosphere must not systematically be deteriorated**	**Principle 4: The use of resources must be efficient and just with respect to meeting human needs**
Lithospheric extraction compared to natural flows	Anthropogenic flows compared to natural flows	Transformation of lands	Overall efficiency
Accumulated lithospheric extraction	Long-term implication of emissions of naturally existing substances	Soil cover	Intra-generational equity
Non-renewable energy supply	Production volumes of persistent chemicals	Nutrient balance in soils	Intergenerational justice
	Long-term implications of emissions of substances that are foreign to nature	Harvesting of funds	Basic human needs

Source: Adopted from Azar, Holmberg and Lindgren 1996 p. 109

However, indicators have been grouped under the headings of: social, environment and economy. Bearing in mind however, that the intension is to consider a 'tourism ecosystem', examples of indicators directly relating to the application and analysis of industrial symbiosis were identified and developed by Agarwal and Strachan (2006). They (Agarwal and Strachan 2006) also created a matrix that captured these indicators, along the lifecycle of the development of a 'symbiosis project' (this will be presented in table 4-6). Agarwal and Strachan (2006) also propose three criteria for selecting indicators: relevance, practicability and appropriateness. Being cognizant that the actors may be interested in a collaborative effort in monitoring the progress the sector is making towards island sustainability these criteria may be useful.

But to select actual and relevant indicators for this research, McAlpine and Birnie (2006 p.84) suggest that the development of indicators can begin with a top-down approach of selecting indicators and incrementally attract interest of key stakeholders which "... allowed the indicators to evolve into a more accurate and detailed assessment of the island's sustainability". This approach will be adjusted for this research, recalling that the intention is to demonstrate the creation of a strategic approach to measuring island sustainability in the tourism accommodation sector. In this regard the indicators will be sought form the actors/stakeholders in the tourism accommodation sector. In this way actors may have more ownership of the indicators and the indicators are more likely to fit the criteria noted above. Actors will be prone to name indicators that are relevant, practical and appropriate to the sector.

It will be attempted under this study to focus on the goal of sustainability, which is to create a robust social and ecologic subsystem. In the context of the accommodation sector therefore, the actors should consider their economic win as a means to achieving the socio-ecological sustainability. Robèrt et al. (2004 p.324) argued that "Means and goals should never be confused and that for sustainable development this is of particular importance". He goes on to cite two reasons for this, the first of which is extremely important and that is "... being economically powerful is neutral to 'bad' or 'good' [and he continues further to point out that], it is some aspects of our current society's industrial economy, and the way that we measure the strength of it, that provide the largest threats to social and ecological sustainability on the global level" (p324). The economic win, as described previously,

can be seen as strategic means as opposed to strategic goals to be achieved for a successful ‘society in the biosphere’ system. However, for completion, the economic indicators will be a part of the strategic matrix.

In chapter 2 policy and CSR were introduced as necessary concepts for making the adapted FSSD operational. In the subsequent section these concepts are discussed and analysed with the view of how they are applied to the adapted FSSD and the strategic matrix for using the indicators.

4.8.4.3 Social responsibility

The success of the island system critically depends on social success as it does on ecological success. Therefore social issues must be addressed and this can be done via the concept of social responsibility from an organizational perspective. The term ‘corporate’ is omitted so as to embrace all organizations including small business enterprises, which can aptly describe the majority of businesses in operation globally and in Grenada. As was shown in chapter 2, CSR is important in the context of sustainability and more specifically island sustainability. This section addresses the internal issues associated with the concept, vis-a-vis, planning and an assessment of the drivers for embarking on social responsibility by the business in the tourism accommodation sector.

Following on the work of Moon (2007 p. 299), “... CSR, including environmental responsibility, consists of corporate activities [or organizational activities, authors addition] that reflect and address both the social imperatives for business success and the social consequences of business activities”. Additionally, CSR is described,

“... as a set of actions aimed to further some social good, beyond the explicit pecuniary interests of the firm, that are not required by law (Carroll; McWilliam and Siegel) and as practices that improve the workplace and benefit society in ways that go above and beyond what companies are legally required to do (Vogel 2005)” (Babiak and Trendsfilova: 2011 p.11).

The intended activities and practices of the organization can be formulated into plans that layout the approaches that the organizations’ intend to take to achieve sustainability.

Therefore, corporate responsibility plans within organizations can be critical for linking organisations' activities to the overall vision and goals of island sustainability. Moreover, such plans should transcend the intentions of corporate responsibility and should include environmental issues. Babiak and Trendsfilova (2011p.11) conclude that "...environmentally responsible business practices are an element of CSR in that they are often initiated for reasons than to make a firm money (but sometimes do), they are not (always) required by law and they benefit society." . In this regard a merged 'corporate' social and environmental plan formulated into a sustainability responsible plan is suggested in the context of this research. This plan can provide the necessary approach that the organization can use to assist with moving towards the island sustainability vision and goals.

Moreover, Lindgreen and Swaen (2010 p. 3) indicate that there is a need for indicators to "... assess the degree of CSR and measure its impact on the different dimensions of business performance and society's well-being". Papers in the IE literature have begun to call for research into CSR as it relates to the flows of energy and resources, either individually or collaboratively. For example, Korhonen (2004 p. 512), notes that from a "systems" and "networks" perspective and considering the diversity of the actors, then it is proposed that IE "... can be developed to better include the social aspects of sustainable development..." through contributions of participatory planning, etc which can be achieved through such "(re)emerging theories as corporate social responsibility".

However, the development and embracement of social responsibility and by extension sustainability responsibility can be driven by external forces. These must be considered as they can hinder and/or enhance the development and implementation of social (and environmental) corporate responsibility. Moon (2007 p. 300) suggests what he calls "Four contemporary drivers for CSR: ... market; social; governmental; globalization". From the perspective of this research, it is important to determine whether or not the social aspects of the tourism accommodation sector are driven by the forces identified. The answer to this question will be sought so as to determine if such planning will be adopted by the organizations.

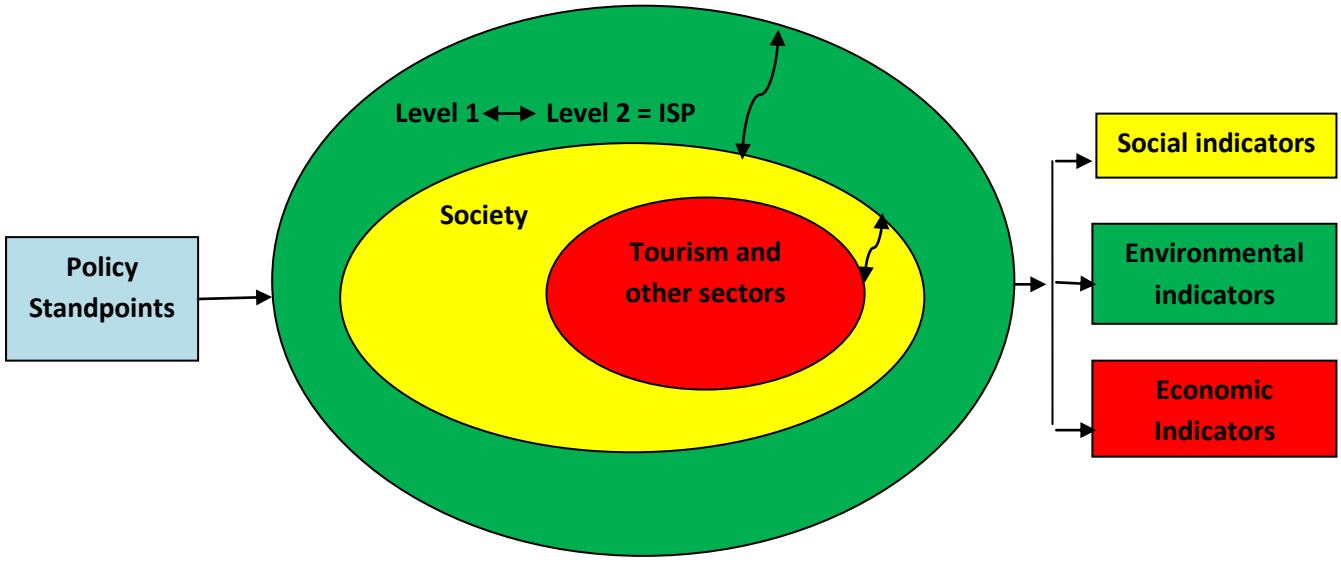
4.8.4.4 Policy and island sustainability

Finally, the importance of policy in the context of island sustainability was already established in chapter 2. Therefore public policies (non-tourism centric) which may impact on any planning endeavour in the tourism sector are considered. Simão and Partidário (2012 pp. 373-374) note that the

"... public sector must perform a relevant role in tourism development, having the ability to influence the sector in many ways: promoting and supporting the construction of infrastructure ... fostering land planning, showing directions and providing guidelines, creating incentives to investment, preserving the historical and cultural heritage...".

Generally therefore "Government intervention, through public bodies .... is justifiable by the need to protect these resources, as well as the need to promote the economy and the well-being of the population" (Simão and Partidário 2012 p.374).

Figure 4-7: The Island System, with policy inputs and indicators



Conceptualized by Author using Nijkamp and Vreeker, 2000

Public policies therefore are intended to direct economic development in a particular direction while at the same time attempting to enhance social progress and protect environmental assets. Moreover the policy standpoints thus developed can impact on the sustainability of the island system and as such it is critically important

that these impacts are monitored and measured. Nijkamp and Vreeker (2000) have created qualitative descriptions of a region in Thailand; by graphically representing the complex relation amongst the environmental, social and economic subsystems, including what they refer to as a demographic subsystem (see Nijkamp and Vreeker, 2000 p.17). They further pointed out that "By following a stimulus- response approach it is in principle possible to estimate the implications of distinct policy scenarios for various relevant sustainability indicators. Drawing on the work of these authors, figure 4-7 was developed, which depicts the island system as the interaction amongst economy, society and environment. The policy standpoints impacting the system and indicators which can be used to measure the impacts are summarised in table 4-5.

Table 4-5: Indicator Development from policy interventions

Key s= social indicator, e=environmental indicator, x =economic indicator

Stimuli= Policy interventions form the NEPMS	**Response= proposed Indicators**
Standpoint 1: Maintain and enhance the natural productivity of ecosystems and ecological processes	1. Biodiversity health (e)
Standpoint 2: Optimise the contributions of natural and environmental resources to economic development	1. Level of community services (s) 2. Generate local business opportunities, e.g. recyclers, ESCO, etc (x) 3. Water consumption (e) 4. Energy consumption (e) 5. Material consumption (e) 6. Waste generation (e) 7. Cost of electricity per annum (x) 8. Cost of water per annum (x)
Standpoint 3: Optimise the contribution of natural and environmental resources to social and cultural development	1. Job creation, see examples in 2 above (s) 2. Level of community services, e.g. involvement in community activities such as environmental clean-up etc (s) 3. Sensory stimuli, e.g. impact of landscaping etc (s)
Standpoint 4: Prevent and mitigate the negative impacts of environmental change and natural	1. Disaster management plan and strategy

Stimuli= Policy interventions form the NEPMS	Response= proposed Indicators
disasters and build resilience to these	2. Regular drills
Standpoint 5: Maintain and enhance the contribution of the environment to human health	1. Health and well-being, e.g. minimize waste to landfill and GHG emissions (s)
Standpoint 6: Fulfil regional and international responsibilities and capitalize on opportunities that accrue from regional and international networking	1. Certification to sustainability standards (e.g. green globe)

Source: Government of Grenada 2005 and Agarwal and Strachan 2006

It must be pointed out that the social indicators can also serve to analyse the accommodation's management decisions as it relates to their social responsibility. For example, the level of community service that the accommodation sector embarks upon can provide some insight of the social responsibility of that particular accommodation unit. However, the stakeholders/actors were asked to suggest indicators for measuring the social, environmental and economic impacts. These are assessed for their alignment with the theoretically generated indicators shown in table 4-5.

However, before the final strategic framework for measuring system sustainability is proposed, it is instructive to check with the island stakeholders/actors for any barriers that may hinder the implementation of policies that can enhance tourism development within the island context. This is important since the tourism policy is now thirteen years old and the NEMPS is now in its 8th year. Dodds (2007) provides some barriers to policy implementation on the island of Malta. It was found that there were sixteen barriers that actors in the public sector, NGO organizations and the private sector provided. In the context of this research only the first six which had very significant responses are checked. According to Dodds (2007 p.55) the six, which are reported here in order of importance are:

1) Non-coordination between Ministries & Authorities- power struggles
2) More talk than action: more just to gain votes
3) Economic priority over social and environmental concerns;
4) Short term focus

5) Private sector power, pressure on politicians for development;
6) Lack of commitment to sustainability: tourism not seen as priority

The stakeholders' views on these barriers are essential since island sustainability has to be driven by policy and organizational decisions. Been aware of the barriers to policy implementation, can provide insight for leap-frogging them in an effort to contribute meaningfully to a successful island system.

4.8.4.5 The strategic framework- linking ISPs to indicators

The proposed 'strategic' matrix which may be simple, but robust enough for assessing the move towards island sustainability is finally presented. The indicators that were suggested in table 4-5 are now placed within the matrix in table 4-6. The matrix is constituted of the entire life cycle stages of the building, although the focus is on the operational stage. The other stages however are added for completeness of the framework and they can be developed in further research endeavours. The four ISPs are also a part of the matrix, and this is shown in figure 4-6.

Table 4-6: Proposed matrix for measuring system success

Building lifecycle stage	**Sustainability indicators based on ISPs**			
	In sustainable island systems, the system is not systematically subjected to increasing concentrations of materials extracted from the earth's crust.	**In sustainable island systems, the system is not systematically subjected to increasing concentrations of materials created in society.**	**In sustainable island systems, the island is not subjected to degradation by physical means.**	**In sustainable island systems, the people are not subjected to conditions that would systematically undermine their capacity to meet their own needs.**
Planning & Design				
Construction				
Operations	Quantity of energy consumed and converted to CO2 emissions;	Materials consumed and generated as waste that are not readily		Constant influx of jobs contributing to intra and inter-generational

	Quantities of materials imported, used and gets into the waste stream;	biodegradable Water consumed and generated as waste;		equity;
Refurbishment & Decommissioning				

Source: Adapted from Agarwal and Strachan, (2006) and table 4-5

The matrix is intended to provide a more strategic approach to dealing with indicators. In this regard, it is important to note that since the research outcome is to develop a set of SS procedures within the island context, no targets are set, but the desired trend in movement of these indicators will be discussed.

The following research question guides the data to be gathered for this final section of the framework.

Research question 7:

What level of importance do the actors place on a matrix within which indicators can be used to measure the impacts of policy and other decisions on the island sustainability goals?

Objective 7

To analyse the importance of a matrix which tourism accommodation stakeholders can use to measure the impacts of policy and other decisions on the island sustainability goals

From the literature review in this section three sub-themes are considered critical to the development of the strategy content needed at this level of the adapted FSSD. These are:

- Social responsibility;
- Public policy,
- Indicators.

Chapter summary

The first four sections of this chapter considered the theoretical perspectives of strategic sustainable development, pitched within the context of a framework for

strategic sustainable development. An adapted FSSD that formed the basis for planning towards island sustainability was the main output of this theoretical endeavour.

In the final sections of the chapter the adapted FSSD was made operational. The main objective of this analysis was to discuss and explain how strategic management, industrial ecology, policy and CSR and to some extent stakeholder theory were used in the operationalization of the adapted FSSD. In essence the focus was on seeking themes that can feed into the development of the SS procedures. In this regard the research aim, questions and themes and sub-themes were generated from these analyses. The research questions and objectives are summarized in table 4-7. Table 4-8 summarizes the themes and sub-themes that should be considered when planning. These will guide the field work conducted as a part of this research

Table 4-7: Research questions and related objectives

No.	Research Questions	Related Objectives
1	How do some key stakeholders/actors in Grenada define sustainability and sustainable development and what are their views on the island sustainability goals?	To determine the views of some key stakeholders in Grenada on the four proposed island sustainability goals.
2	What are the estimated MEWFs in the tourism accommodation sector?	To estimate the MEWFs in a sample of tourism accommodation units in Grenada.
3	How do the actors in the tourism accommodation sector feel about a triple win vision for reducing MEWFs for achieving the island sustainability goals?	To determine the views of stakeholders in the sample of tourism accommodation units, on a triple win vision for reducing the MEWFs for achieving the island sustainability goals
4	What concrete actions can be taken by actors in the tourism accommodation sector to reduce	To determine what actions the tourism accommodation unit stakeholders in the sample are willing to take to

No.	Research Questions	Related Objectives
	MEWFs?	reduce their MEWFs
5	Are the actors in the tourism accommodation sector willing to act-individually or collaboratively to implement the proposed actions to reduce these flows?	To determine the willingness of the actors, in the sample of tourism accommodation units, to act collaboratively or individually to implement these actions to reduce the flows.
6	What factors can be considered for making the decision to act individually or collaboratively to reduce MEWFs in the tourism accommodation sector?	To analyse the factors that may affect the willingness of the stakeholders in the sample to act either collaboratively or individually to reduce MEWFs.
7	What level of importance do the actors place on a matrix within which indicators can be used to measure the impacts of policy and other decisions on the island sustainability goals?	To analyse the importance of a matrix which tourism accommodation stakeholders can use to measures the impacts of policy and other decisions on the island sustainability goals

. **Table 4-8: Summary of themes and sub-themes**

Theme	Sub-themes
1. Vision and Goals for Island Sustainability	a. Goals can address current and future generations needs
	b. Ease with finding agreement amongst stakeholders
	c. The creativity of goals
	d. Adherence to goals leading towards island sustainability
2. Sector Vision for Island Sustainability	e. Agreeing to the win-win-win vision
3. Actions for Island Sustainability	f. Actions for material flow reduction
	g. Intra and inter -organizational collaboration
	h. Advantages/disadvantages of collaboration
4. Monitoring the move towards Island Sustainability	i. Social Responsibility

Theme	Sub-themes
	j. Public policy
	k. Indicators

The themes generated are intended to be high-level and are suggested as the core themes that must be considered if a comprehensive strategy for the sector has to be developed in the future. All the themes and sub-themes can be considered as generic to planning towards sustainability of any other sector in the island system. This gives the adapted FSSD a universal appeal as a sustainability planning tool. Moreover, the themes by themselves cannot drive the plan, so it is important that they should be translated into actionable steps. However, since the themes will be assessed in a practical sense by the field study, these steps will be developed once the theoretical themes are corroborated against the responses from the sample of stakeholders/actors who participate in this research.

CHAPTER 5: RESEARCH METHODOLOGY

Chapter Introduction

In this chapter the research methodology and strategies are outlined. The chapter begins with a context setting section in which the research in the island context is explained. In this section the frame for studying islands on their own terms or nissology (Baldacchino 2008 citing Mc Call) is presented. The research questions are also presented for ease of reference. In the second section the research design is comprehensively developed. Three critical questions are used to formulate the design: 'what were the claims to knowledge and theoretical justifications for the chosen design?'; 'what strategies of inquiry will inform the procedures?' and 'what methods of data collection and analysis will be used?' (Creswell 2003). A mixed method concurrent triangulation strategy is argued for.

The chapter comprehensively explains the qualitative and quantitative data collection and analysis methods. A section on how the results from the two methods are corroborated is also included in the chapter.

5.1 Research methodology in the island context

The significant contributions that the study of Islands can bring to the academic world have been widely acknowledged. From this perspective there are academic journals and several journal issues dedicated to islands "...especially in geography" (Royle 2010 p. 15; Baldacchino 2006). In one such journal, the Island Studies Journal (ISJ), Professor Godfrey Baldacchino in his 'Editorial: Five Years On', was pleased to announce what "... is probably a first in the history of academe, ..." the installation of a Professor of Island Geography (Baldacchino 2010 p. 1).

Additionally, islands are widely conceived as places to be used as research type laboratories where any conceivable experiment can be conducted (Deschenes and Chertow 2004; Baldacchino 2006; Kerr 2005). This is postulated for many reasons, for example, Gough (2010 p. 1) notes that in the global crisis of 2009/2010 "... it may even mean that small islands offer messages of hope and lessons for sustainability"; "... the apparent clarity of boundaries, the very insularity of islands, makes them a tempting object of study (Kerr 2005).

In an effort to further legitimise the contribution that the study of islands can bring to the academic world the idea of nissology, also referred to as 'island studies'

and defined as the "... study of islands on their own terms" was put forward (Baldacchino 2008 citing Mc Call). Nissolgy therefore is almost a natural attraction to an 'islander'. Moreover, and with the advent of globalization, nissology has become a more fascinating prospect. In this context the issues of sustainability and sustainable development manifested as 'a conflict between economic development and growth and the protection of the environmental commons', can have a profound impact on nissology. In the island context (see chapter 3) the issues of sustainability and sustainable development are of critical concern. More importantly developing solutions for the environment/development conflict on islands is an urgent and critical pursuit. Nissology therefore can be used to seek out solutions.

However, nissology as a research method/approach, or more appropriately a frame for the study of islands, has been criticised (see for example Christensen and Mertz 2010). Islands are a part of the global world and as such the effects of global phenomena must be considered when islands are studied. Hence Christensen and Mertz (2012 p. 280 citing Bladacchino) provide an alternative framework to nissology that is, "... the 'globalisation of locality'. This perspective is aligned to the argument presented in chapter 2 in which a 'glocal' basis was proposed for considering the actions and activities of organisations. Moreover, in arguing for the island context and island sustainability vision and goals in chapters 3 and 4, the global perspective of MEWFs into and within islands and the impacts that they have on the islands' socio-ecological system, formed the core of this research. So as an 'island researcher' located on the object of study-the island, the 'alternative' approach to nissology is extremely relevant. As an islander now transformed into an 'island researcher', the permeable nature of the island boundaries of Grenada, needs close scrutiny from both the global and local perspectives. Christensen and Mertz (2010 p. 280 citing Baldacchino) suggest that "... we should understand and analyse small islands conceptualised in the term 'islandness', which in an almost meta-physical way includes more than just the mere study of events and phenomena present on islands".

From this perspective, this study seeks to investigate the island of Grenada on its own terms, but from the perspective of the global MEWFs. To conduct the study an 'adapted FSSD' was first conceptualised. The main aim of the study was provided in chapter 4 and is repeated here for ease of reference:

''*to make operational an 'adapted framework for strategic sustainable development (adapted FSSD)' that applies industrial ecology concepts and tools and the strategic management approach, to develop strategic sustainability procedures for the tourist accommodation sector in an island context and with a roadmap for a green economy'.*

Seven research questions are generated from the literature analysis in chapter 4. Like the research aim the research questions are very critical to the selection of the research design and these are reproduced for ease of reference.

1. How do some key stakeholders/actors in Grenada define sustainability and sustainable development and what are their views on the island sustainability goals?
2. What are the estimated MEWFs in the tourism accommodation sector?
3. How do the actors in the tourism accommodation sector feel about a triple win vision for reducing MEWFs for achieving the island sustainability goals?
4. What concrete actions can be taken by actors in the tourism accommodation sector to reduce MEWFs?
5. Are the actors in the tourism accommodation sector willing to act individually or collaboratively to implement the proposed actions to reduce these flows?
6. What factors can be considered for making the decision to act individually or collaboratively to reduce MEWFs in the tourism accommodation sector?
7. What level of importance do the actors place on a matrix within which indicators can be used to measure the impacts of policy decisions on the island sustainability goals?

5.2 Designing the research method

The most appropriate approach in the context of this research was selected from the three established approaches of 'qualitative, quantitative or a mix of the two methods' (see Creswell 2003). And to guide the selection of the most appropriate strategy, three questions were considered. According to Creswell (2003 p. 5), the questions that must be addressed and are "... central to the design of this research are:

1. “What knowledge claims are been made by the researcher (including a theoretical perspective)?”
2. “What strategies of inquiry will inform the procedures?”
3. “What methods of data collection and analysis will be used?”

These were interpreted by Agarwal (2011 p. 69) who developed a more practical interpretation of question 2 and included an analysis of ‘research methods used in the past in the area for research’. Drawing on these questions and including Agarwal’s interpretation of question 2, the research design is justified.

5.3 Knowledge claims and theoretical perspectives

5.3.1 Justifying research methods from alternative knowledge claims

There are three alternative knowledge claims each based on the research approaches under consideration: positivism/postpositivism usually associated with quantitative research; interpretivism/constructivism associated with qualitative research and pragmatism being the dominant position held for mixed methods approach (Creswell 2003). The claims to knowledge or the epistemological perspectives of the three research paradigms are investigated. To further justify the research design, the strengths and weaknesses of each of the three paradigms were compared and contrasted, in the context of ‘refined nissology’ and the background of the research.

The debate, based on the paradigm ‘wars’, on the advantages and disadvantages of the ‘pure’ forms of the research, that is qualitative and quantitative, anchored on either side of a continuum, has been described as “... long lasting, circular and remarkably unproductive” (Feilzer 2010 p. 6). On one end of the continuum lies the quantitative researcher, anchored in the positivism/postpositivism paradigm. This stance is based on “... cause and effect thinking...” (Creswell 2003 p. 18) and that “... of a singular reality, the one and only truth that is out there waiting to be discovered by objective value-free inquiry...” (Feilzer 2010 p. 6). On the other side of the divide the qualitative researcher, equipped with the interpretivism/constructivism paradigm, claims that there are “... multiple meanings of individual experiences...” (Creswell 2003 p. 18) and “... that there is no such thing as a single objective reality and hence “subjective enquiry is the only kind possible to do” (Feilzer 2010 p. 6). These paradigms are well established and entrenched worldviews and the objective of positing the debate is not to seek a solution, but to establish a basis for proffering an alternative paradigm.

The research questions previously re-sated above require answers that may transcend the mere extremes of the epistemological and ontological positions of the positivist and constructivist paradigms proposed. For example, many of the questions ask for people's opinions and interpretations or re-interpretations of statements (e.g. question 1), which may fit into the category of interpretivism. On the other side of the coin questions ask for measureable data such as material flows (e.g. question 2) and these are objectively obtained and may fall in the positivist category of knowledge claim. Therefore, the research questions dictate that an alternative research paradigm and epistemological stance is taken.

Within the extremes of these research paradigms lies the possibility of mixing these approaches to achieve, what is now widely referred to as a mixed methods approach. In this approach, the idea is to "... use a method and philosophy that attempts to fit together insights provided by qualitative and quantitative research into a workable solution" (Johnson and Onwuegbuzie 2004 p. 16). In the mixed methods approach, the claims to knowledge are anchored in pragmatism, which is "... consequence oriented, problem centred and pluralistic" (Creswell 2003 p. 18). Moreover, "Pragmatism, when regarded as an alternative paradigm, sidesteps the contentious issues of truth and reality, accepts, philosophically, that there are singular and multiple realities that are open to empirical enquiry and orients itself toward solving practical problems in the "real world"" (Feilzer 2010 p. 8 citing Creswell and Plano Clark, Dewey and Rorty).

In the context of the research background and the alternative nissology framework, the pragmatic paradigm appears to offer the 'best' grounding for the claims to knowledge. Nissology, which does not make any claim to knowledge and which in many ways is a framework for the study of islands in a 'real world' context, provides an excellent setting for a 'pragmatic' research design. In other words, to understand the dynamics within islands and their interactions with the global systems, pragmatism is required.

5.3.2 The strengths and weaknesses of mixed methods research

However, to support the case for a more pragmatic approach, it is essential that the strengths and weaknesses of the pragmatic paradigm are considered. Some of the key strengths and weaknesses are shown in table 5-1 (Johnson and Onwuegbuzie 2004 pp. 19-21).

Table 5-1: Key strengths and weaknesses of mixed, qualitative and quantitative research

Mixed Research	
Strengths	**Weaknesses**
1. "Words, picture and narratives can be used to add meaning to numbers." 2. "Numbers can be used to add precision to words, pictures and narratives." 3. "Can provide quantitative and qualitative research strengths." 4. "Can answer a broader and more complete range of research questions because the researcher is not confined to a single method or approach." 5. "A researcher can use the strengths of an additional method to overcome the weaknesses in another method by using both in a research study." 6. "Can provide stronger evidence for a conclusion through convergence and corroboration of findings." 7. "Can be used to increase the generalisation of the results." 8. "Qualitative and quantitative research used together produce more complete knowledge necessary to inform theory and practice."	1. May pose difficulty for one researcher and as such may require a research team. 2. "Researcher has to learn about multiple methods and approaches and understand how to mix them appropriately." 3. "Methodologists purists contend that one should always work within either a qualitative or a quantitative paradigm." 4. "More expensive and time consuming" 5. "Some of the details of mixed research remain to be worked out fully by research methodologists (e.g. problems of paradigm mixing, ...)."

Source: Johnson and Onwuegbuzie (2004 pp. 19-21)

One of the most compelling strengths of the mixed methods approach is the capacity to develop a synergy of the strengths of the qualitative and quantitative

methods (see number 3 under ‘strengths’ of mixed research in table 5-1). Moreover, form the philosophical perspective, the pragmatic approach offers a more comfortable position for an acceptable outcome of the research. For example, the last three strengths listed in table 5.1 point to the ability to corroborate results, increase the ability to generalize these results and more importantly, it provides the opportunity to produce more complete knowledge necessary to inform theory and practice ‘in the island context’. One may argue that the weaknesses of the two pure approaches may be amplified in the mixed approach. However, as noted in the strengths of the mixed methods the weaknesses of one method can be negated by the strengths of another method while mixing (see number 5 under strengths of the mixed approach in table 5.1).

Further some of the key weaknesses of the mixed methods approach concerned time, learning new methods from both pure methods, and other logistical problems. In fact learning from both pure methods provide an excellent opportunity for me as ‘island researcher’ to be equipped with the skills from each of the methods. However, the logistical issues were adequately considered and the strengths widely out-weighed the weaknesses of the approach.

The philosophical merits of the mixed methods approach, that is, pragmatism, supports the proposed research design. The need to generate diverse ‘types’ of knowledge and to corroborate results to create a practical solution to the issue identified in this study is one example. Another example rests in the need to support the ‘alternative nissology approach’ espoused previously.

5.4 Strategies of inquiry to inform procedures

There are three main strategies of inquiry associated with the mix methods approach: sequential, concurrent and transformative (Creswell 2003). However, the nature of this research is exploratory and is perched within the context of an island. In this regard and drawing on the inquiry strategies within qualitative and quantitative research, the case study approach and survey are adopted respectively (to be developed more fully in subsequent sections). Therefore, for this research a case study approach is also employed. Creswell (2003 p. 15) defines “Case studies, in which the researcher explores in depth a program, an event and activity, a process or one or more individuals”.

