The Multi-Donor Mid-Term Review of The Iwokrama International Centre for Rain Forest Conservation and Development

Draft Final Report

April 2001

The Environment and Development Group
41 Walton Crescent, Oxford, OX1 2JQ
United Kingdom
Tel: + (0)1865 318180; Fax: + (0)1865 318188;
E-mail: admin@edg.org.uk; Web: www.edg.org.uk

Table of Contents

List of acronyms

CEO	Chief Executive Officer
CEW	Community Environmental Worker
CIDA	Canadian International Development Agency
CNPPA	Commission on National Parks and Protected Areas (of IUCN)
DFID	Department for International Development
EC	European Commission
ECTF	Edinburgh Centre for Tropical Forestry
EPA	Environmental Protection Agency
EU	European Union
FPA	Forest Products Association
FRP	Forest Research Programme
FSC	Forest Stewardship Council
GEF	Global Environment Facility
GFC	Guyana Forestry Commission
GIS	Geographical Information System
GPS	Global Positioning System
HIPC	Highly-indebted poor country
HRD	Human resources development
IAST	Institute of Applied Science and Technology
ICDP	Integrated Conservation-Development Project
ICU	Information and Communications Unit
IIC	Iwokrama International Centre
IIED	International Institute for Environment and Development
ITTO	International Tropical Timber Organization
IUCN	The World Conservation Union (formerly the International Union for Conservation of Nature and Natural Resources)
MoE	Ministry of Education
MoH	Ministry of Health
MoU	Memorandum of Understanding
MRU	Makushi Research Unit
MTR	Mid-Term Review
NGO	Non-Governmental Organization
NRDDB	North Rupununi District Development Board
NRI	Natural Resources Institute
NTFP	Non-Timber Forest Product
PA	Protected Area
PDF	Professional Development Fellow
PHRIA	Participatory Human Resource Interaction Appraisal
RA	Research Assistant
SFM	Sustainable forest management
SSWG	Social Science Working Group
SUA	Sustainable Use Area
TFRK	Traditional Forest-Related Knowledge
UG	University of Guyana
UNDP	United Nations Development Programme
WP	Wilderness Preserve
YP	Young Professional

Executive Summary

The Iwokrama initiative is a unique and ambitious venture that aims to do nothing less than to demonstrate to the world that sustainable forest management can pay its way, and to help develop the necessary tools. It comprises the Iwokrama International Centre (IIC), the Iwokrama Forest and partnerships with local and national stakeholder groups and the broader international community. There are three core programmes, each with a primary governmental donor in support - *Sustainable Forest Management* (ITTO, with CIDA funding for ecotourism development), *Conservation and Use of Biodiversity* (EC) and *Sustainable Human Development* (DFID) - and two cross-cutting programmes with multiple donors - *Forestry Research* (IITO, DFID, EC) and *Information and Communications* (DFID, EC). Staff and operations are supported by DFID and CIDA grants, Commonwealth and World Bank salaries, and project financing. Unallocated core funding is scarce and urgently needed.

The mid-term review (MTR) aims to establish how far the Iwokrama initiative has got, and where does it need to go in next 18 months and beyond. To do this, it focuses upon the implementation of the *Operational Plan 1998-2002* as a whole. The MTR report is organized around assessments of the three core programmes, each of which also contains links with the two cross-cutting programmes, followed by a discussion of issues related to sustainability. A total of 36 recommendations are made (see below). The overall conclusion of the MTR is that excellent progress has been made across a wide range of target areas, with the achievement of institutional sustainability being the main challenge of coming years.

Implementation schedule. Implementation of the 1998-2002 *Operational Plan* is running about a year behind schedule. Delays have been caused by factors largely beyond Iwokrama's control (e.g. delays with staff recruitment, disbursements, lack of suitable candidates for key positions and lack of finance for key administrative support positions). Some programme elements have been slow to start because Iwokrama's participatory and inclusive approaches take time and it can be unpredictable when consensus will be achieved on each issue. However, the management team has been able to compensate adaptively for these delays, and programme purposes are likely to be largely achieved within amended deadlines.

Highlights of progress. Impressive progress has been achieved since 1998 in the following areas:

- *Understanding the Iwokrama ecosystem.* Iwokrama has been very effective in documenting the diversity and natural history of wildlife and other forest resources both directly and indirectly. Ecological and economic linkages around the forest have been clarified, including those among the forest, the North Rupununi savannahs, the associated river systems, and the people who inhabit and use the area.
- *Managing information to support planning.* Iwokrama has organized and used social, economic, cultural and ecological information to classify and map forest types and community lands in and around the forest. GPS and GIS have been used to support participatory and technical resource management planning, feeding into processes for the zoning of the forest into the Sustainable Use Area (SUA) and Wilderness Preserve (WP).
- *Human resource development and capacity building.* Iwokrama has achieved significant impact by employing and training 13 Rangers (mostly local), 26 Community Environmental Workers (CEWs, all local), and 13 young Guyanese

employed under the Young Professionals Programme (six Professional Development Fellows or PDFs with post-graduate qualifications, and seven Research Assistants or RAs with bachelors level qualifications or equivalent). Rangers have been equipped for duties that include forest management, enforcement, research support, visitor guiding and interpretation, and community liaison, the last role linking to the CEWs, who participate in parts of the Ranger syllabus. The PDFs are provided with two years' work experience in a mentoring relationship with senior staff, and work in forest and protected area management, community development, forest ecology, ecotourism, and GIS. Competence and motivation among staff appears to be extremely high. In selecting the RA's, preference was given to candidates with an interest in progressing to graduate level studies. Their two-year fellowships are designed to give the RA's practical experience working with experienced researchers to better equip them for graduate-level studies and further professional development.

- *Public outreach.* The IIC manages a well-used public-access library and research space, a well-designed web-site and a multimedia publications service. It also runs series of informal seminars, formal public lectures, public forums, and technical workshops.
- *Collaboration with local communities.* Iwokrama has achieved much in working with local communities, especially by encouraging and enabling the emergence of the North Rupununi District Development Board (NRDDB). This has a strategic role in promoting dialogue, articulating local aspirations, and providing an interface between local people and the outside world. Iwokrama also helped to establish the Makushi Research Unit (MRU), which has documented traditional knowledge and language among local peoples. Participatory community resource assessments (or PHRIAs) have given an initial basis for community development planning. Other initiatives include Ranger and CEW recruitment and training, establishment of Wildlife Clubs in local communities, assistance with the construction of a community training centre (the Bina Hill Institute) and founding of a community radio (Radio Paiwomak). The net result is an intimate and mutually supportive relationship between Iwokrama and local communities.
- *International and inter-sectoral collaboration.* Iwokrama has developed an array of collaborative formal and informal relationships with organisations nationally and internationally, both to *generate* and to *disseminate* research results and lessons from forestry-related development experiences. An example mechanism is the series of regional technical workshops, drawing representatives from within Guyana and other countries. Subjects have included reduced impact logging (and its relationship to certification systems for sustainably produced timber), the conservation and use of wildlife resources (highlighting research priorities and potential improvements to policy and practices in the Guiana Shield countries) and the development of business partnerships for forest conservation and management. Workshops attract a wide range of stakeholders and are generally designed through multi-stakeholder planning meetings, resulting in a content that closely matches participants' interests.
- *Building partnerships for good governance.* Iwokrama is demonstrating how inclusion and dialogue promote efficiency and sustainability, which is a major influence in favour of good governance. Iwokrama has also contributed to a number of important national-level thematic processes. They are reflected in relationships established with national institutions such as the Guyana Forestry Commission, the Environmental Protection Agency, the Guyana Broadcasting

Corporation, the Fisheries Division of the Ministry of Fisheries, Other Crops and Livestock, and the University of Guyana.

- *Influencing thematic processes.* A key attribute of Iwokrama is its sophisticated understanding of the role of research within wider participatory processes of policy, human resources and institutional development. Examples of areas in which Iwokrama is making actual or potential policy-process interventions are: (a) reduced-impact logging methods within efforts to improve forest management standards for industrial-scale timber concessions; (b) development of national GIS capacity, environmental education, equitable arrangements for bioprospecting, and national wildlife management capacity; (c) restoration of Amerindian culture and traditional forest-related knowledge; (d) non-timber forest products and their downstream processing; and (e) locally-appropriate ecotourism.

Participation and impacts on stakeholders. Iwokrama works in local and national contexts characterized by relatively low levels of economic activity and ecological productivity, so opportunity costs are low and potential beneficiaries abundant. Likely benefits to stakeholder groups are as follows:

- *Amerindians in and around the Iwokrama forest* are receiving benefits from a managed landscape that preserves physical and biotic elements that are important to them, and to participate equitably in benefit streams from a wide array of economic activities that the Iwokrama initiative is designed to stimulate.
- *Amerindians in other areas of Guyana* are expected to benefit indirectly from replication of participatory planning mechanisms and benefit-sharing arrangements, from improved management practices for wildlife, NTFPs, timber and ecotourism, through the application of more appropriate national policies and through the efforts of other agencies nation-wide (as these begin to implement elements of the 'Iwokrama model'), and from recognition of the value of Amerindian culture and self-organization, leading to greater Amerindian recognition and active participation in national life.
- *Public, political groups and government agencies in Guyana* are benefitting from direct training and collaboration, and from Iwokrama's influence on policies and processes, which validate and promote participation, dialogue, joint problem-solving and accountable forums in many sectors and locations. Transparency, inclusiveness and local participation are hallmarks of every Iwokrama initiative, thus promoting good governance in a country with a long history of excessive centralization.
- *The national and international scientific community* are expected to benefit from the preservation of an important biodiversity resource and a set of viable natural ecosystems for future study, and provision of access and support to enable most efficient use of research time. The scientific community will also benefit from increased knowledge and understanding of the ecological, economic and social processes that influence the sustainability of forest conservation and management systems.
- *The private sector,* in the form of national and international business partners, is expected to benefit from new business opportunities in and around the Iwokrama forest, taking advantage of Iwokrama's investment in organizing information on local resources, and the emergence of strong local communities with which mutually-profitable partnerships can be negotiated. The private sector will also benefit from access to improved forest management and planning technologies

and improved understanding of the processes of sustainable forest management and forest-based development.

- *Iwokrama staff* are benefitting from their participation as employees and trainees, and as potential investors, shareholders and entrepreneurs, in all aspects of the programme and spin-off economic activities. Staff receive considerable personal satisfaction by being actively involved with the stewardship of a large natural area and an internationally-significant action-learning experiment in sustainable conservation and development.
- *Other beneficiary groups* include: (a) *local, national and international NGOs* with an interest in biodiversity conservation and Amerindian well-being; (b) *the people of Guyana* who will benefit from improved governance and environmental literacy; (c) *international development institutions* which will have access to a new process model for durable benefit-sharing, collaborative partnerships and forest resource management arrangements; and (d) *the world community* which will benefit from the preservation of biodiversity, unique ecosystems, traditional forest-related knowledge, and the use, option, bequest and existence values associated with these resources.

