CONCLUSIONS AND RECOMMENDATIONS

In terms of mitigation and adaptation to climate change, the land use and forest sector offers the country the greatest advantage in providing valuable sinks to offset greenhouse gases (GHG) emissions and for participation in the global fight against climate change under the existing international protocols. The standing biomass contained within the nation's forest already hold a considerable stock of sequestered carbon and this can be maintained indefinitely with proper management and judicious channelling of resources into this sector.

The country has a stated policy of pursuing sustainable development and the maintenance of high biodiversity values as its membership and participation in regional and international bodies working under these themes can attest. Several initiatives are underway to address land use issues and to create a more enabling climate for biodiversity management and sustainable development. The most important recent projects are:

- *National Biological Corridor Program* – This project has produced a series of maps delineating a network of biological corridor across the country. These corridors are contained within three priority areas each containing interconnecting links to each other and to neighboring Mesoamerican countries. The ultimate objective is to create natural ecosystem linkages throughout the Mesoamerican region, which will promote sustainable regional development, while maintaining or enhancing the biodiversity values of the region. The project has recruited stakeholders from across the country into the undertaking, and places a heavy emphasis on grassroots participation in its various activities.

  Stakeholders are being asked to maintain their lands in ways that are compatible with maintaining these linkages. If successful, this project stands to save large swaths of forestland in strategic regions across the country for the long term. It will also help to create new opportunities for land rehabilitation and recruitment of new areas into forest cover.

- *Land Management Program* – This program was launched in 2002 and has as its main objective the improved, efficient and sustainable use of land resources through enhanced land security, effective land markets and the promotion of a coherent land policy framework.

In terms of its impact on land use and the forestry sector, the project intends to produce a land use policy to guide decision-making in the area of natural resources management. A comprehensive land policy has never been produced in the country before and this state of affairs has definitely contributed to the erratic and inconsistent management of this resource.

By 2006 the project intends to have awarded property rights through tenure clarification and registration to approximately 23,000 rural families and to have mapped and surveyed at least another 5,000 rural parcels. In addition, the project intends to delineate 80 village boundaries and produce village maps.

The national forest sector and the CDM: mutual compatibility?

The emergence of the Clean Development Mechanism (CDM) on the national scene offers distinct opportunities to revive the sagging fortunes of the national forest sector. The main advantages are:

- Provision of a reliable funding mechanism to make the long term investment in the sector viable.
- Allows reforestation on degraded and abandoned lands in certain areas critical for biodiversity conservation.
- Creates the opportunity for large scale individual and community involvement in forest projects.
- Opportunity to create a sustainable and long term approach to forestry which has up to now not been the case.

- Creates incentive to grow forest rather than to clear it.
- Better protection for watersheds and improved water quality.
- Long term employment opportunities for rural dwellers.
- Transfer of technological know-how and capacity building to the national forest stakeholder community.

The potential world market for greenhouse gas reduction is huge and is estimated at circa US$5 –200 billion even without the participation of the United States, whose involvement would make the total considerably bigger. In 2001 the carbon market saw trades of 55 million tons of carbon dioxide equivalents (CO2e) valued at over US $100 million. This is occurring without the entry into force of the Kyoto Protocol, when it is expected that the carbon markets will take off on a grand fashion and could in time become the world biggest commodities market (Faroohar, 2001).

The CDM projects are expected to have a broad spread over different geographic regions to prevent other larger countries with more resources and institutional capacity from monopolizing the carbon –offset game. This should help to ensure that the smaller Latin American countries get their fair share of CDM projects. With these exciting possibilities, it is imperative that the country positions itself to take advantage of any opportunities in this area.

Likely scenario for national involvement in the CDM

Developing countries such as Belize stands to gain from climate change transactions under the CDM by using their inherent advantages in emission reductions capability through sinks to finance a range of sustainable projects. The great advantage of the CDM is that it brings international leverage and financing into the climate change arena hence creating financing mechanisms that were lacking under the Joint Implementation (JI) program. The goal of sustainable development is implicit in the CDM and therefore it can be used as a vehicle both for socioeconomic and environmental development.