In this research the activities occurring in the tourism accommodation sector in the island context are studied in depth. In this regard the researcher seeks to

glean an understanding of these activities, with a view of developing a strategic approach for ensuring that these activities do not have adverse impacts on the socio-ecological system of the island. From this perspective, Deschenes and Chertow (2004 p. 213) conclude that "[F]or smaller islands, it may be appropriate to look at the whole island at once or an entire industrial sector on an island". This research draws on the latter approach. One such approach was used by Sundkvist et al. (2001) who studied the bread production industry on the small island of Gotland, population 58,000 persons

5.5 A mixed methods research design

Creswell (2003) proposes six strategies that can be considered for the mixed method approach and the decision choices that determine the selection of a strategy, which is adopted in table 5-2. The intention of presenting this is to justify the choice of the proposed strategy. In choosing a strategy Creswell (2003) and Creswell et al. (2004) recommend four criteria: implementation, priority, integration and theoretical perspective. By using these criteria, the concurrent triangulation design strategy is chosen for this research and is graphically represented in figure 5-1. According to Creswell (2003 p. 218) in this model

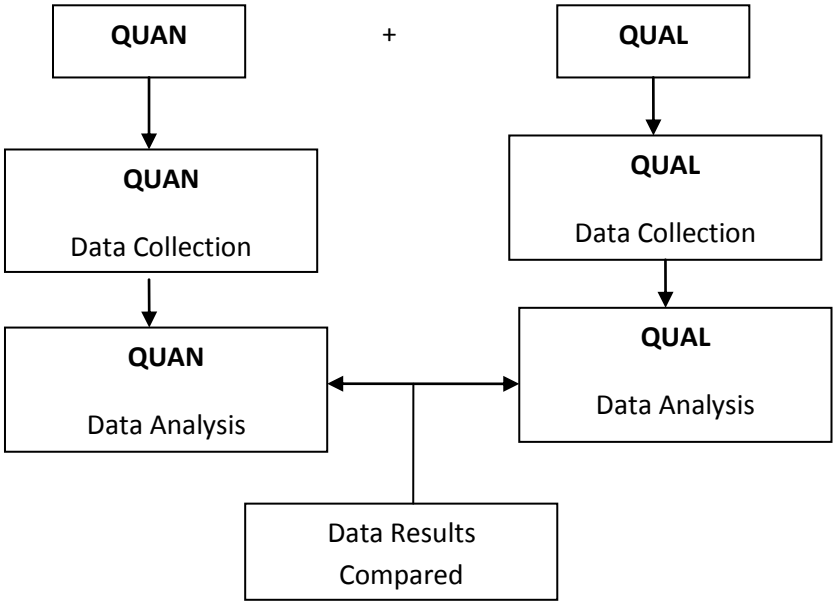
"The concurrent triangulation approach is… selected as the model when a researcher uses two different methods in an attempt to confirm, cross-validate or corroborate findings within a single study... the quantitative and qualitative data collection is concurrent, happening in one phase of the study. Ideally, the priority would be equal between the two methods, but in practical application the priority may be given to either the quantitative or qualitative approach. This strategy usually integrates the results of the two methods during the interpretation phase."

The sections that follow seek to justify this choice based on the proposed criteria.

Implementation

Referencing figure 5-1, both qualitative and quantitative data collection and the analysis of this data will occur simultaneously. Creswell (2003) refers to implementation as the consideration of collecting data in a sequential or concurrent manner and noted that a key issue to be considered in deciding on the implementation technique to be used- is time. For this research the concurrent approach to implementing the research is chosen based on time.

Figure 5-1: Graphic of the concurrent triangulation strategy



Source: adapted from Creswell 2004 p 214

Table 5-2: Comparing the strategies

Implementation	Priority	Integration	Theoretical perspective
No sequence Concurrent	Equal	At Data Collection	Explicit
Sequential-Qualitative first	Qualitative	At Data Analysis	
Sequential-Quantitative first	Quantitative	At Data Interpretation	Implicit
		With Some Combination	

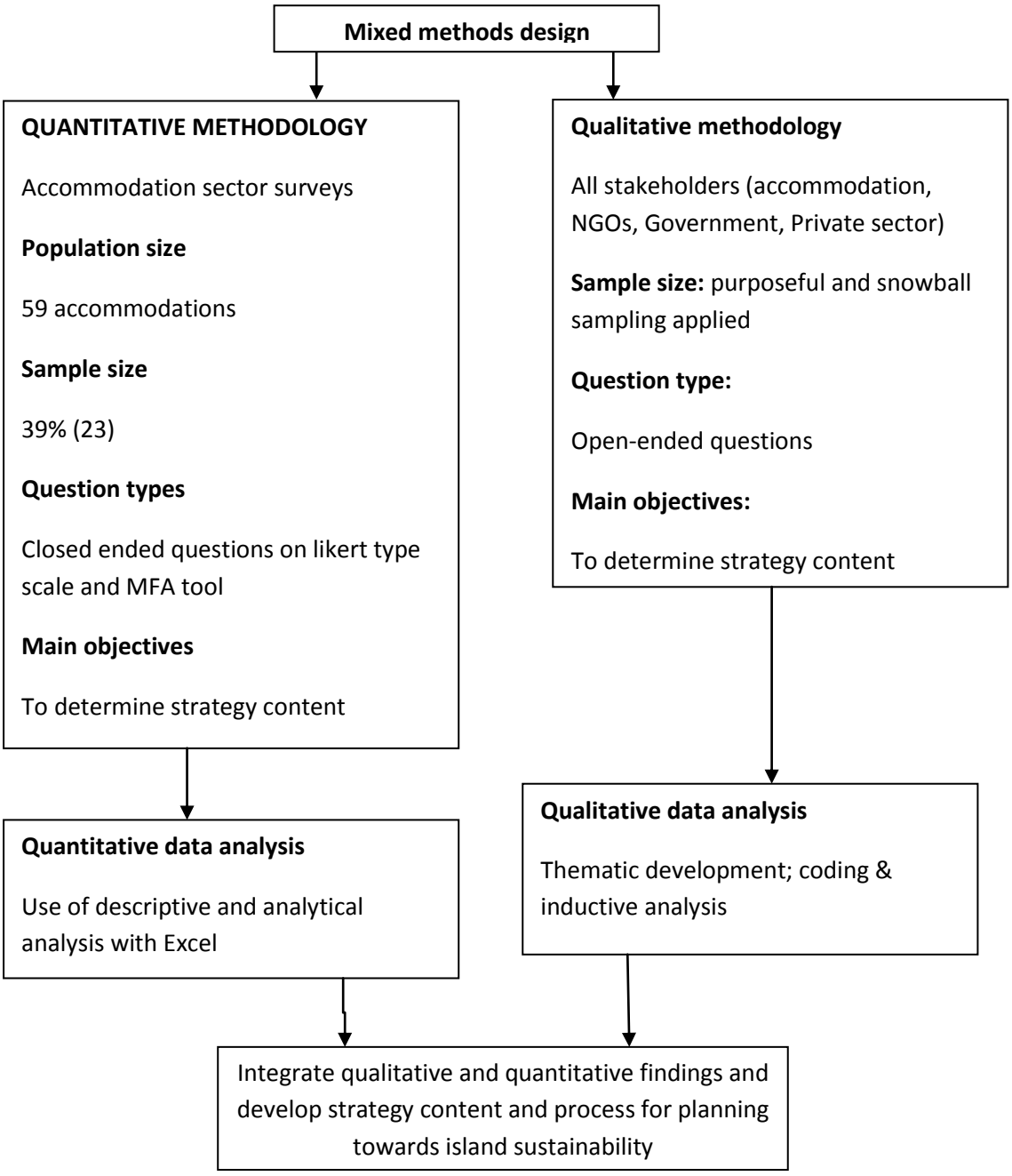
Source Creswell 2003 p. 211

Priority

It was noted previously, that one of the methods may be given priority when the research is executed. In this regard the quantitative approach is may be given priority. According to Creswell (2003 p. 10), “Priority is determined by the researchers, who place emphasis on quantitative data, qualitative data or equal priority shared between the two forms of data”. In this research priority is given to quantitative data, with the qualitative aspects providing support to these findings or in

some cases to elaborate on the themes and sub-themes. Although some of the research questions are qualitative in nature, the data collected are quantified, a process referred to as 'quantising' (e.g Bazely 2009). Additionally, the key focus on MEWFs requires the collection of quantitative data.

Figure 5-2: Overview of the research process



Source: Adapted from Marzuki (2008 p. 234)

Integration

Creswell et al. (2003 p.10), identify two points at which the quantitative and qualitative data can be brought together: when data analysis leads to further data collection and when results are reported. The intention of this research is to integrate data at the interpretation phase, that is, the stage at which the adapted FSSD will be formulated for the Island system. In other words the main themes and sub-themes generated in chapter 4 will be corroborated.

The intention of choosing the concurrent triangulation strategy for this research is therefore based on the interpretations previously explained. Creswell (2003 p.11) summarize the intent of this design strategy as "... to triangulate or gather both quantitative and qualitative data at the same time, and to integrate the two forms of data to best understand the research". The main outcome of the overall strategy therefore is to gather both quantitative and qualitative data at each level of the adapted FSSD and then to interpret this data to construct the strategic content that can be used in applying the adapted FSSD for planning in island systems.

A comprehensive graphic of the research design translated into the research process is shown in figure 5-2. This graphic summarises the details of the procedures for data collection and analysis that are used for the research.

5.5.1 Data collection techniques and strategies

In this section the data collection techniques and strategies are explained. This section therefore concentrates on the quantitative and qualitative boxes in figure 5-2. However, the research participants selected through the quantitative strategy were also required to provide qualitative data and vice versa. Hence the research participants selected and coded for the qualitative data include the participants from the accommodation sector that were selected using the quantitative approach. Both sampling approaches are detailed in the following sections.

5.5.1.1Quantitative sampling

The quantitative sample is selected using proportional stratified random sampling. The quantitative sampling approach is targeted at the population of tourism accommodation units. Using the Grenada Board of Tourism website (http://www.grenadagrenadines.com/plan-your-vacation/accommodations/) the entire population of accommodation units were accessed and listed. According to the Tourism Board, there were 79 accommodation units in Grenada. These were broken-down in the literature review as: hotels and resorts, guest houses and

cottages. However, after further analysis the list was reduced to 59 for the following reasons. Firstly, there were multiple entries in several of the categories, for example, one resort could have been simultaneously entered under the Villa and Resorts categories and these were eliminated. Secondly, the accommodation units on the small island of Carriacou were also eliminated. The population was then divided into 'Hotels and Resorts' and 'Other Units' (which included Apartments, Guest Houses, Inns and Cottages). Both lists were finally scanned for any further possible double entries. Ten facilities from the 'hotel and resort' category and 13 facilities from the 'other units' category, were randomly selected. Due to the small population of accommodation units a sample size of twenty-three accommodation units or 39% of the population was chosen. All the details for each of the accommodation units in the sample were then compiled and prepared for conducting the survey. The accommodation units responding were assigned a code with the prefix 'E' and a number ranging from 01 to 99.

5.5.1.2 Qualitative sampling

The second sampling design is targeted at other stakeholders in Grenada who it was felt had the knowledge and expertise in the area of this research (see chapter 4, section 4.6). These participants were selected because it was felt that they possessed specific knowledge about sustainable development and sustainability in Grenada (see e.g. Agarwal 2011). Additionally to ensure that the strategy context is fully considered, these stakeholders were deemed to be important, at least at the 'vision and goals' levels of the adapted FSSD. This 'vision and goals' is not unique to the accommodation sector and hence other stakeholder input was considered to be of critical importance at these levels.

To ensure that research participants having the requisite background and those unknown to the researcher were identified, "[A] snow ball sample approach is used ..." (Dodds 2007 p. 53). These persons were chosen from amongst academics; Government Officials; Private Sector Representatives (Grenada Hotel and Tourism Association, Board of Tourism, Engineering Association, Chamber of Commerce, etc); Members of the Sustainable Development Council of Grenada and Non-Governmental Organizations. Due to the small population and limited number of stakeholders knowledgeable in the area of investigation, saturation or close to saturation was easily achieved.

The expert stakeholders were also assigned a code with the prefix ‘E’, and a number ranging from 01 to 99.

Table 5-3 summarises the participants selected by both sampling plans.

Table 5-3: List of research participants and their profiles

Participants	Organisation	Position in organisation	Area of expertise of participants
E01	Academia	Lecturer	Sustainable development
E02	Government	Supervisor	Environment
E03	Government	Supervisor	Environment
E04	Accommodation	Management	Accounting
E05	NGO	CEO/Founder	Socio-economic development
E06	NGO	Head	Agricultural & Rural Development
E07	NGO	Head	Economics
E08	Accommodation	Management	Tourism and Hospitality
E09	Accommodation	Management	Operations & Marketing
E10	Tourism association	Executive	Did not indicate
E11	Accommodation	Management	Did not indicate

5.5.2 Data gathering

The data gathering stage consisted of collecting data from the sample of accommodation units selected through quantitative sampling and from the sample of experts/stakeholders selected via a qualitative approach. Both groups of participants were required to provide both quantitative and qualitative data. Additionally, the research questions generated in chapter 4 were all aligned to ‘pre-selected themes’. Therefore using the themes and the fact that the same participants were required to provide two types of data, one survey instrument was created. The data collection was therefore conducted concurrently and open ended and closed ended questions were used in this one instrument. According to Driscoll et al. (2007 p. 20) in many cases where the “Concurrent mixed methods data collection strategies have been employed ... the same individuals provide both qualitative and quantitative data so that the data can be easily compared”. From this perspective Driscoll et al (2007 p. 21) further argue that “Each topic specific set of structured questions in the survey instrument was followed by at least one open ended and unlimited space for

comment which was explicitly linked to the question set immediately preceding it". In this regard each quantised closed question or qualitative ordinal datum in the instrument were followed by the open ended statement 'Please provide comments to support your answer'.

Data is gathered using a questionnaire which also included spaces for gathering materials, energy and waste quantities in the accommodation sector. The design of the questionnaire is instructive as it will assist with outlining the data gathering procedures used. The questionnaire is divided into four main sections, which corresponds to the four themes generated in the literature. The corresponding levels of the adapted FSSD are shown in the brackets. A copy of the questionnaire is provided in appendix B.

Theme 1: Vision and goals for island sustainability

Instrument section A: Defining island sustainability (Levels 1 and 2)

The questions in this section of the instrument were designed to obtain data or strategy content for level two, which was encapsulated with level one in the adapted FSSD. These data were necessary to create the island sustainability vision and goals. The first set of questions in section 'A' are therefore aligned mainly to level 2. They are intended to obtain fundamental information from stakeholders on their conceptualization of sustainability and most importantly on their views of the proposed goals for moving towards the vision of island sustainability. For example, question 1 asks the open-ended question: 'What does (sustainability) sustainable development mean to you?' (qualitative) A Likert scale is also used to determine the stakeholder views on the four ISPs (qualitative ordinal). Stemming from these opinion- seeking questions, a number of closed questions were asked. For example, 'Do you think that if we were to adhere to these goals, then Grenada will be on the path sustainability? Each of these questions is followed by a section for respondents to provide further comments that support their answers.

Theme 2: Sector vision for island sustainability

Instrument section B: Considering material flows and a proposed vision for their reduction (Level 3)

The questions in section 'B' of the instrument were intended to glean a snap-short of the material and energy used and the quantities and the waste generated by the facilities in the sample. After these are gathered respondents were asked to state their agreement on a Likert-scale with a proposed vision for reducing these flows. In

this regard, respondents were then asked to ‘provide comments that support their responses. In this regard, the fifteen questions in this section are geared towards (1) understanding the flows of materials within the accommodation sector and (2) gleaning an understanding of how the sector can begin to plot a strategic approach to reducing these. In the case of the former, questions on the quantities of energy, materials, water, effluents, and emissions are formulated (quantitative). The methods for calculating the materials in and out flows are described under the ‘quantitative’ section. Under the second goal, the opinions on whether or not the actors agree with a vision of a triple win for sustainability in the sector is sought (qualitative ordinal/qualitative).

Theme 3: Actions for island sustainability

Instrument section C: Actions for island sustainability (Levels 4)

At level 4 critical actions that can be taken by the tourism accommodation units to ensure success of the overall system were indentified. This level corresponds to task 4, which is the implementation stage of the strategy process (see chapter 4). In this section of the instrument therefore questions that sought to determine the stakeholders’ views on the actions they are willing to take to manage MEWFs and how they are willing to do so were included. As was explained in the literature, the concept of industrial ecology or more specifically industrial symbiosis suggests that actors can collaborate to reduce MEWFs (see chapter 4, section 4.7). In this regard respondents were asked to indicate if they were willing to collaborate or act individually to reduce their flows to achieve island sustainability. They were further required to suggest advantages and disadvantages for acting in either way (qualitative data). Finally, the literature suggests some factors that can affect the actors’ decision. These were provided to the actors and they were asked to rank them in order of importance (quantitative data).

Theme 4: Monitoring the move towards island sustainability

Instrument section D: Considering the move towards island sustainability (Level 5)

The final task in the strategy process asked for the evaluation and monitoring of the strategy developed. The task is akin to the development of concepts and tools (matrix) in the adapted FSSD. According to the adapted FSSD, the stimuli that impact the island system, which were previously identified illicit responses that were grouped as social, ecological and economic indicators. In this final section of the

instrument the research participants are asked to respond to ‘if they embraced the principles of CSR’. The actors were then asked to give examples of how they have embraced CSR and if four factors identified in the literature have influenced their embracement of the concept. The second set of questions dealt with public policy and its importance to the actors in assisting them in addressing their sustainability efforts. In the literature reviewed, barriers to implementing policy were identified. The opinions of the actors on the relative importance of these barriers were sought. The final questions were designed to determine the importance that the actors attached to a matrix for strategically linking the indicators for monitoring system sustainability. The matrix was previously conceptualized in the literature. The final question sought to gather a number of economic, social and ecological indicators that can be assigned to the matrix.

5.5.2.1Data collection strategy

The eleven participants identified in the sample were not required to respond to all the sections in the instrument. In this regard, section ‘A’ of the instrument was specifically targeted to participants E01, E02, E03, E05, E06, E07 and E10 who were considered to be critical stakeholders on the general aspects of sustainable development. These participants were all selected through the qualitative sampling plan. Additionally the participants selected by the quantitative approach were all from the tourism accommodation sector. This approach was used to ensure that the tourism accommodation units in the two previously identified groups, ‘hotels and resorts’ and ‘other units’ were given an equal opportunity of participating in the research and to assist with the generalisation of the data. The participants in the accommodation sector are identified as E04, E08, E09, and E11. These participants were only required to respond to sections B, C and D of the instrument. However, they also had the option to respond to section A, since they were also critical tourism and sustainable development stakeholders on the island. At the end of the data collection phase, three of the participants in the accommodation sector responded to section ‘A’, while one opted out.

In summary therefore, 10 participants responded to section A, these were E01, E02, E03, E04, ,E05, E06, E07, E08, E09, E10 and 4 participants responded to sections B, C and D, they were E04, E08, E09 and E11. This therefore resulted in two sets of sample sizes for the quantitative data analysis: ten (10) participants corresponding to section ‘A’ of the instrument and four (4) participants corresponding

to sections ‘B’, ‘C’ and ‘D’. This was similar for the qualitative analysis. These will be comprehensively addressed in the data analysis stage in the subsequent sections.

5.5.2.2 Data collection method

The data were gathered from the research participants through semi-structured interviews, guided by the survey instrument. Each of the participants was sent an e-mail with a cover letter asking to participate in the survey. A follow up hard copy of the letter and the survey instrument were also delivered to the participants. In this cover letter participants were advised that their identity will be anonymous. A follow up interview was then sought. The participants were required to respond to section ‘A’ only, were given the option to respond by e-mail. Three participants responded in this manner. These responses provided ‘rich data’ and did not require further clarity. The remaining seven participants agreed to face-to-face interviews and the data captured through notes taken by the interviewer. This was appropriate since there were not much data and the interviews lasted at least 15 minutes at the most. All the four participants in the accommodation sector agreed to an interview and this occurred in a similar manner to the seven interviews. However, there was much effort required to obtain these interviews. This required several telephone calls and visits to the accommodation units. The implication of the response rates will be discussed in the subsequent section.

5.5.3 Data analysis and procedures for validation

This final section describes the techniques of data analysis that are utilized to create the necessary information that will form the strategy content of the adapted FSSD. From the procedural graphic (see figure 5-2), the strategy chosen suggests that qualitative and quantitative data were simultaneously gathered and analysed and then interpreted at the end. The first two sections will consider the qualitative and quantitative data analyses techniques, while the third section presents the overall interpretation of the data.

5.5.3.1 Quantitative analysis

Some of the quantitative procedures were already discussed including the sample selection methods for the accommodation sector. Also some of the questions in the survey will require the application of statistical analysis. Moreover, the majority of questions were closed ended questions that were quantised using Likert scales, rankings and ‘yes’/’no’ responses. Therefore drawing on the work of Creswell (2003

p. 160), who describes the main steps for analysing quantitative data, the approach for analysing such data gathered by this research is outlined in table 5-4.

Table 5-4: Steps for a conducting data analysis for a 'purely' quantitative research

Step #	Step Description
1	Report on number of members returning or not returning survey
2	Discuss response bias
3	Discuss a plan to provide a descriptive analysis of data for all independent and dependent variables in the study
4	If proposal contains an instrument with scales, describe reliability checks for internal consistency
5	Identify and provide rational for statistics and statistical computer packages used for analysis.

Source: Creswell (2003 pp.160-161)

Not all the steps in this approach were applicable to this research, however to ensure the reliability of the quantitative data the relevant aspects are detailed.

Step 1

The number of responses collected from the quantitative sample of accommodations units were four. This corresponds to a response rate of 17% of the chosen sample and 7% of all the accommodation units in Grenada. Since one of the main outcomes of the survey in the accommodation sector was to determine material and energy flows, the response rates of similar studies were compared. For example, in a similar study conducted in hotels in the Balearic Islands where 50% of tourist accommodations are represented by hotels a sample of 2.5% of all hotels were used to analyse energy use, CO^2 emissions and waste throughput in the operations stage of these hotels (Rosselló-Batle 2010). Additionally it was already discussed (see chapter 4) that in a study of MFA in Hawaii, one hotel was used (Housenecht et al. 2006).

Moreover, this response rate has implications for the data collected in sections B, C and D of the survey instrument which are data pertaining to the study of the accommodation sector only. From this perspective further analysis of the accommodation sector was conducted. It was discovered that only six (6) out of the fifty nine (59) accommodation units in Grenada had fifty (50) rooms or more. As a

consequence two out of the four units in the sample fell within this category. This therefore accounted for one third of all the accommodation units with fifty rooms and above. From the perspective of MEWFs this provides, in addition to the studies above, further justification of the number of samples used for analysing the material and energy flows in the accommodation sector in Grenada and in the context of this research.

Additionally, the conceptualisation of the tourism symbiosis was the other major outcome from the research in the accommodation sector. This does not require the inclusion of an excessively large sample. In this regard, an industrial symbiosis constitutes a minimum of three enterprises exchanging at least two materials (see chapter 4, section 4.7). It follows therefore, that a sample of four accommodation units can constitute a symbiosis. Secondly, eleven (11) enterprises out of two hundred and fifty companies in an industrial park on the island of Hawaii were analysed (Miyata and Chertow 2010). This relatively small number of enterprises further suggests that a small number of accommodation units to be considered in this research should not be problematic. Moreover, this conceptualisation on such a small scale may be much easier to implement and serve as a pilot to address the challenges and record lessons learned before any expansion may occur.

Step 2

One accommodation unit, E09, was a relatively new establishment. As a consequence, there were no MEWFs data for a year of operations. Additionally, the management of the unit was not collecting such data. However, the unit was similar in capacity to one of the other units which had relatively accurate MEWFs data. As such the data are used as an estimate of the MEWFs of E09.

Step 3

The variables for the material flow analysis were described using secondary sources of data. These variables are grouped under ‘in-flows and out-flows’ and appeared in chapter 4. These variables were generated from the literature and drew on previous researches.

Steps 4 and 5

Many of the questions included in the questionnaire use Likert scales and some of the data collected are subject to reliability tests. Most importantly in this regard, were the data collected on the research participants’ views on the island

sustainability goals. These data were used as the representative sample was ten (10) participants. In this regard the averages of the Likert scale responses were calculated. Additionally, the standard deviation was applied to determine the internal consistency of the responses received. The data from these responses were captured using the coding scheme and manual, and were reported in chapter 6, table 6-1. In keeping with step 5, Microsoft Excel and the statistical package it supplies was used extensively to aid with the analysis of the data.

5.5.3.2 Methods of calculating MEWFs

The material flows estimates in the tourism accommodation sector are calculated based on data gathered from the accommodation units. The required in-flow and out-flow materials were previously summarized in chapter 4 (Table 4-3). The data gathered were then summarized in an Excel workbook and tallied to create the total flows. Simple conversion factors were applied to consistently report the data in grams. The conversion factors in the box below were used for the conversions. The materials flows for all the units in the sample are shown in appendix C.

However, it was argued that the growth objectives for the tourism sector may impact on the island sustainability vision and the reduction strategies which may be employed by the accommodation sector. To analyse the potential impact the 'incremental' environmental loads were determined. That is the relative increase/decrease of the load indicators was determined. To do so the per capita data (C_i), for example electricity use per tourist night, which were compiled by Kuo and Chen (2009: 1326) and used to quantify environmental loads in an island context were reported for each relevant environmental load indicator in the hotel sector (see table 5-5). These per capita data are used to estimate the annual environmental loads using the revised formula (1): (see Kuo and Chen, 2009)

$$S_i = (C_i \times T_j \times P_j) \qquad (1)$$

where S_i is the amount of loads per i indicator, $C_{i\,=}$ per capita data of i indicator (see table 5-5), T_j is length of stay; and P_j =number of tourists of the '$T'_{j.}$ The incremental increases in loads for the sample only are assessed. In this regard the occupancy for 2010 is estimated using the number of rooms in the sample, an annual occupancy of 50% and assuming this occupancy level for 365 days of the year. The occupancy for the sample is 36, 865 (202 rooms x 50% x 365 days). The 2014 occupancy is projected to increase by 4.25% per annum in the four year period.

Conversion Factors

Diesel: 1 gallon = 7.5 lbs.

Diesel use for electricity generation (Grenada 2011): 16.22 kWh/gallon

Water: 1 gallon ~ 8.33 lbs.

1 lb. = 0.4563 kg

1tonne= 1,000 kg

1kWh = 3.6MJ

1kg of LPG ~ 50MJ of energy

1 L = 0.22 gallons

The annual environmental loads can therefore be estimated and this will be used to assess the incremental impact of the GBT's growth objective reported in chapter 2. These impacts are discussed in the context of the procedure and tourism eco-system in chapter 8.

The quantitative results are reported in chapter 6.

Table 5-5: Per capita data in the accommodation sector (hotels)

Indicator	Per capita data
Energy use (all energy)	155 Mj/visitor night
Carbon dioxide emissions	7,900g/visitor night
Water demand	292 L/per day
Electricity used	16,416 Mj/per day
Solid waste discharge	0.94 kg/per day
Wastewater discharge	200 L/per day

Source: Kuo and Chen 2009

5.5.4 Qualitative analysis

This section describes the proposed techniques for conducting the qualitative analysis. Creswell (2003 pp.191-195) describes in detail the key steps to be followed for analysis and interpretation of qualitative data. Table 5-6 provides a summary of these steps which are applied in this research.

Step 1

All the proposed qualitative research question data are organized into Excel sheets. Each response is assigned to a sheet. The sheets will contain the information under the four headings of the questionnaire. All qualitative data are transcribed into these sheets as obtained from the interview.

Table 5-6: Steps for qualitative data analysis and interpretation

Step #	Description of Step
1	Organization and preparation of data
2	Read through all of the data to obtain a general sense of information and general meaning.
3	Begin detailed analysis with a coding process.
4	Use coding process to generate a description of people as well as categories and themes for analysis.
5	Advance how the description and themes will be represented in the qualitative narrative.
6	Make an interpretation of the meaning of the data. This final step is incorporated into the entire mixed method research strategy as both qualitative and qualitative research data will be interpreted together.

Adapted from Crewell 2003 pp.191-195 and Bryman& Bell 2003

Step 2

Data are read and notes taken to obtain a general sense of the information obtained. General themes on the participants' concepts of sustainability in section A is of particular interest. Additionally the research participants' views on the sustainability goals are of critical importance. The commonality of the indicators generated for the sector in section D is of particular concern. The strategy to be adapted for resource use reduction is of importance in section C. And the use of CSR principles and the drivers that affect its use will be priority in section D. In sum a comprehensive overview of the overall sense of the data obtained are recorded.

Step 3

Coding is necessary for content analysis and is the key analytical technique applied in this strand of the research. According to Bryman and Bell (2003 p.311) "... coding is a crucial step in the process of doing content analysis. There are two main elements to a content analysis coding: designing a coding schedule and designing a coding manual". Using the proposed guidance and the work of Bryman and Bell (2003), a coding manual and scheme were designed.

To comprehensively analyse the data two coding manuals are developed. The first manual is designed to code the data from theme 1 or the first section of the questionnaire. The second coding manual targets the data from the remaining three

sections. “The coding schedule is a form into which all the data relating to an item being coded will be entered” (Bryman and Bell 2003 p. 311). For this research a coding schedule for each of the research participants in section A of the questionnaire is created. Coding schedules for the tourism accommodation sector, which will include the other three sections of the questionnaire, are developed. Bryman and Bell (2003) suggest that a new coding schedule should be developed for each entry for the research. The coding schedule captures all the relevant data from the questionnaire. Copies of these are in appendices D and E.

Step 4

This step in the analytical process requires the selection of common themes and perspectives of the research participants at each level of the adapted FSSD. By using the coding schedule key themes emanating from the research participants responses are recorded. These themes are determined based on the predetermined themes in the literature review (see chapter 4). Excel is used to select appropriate themes using the codes developed. Inductive analysis is also employed (see Bryman and Bell 2003). This approach ensures that themes emerging from the research that may not be in line with the pre-determined themes are also recorded and dealt with appropriately. .

Step 5

In this step, how the results of the analysis are presented in chapter 7 is described. The four themes and attendant sub-themes will form the major headings of the presentation. For each heading a table summarizing the main quotations from the research participants is presented. The intention then is to present a narrative of the findings, detailed in a discussion on the themes and sub-themes and where applicable emerging themes.

Step 6

The final step considers how the data are interpreted. As was previously described the intention is to compare pre-determined themes and sub-themes to emerging themes from the data gathering process. According to Creswell (2003 p. 195), “lessons-learned could also be a meaning derived from a comparison of the findings with the information from the literature or extant theories”. The overall interpretation of the results is further described in the subsequent section.