Remaining weaknesses and scope for improvement. These are few but important, and include:

- *Lack of an in-house resource economist,* so that data and analyses to refine key assumptions in the *Business Plan* are missing, the credibility of investment prospects and cash-flow projections are undermined, and the basis for international fund raising is weakened.
- *Increasing need for management information systems,* to ensure full knowledge management support to the Management Committee in making decisions and for managing staff, money, materials and information, and establish participatory monitoring and evaluation systems to track inclusion and impact indicators amongst local people and other stakeholders.
- *Need for local community representation on the Board of Trustees,* to ensure full transparency and the responsive protection and advancement of local community interests and to enhance the development and maintenance of effective partnerships for rain forest conservation and development at Iwokrama, by ensuring that the Board has direct access to the communities' detailed local knowledge of the Iwokrama Forest and surrounding environments and conditions to inform its deliberations.
- *Need to strengthen collaboration at all levels,* to increase support for Iwokrama and its programmes and to maximise stakeholder knowledge and application of the lessons being learned. In this, the Centre should take particular advantage of its maturing programmes in forest management and planning to deepen collaboration with national stakeholders, particularly in the Guyana Forestry Commission and the forest sector
- *Need for a clear strategy for achieving institutional sustainability,* including an effective fund-raising system to meet the need for unallocated core funding to support essential but not directly project-related work (such as convening meetings of the Board of Trustees), to capitalize a trust fund, to replace the Director General when the incumbent leaves in mid-2001, and more generally to ensure the continuity of staff and programmes through a potential funding crisis in 2002 when most donor-funded projects conclude.

Key recommendations. A total of 36 recommendations arose from the MTR. They are hyperlinked to references in the text (return navigation is by means of the 'back' arrow in the web toolbar). They are summarized as follows:

- *Forest zoning.* The proposed Mahdia road is the major challenge to rational zoning of the Iwokrama forest and should be addressed by careful assessment of options in terms of Iwokrama's long-term aims.
- *Forest management.* In seeking commercial partners, Iwokrama should make a deeper examination of the opportunities and constraints associated with different approaches to timber management. In order to secure equitable outcomes, Iwokrama should review timber harvesting and timber marketing strategies from the perspective of community-based management in order to ensure that local stakeholders are not delivered relatively late and powerless into commercial ventures. Engagement with the timber industry building on RIL experience should also occur through partnerships outside the Iwokrama Forest. A study of NTFP stock levels in Iwokrama and other forests should be done to clarify potential harvest intensities, yields and harvesting cycles to permit prediction of income per unit area. A technical workshop on NTFPs should be convened, leading to a code of practice for their management
- *Biodiversity inventory and prospecting.* Assessment should be made of information management needs of the biodiversity programme, including a capacity to share knowledge with other bioprospecting concerns to prevent biopiracy, while development of IPR and benefit-sharing arrangements should address ways to react to claims based on Amerindian ancestral domain.
- *Sustainable human livelihoods.* More support should be provided by DFID to the SHD programme in the form of advisory visits to enable lessons to be learnt and contribute to the further development of sustainable livelihood skills amongst staff and local stakeholders.
- *Management information system.* Preceded by an analysis of institutional knowledge management needs, an upgraded MIS should be developed to support the Management Committee, linked to a locally-sited, open-access knowledge bank and to participatory monitoring and evaluation that uses the MRU and CEWs to track indicators of well-being among local stakeholders.
- *Expanding capacity building and collaboration.* Iwokrama should give priority to maintaining and expanding its training and capacity-building programmes by targeting training activities at key gaps in local and national capacity and increasing opportunities for collaboration with national and regional institutions by providing secondment and sabbatical placement opportunities at the Centre.
- *Senior staff presence in the field.* Institutional capacity and local networks should be further strengthened by basing a permanent Iwokrama staff member at the Bina Hill Institute, who would counterpart the NRDDB and work closely with the CEWs.
- *Financial sustainability.* The existing *Business Plan* can be used as a basis for fund-raising efforts in most areas of current activity, but to move the IIC to the necessary level of long-term financial sustainability new and additional resources will be needed. Efforts to secure these should include preparation of an IIC-specific business plan, and should focus on: (a) a proposal to GEF for capitalization of an ethical trust fund to guarantee long-term core funding; (b) international fund-raising among private foundations and companies by agents

working on commission; and (c) proposals to governments for additional project-related funding and to ensure the continuity of existing staff and programmes.

- *Investments.* Efforts to direct private investments to an array of regulated businesses in and around the Iwokrama forest should be preceded by the definition of investment rules in line with Iwokrama's business principles, and the preparation of a set of business plans which can be used in marketing.
- *Business skills development.* The ability of local people to participate fully in commercial opportunities should be enhanced through prior training in how to set up and run businesses, including related skills such as how to assess market opportunities and the equity of proposed joint ventures.

1. Introduction

1.1 Historical Background

The Iwokrama International Centre for Rain Forest Conservation and Development (IIC) has its origin in the 1989 Commonwealth Heads of Government meeting, at which the Government of Guyana offered to set aside 360,000 ha of tropical moist forest for the use of the international community as a proving ground for techniques of conservation and sustainable use. A Commonwealth Appraisal Mission was undertaken in 1990 which selected the site of the Iwokrama Forest in the centre of the country. The British Government supported reconnaissance surveys by the Natural Resources Institute in 1992, and an Interim Board of Trustees was established to govern the enterprise in the same year. A Global Environment Facility (GEF) pilot project with UNDP as implementing agency was agreed in 1993, with a Project Implementation Review in 1998 and a Final Project Evaluation in 2000. While this process was underway, the Iwokrama International Centre (IIC), the Iwokrama forest, and the Board of Trustees were all formally established in law through passage of the Iwokrama Act 1996. Two strategic documents, the *Operational Plan 1998-2002* and the *Business Plan 1998-2007* were adopted by the board of Trustees early in 1997, and a Director General was appointed in July 1997. A meeting of a number of potential donors was convened in January 1998, and several of these agreed to finance elements of the *Operational Plan*, leading to a new phase of activity that began in July 1998.

1.2 Economic Background

The Iwokrama initiative can be said to comprise two main sets of activities. The first set are those to do with developing an institution (the IIC) to the point where it is sufficiently valued by the national and international communities to be supported through policy, funding and public opinion, in return for provision of public services in tropical forest conservation and management (some of them in markets that still have to be created). The second set of activities are those to do with developing the partnerships needed to collaboratively manage a large protected wildland (the Iwokrama Forest), in sustainable ways that reward compliance by all groups that would otherwise either threaten the area or withdraw their support from it, while also generating revenues and other outputs to support diversified and intensified local economic activity. The ultimate aim of these related spheres of activity is to demonstrate to the world how tropical forests and the biodiversity they contain can survive the next hundred years or so (a time of tropical deforestation and global mass extinction), while contributing experiences, skills and information concerning tropical forest management, within a hoped-for emergence of less destructive and more equitable local, national, regional and international economic systems.

Thus, Iwokrama is a global partnership that attempts to demonstrate that it is feasible to conserve and sustainably use tropical rain forest ecosystems in a manner that contributes lasting benefits to both local and national social and economic development. The global community sees forest conservation as a desirable objective and there is a belief that in the longer term, sustainable forest management (SFM) can be economically and socially sustainable for host countries. But this view is based largely around the need to demonstrate two things associated with SFM: (a) that the full economic value of forests and forest products (including biodiversity and carbon) deriving from SFM can exceed returns from

competing land uses such as agriculture or conventional forestry focusing on industrial timber production; and (b) that markets can be used and created to capture some of this value to substantiate what are currently non-market benefits.

The institutional, economic and social processes associated with value demonstration and value capture are the essence of Iwokrama's activities. The SFM experiment, however, implies short-term sacrifice for potential long-term gain, since it imposes social and economic constraints or opportunity costs on the host. For example, implicitly the Iwokrama experiment challenges Guyana to adopt an alternative development path (in this case biodiversity conservation, integrated land use planning, multiple use of all forest goods and services, reduced impact harvesting and social inclusion in forest management), which is not necessarily the most financially profitable to influential key actors in the short term[1].

There are thus *national* and *local* costs associated with pursuit of this *global* benefit objective. Iwokrama is trying to reconcile the global demand for conservation with unique national and local challenges arising from the opportunity cost imposed on Guyana. Donor engagement with the project can be viewed as representing a model transaction between 'cash-rich/species-poor' societies and 'cash-poor/species-rich' ones. Key questions relate to the economic viability of SFM and the social impacts of the experiment. Can this experiment prove that SFM is economically efficient (i.e. that full economic benefits outweigh all costs), and how long will it take to find this out? If it cannot in the short to medium term (say over 10 years), is the global community willing to pay the price of the lessons to be learned? This leads to questions about the criteria for judging Iwokrama's performance. Specifically, to what extent should the IIC itself, as a demonstration project of a *desirable global principle* (i.e. SFM), be tied to a largely untested financial objective? In other words, while Iwokrama operates to disseminate lessons on the economic efficiency of SFM, should the initiative itself be a model of economic efficiency? Having high levels of economic efficiency and effectiveness will clearly enhance the credibility of the practices and models developed by Iwokrama. However, these questions are complicated by uncertainty associated with the structure of the domestic timber production industry in Guyana and the evolving roles of different stakeholders in forest exploitation and management.

The Iwokrama *Business Plan* substantiates the objectives of the *Operational Plan* with financial/economic return projections that are set against projected operational costs. The IIC is working to realise these returns with its programme of research based on environmentally and socially sustainable product commercialisation and general market creation for biodiversity. Some of the anticipated returns (e.g. carbon and bioprospecting), however, are somewhat speculative and partly beyond Iwokrama's control, and revenue forecasts are based on estimated accounting or shadow values. This simply means that the IIC has calculated its best guess of the (to be created) market value for these products and the value that it can capture using created markets. The returns to other activities are calculated on best-guess business forecasts for IIC activity and participation in existing markets (timber, NTFPs, ecotourism). The business plans for these sectors are calculated to varying degrees of rigour.

There is a question of the *order* in which the IIC is able to realise bankable returns to offset its running costs. Earlier returns are clearly preferable from the donor perspective, since they

[1] The fact that Iwokrama represents some 5.7% of allocated state forest in Guyana is indicative of the scale of this opportunity cost (Forestry in Guyana Fact Sheet, GFC 2000)

will move the IIC nearer its self-supporting objective, and Iwokrama is working on the basis of bringing any activity to the market as early as possible. Some projected returns will be earned from goods and services to be traded in markets that already exist, while in other cases the markets need to be created or the necessary financial tools invented. Moreover, even near-market activities are contingent on domestic social and environmental obligations that complicate the process of commercialisation and essentially mean that Iwokrama has to develop a more complex commercialisation system to suit diverse stakeholders. For example, although conventional industrial-scale logging might permit quick progress towards cost recovery, domestic social obligations in terms of benefit sharing (e.g. community forest management) may complicate reaching this objective.

The unique mix of obligations tied to commercialisation of forest products is the marketing challenge faced by the IIC. It is a challenge that faces advocates of SFM in many parts of the world. While there is optimism that these packages can be sold to domestic and international markets, this has still to be tested in such areas as timber, ecotourism, and NTFPs. An inability to realise benefits in these circumstances should not be seen as a sign of failure. Rather the global community can learn much from this experiment, whatever the outcome and, to facilitate this, Iwokrama should pay particular attention to identifying the factors that lead to the success or failure of particular initiatives or forest uses. Iwokrama can be viewed as a necessary global learning project, and donor inputs in the initial learning period indeed represent a willingness to pay for the learning experience. Should SFM prove to be less attractive economically, then a longer-term donor coordination may be needed to bridge the gap between project costs and SFM returns. Such a scenario is possible and simply substantiates the view that 'species-rich but cash-poor' countries should be recipients of international transfers to realise environmentally and socially sound development for domestic and global benefit.

