GUYANA'S FOREST RESOURCES

AND

ENVIRONMENTAL SERVICES

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LIST OF ACRONYMS

A/R	Agroforestry or Afforestation/Reforestation climate change mitigation project Activities
AD	Avoided deforestation
BBOP	Business and Biodiversity Offsets Programme
CCBA	Carbon, Community and Biodiversity Alliance
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism of the UNFCCC
CERs	Certified Emissions Reduction Units – traded in the Kyoto regulatory market
CSME	Caricom Single Market and Economy
ERU	Emissions Reduction Units – traded in the EU ETS market
ES	Ecosystem Services or Environmental Services
EU ETS	European Union Emissions Trading Scheme
GDP	Gross Domestic Product
GFC	Guyana Forestry Commission
GHGs	Greenhouse Gases
HIPC	Highly Indebted Poor Country
ICPD	Integrated conservation and development project
IDB	Inter-American Development Bank
ITQ	Individual Transferable Quota
JI	Joint Implementation
LULUCF	Land Use, Land Use Change and Forestry – a sector of projects in the carbon credit marketplace
$MtCO_2e$	Metric tonnes of Carbon Dioxide emissions
NGO	Nongovernmental Organisation
ODA	Overseas Development Assistance
OTC	Over the Counter sale of voluntary (carbon) credits – retail sales
PES	Payment for ES
REDD	Reduced emissions from deforestation and forest degradation
REDD	Reducing Emissions from Deforestation and Forest Degradation in Developing countries
SFM	Sustainable Forestry Management
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
VERs	Verified or Voluntary Emissions Reduction Units – traded in the Voluntary Market.

SECTION 1 INTRODUCTION AND BACKGROUND

1.1 Setting the Context: Climate Change and the Forest Debate

Climate change is a major global threat[1] that has temporal and spatial implications; as such, every region and country must ACT NOW to avert widespread disaster, and to safeguard current and next generations. Global response requires multiple approaches by regions and countries, depending mostly on their natural capital endowment and their social, economic, political, cultural and technological circumstances, and most importantly, political will and good leadership.

The role of forests in maintaining and regulating the earth's climate, as well as providing other ecosystem services (with global benefits of approximately US$ 4.7 trillion per annum) is well established and recognized (Caldecott, 2011). However, forests are exploited for short term economic gains. Undoubtedly, combating deforestation and continuous sustainable forest management are critical mitigation strategies to limit the temperature increase on Earth below 2^0 C[2] . In fact, it is believed that forest protection measures are less costly than many other emissions reductions[3]; hence the importance of the United Nations Framework Convention on Climate Change (UNFCCC) "Bali Action Plan" which unequivocally supported policy approaches and positive incentives relating to reduced carbon emissions from deforestation and forest degradation (REDD) in developing countries, and the conservation and sustainable management and enhancement of forest carbon stocks. This is commonly referred to as REDD-Plus, which is characterized mainly by avoided deforestation and sustainable forest management.

Despite the crucial role of forest in tackling the global climate change problem[4], there is currently no international legal framework to monetise forest carbon[5]. It can be argued, however, that deforestation occurs mainly because of market failures (absence of a system to incentivise terrestrial carbon mitigation either by reducing the rate of deforestation or not starting it in the first place[6]), and that forest nations should be adequately compensated for foregoing alternative

[1] Global temperatures have risen by 0.7 ^{0}C over the last century. The economic costs of climate change impacts have been estimated at between 5 and 20 per cent of global GDP and could be considerably higher. See Eliasch Review (2008) Climate Change: Financing Global Forests

[2] Henrik Lindhjem, Kirsten G. Bråten, Audun Gleinsvik and Ida Aronsen (2009) Experiences with benefit sharing: Issues and options for REDD-plus: IUCN Report

[3] See McKinsey Abatement Cost Curves.

[4] Reducing tropical deforestation will be vital if the world is to avoid catastrophic climate change and preserve important ecological functions. Emissions from tropical deforestation contribute about 17% of annual GHG emissions, while conserving rainforests continue to sequester similar amounts of atmospheric carbon each year. See The Prince's Rainforests Project (2009) An Emergency Package for Tropical Forests.

[5] It should be noted that forestry transactions were the first-ever carbon offsets, they were soon sidelined in emerging global GHG regulations and a narrow band of forestry offsets were recognized under the Kyoto Protocol. (See www.forest trends.org)

[6] See Martin Wright (2009) Forest Futures. In: Green Futures, October 2009, 27. Pp. 26-29

economic opportunities[7] associated with the exploitation of their natural capital in pursuit of national development agendas.

REDD plus requires significant financing requirements ($17 to $33 billion per year for reductions in emissions of up to 50% by 2030 according to Eliasch, 2008) but to date opportunities for attracting financial flows to forest conservation (to ensure that forests are worth more alive than dead!!!) are limited and can prevent early action. This problem is exacerbated when one considers that despite the fact that forests offer much more than carbon storage and sequestration[8], it is widely believed that the best chance of early action on REDD plus internationally will come from finding ways to fit forest carbon into the existing carbon market[9]. Judging from the European Union's position and the myriad of concerns (example, reference level, linking performance to finance, and forest carbon trading interactions with other mechanisms) expressed about the possibility of such a policy decision[10], there is an urgent need to explore a variety of financial structures to fund REDD plus activities that are not wholly based on carbon. In fact, avoided deforestation as a climate change mitigation strategy can offer opportunities for significant generating financial resources to developing countries (like Guyana) with their forest still intact.

1.2 Introducing Guyana

Guyana, a relatively small developing country, is located on the north-eastern coastline of the South American continent with a land area of approximately 215,000 sq. km and a population of about 751,000 (2002 estimates). The economy of the country has traditionally been based on the production and export of primary products – specifically sugar, rice, bauxite, timber and gold. Despite many policy statements to this effect, and some effort at strategic planning, the diversification of the economy remains a challenge. A review of the real sector for the past three decades shows that "…the economy remained highly dependent on the production and export of a few primary commodities, with poor access to external markets"[11]. The share of the five main

[7] The Prince's Rainforest Project, notes that global surveys estimate the opportunity costs of halving deforestation at between US$10 billion and US$15 billion per year.

[8] For example, forests are a key regulator of the climate, provider of biodiversity and source of livelihoods for local people

[9] Carbon markets could provide as much as $7 billion finance by 2020 (See Eliasch, 2008)

[10] See Jodie, ,K. J. MacGregor, J., Page, S., Peskett, L. and Thorstensen, V. (2010) Development, trade and carbon reduction. Designing coexistence to promote development. Working Paper 315. Overseas Development Institute, London.

[11] Staritz, Gold and Atoyan IMF Working Paper. 2007. Guyana: Why has Growth Stopped? An Empirical Study on the Stagnation of Economuc Growth. IMF , Washington

export commodities – sugar, gold, rice, timber and bauxite only declined slightly during the period from over 80 percent in 1991 to about 75 percent in 2004.

The direction of foreign direct investment and the international markets continues to mandate that the country's comparative advantage, such as it has, is in the area of exploiting natural resources. Fortunately the national endowment of such natural capital is significant. The challenge has been and continues to be, how to market this wealth to the advantage of stakeholders today and in the future. The variable economic performance of the country can in part be explained by its exposure to the vagaries of international markets. In the last five years for instance, Guyana has been affected by the global crisis mainly through the real sector channel. Initially shielded by its limited exposure to the direct financial shock, it has suffered mostly as its main sources of foreign income – including remittances and FDI inflows – declined, led by the contraction of growth and employment in the developed economies. In addition, the reduction in prices and global demand also hit the country's commodity exports. The steep decline in global economic activity has reduced demand for Guyanese exports. Lower export prices had adverse effects on exports and growth. The largest declines were recorded in the prices of bauxite and rice. However the increase in gold prices partially offset the decline in export earnings.[12]

In recent years Guyana has been able to sustain a solid economic performance. The new GDP series, rebased on 2006 prices, shows that economic growth exceeded 4 percent per year on average for the period 2007 to 2009. Nominal GDP at market value is significantly higher than had been estimated at 1988 prices in part due to the incorporation of new economic sectors, and the previously large informal sector that has been shifting into the formal sector since 1988. Inflation has declined steadily since the imported price shock of 2008, to around 3.5 percent at the end of 2009. This is perhaps due to implementation of policies to rein in the public debt. The debt overhang is lower than previously estimated while the fiscal and current account deficits are also lower. In 2009, output growth was robust despite the global crisis and the outlook for 2010 remains positive despite closure of the Barama plywood factory which is likely to shrink forestry's contribution to exports and GDP. The task of creating jobs and increasing, employment levels continues to be in the focus of policy makers. Data from the Bureau of Statistics show that the labour force has shrunk, despite a growth in overall population, and the numbers of people employed has declined by almost 1 percent. The inactive population showed an increase of 3 percent. The data also show that males between the ages of 15 and 29 comprise 63 percent of unemployed men, which females of the same ages comprise 66 percent of the unemployed females.

One of Guyana's most valued natural assets is its forests: the national forest cover is approximately 85% with estimated forest land between 18.416 million hectares and 18.695 million hectares and approximately 12% designated as protected areas: Iwokrama Rain forest Reserve, Marudi Mountain allocations to Conservation International and the Kaieteur Falls.

[12] IMF Staff Report for the 2009 Article IV Consultation.2010

Significant acreages have also been allocated to Amerindian communities. It is estimated to contain over $5GtCO^2$ in above ground biomass.

Six types of forests can be identified, namely:

- Tropical rainforest – which grows on the peneplane and interior lowlands of Guyana. The greenheart and other popular species used in construction are part of the rain forest.

- Seasonal Forests – which occur on well drained sites and in areas with long dry seasons such as the south and eastern areas of the country. The bulletwood tree and kabukalli are examples of species found in these forests.

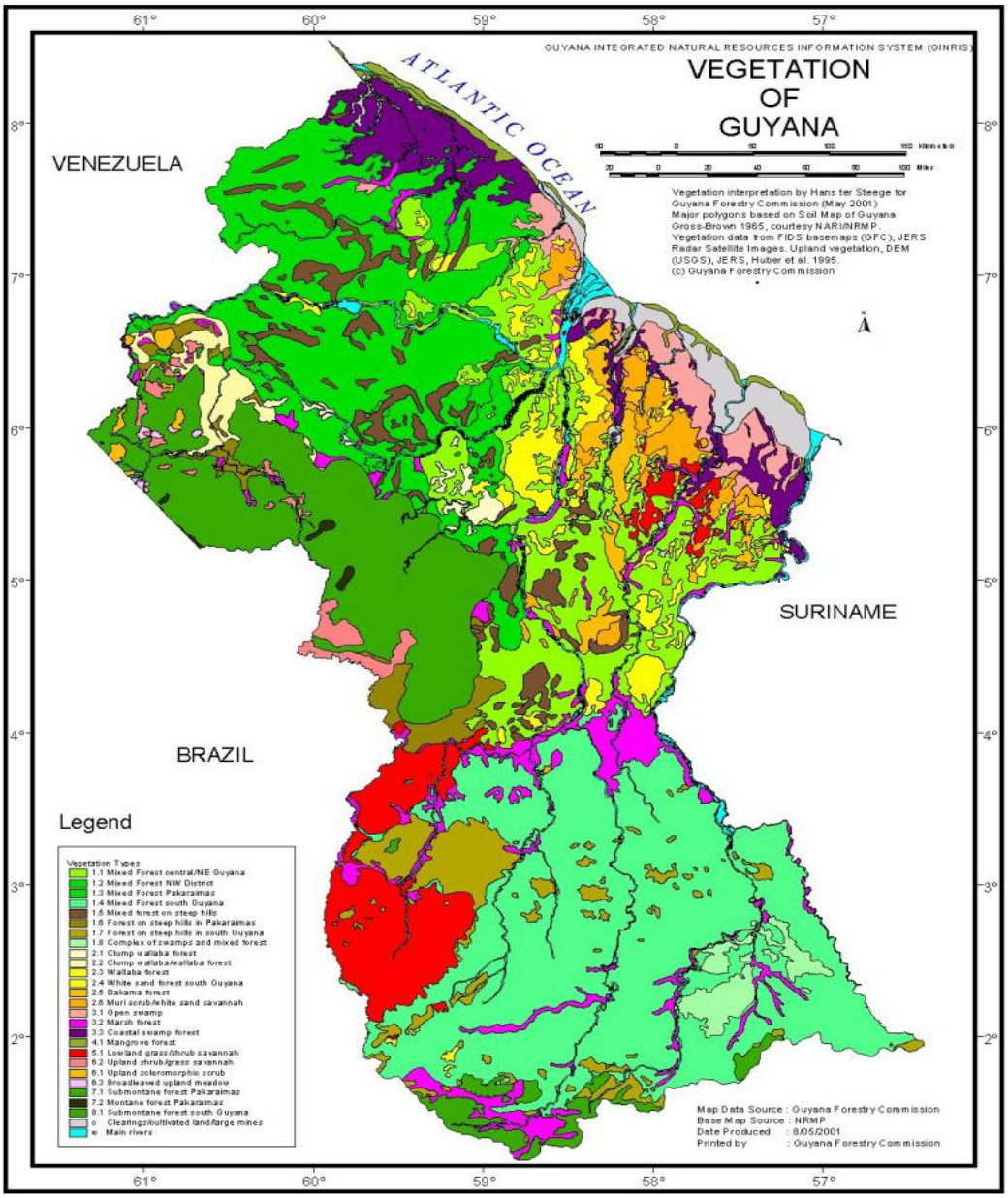
- Marsh forests –can be located where the soil is very wet or flooded for part of the year and very dry for part of the year. This type of forest is found extensively on pegasse (peat) swamps and under other wet soil conditions. Usually marsh forests are dominated by palm trees, including the heart of palm.