5.5.5 Comparing qualitative and quantitative results

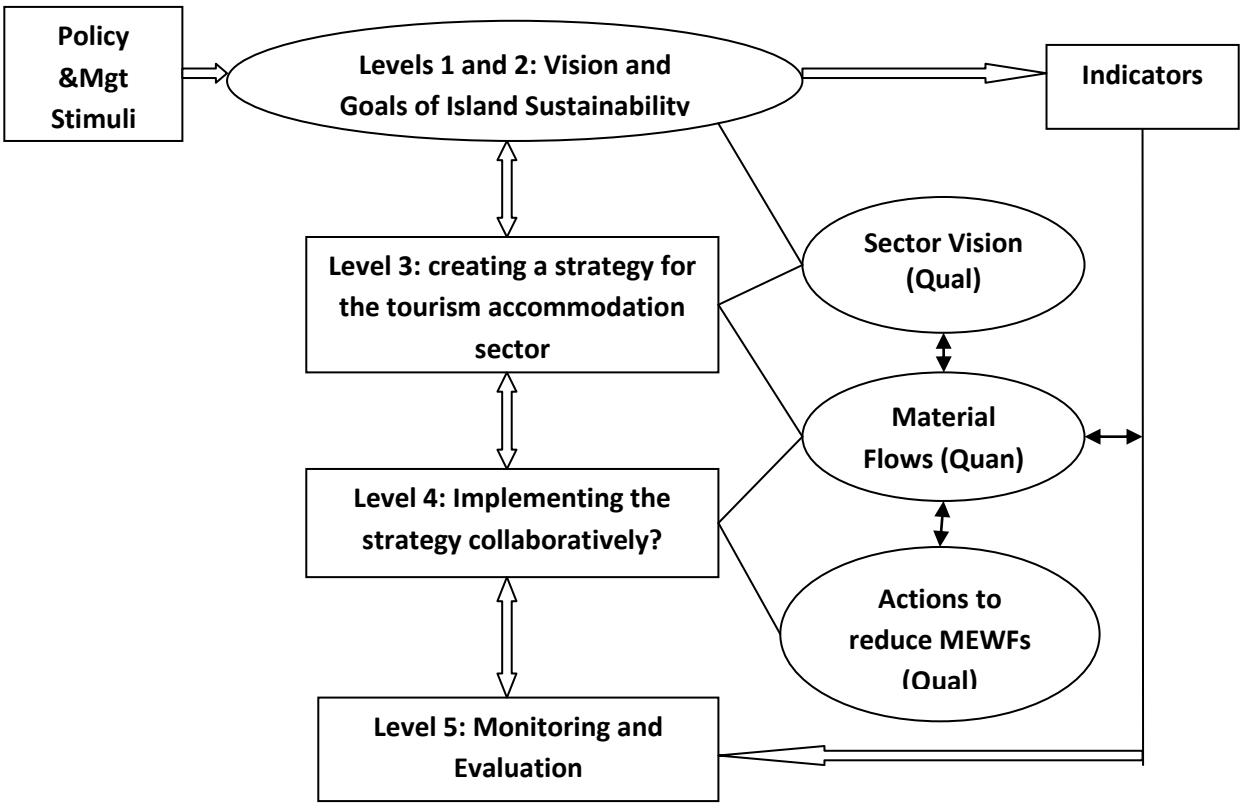
The final stage of data analysis is the mixing of the two types of data and the literature through a process of triangulation or corroboration. However, in the concurrent strategy applied "... the qualitative and quantitative analysis and interpretation combined the two forms of data to seek convergence amongst results" (Creswell 2003 p. 222). In other words triangulation is done to interpret how the themes are combined to create a comprehensive set of steps that can guide the content development at each level of the adapted FSSD.

The model in figure 5-7 describes how the quantitative data mainly material flows and the qualitative data- proposed decisions and actions of the research participants are corroborated to comprehensively generate from the themes and sub-themes practical steps for business strategy planning towards sustainability. Figure 5-7 shows that the quantitative data collected mainly in the form of MEWFs for the accommodation sector can be used to shape the strategic vision created at level 3 and hence link the business vision to the vision and goals for island sustainability. This can be regarded as 'visioning and vision linking'. Secondly, the actions that businesses may take to meet the vision can be guided by the materials flow analysis. Thirdly, the monitoring of the material flows reduction to ensure that sector actions are meeting the sector vision and ultimately the goals of island sustainability is also corroborated.

This attempted corroboration amongst the data collected at levels 3 to 5 of the framework is demonstrated by the double headed arrows linking the information in the circles and to the indicators. The other sections of the adapted FSSD remains as originally conceptualized and are added-in for completeness of the adapted framework and the relation to the data gathering or the strategy content development process.

The model basically demonstrates that the results can lead to three main strategy process steps under which the strategy content can be added. These are 'visioning and vision linking'; actions; and 'monitoring and evaluation'. These group of steps are used to inform the development of the propose SS procedures.

Figure 5-7: Mixing the QUAN+QUAL data



Source: Author's conceptualization

Chapter summary

This chapter presented the methodological approach and strategy for gathering and analysing data. Based on the background of the research, that is, islander as researcher or within an enhanced nissology frame and on the research questions posed, a mixed method concurrent triangulation approach was selected. This method was further justified on the pragmatic paradigm of knowledge claims and on the overwhelming strengths of the method when compared to its pure counterparts of quantitative and qualitative methods.

The main data gathering technique was the use of a questionnaire to conduct semi-structured interviews and the recording of quantitative data to feed into a materials flow analysis. Analysis of the qualitative data was aided by coding and the use of excel. Inductive analysis was used. The fundamental mixing approach was the corroboration of the data gathered with that of the generated themes, and this

occurred at the end with the overall interpretation of the results. From this a group of steps which may form the SS procedures was proposed.

CHAPTER 6: QUANTITATIVE RESULTS AND ANALYSIS

Chapter introduction

This chapter presents the quantitative results and analysis. The results seek to determine from a quantitative perspective the research participants views on the various themes and sub-themes generated in the literature. The views of the stakeholders on the following themes were sought: the vision and goals for island sustainability; sector vision for island sustainability, which includes the results of MEWF analysis and the impacts of the growth objectives on these flows; actions for island sustainability and monitoring the move towards island sustainability.

6.1 Results on goals for island sustainability

The data gathering process for the second part of this theme was described in chapter 5. Four sub-themes were proposed for reporting and analysing the data. These sub-themes were founded in the theory expounded at level 2 and sought to answer the second portion of research question 1: what are the stakeholder views on the island sustainability principles/goals for defining island sustainability? Ten (10) participants responded to this section, these were E01, E02, E03, E04, E05, E06, E07, E08, E09 and E10. The descriptions of the respondents were already reported in chapter 5.

Table 6-1 presents the results from the question: ‘On the scales provided please indicate your level of agreement with the following four goals for ‘island sustainability?

Table 6-1: Stakeholder agreement with ISPs

Goals	No of responses n=10						
	Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**	**Ave.**	**Std. Dev**
ISP 1	4	4	1	1	0	4	1.0
ISP 2	6	3	0	1	0	4	1.0
ISP 3	7	2	0	1	0	5	1.0
ISP 4	7	2	0	1	0	5	1.0

Generally, the stakeholders agreed or strongly agreed with the four goals presented. It is apparent that the responses were generally supported by the

experience of the respondents who are all island residents. For example, four out of the ten respondents (40%) strongly agreed with ISP 1. The first goal dealt with the extraction of resources from the earth's crust. It is apparent that this may not be applicable to islands, since there are not many extractive activities occurring in islands, for example, the drilling and extraction of oil and natural gas for the provision of energy. Moreover, six out of ten (60%) respondents strongly agreed with ISP 2, which dealt with the generation of waste in society. More importantly ISPs 3 and 4 had seven out of ten (70%) of the respondents strongly agreeing, that is, their strongly agreed that islands must not be 'systematically subject to degradation by physically means' and that 'island dwellers must not be subject to conditions that systematically undermine their capacity to meet their own needs', respectively. These goals may have had greater relevance to islanders, for example ISP 2 which deals with waste accumulation, ISP 3 land degradation and ISP 4 social issues, which are all close and real problems experienced by people living in Grenada.

One out of the ten respondents did not agree with any of the ISPs. This is important for it sheds the light of an expert (E07) who felt that islands should not be subject to these goals and that it should be taken from a global perspective. However, these goals are from a global perspective and this was explained. The respondent still disagreed with the goals. E07 indicated that the classical definition of the Brundthland Report is the most appropriate definition of sustainable development. It is the researcher's view that the Brundthland definition of sustainable development is broad and is difficult to translate into practice. As a consequence, the establishment of a set of goals built on this definition can assist with the operationalization of sustainable development and sustainability and more importantly island sustainability (see e.g. Robèrt 2004). .

Additional results that capture in more details the experts' views on these goals are presented in table 6-2. The responses were simply 'yes', 'no' and 'no response'. However, an open ended statement asking for comments in support of their responses, including no response, followed each question. The responses to these open ended questions are reported in chapter 7.

Table 6-2: Summary of stakeholders' responses on the sub-themes

Questions	No Responding (n=10)		
	Yes	No	Did not respond
1. Do you think that these goals address the needs of our current and future generations?	7 (70%)	2 (20%)	1 (10%)
2. Do you think that it will be easy to find agreement amongst stakeholders on using these four statements as goals for moving towards Grenada's sustainability?	3(30%)	5(50%)	2(20%)
3. Do you think that these four statements creatively define the sustainability goals for Grenada?	5(50%)	3(30%)	2(20%)
4. Do you think that if we were to adhere to these four goals, then Grenada will be on the path to sustainability?	6(60%)	3(30%)	1(10%)

The majority, seven out of ten (70%) respondents thought that the goals can address inter and intra generational needs. Also a further six out of ten (60%) thought that if the goals were adhered to that Grenada can be placed on a path towards sustainability. However, five out of ten (50%) respondents thought that it will not be easy to find agreement amongst a broader stakeholder group on using the goals for moving Grenada on to a path of sustainability. Additionally, three out of ten (30%) thought that the goals were not creative.

The qualitative results for this section will address this result and the others in more details.

6.2 Results from the accommodation units surveyed

The next section reports the results from accommodation sector survey and addresses the sector levels (3, 4 and 5) of the adapted FSSD. Four accommodation units were surveyed, E04, E08, E09 and E11. The justification for the four units that participated was previously provided in chapter 5. These results were gathered from sections 'B', 'C' and 'D' of the survey instrument. The key focus was to assess the material flows in the accommodation sector.

6.2.1 Sector Vision for Island Sustainability

The data for this section was obtained from section 'B' of the questionnaire. The section seeks to respond to research questions 2 and 3.

6.2.1.1 Material Flow Analysis

The MEWFs in and out of the units surveyed are shown in table 6-3. The building mass accumulation was not surveyed and was not within the scope of the study. From the table therefore, the total inflows were 1.2 times that of the outflows, suggesting that there was some level of accumulation of materials within the boundaries of the units. Excluding the accumulation of building materials, water can be considered to remain within the boundaries of the units when consumed by tourists or used for irrigation of lawns and for filling swimming pools. These will be further investigated as each of the materials is analyzed.

Table 6-3: Material Flows for the accommodation sector

Materials	In- flows (kg)	Out-flows (kg)
1. Fossil fuels for electricity	7,557	
2. Energy source (LPG)	79,046	
3. Water	33,639,896	
4. Other materials (cleaning)	12,000	
5. Other materials (food)	47,600	
6. Solid waste		37,706
7. Emissions		23, 619
8. Effluents		27,372,887
Total	33,786,099	27,434,212

When the inflows (table 6-3) were compared to the estimated overall inflows of the island (see chapter 4), it was found that for the sample of accommodation units, the inflows accounted for about 2.4% of the island's inflows. Similarly, the outflows were compared to the islands corresponding outflows (emissions, waste and effluents), this revealed that for the sample, the outflows accounted for approximately 5.6% of the islands outflows.

Each of the materials is discussed in turn. However, in keeping with the focus of this research and the literature reported (see section 4.9.2.3 in chapter 4) and with the flows of these materials on a whole island basis, water and energy will be fully

considered as inflows. The outflows to be fully considered were also specified in the literature, therefore emissions, effluents and waste are the other core materials comprehensively analysed.

The results of the growth objectives of the GBT is also presented and analysed in this section.

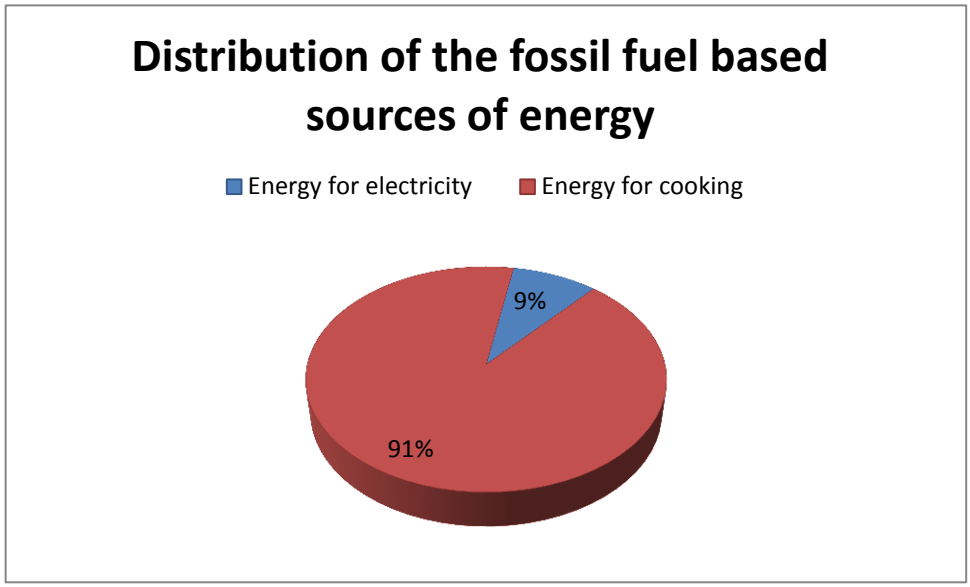
Energy

The majority of the accommodation units depended on diesel fuel for electricity generation and liquid petroleum gas (LPG) for heating in laundries and for cooking. The total energy inflows were about 86,603 kg and accounted for less than 1% of the total materials inflow. The distribution of the inflows for both energy services is shown in figure 6-1.

From figure 6-1 it was estimated that about 91% of the energy used in the accommodation sector was from LPG, which was used mainly for cooking. It was noted (chapter 4) that propone or LPG was an important energy input in the hotel sector. This finding therefore is congruent to the literature review.

The other main energy inflow was associated with the quantity of diesel used to generate electricity for the sector. The accommodation sector has an indirect impact on the quantity of petroleum products imported into Grenada. In Grenada there is a sole generator of electricity. It is estimated that about 9% of the diesel used to generate electricity, is ‘indirectly’ consumed by the accommodation sector. This diesel does not directly flow into the sector, but is considered as an indirect inflow of energy due to the electricity needs of the sector. This has implications for the inflow of fossil fuels into Grenada as a whole and for the island’s sustainability. These implications are discussed in chapter 8.

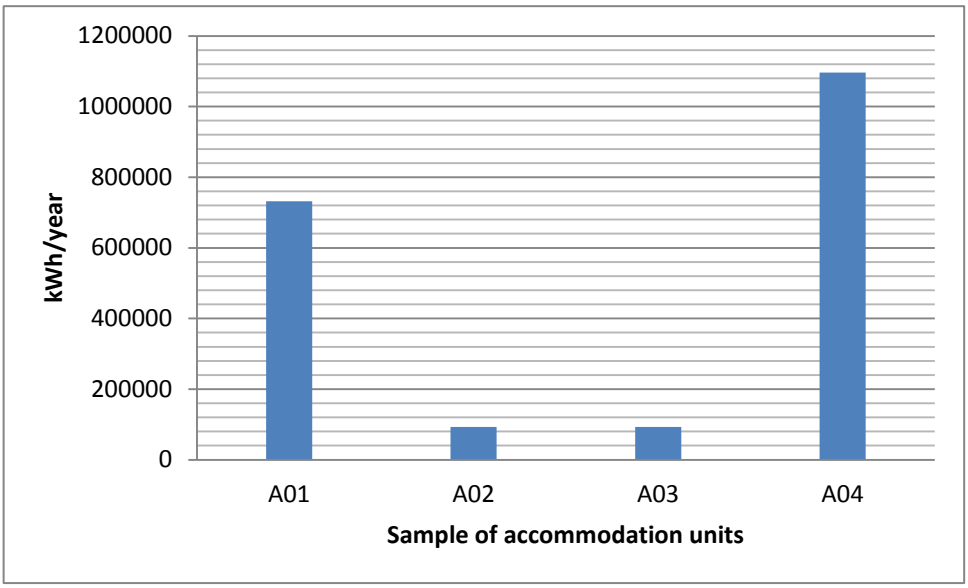
Figure 6-1: Distribution of fossil based fuel sources in the accommodation sector



In this regard, the total quantity of electricity consumed by the sector is very significant. Electricity consumption was estimated to range from ~90,000 kWh/ year in the smaller hotels to over 1.1 GWh/year for the larger resorts, see figure 6-2. It is further estimated that the average consumption for the smaller units was ~93, 216 kWh/year and for the larger resorts that average was approximately 914,100 kWh/year. When the electricity consumed by the sub-sector is compared to the overall supply of electricity, it was estimated that the sub-sector consumed about 16% of the supply of electricity in the entire country. Additionally, when the consumption in the sector was compared to the total consumption in the commercial sector to which the accommodation sub-sector belongs, it was found that the units consumed about 30% of the total consumption.

These estimated consumptions compare to the literature, in that it was reported in the study on Hawaii that the accommodation sector consumed about 18% of the electricity supplied on the entire island, while in Grenada that was estimated to be approximately 16%. These consumption figures are very significant in an island context. The impact of the growth objective on electricity use in the accommodation sector is presented in a subsequent section.

Figure 6-2: Quantities of electricity used by the units in the sample



Despite these relatively high consumption patterns, the resorts did not use any other source of energy, such as renewables, for the generation of electricity. This observation presents an opportunity for the accommodation sector to transition to renewable energy sources (RES) for generating electricity.

As it relates to domestic water heating the majority of the units use solar thermal technology. The fact that solar thermal is used and not solar photovoltaic for the generation of electricity will be further discussed in chapter 8. Additionally, the prevalent use of liquid petroleum gas (LPG) for cooking and heating further lends itself to the consideration of biogas generation for these purposes.

Emissions

As an account of the use of electricity generated from diesel, the accommodation units have an indirect impact on the climate due to the carbon dioxide released during the burning of the diesel. Additionally, carbon dioxide is directly released from the accommodation sector when LPG is burnt. The total emissions of carbon dioxide, referred to as the carbon footprint of the sample of accommodation units were estimated to be 23, 617 kg CO_2 equivalent. This accounts for about 2% of the total emissions of carbon dioxide in Grenada.

Carbon dioxide is considered as one of the main contributors to climate change. The impact of climate change can be detrimental to the survival of islands;

but islands have a relatively miniscule emission of carbon dioxide (see chapter 3). The argument in the island context is whether islands should mitigate or adapt to climate change. This argument is critical in the context of this research as the carbon dioxide emissions hinge on the type of energy source used by islands. From the results of the energy flows and the carbon dioxide emissions, consideration should be given to this argument. Moreover, climate issues must also be a critical component for business and as such, they should be a part of the strategic planning process of businesses even on islands. The mitigation/adaptation debate therefore should be considered in the context of energy and emissions flows.

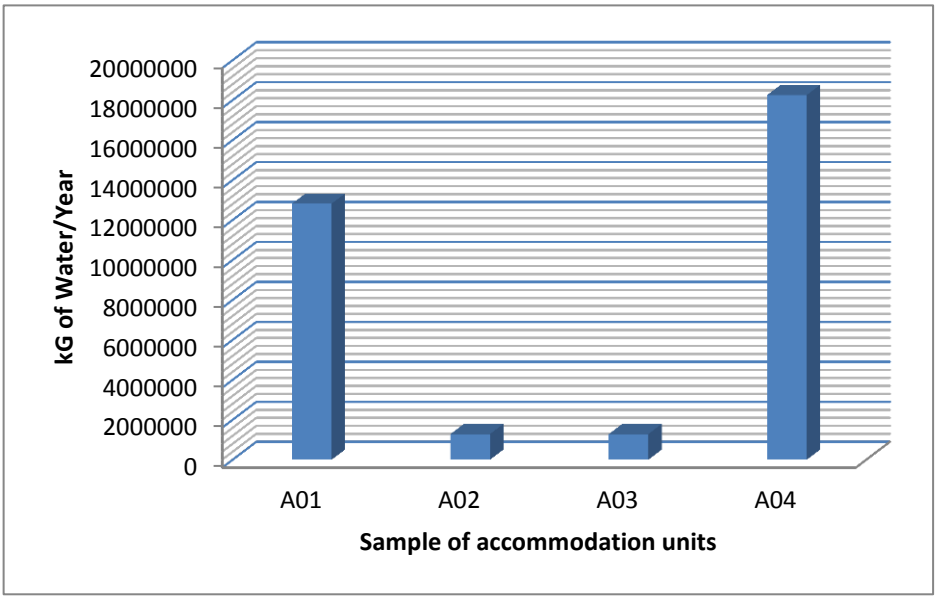
Water

The units used approximately 33.6Gg of water on an annual basis. Water is used by guests for bathing, and for other sanitary chores and for laundry and cleaning. Many of the accommodation units have swimming pools. Water was also used for irrigating lawns which were a prominent feature of the majority of the units. The extremes of the water consumed are shown in figure 6-3. In the large units A01 and A04 the water consumed ranges between 1.3 Gg and 18Gg. The water consumed by the accommodation sector was about 21% of the total water harvested on the island. According to the finding on Hawaii, 23% of the water used in the entire country was consumed by the accommodation sector. Moreover, this result corroborates with the finding in the literature (see chapter 4, section 4.9.2.3) that water dominated the materials flow in the accommodation sector. The high concentration of water consumed in the accommodation sector requires a comprehensive discussion. This also has implications for energy use on a whole island basis. These considerations are further discussed in chapter 8.

Waste

The solid waste flows out of the tourism accommodation sector were estimated to be 37, 706 kg of waste per year. It was further estimated that the accommodation sector accounted for about 1.6% of the total waste flow generated on the whole island.

Figure 6-3: Quantities of water consumed by accommodation units in sample

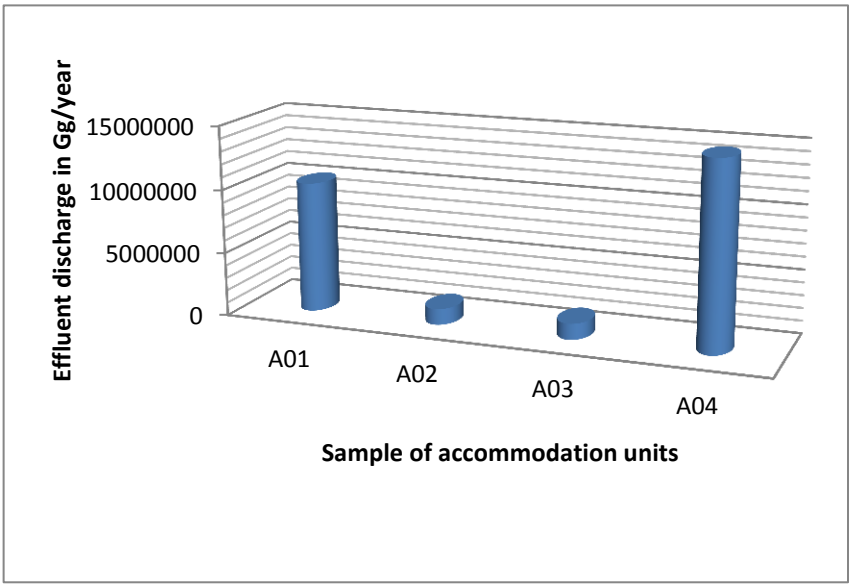


Effluents

After use the water became an outflow in the form of effluents. Grey water from kitchens, laundries and bathrooms and sewage from toilets were major out flows from the units. The range of effluent discharges is shown in figure 6-4. The total quantity of discharge was estimated to be 27.4 Gg or 80% of the total quantity of water in-flow into the resorts. The remaining 20% was assumed to have accumulated within the boundaries of the units in swimming pools, for drinking and in other activities such as cooking and the irrigation of lawns etc. Compared to the whole island the effluent discharge from the accommodation units was approximately 63%.

All the units used cleaning agents, such as chemicals for polishing, floor cleaning, window shining, kitchen cleaning and laundry. These materials also contributed to the grey water effluents from the facilities. According to the literature (chapter 4, section 4.9.2.3) materials for cleaning were noted for their contribution to the environment. In this research cleaning materials would not be discussed fully. However, in the context of effluents and its potential impact on the island environment, cleaning materials are given consideration.

Figure 6-4: Quantities of effluent discharges by accommodation units in sample



Other concerns with water and effluents

The majority of accommodation units purchased water from the only authority on the island that provides a supply of portable water island-wide. The units did not use any other sources of water. There was no recycling of grey water and all the effluents from the toilets and kitchens were discarded to the near-by sewage system. No desalination was used by any of the accommodation units in the sample, although this could be an option for the majority of the units as they were located on the beach fronts. The implications associated with these actions as strategic actions for reducing water and effluent flows will be further discussed in chapter 8. Additionally, the implication for energy use if desalination is employed is considered.

6.2.1.2 The impact of the growth objectives on MEWFs

Table 6-4 presents the results of the incremental change that may occur in 2014, if the objectives of the GBT are achieved, vis-à-vis: increasing the number of stay-over tourists by 4.25% annually and the length of stay to 9.25 days. Despite the fact that the loads in 2010 were estimated to be below the benchmarks considered in chapter 4, section 4.8.2.3, all of the loads were estimated to increase in the sample, if the growth objectives are met in 2014. This result will be discussed in relation to the actions that the tourism accommodation units in the sector are willing to take to

reduce these loads. The implications of these incremental increases, for the conceptualization of a tourism symbiosis, are also discussed in chapter 8.

Table 6-4: Incremental environmental impacts of GBT growth objectives

Environmental load indicators	Annual environmental loads		Incremental change
	2010	2014	
Energy use (MJ)	$4.9x10^7$	$5.5x10^7$	$6.5x10^6$
CO^2 emissions (g)	$2.5x10^9$	$2.8x10^9$	$3.3x10^8$
Water demand (L)	$9.1x10^7$	$1.0x10^8$	$1.2x10^7$
Electricity used (MJ)	$5.1x10^9$	$5.8x10^9$	$6.9x10^8$
Solid waste discharge (kg)	$2.9x10^5$	$3.3x10^5$	$4.0x10^4$
Wastewater discharge (L)	$6.3x10^7$	$7.1x10^7$	$8.4x10^6$

The results of these materials flows establish another basis for conceptualizing the proposed tourism symbiosis, using the four accommodation units in the sample.

6.2.1.3 The sector vision-linking to the island sustainability vision

Sub-theme e: Agreeing to the Win-win-win Sector Vision

The win-win-win vision was proposed to the stakeholders and their agreement/disagreement with that vision was solicited. Table 6-5 summarizes the results. For ease of reference the proposed vision is presented here again.

Table 6-5: Agreement with triple win vision

On the scale provided please indicate your level of agreement with this vision				
No of Respondents n = 4				
Strongly Agree 5	**Disagree 4**	**Undecided 3**	**Agree 2**	**Strongly disagree 1**
3 (75%)	1(25%)			

"We (name of company) will endeavor to contribute to island sustainability by ensuring that the way we generate waste and use materials and energy can result in a triple win for: environment, society and economy. We will take appropriate actions in these areas as part of our strategic efforts towards our island's sustainability."

All the respondents agreed or strongly agreed with the vision (see table 6-5). Respondents were then asked to suggest whether or not they thought that the vision can easily be accepted by other businesses in the accommodation sector for achieving island sustainability? All the respondents indicated that it would be easy for other businesses to accept the vision (see table 6-6).

Table 6-6: Results from questions on vision

Questions	Number of Respondents n=4		
	Yes	No	Did not respond
Do you think that this vision can easily be accepted by other businesses in the accommodation sector for achieving island sustainability?	4		
Would you be willing to modify your current vision to incorporate this sustainability vision?	3		

Three out of the four respondents said that they were 'willing to modify their current organizational vision to incorporate the sustainability win-win-win vision.

The qualitative results for this section of the research are presented in chapter 7.

6-3 Results on actions for Island Sustainability

The data for answering the questions in this section were obtained from section C in the questionnaire.

The following sub-themes were researched.

Sub-theme f: Actions on material flow reductions

Two strategic approaches for acting were proposed in the literature: a collaborative approach and an individual approach. The first question sought to determine the actions the respondents were willing to take, whether or not they were currently taking these actions or will be willing to implement them in the future and the timelines they offered for implementing future actions. Table 6-7 summarizes these findings.

Table 6-7: Actions and timings

Actions	Timing for Implementing Actions number responding n =4		
	Current (no.)	Future (no.)	Not at all (no.)
Reduce waste to land fill by composting etc	1	2	
Use of renewable energy (solar thermal)			
Use of renewables for electricity		4	
Reuse of plastic containers	2		
Recycling, reusing of other materials	1		
Implementing energy efficiency measures	3		
Rainwater harvesting		1	
Dual flush toilets	1		

When asked within what maximum time periods the respondents were willing to implement the future actions, a timeline of 1 to 2 years was proposed.

Sub-theme g: Inter -organizational collaboration

Inter and intra-organizational collaborations are proposed strategies in the IE and IS literature, that can lead to the reduction of material flows in industry and hopefully in the tourism accommodation sector. In this research inter organizational collaboration is that which could occur among the tourism accommodation sector and organizations which are not within the tourism sector, mainly water, electricity and waste management. The actors in the tourism accommodation sector were asked if they were willing to collaborate with any organization- tourism or otherwise to reduce material flows. In the case of inter-organizational collaboration, the possibilities to collaborate with three main organizations were sought. These

possibilities were grouped into categories and these together with the actor's willingness to do so are reported in table 6-8.

The stakeholder organizations suggested a number of ways in which they were willing to collaborate with these external organizations and these are reported in chapter 7.

Table 6-8: Actor's willing to be involved in inter organizational collaboration

Combinations of inter-organizational collaboration	No of respondents willing to participate n=4
Electricity Company Only	1
Water Company Only	0
Waste and Sewage Company Only	0
Electricity and Water	1
Electricity and Waste	0
Water and Waste	0
All three organizations	2
No collaboration	0

Sub-theme h: Intra-organisational collaboration

Intra-organizational collaboration is considered to be collaboration amongst the accommodation units only. The stakeholders were asked if they were willing to act individually, in essence the way they were currently acting, or if they were willing to act collaboratively to reduce these material flows. Three out of the four respondents indicated their willingness to act collaboratively.

The respondents were asked to 'indicate in order of importance, those factors that must be considered in making a decision to act collaboratively', that is both inter and intra organisational collaboration. The findings of this ranking are reported in table 6-9. Three out of four respondents (75%) indicate that 'long term strategies'; while two out of four (50%) indicated that the 'willingness to corporate' was the most important factor.

Descriptions of the actions and the advantages and disadvantages of acting collaboratively are reported in chapter 7. The implications for this result are discussed in chapter 8.

The overall ranking was derived and is reported in table 6-10.

Table 6-9: Ranking of factors affecting possible collaboration

Factors	Respondents Reporting Ranks (number responding) n=4								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Personal Contacts (with organizations)								**3(75 %)**	**1(25 %)**
Trust	**1(25 %)**			**2(50 %)**			**1(25 %)**		
Good will		**1(25 %)**				**3(75 %)**			
Long term strategy	**3(75 %)**	**1(25 %)**							
Enthusiasts on all sides	**1(25 %)**	**1(25 %)**					**2(50 %)**		
Need for new investments	**1(25 %)**		**2(50 %)**						**1(25 %)**
Improvement of quality		**3(75 %)**	**1(25 %)**						
Access to specific knowledge and technologies		**1(25 %)**		**1(25 %)**	**2(50 %)**				
Willingness to corporate	**2(50 %)**				**1(25 %)**				**1(25 %)**

Table 6-10: Overall Ranking of factors

Rank	Factors
1	Long term strategy Willingness to corporate
3	Improvement of quality
4	Need for new investments
5	Trust
6	Access to specific knowledge and technologies
7	Good will
8	Enthusiasts on all sides
9	Personal Contacts (with organizations)

6-4 Results on monitoring the move towards Island Sustainability

The main sub-themes that emerged from the literature were: ‘corporate social responsibility; ‘policy’ and ‘indicators’. The monitoring of sustainability as was previously described in the literature required a holistic approach that ties the indicators to the sustainability principles and goals. Secondly, the indictors should

not be isolated from the policies and management decisions that deal with social responsibility. It was further argued in the literature that corporate social responsibility is one of the major management ideas that encompassed the sustainability concept in business. The findings on these three sub-themes are reported in the following sections.