1.3 The Iwokrama Project Portfolio

The Iwokrama initiative involves a complex array of inter-linked processes, which are articulated in the *Operational Plan* and *Business Plan*. The former specifies three core thematic programmes (*Sustainable Forest Management, Conservation and Use of Biodiversity*, and *Sustainable Human Development*) and two cross-cutting programmes (*Forestry Research* and *Information and Communications*). Implementation of the *Operational Plan* is being supported by several governmental donors through a number of individual projects, the purposes and outputs of which are given in Annex 2, and that are targetted to the various programmes as follows:

- *Sustainable Human Development*, funded by the British Department for International Development (DFID) for three years, with the first disbursement in June 1998. Its role is to support inclusive resource management planning for sustainable livelihood development among local people and other Iwokrama stakeholders. This is referred to hereafter as the DFID project.
- *Senior Staff Support*, funded by DFID for three years from March 1998. Its role is to provide part of the salary of Iwokrama's Director General and other senior staff, and thereby to support implementation of the *Operational Plan*. This is referred to hereafter as the DFID Senior Staff Support project.
- *Sustainable Management Model in the Iwokrama Rain Forest* (PD 10/97 Rev. 1(F)), funded by the International Tropical Timber Organization (ITTO) for three years, with the first disbursement in July 1999. Its role is mainly to support the

Sustainable Forest Management programme. This is referred to hereafter as the ITTO project.

- *Conservation and Sustainable Utilization of Biodiversity in the Iwokrama Forest* (B7-6021/98-02/VIII/FOR), funded by the European Commission (EC) for three years from May 1999. Its role is to support Iwokrama in demarcating and managing a forest Wilderness Preserve, conducting an inventory of biodiversity resources and developing a bioprospecting capacity in conjunction with the University of Guyana. This is referred to hereafter as the EC project.
- *Contribution Agreement for Administrative Support and Community-Based Ecotourism,* funded by the Canadian International Development Agency (CIDA) for three years from September 2000. Its role is to provide administrative support to Iwokrama in the person of the Director of Programme Support, and to provide an Ecotourism Specialist to guide planning and development of ecotourism activities. This is referred to hereafter as the CIDA project.

1.4 Timing and Approach of the MTR

The mid-term review (MTR) team[2] was asked to assess the progress of the Iwokrama initiative roughly mid-way through the period of applicability of the *Operational Plan,* and to recommend changes that may be needed during the remainder of that period. The review coincides with the middle of the current phase of multi-donor financing, which began in the first half of 1998 with the start of DFID funding, and which will draw to a close in the second half of 2002 with the final disbursements of the EU, ITTO and CIDA projects. The timing of the MTR is thus appropriate with respect to the *Operational Plan,* even though two of the projects (EC and CIDA) are well short of their individual mid-points. The fact that most resources available to Iwokrama are in the form of project funding imposes a financial structure that is not perfectly adapted to support the implementation of a complex, integrated programme of activity. For this reason, the leadership of Iwokrama proposed, and the MTR team accepted, that the review should focus upon the implementation of the *Operational Plan* as a whole, rather than concentrating on the allocation of specified project resources to particular activities. This approach is also consistent with Iwokrama's auditing procedures.

The MTR team approached the work by first reviewing documents (both in UK and in-country) and on arrival received a detailed briefing from Iwokrama staff, which permitted rapid active engagement with all staff, and identification of relevant topics to be covered. Collaboration from staff led to preparation of stakeholder impact matrices (see Annex 7). Three of the four consultants visited the Iwokrama forest and the north Rupununi savannah communities, allowing for direct observations, while the fourth concentrated on economic analyses. The team concluded with a one-week series of interviews and workshops with all major stakeholders and further document revision in Georgetown, and leading to follow-up questions and discussion that culminated in a two-day multi-stakeholder dialogue at the end of the mission's time in Guyana (see Annexes 1 and 4). This report integrates the main findings of the MTR team and is organized around assessments of the three core thematic

[2] The MTR comprised Julian Caldecott (Team Leader, Biodiversity), Torsten Kowal (Forestry), Jeremy Holland (Social Development) and Dominic Moran (Economics). The team would like to record here their appreciation for the extraordinary effort made in hosting the mission by the staff and associates of Iwokrama, from David Cassells (the Director General) to the furthest fringes of the co-operative network that he leads and inspires.

programmes of the Iwokrama initiative, each of which also contain links with the two cross-cutting programmes. Progress made in developing the institution of the IIC is also described, followed by an analysis of key issues that were identified and a set of specific recommendations that emerged from the study. The ways that the MTR Terms of Reference have been addressed are indicated in Annex 1.

2. Review of Progress

2.1 Introduction

2.1.1 Physical location and facilities

The IIC is headquartered in rented accommodation in a residential area of Georgetown. This facility supports an administrative service and seven work teams focused on: Geographical Information Systems (GIS), Wildlife Management, Information and Communications, Social Sciences, Forest Ecology and Management, Human Resources Development, and Ecotourism Development. A Natural Products Unit is in the process of being established at the University of Guyana (UG), near the site where it is planned to locate the IIC HQ on a permanent basis. In-house facilities at the IIC include a GIS laboratory, a local area network (LAN) and a library.

Field operations are headquartered at the Iwokrama Field Station, close to the settlement of Fairview/Kurupukari and the ferry crossing of the Essequibo River on the Georgetown-Brazil road that bisects the Iwokrama forest. The Field Station comprises four barrack-style accommodation units for staff, a number of cottages, a workshop and teaching facility/dining hall (under construction), a computer lab, dry and wet field labs and facilities for equipment storage and radio communications. Four boats and three vehicles are based at the Field Station, and there are four well-developed satellite camps and two research camps elsewhere in the forest.

2.1.2 Auditing and monitoring procedures

The accounts of the IIC have been audited by Deloitte and Touche for the years 1996, 1997, 1998 and 1999, with the most recent set awaiting signature. The accounts were inspected by the MTR team, and notes to the accounts provide the following details on accounting policies: (a) the accounts are prepared under the historical cost convention; (b) the purchase of fixed assets from grants related to specific projects is charged out in the year of acquisition to operating expenses. Memorandum records are maintained for such assets, and at the end of the project they are valued and accounted for in the books of Iwokrama; (c) conventions are specified on the depreciation of computer equipment and the conversion of foreign currencies; and (d) revenues are recognized as falling into the specified categories of 'unrestricted core grants', 'restricted core grants', and 'other revenue'.

The last point notwithstanding, the audited accounts appear to be on an ICC basis rather than on the basis of any specific project or donor. Prior to the arrival of the current CIDA-funded accounts manager, the Director General managed project budgets (assisted by the in-house economist prior to his resignation). Current financial monitoring consists of the

introduction of the Windows-based accounting software 'ACCPAC' and a plan for training using an external consultant, plus in-house training.

2.1.3 *Management culture and business principles*

An impressive feature of Iwokrama's management culture is its *adaptive flexibility*. The various work teams operate in a dynamic environment using 'bottom-up' principles of participation, holism, sustainability, functionality and equity, rather than by following an imposed order from 'above'. This allows individual units to operate more or less autonomously in line with a general plan, an approach more like that of modern corporation than a traditional scientific institution. The approach is reflected in Iwokrama's business principles, developed through a participatory workshop in late 2000, which will guide the development of business partnerships that Iwokrama will establish to promote sustainable economic activity using the resources of the forest and surrounding areas. These include the following requirements:

- for open, competitive, transparent processes;
- for independent evaluation and certification of environmental performance;for equity partnerships with employees and local communities;for protocols to guarantee rights to intellectual property rights and equitable benefit sharing;
- for emphasizing the exploitation of high-value niche markets; and for a preference towards national partners in joint ventures.

2.2 Sustainable Forest Management

2.2.1 *Resource surveys and socio-economic characterization*

Good forestry practice in tropical moist forests involves dividing the forest into permanent, ecologically-meaningful units (called primary catchments or catchment units at Iwokrama). These can then be inventoried, harvested and monitored individually, providing a basic architecture for making decisions about the management regime in each unit, and for managing information about each stand. A unit-level inventory that allows choice among silvicultural systems allows matching of management to variable stand characteristics, including consideration of NTFP, ecotourism, water catchment, biodiversity and other values in assessing the stand before deciding how to manage it. The IIC has carried out a range of activities to generate information associated with the 930 catchment units of the Iwokrama forest, some during the pre-1998 phase with GEF and NRI support. Information has since been compiled under the geological, pedological, hydro-meteorological, archaeological, zoological, mycological and botanical resource survey topics. A second stage forest typing is largely complete, and considerable progress made in associated forest inventories.

Technical papers, reports, maps, photographs and a Resource Survey Strategy document are inputs to the zoning and SUA planning processes. Meanwhile, socio-economic characterization of the Iwokrama forest, neighbouring communities and their resource use patterns is well advanced. This theme overlaps with the research theme on '*use of biological resources by Amerindian communities*', and other activities under the DFID project, including the Participatory Human Resource Interaction Appraisals (PHRIAs) that are close to completion, and work carried out from 1996 by the Makushi Research Unit to collate

indigenous knowledge and prepare detailed inventories of local uses of biological resources and geo-referenced community resource mapping. Integration of these data sets with other biophysical resource information is challenging, and is being progressively carried out within the zoning and SUA planning processes. More details on these activities are provided in Section 2.4.

2.2.2 *Forest zoning*

Zoning of the Iwokrama Forest into the protected Wilderness Preserve (WP) and the Sustainable Utilisation Area (SUA) is a major activity requiring local group involvement in planning decisions. There is considerable overlap in practice between simple zoning of the WP and SUA (to cover approximately 50% each of the total area) and SUA planning *per se*, as scenarios for different resource use 'blends' within the SUA can be modelled and adjusted depending on the basic configuration between SUA and WP. The finalised zoning is a precursor to the development of management plans and activities for each zone.

During 1999 and 2000 the zoning strategy was defined, GIS coverage developed for decision analysis, survey data evaluated, and the Strategic Inventory collating forest-based and social information was largely completed. Integration between resource inventory data and GIS became operative and a computerized decision model developed to generate a series of zoning scenarios. The overall zoning strategy and the criteria and indicators used in the zoning decision process are under discussion with stakeholders. Compartment-level information within both the SUA and WP is integrated at larger scales and processed in relation to other features such as accessibility, topography, rivers and roads, in order to generate zoning and preliminary management scenarios for the SUA and WP. A zoning process document was released in both hard copy form and www format in November 2000 to facilitate peer review and allow other national and regional organizations involved in zoning to benefit from the experienced gained.

Progress in zoning has been somewhat slower than planned in late 1999, due to constraints in collating the large data sets from resource inventories and developing the computer model. A strategy for rapid progress in 2001 is now in place and a definitive decision on basic zoning will be made alongside the ITTO Growth and Yield consultancy in the first six months of 2001.