- Swamp Forests occur where the soil is waterlogged and rarely dry. Swamp forest includes the mora forests, found in wet conditions and the mangrove forests growing on the coast and in the brackish waters of the major rivers.

- Dry Evergreen Forests – found in areas where the rainfall is high but the soil is excessively well drained. The most common form of this forest, the wallaba forest, grows on the white sand areas. The forest is not as dense as the rain forest and the trees are smaller in diameter though the canopy may be quite high.

- Montane Forests that grow on the Pakaraima and Kanuku Mountains and so are affected by both the high altitude and high rainfall, and also the poor soil conditions. Some are luxuriant and similar to the rainforest; others are sparser with stunted growth and gnarled trees on the higher slopes and escarpments.

Figure 1 Vegetation Map of Guyana



Source: Guyana Forestry Commission (2010)

According to the National Forest Policy Statement (1997) State Forests shall be classified as follows:

(a) **Permanent production forests** - in which the principles governing the sustainable management of forests shall be applied.

(b) **Permanent protection forests and biodiversity reserves** - in which, because of the vulnerability of the forest ecosystem, no tree felling or other types of forest utilisation shall be permitted, and in which representative areas of biodiversity shall be inviolate.

(c) **Reserve forests** - forests which are yet to be classified, and on which no exploitation shall be permitted.

(d) **Extractive forests** - forests reserved for the exclusive utilisation of their non-timber forest products.

(e) **Multiple use forests** - forests to be utilised for the concurrent production and provision of goods (timber and non-timber) and services.

(f) **Permanent research forests** - forests devoted exclusively to research.

(g) **Conversion forests** - forests to be cleared for other uses

Contribution to GDP

There have been improvements in protective regulations and improved surveillance and supervision of logging activities. Nonetheless there has been a slight decline in the contribution to GDP, possibly due to the expansion of other sector activities, which may have diluted timber's value in the measurement of goods and services. This said, in the past 5 years the forestry sector contribution has held steady at between 4 and 3 percent of GDP, as shown in the table 1 below.

Table 1 Forest Products: contribution to GDP

	2006	2007	2008	2009	BGT 2010
G$ million	10,958.00	10,331.00	8,927.00	9,161.00	9,619.00
Percent of total	4%	4%	3%	3%	3%

Source: Bureau of Statistics

Log Production

Since 1997, when log production peaked at 513,000 cubic metres, there has been a significant decline in log production from Guyana's forests. In 2003, production was at its lowest in 20 years at 211,000 cubic metres. According to the GFC production peaked in 2006, and in recent years the recovery has been sustained.

Table II Log Production 1999-2009

CATEGORY	UNIT '000	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Greenheart	cubic Metres	83	74	88	97	61	73	102	129	85	58	61
Other Species	cubic metres	379	330	172	200	150	263	224	265	246	217	205

Source: Bureau of Statistics

Other products

Harvesting of Manicole Palm was stable over the last 15 years at about 6 million stems. However there has been a downward trend in Mangrove Bark production in the same period from under 24,000 lbs in 1996 to zero production in 1997. The production of balata from the bulletwood tree has also been restricted with the controls placed on felling these trees since the 1940s.

Table III Other timber products 1999 - 2009

CATEGORY	UNIT	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sawn Lumber	cubic Metres	376	437	25	31	37	37	36	68	74	67	68
Charcoal	m.t.	0.32	0.55	0.52	0.32	0.35	0.21	0.54	2	2	4	13
Firewood	m.t.	6.9	6.8	7.9	13.4	12.4	15	11	18	24	17	17
Paling Staves	Pieces	460	419	429	238	468	292	220	1	1	1	1
Shingles	Pieces	166	48	103	136	27	508	636	0.11	0.30	0.1	0.09
Posts	Metres	154	141	107	94	39	66	20	1	2	2	2
Spars	Metres	38	43	60	5	20	17	7	25	0.03	0.05	0.06
Wallaba Posts	Metres	91	99	135	144	146	236	321	6	2	2.00	3

Source: Bureau of Statistics

Export earnings from forestry have not been as strong as would have been expected for the past decade. This is due to a combination of circumstances related to the international markets and local conditions. As shown in the table IV below, however earnings are still at a respectable level.

Table IV Forestry Export Earnings 2006 - 2010

	2006	2007	2008	2009	2010
US$million	55.00	55.40	53.80	41.40	48.00

Source: Bank of Guyana Statistical Bulletin and 2011 Budget Speech

1.3 Guyana's Low Carbon Response to Climate Change and the Issue of Financing Standing Forests

In view of the need for global action to tackle the climate change problem and the new opportunities to generate financial resources by means of REDD Plus initiatives, Guyana's President, His Excellency Bharrat Jagdeo, has made a political commitment by promising to deploy the country forests to tackle global warming in exchange for "development aid" and "technical assistance needed to make the change to a green economy.[13]" Thus, Guyana has charted an 'economically rational' deforestation path that involves reducing forest cover by approximately 4.3 percent (approximately 630,000 ha) per annum over the course of 25 years, leaving intact as protected areas the 10 percent of Guyana's forests with the highest conservation value.

Notably, Guyana's REDD Plus mechanism is linked to a wider national development policy and planning process, which is encapsulated in Guyana's Low Carbon Development Strategy (2010)[14]. The McKinsey & Company Report (2008) argues that avoided deforestation in Guyana could bring for the world avoided emissions of greenhouse gases the equivalent of 1.5 gigatons of CO^2e by 2020. The challenge therefore is to access the level of financing for REDD Plus that will align Guyana's economy along a low carbon trajectory (outlined in the LCDS), and in so doing, mitigate the principal drivers[15] of deforestation[16] that lie outside the forest sector.

According to the McKinsey estimates, by preserving forest "Guyana forgoes economically rational opportunities that could net it the equivalent of $430 million to $2.3 billion in additional value per year." In fact, the Company estimates a "most likely figure" of US$580 million a year. The proposal is therefore to raise this amount of money through carbon market. Unfortunately, the Political Accord that ensued from the Copenhagen Meeting held in December 2009 is less

[13] President Jagdeo told *The Independent* in November 2009.

[14] The LCDS provides insights on how to stimulate the creation of a low-deforestation, low-carbon, climate-resilient economy, and outlines how Guyana's forest helps the world (by limiting world based emissions), and how transitional payments from Guyana's climate change partnership with Norway and others, followed in the longer term by payments under the REDD can create the platform for an effective strategy to avoid deforestation.

[15] Key drivers include commercial logging and timber extraction, mining, agriculture and infrastructure development.

[16] 0. 3 per cent as current proxy deforestation rate. The reference level is 0.45 % derived from a global deforestation rate compared to a national deforestation rate.

definitive about the emergence of this REDD financial mechanism. To compound the issue of financing, the infrastructure to implement the Climate Fund facility (Copenhagen Green Climate Fund which equals US$10 billion/yr from 2010-2012)[17] is not fully established and therefore not currently implementable. More importantly, there are still debates on terrestrial carbon markets and issues of additionality, leakage, and permanence[18].

Guyana's best policy decision is therefore to explore all possible financial possibilities (especially non- market sources referred to as novel instruments) to channel payments into the country through a combination of a national REDD fund (for example, by establishing a Guyana REDD Plus Investment Fund) and direct project-based funding. Already, a national level initiative is being supported by the Norwegian Government: on November 9th, 2009, Guyana and Norway signed a Memorandum of Understanding (MoU) regarding cooperation on issues related to the fight against climate change, in particular those concerning reducing emissions from deforestation and forest degradation in developing countries (REDD-plus1), the protection of biodiversity, and enhancement of sustainable, low carbon development to enable the acceleration of Guyana's REDD-plus efforts, based on the results of which Norway will start providing financial support. Norway has pledged financial support for US$30 million to be paid by 2010 to support the Guyana REDD Plus Investment fund and US$ 250 million to be paid by 2015 based on certain conditions being met by Guyana. The support will finance two sets of activities: (i) the implementation of Guyana's Low Carbon Development Strategy (LCDS); and (ii) Guyana's efforts in building capacity to improve overall REDD+ and LCDS efforts. This is described in Section 4.

Obviously, there still remains a huge financing gap in terms of international, multilateral or bilateral financial support and the stated Economic Value of Guyana's forest to the Nation (EVN); herein lies the relevance and timeliness of exploring opportunities that may be created by Payment for Ecosystem Services.

1.4 The Consultancy

The Guyana Forestry Commission (GFC), being the State Agency to plan for and manage the State Forest Estate, has advanced efforts towards enhancing sustainable forest management and strengthening important areas such as legality, forest industry and training in harvesting practices. One important aspect of natural resources management is the area of environmental services.

In accordance with the Contract prepared by the GFC, the purpose of the Consultancy is …"*to strengthen the Guyana Forestry Commission's ability to maintain the current levels of deforestation and forest degradation, through sustainable forest management and develop Guyana's capacity to engage in ecosystem services*"…, while the specific objective is …"*to*

[17] See UN, FCCC/AWGLCA/2009/L.7/Add.2/Rev.1. See also, Articles 6, 8 and 10 of the Copenhagen Accord.

[18] See, for example, Eliasch Review: Climate Change: Financing Global Forests Crown, 2008 and IIvan Bond, Maryanne Grieg-Gran, Sheila Wertz-Kanounnikoff, Peter Hazlewood, Sven Wunder and Arild Angelsen (2009) Incentives to sustain forest ecosystem services. A review and lessons from REDD.AA review and lessons for REDD

enable more effective planning and management of forest resources and environmental services in the State Forest Estate, resulting in enhanced monitoring of deforestation and forest degradation".

In keeping with the three specific objectives of the Consultancy titled "Strengthening Guyana's Capacity to manage Forest Resources and Environmental Services through Resources Assessment and Monitoring Changes in deforestation and degradation", this Report aims to:

- Collate information on available market mechanisms for environmental services;
- Assess the suitability of existing market mechanisms to Guyana's context; and
- Present information on available market mechanisms, incentives programmes and remuneration systems for environmental services.

SECTION 2 SUSTAINABLE FOREST MANAGEMENT AND ENVIRONMENTAL SERVICES

2.1 Sustainable Forest Management

Forests have a central role in global and national climate mitigation and adaptation strategies; thus, sustainable forest management is central to the success of REDD.