Delving into this new area will not be without its challenges and growing pains however. Although the country has had a carbon sequestration project before under the Activities Implemented Jointly (AIJ) program and therefore has experience in this area, projects executed under the CDM promises to bring in new challenges that were absent in the previous project such as how to account for carbon sequestered in plantations and under agroforestry schemes.

Unlike the JI projects, which allowed funding for protection against deforestation, CDM projects (at least in the first commitment period) will only fund land use projects in the area of afforestation and reforestation and even these must meet a set of very strict criteria. In this area, countries like Belize will be penalized for good environmental stewardship, since most of the country remains under forest cover and the areas that have been deforested are pretty much dedicated to long-term use such as human settlements and farms catering to the export of primary products and to a smaller extent subsistence agriculture. Since these are dedicated land uses the potential for projects in these areas at the present time appears to be limited, however these conditions may change overnight. Important questions are who would benefit? By how much? Under what conditions? Could other funds and benefits be leveraged?

Belize's participation and benefits in CDM projects is contingent on a number of scenarios. Some of the most important are:

- ***Loss of market share for principal domestic exports.*** The country is now experiencing enormous pressure for its three principal domestic exports namely sugar, citrus, and bananas. The world market price for all three commodities is very low and these crops are

only able to survive due to the existence of preferential markets. The continued existence of these markets is highly questionable and subject to intense negotiations, however it is becoming clearer and clearer that eventually the exigencies of free trade will eventually prevail with potential devastating consequences for these primary industries. The demise of one or more of the primary agriculture export industry due to fair trade will leave a vacuum that may potentially offer opportunities for CDM projects. The outlook for each industry is as follows:

Sugar – This is the most beleaguered of the primary industry with a discouraging long-term prognosis. In 1999 there were approximately 23,085 ha. planted to this crop that has been on a declining trend since 1990. If the proposed Bagasse co-generation plant is constructed and commissioned as expected the overall outlook for the industry will improve. Indeed the proposed cogeneration facility using biomass fuel is highly compatible with sustainable development and are listed among the most attractive projects with potential for funding under the CDM since they play a dual role in sequestering carbon (cane crop) and in emissions avoided (replace fossil fuel). If the Bagasse co-generation plant is built it may well become the country's most important contributor of certified emission reduction (CERs). If for some reason the co-generation plant is not built, it is doubtful that the sugar industry will survive in its present form if at all. The lost of this industry will create a large area for potential CDM project activities. At the present time there is a strong likelihood that many of the farmers would withdraw from the industry and its marginal profits if another viable alternative can be found.

Citrus – The citrus industry suffers from many of the same malaise as the sugarcane industry but to a lesser degree and may be able to weather the storm ahead better than sugar and bananas. There are more land devoted to citrus than any other crop (29,970 ha.) and there are signs that at least some groves are still expanding, while new players are entering the field. The industry has grown 630% since 1985 and has recently changed hands from its previous owner, The Commonwealth Development Corporation to an organization of its growers called the Citrus Growers Association. If depressed world market price for citrus continues, at least some of the growers may diversify and become potential CDM project proponents.

Banana – This is the youngest of the three primary industries and witness robust growth in the last half of the 1980s to the present. The lost of preferential markets in Europe due to the World Trade Organization rulings is expected to hit this industry hard, although some money has been made available to the industry by the European Union to improve on production methods so as to become more competitive with other regional producers. If this initiative fails, a potential of 2,025 ha. may become available for CDM projects in the land use sector.

Besides the three crops listed above large amounts are also devoted to annual crop shifting cultivation and pasture that may be devoted to CDM projects.

- ***Milpa, mixed farming systems and pastures.*** There is considerable latitude for the adoption of CDM projects within these sectors. As a general rule these types of farming systems are more flexible and therefore able to accommodate small scale forestry projects but with good returns per hectare for carbon sequestered. These systems may not be attractive from the plantation forestry viewpoint but stands the chance to do the most socioeconomic good and sustain livelihoods in the areas that needs it most, marginalized subsistence farming communities. When checked for area these farming systems

have 23,273 ha. under milpa, 34,856 ha. of pastures, and a further 750 ha. with mixed farming regimes.