2.2.3 *Forest management planning*

Planning for management of the 180,000 ha SUA is key to ensure achievement of Iwokrama's goals, as forest products and services from the SUA will contribute a significant proportion of the IIC's income and generate local employment. The planning process seeks to demonstrate a range of lessons to national and international stakeholders, including data collection methods and approaches to empower local and national participants in management planning. This pluralistic planning approach has also been linked to efforts to improve international (ITTO) and national guidelines for sustainable forest management[3]

[3] The National Code of Practice is based on outputs from the DFID GFC Strengthening Project. Higman S & Turnbull C (1997) *Monitoring of timber harvesting operations: experience with the development of an audit procedure in Guyana.* Commonwealth Forestry Review 76 (4) 1997.

and will anticipate Forest Stewardship Council (FSC) certification requirements. During 2001, planning will be coordinated with development of business arrangements to avoid an uneven transition between the planning and implementation stages. Efforts are underway to calculate costs of the planning exercise to permit their inclusion when assessing the net value of Iwokrama services and products.

The collaborative approach to SUA management planning involves a planning team made up of North Rupununi leaders, government agencies and other national stakeholders, international consultants (mainly to be contracted through the ITTO project) and Iwokrama staff. Four meetings are planned over the nine-month planning period with the first being held as a week-long workshop at the Field Station in October 2000. Some difficulties were experienced in improving forest typing using SPOT images since clear images could not be obtained, and satellite radar images are proving more useful[4]. To aid the use of these materials in management planning, the Centre's Professional Development Fellow in GIS Applications is undertaking training in radar image analysis in the United States, with the first session beginning in December 2000.

Some delays to activities within this programme were experienced, as the original ITTO proposal assumed that core funding would be available to cover key staff costs from other donor projects. Despite ITTO approval in May 1997, these staff positions were only filled during the period from January 1999 to February 2000, holding up work on the strategic inventory and other inputs into the forest planning process. Additionally, forest inventory work was delayed at the beginning of 1997 when the national forester employed under the preparatory project was injured and no replacement could be found during the life of that project. Software for analyzing inventory data was supplied by FAO but was faulty and there was no in-country capacity to address these problems or process the field data. These problems were not solved until mid 1999 following the appointment of the GIS specialist under the DFID project in April of that year. He quickly processed the backlog of data and established a data reduction and analysis system to handle future data sets being collected in the strategic inventory. Forest productivity classes have been developed for both timber and NTFP products, and will be integrated with forest typing maps as part of zoning scenarios for the SUA.

A progress report submitted to ITTO in October 2000[5] lays out plans for consultancy services in reserve planning during 2001, the terms of reference for which are summarized as follows:

- *Forester to assess Growth and Yield* (4.5 months 1st and 2nd quarters 2001). To refine forest maps, calculate off-take levels, prepare data collection manuals, allocate management units to different uses, assess harvest intensity, produce harvest scenarios and calculate annual production trends, carry out sensitivity analyses and present define harvesting options to SUA team.
- *Forest Product Development Specialist* (2 local community and 1 national advisors, 2.5 months 1st/2nd quarter 2000). Based on a review of local, national and international approaches, to develop a shortlist of products sourced from SUA or from neighbouring lands, asses value-adding processing techniques, identify

[4] Obtained through collaboration with the US Forest Service's International Institute for Tropical Forestry in Puerto Rico.

[5] Cassells, D. (2000). *A Sustainable Management Model in the Iwokrama Rain forest.* ITTO Progress report.

technologies and identify investment needs; consult with potential business partners.

- *Forest Product Market Assessors* (3 months 1st/2nd quarter 2000). To develop a shortlist of markets for short-listed SUA timber and NTFP products; examine market conditions and requirements; role of certification; use of Iwokrama brand in order to identify prices, market access and demand.
- *Business Management Adviser* (7 months third and fourth quarters 2001). To develop a business prospectus for Iwokrama and neighbouring community products and services; target markets identified by the Market Assessor; explore arrangements with potential partners through exchange visits; carry out bidding process for timber, NTFP and ecotourism components; negotiate contracts; prepare integrated business plan for all Iwokrama-related goods and services.
- *Forest Impact Monitoring Adviser* (1.3 months in 2002). To assess knowledge needs to determine impacts of forest use on timber and NTFP regeneration and the effect of harvesting on other services (tourism); develop monitoring options; draft research proposals for monitoring harvesting impacts.

These consultants will work with the Iwokrama staff responsible for GIS, forest production, forest ecology, social scientists and ecotourism. Draft terms of reference for these consultancies were prepared by Iwokrama staff and reviewed by the SUA Planning Team to ensure that they take account of local understandings and follow participatory processes. Additional inputs on NTFPs are expected from doctoral researchers now working with Iwokrama. A Gantt chart has been prepared to detail timing and overlaps between phases of each consultancy and to allow for Iwokrama staff inputs. A novel feature of these consultancies was participation in the development of their ToRs by stakeholders through SUA planning workshops, ensuring that they take account of local knowledge. These consultancies represent a well-conceived plan during 2001 to finalise SUA planning and lead into the business phase, and appear to be fully integrated with a range of team processes. Iwokrama will need to use these processes to allow deeper examination of the opportunities and constraints with different forms of harvesting and management for both timber and NTFPs. In particular, Iwokrama should review all potential harvesting and marketing regimes from the perspective of local communities, in order to ensure that they can participate in commercial activities from a position of strength and comparative advantage rather than disadvantage and marginalization. Attention should also be given to developing mechanisms that can increase the overall value of production from the forest by spatially and temporally integrating the production of timber and NTFPs.

2.2.4 *Ecotourism*

The CIDA project supports activities to develop community-based tourism within the SFM programme, building on an ecotourism strategy that was developed with consultancy assistance in 1997 and 1998. The project purpose was defined as '*operational community-based ecotourism, based on the natural ecosystems and cultural resources of the Iwokrama forest and surrounding environment and acting as a catalyst for the recognition of Guyana as a desirable ecotourism destination*'. An Iwokrama Young Professional is dedicated to developing this component assisted by a recently-contracted tourism expert staff member. These staff are tasked with developing the strategy into a detailed development plan, carrying out research into market segments, developing and implementing a three-year marketing and promotion strategy, selecting initiatives for immediate development, and developing partnerships with

Amerindian communities and private enterprise to put them into effect. The CIDA project provides for a revolving credit fund to support community ecotourism initiatives, preceded by an institutional capacity building appraisal in the first quarter of 2001.

Specialist tourist groups with interests compatible with Iwokrama's mission are being targeted. The ranger-training programme for community members and other nationals has significant overlap with the ecotourism programme. The rapid development in ranger skills acquisition shows every sign of ensuring a fully satisfactory experience for visitors. Efforts are currently underway to optimise the design and function of the Centre's infrastructure, developing a state-of-the-art canopy walkway as a primary attraction. Based on the experience of other such walkways in other tropical ecotourism locations, this has the potential to boost visitor numbers considerably, though legitimate doubts can still be raised as to ecotourism's true income-earning potential (see section 3.3.3). Completion of the management plan for the Wilderness Preserve is planned for the second quarter of 2001 and will be followed by a competitive bidding process in the second half of 2001 for ecotourism facilities within the reserve and for investment options with neighbouring communities. Given current progress, these elements of the CIDA project have a high probability of achieving the purpose by end of project.

2.2.5 *Development and control of access*

a. Internal road system.

The Iwokrama forest is bisected by the only road linking the southernmost administrative centre of the country (Lethem, on the Brazilian frontier) with its capital Georgetown. A management plan for the 72 km corridor within the forest that is affected by this road is in advanced preparation, and will respond to the anticipated upgrading of the Lethem-Georgetown road as a whole. This road provides primary access to the forest, and is in fair condition between the field station and the Annai community cluster, where an airstrip is located. There is a 1.6 km access road from the main road to the field station but this is flood-prone and in extremely poor condition, and access to the station will largely be restricted to the river until repairs are completed.

b. Checkpoints.

The checkpoints envisioned in the *Operational Plan* have not yet been established. It is planned that these will be staffed by rangers in radio contact with the field station. One checkpoint has been built on the DTL side of the Essequibo but it is functioning without reference to protected area management considerations. Better integration is expected with implementation of the WP and SUA management plans during 2002.

c. Harvesting road network.

This will be designed within the SUA planning process, and early discussion indicate that narrow primary and secondary roads will be preferred in relation to the requirements of light machinery and the relatively low log and lumber volumes extracted.

d. Trails.

Forest trails within the Iwokrama forest link remote areas with the main road and rivers. Trails were cut largely in conjunction with floral/faunal surveys and timber inventories and

to provide access for tourists and researchers. Foot trails will contribute to low-impact timber and NTFP harvesting from the SUA. Other trails already play a role in the development of ecotourist facilities. In 1999 and 2000 averages of 60 km of cut lines were established, to access most of the forest. A network of forest trails is based on these cut lines. Infrastructure inputs are not yet in place to provide long-term access and maintenance.

e. Rivers.

Using approaches similar to those outlined for road management, a river management plan is also in an early stage of preparation for the Essequibo and Rupununi, covering wildlife management and related issues. It is scheduled to be completed by mid-2001 by a team led by the Centre's Wildlife Biologist, Dr Graham Watkins.

2.2.6 *Links with cross-cutting forestry research programme*

In the first quarter of 2000, the Iwokrama Centre carried out a consultancy for ITTO to review the *Criteria and Indicators for Sustainable Management of Natural Tropical Forests* in the light of Iwokrama experience[6]. This work was discussed by the ITTO Council in November and will be further considered at the forthcoming Council Session in May 2001. It has found international support amongst sustainable forestry practitioners as it seeks to make the ITTO guidelines relevant in field implementation in local circumstances. It developed a systematic framework for updating the guidelines or developing new guidelines in new topic areas such as the management of secondary forests and degraded lands. The framework also suggested adaptive linkages between guidelines, criteria and indicators, field management and certification processes. Themes covered in the framework included the cost effectiveness of reduced impact logging, the relevance of ITTO guidelines to the informal chain-saw sector, management of secondary forests and NTFPs, conflict management within community participation processes, economic incentives structures and the need for experiences demonstrating best-practice.

The IIC has made considerable progress on the core research themes of *'use of biological resources by Amerindian communities'* and *'development of NTFPs'* as specified in the *Operational Plan*. The latter also sets out a theme *'sustainable management practices for timber production'* that is now covered by the research work into reduced impact logging funded by DFID. In addition, the *Year 2000 Work Plan* specifies a number of research themes additional to those listed in the *Operational Plan* including *'development of reduced impact logging systems'*, and *'forest policy and collaborative management processes'*. Two further themes *'applied regeneration and stand dynamics'* and *'criteria and indicators for sustainable forest management'* are identified in the *Work Plan* as requiring attention, although no funding was available for general staff activities in these areas in 2000. Detailed work plans have been prepared for each theme, and staff and resources assigned, with comments below on progress in each area.

a. Use of biological resources by Amerindian communities.

Wildlife is fundamental to the interaction between local people and ecosystems in the North Rupununi. Community wildlife management, considered of highest priority by Amerindian stakeholders, has been a key entry point into generating positive livelihoods outcomes and is currently one of the most significant areas of Iwokrama's output. A major effort was made

[6] Cassells D. and Hall, C. (2000). Taking the Policies to the Forest. *ITTO Tropical Forest Update*, 10(3).

to study community resources issues during 1999 and 2000, led by a wildlife biologist with the support of a highly effective research team. An indicator of local success is an almost total cessation of sale, beyond sustainable off-take levels, of riverine resources by Amerindians to outside traders, and increasing local resistance to outside commercial exploitation and recreational use. These achievements so far reflect the creative use made by Iwokrama of Amerindian forest knowledge that has synergistically fed into wildlife research, and in turn has been fed back into Makushi cultural restoration, greater confidence and community management agreements. The use of NTFPs other than wildlife has been documented by the local (mainly female) Makushi Research Unit team, while wider Amerindian resource use has been covered in the PHRIA reports and by appraisals within zoning consultations.