In December 2007, the General Assembly of the United Nations accepted the definition of *Sustainable Forest Management* (SFM) as: "*Sustainable forest management as a dynamic and evolving concept aims to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations. It is characterized by seven elements, including: (i) extent of forest resources; (ii) forest biological diversity; (iii) forest health and vitality; (iv) productive functions of forest resources; (v) protective functions of forest resources; (vi) socio-economic functions of forests; and (vii) legal, policy and institutional framework" (*UN 2008, Resolution 62/98*).*

In recognition of this imperative, the (Guyana) National Forest Plan (Draft) 2001 aims to ensure that "forest resources are sustainably managed to the highest practicable standards and that social, economic and environmental benefits are optimised and the needs and aspirations of all interest groups are considered." This statement resonates with the objective of the National Forest Policy (2007): "… *the conservation, protection, management and utilisation of the nation's forest resources, while ensuring that the productive capacity of the forests for both goods and services is maintained or enhanced*."

The specific objectives are to:

(a) promote sustainable and efficient forest activities which utilise the broad range of forest resources and contribute to national development while allowing fair returns to local and foreign entrepreneurs and investors;

(b) achieve improved sustainable forest resource yields while ensuring the conservation of ecosystems, biodiversity, and the environment;

(c) ensure watershed protection and rehabilitation: prevent and arrest the erosion of soils and the degradation of forests, grazing lands, soil and water; promote natural regeneration, afforestation and reforestation; and protect the forest against fire, pests and other hazards.

Guyana has also prepared a new draft Forests Act (2009) to support the implementation of the forest policy. The purpose of the new Act is to reform the law relating to the management of forest resources, to provide for sustainable management and to consolidate provisions of predecessor legislation. It provides for: (i) the conservation of the forests of Guyana, including measures to conserve biodiversity, special species and habitats, soil and water resources, and to

protect forests against pollution, fires, pests and diseases; (ii) the participation of interested parties, including Amerindians, local communities, non-governmental organizations and persons engaged in the commercial utilization of forests, in the development and implementation of forest policies; (iii) the sustainable use of Guyana's forest resources, in accordance with Guyana's development needs and level of socio-economic development, pursuant to national policies; (iv) the integrated and comprehensive regulation of the multiple and complementary functions and uses of the forests of Guyana, including traditional uses; (v) the promotion and regulation of primary conversion, secondary and tertiary processing activities, including the use of environmentally sound technologies and the facilitation of market access for value-added forest products; and (vi) the discharge of Guyana's responsibility to ensure that activities within its jurisdiction or control do not cause damage to the environment of other States or areas beyond the limits of national jurisdiction.

2.2 An Overview of Payment for Ecosystem Services (PES)/Environmental Services

Forestry, as defined by the IPCC, produces around 17 per cent of global emissions, making it the third largest source of greenhouse gas emissions – larger than the entire global transport sector. Annual forest emissions are comparable to the total annual CO_2 emissions of the US or China. If we do not tackle deforestation, it is highly unlikely that we could achieve a CO_2e stabilisation target that avoids the worst effects of climate change. Forests also deliver additional ecosystem services such as regulating regional rainfall, flood defense, maintaining soil stability and supporting high levels of biodiversity (Eliasch Review, 2008).

Environmental services, most commonly referred to as ecosystem services, are basically a multiple of resources and processes, supplied by ecological systems that are beneficial to humankind. The United Nations Millennium Ecosystem Assessment (2004) identifies four broad categories of ecosystems services:

- provisioning such as the production of food and water;
- regulating such as the control of climate and disease;
- supporting such as nutrient cycles and crop pollination; and
- cultural, such as spiritual and recreational benefits.

The Costa Rican forest law provides a definition of forest environmental services along the following lines:

> *"Those provided by forests and forestry plantations that have an impact on environmental protection and improvement. They are the following: mitigation of greenhouse gas emissions (fixing, reduction, sequestration, warehousing and absorption); protection of water for urban, rural or hydroelectric use; biodiversity protection to conserve it and for sustainable, scientific and pharmaceutical use; genetic research and improvement; protection of ecosystems, life forms and natural scenic beauty for tourism and scientific ends".*[6]

Although Guyana does not have legislation that speaks directly to the issue of payment for forest ecosystem services, there are indirect references that could be identified in the country's Forest Act of 2009, Section 25 (b) states*: "forest" includes (i) mangrove forests and any wetlands or open lands within a forest which form an integral part of the ecosystem; (ii) forest produce in the ecosystem; and (iii) biological, soil, and water resources of the ecosystem.* Further, "*forest conservation operations" includes (a) the preservation of forests for the purpose of carbon sequestration or any other form of environmental service; (b) the conservation of biological diversity; (c) eco-tourism" and Section 31(6) affirms that the State shall give the owner and the lawful occupier of any land declared to be a forest conservation area adequate compensation for the disturbance of their rights, including the fair value of all forest produce to which that owner or occupier would, but for the order, be entitled to remove from the land*".

Basically, payments for environmental services (PES) can be defined as transactions in which a defined environmental service (or a land-use likely to secure that service) is bought by a buyer from a provider, on the condition that the provider secures provision of the service (Wunder, 2008). **PES is therefore a type of economic instrument that provides incentives to land owners to supply environmental services, which benefit society more broadly**. The basic principle behind PES is that resources users and communities that are in a position to provide environmental services should be compensated for the costs of their provision, and that those who benefit from these services should pay for them, thereby internalizing these benefits. There is no commonly agreed definition of PES schemes, but a series of classifications based on the type of environmental services, the geographical scope, the structure of markets, or the types of payments involved can be found in the literature.

2.3 Types of Environmental Services

The principal Environmental Services (ES) provided by these forests include the following main types:

- Watershed Protection: (Hydrological benefits: controlling the timing and volume of water flows and protecting water quality; Reduced sedimentation: avoiding damage to downstream reservoirs and waterways and so safeguarding uses such as hydroelectric power generation, irrigation, recreation, fisheries, and domestic water uses; Disaster prevention: preventing floods, soil erosion and landslides);

- Biodiversity Conservation/Protection;

- Carbon storage and sequestration: acting as Carbon Sinks and mitigating against higher temperatures by creating their own micro climate;

- Landscape Beauty e.g. Nature-based Tourism; and

- Traditional forest products – timber and non timber (medicines, food, fuel etc).

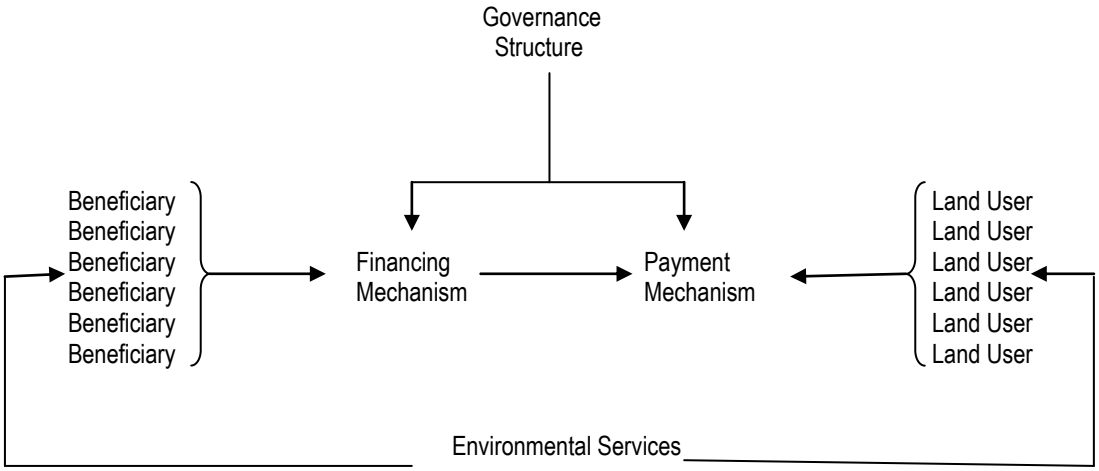
Land users typically receive no compensation for the services their land generates for others and therefore have no economic reason to take these services into account in making decisions about land use. Responses to this problem have tended to fall into two categories: regulations that attempt to dictate particular patterns of land use, and remedial measures such as repair of the damage cause by flooding or the construction of civil works intended to protect downstream communities from floods. Neither approach has proved effective. Remedial measures are often expensive, more so than preventive measures. Regulations are difficult to enforce because of the spatial dispersion of the land users and thus imply high transactions costs

Recognition of this problem and of the failure of past approaches to dealing with it has led to efforts to develop systems in which land users are paid for the ES they generate, thus aligning their incentives with those of society as a whole. The payment for ecosystem services (PES) approach is an example. The central principles of PES are: that those who provide ES should be compensated for doing so; and that those who receive the services should pay for the benefit provided. The approach has the further advantage of providing additional income sources for poor land users, helping to improve their livelihoods. Several countries are already experimenting with such systems.

For PES programmes to survive, secure sources of funding must be identified. This is especially important if the payments have to be long term and open ended – as is usually necessary if land users are to have a continuing incentive to maintain the ES. This entails identifying not only the beneficiaries but also the specific services they receive. Beneficiaries do not receive generic "ecosystem services"; they are interested in very specific ones. Even within specific service categories, there are differences: For instance, domestic water supply systems require a constant flow and high quality; but agriculture on the other hand may prize volume but not quality of water, except for the absence of harmful chemicals. The willingness to pay by a given group of beneficiaries will depend on the specific service received, on the value of that service to them (compared with the cost of alternatives), and on the size of the group.

Once the beneficiaries of a service are known, a means must be devised to capture part of their willingness to pay. This is easiest when the beneficiaries are easily identifiable and are already organized making it relatively simple to negotiate with them and to collect payments. For example an additional fee can easily be added to water bills paid by municipal and industrial water users. In contrast, populations in flood-prone areas are not organized as such, although they may be included in other beneficiary groups, and there is no preexisting mechanism for collecting payments from them.

Figure 2: The flow of compensation from Beneficiaries to Land users



PES programmes will have the desired effect only if they reach the land users in ways that influence their decision on how to use the land. Several general principles can be identified: (i) make payments continuous and open ended; (ii) target payments; and (iii) avoid perverse incentives.

2.4 PES Typology

There are several types of markets and payment mechanisms:

- Public Payments and support services;
- Private contracts or deals;
- Tax incentives and subsidies;
- Trading of rights or credits under a regulatory cap; and
- Eco-labeling.

2.5 Purpose of Environmental Services

From an economics perspective, a major cause of environmental service degradation is due to market failure associated with the nature of ES being "externalities' or "public goods"; as such no compensation is given for their conservation; this leads to socially sub-optimum land use (Wertz-Kanounnikoff , 2006). Importantly, PES aims to correct a market failure by internalizing benefits, thereby creating these missing incentives for the provision of environmental services. PES has the potential to become very valuable transfer mechanisms to internalize positive environmental externalities[19], and to generate new revenues for sustainable development. In short, it is about putting a "price" on natural assets – recognizing the environmental, economic and social values of forest ecosystem services – is one way to promote conservation and more responsible decision making.

2.6 Preconditions for PES Markets to be Developed

PES programmes require an enabling and supporting institutional infrastructure. These systems depend on several prerequisites. There are economic issues and stakeholders involved in the market that need to be clarified and identified: the services provided, and their value; the beneficiaries and their location; the sellers and their willingness to pay; the regulators and their legal powers; the current cost of maintaining the services and who is currently paying; changes in benefits over time and space if different policy objectives are pursued; finding a method of equitably allocating costs of conserving the services to all beneficiaries.

As with any market, there are a number of institutional requirements for the PES market to work: markets require individualist institutions related to property and decision making; social institutions of trust; infrastructure for the smooth flow of information and products; and money as a medium of exchange.

Market participants must have access to information on the value and volume of the services being exchanged. Participants must have opportunities to negotiate payments. Further, property rights to service commodities need to be clearly defined and ownership has to be assigned. Monitoring and enforcement mechanisms are required, along with a network of supporting regulatory and institutional arrangements, if markets are to function effectively. It is to be expected that establishing such market infrastructure is not easy or cheap.