The small holders who manage these farms are in many instances already engaged, through other sustainable development agencies such as conservation organizations, and the Mesoamerican Biological Corridor Program (MBCP). There is therefore a good measure of awareness and sensitivity within this group to the dangers of deforestation and the importance of forest ecosystems and other land uses compatible with maintaining high biodiversity values. These agencies will be instrumental in organizing these small-scale stakeholders and facilitating their project application to the CDM whose objectives will find synergy with their own.

The prospects for CDM projects within any of the above land use system will depend on the opportunity cost of these projects vis-à-vis other potential land uses including agriculture. It is estimated that the income per ton of carbon sequestered will range between US$ 1-28 but more realistically falling between US$ 5-10. At this price projects on the scale of plantations that could be grown on abandoned sugarcane, citrus and banana fields will probably be viable (if also incorporating other objectives e.g. timber) but small-scale smallholder forest farms will be on their own uneconomical.

The best bet is for small-scale forest growers to aggregate to achieve economies of scale and to share project cost which should not be overlooked. These small scale operations must also engage in forest projects that deliver other goods such as food, fodder, shelter, ecotourism, etc., as would be found in for example agro-forestry and integrated rural forestry projects. This will assure a continued income source for the project developer while assuring potential investors as to the permanence of project benefits. There are certain disadvantages to this however, of which the most important is that in a mixed farming system the potential carbon benefits are hard to measure and there is in many cases no good models to rely on for doing this. Smallholders and their supporters should resist selling out their lands for big operators to establish large plantations since this marginalizes the small holder, does not create maximum employment benefits and does little to transfer technology but instead creates dependency.

Recommendations

The main recommendations of the study are:

- Create a program to generate public awareness of the CDM.
- The government should establish an office to facilitate investments into CDM projects in the country.
- Incorporate CDM objectives into national development policies and priorities.
- Create additional capacity within the Forest Department to assist small-scale CDM projects.
- Revise the laws to ensure that proper legal incentives are in place to encourage CDM projects.
- Ensure that CDM projects have multiple objectives such as watershed protection, biodiversity enhancement, food security, along with others.
- Encourage full Belizean participation in all aspects of CDM project implementation to ensure efficient and meaningful transfer of knowledge.

BIBLIOGRAPHY

Aukland, L.; Moura, Costa P.; Bass. S.; Huq, S.; landell-Mills, N; Tipper, R.; and Carr, R. Laying the Foundations for Clean Development: Preparing the Land Use Sector. A quick guide to the Clean Development Mechanism. IIED. London, 2002.

Avila, Marcelino. Building on Current and Local Initiatives for Sustainable Development in Belize. World Bank Report. 1999.

Baille, I. C.; Wright, A. C. S.; Holder, M. A.; Fitzpatrick, E. A. Revised Classification of the Soils of Belize. NRI Bulletin 59. Natural Resources Institute. Chatham, U. K, 1993.

Belize Land Management Program, Summary Presentation to Priority Areas Stakeholders. 2002.

Butcher, P. N. et. al. Evaluating the Carbon Sequestration Potential of Tropical Forest. 2001.

CATIE. Integrated Silvopastoral Approaches to Ecosystems Management Project in Colombia, Costa Rica and Nicaragua. Report No: 21869-LAC. 2002.

CATIE. Inventarios Forestales para Bosques Latifoliados en América Central. 2002.

Central Statistical Office. Environmental Statistics for Belize. 2000.

Clausen, R. M; Gholz, H. Carbon and Forest Management (Prepared under U.S. Department of Agriculture, Forest Service, Cooperative Agreement 98 – CRA-094). 2001.

ESTAP. Community Profiles. 2000.

ESTAP. Regional Development Plan for Southern Belize. 2000.

FAO – CCAD. Plan de Capacitación PBCC. 2002.

GoB. Belize National Report to the World Summit on Sustainable Development. 2002.