Sub-theme i: Embracing Social Responsibility

The research participants were first asked if they embraced the principles of CSR. Table 6-11 shows the results of this question.

Table 6-11: Embracing CSR

Percentage of respondents (%) indicating that they embraced the principles of CSR n =4	
Yes	**No**
4 (100%)	0

Four factors were identified as drivers that may affect organizations' embracing of CSR. The respondents were asked to indicate if these factors affected or did not affect their embracing of CSR. Table 6-12 summarizes the responses.

Table 6-12: Drivers affecting CSR

Drives of CSR	**Percentage of Respondents (%) indicating that the driver affected their embracing CSR n=4**		
	Yes	**No**	**Did not respond**
Market	3 (75%)		1(25%)
Social	3 (75%)		1(25%)
Government	3(75%)		1(25%)
Globalization	3(75%)		1(25%)

Sub-theme j: Public Policy

The respondents were asked to indicate, 'how important policy was in assisting their CSR or any other efforts for addressing their impacts on society and the environment'. Table 6-13 reports the findings. Three out of the four respondents felt that public policy was very important to assisting them in their CSR or any other efforts for addressing impact on society and the environment.

Table 6-13: Importance of policy in assisting CSR and Sustainability Efforts

No of respondents (%) n=4				
Un-important	**Of little importance**	**Moderately Important**	**Important**	**Very Important**
0	0	1(25%)	0	3(75%)

Finally, barriers to the implementation of policy relating specifically to the implementation of sustainable tourism development in islands were presented and discussed in the literature. The researchers found that some of these policy standpoints were more important than others in their research. The research participants were asked: how they would rank the barriers to implementing policies that may hinder the general move towards island sustainability. Table 6-14 summarizes the findings.

Table 6-14: Respondents ranking on each barrier to policy

Barriers	**Respondents reporting ranks on barriers (%)**					
	1	**2**	**3**	**4**	**5**	**6**
Non coordination between Ministries & Authorities-power struggle	2 (50%)			2 (50%)		
More talk than action; more just to gain votes	1 (25%)	1 (25%)	2 (50%)			
Economic priority over social and environmental concerns	3 (75%)		1 (25%)			
Short term focus		3 (75%)		1 (25%)		
Private sector power pressure on politician for development	1 (25%)				3 (75%)	
Lack of commitment to sustainability		1 (25%)				3 (75%)

From the responses summarized in table 6-14, it was possible to place some of the barriers in an order of rank and these are reported in table 6-15.

Table 6-15: Overall Ranking of barriers to tourism policy implementation

Rank	Barrier
1	Economic priority over social and environmental concerns (75%) Non coordination between Ministries & Authorities-power struggle (50%)
2	Short term focus
3	More talk than action; more just to gain votes
4	Non coordination between Ministries & Authorities-power struggle
5	Private sector power pressure on politician for development
6	Lack of commitment to sustainability

Sub-theme k: Indicators

The matrix derived from linking the ISP goals was proposed in the literature review and was presented to the stakeholders in the accommodation sector and they were asked 'how important they considered the matrix for determining the impacts of operations on the sustainability of the island'. Table 6-16 reports the responses. The majority of the respondents (75%) felt that the was important for determining the impacts of operations on the sustainability of the island as a whole.

Table 6-16: Importance of Matrix for linking indicators to ISP goals

How important do you consider the following framework/matrix, for determining the impacts of your operations on the sustainability of the Island?				
Un-important	**Of little Importance**	**Moderately Important**	**Important**	**Very Important**
		1 (25%)		3 (75%)

Chapter summary

Under the ‘island sustainability vision and goals’, stakeholders in the sample generally agreed with the four (4) proposed ISP goals. However, further results showed that it may be problematic to find agreement amongst other stakeholders on using these goals for moving towards inland sustainability.

Secondly under the theme: ‘sector vision for island sustainability’, the overall MEWFs in the sample of units were assessed. The inflows of MEW accounted for about 2.4% of the overall inflows of the islands. Similarly, the outflows in the sample were estimated to be 5.6% of the overall island outflows. Water was found to the highest inflow into the sample of units, effluents were the highest outflows. Generally the growth objectives increased the inflows and outflows of the sample. The majority of research participants felt that a triple win vision of economy, society and environment, can assist with the reduction of MEWFs in the sector.

The research participants suggested that reducing waste to landfill, the use of renewable energy and embarking on energy efficiency were critical actions that they can embark upon to reduce MEWFs and thus move towards island sustainability. Additionally, three out of the four research participants showed their willingness to act collaboratively to reduce these flows. However, ‘long term strategy’, and ‘willingness to corporate’, in that order were identified as the two most important factors to consider in making the decision to collaborate. These findings establish the foundation for conceptualising a ‘tourism symbiosis.’

In conclusion, all the research participants embraced corporate social responsibility in their management. Additionally the majority of the research participants agreed that public policy was important for supporting the CSR and sustainability efforts. However the majority felt that ‘economic priority over social and environmental concerns’ and ‘non coordination between Ministries & Authorities-power struggle’ were barriers to implementing policy. Finally, the research participants agreed that a matrix that links policy and management decisions to indicators that can be used to measure the move towards sustainability was very important.

CHAPTER 7: QUALITATIVE RESULTS AND ANALYSIS

Chapter introduction

This chapter comprehensively reports the qualitative findings of the research. Following on the themes and subthemes in chapter 6, these findings will provide a deeper perspective on the quantitative findings previously reported. In-keeping with the research methodology, these results will be corroborated and interpreted in chapter 8.

7.1 Vision and goals for island sustainability

This first section is focused on the first portion of research question 1, that is, how the island stakeholders define sustainable development and/or sustainability or what did the sustainable development (sustainability) meant to them. It therefore serves as a precursor to seeking the stakeholder views on the sustainability goals. This was important to corroborate the finding that the meaning of sustainable development may be diverse and can also be influenced by the nature of business or activity that the person(s) is/are involved in. This plethora of meanings makes it exceptionally difficult to make sustainable development operational and to create a vision of sustainability. Table 7-1 summarizes the numbers of meanings offered by the research participants.

7.1.1 Meanings of sustainable development (sustainability)

Table 7- 1: Research participants' meanings of sustainable development

Research Participant	View on sustainable development	Quotations
E04	Dealing with challenges for business	'*dealing with the challenges and unpredictability of business; absorbing the external shocks on the small economy and in this context being able to stay in business in perpetuity'*.
E08	Dealing with impacts of business	*"... running my business in such a way that it does not destroy the resources be it natural, economic or cultural on which it depends on. I believe that*

Research Participant	View on sustainable development	Quotations
		running a business this way can improve/enhance all three of the aspects and still operate successfully while benefiting its natural surrounding and the country"
E09	Resource use and inter and intra-generational needs	*"Whereby resources are used effectively [and] efficiently to meet human needs without destroy[ing] the environment"*
E02		*"Sustainability means using the natural resources of a particular country/region in such a way that it meets present human needs and at the same time, using them in such a way (conserve/preserve) that they are always available (Present and future use)"*
E10		*"It [sustainability] means development in such a way that it fulfils the needs of the present generation without harming the environment and ensuring that future generation's needs are not compromised".*
E01	Inter and intra-generational equity	*"Everyone being able to do the same thing in perpetuity and not cause a problem".*
E05		*"SD should address the pressure to grow the economy to meet the needs of the people (society) in a limited and fragile environment. It is about equity in the face [of] non equitability as the poor becomes poorer and the rich gets richer. The divide between the poor and rich is widen[ing] and maybe sustainable development can assist. But in the*

Research Participant	View on sustainable development	Quotations
		current state, and as environmental degradation increases the poor puts more pressure on the environment to meet their own needs thus putting more pressure on the ecosystem".
E05	Localising sustainable development	*"SD requires planned approach, with consideration to local conditions".* *"SD is crucial in the island environment, due to lack of space and resources and human capacity as it relates to education and enlightenment"*
E07	Present and future development	"Responsibility to act now so as not to disrupt development in the future"

Five clear perspectives on the meaning of sustainable development emerged from the research participants. A business perspective; a resources and inter and intra-generational needs perspective; an inter- and intra-generational equity perspective, a localising sustainable development perspective and a present and future development perspectives.

7.1.1.1 A business perspective of sustainable development

Some research participants defined sustainable development from a business perspective, albeit from two differing angles. E04 took the approach of the impact of sustainable development on the business, while E08 suggests that the impacts business has on sustainable development should be addressed (see table 7-1).

7.1.1.2 Resources and inter and intra-generational needs

The idea of the use of resources, in a manner that makes them available in the present and the future was a critical theme. In this regard, E06 notes *that "Sustainable development [is] interventions which improve the quality of life of citizens of a country in an equitable and continuing basis without compromising the*

integrity of their natural resources. The capacity of the persons is built and 'development' does not alienate the people for their resources". This focus on resources and needs is a foundational perspective of sustainable development. It also hinges firmly on equity. E06 further notes "That there is social equity along with economic progress".

7.1.1.3 Inter and intra-generational equity

The issue of equity is considered separately as it addresses poverty to a great extent and the stress that it puts on the environment. According to E05, "… as environmental degradation increases the poor puts more pressure on the environment to meet their own needs thus putting more pressure on the ecosystem". This further reiterates the link between the fulfilling of needs through resources that are provided by the environment. With inequitable access to resources, the less fortunate places extra stress on the environmental attributes of the place from which they are sourced.

7.1.1.4 Localising sustainable development

Another important perspective dealt with the issue of sustainable development in a local context. E06 notes that "Sustainable development takes place from the ground up empowering locals to develop and retain ownership of their resources". Here the focus on resources and in this case local and scare resources in the island context is highlighted.

7.1.1.5 Present and future development

This final perspective summarises what in essence sustainable development is about (see table 7-1). Despite the similarities and differences in the examples of the meaning of sustainability previously recorded, one common thread that runs through the majority of descriptions is that sustainable development has to do with the prudent use of resources, ensuring that they are used to meet the needs of the present and future generations, that is inter and intra-generational equity. In essence the research respondents are in line with the classical definition of sustainable development (see WCED 2007). The resource based meaning of sustainable development was prominently featured in the stakeholder's responses. In sum the

research participants focused on the social and environmental pillars of sustainable development and to lesser extent on the economic pillar.

However, the subtle differences recorded by the research participants suggest that there is a need for common goals that can lead towards a general direction of sustainability. The four sustainability goals can provide this direction and the qualitative results, which seeks to further clarify the quantitative results follows.

7.1.2 Goals addressing the current and future generations needs

Table 7-2: Research participants' views on sustainability goals meeting intra and inter generation needs

Research Participant	Quotations
E02	"All the statements [goals] above (fossil fuels/CO2, excessive solid waste, large scale clearing of land, unjust laws) have the ability to place adverse stresses on natural resources, if not controlled' This will undoubtedly prevent the resource base form sustaining itself and its ability of being available now and in the future"
E08	"If we enforce these goals and follow it we can protect our resources and our people and thus enhance our Island".
E05	"If these goals are addressed now we have a chance to redress what has already happened. Consider the biggest impact on the environment to be people".
E01	"Only provide part of the answer. The most important component is a source of abundant and affordable energy that is relatively environmentally benign".

Table 7-2 reveals that there is a general feeling amongst the stakeholders that the proposed goals can assist with addressing the needs of the present and future generations. Even in the case of an opposing viewpoint as proposed by E01, there was some level of partial agreement. In essence therefore there was no alternative

emerging sub-theme that appeared to be significant enough to discard the sub-theme as proposed.

7.1.3 Agreement with Goals amongst wider stakeholders

Table 7-3 summarizes the views of the research participants on finding agreement amongst other stakeholders in the island. Research participant E01felt that the statements or goals were made in the negative and that they should be "… more motivational" Another research participant indicated that "conflicts of interest may arise" amongst stakeholder (E03). Additionally, E08 supports the issue of conflict and adds the dimension of ***'selfish use'*** of resources. These observations are instructive since finding consensus amongst stakeholders on the goals for island sustainability is critical to ensuring that the vision and goals are achieved.

Table 7-3: Research participants' views on finding agreement amongst other stakeholders

Research Participants	Quotations
E01	"More motivational to provide positive message".
E02	"conflicts of interest usually arise among stakeholders using a resource as they do not appreciate or utilize the resource in the same way" and that these differences "… are usually driven by economic, social and other situation within the country"
E08	"There will be stakeholders that will not fully agree to using these goals because some of them engage in physical degradation and in extracting mineral[s] from the earth for business purposes and some business provide poor working conditions for employees".
E03	"This may necessitate some degree of awareness raising or educating as prior step. Some sort of process may be required to arrive at a consensus on the issue or concept".
E05	"… for agreement a … process plan [is] needed driven by information on the existing problems and the consequences of actions and non-actions"

This sub-theme therefore was certainly challenged by the research participants and what seemed to emerge is the need to develop a process for reaching agreement. Therefore there were some useful suggestions on how agreement can be reached. These included: the need for awareness and education on the goals, participation and discussion amongst the stakeholders and planning process for achieving consensus. Therefore, the main challenge is to find consensus amongst all relevant stakeholders. In this regard, the consensus building process and stakeholder engagement is critical to the strategy planning process considered in this research.

As a result this sub-theme may be revised to include this process and is suggested. The suggested theme is: to provide a 'process for stakeholder participation and involvement in finding agreement with the goals'. This is discussed further in chapter 8.

7.1.4 The Creativity of Goals

Table 7-4: Research participants' views on creativity of goals

Research participants	Quotations
E01	"Statements are made in the negative. More motivational to provide positive messages"
E02	"A balance has to be negotiated and agreed upon by stakeholders, due to their present needs and economic status"
E04	"Statements are just regular and good for purpose; not necessarily creative."
E08	"To a certain extent it does creatively define the sustainability goals for Grenada, because it focuses on all aspects which are: the people, waste materials, physical and natural resources (land and materials)".

Although there seems to be a general feel that the goals are creative (see table 7-4), there is room for improving these goals. This provides a platform for further addressing the creativity of the goals and this may require more detailed

stakeholder engagement and participation in developing goals for island sustainability. This sub-theme may not have been substantially challenged by the stakeholders and as such the theme can hold. However, it is further discussed in the context of stakeholder management and consensus building in chapter 8.

7.1.5 Adherence to Goals leading towards Island Sustainability

Table 7-5 summarizes the research participants' feelings on 'adherence to goals leading towards island sustainability'. E08 felt that the goals can lead Grenada on to a path of sustainability. The research participant offered some pertinent reasons for the response: "It will help us cut down on waste and aid in disposing it properly, it will assist with the control of carbon dioxide quantities and will bring about better working conditions…" These reasons go to the core of island sustainability as was articulated in chapter 4, where waste and energy were identified as the key issues of sustainability. This sub-theme was not significantly challenged and as such the theme will hold for this research. However, the further promulgation of the goals amongst stakeholders and getting consensus must be given critical consideration.

Table 7-5: Research participants' views on adherence to goals leading towards island sustainability

Research participants	Quotations
E03	"Some analysis of Grenada's aspirations relative to a sustainable path, where Grenada is at present relative to those aspirations, what will be required to arrive there… will have to be undertaken…"
E08	"If we follow these four goals, Grenada will be on the path to sustainability…"
E08	"… following these goals will help us control the amount of carbon dioxide that is emitted, it will help us cut down on waste materials and aid in disposing it properly". In addition "… the goals will bring about better working conditions for employees".

The final question in section 'A' required that respondents suggest goals for island sustainability. The goals for sustainability suggested by the research participants are captured in table 7-6. The majority of the proposed goals however, align with the ISPs investigated. This observation is further discussed in chapter 8.

The sustainability goals and visions offered by the stakeholders reveal that stakeholders have a relatively 'good' appreciation and understanding of what is needed for Grenada's sustainability. However, as the literature suggests, this understanding may vary and as such a 'common platform' or understanding should be promoted. The efforts of this research within the limits have laid a foundation for further development of the vision and goals. This is discussed in chapter 8.

7.1.6 Suggested sustainability goals

Table 7-6: Sustainability goals suggested by the research participants

Research participants	Goals suggested
E01	• "Abundant supply of clean energy (geothermal); • Closed loop of waste management; • Compliance with stringent air & water quality standards and other environmental legislation; • Stable population, high investment in education and health; • Absence of crime & violence; • High quality of life; • High 'happiness' indicators".
E03	"Better processes employed to decide on activities or actions that pertain to what is consumed as food or that which have the potential to impact on human/biodiversity health … and the state's overall development and cultural agenda".
E04	"the creative and industrious desires of the population are attended to; the productive sectors are addressed; foreign exchange outflows are reduced and more of the needs and demands of the population are supported locally".
E06	Energy self-sufficiency for households by exploiting solar energy

Research participants	Goals suggested
	Food security Health and wellness of citizens – preventative rather than curative and a deliberate effort to focus on traditional knowledge and the country's traditional resources – e.g. focussing on the use of local herbs and plants and promoting the philosophy of "Eat local! Eat healthy!" Education and Capacity Building for Citizens Disaster Resilience Protecting Land and Marine Resources Enlightened and Empowered citizenry which actively participates in decision making in the country; they participate in decisions pertaining to matters which will affect them. Social equity Job Creation and Employment: based on utilising sustainable utilisation of country's indigenous resources
E08	"the need to conserve water and to harvest rain water as a source of water to be used in households and businesses"

7.2 Sector Vision for Island Sustainability

The actors in the accommodation sector were asked to provide further insight on the development of the sector vision and its alignment to that of island sustainability. Additionally, the research participants were further asked to suggest modifications to the vision, however, no modifications were offered. The most critical quotations that provide insight into the feelings of the research participants on the proposed vision and the fit to their current vision are summarized in table 7-7.

Table 7-7: Research participants' quotations on the proposed sector vision

Research participants	Quotations
E08	"This vision is quite good [but] some businesses might say they accept it but might fail to put measures in place to achieve".
	"What we do as a company affects our environment and the country as a whole so I see no problem in incorporating this sustainability vision in our current vision".
E11	"the company's vision already contained aspects of sustainability"

One accommodation unit, E11, already has an environmental policy that contains critical aspects and actions that may guide the environmental direction of the company, and these will be further considered under sub-theme (i), corporate social responsibility. Another company E03 expresses the willingness to modify the company's vision to include the sustainability vision. In summary the research participants, who consisted of top and mid-level managers agreed to a vision of resource and waste reduction in their facilities. The fact that the research participants are on the top tier of their organizations augurs well for the possible implementation of this strategic step in the sector. In the implementation of sustainability and environmental systems, top management 'buy-in' is critical.

7.3 Actions for island sustainability

7.3.1 Inter and intra-organizational actions

The most prevalent result in table 7-8 seems to suggest that the interaction amongst the actors is critical to operationalising the collaboration. For example, 'knowledge sharing…', 'meet to discuss ways to implement…', point in the direction of a need to consider the societal/human dimension associated with the 'collaboration'.

Table 7-8: Research participants suggested ways for inter-organizational collaboration

Organizations suggested for collaboration	Suggested ways for collaborating
Electricity	• Grenada Electricity Services (GRENLEC) partnership for net metering of electricity • System to encourage investment in renewables such as photovoltaic (PV) • Meet and discuss ways of implementing energy savings mechanism • The electricity company can provide a fixed quantity of electricity to the accommodation units. This will allow the accommodation unit owner to conserve electricity
Water	• Meet and discuss ways of implementing water saving mechanisms • The water company can provide a fixed quantity of water to the accommodation units. This will allow the accommodation unit owner to conserve water.
Waste	• None
General	• Knowledge sharing to reduce flows within the business

The research participants were also asked to suggest advantages and disadvantages for acting in the manner they suggested. For example, if the research participants indicate that they were willing to act collaboratively, then they were to suggest any advantages and disadvantages they perceived for so doing. Table 7-9 summarizes in detail the advantages and disadvantage for collaborative actions only. From this perspective the disadvantages for acting collaboratively may be advantages for acting individually. For example, in table 7-9 the disadvantage of ‘a long lead time for implementing action’ may be overcome if the business decided to act individually.

The suggested advantages of acting collaboratively are very critical to the success of both an intra and inter organizational collaboration strategy. In chapter 3 the case was proposed for a ‘tourism ecosystem’ akin to that of industrial ecosystems and symbiosis. The fact the four accommodation units see the advantages of collaborating with one another and other critical organizations such as

the electricity provider, suggest that there is some potential for a collaborative approach to reducing material flows in the sector. The reducing of material and waste flows in the sector is the foundation of an industrial ecosystem and now proposed tourism ecosystem. This is conceptualized in chapter 8.

Table 7-9: Suggested Advantages and Disadvantages for collaborative actions

Strategic action	Advantages	Disadvantages
Collaborative	• Better result • More brainstorming, • Information sharing • Learning from each other • More ideas can be generated by a larger group of persons • Goals and actions can be accomplished faster	• Longer period of time for implementation and frustration may set in • Small mind that does not see the vision • Refusal of one or more company to cooperate or continue in the cooperation

7.4 Monitoring the move towards island sustainability

7.4.1 Embracing CSR

7.4.1.1Environmental focus

The quotations in table 7-10 reveal a focus on the reduction in the flows of materials, energy and waste within the accommodation units researched, effectively revealing an environmental focus. This suggests that the research participants felt that MEWFs reduction were critical actions under their CSR decisions. This perspective is embedded in statements such as E09, “We conserve electricity by taking off electrical breakers when not in use” and E11, which monitors resource and energy use and the reduction of “air emissions, water pollution, solid waste generation...” Together with statements such as ‘continuous improvement to environmental practice’ (E11), suggest that there is an environmental focus to CSR.

Table 7-10: Research participants' on actions that can be considered within CSR

Research participants	Quotations
E09	"We conserve electricity by taking off electrical breakers when not in use" "We ensure that all guests take off air conditioners, television etc when not in the room; "To dry our linen we do not use our dryer, instead we use the sun to dry..." "We ensure that all workers work in good conditions. We always make improvements ... monthly".
E11	"applicable laws and regulations..." "environmentally friendly practices..." Monitoring of resource and energy use and the reduction of "air emissions, water pollution, solid waste generation..." Taking a supply chain approach to environmental actions, by involving "...guests, suppliers, contractors and employees in the environment campaign; Education and training of all employees in "...environmental practices, policies, objectives and targets"; Continuous improvement to environmental practices Monitoring and recording of environmental performance against objectives and targets; Employment of persons in the near-by communities to promote economic and social growth; Purchasing local goods and services, where possible

7.4.1.2 Social focus

Additionally, there is strong focus on people in the CSR decision making, including guests and more importantly employees in the accommodation units. For example E09 indicates that "We ensure that all workers work in good conditions. We always make improvements ... monthly". The focus on training and development in

the area of environmental sustainability is also captured. For example E11 indicates that education and training in "...environmental practices, policies, objectives and targets" is a priority in their organisation. More importantly, the "employment of persons in the near-by communities to promote economic and social growth" (E11), is another social decision made by one of the research participants.

These important sustainability (socio-ecological) activities are critical and can positively impact on the overall sustainability of the island. Moreover, the activities can form an important part of the proposed sustainability responsible plans as suggested in chapter 4. More critically however, is the need to measure the impacts of these actions from a strategic perspective, that is, from the perspective of linking these actions to the vision and goals for island sustainability. In this regard, this result will again form an important part of the discussions in chapter 8.

7.4.1.3 Drivers that affect the embracing of CSR: globalisation and markets

A second aspect of this part of the research was to consider the drivers that affect decisions pertaining to CSR. It was reported in chapter 6 that 'globalization' and 'market' drivers were important to the research participants embracing CSR. In this regard, E11 has a comprehensive 'environmental policy' developed to meet the requirements for Green Globe Certification'. Green Globe is one of the travel and tourisms industry's certification program for sustainable tourism (www.greenglobe.com 2013). In essence the body certifies tourism enterprises that meet criteria in waste, energy and operational costs reduction; positively contributes to local communities and their environments and meet the high expectations of business and leisure travels (www.greenglobe.com 2013). In essence therefore the accommodation unit that is green globe certified is driven by both global and market processes.

7.4.1.4 Drivers that affect the embracing of CSR: social

Additionally stemming from the green globe certification and considering the activities proposed by the research participants E09 and E11, (see table 7-10) social concerns are addressed. The social aspect was agreed to be a driver of CSR.

7.4.2 Policy and CSR

E09 reported that "Policy can be described as a principle or rule to guide decisions and achieve rational outcomes. It is a statement of intent or commitment,

therefore it is important to have policies in assisting with CSR in order for it to be achieved,,, successfully".

This statement is very significant, in that it supports the core of the reasons for policy or public policy direction towards a public 'good', in this case the direction towards island sustainability vision and goals. More importantly however, the policy impacts must be measured and these should be aligned to the indicators that the accommodation units intend to use to measure their impacts on island sustainability (see adapted FSSD).

7.4.3 Indicators

The final question sought to determine 'what indicators stakeholders will like to suggest for determining their environmental, social and economic concerns associated with their activities'. These concerns have a direct impact on the goals of island sustainability as was demonstrated by the proposed matrix. The proposed indicators are gathered according to each of the headings in the matrix and are summarised in Table 7-11.

Table7-11: Suggested indicators

Indicators		
Environmental	**Social**	**Economic**
Water used annually	No. of persons employed from nearby community	Annual cost of water
Waste generated annually	No. of employees trained in environmental issues	Annual cost of fossil energy
Energy used annually	No. of employees trained in health and safety	Annual cost for waste disposal
Emissions to air	No. of charitable activities undertaken per year	Annual investments in energy efficiency measures
Effluents to sewage system		
Quantity of waste composted or avoided sent to the landfill		

These indicators were selected by the tourism sector and may be considered to be tourism centric. However, because they will be fitted into the matrix can render

them more strategic, while maintaining ownership by the tourism sector. It is very important to the overall monitoring of policy decision and management decisions, that matrix are owned by the sector so that the overall vision and goals for island sustainability can be achieved.

Chapter summary

There were a number of perspectives that emanated from the research participants on what sustainable development meant. Although these perspectives were generally embedded in the classical definition of sustainable development, it underscored the difficulty associated with the operationalizing of the sustainable development process. In this regard the four ISPs reported in chapter 6 and agreed to by the research participants were further interrogated.

Generally, three out of the four ISPs were further supported by the qualitative results. These were: 'the goals meeting intra and inter-generational needs', 'the adherence to the goals leading towards island sustainability' and the 'creativity of the goals'. However, the theme: 'finding agreement amongst stakeholders' was challenged, and the need to have a more comprehensive process to engage stakeholders and to find consensus amongst stakeholders was highlighted. Additionally, a number of goals for island sustainability were suggested by the research participants. These however can be aligned to the four proposed ISPs.

The reaming themes and sub-themes were further supported by the qualitative results. These themes were: 'a sector vision for island sustainability', 'actions for island sustainability' and 'monitoring the move towards island sustainability'. It was reported in the case of the latter theme that an 'environmental focus' and a 'social focus' were key decisions taken under the purview of CSR. Additionally, it was reported that policy could be used to drive decisions towards a particular goal or outcome. The research participants further suggested a number of social, environmental and economic indicators that can be used within a proposed matrix (see chapter 6) for the purpose of monitoring the move towards the island sustainability goals.

In conclusion the themes can be amalgamated into the three broad groups proffered in chapter 5, section 5.5.5. These are used to develop the necessary strategy process and content. These groups are: 'visioning and vision linking';

‘developing sector strategic actions’ and ‘monitoring and evaluation’. These themes form the basis for corroborating the qualitative and quantitative findings; thus proposing the strategic sustainability procedures.

Chapter 8: STRATEGIC SUSTAINABILITY IN AN ISLAND CONTEXT- A DICUSSION

Introduction

This chapter discusses in detail the strategy process and content that together constitutes the proposed SS procedures which the sample of accommodation units can apply in the island context. In chapter 4, a number of themes were developed and the results in both chapters 6 and 7 have provided the research participants' input into these themes. In other words relevant strategy content was gathered. This chapter therefore provides a comprehensive discussion on how the results in chapters 6 and 7 can be corroborated with the literature in chapters 2 and 3 and more importantly chapter 4. As was suggested in the conclusion of chapter 7 and depicted in figure 5-7 in chapter 5, section 5.5.5, three practical steps to enhance the strategy process and to guide the creation of the strategy content are revealed: 'visioning and vision linking'; 'developing sector strategic actions' and 'monitoring and evaluation'. In this chapter, the key results under each of these headings are comprehensively discussed.

Emphasis is placed on 'visioning and vision linking' and 'developing sector strategic actions'. In the case of the latter, one of the main contribution of this research is using MEWFs reduction strategies to conceptualise a tourism symbiosis. From this perspective, the linking of the current and future strategic actions of the tourism accommodation sector to that of the island sustainability vision and goals is further discussed and clarified. A strategic approach which uses a matrix to monitor and evaluate progress towards the island sustainability vision and goals is also discussed. Additionally, consideration is given to a model for using the SS procedures to implement the proposed green economy roadmap.

8.1 The proposed SS procedure- strategy process and content

Table 8-1 summarizes the proposed steps and suggest strategy content to be considered. The relevant results in chapters 6 and 7 that led to the step or content appear in brackets and bolded at the end of each step or content statement. Each category of steps is subsequently discussed in turn and is interpreted in the context of the relevant literature reviewed in chapters 2, 3 and 4.

Table 8-1: The proposed SS procedures

Categories	Suggested planning steps and strategy content
Visioning and vision linking	1. Develop an understanding of the island sustainability goals, which will require stakeholder participation and involvement **(chapter 6, section 6.1; chapter 7, section 7.1**) 2. Craft a business vision for sustainability that is based on an understanding of the island sustainability vision and goals **(chapter 6, section 6.2, and chapter 7, section 7.2**)
Developing sector strategic actions	3. Conduct a materials flow analysis for the business and ensure that the business vision reflects the intention to reduce material flows (and social ills) (**chapter 6, section 6.2.1**) 4. List and analyse current actions for reducing the flows (and for addressing social issues) (**chapter 6, section 6.3 and chapter 7, section 7.3)**, 5. Attempt to uncover potential actions that can be taken to reduce flows (**same as 4**) 6. Engage partners within and without the sector on potential collaboration for reduction of flows (**same as 4**)
Monitoring and evaluation	**7.** Develop/adopt/adapt a framework/matrix for monitoring results of actions (**chapter 6, section 6.4 and chapter 7, section 7.4)** 8. Select key indicators that are aligned to relevant public and business policies for measuring the impact of actions on the business and island sustainability vision and goals **(same as 7**) 9. Place indicators within matrix according to social, economic and ecological (**same as 7**) 10. Create an effective sustainability responsibility 'action plan' for implementing the actions (**same as 7**) 11. Monitor and record indicator performance (suggested) 12. Adjust plans accordingly to achieve business and island sustainability vision and goals (suggested)

Author generated

The overall argument and aim of the research are first discussed in the context of these results.