Generally, environmental services transactions are hindered by several factors: (i) lack of scientific evidence; (ii) existence of cheaper substitutes; (ii) lack of regulatory framework; (iii) co-ordination problems; (iv) inadequate participation; (v) cultural resistance; and (vi) lack of finance.

19 Ecosystem/Environmental services are "externalities" or public goods by their nature characterized by their non-excludability and non-rivalry. Consequently, land managers (at various levels) do not receive any compensation for conserving them, and thus ignore them in their land-use decision making which often leads to environmental loss. (CIFOR).

The design of PES schemes plays a central role in guaranteeing their success. Thus, PES schemes tend to work best when they have the following characteristics:

- They are based on clear and consensual scientific evidence linking land uses to the provision of services;
- They clearly define environmental services to be provided;
- Their contracts and payments are flexible, ongoing and open-ended;
- Their transaction costs do not exceed potential benefits;
- They rely on multiple sources of revenues delivering money flows that are sufficient and sustainable in time;
- Compliance, land use changes, and the provision of services are closely monitored; and
- They are flexible enough to allow adjustments to improve their effectiveness and efficiency and to adapt to changing conditions.

These PES schemes also face various difficulties and limitations, including the following:

- They are often based on scientific generalizations not supported by empirical studies;
- They are sometimes implemented in a context where they are not the most cost-effective method to attain the goals established;
- Service providers, users and the service itself are sometimes not properly identified;
- They are executed without a proper monitoring or control mechanism;
- The cost of environmental services are set arbitrarily and do not correspond to studies on demand and economic valuation of the resource;
- Their design is not based on previous socioeconomic or biophysical studies;
- They may offer perverse incentives to land users, or they may displace environmental problems or unsustainable land uses to surrounding areas;
- They depend largely on external financial resources; and
- Programs and activities are disseminated poorly among the local population.

Landell-Mills and Porras (2002) propose the following key steps that can help the State to develop successful markets for environmental services:

- Identify benefits provided by a specific service and by determination of (forestry activities that deliver this service;
- Undertake a feasibility study;
- Establish willingness to pay;
- Formalize property rights;
- Establish payment mechanisms and supporting institutions; and
- Undertake pilot activities and feedback to market design.

Given the above mentioned steps, experience has shown that for countries to engage in PES markets, they need to tackle the governance and policy failures which perpetuate poor forest management outcomes. Most experts suggest that effective governance and secure tenure are more important drivers of sustainability than PES per se. Governments and donors also need to

invest in capacity-building of national PES providers. All this would reduce the transaction costs and risks of buyers, and thus increase the demand and willingness to pay for ES. As such, while PES mechanisms cannot be seen as a panacea, they respond to market failure problems of forestry and are essential to an integrated approach to SFM and conservation.

SECTION 3 PAYMENTS FOR ENVIRONMENTAL SERVICES MECHANISMS

3.1 Carbon Markets

The Carbon Market uses carbon credits as the commodity of trade. The biomass in the forests is converted to carbon credits that can either be brokered or sold. The forestry credits would come from the conservation and reforestation activities undertaken by communities and community watershed forums, who are the key constituents of Ecosystems Service Providers.

Carbon credit emissions trading market mechanisms currently exist for carbon projects that are designed for both the regulatory and voluntary markets. There are several types of market mechanisms and each has a different role:

- Regulatory mechanisms are used by entities to meet their legally-binding regulated carbon emissions allowances. These include all entities in Annex 1 countries[20] of the UNFCCC that have ratified the Kyoto Protocol, companies in the EU Trading System, or entities in a growing number of local and regional markets.

- Voluntary mechanisms operate for use by entities that are not legally regulated. This includes some carbon market instruments that are legally binding, even though they are voluntary. This includes all individual purchases to offset personal carbon footprints, companies that retire credits for strategic or personal satisfaction reasons, and/or credits purchased as gifts or donations. The rules and regulations required for carbon credits to be registered differ markedly between the various regulatory and voluntary registries. As a consequence, different mechanisms are better suited to certain activities or project locations.

Markets for Carbon Credit Projects:

a. Regulatory Carbon Market Mechanisms

1. Clean Development Mechanism
2. Joint Implementation
3. Emissions trading and EU's European Trading Scheme
4. The United States
5. The New South Wales Greenhouse Gas Abatement Scheme

b. Voluntary Carbon Market Mechanisms

1. Chicago Climate Exchange
2. The Over The Counter Voluntary Market

[20] Annex 1 countries – Industrialised countries and economies in transition that have committed to reduce their emission levels of GHG to targets that are mainly set below their 1990 levels.

Status of the Markets

The regulatory emissions offset market has grown very rapidly over the last few years. The World Bank estimated (in 2007) that the regulatory market alone grew to be three times larger in 2006 than in 2005, to over US$30 billion. Sales of allowances in the EU ETS reached almost US$25 billion, dominating the market. Project-based transactions such as CDM and JI almost doubled in size and supplied close to 450 Mt CO_2e with a market value of over US$5 billion in 2006. With 86 percent of the volumes transacted, European buyers dominated the CDM market. Despite the large size of this market, the Land Use sector has remained one of the smallest sectors in the CDM with only 1 percent of all volumes originating from projects worldwide.

While the voluntary market is much smaller than the regulatory market, in 2006 the voluntary market reached a value of US$91 million with about 40 percent of that market under the CCX. The distribution of project activity and project type in the OTC market differs markedly from the CEM market. The recent Ecosystem Marketplace report on voluntary markets found that according to surveys conducted, forestry type projects accounted for 36 percent of the volumes transacted with about 8 percent of those originating from Asian projects, predominantly from India and China. The Ecosystem marketplace report found that prices of VERs differed by project type, location and whether the seller was the project developer or a wholesaler-aggregator with the average price from the developer being US$3.88/t CO_2e.

Table V:Estimated Economic Value of Forests (US$/hectare/year unless otherwise stated)

Forest Good or Service	Tropical forests
Timber	200-4,400 (NPV)
Conventional logging	300-2660 (NPV)
Sustainable conventional logging	20-440
Sustainable	30-266
Fuelwood	40
NTFPs	0-100
Genetic information	0-3000
Recreation	20-470 (general)
	750 (forests near towns)
	1000 (unique forests)
Watershed benefits	15-850
Climate benefits	360-2,200 (gross present value)
Biodiversity (other than genetics)	?
Amenity	-
Non-use values	Not available
Option values	12-Feb
Existence values	4,400 (unique areas)

Source: Pearce & Pearce (2001) as quoted in ITTO (2007)

3.2 The Watershed Services Market

The hydrological services of forests are among the most valuable of the many ecosystem services from forests. Most national parks and forests have been justified in part based on their water benefits, as have government regulations limiting private land-use. The dry evergreen forests on the Linden-Soesdyke highway which supposed to be the recharging site for aquifers on the coast are currently being cleared to facilitate agricultural land use. This might need to be examined more closely to determine if it is an appropriate land use.

The Status of the Market

Public-sector agencies have been the more active investors in watershed management to date. Typically, funds for watersheds and protected areas come from general government revenues and are not based on the value of water that these areas provide. This approach has been effective in some places, but with serious limitations. For example, faced with budget constraints many governments are unable to offer sustainable funding. In addition, since there may be many tax payers who are not beneficiaries of the service, hence it is not equitable to use general tax revenues for this purpose. For example, to determine beneficiaries of the mangrove forests which provide services to the tanning and fishery industries, in addition to protecting the shores and river banks can be complex.

The desirability and potential for financial incentive mechanism for watershed management varies: Many factors, including the nature of the service provided, who supplies it, which benefits, its economic importance, and the legal and regulatory systems need consideration to guide the development of a market. The main groups of beneficiaries include hydro-electric power generators, municipal water supply systems, irrigation systems, industrial users, and populations in flood prone areas.

Generally, forest-owner responsibilities to protect ecosystem services are poorly defined, as are the rights to be compensated for providing them. This is complicated by the difficulty of tracing the origin of the ecosystem service as one moves downstream. Furthermore, water-related ecosystem services are often considered to be public goods flowing from a mixture of private and public lands, for which downstream beneficiaries may thus be reluctant to pay. Because of this, governments often retain an important or even predominant role in protecting water related ecosystem services. Still, there are some economic tools, including markets and other financial mechanisms which are being used to help restore, maintain and enhance water related ecosystem services on forestlands as shown in the table below.

Box 1: Biophysical Relationships that link Forests, Water And People

The Biophysical relationships between forests and water are highly variable from one location to another depending on climate, soils, and vegetation types; there is no substitute for the size-specific information. The following are a few simplified basic relationships to keep in mind.

Forests can slow the rate of runoff in a watershed: forest vegetation takes up water and delays the time to soil saturation (after which water pools or runs off the land into the nearest watercourse). Forest soils also usually have a higher water storage capacity than non-forest soils (Falkenmark et al. 1999). The more complex structure of the forest ground surface and underlying soil allows more efficient soil infiltration compared to a deforested watershed. By slowing the rate of runoff, forests may help to minimize flooding in smaller watersheds (although they will not influence large-scale flooding).

Forests can reduce soil erosion and sedimentation of waterways: interruption of rain and snowfall by forest canopies means that less water falls on the ground compared to a deforested watershed. Understory forest vegetation and leaf litter protects the soil from the impact of rain that does fall through the canopy. Extensive root systems help hold soils more firmly in place and resist shallow-s landslides compared to clear-cut or heavily disturbed water beds. Sedimentation levels in forested watersheds are generally lower than in nearby agricultural or urbanized watersheds, but the degree depends on soil types, topography and climate (Falkenmark et al 1999).

Forest soils filter contaminants and influence water chemistry: forest soils are more waterlogged than other soils (except wetlands). Clearing and cultivating forest soils tends to greatly accelerate decomposition and release large amounts of nutrients that leach into groundwater, surface water runoff, and streams. For example, streams in agricultural areas in temperate regions typically have nitrate levels ten times higher than streams in nearby forested watersheds (which is also partly the result of fertilizer applications.

Forests reduce the total annual water flow in a watershed: contrary to popular opinion, forests generally reduce the total annual stream flow (Calder 1998). This is because trees consume water for transpiration, which is then evaporated back into the atmosphere. In general trees consume more water than other types of vegetation including grasses and annual crops. The degree to which forests reduce stream flow however, depends on various factors. For example, shallow-rooted trees tend to use less water than deep-rooted trees. Young regenerating forests tend to use much more water than mature and old-growth forests.

Forests can increase or decrease groundwater recharge: forest cover can lower groundwater recharge because more precipitation is intercepted by vegetation and returned to the atmosphere though evapotranspiration. In some areas however, removal of forest cover can result in a crusting of the soil surface that reduces or prevents water infiltration and groundwater recharge (Falkenmark et al. 1999).

Forest loss shifts aquatic productivity: forest cover plays an important and complex role in sustaining aquatic productivity (Revenga et al. 2000). Trees shade waterways and moderate water temperatures. Woody debris provides fish with habitat while leaves and decaying wood provide nutrients to a wide array of aquatic organisms.

Forests may influence precipitation at a large regional scale, but the effect of forest cover on rainfall in most areas is limited: the distribution of forests is a consequence of climate and soil conditions – not the reverse. Some evidence suggest that large-scale deforestation has reduced rainfall in China and some climate models indicate that extensive forest losses in Amazonia and Central Africa could lead to a drier climate (Institute of Hydrology 1996). Still, afforestation is not an effective strategy to increase rainfall (Kairnowitcz 2000).