The work to date has developed via participatory mechanisms permitting local definition of research goals and methods. A series of local wildlife workshops have yielded information of local and national relevance through diverse institutional partnerships, with research work linking strongly to the conservation contracts implemented under DFID support. A wide range of flora and fauna research studies have been undertaken with community participation. These activities culminated in late 2000 in a successful Regional Wildlife Workshop, bringing together local, national and regional stakeholders with international collaborators, for wide-ranging discussions on wildlife issues, linked in to a national process to develop a wildlife management Code of Practice. A further activity has been Iwokrama's support to the EPA with the design and implementation of national wildlife surveys to help Guyana meet its obligations under CITES in carrying out national wildlife surveys.

Iwokrama's work is quite atypical of many other neotropical wildlife research programmes, which have rarely led to concrete improvements in local management. Crucially, the high levels of local involvement have allowed for the blending of anthropological with biological studies. The action orientation has permitted rapid change towards community observance of locally-imposed restrictions and defence against the sale of resources to outside traders. By tapping into local knowledge, the IIC has made clear progress in generating local ownership and adoption of management strategies. Early results merit wider dissemination and application in other protected area and forest management programmes nationally and globally.

b. Development of non-timber forest products.

Trade in NTFPs is an important component of rural livelihoods and has the potential to generate income from tropical forests without the level of impacts associated with conventional timber harvesting. The *Operational Plan* lays out a clear strategy for research into NTFPs, involving database development, the screening and selection of promising species, marketing research and the development of sustainable production and processing. Work on the various uses of NTFPs has been an active research theme for several years, focusing on both wildlife (see previous section) and non-timber plant products (NTPPs). The NTPP work has focused on those species with capacity to provide raw materials for commercial-scale handicraft industry, especially balata (*Manilkara bidentata*), nibbi (*Heteropsis flexuosa*), kokerite (*Attalea maripa*) and crabwood (*Carapa guianensis*). Crabwood is the subject of a socio-economic assessment study for which funding has been obtained from the DFID-funded Forestry Research Programme. Other work will be carried out in 2001 under the ITTO consultancies and doctoral research projects, with the aim of generating information on sustainable off-take levels, long-term NTPP productivity, harvesting/processing costs, and

market development. By mid-2001 this information will have been consolidated within the SUA management plan and more reliable estimates of income should be available for the Iwokrama Forest Business Plan. Efforts are also underway to develop national and regional collaboration into research and commercial use of NTPPs.

c. Sustainable management practices for timber production and development of reduced impact logging systems.

The *Operational Plan* specifies research into reduced impact harvesting practices based on economic, ecological and cultural criteria, as well as road layout research, and proposes trials on pre-harvest planning, marking, climber cutting, logging intensity, skidding and yarding. Work in this area began in April 1999, when Iwokrama jointly hosted a collaborative International Workshop on Reduced Impact Logging (RIL) with TROPENBOS and GFC, leading to a Special Issue of the *International Forestry Review* dedicated to the proceedings. An important outcome that grew from the workshop was an initiative by the Tropical Forest Foundation that allowed a party of ten national participants selected from the GFC, the timber industry and Iwokrama to attend a RIL training course in Brazil.

A key spin-off that grew from this workshop was a decision by national participants to establish a Working Group on Certification. This obtained support from UNDP's Programme on Forests, PROFOR (in turn supported by the EC) for a National Forest Certification Workshop in July 2000, facilitated by experienced Cost Rican consultants. This was convened by the GFC and supported by the World Wide Fund for Nature (WWF). Following the workshop, the Interim Certification Working Group has continued to meet to develop a national approach to certification, acceptable to the international market. The IIC's Senior Social Scientist chairs the Rights Sub-Group of the Working Group in the elaboration of critical issues.

These two workshops generated a clear demand for a cost benefit study of operational-scale reduced impact logging. This is being undertaken jointly by Iwokrama, TROPENBOS and GFC, with the International Institute for Environment and Development (IIED) providing consultancy support on economic analysis aspects through Iwokrama, and seeks to generate information relevant to key knowledge gaps about RIL[7]. The trial is largely financed under the DFID project and is located within the Demerara Timbers Ltd (DTL) concession (neighbouring Iwokrama). It seeks to analyse biophysical impact (including carbon sequestration), financial performance, economic timber/NTFP values and a cost-benefit study, of three logging scenarios (each treatment applied to one 100 ha block) varying from conventional to RIL. The trial has now been laid out, inventories performed and the logging will be carried out in early 2001 with DTL staff and equipment.

Measures to ensure wide results dissemination include: (i) post-trial demonstration in at least two other concessions; (ii) a training course in RIL in collaboration with the Tropical Forestry Foundation (Virginia, USA); (iii) a bimonthly newsletter on SFM/RIL in collaboration with the Forest Products Association and the national timber industry; (iv) links with a PROFOR study profiling operations in two other concessions; (v) training for field operatives; (vii) the prospect of use of results by GFC in efforts to improve and apply the existing forest management Code of Practice. Overall, this is a well-designed trial with clear stakeholder

[7] Hammond, D. *et al* (2000). Benefits, bottlenecks and uncertainties in the pan-tropical implementation of reduced impact logging techniques. *International Forestry Review*,2(1):45-53.

uptake pathways, carried out within a process that demonstrates Iwokrama's considerable capacity to develop strategic partnerships and engage in agile facilitation that has generated a demand by industry for research information about RIL, and has the potential to contribute significantly to continued collaborative lesson-learning.

Carbon storage is covered by a detailed study integrated within the RIL trial, managed by a Post-Doctoral Research Fellow employed under the YP Programme. This study seeks to quantify storage across forest types and evaluate carbon retention in soil organic matter. Early figures show that, due to the high specific densities of timber, the Iwokrama forest may store 250 t/ha of CO_2. In the medium term the results may be useful in national carbon 'sale' efforts, should such opportunities arise in future.

d. Forest policy and collaborative management processes.

Partnerships among government agencies, communities, NGOs and private enterprise are considered essential for sustainable forest management. The 2000 Work Plan considers this topic to fall under 'research', though the nature of collaborative links is beyond the scope of a narrow research focus. Under the DFID project consultation protocols are being developed to facilitate diverse community-based collaborative approaches. Other work has involved resolution of trade-offs in attempts to develop efficient management processes, for example through engagement in planning processes with national agencies responsible for road and river corridors. Further collaborative management examples include:

- Financial partnerships expected to develop during 2001 between communities through conservation and other contracts with private enterprise and NGOs, in the context of public-private partnerships for income generating businesses.
- Active collaboration between donor agencies for other conservation and development projects through inter-agency occasional meetings of NGOs and other entities working in the North Rupununi.
- MOUs are being implemented with GFC, EPA, the Guyana Broadcasting Commission, the Fisheries Division of the Ministry of Fisheries, Other Crops and Livestock and other national intuitions concerned with knowledge management and environmental education, and others are in preparation with IAST and the University.
- Internationally, Iwokrama's resource and expertise-sharing partnerships support important lesson-learning processes.

The MTR team received comments from stakeholders to the effect that the Iwokrama participatory approach was of great usefulness to various government agencies, which are now increasingly accustomed to inviting stakeholder participation in consultative processes. One policy area remaining for further research is forestry resource economics within sector-wide studies. The *Operational Plan* states that the total economic value of Iwokrama will be calculated and the *Business Plan* also envisions that an economic assessment of existing forest operations and trends in the forest sector will be carried out.

2.2.7 *Issues arising from the programme*

The previous sections have reported on progress to date, outlined current plans and reviewed the benefits received by key stakeholders through the substantial work carried out under the Sustainable Forest Management Programme. No major criticisms seem applicable

to this programme; some recommendations are made to cover apparent gaps and to develop initiatives mentioned in discussions with stakeholders.

a. Working group on growth and yield.

Forest growth modelling software has been developed by DFID in Indonesia through the SYMFOR and *Dendrogene* projects[8], while a competing CAFOGROM model for yield scheduling has been developed by a UK consultant (Denis Alder) for the GFC. The forthcoming ITTO Growth and Yield consultancy will help guide the choice and development of software to meet Iwokrama's growth modelling needs. This choice should not be made in isolation from wider forest sector needs, and discussions on the best approach should be focussed through the Technical Working Group on Forest Resource Information Management and Processing jointly formed by GFC and Iwokrama in November 1999. This would allow wider participation in key forest management decisions by a more inclusive range of expert stakeholders. See Recommendation 1.

b. Non-timber forest products.

Comments made on progress in NTFP research and development for both NTPPs and wildlife indicate a substantial and well-planned programme, which during 2001 will culminate in the application of information to harvesting, product development, marketing and value-adding processes. It is important to note, however, that the *Business Plan* makes no analysis for NTFP income accruing to communities or Iwokrama through SUA management, and the incomes projected for timber/NTFPs and value-adding relate only to timber. At the time, as little information was available on NTFP stocking and management, this basis was considered too uncertain for projections. Filling this gap will require efforts to develop per-area estimates of off-take, financial cost data, understanding the downstream value-chain and margins. Opportunities also exist for the ITTO series of consultancies to involve wider stakeholders, so generating a national NTFP process similar to that followed for wildlife management. In addition, the issues around integrated NTFP/timber harvesting merit some specific research. See Recommendations 2, 3, 4, 5, 6 and 7.

c. Community forestry options.

The *Operational Plan* presents an open approach to developing a wide range of approaches to business arrangements for timber and other forest resources. Key principles include the promotion of sustainability and equity and developing utilization systems that are responsive to the full range of potential resource values found in the forest. Some key stakeholders, however, including the current leadership of the GFC, have expectations that operations in the Iwokrama Forest will closely resemble conventional large-scale industrial harvesting mainly improved through the adoption of RIL techniques, to demonstrate the economic viability of these techniques to the timber industry. The MTR team concluded that, due to resource and other constraints, this scenario is unlikely to be feasible. Important factors here include the forest's low stand growth rates and low extractable volumes, soil

[8] Consideration by this MTR of the potential role of SYMFOR in Iwokrama and Guyanese forest research was recommended by van Gardingen (2000) in: *Development of an integrated approach to the implementation of forest management and decision support tools for DFID forestry projects in Brazil and Guyana.* Consultancy report. DFID (London).

nutrient constraints[9], distance from markets, the need to add value and access niche markets, the need to integrate timber and NTFP extraction, and Amerindian preferences to 'get most out of each tree with as little damage as possible'. Likely SFM elements would involve the use of portable saw-milling technologies in the forest; lumber extraction using adapted agricultural tractors, full use of river transport routes and other low-impact techniques such as use of narrow access roads.

Discussions within Iwokrama and with local stakeholders have confirmed the view that considerable advantages can be expected from partnerships between a business partner or partners, Amerindian enterprises and Iwokrama in extraction and marketing operations. *Thus, some form of community-based forest enterprise seems likely to be the most promising option and may, in fact, be the only commercially viable option given the ecological, economic and social constraints of the area.*. This is consistent with the findings of the UNDP/GEF evaluation, which concluded that "a Community Forest Conservation and Development program should be initiated to provide basic technical assistance to communities interested in developing forest-based enterprises, such as the extraction and processing of non-timber forest products, fauna management, and 'green' forestry." Iwokrama's proposed open and competitive bidding process for developing forest-based business partnerships will be crucial in determining what sort of business partnerships are feasible.