In this regard the central argument of the research was to show how the tourist accommodation sector can link their internal strategy planning processes to the goals of island sustainability. It was argued that this alignment effectively operationalises sustainable development and improves the certainty of achieving sustainability when planning. How this is achieved by the proposed steps is discussed. Additionally, the criticism and failures of sustainable development argued in chapter 2 are also addressed. Secondly, the first outcome of the research that is, to consider strategy process is discussed. In this regard the need to consider these procedures in the context of the normal strategy planning process is addressed (see chapter 4, section 4.5). These initial sub-sections lay the foundation for the overall discussion.

8.1.1 Linking SD to sustainability

The strategic sustainability procedures link sustainability and sustainable development argued for in chapters 2 and 4. The visioning and vision linking step provides the opportunity for the tourist accommodation sector to glean an understanding of the island sustainability vision and goals and to address this vision in the development of their internal vision(s) (see chapter 2, section 2.3.1). Additionally, it allows for the sector to further align their strategic sustainable development processes or actions to that vision. Moreover, the idea of understanding the island sustainability vision was further argued in chapter 3, in which case a model was presented (see chapter 3, figure 3-2). In this model it was shown that business in general and the accommodation units in particular should focus on the sustainability of the island as they embark on their sustainable tourism development. It is suggested therefore that if these procedures are used, then the tourist accommodation sector can remain focused on island sustainability when strategy planning occurs. Further, and with this approach, the sector can avoid problem shifting and displacement (see chapter 4), as they will have a comprehensive, principle based understanding of what island sustainability should be.

Additionally, the criticisms of sustainable (tourism) development can also be addressed with these steps. For example, the vagaries of sustainable development and the arguments emanating from them can also be clarified in the applications of these steps. In this regard the planners will have a clear understanding of the differences between sustainable development and sustainability at the two planning steps- 'vision and vision linking' and 'developing sector strategic actions'. Additionally, these steps can also clarify the criticisms of delusion and hypocrisy associated with sustainable development. In this regard, a clear agenda for sustainable development and sustainability is established and the outcome of sustainability can be achieved with some degree of certainty.

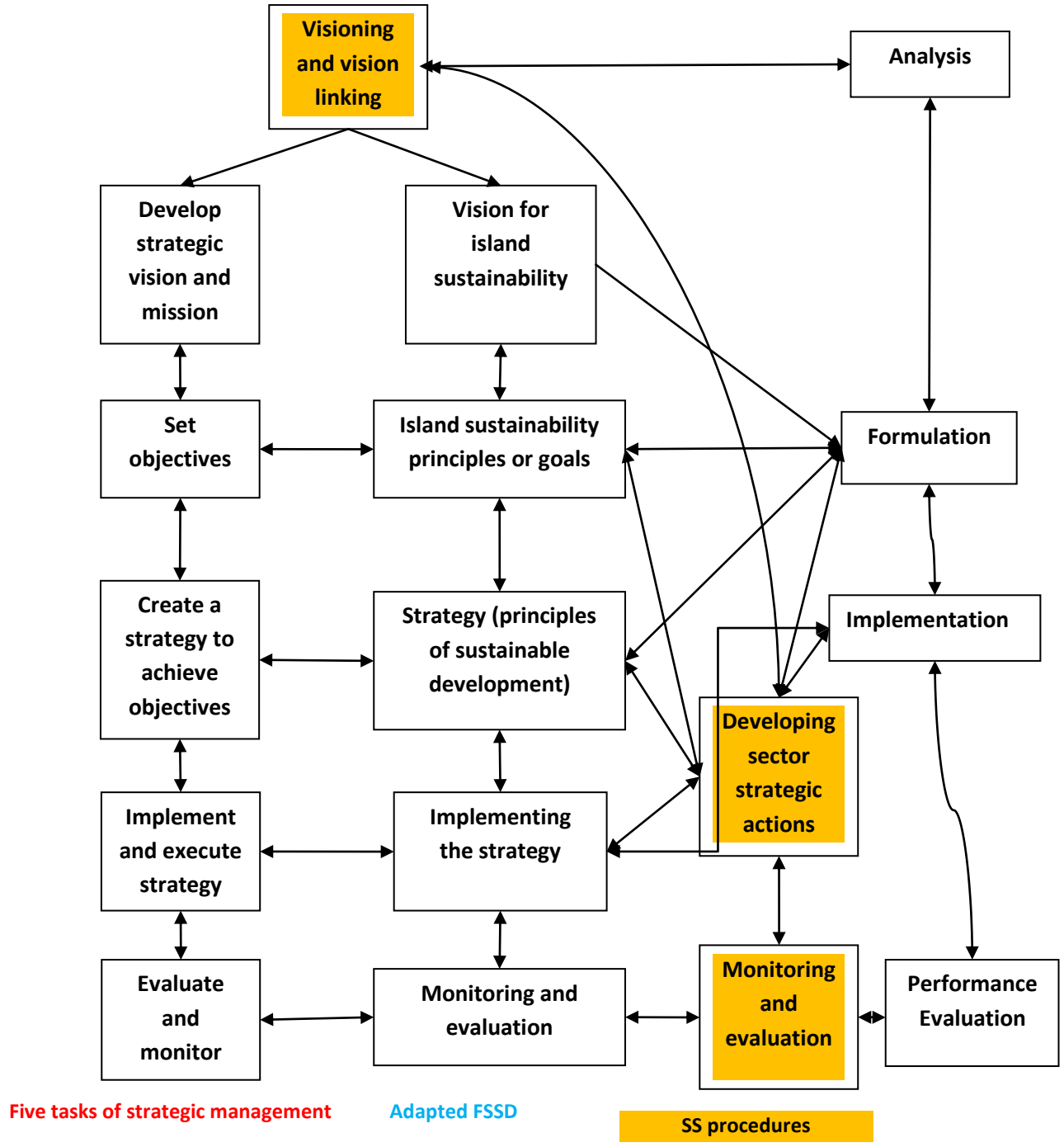
These steps also assist with making the adapted FSSD operational. The group of steps under the 'developing sector strategic actions' allows the tourist accommodation units to engage in sustainable development actions that are aligned to the vision and more importantly the goals of island sustainability. Further the steps in the 'monitoring and evaluation' group allows for the accommodation sector to strategically monitor these actions as the tourist accommodation units seek to plan towards island sustainability. The impact of policy and the decision within the tourism accommodation on island sustainability is also monitored.

The next section further describes how this occurs by aligning the proposed steps to the FSSD and other processes of strategy planning.

8.1.2 Strategy process

Figure 8-1 shows the SS procedures compared to the 'adapted FSSD' and the five tasks of strategic management on the left of the model. On the right of the model the strategy process articulated by Simão and Partidário (2012), (see chapter 4, section 4.5) is shown. The SS procedures are highlighted in orange. Table 8-2 summarises the alignment of the steps shown in figure 8-1.

Figure 8-1: The SS procedures compared to normal strategy planning procedures and the adapted FSSD



Conceptualised by Author

At the top of the model the 'visioning and vision linking' step is shown to be basically bringing together the vision and mission of the five tasks of strategic management and the island sustainability vision, of the adapted FSSD. The

'visioning and vision linking' step, can also be included in the 'analysis' stage of the normal strategic management process. In this step Simão and Partidário (2012 p. 375) note that, "The involvement of stakeholders ... is an unavoidable stage". Further and more specifically:

"The analysis of the touristic resources available to the destination provides the possibility of responding successfully to the challenges placed by the external environment. Natural and ... historical-cultural resources should be subject to special focus.... since they are considered as the main determinants of tourism demand" (Simão and Partidário 2012 p. 376 citing Ritchie and Crounch).

Table 8-2: Aligning the 'normal strategy planning procedures' to the proposed SS procedures

Proposed SS Procedures	Five tasks of strategy management	Adapted FSSD	Other strategy planning procedure
Visioning and vision linking	Develop strategic vision and mission	Vision for island sustainability Island sustainability principles and goals	Analysis Formulation
Developing sector strategic actions	Set objectives Create strategy to achieve objectives Implement and execute the strategy	Island sustainability principles or goals Strategy (principles of sustainable development Implement the strategy (activities)	Formulation Implementation
Monitoring and evaluation	Monitoring and evaluation	Monitoring and measuring	Performance evaluation

Conceptualised by Author

Although this is true, in that their degradation may lead to what was previously described as 'progression to destruction (see chapter 3), the analysis should be

more holistic, considering the sustainability of the island as the main outcome. The argument supporting this position was proffered in chapter 3. It follows therefore that this proposed step is critical for ensuring that the island's socio-ecological attributes are preserved and marinated for sustained tourism demand within the island context. The island sustainability vision which this group of steps seeks to draw out becomes critical for island planners.

Secondly, the 'developing sector strategic actions' procedural step includes formulation and implementation and these are aligned to the relevant steps in the 'five tasks of the strategic management process' and by comparison the 'adapted FSSD'. According to Simão and Partidário (2012 p. 376) "The formulation of strategy for tourism development starts with the definition of the mission and the vision to which the stakeholders have contributed. General and specific long-term objectives are established accordingly, along with a plan to achieve them...". At this stage, consideration should be given to the adopting of the island sustainability goals by the accommodation units. The adoption of these goals as a part of the accommodation units' objectives will further assist with the vision linking proposed in the previous step. The creation of sustainable development processes, that is, fundamentally the conceptualisation of a 'tourism symbiosis' is included in this procedural step. This will form a vital part of the accommodation units' strategies for leading towards island sustainability. This is further developed in a subsequent section.

Additionally, and as a part of the 'developing sector strategic actions' step, "Strategy implementation [which] ... is a process by which strategies and policies are put into action through the development of programmes, budgets, procedures'" are included (Simão and Paridário 2012 p. 376 citing Wheeler and Hunger). This also includes 'implementing the strategy' as shown in the five tasks of strategic management and executing the strategy in the adapted FFSD; fundamentally implementing the tourism symbiosis strategy proposed in this research.

Thirdly, the monitoring and evaluation step is similar to the 'performance evaluation' of the general strategic management steps; albeit a strategic approach is proposed in the performance evaluation procedural step. According to Simão and Paridário (2012 p. 376 citing WTO) "... we seldom see the indicators devised for [the purpose of monitoring external environmental and social impacts] being organised

and reflecting a strategy...” This concern is addressed with the strategic approach proposed to monitoring in this research and is fully discussed in a subsequent section.

The preceding discussion shows that the accommodation sector would not be diverting from the general strategic management planning process and as such will only have to incorporate the suggested content offered by this research. So as the tourism accommodation sector embarks on ‘normal’ strategic planning, the implications for strategic sustainability can be addressed at each relevant stage. In other words the strategy process suggested by this research can be considered while planning is occurring. Therefore, the proposed SS procedures can be seamlessly incorporated into the normal strategic planning process of the tourist accommodation units. Moreover, by embarking on these suggested procedures the adapted FSSD is made operational.

8.2 Strategy content

This section discusses the other outcome of the research, that is, the strategy content proposed under each of the strategy process steps in table 8-1.

8.2.1 Visioning and vision linking

The proposed SS procedures suggests that at the analysis and formulation stages of the ‘normal’ strategy planning process, visioning and visioning linking should occur. At this stage two steps were suggested: developing an understanding of the island sustainability vision and crafting a business vision that aligns with that vision (see table 8.1). Both the suggested analysis that should occur when planning towards island sustainability and the formulation of the internal vision of the accommodation sector in the sample are discussed. Moreover, at the analysis stage of the normal strategy management process an understanding of the socio-ecological system and its use in creating the proposed island sustainability vision articulated previously is needed. A more holistic approach to the tourism accommodation sector strategic planning is required to avert problem displacement and shifting. Strategic planning proposed in the context of this research should not work against the success of the island socio-ecological system as envisioned, see chapter 4.

With vision linking', the internal vision of the accommodation sector is formulated in alignment with the understanding of the island sustainability vision. This is basically the reduction of MEWFs on a whole island basis. Additionally the ISPs play a critical role in linking the two visions.

8.2.1.1 Visioning

Visioning in this research is an understanding of island sustainability; as where Grenada wants to be in the future. In this regard it was argued that the socio-economic and socio-ecological systems were linked by MWEFs. It was further shown that the tourist accommodation sector operates in the socio-economic system, where the 'green economy' also resides. The tourist accommodation sector also operates within socio-ecological limitations, imposed by the laws of nature and of society. These conceptualisations led to the suggestion that the island system could be envisioned as a microcosm of the economy embedded in the socio-ecological system and limited by it. Additionally the resource based perspective of an island sustainability vision and the island context should also be given consideration at this stage. Moreover, the resource based actions (see chapter 3, section 3.1) can be important guides at this stage of strategy planning. Even in the case of the island attempting to transition towards a green economy, this depiction should hold.

Being mindful of these conditions, it was possible to first of all suggest a 'vision' for island sustainability. This was: 'to reduce MEWFs, while achieving high quality island sustainable living, within socio-ecological limitations' (see chapter 4). The suggested vision is in keeping with the idea of round-put and the type 111 industrial system considered in chapter 4, section 4.7. In this regard, the reduction of MEWFs in the island system can be achieved by evolving the through-put approach to socio-economic development to round-put. Recycling and energy cascades within the tourism accommodation sector point toward the reduction of the MEWFs on a whole island system.

Therefore, the models previously described in chapter 4, provide a comprehensive platform for understanding why such a sustainability vision is critical in an island context and green economy. As an example, in Grenada the issue of space for landfills required for discarding waste was recently underscored. According to the Grenada Informer (2013 p. 13), in an interview with the GSWMA, the issue of

space for landfill was lamented: “Certainly we are concerned that the life of our landfill, which was constructed in 2001, is currently out of commission, because we simply have no space to dispose of our waste; the old dumpsite which we are currently using is also out of space”. This grave position epitomises the chromic problems associated with the finite nature of islands. This example fully supports the argument espoused in chapter 2 and the model of island sustainability being at the core of the sustainable development processes in SIDS.

The island sustainability vision can therefore lead to a possible solution to this concern. Certainly, the reduction of waste throughput in Grenada can suggest a long term solution to this issue. In this regard, the GSWMA was on the right track as they urge citizens to consider composting and to support recycling initiatives in an effort to avoid waste disposal to landfill (Grenada Informer 2013 p. 13) (this would be returned to subsequently). These strategic actions however, can benefit from a holistic perspective of the situation as provided by the model in figure 4-4. Stakeholders may require a graphic picture of the quantities of waste generated and the portion of that waste that each sector actually contributes to the overall generation of waste. In this regard the vision of waste reduction can be more tangible and may provide the necessary motivation by the relevant stakeholders to embark on the suggested strategies. Similar examples can be discussed for all the material flows and this will be returned to in a subsequent section of this chapter.

However, the understanding of the island sustainability vision is critically important, in that it can ensure with some degree of certainty that the implementation of these strategies is leading towards the island sustainability vision. By embarking on this shared vision, and attempting to link the strategic actions of the tourist accommodation sector to that vision, then the issues of problem displacement and shifting can be addressed. But the shared vision should be accepted by ALL relevant stakeholders.

However, due to social diversity and differing individual perceptions, there would be varying opinions of sustainability and sustainable development that may shape the vision (see results in chapter 7, section 7.1). This has to be assessed if consensus on the vision is to be achieved.

To treat with the issues of the differing meanings of sustainable development and sustainability that may exist with the stakeholders, and to establish a platform for achieving consensus on the vision, the opinions of the stakeholders in the sample were sought (see chapter 6, section 6.1.2). It was concluded that there was sufficient diversity in the opinions which may have to be drawn out and discussed if consensus on the proposed island sustainability vision is to be reached. It must be re-emphasised here, that a common vision is critical to the success of the island system. In this regard re-invoking the words of Lenzen (chapter 4), the 'vision and creativity can go a long way in doing more with less, within the finite island paradise'. So with this level of differing opinions and the need to ensure that sustainable island living within socio-ecological limits' (see chapter 4) is realised, then stakeholder engagement, beyond what has happened in this research needs to be comprehensively discussed (see subsequent section). Additionally, the vision creates the path but there must be a more tangible way to measure progress along this path. Here island sustainability goals are needed and these are discussed in a subsequent section.

8.2.1.2 Vision linking

The second part of the 'vision and vision linking' procedure category was the crafting of a tourist accommodation sector vision that was based on the goals for island sustainability or the ISPs. This vision was based on the triple win of environment, society and economy. The vision was principle-based and hinged mainly on the actions the tourist accommodation units in the sample felt were appropriate for achieving island sustainability. These actions were geared towards MEWFs reduction.

But a critical step in the normal scheme of the business strategic process, is the formulation of the strategy, which begins with the ".... definition of the mission and the vision to which the stakeholders have contributed" (Simäo and Partidário 2012) (see also the tasks of strategic management in chapter 4). This mission and vision is a part of the internal strategy management process of the accommodation units in the sample, although it should involve external stakeholders. The involvement of stakeholders in crafting the sector vision, to be in line with the island

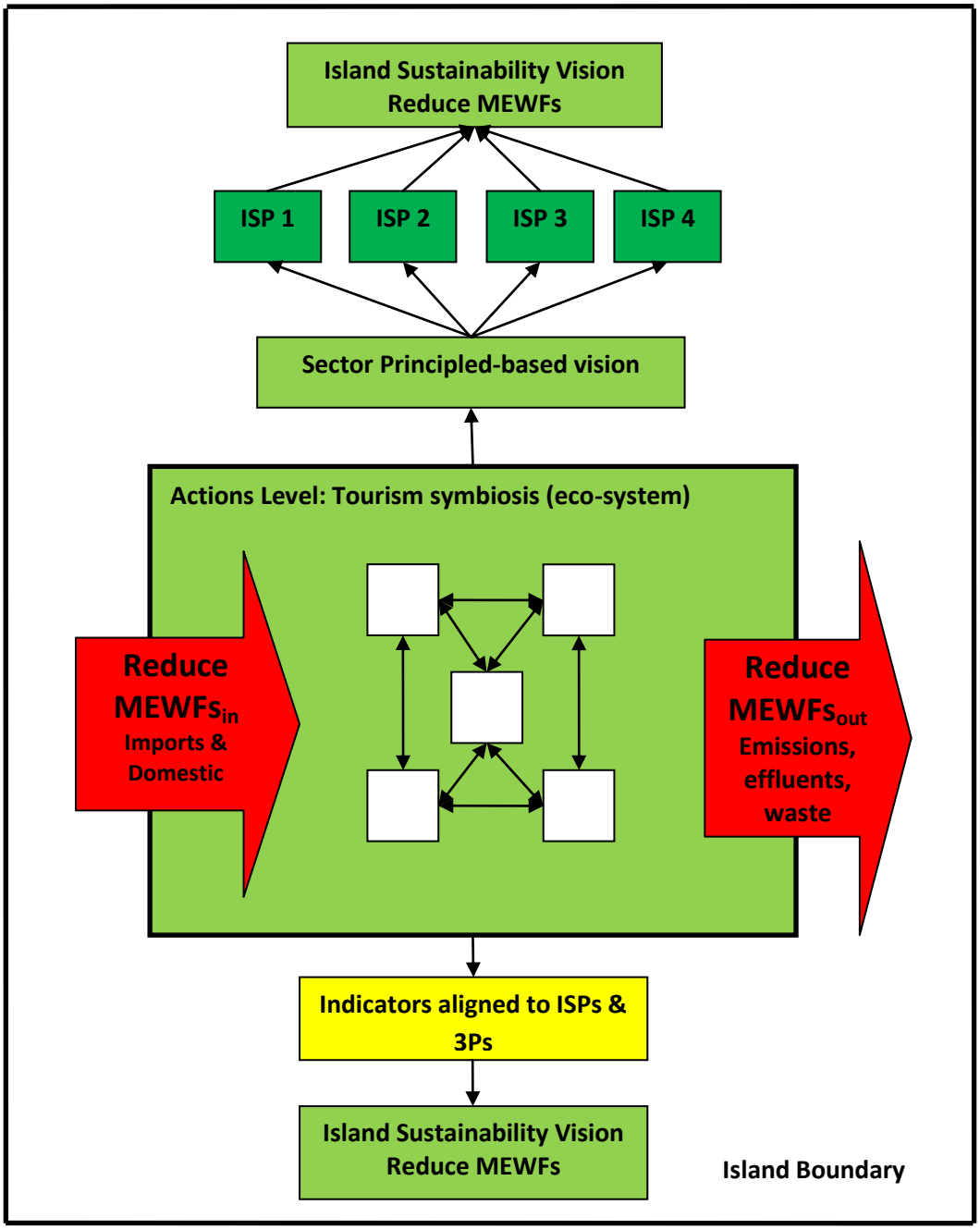
sustainability vision also requires consideration at the analysis stage of strategy planning.

But how does this vision actually link to the island sustainability vision? Firstly, "... a strategic vision generally establishes the direction that an organisation intends to embark upon (see for example Thompson and Strickland 2001). Therefore the vision is only a guide or roadmap that ensures that the strategic actions taken to reduce MEWFs within the accommodation sector are meeting the proposed island sustainability vision. However, this vision is crafted as principle-based and practical, and was geared towards the reduction of MEWFs within the accommodation sector, thus keeping in line with the island sustainability vision of reduced MEWFs.

Vision linking is therefore a transition between the 'visioning and vision linking' step and the 'developing sector strategic actions' step. As was discussed in chapter 2 and with the development of the adapted FSSD in chapter 4, this is where the sustainability vision is congruent with the sustainable development actions in the organisation. Therefore, organisations that are wishing to develop a vision, individually or collaboratively similar to what is been demonstrated here, should create a vision in line with an understanding of island sustainability. The actual linking however occurs in detail in the subsequent two categories of the proposed procedures: 'developing sector strategic actions' and 'monitoring and measuring'. The model in figure 8-2 is essential for providing a comprehensive overview of how this can be conceptualised. This model further clarifies the approach proposed by the SS procedures and includes all the steps in the enhanced procedure. This model will also be drawn upon as the discussion continues.

In the model the island system boundary is identified and with the proposed tourism symbiosis embedded within the boundaries. The 'red' double lined arrows show the reduction of MEWFs into and out of the tourism accommodation sector. The in-flows consist of domestic materials or resources, inter alia water being the most prevalent (see chapter 6). The imports consist of mainly LPG and other petroleum products used for the provision of energy and electricity. The outflows were dominated by effluents, with solid waste and emissions included. The material flows for the tourist accommodation sector were reported in chapter 6.

Figure 8-2: Model of the strategic sustainability approach



Author's conceptualisation with input from Sokka, Melanen and Nissinen 2008

The reduced flows in and out of the tourism accommodation sector are implied since the research participants have proposed actions to reduce these flows within the accommodation sector. Additionally, this can be done collaboratively

through a process akin to industrial symbiosis and referred to in this research as a tourism symbiosis, already defined in chapter 4 (this will be comprehensively developed in a subsequent section). The white boxes in the sector represent the accommodation units sampled and the possible collaboration that may occur amongst them linked by double headed arrows. The white box in the middle may be an external organisation, for example the Grenada Electricity Services (GRENLEC), which may wish to collaborate with the accommodation units to reduce energy flows. The reduced inflows are based on the possibility that the reduction of flows within the sector will in turn reduce on the quantities of virgin materials required for consumption in the tourism symbiosis.

Therefore the reduced material flows in the tourism symbiosis, aligns to the sector vision. If this vision is realised then it follows that the ISP goals can be met, and as such the island sustainability vision can be achieved. These connections are demonstrated by the arrows leading out of the tourism symbiosis, into the sector vision, ISPs and ultimately the island sustainability vision. In effect the ISPs establish the link between the island sustainability vision and the sector vision. The island sustainability vision was premised on the principle that the success of the island system depends on the reduction of MEWFs in the socio-ecological system of the island. But the direction towards the vision must be monitored and measured and to do so indicators which were already chosen are used. These indicators are represented in the yellow box and they are connected to the island sustainability vision below. The location of the island sustainability vision is not critical since it still lies within the boundary of the island.

This generic model further comprehensively summarises the findings of this research and as such establishes the basis for the discussion on the linking of the proposed tourism symbiosis strategy with that of the island sustainability vision and goals. Moreover, it further solidifies the main argument of this research in that it demonstrates how the sustainable development processes within the accommodation sector (tourism symbiosis) can be linked to the island sustainability vision and goals. The remainder of this chapter fully discuss the rudiments of this model. The key points in the literature and the results are used to substantiate the discussions. However an understanding of the sector vision is first discussed as this

is critical for further solidifying the links between the island sustainability vision and the sector vision.

8.2.2 Understanding the sector vision

The sector vision was basically attempting to achieve the triple win for environment, society and economy. More precisely however, is the achievement of socio-ecological success in the island system. One may be tempted to suggest that the sector vision may be sufficient for achieving island sustainability since it is premised on the win of the triple pillars of the island system. However, this could be plagued with the fact that a lack of understanding of the interactions amongst the systems and the limitations that are imposed by the socio-ecological system, can lead to problem shifting and displacement. Therefore the goals for island sustainability serve to address this concern and were shown in the model to effectively link the two visions.

Since the sector vision is firmly tied to the MEWFs and was crafted based on this premise, the discussion on these results are critical for supporting the suggested sector vision and more importantly on linking the sector vision to the island sustainability vision.

The results on the sector vision revealed that the majority of accommodation units in the sector agreed with the vision as proposed. Additionally the majority also felt that their colleagues may agree with the vision (see chapter 6). Also the majority were willing to incorporate the proposed vision into their existing corporate vision. But there was a warning of concern proposed by one respondent, which dealt with the point that the actions of business may not match the acceptance of the vision. This vision is quite good [but] some businesses might say they accept it but might fail to put measures in place to achieve" (see chapter 7, section 7.2) This may be akin to the issue of 'green-washing' in which business enterprises 'declare sustainability' but closer scrutiny reveals that the actions may be incongruent to these declarations'. However, with an understanding of the island sustainability vision and with an effort to ensure that the strategic actions are analysed and aligned to achieving the ISPs, then the problem of green washing can be addressed. This therefore further supports the case for this research and the need for congruence between the sector vision and the island sustainability vision. The model shows however, that the ISP

goals can link the two visions in a practical way. The results on these goals are now discussed.

8.2.3 The ISP goals and linking the island sustainability vision to the sector vision

The ISP goals (see chapter 4) based on the socio-ecological system were assessed by the stakeholders in the sample. This must be reinforced as a necessary first step for the organisation to embark on strategic sustainable development within their operations. But it was shown that the goals are not unique to the type of business, in this case the tourist accommodation business and as such stakeholders external to the organisation were interviewed in the sample (see chapter 5 for stakeholder backgrounds). From the interviews the level of agreement/disagreement with the proposed ISP goals was determined. Generally the research participants agreed with the ISPs (see chapter 6, section 6.1.3). This observation is interesting, since it appears that this was the first time that the global principles were subject to such scrutiny, albeit re-shaped in the island context. However, a deeper analysis revealed that some of the key themes relating to the goals and emanating from the literature were of concern to the stakeholders (see chapter 7). The two (2) themes were dealing with the creativity of the goals and ease of finding stakeholder agreement with the goals.

Therefore and despite the fact that the majority of research participants agreed with the creativity theme, one stakeholder offered an excellent observation surrounding the need for a more comprehensive approach to engaging stakeholders. As was reported in chapter 7, the respondent suggested ‘a balance has to be negotiated and agreed by stakeholders, due to their present needs and economic status’. This respondent highlighted the critical need to involve maybe a broader cross section of stakeholders. This was also corroborated and reinforced by the responses to the theme: ‘ease of finding agreement amongst stakeholders on the statements being goals for moving towards island sustainability’ (see chapter 7). There appeared to be legitimate reasons for this.

Therefore the results further revealed the need to have a more comprehensive involvement of stakeholders in relation to finding agreement amongst stakeholders on these goals. This critical step will require a more comprehensive

stakeholder analysis approach and techniques that will be necessary to involve them. In other words it was recorded (see chapter 7) that 'more meaningful stakeholder engagement and management was necessary for finding agreement amongst stakeholders on the proposed goals for island sustainability'. Additionally, a process plan or procedures for engaging stakeholders was also suggested by the stakeholders who participated in the research. Moreover, the subtle differences recorded on the research participants' views on sustainable development can be adequately discussed and debated with more stakeholder engagement. This engagement will also provide the platform for agreeing to an island sustainability vision, for example the one proposed by this research.

Although there was a careful attempt to select relevant stakeholders (see chapter 5), and they generally agreed with the goals, in the views of the research participants it was not practical to gain consensus amongst other stakeholders in this manner. Stakeholder involvement to gain consensus on these goals was definitely lacking. However, to ensure that this step in the procedure is understood and clear, a comprehensive discussion on a process for engaging more stakeholders is provided. The engagement process plan involves both public and private participation and it can be led by either the business leaders or policy makers within the island. However, it is suggested that the public sector should take a leadership role in defining the sustainability vision and goals, since it is not sector centric or more specifically not tourism centric.

Additionally (see chapter 4), it was indicated that the goals for sustainability (global and island) should provide "Flexibility, participation and democracy [and further] - provide for ownership of all stakeholders and ease in agreement about the direction of sustainability" (Korhonen 2007). The observations by the research participants that the goals were not motivating and that conflicts may arises can be addressed by further participation amongst stakeholders to resolve and to build that level of agreement for the ISPs.

However, and before stakeholder engagement is discussed, the research participants offered goals of their own (see chapter 7). Many of the suggestions were mainly actions that can be used to reach the proposed ISPs, and as such can be aligned to the proposed ISPs. These are summarized in table 8-3. For example,

relying on an abundant supply of clean energy is an action that can be taken to achieve compliance with ISP 1, which calls for the systematic reduction of materials extracted from the earth's crust. Similarly, a closed loop management system, suggests a vision of round-put and if waste is avoided, ISP 2, which states that the Island system must not be systematically subjected to the accumulation of materials generated in society will be achieved. This approach of aligning proposed actions to the ISPs is used to address how the proposed actions for reducing MEWFs in the accommodation sector can achieve the ISP goals and hence the sector vision and its link to the island sustainability vision. This is comprehensively discussed in a subsequent section.

Table 8-3: Proposed goals and fit to ISPs

Goals	Expert proposed goals
ISP1	Abundant supply of clean energy Energy independence
ISP2	Closed loop of waste management Waste control
ISP3	Protecting land … resources
ISP4	Stable population, high investment in education and health Absence of crime and violence High quality of life High happiness indicators Health and wellness of citizens Job creation and employment based on sustainable utilization of the country's resources Education and capacity building for citizens Social equity

Source: Authored generated

8.2.4 Engaging stakeholders

For the purposes of this discussion the stakeholder engagement process can be divided into two key parts: stakeholder identification and management and stakeholder engagement. Drawing on the literature in chapter 4, the stakeholder was previously defined as 'a group or individual who can affect or is affected by the outcome of the island sustainability vision and goals'.

8.2.4.1 Stakeholder identification and management

It is imperative that a careful process for identifying stakeholders and then to establish a method of selecting and managing them throughout the process is critical to the success of the steps in the 'visioning and vision linking' procedure category.