Table VI: Examples of Water Market Payments

CASE STUDY	Water-Related Ecological Service Provided	Supplier	Buyer	Instruments	Intended impacts on forests	Payment
Self-organised private deals						
France: Perrier Vittel's payments for water quality	Quality drinking water	Upstream dairy farmers and forest landholders	A bottler of natural mineral water	Payments by bottler to upstream landowners for improved agricultural practices and for reforestation of sensitive infiltration zones	Reforestation but little impact because programme focuses on agriculture	Vittel pays each farm about US$230 per hectare per year for seven years. The company spent an average of US$155,000 per farm or a total of US$3.8 million
Reforestation but little impact because programme focuses on agriculture	Regularity of water flow for hydroelectricity generation	Private upstream owners of forest land	Private hydroelectric utilities, Government of Costa Rica and local NGO	Payments made by utility company via a local NGO to landowners; payments supplemented by government funds	Increased forest cover on private land; expansion of forests through protection and regeneration	Landowners who protect their forests receive US$45/hectare/year; those who sustainably manage their forests receive US$70/hectare/year and those who reforest their land receive4 US$116/hectare/year.
Cauca River, Columbia: associations of irrigators' payments	improvements of base flows, and reduction of sedimentation in irrigation canals	Upstream forest landowners	Associations of irrigators; government agencies	voluntary payments by land associations and government agencies to private upstream landowners; purchase by agency of	Reforestation, erosion control, springs and waterways protection, and development of watershed communities	Association members voluntarily pay a water use fee of US$1.5-2 /litre on top of an already existing water access fee of US$0.5/litre. The total investment was over US$1.5 billion between 1995-2000

Trading Schemes						
United States: nutrient trading	improved water quality	point-source polluters discharging below allowable level; non-point source polluters reducing their pollution	Polluting sources with discharge above allowable level	Trading of marketable nutrient reduction credits among industrial and agricultural polluting sources	Limited impact on forests; mainly the establishment of trees in riparian areas	Incentive payments of US$5-10 per acre.
Australia: irrigators financing upstream reforestation	reduction of water salinity	New South Wales State Forests (state government agency)	An association of irrigation farmers	water transpiration credits earned by State Forests for reforestation and sold to irrigators.	Large-scale reforestation, including planting of desalination plants, trees and other deep-rooted perennial vegetation	Irrigators pay US$40/hectare/year for ten years to NSW State Forests. Revenues are used by State Forests to reforest on private and public lands. Private landowners receive an allowance but rights remain with State Forests.
Public Payment Schemes						
New York City: watershed management programme	Purification of new York City's water supply	Upstream landowners	Water users taxed by New York City with supplemental funds provided by federal, state and local governments	Taxes on water user; New York City bonds; trust funds; subsidies; logging permits' differentiated land-use taxation; development rights; conservation easements; development of markets.	Adoption of low impact logging; retirement of environmentally sensitive land from agricultural production; forest regeneration	Dairy farmers and foresters who adopted best management practices were compensated with US$40 million, which covered all their additional costs. Foresters who improved their management practices (such as low impact logging) received additional logging permits for new areas, and forest landowners owning 50 acres or more and

						agreeing to commit to a ten-year forest management plan are entitled to an 80% reduction in local property tax.
Columbia: environmental services tax (eco-tax) for watershed management	Regularity of water flow for industrial uses; regularity and water purity for drinking water	private landowners and municipalities	Industrial water users and municipalities	eco-tax on industrial water users; payments by municipalities and watershed authorities to landowners	Improved forest management; expansion of forests	NA
State of Parana, Brazil: public redistribution mechanism	Rehabilitation of private and public areas for watershed protection	Municipalities and private landowners	State of Parana	Public-sector redistribution mechanism; State provides additional funds to those municipalities with protected areas and which harbour watersheds that supply neighbouring municipalities	Rehabilitation of degraded forest areas	US$170/hectare
US: conservation reserve programme	reduction of soil erosion; improvement of water quality and regularity of stream flow	owners of cropland and marginal pasture lands	US Department of Agriculture	Conservation easements; restoration cost-share agreements; yearly rental payments to landowners for engaging in conservation; additional incentive payments	Though the programme is directed at farms, advantages to trees are many: tree-planting strips, riparian buffers, grassed waterways, field windbreaks, shelter belts, living snow fences, and establishment of bottomland timber.	Farmers receive US$125/hectare/year and are compensated for 50% of costs to establish approved conservation practices. Total government cost: US$1.8 billion per year.

Source: Johnson, Perrot-Maitre, Pagiola, 2007

3.3 Biodiversity Services Markets

Biodiversity is defined as the variability among living organisms in terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part.

Biodiversity performs as a wide range of services including:

- Providing habitat conditions that support diverse wild plant, animal and microorganism populations of economic, subsistence or cultural value: for example, wild animals account for 25 percent of protein requirements in West Africa and as much as 75 percent in Congo. In Botswana 50 different species account for 40 percent of protein consumption. Wild species are the source of traditional medicines basic to the health care of about 80 percent of people in developing countries. Over 5000 species of plants and animals are used for medicinal purposes in China alone. In dry ecosystems, open woodlands are critical sources of fodder for livestock herds. The health of natural freshwater and coastal fisheries is strongly affected by adjacent forests;

- Maintaining ecosystem functioning: research indicated that increased species' diversity generally provides more opportunities for species interactions, which in turn improves the rates of resource use that govern ecosystem efficiency and productivity.

- Conserving genetic and chemical information of potential future utility: for example, the seed industry constantly seeks new genetic material to improve plant yields and performance and draws on sources of genetic material from the wild.

- Providing insurance against future change: for example, the greater resilience of diverse environments and species may be required to adapt to climate change.

- Providing spiritual aesthetic and cultural values: for example, nature tourists dependent on access to diverse habitats and wild species comprise 40 – 60 percent of all international tourists.

- Ensuring the continued existence of wild organisms as legitimate claimants on earth's resources: some conservation advocates and investors are driven by ethical, philosophical and religious imperatives to conserve biodiversity.

The Status of the Market

The market for biodiversity protection can be characterized as nascent. Many approaches are emerging to remunerate financially the owners and managers of tropical forest resources for their good stewardship of biodiversity as shown in the table below:

Table VII: Types of Payments for Biodiversity Services

Purchase of high-value habitat
Private land acquisition (purchase by private buyers or NGOs explicitly for biodiversity conservation
Public land acquisition (purchase by government agency explicitly for biodiversity conservation)
Payment for access to species or habitat
Bioprospecting rights (rights to collect, test and use genetic material from a designated area)
Research permits (rights to collect specimens, take measurements in area)
Hunting, fishing or gathering permits for wild species
Ecotourism use (rights to enter area, observe wildlife, camp or hike)
Payment for biodiversity-conserving management
Conservation easements (owner is paid to use and manage defined piece of land only for conservation purposes, restrictions are usually in perpetuity and transferable upon sale of the land Conservation land lease (owner is paid to use and manage defined piece of land for conservation purposes, for defined period of time)
Conservation concession (public forest agency is paid to maintain a defined area under conservation uses only; comparable to a forest logging concession)
Community concession in public protected areas (individuals or communities are allocated use rights to a defined area of forest or grassland in return for commitment to protect the area from practices that harm biodiversity)
Management contracts for habitat or species' conservation on private farms, forests, grazing lands (contract that details biodiversity management activities and payments linked to the achievement of specified objectives)
Tradable rights under cap-and-trade regulations
Tradable wetland mitigation credits (credits from wetland conservation or restoration that can be used to offset obligations of developers to maintain a minimum area of natural wetlands in a defined region Tradable development rights (rights allocated to develop only a limited total area of natural habitat within a defined region) Tradable biodiversity credits (credits representing areas of biodiversity protection or enhancement that can be purchased by developers to ensure they meet a minimum standard of biodiversity protection)
Support biodiversity-conserving businesses
Business shares in enterprises that manage for biodiversity conservation Biodiversity-friendly products (ecolabeling) Source: ITTO (2007)

As with the watershed services, biodiversity services are not sold directly. Instead, specific land uses that are thought to protect species, ecosystems or genetic diversity are sold. Buyers are varied, including global international organisations, foundations and conservation NGOs, Pharmaceutical companies inter alia. The value of biodiversity conservation services is difficult to establish, because quite often, they are based on the option value of future discoveries as with bioprospecting. For this reason, these services are problematic to value and to match demand and supply.

A survey of 70 payment schemes for biodiversity conservation revealed the newness and experimental nature of the market – for example in Brazil rubber tappers receive payments for forest conservation services they provide by managing forest resources. In Guyana Conservation International signed an agreement with the government for a conservation concession in 200,000 acres of forest. In the US the Conservation Reserves Program has 10 – 15 year contracts with farmers to stop cultivation on sensitive lands to prevent degradation and hence preserve future biodiversity. More Payment schemes are shown in table below.

Table VIII: Examples of Biodiversity Payments

Payment Scheme	Country	Type of Payment/Commodity	Estimated value
Critical ecosystems Partnership (world bank, Conservation International, Global Environment Facility	Developing Countries	Fund to finance diverse groups to protect biodiversity	US$150 million
Ejido financing of local Pas - 7 million hectares	Mexico		US$14 million
BOCOSA Project (Osa Penninsula)	Costa Rica	Payments to farmers to conserve their lands	US$24 /hectare/year
Payment for environmental services	Costa Rica	Compensation to forest owners for the ecosystem services of their lands, as included in 1996 Forest law	US$221-344/hectare/year. Total US$14 million
Shade-grown coffee	Mesoamerica	Coffee trees grown among other trees, enhancing biodiversity	US$5 billion for sale of shade grown coffee in US alone
Privately protected areas	Chile	Private investments in land conservation including: private parks, land donatins to national park system, conservation communities, eco-real estate and ecotourism, and private administration of government conservation lands	NA

Wetland banking	US	Developers who have mitigated off-site draw from bank of mitigation credits to offset damage to wetlands as development is implemented	US$7,500 - US$100,000/ acre cost of banking credits)
Bioprospecting	Worldwide	Biodiversity prospecting, primarily pharmaceutical, to market products and conserve forests	US$175 billion (natural-product drugs)
Ecological value-added tax	Brazil	Mechanism that compensates municipalities that have conservation areas. Stimulates improvement of existing areas or creation of new areas	US$150 million (Parana State) US$45 million (Minas Gerais)

Source: ITTO (2007)

The fastest growing component of future market demand for biodiversity services from tropical forests is likely to be in the Ecolabelling of crops.

The size of the market for biodiversity services is under $7 billion. Of this, the regulated market is estimated at $3.4 billion; while the government –mediated PES is $3 billion. The voluntary market is between $2 and $5 million per year.

3.4 Typology of Markets

Markets are institutions that bring buyers and sellers into communication with each other, structuring and coordinating their actions. The advantages offered by markets are many, including the fact that market exchange is voluntary. Market systems offer people some choice; create incentives to be creative, innovate and to communicate with each other. However, markets may not always work independently or freely. As noted above, Real world markets require an array of institutions to work well. Particularly when addressing certain kinds of economic problems.

In some instances, the "free market" yields inefficient or inappropriate outcomes in such cases the market cannot be voluntary, but is instead regulated by the government.

Table IX below highlights the different market mechanisms, the environmental benefits, the buyers, the sellers, and case studies.

PES Mechanism	**Buyers**[21]	**Sellers**[22]	**Service Providers**[23]	**Case Studies**
Carbon Markets Regulatory Carbon Market		Precious Woods (forestry related CDM), the Pearl River project developers (State Forestry Administration, Research Institute of Forest Ecology, Environment and Protection Chinese Academy of Forestry, International Bank for Reconstruction and Development/ Bio Carbon Fund), and the World Bank.	Baker & McKenzie, Winrock International, EcoSecurities, Also, large NGOs, like Conservation International and The Nature Conservancy, and large banks, like HSBC, and Climate Change Capital, Point Carbon, Environmental Finance, Evolution Markets, and Ecosystem Marketplace	In Chiapas, Mexico, the Bioclimatic Fund was established to manage funds collected under the Scolel Té project, a carbon sequestration scheme based on agroforestry practices. More than 300 coffee and corn farmers participated in the project by planting trees on 20 percent of their land parcels on average to absorb carbon. In Bolivia, the Nature Conservancy, along with the Bolivian government, Amigos de la Naturaleza, and US-based energy companies, have developed the largest forest-based carbon project in the world (600,000 ha) to sequester 26 million tons of carbon over 15 years in the Noel Kempff Mercado National Park at a cost of US$9.6 million. In Argentina, the German Development Agency (GTZ) agreed to invest in a project to generate carbon offsets in La Plata-Fontana. Under this project, 120,000 ha of native forests will be protected to sequester 12.6 million tons of carbon.