GoB. First National Report of the Conference of the Parties of the United Nations Framework Convention on Climate Change. 2002.

GoB, 2000. Forest Act Chapter 213, Revised Edition 2000.

GoB, 2000. Medium Term Economic Strategy Paper 2000-2002.

GoB, 2001. Ministry of Agriculture, Fisheries and Cooperatives, Annual Report 2001.

GoB, 2001. Ministry of Economic Development and Foreign Trade, Annual Report April 1 to March 31, 2002.

GoB, 2001. Ministry of Natural Resources, the Environment and Industry, Annual Report 2000 –2001.

GoB, 2000. National Population and Housing Census 2000.

GoB, 2000. National Poverty Elimination Strategy and Action Plan 1998 – 2003.

GoB, 1999. Preparing for the New Millennium, National Human Development Report 1999.

Gomez – Echeverri, L. Climate Change and Development. 2000.

González, Candy. Survey of Land Related Laws of Belize. 2000.

Government of Belize. National Environmental Action Plan, 1996. Belmopan, June 1998.

Herrera, A. C. Mesoamerican Biological Corridors Program; Belize National Report of the Participative Planning Process (Volumes I & II). 2002.

Herrera, A. C. Belize National Report to the United Nations Convention to Combat Desertification. 2002.

Huq, S. Applying Sustainable Development Criteria to CDM Projects: PCF Experience. 2002.

Instituto Meteorológico Nacional del Ministerio de Ambiente y Energía. Estimación Preliminar del Carbono Almacenado en los Bosques de Costa Rica. Costa Rica, 1999.

IUCN, WWF, CCAD, SICA. Listas de Fauna de Importancia para la Conservación en Centroamérica y México.

IUCN. IUCN Red List Categories. Prepared by the Commission as approved by the 40th meeting of the IUCN. Gland Switzerland, 30 November 1994. IUCN Home Page, 2001.

King, R. B.; Baille, I. C.; Abel, T. M. B.; Dunsmore, J. R.; Gray, D. A.; Pratt, J. H.; Versey, H. R.; Wright, A. C. S.; Zisman, S. A. Land Resource Assessment of Northern Belize. Natural Resources Institute. Chatham, UK, 1992.

King, R. B.; Pratt, J. H.; Warner, M. P.; Zisman, S. A. Agriculture Development Prospects in Belize. NRI Bulletin 48, National Resources Institute. Chatham, UK, 1993.

Meerman, J. C. Central American Ecosystems Map (Volumes I & II). 2001.

Ministry of Natural Resources and the Environment. The Belize Biodiversity Action Plan 1998-2003. 1998.

Ministry of Natural Resources and the Environment. The Belize Biodiversity Strategy 1998-2003. 1998.

NARMAP. Towards a National Protected Areas System Plan for Belize, Synthesis Report. 1995.

Programme for Belize. Río Bravo Conservation and Management Area, Management Plan (Forth Edition). 2000.

Ravindranath, N. H. Comparative Analysis of Emission Factors and Activity Data used for the Estimation of Greenhouse Gas Emissions in the Land Use and Forestry Sectors for some Developing Countries.

Salas, A. et. al. El potencial del Corredor Biológico Mesoamericano de Centroamérica en el Mecanismo de Desarrollo Limpio. 2002.

Silver, W. L.; Ostertag, R.; Lugo, A. E. The Potential for Carbon Sequestration through Reforestation of Abandoned Tropical Agricultural and Pasture Lands (Restoration Ecology Vol. 8 No. 4, pp. 394 – 407). 2000.

UNDP. Belize National Human Development Report. 2000.

UNEP. Summary of National Commitments Implied by the Articles of the Convention and the Conference of the Parties. 2000.

Winrock International, Revised Carbon Monitoring Protocols, SOP's and QA/QC Plan for the Río Bravo Carbon Sequestration Pilot Project. 2001.

Winrock International. Year 2001 Carbon Monitoring Analysis and Status Report for the Río Bravo Carbon Sequestration Pilot Project. 2001.