Therefore, in the island context, stakeholders can include all the identified groups and individuals who participated in the research and who were identified using a snow-ball sampling technique. In fact Reed et. al. (2009) note, that stakeholder identification was a critical typology of stakeholder analysis. They further identified 'snow-ball sampling' as one of three methods for identifying stakeholder groups and individuals. This technique was applied in this research together with semi-structured interviews. So as a first step in stakeholder engagement, the critical stakeholders who have interest and who can influence the island sustainability vision and goals should have been identified. It is suggested that focus groups, semi-structured interviews and snow ball sampling can be used as methods for stakeholder identification (see Reed et. al. 2009). The approach used in this research, that is the use of snow-ball sampling, can be applied in the future.

Once this is done, then each stakeholder should be analysed for their influence and interests and a strategic narrative of how they should be managed developed. This goes to the heart of Reed et al's (2009 p.1936) second typology, 'differentiating between and categorising stakeholders', in which 'influence-interest matrices' were identified as one of the methods (for a more detailed analysis of the various methods used for categorising stakeholders see Reed et al. 2009). This method is a top-down approach in which the researcher or person carrying out the analysis classifies stakeholders based on their observations of the phenomenon in question and embedded in some theoretical perspective on how the system functions (Reed 2009 p.1938). This method appears to be an appropriate approach since the researcher can continue to look at the process of stakeholder engagement as a post research activity. It is suggested therefore that a stakeholder influence-interest matrix as shown in table 8- 4 can be used to serve this purpose. The stakeholder examples represent the four possible combinations of interest and influence and a brief generic description of how they can be strategically managed.

The need to fully engage the identified stakeholders is the second step in the process. In this regard the IAP2 (2007) suggests a spectrum of participation levels: inform, consult, involve, collaborate, empower, which should be considered for deciding on the level of engagement required. For this one off project, 'collaboration' is suggested as the level of engagement required. At this level the researcher, through the public sector, would partner with all stakeholders to decide on the appropriateness of the vision and goals and to seek out alternative ideas where applicable. In this regard, the consensus building technique can be employed (IAP2 2007). Consensus building can be done at the analysis stage of the 'normal' strategy planning process (see table 8-1).

Table 8-4: Suggested influence-interest matrix

Stakeholder	Influence	Interest	Strategy
A	High	High	Manage closely; fully inform and communicate with these stakeholders at all times; keep them engaged to maintain support
B	High	Low	Keep informed on a regular basis
C	Low	High	Adequately informed and touch base regularly to ensure that there are no emerging issues that needs attention
D	Low	Low	Monitor and keep informed as is necessary

Source: Adapted from Jepsen and Eskerod 2009

8.2.4.2 Stakeholder engagement

But the idea in this research is not to offer a prescription on how consensus building can be conducted and reached, as this would be restrictive at this point. In other words a technique for consensus building can be developed if the project actually occurs. However, what is needed here is an understanding of the outcome required in a consensus building forum.

Achieving consensus can be problematic as this can lead to 'sectarian groups' and 'consensus at the lowest common denominator', as groups avoid contentious issues to reach consensus' (Robèrt et al. 2004). In the case of the latter, this must be avoided. . In fact the results show that there was one research participant who

disagreed with the goals presented in an island context, on the premise that they should be global. Additionally another expert felt that the goals 'only provided part of the answer' (see chapter 7). With these concerns therefore the consensus building session must carefully present the island sustainability vision and goals from a principle-based perspective

The originators of the global SPs (see chapter 4), have provided the key principles upon which these goals were created. These stemmed from a critical understanding of the social and ecological systems. The consensus building session(s) therefore must include a presentation on the principles that govern the development of the SPs and this must be placed in the context of the island system, that is, the island as a microcosm in which the environment, society and economy are linked in exchanges of material and energy flows (see chapter 3). Once the principles are developed the ground work should be established for building consensus on the vision and goals for island sustainability.

This principle-based argument creates a solid foundation for presenting the case for island sustainability and for hopefully finding consensus, albeit not at the lowest denominator. As Robèrt and his colleagues (2004 p. 24) reinforce "Consensus used at the right level in the system, at the trunk and branches, is not only good, it is essential for effective collaboration". The 'right level' in the system must also be made explicit in the consensus building session, that is, the whole island system. It was revealed in the results (chapter 6) that the 'suggested goals' from the research participants interviewed were not pitched at the systems levels and this is no fault of the experts themselves. For example, many of the suggested goals appear to be actions that can be taken to achieve island system success (see chapter 7). This observation supports the argument above that the need for an understanding of the principles that govern the island system is critical to developing consensus on the island sustainability vision and goals.

In conclusion therefore, stakeholder engagement and consensus are critically important for furthering the development and promulgation of the island sustainability vision and goals. Without such a focus, the sustainable development activities and actions within the tourism sector and indeed within any sector on the island, may lead to reductionism and problem displacement, thus jeopardising the ultimate intent

of the action(s) (see chapter 4). With such consensus the tourism accommodation sector can consider how they can align their strategic planning to that of the vision agreed to and accepted by all relevant stakeholders in the island system. This goes to the next set of steps in the procedures: ‘developing sector specific actions’ and was previously summarised in table 8-1 and demonstrated in figure 8-2.

8.3 Developing sector strategic actions

All the proposed steps in this category of the strategic sustainability procedures are focused on the creation of a tourism symbiosis. This starts with a discussion on the MEWFs for the sector. Then developing a sector vision that reflects the intention to reduce these flows; investigating potential actions for reducing these flows and then seeking inter and intra-organisational collaboration to reduce the flows. This is effectively formulating and implementing the sustainable development strategy within the organisation. Effectively this discussion focuses on the core of the model presented in figure 8-2.

8.3.1 MEWFs and the impact of the GBT growth objectives

The picture of the tourism accommodation’s sector MEWFs was already established in chapter 6. The picture reveals that the inflows and outflows of materials (resources) and energy and waste respectively are very significant. These materials and resources are extracted from within the island boundary, for example water and imported, such as primary energy sources. Further the quantification of the incremental impacts, due to the growth objectives of the GBT, shows that all flows will increase if these objectives are achieved, that is however, if no further interventions are made to reduce them. Additionally, a comparison of the annual loads for the sample to that of the island loads reported in chapter 4 reveals the following: that with the exception of electric use all the environmental loads in the sample are lower than that of the benchmark loads in chapter 4.

But the environmental and social impacts of these flows on the entire island system can be exacerbated as was discussed in chapter 3. This observation suggests that comprehensive actions for reducing these flows must be taken, to ensure that the island sustainability goals are achieved, and that Grenada is put on to a path of island sustainability.

In this regard the accommodation units should focus on the reduction of MEWFs. The vision and the results were already discussed and it was demonstrated in the model (Figure 8-2) how these can link to the sustainability goals and ultimately to island sustainability. Therefore the MEWFs will first be used to discuss the proposed actions for reducing MEWFs and how this reduction can eventually lead to achieving the ISPs.

8.3.2 Proposed actions and their contribution to the ISPs

The research participants proposed several actions that they were currently taking and were willing to take in the future. These went across the spectrum of flows and they were already reported in chapter 6, table 6-7. In the analysis, the proposed reduction effect on the material flows was also presented. In this section the in-flow and out flow indicators, water and effluents; energy and emissions and waste are discussed in turn. The contributions to the ISPs are also comprehensively summarised.

8.3.2.1 Actions to reduce water and effluents

Water resource was a key resource addressed by the BPoA in chapter 3, section 3.1. Additionally, water demand in the tourism sector was highlighted as a critical tourism resource (see chapter 3, section 3.1). Moreover, the management of water resources was addressed in the green economy roadmap. In this regard both the literature review (chapter 4) and the results (chapter 6) confirm that water was the highest resource inflow of the tourism accommodation sector. The results further show that the demand for water in the sector can increase in 2014 if stay-over tourist numbers were to increase and if these tourists spent a longer period of time on the island. Also, on the national level, the demand for water is higher than the supply in the dry season (Grenada has two seasons: rain in June to November and dry from December to May) (see for example Government of Grenada 2007). In this regard a visual inspection reveals that the peak in stay- over tourists (see figure 3-10, chapter 3) corresponds with the on-set of the dry season. These temporary increases in demand for water by the tourism accommodation units, if not addressed, can hinder the move towards island sustainability.

Conversely, effluents accounted for the highest outflow. It follows therefore that actions to reduce water inflows can also reduce on the effluents in the sector. As

a consequence the need to embark on water use reduction strategies in the tourism accommodation sector is critical for both the water resource management of the island and effluent outflows in the form of sewage and grey water into the island system. These will positively impact on the sustainability of Grenada. In this regard two main actions were offered by the sample accommodation units: the use of dual flush toilets and the proposal to employ rain water harvesting by one unit in the future.

The use of dual flush toilets can reduce on water inflow and effluent outflow. A dual flush toilet optimizes the quantities of water used to flush the toilet based on what it was used for. Less water is used for urination. It follows therefore that if dual flush toilets are used effectively then both water inflow and outflows can be reduced.

The second action of rain water harvesting is also critical to the reduction of inflows of costly portable water used for human consumption. This water is also used for laundry, cleaning, lawn irrigation and other room services such as the flushing of toilets. Rain water therefore can be used to achieve these tasks.

The latter action may be quite useful if it is done effectively. But retrofitting of properties to accept the large storage tanks and other energy consuming equipment such as pumps could require high initial cost. However there is the potential to reduce lifecycle cost of such plants by using renewable energy resources (RESs) to power these systems. Although the tourism accommodation units in the sample were not using desalination, this may also be an option as the seawater is in close proximity to the majority of these units. In this regard, the very energy intensive process of desalination can benefit from the use of renewable energy technologies (RETs) for power.

8.3.2.2 Actions to reduce energy use and carbon dioxide emissions

Energy was a critical resource considered by the BPoA and its provision by fossil fuels has been show to relate to global warming and climate change (see chapter 3, section 3.1). Anthropogenic climate change is caused by the emission of carbon dioxide from the burning of fossil fuels. Energy was also addressed in the green economy roadmap and was highlighted as a vital tourism resource (see chapter 3). Therefore the use of energy in the tourism sector must be effectively managed, especially as the majority of it is supplied by fossil fuels. The results of this

research confirm that the accommodation sector utilises a significant quantity of the primary fossil fuel based energy imported into Grenada. These were mainly in the form of diesel and liquid petroleum gas (LPG). Actions to reduce energy use in the sector can impact positively on both the sector and the sustainability of the island system as a whole.

But if stay-over tourist demand increases in 2014, the unabated use of energy from fossil fuels will increase (see chapter 6). It is critical therefore that the strategic actions taken to reduce the energy flows are considered from both medium and long term perspectives. If the use of fossil fuels to provide energy is reduced, then emission of carbon dioxide can be reduced thus mitigating climate change. In this regard only two actions were suggested by the research participants: the use of solar for electricity and water heating and the implementation of energy efficiency measures (EMMs). There were no actions proposed for reducing LPG flows, although it was the most significant primary energy resource in the sample.

The use of RES for solar water heating is a prevalent feature in the tourism accommodation sector. Three out of four of the units were using solar thermal technology for water heating. This action therefore can reduce on the quantities of fossil based fuel sources such as gas or electricity, used for water heating. Conversely, the reduction of carbon dioxide emissions can be achieved.

Secondly, all the units indicated their willingness to install renewable energy technologies to generate electricity in the future. In this regard the reduction of diesel as an input for electricity generation can be achieved. Conversely, the emission of carbon dioxide from the use of this diesel can also be avoided.

However, from an island perspective the deployment of renewable energy as a strategic action may be problematic. Lenzen (2008 p. 2034) argues that on island technological solutions such as the deployment of the renewable energy technologies (RETs), to solve the issues with energy, "...have failed due to a lack of continuing skills and financial resources needed for on-going operation and maintenance". These issues were also identified in a recent assessment of Grenada's readiness to deploy RETs on a wide scale, even as preliminary solar and wind resources map show that there was great potential for their deployment (IRENA 2012). However, there was a marked awareness amongst key stakeholders,

including the hotel accommodation association, on the ability of renewables to reduce cost and the benefits of preventing global warming. This has spurred the association to seek-out possible projects to move their hotels to renewable sources, especially for the generation of electricity (IRENA 2012). Also there is a marked thrust towards improving the human capacity in the area of installation, operation and maintenance of these technologies, especially solar, as the local college has established some training in that regard (IRENA 2012). However, there still remains the issue of financing which needs to be addressed.

The financing of renewable energy in small islands is plagued by the high interest rates and the lack of seed funding for investment. However, in recent times (2011) the Government of Grenada was able to find concessionary funding for a small wind-farm project; while one lending institution was able to attract similar funding for financing solar water heaters in the domestic sector (IRENA 2012). This approach can be very useful for dealing with the challenge of financing. Moreover, the financing of RETs can be greatly reduced if energy efficiency measures are employed. Three out of the four accommodation units indicated that they were embarking on energy efficiency measures at their facilities.

Energy efficiency measures will have a reduction impact on the use of diesel and the emission of carbon dioxide, as the quantity of energy consumed is reduced by these measures. . In addition the energy security and independence of the nation may be improved. This may also bring some level of economic stability, as the need to depend on imported volatile and high priced fossil fuels can also be reduced.

Reducing demand for energy by deploying energy efficiency measures can lower the initial investment cost for RETs, as this cost is directly proportional to the demand and hence the capacity of the equipment required to generate energy from RETs. But the implementation of energy efficiency measures must be preceded by energy audits and effective monitoring and verification plans. These precursors are necessary to ensure that any changes in load patterns are effectively managed and that the RETs remain within capacity to meet any load changes.

Finally, energy and electricity are costly for the accommodation sector. “The price for electricity in 2011 was approximately USD0.40, much higher than what obtains in Europe and the United States. The average price in the Caribbean is

approximately USD0.32 in the same year (see IRENA 2012). These high prices are a symptom of the high prices for fossil fuel based energy on the world market. Additionally, the local price for the fossil based fuels fluctuates based on the volatility of the fuel prices on the international market. However, in Grenada the fuel price has systematically risen from about USD0.05 in 1996 to USD0.40 in 2011 (IRENA 2011). So notwithstanding the impacts of climate change that can be mitigated by the reduction of fossil fuels, it is also possible to have the lifecycle cost of electricity reduced by strategic actions to reduce the dependency on fossil based fuels. These strategic actions can again benefit from a comprehensive understanding of island sustainability supported by the models presented in chapter 4.

8.3.2.3 Actions to reduce waste

The management of waste was highlighted in chapter 3 as critical to the sustainability of islands. Waste management was also highlighted for consideration under tourism resources of islands (see chapter 3). The results from the research show that waste flows in the tourism accommodation sector can increase if stay-over tourists increase and if they remain longer on the island (see chapter 6). Therefore actions to reduce waste flows in the sector can assist with moving towards island sustainability. In this regard, the participants in the sample indicated that composting, recycling materials and reusing plastic bottles were measures they were currently taking or willing to take in the future to reduce waste flows to the landfill.

These actions are critical since in recent times (see section 8.1 in this chapter) the clarion call for reducing waste to landfill was made by the central waste management authority in the face of shrinking space for landfill in the island. The call was further made to have composting as a key strategy to do so, since approximately 45% of the total waste stream was organic (see Grenada Informer 2013).

But the results show that only one out of the four accommodation units was actually practicing composting; while two others felt it was something they wanted to do in the future. In the face of a projected waste stream increase from the tourism sector in 2014 (see chapter 6) and the real danger of running out of space for landfill looming in Grenada, then waste reduction strategies are critically important to the sustainability of Grenada.

Relating to composting the sector can also consider the use of waste for conversion into biogas, using waste to energy technologies, such as anaerobic digestion (AD). This small scale technology, in which mostly organic waste is used to generate biogas for cooking is another action that the sector can consider for reducing waste to the landfill. Additionally, this strategy can have a two-fold impact, for in addition to waste reduction, the need for LPG can also be reduced. The feasibility of these actions is not the focus of this discussion and this is out-with the scope of this research. However, actions must be taken to move to the higher levels of the waste management hierarchy of 'waste minimisation' and 'elimination' (see for example Shah 2007: 247).

This latter suggestion however, requires a more comprehensive analysis of the waste streams and to actively seek out avenues to achieve 'elimination'. Additionally, total elimination of waste may work contrary to a composting plan or even bio-gas digesters. Moreover, it may be impossible to totally eliminate waste. Specifically, the organic waste stream will be difficult to eliminate in the tourism accommodation sector, since food waste and waste from the care of landscapes and lawns will be a key feature. Therefore the feasibility of these actions must be thoroughly investigated before such actions are implemented. However, what is glaringly needed is action to reduce waste to landfill as the landfill space seems to be tending to zero going in to the future.

The preceding discussion suggests that there is a possibility to conceptualise a tourism symbiosis. This was already theorised in chapter 4, and a comprehensive discussion follows subsequently. However, the model in figure 8-2 shows that these actions are linked to the ISPs and thus can assist with moving towards the island sustainability vision. In this regard a description of how these actions are linked to the ISPs is summarised for each action in table 8-5.

8.3.3 Describing the link between the actions and the ISPs

Table 8-5: The links of the actions to the goals and a description how they are linked

Proposed action	Goal	Description of link
Reduced waste to landfill by composting	ISP 2	By reducing waste to the landfill, the tourism accommodation sector is actually reducing the

Proposed action	Goal	Description of link
	ISP3	on the systematic accumulation of materials create by society. The fact that composting was specified indicated that this was mostly organic waste from kitchen and landscaping. Reducing the quantities of waste sent to the landfill also reduces on the need for degrading lands to create landfills
Reduce of plastic containers	ISP 2	Similar to action above
Recycling, re-using of other materials	ISP2	Same as above
Use of renewable energy (solar thermal)	ISP1	Reduces on the needs for fossil fuels and hence assist with the systemic elimination of the accumulation of materials extracted from the earth's crust.
Use of renewable technologies for electricity	ISP1	Same as above
Implementing energy efficiency measures	ISP 1	Same as above
Rainwater harvesting	ISP4	Water is normally a social concern in that it is a need that supports the social system. Lack of water and how it is administrated can lead to social breakdown. Thus the tourism accommodation sector's thrust to harvest rainwater to supply their operations can lead to the increased availability of water supply for the remainder of the Grenadian society.
Dual flush toilets	ISP4	Same as above

8.3.4 The proposed tourism symbiosis

The proposed actions discussed above can be used to conceptualise a tourism symbiosis as defined in chapter 4 and repeated here for ease of reference:

‘an exchange of materials, energy and information amongst tourism accommodation units and other external organisations in an effort to reduce material flows and achieve island sustainability while maintaining competitive advantage’. Additionally, the results show that the four units expressed a willingness to collaborate amongst themselves and with other organisations to reduce flows in electricity, water and waste (see chapter 6). In effect therefore two critical inflows, water and energy and one outflow waste, were identified as areas where collaboration can be used as a strategy to reduce these flows. The first section of this discussion will analyse the potential to use the tourism symbiosis as a strategy to reduce MEWFs; while the second section will discuss the management decisions from the perspective of balancing the environment/economy nexus by implementing the proposed symbiosis.

8.3.4.1 The idea of a tourism symbiosis

The tourism accommodation units in the sample were willing to collaborate to reduce their MEWFs in both inter and intra-organisational arrangements (see chapter 6). Many suggestions were offered as to how collaboration can occur and one of the most prevalent ones was the ‘need to share knowledge and discuss ways to reduce the flows with the external partner’ (see chapter 7). More importantly, this also coincides with the need to exchange information, which is indicated in the definition of the tourism symbiosis.

As it relates to intra-organisational collaboration a number of advantages for collaboration were proposed (see chapter 7). These proposed advantages all seem to support the need for discussion and information exchange, amongst stakeholders on how these flows can be reduced. For example, ‘actors can learn from each other’, ‘ideas can be generated’, and ‘goals accomplished and better results would be achieved’. However, disadvantages were also proffered and amongst them ‘a longer period of time for implementation, resulting in frustration was a key one. Additionally, the cooperation may come to an abrupt halt if one or more individuals in the collaboration refuse(s) to continue.

In light of these disadvantages the need to share information in an atmosphere of trust may be important. The respondents ranked trust relatively high (5 out of 9 in table 6-9) as a factor that can affect the decision to collaborate. This

relatively high ranking of trust, if considered seriously by decision makers, can help to negate the suggested disadvantage. But two factors that could affect the intra-organisational collaboration: 'willingness to corporate' and 'long term strategy' were suggested in chapter 6, as the most important to consider in making the decision to collaborate; the latter appearing to have emerged from this research.

In this regard, it was previously argued that the 'willingness to corporate' is a critical consideration for making that decision to collaborate in inter- and/or intra-organisational arrangements. This goes to the core of the human dimension of industrial ecology. (See chapter 4: sections 4.7, 4.7.2.4 and 4.8.3.1). In this regard, the human dimension and the need for critical management decisions have also emerged. For example, the threat of collapse of any collaboration suggests the need for upfront willingness and commitment by managers to collaborate. This is also supported by the suggestions to engage in dialogue on how the collaboration may occur. In light of this, "Knowledge of the kinds of waste streams can provide a means to determine potential linkages. But this does not link them; decisions by people do" (see chapter 4, section 4.8.3.1). If the willingness to collaborate is lacking then, despite the knowledge of MEWFs, the implementation of a tourism symbiosis can be jeopardised.

Secondly, considering the 'long term strategy' as a high ranking factor for deciding to collaborate is critical. An IS it was suggested can have a competitive advantage as these tourism units may be able to reduce on their virgin material inputs if these exchanges occur. As a consequence, cost reduction may redound to the individual units involved in the collaboration. Additionally, environmental benefits can be achieved and in this regard the associated benefits of attracting environmentally conscious tourists to the resorts, who may be willing to pay a premium, can improve the competitive advantage of the individual accommodation units. Therefore the collaboration has to be considered from a long term strategic perspective as such a decision can have tremendous long term cost and environmental benefits for the units involved. The specific advantage of cost however, accruing to the individual units and not necessarily to all the units as a whole, may serve as a further incentive for accommodation units to participate in the intra and/or inter organisational collaboration. In this regard the units may share the cost to reduce the flows, while the benefits accrue to the individual units. From this

perspective the advantages may outweigh the cons, in that the actors, at least in the sample, may see the long term benefits of the collaborative strategy.

This discussion therefore supports the bridging of the engineering/social science gap identified with IE in the literature (see chapter 4, Section 4.7.1). The willingness to corporate and the long term strategic approach to do so are rooted in the social sciences aspect of IE. On the other hand these decisions are made in the context of MEWFs which is in the domain of the natural science aspects of IE. Applying the SS procedures in this regard, effectively bridges the identified gap.

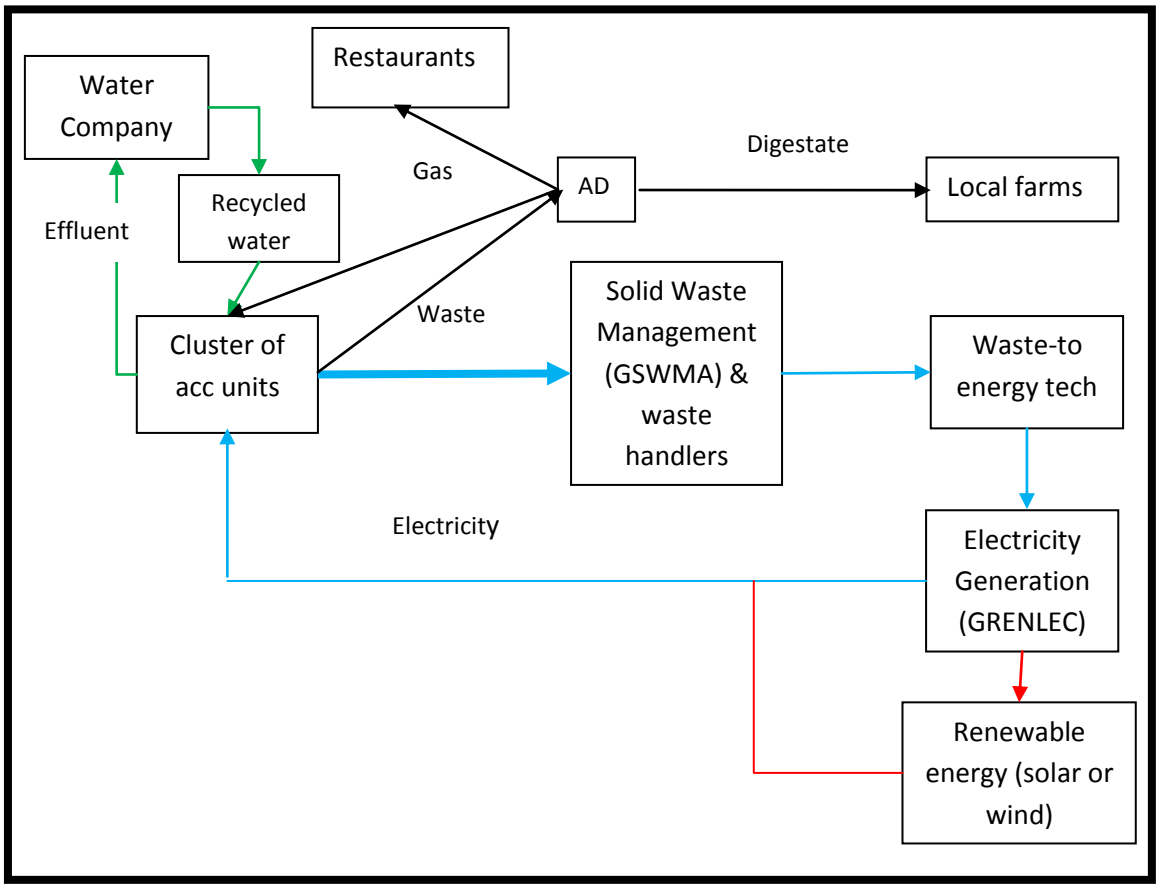
Additionally, the accommodation sector suggested ways in which they were willing to collaborate. However the suggested actions appear to focus on the exchange of information on how collaboration can occur. For example, the suggestion to 'meet and discuss ways of implementing energy and water savings mechanisms' and more importantly 'knowledge sharing to reduce flows within the business' were fundamental to a knowledge exchange interlink in a proposed tourism symbiosis. Although there were suggested actions to reduce individual MEWFs, there were no real suggestions on how material flows or waste exchanges amongst the accommodation units in the sample can occur. However there are many possibilities for so doing that will be discussed. Moreover three out of the four units in the sample suggested that they were willing to collaborate amongst themselves, in such a symbiosis. Together with the possibility of collaborating with the Electricity, Water and Waste Management Authority, the minimum requirement of three entities required to develop a symbiosis is achieved (see chapter 4, section 4.7). However, it was observed in chapter 4, section 4.7 that a kernel may be a starting point in the tourism industry. In this regard proposed kernels will be investigated.

Therefore drawing on the model in figure 8-2, the strategic actions can be linked in inter and intra organisational collaboration, see the interlinked white boxes. This collaborative approach for reducing MEWFs within the accommodation sector in the sample may lead to a reduction in the overall reduction of the MEWFs of the island. However, how the exchanges can occur needs to be fully discussed.

An industrial symbiosis is typically represented by 'boxes and arrows' (see for example Sokka, Melanen and Nissinen 2008; Miyata and Chertow 2010). However, most symbiotic representations are of actual collaborations or industrial ecosystems.

Therefore it is possible to mimic these representations in the formulation of a concept of a tourism symbiosis. This representation is an expanded form of the centre of figure 8.2, and the representation is shown in figure 8.3. The preceding discussions on the actions are used to support the proposed concept.

Figure 8-3: Proposed tourism symbiosis



Author's conceptualisation

Considering the proposed symbiosis firstly from the blue arrows, a 3-2 heuristic can be observed. In this case the tourism accommodation units, the solid waste company and the electricity company are sharing waste, steam or biogas and electricity. In this regard the ideal symbiosis is that the tourism accommodation units send their waste to the solid waste management authority where some waste-to-energy (WTE) technology (anaerobic digestion, thermal WTW) can be used to generate steam that feeds a turbine at the electricity company to produce electricity. In this symbiosis, waste to land fill is avoided, fossil fuel inflows and carbon dioxide emissions are reduced. The implications for this however, need to be comprehensively discussed.

Cost and a constant flow of organic waste are important in the context of establishing the proposed symbiosis. The envisioned collaborations however go to the core of management decision making and a comprehensive cost benefits analysis (CBA) for such arrangements must be conducted. In fact the need for a lifecycle approach to this CBA is also required as there is the drawback of insufficient waste flows to maintain such an arrangement over time. In this regard the central solid waste management authority or some third party waste handler which features in the symbiosis can ensure that there is adequate feedstock to maintain the production of steam or biogas especially over the life of the technology. These third party handlers can be referred to as 'waste processors' in the original concept of a type iii industrial ecosystem (see for example Jelinski et al 1992 and chapter 4, section 4-7). With a CBA the role of the third party can be comprehensively analysed.

Additionally, in Grenada solid waste management is very linear and as such all waste is collected and disposed of at a central landfill. There are therefore many waste collection contractors who are responsible for this collection. Unfortunately however, these operators have no other responsibility but to ensure the effective collection of curb-side waste. They cannot be referred to as waste processors in any form. But in recent times there was the creation of two recycling businesses (Author's observation), which are involved with the purchasing of 'metals only' and these are shipped off- island. No recycling per se occurs on the island.

In the case of collaborating with organic waste as shown in the symbiosis, the role of the 'waste processor' will be simpler to such recyclers. In this regard the expertise required to handle the waste to ensure that the waste stream is clean may lie with the processor. With such a symbiosis the processor may also serve as the owner of the WTE plant. Additionally special services vehicles can be established to include all the key stakeholders as owners of the WTE plant. In this way a more equitable management arrangement can be achieved.

Alternatively, this symbiosis can begin as a kernel with waste sharing amongst the tourism accommodation units to produce biogas and possibly electricity for their own use. These can reduce on the quantity of LPG required for cooking and firing up boilers and for electricity generated from fossil fuels. In this arrangement the

unit managers can come together and agree to install a central WTE plant, and connect the various units by a utility gas supply line. With such an option the units in the kernel will agree to cart their bio-waste to a central plant and the gas thus produced piped to the kitchens of the units, or to small boilers for generating steam for the laundry. However, there is one drawback in this regard as a significant piping network will be required to link the kitchens of the units. The initial investment cost of installing this network can be prohibitive. As the IS literature suggests, collaborators are required to be in close proximately and it is apparent that this is necessary to facilitate such exchanges.

However, this arrangement can be developed differently as the focus of the collaboration is to reduce waste flows out of the units and into the landfill. Alternatively therefore, the unit managers can come together and agree to install individual anaerobic digester (Ads) and to establish a database of waste flows from the units and share these flows to feed the individual ADs. In this latter arrangement the need for 'long run of pipes' can be eliminated thus making the arrangement more affordable.

Additionally, the waste to energy arrangement by the units can remove the need for composting by itself, since the digestate can be used as a fertilizer and applied to on-site farms that the units may wish to develop for producing locally grown foods. Locally grown food can support a 'green' tourism strategy and may receive premium prices from tourists who are seeking out eco-tourism resorts. Additionally, excess digestate can be sold to farmers external to the resorts thus creating a revenue stream to the owners of the digesters.

In sum the proposed symbiosis can be beneficial to the accommodation sector. However, the initial planning cost can be as high as 4-5% of investment cost, while operating cost can be about 7-8% (Carbon Trust 2012). However, despite the investment cost the income from such an arrangement can be significant, for example, from the sale of digestate to farmers, the sale of electricity and in general the avoided cost of sending waste to the landfill (carbon Trust 2012).