The adoption of some form of community-based forest utilization process in the Iwokrama Forest will increase rather than reduce the relevance of Iwokrama's programmes to the GFC and other forest sector stakeholders. Like most other tropical countries, Guyana has large areas of tropical forest that will not be capable of generating positive resource rentals under conventional industrial forestry regimes. It will simply cost more to cut and extract timber than what can feasibly be obtained for these products in the market place. It is still desirable, however, that these areas contribute to local and national economic development, and gaining a better understanding of the nature of these options from a multiple resource perspective will be a major contribution to the sector.

Iwokrama will also continue to contribute research to the understanding of issues affecting the conventional timber industry sector. As discussed above, Iwokrama has actively engaged with the wider RIL/certification process in a highly appropriate manner. This involvement has led to the widely-accepted view within Iwokrama and amongst other stakeholders that the optimal location for RIL research is within timber industry concessions, where directly overcoming industry constraints to RIL adoption and training activities will have most impact.

It must also be noted, however, that community-based commercial rain forest management is a complex and potentially risky undertaking and that, to date, neotropical experiences have been mixed. One of the more successful community forestry initiatives in Latin America has been the DFID/GTZ support provided to forestry *ejidos* in Quintana Roo in México during the late 1990s, and even here a host of factors constrained the development of local enterprises[10]. Annex 3 lists some of the social and economic issues to be anticipated in

---

[9] Given the nutrient-poor status of most soils in the Iwokrama forest area, it may be appropriate to adopt a new business principle requiring nutrient losses from commercial activity in the Iwokrama ecosystem be minimized.

[10] Finch, A. (1996) *An economic assessment of community forestry in Quintana Roo, with special reference to road and harvesting options.* DFID consultancy report.

the design and implementation of community-based tropical high-forest management projects. Iwokrama has already given considerable thought to many of these themes.

To respond to this complexity, further demand-led analysis of all aspects of business and co-operative arrangements is required; however, none of the proposed ITTO consultancies have enterprise development clearly within their duties. Current plans contemplate using the SUA planning process to begin to explore the options for the design of community–based forest management enterprises. In this process, however, the focus inevitably will be on finalising the management plan document, rather than exploring the detail of business structures at a pace that is likely to be required by stakeholders in the local communities. It is also expected that business partner bidders will consult with communities to develop proposals for their involvement in SUA timber/NTFP extraction, but this does not necessarily imply a sufficient level of attention to the specific requirements of a participatory design process. Special efforts will therefore be needed to reconcile community management structures with the commercial imperatives of timber extraction and other sources of value-adding. See Recommendation 8.

d. Facilitating community agroforestry development.

Local stakeholders raised the issue of Iwokrama's activity in savannah agroforestry, improving traditional shifting agriculture; and in establishing fruit trees, home gardens and multi-purpose tree plantations. The Iwokrama focus on forest conservation and management issues has implied considerably less attention to related land-use issues within the savannah communities. Local population growth, however, implies further pressure on the limited supply of fertile land that is not seasonally flooded. As Amerindian communities now tend to be stationary, there is an opportunity to diversify the cropping system by adding fruit trees in home gardens. Local fuel-wood scarcity may also develop, especially in areas close to brick kilns. Almost no silvicultural work on local timber and other tree species has been undertaken to date. See Recommendation 9.

e. Clarifying costs and benefits of Iwokrama's SFM experience.

At present, the terms of reference of the ITTO Business Management Adviser specify the preparation of an integrated business plan for all goods and services provisioned through the SUA, WP and by local communities. This will provide an opportunity to review the assumptions and projections in Iwokrama's forest-related activities, separating these out as far as possible from the public interest functions, costs and revenues of the IIC. There is a compelling argument for gathering much clearer information about the economic and financial returns to the forest business(es), and this will require data on the associated cost and revenue streams.

It is proposed that the ITTO BMA consultancy be oriented to delineate clearly the commercial and non-commercial roles of the IIC, and the costs and benefits associated with each function. Clearly, this is essential to demonstrate the commercial case for SFM within the Iwokrama Forest, and in order to project the distribution of financial returns to stakeholders and business partners. The BMA consultancy could therefore lay the groundwork for all forest-related businesses to become identifiable cost centres within IIC accounts and/or off-spun projects with business partners, *clearly distinguished from the IIC itself*. When this consultancy begins (mid-2001), the necessary detailed technical information will be on-stream in order progressively to substantiate the figures relating to forest-related incomes and costs.

A further advantage is that this separation will assist the Centre in its fund-raising efforts with a range of public/private donors and investors, once the two activity areas have become more clearly delineated. See Recommendation 10.

f. Making sustainable forest management relevant to emerging stakeholder groups.

The Guyanese forestry sector is in transition, with changing global demand, over-capitalisation and capacity obsolescence all arresting the financial performance of international and domestic operators. A thriving chain-saw sector is emerging, presenting regulatory difficulties for the GFC[11]. In marked contrast, the bigger timber companies are in a depressed economic state and probably making little profit[12]. This trend is likely to intensify as larger concessionaires and saw-mill operators source chain-sawn lumber from independent operators and thereby avoid the need for capital investments in their own logging and extraction activities. Similar trends have been noted in Brazil and Suriname.

The environmental impacts of this trade are poorly understood, though some attempts have been made to evaluate these[13]. As most regulated chainsaw logging occurs under State Forest Permissions of one-year duration, insecurity of tenure is an issue affecting forest management planning and often leads to severe over-exploitation of timber stands. Processing efficiency is often extremely low at around 60 to 65% volume wastage. It is therefore important to develop methods to reduce wastage and reduce negative environmental aspects associated with excessive harvesting intensities, while maximising the potential benefits of the limited use of heavy extraction machinery by these low-capital operations.

The Guyana Forest Commission is enforcing a more rigorous regulatory approach for chainsaw logging through a tagging system and imposing quotas for State Forestry Permission concessionaires. These measures have led to some adverse livelihoods impacts and generated some protest. The formal timber industry through the Forest Products Association has advocated stricter monitoring and control. Following resolution of current tensions, as the chainsaw loggers become fully recognised as a legitimate stakeholder group within the sector, it is likely that an agenda will develop that includes measures to contribute to technical improvement of operations, lessen adverse impacts, maintain livelihoods and enhance sustainability. This will probably include a range of measures relating to security of tenure, type of permissions granted and local operator associations for improved monitoring. The DFID Forest Research Programme has established supporting this agenda as a regional priority[14].

---

[11] In terms of monitoring the chain of custody for logs passing through formal channels and in containing chainsaw activities.

[12] Data supplied by GFC (FAO, 2000) indicate that in 1999 total log production for national and export markets was 351,000 m^3; semi-processed timber (roundwood, splitwood, sawmill lumber & plywood) reached a total of 146,000 m^3 from 26 licensed larger concessionaires managing leases on 4.7mha; while chainsaw lumber produced by 330 individual State Forestry Permission holders totalled 194,000 m^3 from an assigned area of 593,000 ha. Thus the regulated chainsaw sector is responsible for approximately 30% of total Guyanese timber production. These figures do not include an estimated 1,500 unlicensed chainsaw operators whose production may easily equal that of licensed SFP holders.

[13] Grisley, W. (1998). The production of lumber using chainsaws in Guyana. *International Journal for Sustainable Development and World Ecology*, 5:328-248.

[14] McQueen, D. (2000). *FRP demand surveys in Belize, Guyana and the eastern Caribbean states.* NRI (Chatham, UK).

The issue arises whether Iwokrama should position itself to provide outputs explicitly relevant to the informal sector. It is likely that, following completion of the SUA management plan and the tendering process, linkages may develop between future Iwokrama-based community-forestry operations and GFC-led efforts to improve chainsaw logging. These links would make Iwokrama's activities relevant to an important emerging sector of timber industry, bringing benefits on a regional scale (given that the informal sector is likewise growing in neighbouring countries). Efforts to strengthen these links may lead to beneficial influences on policies constraining positive livelihood outcomes, such as those impeding the sustainability of chainsaw logging. Iwokrama should ensure that research on these issues is undertaken in full collaboration with the GFC to avoid possible duplication, and to ensure that the lessons learned are readily available to inform national policy and regulatory practice. See Recommendation 11.

g. Forest research programme.

Four issues arise in reviewing Iwokrama's research programme:

- Potential exists to *link Iwokrama more strongly with the DFID-funded Forest Research Programme* (FRP). This is implemented through the UK-based Natural Resources International Limited and manages a considerable project portfolio. In line with DFID's poverty and sustainable livelihood focus, FRP has carried out a scoping study in the region[15] to ensure that its resources are efficiently targeted, priority problems are addressed and local institutions are involved in the research process from conception. This study offers a basis for refining Iwokrama's research policies in line with a demand-led regional agenda, develop active alliances, bring in further salary support for existing staff and generate substantial additional research funding. Almost all research lines recommended for the group comprising artisans, small traders and small-scale entrepreneurs fully overlap with Iwokrama priorities[16]. Iwokrama has some experience of FRP research applications, but an active management of the proposal development process has not yet been fully developed. Opportunities exist for developing proposals in response to FRP calls for relevant concept notes that meet the needs of Iwokrama's local and national stakeholders and that could count on a high likelihood of FRP funding provided Iwokrama were linked to a UK institution for the purpose. See Recommendation 12.
- The *wider role of Iwokrama* as a key forestry research centre within Guyana bears some consideration, as set out by Ziegler[17] who stated that "The draft Forest Policy Statement (1997) speaks of a National Centre for Research, reflecting a widely felt need for a single, integrated and co-ordinated programme of forest research in Guyana. There is ... a popular view that such a co-ordinated

[15] McQueen, D. (2000) *ibid.*

[16] These are (i) forest valuation of non-traded forest products; (ii) inventory and sustainable NTFP management; (iii) timber marketing structures and strategies; (iv) community forest management on national lands; (v) hunting guidelines for wildlife management; (vi) improvement of tree-spotter identification; (vii) informal logging operations and certification for small producers; (viii) peripheral tourist service provision; (ix) income generation from endemic forest-based flora and fauna/community-based heritage tourism; and (x) Intellectual Property Rights law to benefit poor communities.

[17] Ziegler, A. (1997) *An EC Strategy for Guiana Shield: Some notes on the terms of reference for a country study to develop an EU regional forest sector strategy*. Environment & Development Group, Oxford (UK).

programme (and its physical base) might be located at Iwokrama. The Iwokrama Programme itself believes that such a research centre should aspire to regional stature and ramifications." The option of Iwokrama formally linking in to GFC on these terms requires further exploration and might be considered within the brief of a DFID mission tasked with the design of a further phase of DFID support to Iwokrama. See Recommendation 26.

- Iwokrama is considering the option of applying for *membership of the CGIAR* international research system. Considerable research output is expected in 2001 and will support this initiative. Advantages would accrue from international recognition and access to donor funds may become easier. These benefits should be balanced, however, by appreciation of the potential effects of meeting CGIAR criteria on the overall balance of Iwokrama's outputs, as the tendency during the entry process is to weigh research outputs to a greater extent than development impacts in the field, and the implications of this must be anticipated.
- Almost no work has been carried out in the major area of *regeneration and stand dynamics* as this does not count on donor funding nor are staff available to carry out field-work. Iwokrama will need to develop this research activity, and identify collaborative research partners and potential sources of funding for a future programme.

h. Collaborative tree-spotter training programme.