[21] Regulated industry, governments, carbon funds, investors.
[22] Project developers, retailers, brokers, landowners, stewards
[23]Provide rs of services including legal advice, and technical services related to monitoring, verification, reporting, reporting marketing, project assessment and development, financial services, research and other information.

Voluntary Carbon Market[24]	Mitsubishi, AEP, Cinergy, GM, Texaco, and Yale University	Go Zero, EAD Environmental, Climate Care and project developers like TNC, CI and Pre- CDM VERs. Also, farmers, local communities (including indigenous groups/tribes), and public agencies (state and national government landowners) sell credits to the voluntary market.	Land management service providers include NGOS (TNC), forestry companies (New Forests), and national governments (Costa Rica). Technical providers vary from Winrock International, the Edinburgh Centre for Climate Management and EcoSecurities.	The Marriot International's support for REDD in Amazonas referred to as the Juma Project Plan Vivo in Uganda and Malawi Merrill Lynch's acquisition of Aceh Forest in IndonesiaMerrill Lynch is funding the Ulu Masen project in Sumatra
Watershed Services Market Complaint Water Quality Trading	Owners waste water treatment plants, and other industrial point sources and potentially government buyers through reverse auctions.	Non-point source emitters such as farmers, owners of waterways, streams and wetland developers. Sellers may also include residential emitters and other land owners or managers	Environmental Trading Network; consultants or brokerage firms, technical service providers, financial service providers such as Red Barn Trading in the case of Pennsylvania's Trading Program; academic and other information providers such as Flows, Water Strategist, Carnegie Institute at Dartmouth, the Environmental Law Institute, the Katoomba Group's Ecosystem Marketplace and Government advocates such as EPA.	One of the most famous examples is the system established by the city of New York to protect its drinking water sources. In the late 1990s, the city of New York increased water fees by nine percent to invest in the protection of the Catskill/Delaware and Croton Watersheds. This was done primarily through a land acquisition program and conservation easements that expanded the protected area within the watershed to 121,500 ha. In addition, farmers and forest producers received compensation under new programs to remove environmentally sensitive lands from production or to improve forest and land management practices.
Voluntary Watersheds Management Payments	Private or semi-private entities (who rely on water quality in their production process	Private land owners, forest companies and local communities in a position to affect the quality of ecosystem services. Private land owners, forest companies, large land interests such as national parks and land cooperatives, local	Mostly philanthropic investors such as the World Wildlife Federation and trade associations for water companies. Investors such as AQUA America, Inc a publicly traded water utility based in PA; Philanthropic investors such as the TNC, the World Bank, Conservation	Another well-known example is the *Fondo Nacional del Água* (Fonag) in Ecuador.

[24] There is a range of sub-markets within the voluntary market, ranging from legally-binding exchanges (Chicago Climate Exchange), to retailers (Carbon Fund), and non-governmental organization initiatives (The Nature Conservancy in Bolivia; Carbon Pool, Conservation International, etc.). Also, the voluntary market also includes verified emissions reductions (VERs) generated from pre-CDM projects

Government-Mediated Watershed PES	Government entities representing water or agricultural interests and both private and public utilities.	Governments and upstream communities.	International and other foundations; technical assistance and information providers such as FLOWS, USDA, and the Water Environment Federation.	Fonag collects contributions from water users, including the water utility of the city of Quito and a hydroelectric power utility, to fund conservation practices in the upper watershed that provides drinking water for the city of Quito.[23] Also in Ecuador, the municipality of San Pedro de Pimampiro, in the province of Imbabura, is developing a pilot project aiming to protect drinking water sources by paying land users in the upper basin to improve forest management in the watershed.[24] In the Cauca Valley in Colombia, farmer associations initiated a PES system to address concerns regarding the sustainable supply of water for irrigation.[25] Since its inception, this scheme has led to the adoption of conservation measures in over one million hectares of land. The system annually raises US$600,000 in revenues from water user fees.[26] Similarly, farmers in the Guabas River watershed in Colombia have negotiated an agreement with upstream land users to improve land use practices in order to maintain dry-season water flows. The system is financed through additional charges for water use.[27] In the states of Paraná and Minas Gerais in Brazil, municipalities receive five percent of the state sales tax to finance upper watershed conservation programs to protect drinking water sources.

Biodiversity Services Market: Compliant Biodiversity Offsets Government Mediated Biodiversity Offsets	Buyers of biodiversity offsets are anyone required to comply with biodiversity mitigation laws: real estate developers, federal and state agencies, utilities, and the military. Governments with support from international NGOs, multilateral agencies and private companies and foundations	Anyone possessing suitable habitat (wetland, disturbed wetland, or endangered species habitat) that is currently unprotected. Private landholders	Trade associations (such as the National Mitigation Banking Association), investors, consultants, academics, and information services such as the Ecosystem Marketplace. Legislators, NGOs, multi-laterals, and landholders	The Birdlife International forest in Indonesia or pure purchase of chunks of the Amazon rainforest through charities. Kinangop Grassland project Conservation International and Guyana renewable 30 year agreement in July 2002- 80,000 hectares of forest in Southern part of country for conservation. CI will pay market rates. Canopy Capital Ltd.'s acquisition of ES marketing rights from Iwokrama International Centre UK investment firm Canopy Capital bought the rights to market the ES provided by 350,000 ha of the Iwokrama rainforest reserve in Guyana in 2008, the first deal of this kind in the world. Now not in the future Migrating over time Mexico Monarch butterfly habitat Brazil ProAmbiente biodiversity payments CI's work in Brazil (Brazil nuts

Certified Agricultural Products[25]	Exporters, traders, processors, manufacturers, mainstream and specialty retailers, and end-consumers.	Small-, medium- and large-scale producers)	-	
Indirect Biodiversity Service Markets[26] Concessions for Certified Forests Products,Timber and NTFPs (food, oil products, fibres, rubber, aromatics and medicines, gums, and tannins (Ecolabelling) Bio-Prospecting Rights (markets for medicinal products) (two-fold: for prospecting rights and shares in commercial value of new drug)/ Genetic resources			The Global Forest and Trade network (GFTN) created by WWF; The Conservation Fund; Conservation International New Forests Tropical Forest Fund (biomass) Consumer preference/procurement driven Pharmaceuticals, biotechnologies research institutions/firms	Rourgier Gabon and Precious Woods Gabon; CIMAL/IMR (a Division of Grupo Roda-a conglomerate of companies baed in Santa Cruz), Bolivia. CI's work in Brazil (Brazil nuts) Preventing land degradation, thereby preserving future biodiversity. 1990: Contract between Merck and Costa Rica's INBio payment of approximately $1 million 1999: US$3.2 million agreement by Glaxo Wellcome to screen 30,000 samples from Brazil's biota

[25] Certification schemes can be broadly classified into three different categories: Fair Trade – focus on social criteria (equitable and just remuneration of producers); Organic – focus on environmental health (production without use of pesticides or herbicides); Biodiversity-friendly (including bird-friendly and shade-grown) – focus on sustainability protecting ecosystem health in general). Established certification schemes include the Rainforest Alliance's (RA) ECO-OK program (coffee, cacao, banana, and–at much smaller scale–a range of other crops), the Smithsonian Migratory Bird Center's (SMBC) "Bird-Friendly" label (coffee) and the UTZ Certified scheme (coffee, cacao, oil palm).

[26] Market is volatile and highly dynamic.

Ecotourism[27] Servic**e/** Recreation			Premier Tourism Marketing, Responsible Tourism	Costa Rica (approximately 1 million visitors annually and $1billion revenue a year. African countries with about 7.5% annual growth. Examples are South Africa, Zambia, Zimbabwe and Madagascar
Bundled Services[28] Market These share features with markets for environmental services that are incorporated in the bundle.	-	-		The bundled services approach was used by The Nature Conservancy in Belize, Bolivia, Costa Rica and Paraguay to bring additional revenues for biodiversity protection by promoting the sale of carbon offsets in biodiversity-rich locations. It was also used by Costa Rica's national power and light company and Norwegian partners to purchase watershed protection and carbon sequestration services

[27] Ecotourism is the fastest growing sector of the tourism industry-the world's largest service industry. (Mastny, 2001). In 2004, this market grew three times faster than the industry as a whole and the World Tourism Organisation estimates that global spending on ecotourism is increasing by 20% a year, about six times the industry-wide rate of growth.[27] However, market is fickle as a result of seasonality; market fluctuations related to external shocks (environmental, economic, political); as such market can be deemed 'fickle' Price of international travel related to price of oil Ecotourism may not necessarily involve forest or biodiversity rich lands.

[28] Bundled services are found where different services are sold from a single land area. Markets for bundled services share features with markets for environmental services that are incorporated in the bundle. Merged bundles are easier to manage and reduce transaction costs in the PES scheme. However, they are less effective since merging services makes it impossible to target payments to individual services. The shopping basket approach is therefore better designed to maximize returns, but also more complex to manage and more costly.

SECTION 4 – ASSESSMENTS OF MECHANISMS/MARKETS

4.1 Introduction

Reviewing experiences documented in the literature on PES Markets confirms the notion that the development of new markets and market-based instruments that monetize the value of forest ecosystems is complex and can be quite protracted. The stakeholders have to be identified, and their transactional roles delineated and adopted. The transactions themselves must be developed by negotiation and supported by rules, contracts and methods of verification.

Despite the wide variety of services, contexts, economic opportunities and types of payment mechanisms, there are several common issues that the market must confront in order to develop, as summarized below:

- What environmental services are (to be) provided?
- What is the economic value of the environmental services?
- What is the cultural, legal and regulatory context?
- What are the rights and responsibilities of stakeholders?
- Who are the potential buyers and sellers?
- Can the service be measured and monitored?
- What support services are required to enable the market?
- Who benefits?

It should be recognized that for some ES, these mechanisms may present challenges, as shown in table x below.

Table X STRENGTHS AND WEAKNESSES OF WATERSHED PES MECHANISMS

Strengths and Benefits	Weaknesses and Constraints
Beneficiaries or users are easy to identify and are often willing to pay for forestry interventions – even though there may be weak scientific evidence.	Hydrological impacts of forest interventions are largely site-specific and additionality is hard to prove. If buyers are unsure they are getting what they are paying for, sustainability is doubtful
Investments in watershed management are cheaper than treatment or new water supplies, e.g., in the US, it is estimated that each $ spent on watershed protection saves $7 – 200 in new filtration and water treatment facilities	In state managed programs, additionality or cost-effectiveness is problematic, e.g., in Mexico's programme, the forests most at risk have received only 10% of payments; tendering schemes are needed to reduce over-payments
There is high win-win potential in developing countries since upper watershed farmers are usually poor, e.g., the RUPES programme in Asia has built up collective action institutions and consolidated	Common equity constraints are insecure tenure, weak local institutions and inequitable public enforcement capacity; strong donor/NGO support has therefore been

tenure	key to positive or neutral equity impacts
Watershed PES work best when there is a scarcity of clean water, and water users have capacity to pay, e.g., urban citizens, companies.	Beneficiaries are often poor and/or unwilling to pay for a free good or their basic right to water, and it is difficult to exclude beneficiaries who won't pay.
For private or market-based mechanisms, there is good potential for leverage of national or municipal finance	"Cap and trade" mechanisms are demanding of administration and compliance, and tend to rely on high external support.

Sources: Scherr et al (2006), Chomitz et al (2006)

4.2 Assessment of PES Markets

4.2.1 Essential design Components for Ecosystems Services Market Growth in Guyana's Context

The best known and longest running ecosystem service market in the Latin America and Caribbean region was examined to tease out the aspects or components that might have facilitated success and especially the constraints encountered. For example, in the Latin America and Caribbean Region the success of the Costa Rica PES system has been most instructive as indicated in table XI below.