Additionally, and in the context of Grenada, it is apparent that the benefits may not outweigh the costs at this time. Firstly there is no feed in tariff or any other policy that will facilitate the sale of electricity to the GRENLEC, despite the

exorbitantly high prices of electricity (see section 8.3.2.2). Secondly, the accommodation sector is not required to pay for the disposal of waste. These two hindrances however can be addressed as the government is making moves to address the fees for commercial waste disposal, of which the accommodation sector is a part. Also, an electricity regulator and hopefully the liberalisation of the electricity market are on the horizon. Therefore the CBA and the LCA may be done in conjunction with these scenarios considered for making the decision to collaborate.

Another example of a kernel is shown in figure 8-3 (see red arrows), which involves the electricity company and the tourism accommodation units. The Grenada Hotel and Tourism Association (GHTA) attempted to embark on the installation of a solar farm (GHTA 2012). This arrangement will certainly lead to the reduction in inflows of petroleum products into the island, equivalent to what the accommodation sector is responsible for. On the other hand the outflows of carbon dioxide will also be reduced. However, the electricity company will have to be a part of the arrangement in that the proposed system will be grid tied. Moreover the problem highlighted with the electricity company in the previous paragraph will remain. Alternatively a stand-alone system may apply, with the use of a mini-grid to serve the sector. However, these arrangements must be assessed for their long term viability, through LCAs and CBAs.

Another kernel arrangement is possible with the handling of water inflows and effluent outflows (see figure 8-3, green arrows). Water inflows and the effluent outflows dominate the material flows in the accommodation sector, and this will increase as Grenada attempts to increase stay-over tourist arrivals and the length of time that they remain on the island. It is proposed that the need for portable water in the sector can be reduced if the waste water from the units is collected and recycled for reuse in the accommodation sector. Such an arrangement can also reduce on the quantity of effluents discarded to the general sewage system which is pumped into the sea. Such a reduction in effluents will have a profound positive impact on the socio-ecological system of Grenada.

But to develop this arrangement the water and sewage authority must be involved in an inter-organisational collaboration. The involvement of the authority will be necessary since they can bring the necessary expertise to the table to assist with

the planning and implementation of such collaboration. For example, the authority will have to use their expertise in diverting effluent discharge away from the general sewage system, in treating such effluents and in re-directing the treated water back to maybe a central holding ‘tank’ for use by the accommodation sector. However, such a decision requires detailed planning and feasibility studies, which can benefit from LCAs and CBAs.

But there are some concerns that are known, for example, the removal of the accommodation sector from the general sewage system can result in loss of revenue to the authority which collects fees for use of the sewage system. This situation however can be addressed if the arrangement includes a type of partnership in which the authority is paid a reduced fee by the sector to operate and maintain such a system. In fact it is envisioned that the authority will not have to embark on high cost investments to meet the increasing demand for portable water by the accommodation sector, since the use of the treated water will reduce on the demand by the sector. Such an ease in demand for water can greatly assist in improving the per capita need for water of the entire island. These preliminary considerations however, must be analysed through LCAs and CBAs.

This discussion pre-supposes that there is some merit in considering a tourism symbiosis and other possible kernel arrangements to form a tourism ecosystem. However, the human/social dimension and its manifestation in the management of the tourism accommodation units and the three external organisations are critical for causing the symbiosis to materialise, and this was already discussed. Additionally, these implications are discussed form the perspective of the environment/economy nexus in the following section.

8.4.4.2 Management decision in the tourism symbiosis

Management decisions that seek to balance the environmental concerns with that of investment and development can be very contentious at times and this goes to the core of sustainable development. In this regard, and as it was previously argued in chapter 3, the OECS islands were traditionally experiencing good economic benefits (recession since 2009 has impacted that growth), but environmental problems were creeping in. In this regard it was further noted that the

OECS and Grenada specifically were in a un-sustainability/sustainability balance and that ‘poor’ decisions may tip the balance towards ‘un-sustainability.

With this caution in mind, the decision making within the tourism accommodation units regarding the tourism ecosystem can focus on the economic benefits and the move of the whole island on to a path of sustainability. Some of the environmental and economic benefits and costs associated with the proposed tourism ecosystem were previously discussed. These should be effectively analysed for making decisions that are balanced. More importantly however, a collaborative approach to decision making that will lead towards island sustainability and that would align the sustainable development actions of the sector to that of island sustainability is required. This goes to the core of what was referred to as ‘inter organisational management and ‘... management of industrial ecosystems’ as necessary bridging themes between the natural science/engineering and social sciences aspects of IE (see chapter 4).

In this regard, the MEWFs that are considered in the proposed symbiosis were determined using tools and concepts from engineering/natural sciences. However, the decision to collaborate to reduce these flows and the management of information flows, such as proposed for the waste flows for WTE production, fall within the ambits of the social sciences domains. The rudiments of the management discipline come into play in this regard. The management decision process must be applied at both the individual and stakeholder levels, since it was previously shown that stakeholder engagement and consensus building are very important. Therefore the entire section on stakeholder identification and engagement previously discussed in this chapter can also be applied here.

Moreover, and investigating the management decision making in regards to the tourism symbiosis, one observes that it may be less problematic for the tourism accommodation sector to be involved in an inter-organisation arrangement compared to having an intra-organisational collaboration, especially, with the electricity company. Firstly the accommodation sector has an umbrella body to which a majority of the units are members (GHTA see previous section). Within this umbrella body the members at least make collective decisions, especially as it relates to electricity use within the sector. Therefore it is envisioned that an approach

using the umbrella body as the broker for such decision making and for getting to consensus can be utilised. On the other hand getting the involvement of and achieving consensus with the other external players such as the electricity company can be stymied. For example, it was mentioned previously that the electricity market in Grenada is monopolised by the electricity company. In this regard there are no incentives for this company to be involved with any arrangement that has the potential to reduce on its revenue flow.

Secondly, the motivation or willingness for the accommodation units to collaborate with the waste management authority may be low. As it was pointed out previously, commercial businesses such as the accommodation sector in Grenada do not pay waste collection fees. Therefore the need to divert waste from the landfill is not an attractive option, since to do so expenditure is required. In other words, waste diversion into the waste-to-energy plant will require both initial investment cost and operational cost which these companies are not expending currently.

These problems point towards the need for the intervention of policy and public sector intervention that will support such a symbiotic arrangement. This involvement may include laws and regulations that will have minimal economic disruption, but that will find the appropriate balance between the required economic performance of the organisations in the symbiosis and the successful outcome of the socio-ecological system-that is island sustainability. Inter and intra-organisational management decisions and the eventual development of this conceptualised tourism symbiosis go to the core of public policy and the other critical concepts already operationalised for this research, especially, CSR. Additionally management decisions are impacted by policy and they are also manifested in the application of CSR. These are all incorporated into a strategic approach to the final step in the procedures. This effectively brings together the two levels of the adapted FSSD previously described in chapter 4: the vision level consisting of part 1: levels 1 and 2 and the operational level consisting of part 2: levels 3, 4 and 5.

8.4 Monitoring and evaluation- a strategic perspective

Another set of procedural steps were suggested in table 8-1, and these were grouped under ‘monitoring and evaluation’. These steps stemmed from answering the final research question on the stakeholders feelings of a matrix within which

indicators were used to measure the impacts of policy and management decisions on island sustainability. In essence three critical themes were analysed: CSR, policy and indicators. This final set of steps added the dimensions of indicator selection that were sector specific and the case for this was already made in chapter 4 (section 4.8.4.2). It was further proposed that the selected indictors should be specific to society, environment and economy. Another step addresses the need to create a corporate sustainability responsibility action plan that includes monitoring indicator performance and adjusting the plan accordingly. This critical group of steps were shown to feed out of the proposed tourism symbiosis and in essence measures the move towards or away from island sustainability (see figure 8-2). Effectively these final steps address a strategic approach to merging the policies that may affect island sustainability; the indicators they can generate and internal social and environmental actions that the tourism units can take to move towards islands sustainability. Additionally the impact of policy can also be determined. This was presented in a model in figure 4-5.

8.4.1 From CSR to sustainability responsibility action plans (SURAP)

Firstly, the literature review debated the need to have CSR incorporated in to the idea of sustainability, which was fundamentally considering socio-ecological issues as opposed to just environmental and social issues on their own. The results in chapter 6, shows that all the units embraced CSR and that social aspects was a critical driver of CSR. More importantly social and environmental focuses were drawn out of the research participants as critical for CSR (see chapter 7). These results support the argument in chapters 3 and 4 for the need to view corporate social responsibility as sustainability responsibility and to incorporate actions and decisions in this regard into sustainability plans. This theme is therefore adjusted to sustainability responsibility action planning (SURAP), which focuses the units on the alignment of their sustainable development processes to that of the main outcome of island sustainability.

Moreover, the drivers of CSR are both internal to Grenada and external. In this regard the key internal factors are ‘government’ and ‘social’; and ‘globalisation’ and market’ can be external. This can have implications for the move towards island sustainability and the willingness of the actors in the sector to collaborate in the

proposed tourism symbiosis. The social driver was previously discussed as it was a critical consideration of the human/social aspect of decision making in the context of the tourism symbiosis. Further, it was already shown in the analysis, that maybe globalisation and markets have 'forced' at least one of the accommodation units to be certified to an international environmental and social standard (see chapter 7, section 7.4.1.3). This certification can focus the units to deal with internal socio-ecological issues of Grenada and also can be used to attract environmentally conscious tourists.

The other critical driver which is a creature of government is that of public policy, which can pressure the decision makers in the tourism sector to act in ways that may impact sustainability or affect their decision to collaborate in a tourism symbiosis. In this regard policy direction, for example to increase tourist numbers and stay-over time and with attendant increase in room stock may have a negative impact on the socio-ecological system, at least with regards to MEWFs as was shown. However, this policy direction can be used to drive the accommodation sector to make decisions to reduce MEWFs. Moreover, and as was previously discussed, there may be a need to improve on the policy direction provided by the public sector by focusing on general (not tourism centric) policy standpoints such as those suggested in chapter 4 (the public policy theme is discussed subsequently).

8.4.1.1 SURAP

But before the policy direction is addressed the sustainability responsibility action plan is discussed. These plans are critical in assisting the tourism accommodation units to develop a set of actions for moving their operations on to a path of island sustainability. This plan can be appropriately incorporated into the business operational plan and it should be created from the overall strategic planning process of the sector. Much like the actions which were reported by one of the stakeholders in chapter 7, these actions will include how the organisation intends to treat with social and environmental issues. The SURAP therefore would not only be focused on social or environmental responsibility but on an integrated responsibility approach which conveys to all employees the integrated focus of the organisation. Moreover, this SURAP is essential to ensuring that the activities of the units are

aligned to the overall strategic vision and goals and by extension to the island sustainability goals and vision (see figure 8-2).

In chapter 2, it was argued that in order to achieve a successful business that is, one which wants to align strategic actions to sustainability and continue operations in perpetuity, then all the operational elements of the organisation must be aligned to the overall strategy. In this regard the proposed SURAP will assist the units in further aligning critical business elements that concern social and environmental issues, unlike separate corporate social and environmental plans that convey focused meaning on one or the other to the employees. This plan therefore will be a critical part of the changing landscape that the organisation may need to demonstrate that they are walking the talk of sustainability.

Although separate plans may achieve the same outcome, in the face of collaborating to implement these actions a more holistic approach to implementing the actions of the units may bring more benefits (as discussed previously). More importantly, the change of name and the proposed integrated approach is more aligned to the socio-ecological definition of sustainability. This therefore makes the plan more relevant to strategic sustainable development processes of the tourism accommodation units.

8.4.2 Public policy

The results show that the research participants felt that policy was very important in assisting the units to implement sustainability responsibility actions. Public policy that seeks to promote sustainability has stemmed from the International arena and have filtered into the SGD and the local NEMPS already presented in chapters 3 and 4. These were presented as policy standpoints in chapter 4. The importance of policy was further underscored in the results, with one research participant indicating that (repeated for ease of reference) ***"****Policy can be described as a principle or rule to guide decisions and achieve rational outcomes. It is a statement of intent or commitment, therefore it is important to have policies in assisting with CSR in order for it to be achieved,,, successfully****"*** (see chapter 6)**.** It is clear therefore that the external direction provided by public policy can drive the sector towards a particular direction.

But the research participants suggest that, ‘economic priorities that take precedence over environmental and social concerns’ and ‘non coordination between ministries and authorities’ are number one barriers to the implementation of public policies. These results were consistent with the ranking of barriers in chapter 4. As it pertains to economic priorities this appears to be a normal outcome of all planning in an economy. Moreover, economic development seems to take precedence even more so in the face of the current economic recession. It is only in the face of some environmental or social problem that these aspects of sustainable development take some priority.

Additionally, this barrier is mutually reinforcing with the barrier of ‘non coordination amongst ministries and authorities. In Grenada, and like many other jurisdictions the ministries responsible for the various public policies are separate and apart. For example, although the policy standpoints presented in this research was developed by the Ministry of the Environment, similar type policies can be found from the Ministries of Tourism and Forestry. Additionally, the ministries for economic development and planning; environment (which is mixed with agriculture, forestry, fisheries), social development and social security are focused on policies for each of their responsibilities. Each of the ministries mentioned are responsible for the development and implementation of policies relating to their ministerial oversight. Thus economy, society and environment are effectively separated by ministerial responsibility. As such there is hardly any integration of the various policies. So this leads in a sense to ministerial responsibility taking precedence over an overall and integrated approach to achieving island sustainability.

However, the six policy stand-points was the closest the Government of Grenada (GOG) has come to integrating the social, economic and environmental pillars. However, its implementation has suffered from the barriers discussed in this research. In this regard the policy was viewed as a Ministry of the Environment document and not even the other ministries or the private sector accepted the standpoints as a holistic approach to directing Grenada towards sustainability. Non-governmental organisations however, periodically, quote the document.

This research proposes that there is a need for policies to drive socio-ecological sustainability that the tourism accommodation units, and any other

organisation, can use to reduce their socio-ecological footprint on the island. In this regard socio-economic development balanced with socio-ecological progress should be the key consideration of policy development and implementation. Therefore and despite the lack of implementation of the policy standpoints, public policies that are not tourism centric must be implemented if Grenada is to move on to a path of sustainability. This will provide the tourism accommodation sector with a more balanced approach to achieving economic development, social progress and environmental preservation. Dodds (2007: 62-63) concludes that:

"a ... 'tourism centric' approach will fail: tourism should rather be integrated into a wider pursuit of sustainable development. Such recognition requires the support and involvement of all stakeholders.... The case for an integrated framework may appear relatively straightforward in principle; yet, social and environmental agendas are often played off against each other..."

This observation by Dodds epitomizes the critical concern of what generally obtains in the Grenada context and which was articulated by the research participants. Additionally, an integration of important policy standpoints along the lines of the triple pillars of sustainable development will allow the sector to develop and formulate more comprehensive indicators that can be used to measure progress towards island sustainability.

The indicators that were generated in the literature sought to link the policy stand points from the NEMPS to possible overarching indicators to measure them. Public policy may also affect the decisions that organizations make concerning sustainability, which is the key outcome of promulgating public policies.

8.4.3 Indicators

A strategic framework for assessing the move towards island sustainability was presented to the research participants. They felt that such a framework was 'very important' for measuring the move towards island sustainability. The research participants were also asked to suggest environmental, social and economic indicators for measuring this move. The framework further matched the possible indicators in the operational stage of the tourism accommodation sector to that of the ISPs. The indicators were also aligned to the ISPs and their general direction '+' for

increasing and '-'for decreasing was also indicated. These directions generally indicate the required movement towards achieving the ISPs and island sustainability. This is shown in table 8-6.

Table 8-6: Matrix aligned to strategically measure movement towards or away for island sustainability

	Sustainability indicators based on ISPs			
	In sustainable island systems, the system is not systematically subjected to increasing concentrations of materials extracted from the earth's crust.	**In sustainable island systems, the system is not systematically subjected to increasing concentrations of materials created in society.**	**In sustainable island systems, the island is not subjected to degradation by physical means.**	**In sustainable island systems, the people are not subjected to conditions that would systematically undermine their capacity to meet their own needs.**
Operations of the tourism accommodation sector in a proposed tourism ecosystem	Energy used annually (-) Emissions to air (-) Annual investments in energy efficiency measures (+) Annual cost of fossil fuel energy (-)	Waste generated annually (-) Effluents to sewage system (-) Annual cost for waste disposal (-)	Waste generated annually (-) Quantity of waste composted or avoided sent to the landfill (+)	Water used annually (-) No. of persons employed from nearby community (+) No. of employees trained in environmental issues (+) No. of employees trained in health and safety (+) No. of charitable activities undertaken per year (+)

Author generated

The general direction of the indicators is important, in that sustainability can be judged based on the increase or decrease of these indicators. For example, the 'no of persons employed from nearby community' indicator, should increase if this is seen as critical to social progress in Grenada. Also, 'annual cost for waste disposal' should decrease if economic benefits are to be accrued. Another example, is the requirement for waste generated annually and sent to the landfill to decrease, and this can also impact on the decrease in the associated environmental indicator.

The indicators with their general directions were also aligned to the policy standpoints and these are summarised for reference in table 8-7. In this regard, progress with the implementation of the policy standpoints can also be measured by the indicators. For example, the quantities of waste and effluents into the environment can indicate if the intention of policy standpoint 1 is been achieved. Also by reducing cost for fossil fuels, may require the use of RES and this can optimise the contribution of this natural resource to the economic development of the island. Thirdly, training persons in environmental issues may include the interpretation of natural sites for tourist excursions. This can accrue to cultural and social benefits since preserving these for that purpose augurs well for society and the cultural heritage of the island.

Table 8-7: Suggested indicators with directions aligned to policy standpoints

Policy	Indicators
Standpoint 1: Maintain and enhance the natural productivity of ecosystems and ecological processes	Waste generated annually (-) Effluents to sewage system (-)
Standpoint 2: Optimise the contributions of natural and environmental resources to economic development	Energy used annually (-) Annual investments in energy efficiency measures (+) Annual cost of fossil fuel energy (-) Annual cost for waste disposal (-)
Standpoint 3: Optimise the contribution of natural and environmental resources to social and cultural development	No. of employees trained in environmental issues (+)
Standpoint 4: Prevent and mitigate the negative impacts of environmental change and natural disasters and build resilience to these	Emissions to air (-) Quantity of waste composted or avoided sent to the landfill (+)
Standpoint 5: Maintain and enhance the	No. of employees trained in health and

Policy	Indicators
contribution of the environment to human health	safety (+)
Standpoint 6: Fulfil regional and international responsibilities and capitalize on opportunities that accrue from regional and international networking	

Author Generated

Additionally the model in figure 8-2 demonstrates the need to measure the impact of the proposed tourism symbiosis through the use of indicators and this was done by aligning them with the ISPs in table 8-6 and indicated by the yellow box in figure 8-2. Therefore, by checking the increase or decrease of each indictor, the achievement of the relevant ISP goal can be determined and by extension the movement towards island sustainability can be assessed. As an example, the economic indicator of reducing cost of fossil fuel energy can be considered as a means of 'not systematically increasing concentrations of materials from the earth's crust'. Cost reduction can also be achieved by investing in energy efficacy measures, although a cost benefit analysis will be required in this regard. These two indicators therefore can reduce the inflows of fossil based fuels into the tourism accommodation sector and the outflows of emissions. If this occurs then the ISP goal of the accumulation of carbon dioxide due to fossil based fuel can be met and as a consequence the island sustainability can be achieved. Similar analyses will hold for solid waste disposal and water and effluent flows.

However, considering the need to ensure that eco-efficiency or what was referred to as resource efficiency (see chapter 2) is achieved, relative indicators may be required. In other words, to ensure that the impacts of the proposed tourism symbiosis are due to the actions taken within the symbiosis itself, then other possible actions will have to be accounted for. For example, reducing energy flows will require that the context of the hotel is considered. In this case, the occupancy and size of the accommodation unit can be incorporated into a model to ensure that any changes in these variables are accounted for when indicators are measured. From this perspective the use of relative indicators as opposed to absolute indicators, as used in this research, will provide a more comprehensive approach to determining whether or not the actions are leading towards eco-efficiency and more importantly

island sustainability. From the perspective of sustainability however, socio-ecological success is the main outcome as opposed to simply eco-efficiency which may only be a transition to sustainability. However, this is not within the scope of this research as the intention is to demonstrate how indicators can be applied within a strategic framework to measure the movement towards or away from sustainability.

This final group of procedural steps are the last set of steps required to effectively integrate the concepts used in the research into a holistic approach to aligning the sustainable development actions of the tourism accommodation sector to that of the island sustainability vision and goals. Steps 7-10 therefore, suggest that the proposed matrix be adapted or adopted; indicators that can assess public policy impact are selected and placed in the matrix according to economic, social and environment; and SURAP plans are created. Progress towards island sustainability can be effectively assessed through the matrix and plan.

The final steps in the proposed procedure were to 'monitor and record indicator performance' and then to use the information gathered to adjust coast if necessary back towards island sustainability. This adjustment can take place by adjusting the requisite actions in the proposed SURAP.

8.5 Implications for the green economy roadmap

Finally, the strategy process and content discussed in this chapter has implications for the green economy roadmap presented in chapter 3. In chapter 2 the green economy was defined and presented as the depiction of the interaction amongst the three pillars of sustainable development. In fact the green economy was envisioned as an enabler of sustainable development. In this regard the green economy is essentially a means to an end, sustainability, rather than an end in itself. From this perspective, the proposed green economy roadmap can benefit from an implementation approach, using the SS procedures.

Specifically from the perspective of business, it was shown that mutually reinforcing cross-cutting themes should integrate "social, economic and ecological innovations" (see chapter 2, figure 2-3). One such mutually reinforcing theme was an "integrated environmental, social and economic policy and decision-making" (see chapter 2, section 2.2.4). In this regard the ICC (2012) reiterates that the:

'*green economy requires a holistic approach to decision making. It integrates and balances policies with respect to environmental, social and economic priorities by considering the intended and unintended consequences of interlinked policies that may result in synergies or barriers and promote or hinder economy-wide, greener growth*'.

Governments in the OECS and in Grenada must now begin to think of more strategic ways to integrate policies and to ensure that the success of the socio-ecological system is the main outcome. That is, ensuring that island sustainability is achieved, even if it is embarking on the implementation of a green economy roadmap which are assumed to be 'sustainable'. In so doing the policies should be robust enough to drive the activities in the socio-economic system towards that same success. Therefore, government policy should provide the platform or what the ICC refers to as the balance of priorities, for economic development and growth, environmental preservation and social progress. This is an imperative in the context of the proposed green economy roadmap.

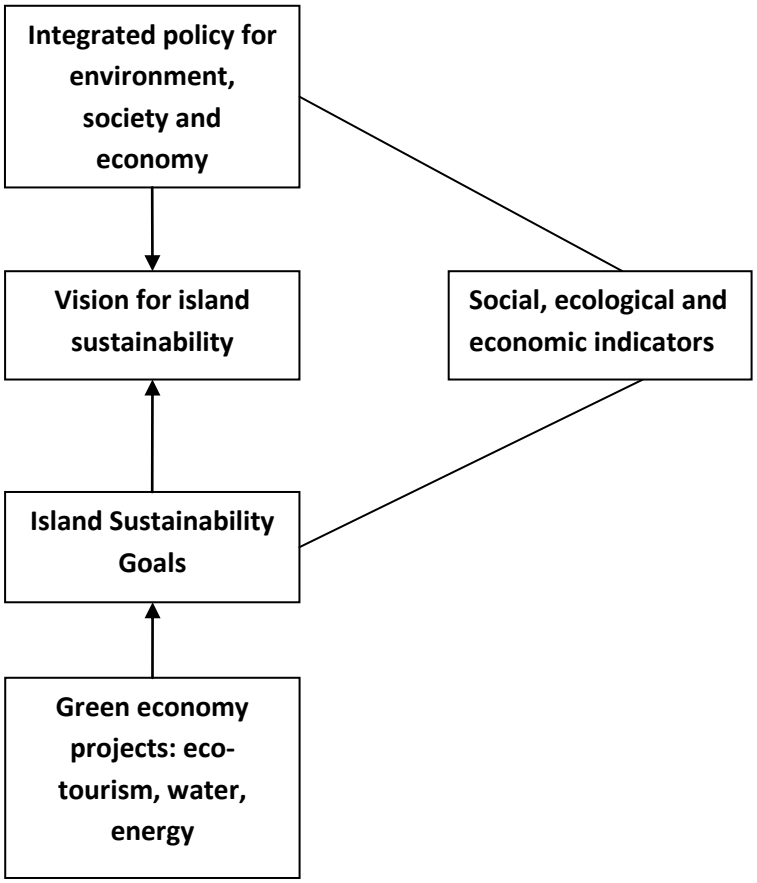
Therefore, in the island context, it was already argued that the green economy should be seen as embedded within the socio-ecological limits of the island system (see chapter 2, figure 2- and chapter 3, figure 3-3). From this perspective, the restrictions placed by the socio-ecological system on the activities in the socio-economic system should also be applied when the green economy roadmap is been implemented. Although the roadmap focuses on issues such as eco-tourism, water and energy, these must be dealt with in the context of reducing impact on the sustainability of the island system. In this regard a lifecycle approach should be taken. For example, the development of eco-tourism resorts may use solar PV systems, which uses batteries, which may be a long term threat to the waste through-put of the island. These must be considered in the context of LCA.

Therefore the consideration of integrated polices such as the six policy standpoints addressed in this research can assist with the implementation of the green economy roadmap. These policy standpoints can provide the public policy direction for the roadmap's implementation. Moreover the approach suggested by this research can provide an example of how such synergies in policy integration and how the intended direction of such policies can be assessed. In this regard, the

proposed SS procedures can also be applied to the green economy. Figure 8-4 demonstrates how this can be done.

A green economy roadmap without a vision can take the island anywhere. Therefore an understanding of the island sustainability vision is applicable to the implementation of the roadmap. But it was shown that policy standpoints can drive the vision, which can also affect the implementation of the roadmap. In this regard, policy standpoints can drive socio-ecological system success, while the green economy projects are assessed for their contributions to the ISP goals and hence the success or the socio-ecological system of the island. The indicators which are aligned to the integrated policy can also be used to measure and evaluate the impacts of the roadmap, through the ISP goals.

Figure 8-4: Using the SS approach to implement the green economy roadmap



Author's conceptualisation

The collaborative approach is also needed for the implementation of the green economy roadmap. In this regard the holistic approach to drive the reduction of MEWFs in an effort to meet the island sustainability vision and goals is critically important for a green economy. For example, the proposed tourism symbiosis focused on the WTE plant can be critical to the development of eco-tourism resorts in a green economy. In this regard, the collaboration at both the intra and inter-organisational level can assist with the implementation of the green economy roadmap. Additionally, and more importantly, all the ACTORS, including policy makers and private sector decision makers, will be on the same page planning towards the same direction of island sustainability, even though the green economy roadmap is been implemented.

Chapter summary

The chapter summarises discussions on the key research questions, which were effectively incorporated into a three-group set of procedures referred to as strategic sustainability. It was shown that the SS procedures can be easily incorporated into the 'normal' strategy planning process. In this regard the tourism units wishing to move towards island sustainability may seamlessly do so during the normal strategy planning exercise.

Additionally, the strategy content was addressed under the three headings of: 'visioning and vision linking'; developing sector strategic actions' and 'monitoring and evaluation'. As it pertains to the first step, the critical importance of stakeholder identification and engagement was highlighted. In the second step, the conceptualisation of a tourism symbiosis was proposed as a critical strategic action that the tourism accommodation units can embark upon for achieving the island sustainability vision and goals. In such a symbiosis it was explained how the tourism accommodation sector can reduce MEWFs in an effort to achieve the island sustainability vision and goals.

Additionally a SURAP was proposed, that is, an integrated environmental and social responsibility plan that can be used to implement the actions. A strategic approach to monitoring and evaluating progress towards island sustainability was presented. A model that demonstrates how the SS procedures can be used for

implementing the green economy roadmap for Grenada was also presented and discussed.

Chapter 9: CONCLUSIONS, RECOMMENDATIONS AND AREAS FOR FURTHER RESEARCH

Chapter introduction

This final chapter concludes the thesis. The chapter summarises the main conclusions based on the strategy process and content. Effectively the concluding remarks on the key research aim and questions are presented. Implications for policy and decision makers are underscored and in this regard recommendations are made. The contribution of the research to the extant literature, inter alia, island studies, sustainable development, green economy and industrial ecology is presented. Suggestions for further research are provided.

9.1 Summary and conclusion on the research aim

The island of Grenada, located in the Caribbean and belonging to a sub-grouping of similar islands-the OECS, was used as a case to demonstrate how organisations can plan towards achieving island sustainability or a successful island system. This island system was described as an interaction of the three pillars of sustainable development-environment, society and economy. In this regard the economy and green economy were shown to be embedded within the social and ecological systems. From this perspective, there are generally two interacting systems-the socio-ecological system and the socio-economic system. In the latter system, organisations are pursuing their activities, and in the case of businesses, these activities depend on the socio-ecological system and they are also limited by it. Additionally, the activities in the socio-economic system impact on the socio-ecological system as well. These impacts are due mainly to exchanges in MEWFs between the two systems. So although businesses need to operate in perpetuity, the success of the socio-ecological system, in which the business exists, must also be an equal imperative. In fact ignoring the socio-ecological system may be detrimental to the business.

To deal with this challenge, it was argued that the ideas of sustainable development and sustainability must be viewed as separate but congruent. Considering this from the business in the island system, sustainability can be envisioned as a successful socio-ecological system; while the actions that the

business embarks upon to move towards sustainability, can be considered to be sustainable development processes. Using MEWFs, it was further shown that a vision of island sustainability- reducing MEWFs, within socio-ecological limits, while maintaining a high quality life, can be achieved, by reducing MEWFs in the business units. Moving towards this vision is critical for the survival of businesses wishing to operate in perpetuity in the island system. Moreover, the island context which is an isolated island system with scarce resources makes the congruence of these two ideas of critical importance.

Additionally, and in an effort to make sustainable development operational and to address the inherit failures with its applications, the ability to align the two ideas is important. To do so it was shown that strategic thinking should be considered and specifically strategy content, process and context should be studied. In this regard an adapted FSSD was applied to the study of a sample of tourist accommodation units on the small island of Grenada, where the island context is applicable. In this regard tools from industrial ecology and strategic management were applied in an effort to glean strategy content and process, for proposing a set of strategic sustainability (SS) procedures.

Therefore, it was further shown that the SS procedures link the sustainable development actions of the organisation to the ultimate outcome of island sustainability. In this regard, the adapted FSSD was applicable to bringing the stakeholders together to develop a planning regime that has an ultimate outcome - island sustainability. Moreover, the linking was demonstrated at the nexus of the 'visioning and vision linking' and 'developing strategic actions' steps of the proposed SS procedures. Therefore with the realisation that sustainability in the island context is an urgent matter, the agreement with and implementation of this common island sustainability outcome is a critical imperative. It was further shown, that the public and private sectors' actors, must come together to develop effective planning towards island sustainability as proposed by the model in chapter 3.

The research demonstrated in the island context how the tourism accommodation sector can operationalize sustainable development using the adapted FSSD. In this regard sustainable development processes and actions must go to the core of the strategy process of the tourism accommodation sector.