Tree-spotters can overcome the use of different common names for the same taxa during forest inventories; their skills are the key to avoiding rare species, within a multiple species common-name group, being taken out during logging; and to ensure quality of timber being marketed under a single common name, thus encouraging the development of markets for lesser-used species. This expertise is threatened as skills of older generations are not replaced. During the MTR, stakeholders mentioned an interest in collaborating with Iwokrama on a programme to maintain a national corps of tree spotters, employed by the timber industry and in research, forest inventory and other management work. See Recommendation 13.

i. Forest sector research.

Forest policy in Guyana was written under the assumption that operators make a reasonable return on their investment despite the level of risk in the industry. The *Operational Plan* proposes carrying out an assessment of existing forest operations to aid understanding and allow for the design of appropriate interventions, but this has not yet been done. The MTR team noted that the recent mid-term review of the DFID-GFC project indicated the need for a better understanding of the economic situation of the industry and SFM in general. Understanding the dynamics of the forest sector at the national, regional and global levels a will remain an important research area relevant to the basic mandate of the Centre.

The hypothesis to be tested by Iwokrama relates to the economic rate of return to a more rigorous system of sustainable forest management. But SFM now has to be set in the context of a changing industrial profile for the forestry sector. The cost implications of SFM for each segment of the emerging sector, including the chain-saw sector, need to be reviewed. This will provide a better understanding of the incentive structures at work in each segment and the nature of policies and instruments to enable SFM.

On-going research would also determine the extent of divergence between operations that are not financially viable unless shadow values (accruing from SFM) are taken into account. More practically, this research should start to show the magnitude of the key environmental 'switching values' including discount rates. That is, the market and non market values[18] associated with SFM that are the difference between unattractive financial rates of return and acceptable economic rates of return. Identification of these values is complementary to the work on market creation and value capture. Together these elements are crucial determinants of the viability of SFM[19]. This study might start by collaborating with the consultants contracted by UNDP-PROFOR to facilitate the Guyanese forestry certification process, or with other partners. Following this, if value capture is unfeasible and there is an 'economic gap' in the IIC balance sheet, then some consideration must be given to the magnitude of the "missing" global information value generated by IIC research. This value is by definition difficult for the IIC to capture, but it accrues globally to endangered forest areas and relates to the value of research into the feasibility and replicability of SFM. This missing value is probably the strongest economic rationale for donor involvement in IIC. The cost effectiveness of securing SFM information that is relevant both locally and internationally is likely to be very high. Developing a stable research capacity in this area should be seen as a key requirement for the Centre's environmental economist when he or she can be appointed. See Recommendation 14.

j. Review options to develop a forest management consultancy business.

Iwokrama is well-placed to make further contributions to improved forest management in the formal sector. New practices must be carefully costed, and attempts made to generate economies of scale in management planning. A key limitation at present to SFM is the almost total lack of GIS capacity within the industry which makes impossible integration of inventory data to generate stock maps, efficiently lay-out road networks and skid trails, and to comply with other elements of management plans. There is a good deal of interest, however, shown by both the GFC and some private sector operators in these areas. There was strong interest in the national GIS Conference organized by IIC and the GTZ-funded Natural Resources Management Project in June 2000 and the IIC hopes to make this an annual event. Demand for these services is one indicator of the relevance of the Centre's research and development programmes to local sector needs. The Iwokrama BoT has given the Centre guidance on the terms of engagement for these activities, as follows: (a) activities must be income generating; (b) they must not use donor resources to subsidise local industry; (c) they must not prevent staff meeting obligations under funded projects; and (d) services must not give the impression that the Centre endorses proposals or management systems

While the GFC is continuing to develop new skills and strengths, it is unlikely to be able to offer management planning services to the industry in the medium term. The closure of Tropenbos during 2001 was a cause for concern amongst many stakeholders during the MTR. Some staff have effectively been taken on by Iwokrama, although what will happen to the management of their data sets and permanent sample plots is still unclear. One option would be for Iwokrama to provide logistical support to GFC in return for access to data for comparative studies with its own PSP network, which will be established with ITTO support over the next twelve months. Another option would be to develop an NGO to manage the

[18] Key values may be for example, the full commercial value of NTFPs.

[19] See Pearce, Putz and Vanclay (1999) *A Sustainable Forest Future*, report to DFID.

Tropenbos portfolio. One way to address all these linked concerns would be for Iwokrama to deploy its own expertise, with Tropenbos, to establish a forest management planning business (see Recommendation 15). This should not, however, be relied upon as a way to cross-subsidize the Centre's other operations, for which the best solution would be to obtain adequate funding for core costs.

Another method, mentioned to the MTR team by GFC, for engaging the timber industry in improving forest management might be to draw out lessons from ECTF's involvement in forest management with the Barama Company and Tropenbos' experience with DTL. Both these experiences will likely be relevant to the local timber industry, and a workshop to discuss them may potentially have a high impact.

2.3 Conservation and Use of Biodiversity

2.3.1 Introduction

The guiding principle of biodiversity management is that biodiversity should be saved, studied and used sustainably and equitably, all in one integrated process. The 'saving' part aims to secure viable and representative samples of all ecosystem types, this being considered the most cost-effective way to maintain species richness and hence the quality of the biodiversity resource. Yet saving biodiversity in this way can impose opportunity costs on people who might otherwise prefer to convert protected ecosystems to logged forests or farms. These protected ecosystems must therefore yield economic outputs, and studying the biodiversity they contain is a way to enable the capture of certain outputs that would not otherwise be obtained.

In other words, biodiversity is studied in order to be used. But economic benefits from protected areas must flow to and be appreciated by the people whose support is most needed to maintain the protected area. There is no point, for example, in protecting an area as a benefit to a national or global elite, if the costs are born and no benefits accrue to local people who will then have no reason to cooperate, or worse. Thus the proper distribution of costs and benefits among stakeholders is probably the most important single factor in determining the success or failure of the conservation process. The EC project is intended to set up a self-sustaining 'save-study-use' system for biodiversity. It is not intended to be self-standing, however, and must be seen in the context of a broader programme that will amplify local benefit capture and maintain a rational and equitable distribution of costs and benefits overall.

2.3.2 Management of the wilderness preserve

a. Background and rationale.

Various kinds of value have been assigned to 930 mapped micro-catchment areas within the Iwokrama forest. These values include some weighting for biodiversity contained within each micro-catchment, insofar as this is known or can be judged, as well as other factors including cultural significance, abundance of NTFPs and timber resources, ecotourism potential and accessibility. This was intended to allow the two management zones required by Article 7 of the Iwokrama Act to be defined - one comprising microcatchments most

suitable for protection (i.e. the Wilderness Preserve, WP), the other comprising those most suitable for other kinds of sustainable use (i.e. the Sustainable Utilization Area, SUA) - and to provide detailed information allowing different microcatchments within the SUA to be managed for the most appropriate outputs in each case.

b. Progress.

The WP and SUA have been tentatively defined by aggregating compartments with value scores that suggest high value for protection or extractive harvesting respectively. Two WP areas with a total extent of 180,000 ha are located on either side of the Linden-Lethem road that bisects the Iwokrama forest. The total area is mandated by Article 7 of the Iwokrama Act to be approximately one-half of the total forest area of 360,000 ha, and the remainder has been allocated to the Sustainable Use Zone for sustainable productive management including resource extraction. The overall zoning plan is due to be completed in January 2001 through a final series stakeholder consultations based on a small number of alternative scenarios. This is later than originally planned because of delay in beginning the analysis of raw data, followed by the identification of significant gaps in the information base needed for zoning which then had to be corrected through further field work. Once the overall division of the Iwokrama forest is agreed, it will become possible both to prepare for the selection of business partners with which to manage the SUA, and to begin the participative process leading to a consensus-based management plan for the WP, which is currently expected in December 2001.

The Mahdia road alignment bisects the western WP area and presents a significant challenge to this sequence of activities. The original road, which was abandoned in about 1960, probably because of flood-proneness, is still visible from the air for about 20 km of its length due to very slow forest regeneration on extremely poor soils, and raises the question of whether such past disturbance is compatible with the WP's designation as equivalent to an IUCN category I Protected Area (Strict Nature Reserve or Wilderness Area). This can presumably be clarified through dialogue with IUCN's CNPPA.

More seriously, however, a mining company (Mekdeci) is building a new toll road from Mahdia along the original alignment, which is expected to reach the Pakatau Falls on the Siparuni river, at the edge of the Iwokrama forest, in 2002. This alone would increase access by the outside world to the Siparuni valley, but without increasing Iwokrama's own access to the area. The company has moreover proposed continuing the road through the Iwokrama WP to meet the Linden-Lethem road, and is lobbying government in favour of the idea. A new road corridor through the western WP would fragment and greatly reduce its area, which (in order to comply with the Iwokrama Act) would have to be compensated for by increasing the size of the eastern WP, thus undermining the whole basis for rational zoning and planning, and threatening both biodiversity conservation and SUA management interests.

Possible options for Iwokrama's response to this include:

- defining the WP regardless of the road proposal, and mounting all-out resistance to the road on principle;
- accepting the current road alignment and the associated impact, and adjusting the WP-SUA accordingly; and
- working with the company to identify a new road alignment that is less prone to flooding and maintenance problems, and that minimize conflict with biodiversity conservation priorities. See Recommendation 16.

A positive outcome from the first strategy would presumably depend on the success with which Iwokrama can generate by 2003 both sufficient public support and sufficient financial and economic benefits that are perceived by government. Both of the last two options would create an opportunity for Iwokrama to drive a hard bargain in terms of a share of toll receipts with which to finance incremental surveillance and enforcement efforts along the road, with the last option being clearly the preferable of the two, except for the inevitable impact on international public perception of Iwokrama, which would thus require careful management.

The existing Georgetown-Brazil road poses additional management challenges, though only indirectly to the WP. A corridor of indeterminate width on either side of the road is to be retained by government under its full control, and on the 12th December 2000 it was announced by government that Federal Brazilian financing had been secured to upgrade the road to an all-weather surface. This appears to have pre-empted a proposed investment by the EC in a much slower-paced road upgrade in the context of an integrated rural development process that might have been rather gentler on local people and ecosystems. The Brazilian scheme is linked to the construction of a deep-water port on Guyana's coast, and has the advantage for Brazil that transport costs of exports from the northern part of the country will be greatly reduced. The effect of this project will be to greatly increase traffic and potentially hunting, fishing, mining and in-migration in the North Rupununi and right through the heart of the Iwokrama forest. The NRDDB is already aware that its Makushi constituency will need to become much more resilient to physical, socio-economic and cultural impacts before the project is completed, and is actively working to that agenda in cooperation with Iwokrama. This development was discussed with national Amerindian organisations, with stakeholders at the wrap-up meeting and local community members from the Annai cluster.