Table XI Example of an Innovative and Successful Ecosystem Service Market Scheme

Market Name	**Summary**	**Market type**
Costa Rica's Pago por Servicios Ambientales (PSA) or	This scheme began in 1997 with the Forest Law No. 7575 which recognised four environmental services provided by forest ecosystems – mitigation of greenhouse gas emissions, hydrological services, biodiversity conservation and provision of scenic beauty.	This is an example of multiple markets for multiple outcomes and multiple buyers – **fixed price payment scheme**
Payments for Environmental Services (PES) Scheme	The law provided a regulatory basis through which landholders could be contracted for services from their lands and established the National Fund for Forest Financing – an intermediary for regulation, contracting and finance. The PSA changed a broad PES to one that was financed by earmarked tax and a system of user pays. It had always been envisaged that the PSA would facilitate beneficiaries paying for services.	

However, according to (Hope et al 2005) the effectiveness of the Costa Rica PES programme has been problematic with regard to at least three issues:

1) the lack of "biophysical evidence of forest land use impacts on increased water flows compared to agricultural conversion (e.g. pasture);

2) economic valuation that accurately and defensibly estimates forest land use value with downstream water demand;

3) social opportunities and outcomes of the PES programme, particularly for the upland rural poor.

4.2.2 PES and Rural Poverty

Poor people tend to be found in rural areas in most developing countries. The social impacts of the PES programme in Costa Rica offer lessons for wider replication and design.

Key findings from the socio-economic study include:

- Perceptions and beliefs of local people are that cloud forests (and lower altitude forests) increase and regulate water flows, and protect water quality;
- Awareness, adoption and support of the PES programme by local people are constrained by little local presence of programme implementers and insufficient programme funds to meet demand;
- Local people have significant reservations about entering into a land contract with the government, particularly a fear of losing their land;
- Increasing bureaucracy and qualification criteria leads to high transaction costs - this fall hardest on poorer people and those living far from towns;
- Experimental scenario analysis indicates large land owners (> 10 hectares) with land titles are more likely to be able to and willing to commit to the programme;
- Respondent ratings to scenario analysis of payment levels indicate higher amounts will not necessarily result in higher participation. This is partly due to high opportunity costs from alternative land uses, particularly livestock or coffee; and
- The programme does not benefit people without land.

4.2.3 Lessons and Policy Implications

Four lessons emerge from the socio-economic study:

Lesson 1. Secure land rights are often critical to benefiting from PES schemes.

The poor and marginalised often have no or uncertain land claims in developing countries. This weakens necessary institutional arrangements between downstream payments to upstream service providers. Examples illustrate here, and in other places, opportunistic elite groups forcibly and/or unfairly appropriating upland areas when land values increase as in the case of a new PES scheme.

Policy implication: if land tenure prevents PES benefits reaching poor groups, more integrative mechanisms should be considered such as wholesaling services from a community/zone and increasing community capacity through education with tangible benefits linked to improved access to credit and market support centres.

Lesson 2. PES will change land use incentives: scenario analysis should be included in a design phase.

One methodological advance in the Costa Rica study was the use of a stated choice method (Conjoint Analysis) to explore experimental scenarios of alternative compensation mechanisms (financial and other), which revealed that land owners were less influenced by cash than broader mechanisms, such as road improvements.

Policy implication: understanding land-decision making processes of farmers in highly variable tropical climates will benefit from careful pre-project design. Stated choice methods provide a flexible and rigorous approach to evaluating alternative scenarios in an objective, inclusive and comparative framework.

Lesson 3. Lack of trust may undermine a good PES scheme.

A clear message from qualitative studies revealed significant and wide-spread distrust of entering into any land contract with the government. While this may not matter for local institutional arrangements under a reward framework, it presents a challenge for more regulatory approaches that are premised on small-holders entering into legal contracts with government.

Policy implication: PES scheme should attempt to build community capacity or awareness to reduce participant misunderstandings or prejudices against scheme adoption. Financial rewards are only one potential constraint to reaching marginal farmers; others include trust, transaction costs, opportunity cost of land and information.

Lesson 4: Be realistic about poverty reduction impacts.

There may not be a close relationship between important environmental services and poor groups. If poverty goals are 'bolted-on' to attract wider donor funding poverty impacts may be limited.

Policy implication: PES schemes with a specific poverty reduction goal may include activities to directly reach the poor and landless. This may include initiatives such as 1) labour-based land management/rehabilitation or 2) promote organic coffee farming as a high-value, labour-intensive land use that benefits the rural poor."

A review of the international literature has revealed that that key considerations for the design of environmental markets include the number and nature of trades likely to occur – e.g. the number of willing buyers and sellers – and likely dynamics into the future. The requirements of market participants, including both buyers and sellers, must also be considered (CSIRO 2009). We have also examined the existing institutional arrangements, as a basis for future developments.

Critical success factors and institutional requirements for environmental markets include clearly defined, measurable and enforceable property rights (or obligations under management agreements or contracts), with trading rules and mechanisms to enforce contracts and settle ownership disputes (Di Leva 2002, Jenkins et al. 2004, CSIRO 2009).

Transaction costs of environmental markets depend on the design features chosen (Boyd and Simpson 1999). Some past market programs and policies have been characterised by high (or informally quantified) transaction costs of participation relative to benefits (McCann and Easter 2000). Transaction costs are incurred in the gathering of information prior to market transaction, the process of exchange, and the costs of monitoring and enforcement. Design principles should minimise transaction costs for the effective operation of environmental markets in Guyana.

In addition, there are a number of key policy decisions that underpin the nature and extent of institutional requirements for an environmental market. For example, decisions regarding:

- The mix of voluntary instruments (e.g. auctions, tenders, other incentive schemes) and mandatory obligations under regulations (e.g. cap and trade schemes, some offset schemes).
- Whether further mandatory obligations need to be imposed – which could either be mandatory payments (e.g. levies, charges, penalties) or mandatory standards (i.e. establishing a level of "duty of care") – as part of the market or policy mix (CSIRO 2009);
- The relative levels of public and private investment. The combination of impactor pays principles with investment by a much broader group of beneficiaries (e.g. taxpayers);

- Whether an outcome (or good) is being traded or actions (or management services) are being contracted;
- Bundling" of rights;
- Market infrastructure. Crediting and banking arrangements and the role of intermediaries such as a broker for trades. Where a market should allow direct trades or require a broker for all trades;
- The staging and timing of payments. Whether payments are made in advance and whether they are one-off or yearly (for a specified/agreement period);
- The scope and consistency of management agreements. Whether there is a standard agreement period or whether the framework and metrics allow for agreements of varying length;
- The geographical scale. Whether there is a consistent country-wide market infrastructure and methodology or whether infrastructure is driven by biophysical and policy heterogeneity; and
- Whether payments for ecosystem services should be limited to private land.

These questions summarise the considerations raised by many authors referenced in the bibliography with regard to the considerations in developing environmental markets. Other technical issues such as the need for sound underpinning science to support metrics to quantify the benefits of actions is fundamental to a viable and effective environmental market (Carpenter et al. 2009). This information provides the foundation for definition of the good (or service), market transactions, cost-effective investment and production decision-making, performance evaluation, and accounting and auditing processes.

Since no suitable readymade PES evaluation scheme was found internationally, these considerations underpin the selection by expert review and consensus of a series of components which form the template that we have used to rate the potential for various environmental service markets in Guyana.

Step 1: Selection of evaluative criteria based on global experiences described in the literature.

Essential Components for Ecosystem Services Market Growth	
1	Identified Ecosystem Services (including ecosystem services available for both current and future payments/markets
2	Enabling Legal, Regulatory and Administrative Context (including positive context for ecosystem services payments and markets)
3	Supporting Institutions (including public or private entities that facili6tate/oversee public funds, regulate private trade etc.)
4	Engaged Local Communities and Stakeholders (including communities, NGOs, financial institutions, businesses, government etc.)
5	Flow of Market Information
6	Technical Assistance (to sellers, buyers, and other market actors, which includes training, education and advising)
7	Financing (for all needed components, including: ecosystem management costs, transaction costs etc.)
8	Support Services for Market Actors (such as brokering, legal advice, measurement and valuation of ecosystem services, third party verification, accounting, computer technology etc.)
9	Standards and Guidelines : for ecosystem services payments or markets
10	Awareness of Ecosystem Services Values, Payments and Markets (among policymakers as well as potential sellers and buyers)

Step 2: A scoring system was devised, using a range of 0 to 3 to rate the component indicators of the suitability of the mechanisms in the Guyana context: where 0 represented non-existence; 1 – nascent; 2-partially developed; and 3-well developed.

0	**1**	**2**	**3**
Non-existent	Nascent	Partially developed	Well developed

Step 3 For each mechanism, scores were assigned to the criteria according to the prevailing situation in Guyana.

Step 4 A justification for the scores given for each PES mechanism is presented in a short discussion after each of the evaluation matrices.

The Results:

1. Assessment of Carbon Market Suitability to Guyana		Scores	
		Voluntary	Regulatory
1	Identified Ecosystem Services (including ecosystem services available for both current and future payments/markets) service value estimated and ownership established and buyers contracted	2	2
2	Enabling Legal, Regulatory and Administrative Context (including for institutions and regulations to manage ecosystem services payments and markets)	2	1
3	Establishment of Supporting Institutions (including public or private entities that administer public funds, regulate private trade etc.)	2	1
4	Well informed and empowered Local Communities and Stakeholders (including communities, NGOs, financial institutions, businesses, government etc.)	2	2
5	Credible and Transparent Flow of Market Information between buyers, sellers and regulators.	1	1
6	Availability of Technical Assistance (to sellers, buyers, and other market actors, which includes training, education and advising)	1	1
7	Provision of Financing (for all needed components, including: ecosystem management costs, transaction costs etc.)	2	1
8	Availability of appropriate Support Services for Market Actors (for example: brokering, legal advice, measurement and valuation of ecosystem services, third party verification, accounting, computer technology etc.)	1	1
9	Locally customized Standards and Guidelines : for ecosystem services payments or markets	2	1
10	High level of Awareness of Ecosystem Services Values, Payments and Markets (among policymakers as well as potential sellers and buyers)	2	2
Total		**17**	**13**
Maximum Possible Score		**30**	**30**

Justification of Scores: In general, the information and MRV relating to the carbon market are well developed and international standards exist and are readily available. The level of awareness is not balanced however, with the policy makers/ public sector entities being well ahead of the private sector and communities and other stakeholders often being out of the loop.

2. Assessment of Watershed Services Suitability to Guyana		Scores		
		Compliant Water Quality Trading	Voluntary Watersheds Management Payments	Government-Mediated Watershed PES
1	Identified Ecosystem Services (including ecosystem services available for both current and future payments/markets) service value estimated and ownership established and buyers contracted	0	0	0
2	Enabling Legal, Regulatory and Administrative Context (including for institutions and regulations to manage ecosystem services payments and markets)	0	0	0
3	Establishment of Supporting Institutions (including	0	0	0

	public or private entities that administer public funds, regulate private trade etc.)			
4	Well informed and empowered Local Communities and Stakeholders (including communities, NGOs, financial institutions, businesses, government etc.)	0	0	0
5	Credible and transparent Flow of Market Information between buyers, sellers and regulators.	0	0	0
6	Availability of Technical Assistance (to sellers, buyers, and other market actors, which includes training, education and advising)	0	0	0
7	Provision of Financing (for all needed components, including: ecosystem management costs, transaction costs etc.)	1	1	1
8	Availability of appropriate Support Services for Market Actors (for example: brokering, legal advice, measurement and valuation of ecosystem services, third party verification, accounting, computer technology etc.)	0	0	0
9	Locally customized Standards and Guidelines : for ecosystem services payments or markets	1	1	1
10	High level of Awareness of Ecosystem Services Values, Payments and Markets (among policymakers as well as potential sellers and buyers)	1	1	1
Total		**3**	**3**	**3**
Maximum Possible Score		**30**	**30**	**30**

Justification of Scores: The watershed services are not well defined nor are they well understood in Guyana. In fact there is great potential for these services particularly in relation to the seasonal forests along the Soesdyke/Linden Highway where the aquifers of coastal Demerara are recharged. Although the Ministry of Housing and Water is the regulatory body, it does not have technical capacity to monitor or evaluate, and neither does its implementation arm the GWI.