9.2 Conclusions on the strategy process

The ability therefore, to adjust the strategy process of organisations, can be effective in ensuring that organisations meet the dual objectives of economic survival and socio-ecological success. This adjustment is even more urgent in the island context and in the context of the proposed roadmap for a green economy. In this regard the research concludes that the SS procedures can be seamlessly aligned to the normal strategy process. It was shown using three strategy management processes how this alignment can occur at the analysis, formulation, implementation, and evaluation stages of the process. The proposed SS procedures were grouped under three headings, under which detailed steps and content were developed.

9.3 Conclusions on the strategy content

The strategy content was gleaned from a comprehensive study of carefully selected island stakeholders. These included stakeholders who were not affiliated with the tourism sector. In this regard, the strategy context was effectively addressed. The strategy content was grouped under the three headings that defined the strategy process. The conclusions under each of these headings are made in turn. Effectively, the conclusions on the answers to the seven research questions are addressed.

9.3.1 Visioning and vision linking (research questions 1 and 3)

This first group of steps effectively addressed the answers to research questions 1 and 3. The first set of content dealt with the research participants' views on four ISP goals for island sustainability. These ISP goals were inherently linked to the success of the island system or the socio-ecological system of the island. It was shown, that because the view of sustainable development could be influenced by the background of the individual articulating the view, then principle based goals that could be used to guide the tourism accommodation sector towards an island sustainability vision are important.

Additionally, crafting the goals in such a manner ensures that it focuses on the social and ecological aspects of the island. This makes it simple for the tourism accommodation units to link their internal vision to the vision and goals for island

sustainability. In this regard the triple win vision of the tourism accommodation sector was effectively tied to the island sustainability vision through the ISP goals.

Another important conclusion which can be drawn at this procedural stage is the need to more meaningfully involve stakeholders in the visioning process or in establishing a vision for a successful socio-ecological system. Therefore, effective stakeholder identification and engagement and as a consequence building stakeholder consensus are needed. It was shown that this can be done at the analysis stage of the normal strategy planning process of the tourism accommodation sector.

Finally, visioning and visioning linking, which straggles the analysis and formulation phases of strategy planning, seeks to determine the views of all island stakeholders on the island sustainability goals. Additionally, the views of the sample of tourism units on the triple win vision for meeting these goals were also determined. In this regard, it is concluded that visioning and vision linking goes to the core of aligning the sustainable development processes/actions of the tourism units to that of island sustainability.

9.3.2 Actions for island sustain ability (research questions 2, 3, 4, 5 and 6)

Four steps constituted this procedural step. These steps address the research questions that focused on determining the actions that can be taken to reduce MEWFs of the tourist accommodation units. Moreover, these actions were used to demonstrate the concept of a tourism symbiosis, the first to be conceptualised in the tourism accommodation sector in the island context and system. As a part of this conceptualisation, management concerns for making such a decision were discussed. It was also shown that these procedural steps can be given consideration at the formulation and implementation stages of the normal strategy planning of tourist accommodation units.

It was concluded, that the MEWFs in the tourism accommodation sector were significant. Additionally, if no actions were taken to reduce MEWFs, the environmental loads of these flows can be increased if tourist numbers and the length of stay of these tourists are increased. This could exacerbate the MEWF impacts due to stay over tourists on the socio-ecological system. Therefore the

tourist accommodation units in the sample, the waste management authority and the electricity company can embark on a simple tourism symbiosis as a strategic approach to reducing MEW inflows and outflows. In this symbiosis, it was concluded that waste-to-energy should be considered. This arrangement can reduce on waste and carbon dioxide outflows and fossil fuels for energy and electricity inflows.

Critically however, was the need to understand the management decisions involved with making the decision to collaborate in such a symbiosis. From this perspective, it was further concluded that the willingness to corporate and the need for long term strategy to reduce these flows were the most important management decisions.

9.3.3 Monitoring and evaluation (research question 7)

At this final procedural step the need to consider indicators that can be used to monitor and evaluate the move towards island sustainability was drawn out as key strategy content. In this regard a matrix which linked the indicators to the ISP goals and to the operational stage of the life-cycle of the tourist accommodation units was designed. The indicators were drawn from the research and aligned to six integrated policy standpoints that reflected the three pillars of sustainable development. This matrix provides a more strategic approach to dealing with indicators.

In conclusion, the monitoring and evaluation of the move towards island sustainability can be assessed by measuring the move in these key social, ecological and economic indicators. These general moves can then be used to determine if the ISP goals are been met. Additionally, it was concluded that because the indicators reflect the policy standpoints then they can also be used to determine the impact of public policy on the island sustainability goals; albeit from the perspective of the tourist accommodation units.

9.4 Implications for policy and management decision makers and recommendations

The proposed SS procedures are applicable to island policy and business leaders wishing to embark on strategy planning towards island sustainability. Decision makers on islands grapple with the complexities of sustainable development and in many instances they may be overwhelmed by it. This approach

proposes that the idea of sustainable development should be viewed as a process that any organisation, government department or ministry included, can use to move towards a goal of sustainability. With this separation, the vagueness and oxymoronic nature of sustainable development can be overcome. Sustainable development can be taken from a strategic perspective in the relevant organisation. And this strategic approach should be congruent with an island stakeholder agreed vision and goals for island sustainability.

Recommendation 1:

A strategic approach should be taken to dealing with sustainable development and sustainability, to ensure that the ultimate outcome of sustainability or a successful socio-ecological system is achieved.

Secondly, the stakeholder engagement and consensus building effectively brings together public and private sector decision makers. In this regard both decision makers will come together to craft the vision and goals. Additionally, these stakeholders should build consensus, thus providing the general direction for island sustainability. In this way the goal for planning at the organisational level will be established and owned by both the public and private sectors.

As a corollary, it was shown that the approach to sustainable development and sustainability are the purview of both the private and public sectors; which have critical roles to play in the implementation of sustainable development. These roles are generally at the policy level which impacts sustainability and this is external to the organisation. The second role is at the organisational level, where vision linking is required.

Recommendation 2

Stakeholder engagement and consensus should be used to create and promulgate a vision for island sustainability, which will be an important outcome of strategy planning. Additionally, it is critical that organisations link their vision to that of island sustainability, in order to plan with some degree of certainty of moving towards the sustainability vision.

Also, and stemming from these dual roles, are the use of indicators for sustainable development in general. Indicators are normally drawn up at a national level and are measured by the public sector. However, the strategic approach to monitoring and evaluating the move towards island sustainability proposed in this research can be applied in an effort to change this perspective. Since indicators are linked to policy and the ISP goals and sustainability vision, then both public and private sector decision makers can develop a set of national indicators to determine the move towards island sustainability. In this way, a set of sector specific indicators can feed into a national data base; while also providing ownership of the indicators by all national sectors.

Recommendation 3

A strategic approach to the development of indicators should be employed for measuring policy impacts, moving towards the island sustainability vision and that will promote ownership by all sectors in participating in their development.

Recommendation 4

The proposed strategy approach should be used as a framework to apply the proposed green economy roadmap for Grenada. It was argued that the green economy was a means to an end, rather than an end in itself. The proposed green economy roadmap therefore could benefit from the strategic approach developed by this research.

Recommendation 5

The SS procedures should be adopted by private and public sector organisations for planning towards island sustainability with some degree of certainty. Finally, the SS procedure can be generic and may be used by other organisations. In this regard, it was shown how the proposed steps may seamlessly align with the ‘normal’ strategy planning processes. Additionally, the strategy content to be considered was effectively demonstrated by the research. Moreover, these steps effectively operationalise sustainable development and sustainability.

9.5 Contributions to extant literature

The research outcome may have contributed to critical aspects of the theories applied in the literature review. Firstly, the study of island sustainability was made operational through the use of the proposed island sustainability goals. In this regard, this research has adapted the global sustainability principles in the island context. This approach can further strengthen the application of SD in the small islands of the OECS, through the SGD principles. Moreover, the need for an island sustainability vision which can be used as the ultimate roadmap for all planning in the island system was also proposed as a new idea in the island context. In this regard, the critical importance of considering the island system as an interaction of the socio-economic and socio-ecological system, linked by MEWFs and information were additional theories to the island studies literature.

Additionally, it was discussed in the literature that MEWFs were variously absent from the study of sustainable development and the green economy on a global scale. Moreover, the strategic applications of the generic FSSD applied in the research, lacked the use of MEWFs as a key support for sustainability goals and vision. In this regard, this research can assist with filling the gap in the literature and in assisting with the application of the generic FSSD.

The research also adds to the literature on the relationship between industrial ecology and the island context. In this regard, it builds and supports the applicability of industrial ecology, in using the strategic approach to dealing with the sustainability of islands. On the other hand, the island context supports the systemic approach that industrial ecologists require.

As it relates to the strategic approach to sustainable development and sustainability the research demonstrates how organisations wishing to plan towards sustainability can do so. In chapter 2, section 2.3, it was argued that the need to align operational strategic aspects such as mission/vision and goals to the sustainability outcome was important and in many ways this was lacking. This research demonstrates how this can be done. It further shows that the strategic sustainability procedures align these internal activities and actions to the external goal of island sustainability. These can be done seamlessly by the organisation at each stage of the normal strategy planning process.

It was further debated in chapter 8, section 8.1, that there was a need to see an organised approach, that reflects strategy, to the use of indicators to monitor social and environmental impacts of tourism. The latter group of the procedural steps can provide a basis upon which this can be further reviewed in future literature.

Also, the study of sustainable tourism development was placed within the context of the island sustainability vision and goals. From this perspective, the tourism centric approach to the study of tourism, especially in the island context, was addressed. With this approach it was demonstrated that the outcome of strategy planning in the tourist accommodation sector can be geared towards the vision and goals of island sustainability as opposed to a tourism sustainability outcome. Additionally, the concerns and criticisms of sustainable development in general were addressed by the application of this strategic approach.

Additionally, the application of industrial symbiosis, a tool of industrial ecology, to the tourist accommodation sector in an island context, was new to the literature. Through the conceptualisation of a tourism symbiosis, using intra and inter organisational collaboration this was demonstrated. Additionally, the research may have addressed the concerns surrounding the strategic approach to industrial ecology in general (see chapter 4, section 4.7). In this regard, and especially in the island context, the model proposed in figure 8-2 (see section 8.2.1.2), may be used to address this concern. The model shows how MEWFs determined by IE can be used strategically to achieve island sustainability. Additionally, it proposes the reduction of flows in this context, at the organisational level, which can be linked to the reduction of whole island flows. With this model, MEWFs can be reduced, in an effort to move the whole island on to a path of sustainability.

Finally, the methodology applied in the island context may be useful to the study of islands on their own terms or nissology. In this regard the pragmatic paradigm of the mixed methods approach may be useful. Further, the island researcher has an approach that allows flexibility, but robustness, for research into sustainability issues on islands.

9.6 Suggested further research

This study lays the foundation for further research into the full development of the proposed tourism symbiosis. In this regard, the tourist accommodation units which indicated their willingness to embark on the symbiosis can be engaged to practically implement the proposed symbiosis and/or build on the kernels identified.

Reflecting on the model in chapter 8, figure 8-2, and possible limitations, further research can be conducted to improve the application of the model.

Firstly, a more comprehensive investigation into the cost and benefits of such a symbiosis can be conducted. Additionally, by supporting the CBA with lifecycle analysis, will provide the possible participants in the proposed symbiosis with economic data that will assist with decision making. Also, the collective benefits of cost sharing to implement actions and the individual benefits that may accrue to the accommodation units can be demonstrated.

Additionally, further work can be conducted on the use of indicators to measure the progress towards island sustainability. As was shown, relative indicators can be further considered to ensure that the actions taken are the ones impacting on sustainability, while considering the context of the accommodation units.

Also, a tourism symbiosis may be a new approach for sustainability management in the tourism sector. In this regard, a pilot project can be useful to test the parameters of such an approach. However, funding will be a key ingredient for building on these preliminary findings through further research.

Finally, the proposed SS procedures can be further refined and developed for the implementation of the proposed green economy roadmap. In this regard another project can be developed using the already developed roadmap for the smaller island of Carriacou.

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Appendix A: Quantities and assumptions for whole island MEWFs

	Mass of Flow		% Total	Key Source of Data	Assumptions
	Tonnes or gals	kg			
Inputs (Origins)					
Domestic Extractions					
Water	200,000,000	759,696,000	89.1	National Water Authority	All water harvested from watersheds and shallow wells. Source NAWASA Annual Report, 2010
Sand	-	-			In 2010 to present all sand is imported
Quarrying	38,826	93,182,400	10.9		Assume a 2.4:1 of gravel to cement. All gravel is extracted locally. Cement data taken form Port of Entry
Total		852,878,400	62.0		
Imports					
Bulk Food	17,382	17,382,000	3.3		
Petroleum Product and Chemicals	87,210	87,210,000	16.7		Fertilizers reported as 383,000 kg
Food, Bev & Detergents	18,722	18,722,000	3.6		
Construction Materials	156,424	156,424,000	30.0		Cement, lumber, sand, and other building supplies including steel, galvanize, etc
Vehicles & Machinery	9,533	9,533,000	1.8		
Other	232,536	232,536,000	44.6	Main Port of Entry for All Bulk Imports	The Port nor the CSO does not adequately record goods category
Total Imports	521,807	521,807,000	38.0		
Total Inputs		1,374,685,400			
Outputs (Destinations)					
Emissions and Waste					
Emissions to air	700,000	1,325,758	0.27		Data taken form ----estimated from growth rates of approx 0.1%
Waste to landfill	38,655	35,060,085	7.12		
Emissions to water+ land (effluents)	120,000,000	455,817,600	92.6		Sewage disposal/Grey water/Agricultural run-off. This is estimated at 60% of the water harvested
Total Emissions & Waste		492,203,443	94.2		
Exports					
Monocrops	1,677	1,677,000	5.5		
Agro products	13,022	13,022,000	42.9		
Other (Light Manufactured products	15,626	15,626,000	51.5		
Total Exports	30,325	30,325,000	5.8		
Total Outputs		522,528,443			
Net Addition to stock (NAS)					
Infrastructure and Buildings		135,400,614			Assume all current construton material in-flows are accumulated less 13.44% that gets into the waste stream (See GWMA, 2010)
Other (machinery, etc)		9,533,000			Asume all vehicle imports
Total NAS		144,933,614			

Appendix B: Copy of questionnaire

Introduction

This survey questionnaire is designed to capture data for doctoral research conducted at the Robert Gordon University, Scotland, U.K. The questionnaire is divided into four main sections. Section A is for all stakeholders; sections B-D are specific to stakeholders in the tourism accommodation sector. Where applicable, I will wish to conduct a brief facility audit. **Please be assured that all the information in this survey will be used for academic purposes ONLY, and that all persons and organizations/companies will remain ANONYMOUS in the thesis. The first section is required for follow-up and for ease with data coding.**

COMPANY/ORGANIZATION/INDIVIDUAL BIODATA

Name of Individual Responding:

_____

Organization Represented:

_____

Area(s) of Expertise: _____

Position in Organization:

_____

Contacts: E-mail: _____ Tel:

_____

SECTION A: DEFINING ISLAND SUSTAINABILITY

1. What does (sustainability) sustainable development mean to you?
2 On the scales provided please indicate your level of agreement with the following four goals for 'island' sustainability? Please circle one number for each.

Strongly Disagree= 1; Disagree = 2; Undecided=3; Agree=4; Strongly Agree=5

Islands must not be systematically subject to increasing concentrations of materials extracted from the earth's crust (e.g., fossil fuel extraction resulting in carbon dioxide accumulation)

1 2 3 4 5

Islands must not be systematically subject to concentrations of materials created in society (e.g., excessive accumulation of solid waste)

1 2 3 4 5

Islands must not be systematically subject to degradation by physical means (e.g., large clearing of lands for construction)

1 2 3 4 5

People living on islands must not be subject to conditions that systematically undermine their capacity to meet their own needs (e.g., unjust labor laws and adverse working conditions)

1 2 3 4 5

3-a Do you think that these goals address the needs of our current and future generations? Yes_____ No _____

3-b Please provide comments that support your answer.

4-a Do you think that it will be easy to find agreement amongst stakeholders on using these four statements as goals for moving towards Grenada's sustainability?

Yes ____ No _____

4-b Please provide comments that support your answer

5-a Do you think that these four goals creatively define the sustainability goals for Grenada? Yes_____ No _____

5-b Please provide comments that support your answer

6-a Do you think that if we were to adhere to these four goals, then Grenada will be on the path to sustainability? Yes_____ No _____

6-b Please provide comments that support your answer

7. What other goals can you provide for moving towards sustainability in Grenada?

8. Notes and further comments

*********End of Section A**********

SECTION B- CONSIDERING MATERIAL FLOWS AND A PROPOSED VISION FOR THEIR REDUCTION

A facility audit may be required for this section

1. Can you please indicate the type and number of rooms in your facility?

Type of rooms	Number
Single	
Double	
Suites	
Apartments/Cottages	
Other (specify)	
Other (specify)	
Total	

2. Can you provide an estimate of the quantity of solid waste generated annually by your facility? _____ lbs
3. Can you provide an estimate of the number of kilowatts of electricity consumed by your facility from the power station on an annual basis? _____ kWh
4. If you use any other sources of energy, please indicate in the table below?

Source of energy	Used for
Solar electricity	
Wind	
Wave	
Biogas	
Wood	
Charcoal	
Solar thermal (water heating)	
LPG	
Other	

5. Can you estimate the quantity of water you use on an annual basis? _____ Gallons
6. What is your main source of water? NAWASA _____Desalination _____ Recycled grey water _____ Other (specify): _____

7. What types of materials do you use for cleaning? (a brand name can be provided here)

Sanitizing:

_____

Polishing:

_____

Floor cleaning:

_____

Window shining:

_____

Cleaning in kitchen:

_____

Laundry:

_____
___

Other (please specify):

_____

8. Can you estimate the quantity of grey water (kitchen, laundry) you discharge annually? _____ gallons
9. Can estimate the quantity of sewage you discharge annually? _____ gallons
10. On the scale provided please indicate your level of agreement with this vision:

We (name of company) will endeavor to contribute to island sustainability by ensuring that the way we generate waste and use materials and energy can result in a triple-win for: environment, society and economy. We will take appropriate actions in these areas as part of our strategic efforts towards our island's sustainability.

Strongly disagree= 1; disagree = 2; Undecided=3; Agree=4; Strongly agree=5

1 2 3 4 5

11-a Do you think that this vision can be easily accepted by other businesses in the accommodation sector for achieving island sustainability?

Yes _____ No _____

11-b Please provide comments to support your answer.

11. Please indicate any modifications you wish to offer for making this vision more applicable to your sector.

12. Would you be willing to modify your current vision to incorporate this sustainability vision? Yes_____ No _____
13. Please provide comments to support you answer.

14. Notes and any further comments

***************End of Section B ***************

SECTION C: ACTIONS FOR ISLAND SUSTAINABILITY

1 In regards to achieving the suggested vision above, what practical actions are you currently taking or will be willing to take in the future, for moving towards

the vision? Please place a tick in the appropriate box and a timeline for the investment. Please add in any other actions as appropriate.

Actions	Time of action		Timeline for future actions
	Current	Future	
Reduce waste to landfill by composting etc			
Use of renewable energy			
Reuse of plastic containers			
Recycling, reusing of other materials			
Implementing energy efficiency measures			

2 If it were possible to collaborate with other businesses/organizations, tourism or otherwise, to implement these actions will you be willing to do so? Yes _____ No _____

3 Which other businesses/organizations will you be willing to collaborate with:
NAWASA: _____ GRENLEC: _____ GSWMA: _____
Other (specify):
_____

4 Can you suggest any ways in which you can collaborate with these organizations to reduce waste, materials and energy flows in your facility?

5 Would you be willing to act individually or collaboratively to achieve the triple win vision above? Individually _____ Collaboratively _____

6 What advantages and disadvantages can you envision for acting in the way you have chosen above?

Strategic action	Advantages	Disadvantages
Collaborative		
Individual		

7 Please indicate in order of importance, 1 being most important, the factors that must be considered in making a decision to act collaboratively.

Factors	**Rank**
Personal contacts (with other organizations)	_____
Trust (or lack of it)	_____

Goodwill _____
Long-term strategies _____
Enthusiasts on all sides _____
Need for new investments _____
Improvement of quality _____
Access to specific knowledge and technologies _____
Willingness to cooperate _____

8. Notes and any further comments

***********End of Section C***********

SECTION D: CONSIDERING THE MOVE TOWARDS ISLAND SUSTAINABILITY

1. Do you embrace the principles of corporate social responsibility or CSR (including environmental management concerns) in your decision making?

   Yes ____ No _____

2. Please give one or two examples of such a decision you have made in the last year.
3. Please indicate if the following drivers have affected your embracement of CSR?

   Market drivers Yes _____ No _____
   Social drivers Yes: _____ No _____
   Governmental drivers Yes:_____ No:_____
   Globalization Yes: _____ No:_____

4. How important is 'policy' in assisting your CSR or any other efforts for addressing your impact on the society and environment?

   Unimportant = 1; Of little importance = 2; Moderately important = 3; Important=4; Very important=5

   1 2 3 4 5

5. Please provide some reasons for your answer

5. How would you rank the following barriers to implementing polices, that may enhance the general move towards island sustainability? Please use 1 to indicate the barrier that is most significant. You may wish to add-in any others and rank them as well.

- Non-coordination between Ministries & Authorities- power struggles _____
- More talk than action: more just to gain votes _____
- Economic priority over social and environmental concerns _____

- Short term focus _____
- Private sector power, pressure on politicians for development _____
- Lack of commitment to sustainability _____
- Other_____ _____
- Other _____ _____
- Other _____ _____
- Other _____ _____

6. How important do you consider the following framework/matrix, for determining the impacts of your operations on the sustainability of the Island?

Unimportant = 1; Of little importance = 2; Moderately important = 3; Important=4; Very important=5

1 2 3 4 5

Building lifecycle stage	**Example of Sustainability indicators based on ISPs**			
	In sustainable island systems, the system is not systematically subjected to increasing concentrations of materials extracted from the earth's crust.	**In sustainable island systems, the system is not systematically subjected to increasing concentrations of materials created in society.**	**In sustainable island systems, the island is not subjected to degradation by physical means.**	**In sustainable island systems, the people are not subjected to conditions that would systematically undermine their capacity to meet their own needs.**
Operations	Quantities of fossil fuels purchased	Materials consumed and generated as waste, e.g. plastics	Quantity of lands cleared for construction	Number of jobs created;

7-b Please provide some comments to support your answer.

7. What indicators can you suggest for determining the environmental, social and economic concerns associated with your activities?

Indicators		
Environmental	**Social**	**Economic**

6. Notes and any other comments

************End of Section D ***********

Thanks for your assistance in filling out this survey. All persons and organizations/companies will remain anonymous in reporting this research

++++++++++++++++ End of Survey ++++++++++++++++

Appendix C: Materials flows for the sample of accommodation units

Materials Measured	Accommodation Units									
	A01		A02		A03		A04		Total	% of total
	In	Out	In	Out	In	Out	In	Out		
Inflows										
Fossil fuels for electricity	2,746		350		350		4,112		7,557	0.0
Energy for cooking	27,336		13,608		13,608		24,494		79,046	0.2
Water	12,816,901		1,284,244		1,284,244		18,254,506		33,639,896	99.6
Other materials (Cleaning)	4,500		1,500		1,500		4,500		12,000	0.0
Other materials (food)	12,400		10,100		10,100		15,000		47,600	0.1
Total Inflow									**33,786,099**	
Outflows										
Solid Waste		14,073		3,538		3,538		16,556	37,706	0.14
Emissions		8,204		3,807		3,807		7,802	23,619	0.09
Effluents		10,253,521		1,257,881		1,257,881		14,603,605	27,372,887	99.8
Total Outflows									**27,434,212**	

Appendix D: Coding manual 1- Section A of questionnaire

Information about the experts
i. Organization Government (1); Non-Governmental (2); Academia (3);Accommodation (4); Local business association (5); Other Tourism (6)
ii. Areas of Expertise: Only include expertise that is clearly expressed Environmental management (1); Marine Biologist (2); Accountant (3); Sustainable development (4); Socio-economic (5) tourism & hospitality (6)
iii. Position in Organization Environmental Officer (1); professor (2) CEO (3) General Manager (4); Accountant (5); Supervisor (6); Chair (7)
Features of and views on island sustainability
Theme 1: Vision and goals for Island Sustainability
iv. Core statement describing sustainability Good use of resources (1) meeting current and future needs (2); inter-generational and intra-generational equity (3); continuation of activities free of problems (4); holistic approach (5)
v. Goal 1: ISP 1: Decrease concentration of materials from earth's crust Strongly disagree (1); disagree (2); un-decided (3); agree ((4); strongly agree (5)
vi. Goal 2: ISP 2: Decrease accumulation of materials used in society Strongly disagree (1); disagree (2); un-decided (3); agree (4); strongly agree (5)
vii. Goal 3: ISP 3: Decrease degradation by physical means Strongly disagree (1); disagree (2), un-decided (3); agree (4); strongly agree (5)
viii. Goal 4: ISP 4: Must not undermine the capacity of the needs of current and future generations Strongly agree (1); disagree (2); un-decided (3); agree (4); strongly agree (5)
ix. Goals address needs of current and future generations Yes (1); No (2); Did not respond (0)
x. Core supporting statement on needs Energy is the most important component (1); resource availability now and in future (2) Did not respond (0)
xi. Agreement on goals amongst experts Yes (1); No (2); Did not respond (3)
xii. Core supporting statement on agreements (0nly use compelling and relevant statements to sustainable development concepts No response (0) Negative statements (1); economic pressures drive conflict in resource use (2);
xiii. Goals creatively define sustainability Yes (1); No (2); Did not answer (0)
xiv. Core supporting statement on creativity (ambiguous statements are coded 0; but are recoded) No response/ambiguous (0);
xv. Adherence to goals can lead towards sustainability Yes (1); No (2); Did not answer (0)

xvi. Core supporting statement on adherence (ambiguous statements not coded; but some are noted in comments) Statement ambiguous or no response (0);
xvii. Suggested goals Yes (1); No (2); Did not answer (0)
xviii. Supports Goals or ISPs (Goals that can be grouped into each of the four ISPs are coded yes; none can be fitted to any of the ISPs coded no; if at least one is similar code assigned is 3; if all are new code assigned is 4) Yes (1); No (2); Somewhat (3) New goals (4) Did not respond (0)
xiv. Comments

Appendix E: Coding manual 2- Sections B, C and D of questionnaire

Information about the accommodation	
i.	Accommodation Type Resort 50 rooms & above (1); Other (villas, inns, etc) below 50 rooms (2)
ii.	Position of Rep in Organization General Manager (1); CEO (2); Middle Management (3)
Features of a resource use reduction strategy (from sector vision to evaluation)	
Theme 2: Sector Vision for island sustainability	
iii.	Other sources of energy used Solar electricity: Yes (1); No (2) Wind: Yes (1); No (2) Wave: Yes (1); No (2) Biogas: Yes (1); No (2) Wood: Yes (1); No (2) Charcoal: Yes (1); No (2) Solar thermal: Yes (1); No (2) Natural Gas: Yes (1); No (2)
iv.	Main source of water Recycled grey water: Yes (1); No (2) NAWASA (main water supplier); Yes (1); No (2) Desalination plant: Yes (1); No (2) Own water supply: Yes (1); No (2)
v.	Materials used for cleaning (record all materials used for cleaning)
vi.	Agreement with sector vision Strongly disagree (1); disagree (2); undecided (3); agree (4); strongly agree (5)
vii.	Acceptance of sector vision by other accommodation units Yes (1); No (2); Did not respond (0)
viii.	Core statement of acceptance (record comments on answer)
ix.	Modifications offered for making proposed vision more acceptable to sector (Modifications will be recoded) Yes (1); No (2); Did not respond (0)
x.	Willingness to Modify organization's current vision Yes (1); No (2); Did not respond (0)
xi.	Core comments offered (Comments will be noted) Yes (1); No (2) Did not respond (0)
xii.	Other comments
Theme 3: Actions for island sustainability	
xiii.	Actions for reduction MF (all actions will be recorded) Only future actions (1); only current actions (2); both current & future(3) no actions (0)
xiv.	Time of implementing proposed actions Reducing waste to land fill: current (1); future (2); not at all (3) Use of renewable energy: current (1), future (2); not at all (3) Reuse of plastic containers: current (1); future (2); not at all (3)

	Recycling, reusing of other materials: current (1); future (2), not at all (3) Implementing energy efficiency measures: current (1); future (2), not at all Other (4) please record
xv.	Maximum time for implementing future actions Within 1 year (1); between 2 & 5 years (2); over 5 years (3)
xvi.	Sectors/companies for inter-organizational collaboration GRENLEC (electricity) only (1); NAWASA (water) only (2); GSWMA (waste) only (3); electricity & water (4); electricity & waste (5); water and waste (6); all of three organizations (7); No collaboration (0)
xvii.	Suggested ways for collaboration Net metering with electricity (1); recycling waste with MWM Company (2);
xviii.	Willingness to be involved in intra-organizational collaboration Collaboration (1); Prefer to act individually (2)
xix.	Advantages of collaboration (Record all advantages of collaboration) Yes (1); No (2); Did not respond (0)
xx.	Disadvantage of collaboration (Record all disadvantages of collaboration) Yes (1); No (2); Did not respond (0)
xxi.	Advantages of individual action (Record all advantages) Yes (1); No (2); Did not respond (3)
xxii.	Disadvantages of individual actions (Record all disadvantages) Yes (1); No (2); Did not respond (0)
xxiii.	Factors affecting collaborative actions (Rank number will be recorded for each respondent) Personal contacts (with other organizations) Trust (or lack of it) Good will Long term strategies Enthusiasts on all sides Need for new investments Improvement of quality Access to specific knowledge and technologies Willingness to cooperate
Theme 4: Monitoring the move towards Island Sustainability	
xxiv.	Embracement of principles of CSR Yes (1). No (2); Did not respond (0)
xxv.	Examples of CSR decision within last year
xxvi.	Drivers that may have affected your embracement of CSR Market drivers: Yes (1); No (2); Did not (0) Social drivers: Yes (1); No (2); Did not (0) Governmental drivers (1); No (2); Did not (0) Globalization: Yes (1); No (2); Did not (0)
xxvii.	Importance of policy in assisting CSR Unimportant (1); of little importance (2); Moderately important (3); Important (4); Very important (5)
xxviii.	Reasons for answer

xxix.	Rank of barriers to implementing policies (rank number for each respondent will be recorded) Non-coordination between Ministries & Authorities-power struggle More talk than action: more just to gain votes Economic priority over social & environmental concerns Short term focus Private sector power; pressures on politicians for development Lack of commitment to sustainability Other suggested barriers will be recorded
xxx.	Importance of matrix for linking indicators to ISP goals Unimportant (1); Of little importance (2); Moderately important (3); Important (4); Very important (5)
xxxi.	Suggested environmental indicators Yes (1); No (2); Did not respond (0) All suggested indicators will be recorded
xxxii.	Suggested social indicators Yes (1); No (2); Did not respond (0) All suggested indicators will be recorded
xxxiii.	Suggested economic indicators Yes (1); No (2); Did not respond (0) All suggested indicator will be recorded