3. Assessment of Biodiversity (direct) Market Suitability to Guyana		**Scores**		
		Compliant Biodiversity Offsets	Government Mediated Biodiversity Offsets	Certified Agricultural Products)
1	Identified Ecosystem Services (including ecosystem services available for both current and future payments/markets) service value estimated and ownership established and buyers contracted	1	2	1
2	Enabling Legal, Regulatory and Administrative Context (including for institutions and regulations to manage ecosystem services payments and markets)	1	2	0
3	Establishment of Supporting Institutions (including public or private entities that administer public funds, regulate private trade etc.)	1	2	0

4	Well informed and empowered Local Communities and Stakeholders (including communities, NGOs, financial institutions, businesses, government etc.)	1	2	1
5	Credible and transparent Flow of Market Information between buyers, sellers and regulators.	0	1	1
6	Availability of Technical Assistance (to sellers, buyers, and other market actors, which includes training, education and advising)	0	2	0
7	Provision of Financing (for all needed components, including: ecosystem management costs, transaction costs etc.)	1	1	0
8	Availability of appropriate Support Services for Market Actors (for example: brokering, legal advice, measurement and valuation of ecosystem services, third party verification, accounting, computer technology etc.)	1	1	0
9	Locally customized Standards and Guidelines : for ecosystem services payments or markets	2	2	1
10	High level of Awareness of Ecosystem Services Values, Payments and Markets (among policymakers as well as potential sellers and buyers)	1	2	1
Total		**9**	**17**	**5**
Maximum Possible Score		**30**	**30**	**30**

Justification of Scores: There is a variable situation in regard to the direct Biodiversity Market. Here again the weight of knowledge and information is with the Public Sector, and the Private sector is less aware. Certified Agricultural Products such as organic coffee and cocoa are grown in the North West, on a very small scale. There were plans to grow organic sugar, but this has not been activated as yet. Agencies to regulate, monitor and supervise the area of Biodiversity are not in existence. Financing has not been made available for this area.

4. Assessment of Biodiversity Market (Indirect) Suitability to Guyana		**Scores**		
		Bio-Prospecting Rights	Concessions for Certified Forests Products,Timber and NTFPs	Ecotourism[29] Service/ Recreation
1	Identified Ecosystem Services (including ecosystem services available for both current and future payments/markets) service value estimated and ownership established and buyers contracted	1[30]	1	2
2	Enabling Legal, Regulatory and Administrative Context	1	2	2

[29] Ecotourism is the fastest growing sector of the tourism industry-the world's largest service industry. (Mastny, 2001). In 2004, this market grew three times faster than the industry as a whole and the World Tourism Organisation estimates that global spending on ecotourism is increasing by 20% a year, about six times the industry-wide rate of growth.[29] However, market is fickle as a result of seasonality; market fluctuations related to external shocks (environmental, economic, political); as such market can be deemed 'fickle' Price of international travel related to price of oil Ecotourism may not necessarily involve forest or biodiversity rich lands.

[30] Market is driven by donors and international players. As such it is biased towards buyers, and the sellers are particularly disadvantaged in terms of knowledge information and organisation.

	(including for institutions and regulations to manage ecosystem services payments and markets)			
3	Establishment of Supporting Institutions (including public or private entities that administer public funds, regulate private trade etc.)	1	1	2
4	Well informed and empowered Local Communities and Stakeholders (including communities, NGOs, financial institutions, businesses, government etc.)	1	2	2
5	Credible and transparent Flow of Market Information between buyers, sellers and regulators.	0	1	1
6	Availability of Technical Assistance (to sellers, buyers, and other market actors, which includes training, education and advising)	0	1	1
7	Provision of Financing (for all needed components, including: ecosystem management costs, transaction costs etc.)	0	0	1
8	Availability of appropriate Support Services for Market Actors (for example: brokering, legal advice, measurement and valuation of ecosystem services, third party verification, accounting, computer technology etc.)	0	0	1
9	Locally customized Standards and Guidelines : for ecosystem services payments or markets	1	1	2
10	High level of Awareness of Ecosystem Services Values, Payments and Markets (among policymakers as well as potential sellers and buyers)	1	2	2
	Total	**6**	**11**	**16**
Maximum Possible Score		**30**	**30**	**30**

4.3 Findings

The scores accorded each of the mechanisms suggest the following ranking of suitability:

Rank	PES Mechanism	Score
1	Voluntary Carbon Market	**17**
4	Regulated Compliant Carbon Market	**13**
9	Compliant Watershed Services market	3
9	Voluntary Watershed Services market	3
9	Government-mediated Watershed Services market	3
6	Compliant (direct) Biodiversity	**9**
1	Government mediated (direct) Biodiversity	**17**
8	CAP (direct) Biodiversity services market	5
7	Prospecting Rights (indirect) Biodiversity services market	6
5	Certified Forest Products and NTFP (indirect) Biodiversity services market	11
3	Ecotourism Services/Recreation (indirect) Biodiversity services market	**16**

The maximum score that could be awarded for any market mechanism is 30. As demonstrated in the scoring of each PES mechanism, the markets in Guyana for ES are rather rudimentary. The most advanced of the markets is that for Government mediated Biodiversity and the Voluntary Carbon Market – and for this it is the forest markets that are developed for timber sales and as carbon sinks. The next most-developed market is the Regulated Compliant Carbon Market. This is a function of the readiness of international organisations and agencies to engage in the market, rather than there being adequate knowledge and regulations locally. The Ecotourism services of (indirect) biodiversity services are also relatively better developed than most of the other ESs. However this service suffers from the inability of regulators to monitor and enforce regulation effectively. Overall, it is evident that in Guyana there is need for a sustained public education programme and the drafting/ reform of legislative frameworks.

4.4 General Conclusions

PES are an innovative and relatively new market-based instrument for environmental protection. As a consequence, it is still early to assess the overall effectiveness and efficiency of global PES schemes and to identify lessons and best practices for Guyana. Nonetheless, some preliminary observations can be made as set out below.

The PES schemes are highly adaptable, and several different models currently coexist in different markets and locations. If one conclusion can be derived from this state of affairs, it is that there is no single transferable model for PES systems and that each one must be tailored to the specific conditions of the market for a given environmental service in a given location. This offers both an opportunity and a threat to the Guyana market development.

Another observation of the schemes is that they may not constitute a cost-optimal instrument in all circumstances. Indeed their success depends on pre-existing conditions. PES systems seem to work best when services are visible and beneficiaries are well organized, and when land user communities are well structured, have clear and secure property rights, strong legal frameworks and are relatively wealthy or have access to resources. These conditions minimize sources of influence/ interference with the newly created market and reduce transaction costs. This suggests that part of the success of PES schemes rests in the selection of regions/communities where they will be implemented or on work conducted in their preparatory phase. Again this should flag an opportunity for Guyana at this stage of the game.

Transaction costs in markets for ES are still high due to the immaturity of certain markets. This makes PES schemes highly dependent on external sources of funding, which may undermine their sustainability in the long run. However, it is likely that transaction costs will decrease over time as markets for environmental services mature. The development of new markets may support revenue diversification and ensure a more stable, long lasting flow of revenues in PES schemes. In that sense, the future of PES schemes may be tied to the development of niche markets for certified forest product, organic agriculture or ecotourism, which have the potential to bring significant revenues. In addition the expansion of carbon markets can constitute a major source or revenues for PES schemes if the persisting uncertainty about these markets is lifted by the entry into force of a new global agreement to succeed the Kyoto Protocol.

Another observation to be made is that PES schemes must be designed and implemented with a view toward minimizing tensions between the concurrent objectives of effectiveness, efficiency and equity. This involves significant trade-offs that may greatly affect the success or failure of PES schemes. It is likely that new approaches will be found to attenuate these tensions as the body of experience with PES schemes continues to grow.

In summary, PES markets have the potential to become very valuable transfer mechanisms for internalizing positive environmental externalities and generating new revenues for sustainable development. This potential will be gradually fulfilled as markets for ES mature over time and as PES schemes become more financially sustainable. In addition their positive effects on sustainable development will be greatest if their distributional impacts are considered and if concrete efforts are made to build capacities in poor and indigenous communities. Otherwise

there is a considerable risk that they will perpetuate or exacerbate existing inequities in resource use and simply continue unsustainable survival patterns in poor communities.

SECTION 5 RECOMMENDATIONS AND NEXT STEPS

5.1 Recommendations

In Guyana, a market approach to carbon sequestration and biodiversity related ecosystem services (specifically non-timber products and tourism services) seems the most promising option and should only be pursued if the benefits of this approach can reasonably be shown to outweigh the costs. In addition, the net benefits must be greater than those of the next most attractive policy alternative. The application of ES user-pays cost recovery principles should generate more revenue and provide more appropriate price signals that along with the enforcement of punitive laws should decrease the cost of beneficial behaviour and increase the cost of activities with negative environmental impacts. There are already some existing laws (e.g. Environmental Protection Act) that might be utilised to do this.

Quantifying the benefits of actions is fundamental to a viable and effective environmental market (Carpenter et al. 2009). However, before implementation a number of key issues need to be resolved:

- How to develop an investment framework and suite of metrics which may be used by private and public investors?

- "The key policy and regulatory agencies need to issue guidance on whether the rights to each ES outcome can be sold separately – or whether there needs to be any "bundling" of rights – and to make sure that the administrative arrangements are in place to avoid any individual rights being sold twice. For example, when a landowner is providing a biodiversity offset, can they potentially also sell carbon rights and water rights for that same land?

- Can the landholder also receive incentive payments for actions to achieve those outcomes" (e.g. reforestation) (Williams et al. 2009)?

Once these policy decisions have been decided, administrative arrangements can be considered further.

Finally, perhaps the way forward, might be to set up a stakeholder working group to consider resolving the policy questions that underpin the institutional requirements for a trial environmental market in biodiversity offsets. For example, according to Crossman et al. 2009, decisions regarding:

- "The mix of **voluntary** instruments (e.g. auctions, tenders, other incentive schemes) and **mandatory** obligations under regulations (e.g. cap and trade schemes, some offset schemes). Whether further mandatory obligations need to be imposed – which could either be mandatory payments (e.g. levies, charges, penalties) or mandatory standards (i.e. establishing a level of "duty of care") – as part of the market or policy mix;

- The relative levels of **public** and **private** investment. The combination of impactor pays principles with investment by a much broader group of beneficiaries (e.g. taxpayers); whether an **outcome** (or good) is being traded or **actions** (or management services) are being contracted;

- "Bundling" of rights;

- Market infrastructure. Crediting and banking arrangements and the role of intermediaries such as a broker for trades. Where a market should allow direct trades or require a broker for all trades;

- The staging and timing of payments. Whether payments are made in advance and whether they are one-off or yearly (for a specified/agreement period);

- The scope and consistency of management agreements. Whether there is a standard agreement period or whether the framework and metrics allow for agreements of varying length;

- The geographical scale. Whether there is a consistent state-wide market infrastructure and methodology or whether infrastructure is driven by biophysical and policy heterogeneity; and

- Whether payments for ecosystem services should be limited to private land."

5.2 Next Steps

1. In relation to the consultancy, the next task is to:
    a. Produce communication and training materials necessary to execute (5) to be submitted to the Commission by 28th February, 2011.

2. This is to be followed by:
    a. An Evaluation of the requirements necessary to access identified markets. This would constitute the second Report of the consultancy which is to be submitted to the Commission by 29th April, 2011;

3. Next, will be the provision of a training programme, using the communication and training materials produced at the end of February 2011, for personnel identified by the GFC. The training will focus on the processes involved in targeting suitable PES mechanisms as identified in the current Report. This exercise is to be completed by 29th April, 2011.

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