Iwokrama itself has taken two main steps to increase its own ability to manage the challenge of the road corridor. First, it has been developing a draft Road Corridor Management Plan, based on participation by government agencies, truckers and other road users, and local people[20], which should be ready for final consultation with stakeholders in January 2001, leading to an operational contract based on the plan by the end of the first quarter. This seeks to address local use of roadside resources, impacts of vehicles in transit (especially on wildlife), road maintenance, road use conflicts, development of mitigation measures for managing roadside vegetation, water resources, tourism, infrastructure development, and identification of key management responsibilities. There is considerable scope for Iwokrama's road management plan to act as a model on which subsequent processes focussing on the larger management issues attached to the Lethem-Georgetown road corridor as a whole.

Iwokrama's other strategic initiative is to make a considerable investment in recruiting, equipping and training 13 Rangers, aiming to create a backbone surveillance and enforcement capability in the field (as well as a cadre of skilled staff to assist in ecotourism development, research and liaison with local communities). Because they have been trained

[20] A similar approach is being taken in developing river management plans. Since Iwokrama has no jurisdiction over the rivers that make up most of its external boundaries, multi-stakeholder participation is both the only practicable way forward, and also has an important capacity-building effect especially among government agencies.

to train others, they represent a resource that will be used to reduce the unit cost of training subsequent Ranger intakes. Part of the job of each Ranger is to patrol widely and monitor field events, but as they currently have no formal enforcement authority they rely on persuasion to halt events that threaten forest integrity, backed in exceptional cases by accompanying officers from the Armed Forces and Police. Government of Guyana policy seems to be moving towards giving Rangers 'supernumerary powers' as Rural Constables, as suggested by some government agencies in view of the limited resources of the security forces in the Iwokrama area.

International classification of the Iwokrama forest is being actively pursued, with the Secretariat of the World Heritage Convention as a possible natural World Heritage Site, and with UNESCO as a possible Biosphere Reserve. World Heritage designation would be highly appropriate at least for the protected WP, especially considering Guyana's offer of the area to the world community in the first place. Biosphere Reserve status would align well with the zoned, multi-purpose landscape planning approach that creates a nested set of forests under different kinds of sustainable management, as well as nearby settled area that are ecologically dependent on the forests and rivers of the area. The Biosphere Reserve might, in fact, usefully be considered to extend over a much larger area than the Iwokrama forest, thus embedding the forest in a network of sustainable development and creating opportunities for additional replication of the approach world wide.

2.3.3 *Inventory of biodiversity*

a. Background and rationale.

The Guyana Shield is a large area of ancient (Pre-Cambrian) rock which has been mostly under tropical moist forest cover for several million years. This has provided time for evolutionary processes to generate a high level of species richness and a moderate degree of uniqueness or endemism throughout the area, which is recognized as a distinct floristic province. The Iwokrama forest itself has particularly high species richness in this context, which is attributed to: (i) the diversity of forest types represented (at least ten[21] of which have been characterized for planning purposes, based on remote photo and radar imagery, ground-truthed by 439 0.1 ha circular samples and numerous inventory transects); (ii) a rainfall gradient across the area (from about 2,500 mm in the north-east to 2,000 mm in the south-west); (iii) a range of altitude from about 100 to 1,000 metres above sea level; and (iv) interface of the Guyanan and Amazonian floristic provinces, which runs approximately east-west across the southern third of the area.

b. Progress.

The biological wealth of the Iwokrama forest is indicated by taxonomic research that has identified the Iwokrama forest as a global 'hotspot' for bats (of which an additional 24 species were reported in 2000), several plant families (e.g. Lecythidaceae and Chrysobalanaceae), and fresh-water fish (of which more than 400 species are recorded). The

[21] These being: (I) mixed and swamp forest on flat terrain; (ii) mixed forest on flat white sand ridges; (iii) mixed forest-liane forest; (iv) mixed forest on high hills; (v) mixed forest on undulating or hilly terrain; (vi) mixed forest, small crowned, on flat to gently undulating terrain, sandy soil; (vii) swamp forest-low swamp; (viii) swamp forest-marsh swamp forest; (ix) swamp forest-mora forest; and (x) wallaba and swamp forest-poor wallaba-dakama forest on flat white sand ridges/marsh-swamp forest.

biodiversity inventory work to be undertaken by Iwokrama will build on these studies, as well as on tree inventories by NRI and Iwokrama itself, and other work on rodents, primates, snakes, frogs, lizards, epiphytes and other groups that have already been undertaken by a number of collaborating institutions[22].

Organizing the results of previous and future studies will cause Iwokrama steadily to advance towards a comprehensive inventory of taxon after taxon, although the total number of species of all taxa within the Iwokrama forest, and hence the end-point of this process, is unknown. On the basis of a very approximate distribution of species among vertebrates, trees and invertebrate classes that is suggested by work in other rain forests, a total species count for the area might be expected to approach or exceed 100,000 species when it is eventually completed.

Thus Iwokrama does not intend to attempt a comprehensive inventory in the near future, but is instead directing its efforts to link in with the incipient bioprospecting programme (as reflected for example in the training provided at CABI Bioscience for the Biodiversity Inventory Specialist). As the *Concept Note*[23] for the latter explains: "There are compelling reasons for combining the biodiversity [inventory] and bioprospecting operations, as data and organisms from one activity can be used directly to achieve measurable outputs in the other. Even a basic overall biodiversity or valuation survey for any of the speciose [i.e. species rich] organism groups could not be carried out satisfactorily within the timescale available. Stratified sampling and careful targeting of resources will therefore be necessary to restrict the sampling and analysis to manageable proportions, resulting in scientifically and economically rigorous surveys of specified organism groups defined by habitat or ecological requirements. Further added value will be provided by sampling based on organism associations such as fungi on insects, which are of particular interest to the bioprospecting industry.

Current inventory efforts are hence targetting groups of endophytic fungi (which live inside the tissues of plants), and in this case specifically those that inhabit intercellular spaces within the leaves of host trees). Other priorities include: (a) nematodes, a group that is extravagantly species rich and abundant, and may account for 80% of all multi-celled organisms on Earth; and (b) bacteria of the family Actinomycetaceae, which are relatively uncommon but biochemically diverse, and have a history of yielding biochemicals of interest to bioprospectors. More general inventory work is focussed around institutional links with the biodiversity centre at the University of Guyana (UG), which is adjacent to the proposed site of the IIC headquarters. Here, with inputs by the Biodiversity Inventory Specialist, the existing collections are being maintained as research and teaching resources, and their expansion encouraged through cooperative arrangements with the international scientific community.

Taxonomic and other research field work in Iwokrama is preferentially undertaken in the context of partnership agreements between the outside institution in each case and UG, which includes attachment of UG students and other Guyanese trainees as well as provision

---

[22] Including the Royal Ontario Museum, Northwestern University, University of Illinois, University of Western England, and Florida International University.

[23] *Biodiversity Inventory and Bioprospecting Programme in the Iwokrama Reserve, Guyana - Concept Note for a Consortium Bid Led by CABI Bioscience,* July 1999.

for the deposition of specimens at the biodiversity centre. When the export of specimens is involved, these requirements are also mandated by the terms of Academic and Commercial Research Agreements for which application must be made to the EPA, and which apply to all biodiversity research in Guyana including that undertaken by Iwokrama. Hence local capacity building is occurring to a satisfactory extent and one that will likely increase in future as Iwokrama Rangers, who are now being trained, become more involved.

2.3.4 *Biodiversity prospecting*

a. Background and rationale.

The soils of the Iwokrama forest provide a challenging environment for plant growth, being sandy and deeply-weathered, or frequently water-logged, or both. Intense and prolonged competition for scarce nutrients and opportunities for growth and reproduction has produced, over evolutionary time, an ecosystem characterized by tight nutrient cycling, intimate co-evolutionary relationships (both exploitative and symbiotic), and the outcomes of on-going 'arms races' to produce bioactive chemicals for defence against predators and parasites. These factors have two important implications for Iwokrama. Tight nutrient cycling means that extractive harvesting casts a long shadow in terms of ecosystem recovery - it can take centuries to restore soil magnesium content after light selective logging, for example. Meanwhile, co-evolution effects are likely to have created a target-rich environment for bioprospecting, which is the search for commercial products and processes using biodiversity as a source of information and new ideas. Because of the defensive nature of much plant and animal biochemistry in this environment, and their targetting against specific metabolic systems that are shared by humans and human domesticates, interest is focussed strongly on pharmaceutical and agrochemical potential (see Annex 6 for examples of bioprospecting discoveries and recent commercial developments).

The development of a new pharmaceutical product costs an average of about US$300 million, and profits to the (beneficial) owner of a patentable product during the patent life-time can amount to several billion US dollars. A share in these investments and rewards can transform the economic circumstances of tropical countries, but past experience shows that it is very hard for source countries to obtain a share of this revenue or associated technology transfer benefits. The Convention on Biological Diversity provides a framework in international law to correct the underlying inequity, but there is still a need for national governments to protect their interests deliberately, for example by resisting biopiracy and promoting technology transfer.

This is recognized in Guyana, where the *National Biodiversity Action Plan* (1999) calls for the revision of legislation to protect national interests, and the EPA has issued guidelines and established an interim a licencing system for all biodiversity research while working on new regulations specifically on bioprospecting. These efforts are encouraged as a matter of policy by Iwokrama, which is seen by EPA as taking the lead in national bioprospecting efforts. This commitment is not always recognized, however, and the *National Development Strategy* (2000) observes that "the benefits to the people of Guyana from Iwokrama's bio-prospecting exercises in Guyana's forests are not sufficiently clear", while also noting that the absence of an adequate institutional and legal framework "make it difficult to ensure that Iwokrama will itself be able to obtain full benefits from biological discoveries or to protect Guyana's biological resources against acts of bio-piracy".

b. Progress.

Iwokrama has contracted a consortium of business partners to explore the bioprospecting process. An invitation to bid resulted in the short-listing of an international consortium, comprising CABI Bioscience, Imperial College, the Royal Botanic Gardens at Kew and the Oxford Forestry Institute, and a national consortium of UG, the University of the West Indies (UWI) and the Institute of Applied Science and Technology (IAST). To promote national participation and benefit sharing, Iwokrama facilitated the fusion of these two groups into one. Under the terms of the resulting agreement, a Trinidadian Natural Products Chemist has been hired and trained, laboratory technicians identified, and facilities at UG have been selected and are in the process of being refurbished and equipped for their new role. As part of the plant chemist's training process at Kew, on a non-commercial basis and with the prior permission of EPA, a number of samples have been processed from a pilot collection of host plant materials, yielding a total of 50 species of endophytic fungi identified from 300 isolates of 10 host plants. Against an interim target of 2,000 extracts of endophytic fungi, 187 extracts were made and 95 of them bioassayed for anti-fungal and anti-feedancy activity. One of these was found to have significant anti-fungal bioactivity, and further studies are continuing at Kew. These results have confirmed both the high species richness among the cryptobiota of the Iwokrama forest, and the high hit rate (more than 0.5% of a limited bioassay sample) to be expected of this ecosystem's biochemistry.

EPA regulations on biodiversity sampling[24] require that either an Academic or a Commercial Research Agreement is concluded with government, involving a fee (to which Iwokrama is immune by virtue of the Iwokrama Act 1996) and covering samples and ethnobiological knowledge, specifying inter alia the numbers of specimens to be collected and imposing conditions on reporting and publications. Commercial use is specified to include studies with a view to such use (or captive propagation), and Iwokrama has agreed with EPA that the training studies mentioned above should not be considered commercial in this sense. More specific regulation on bioprospecting is being developed by the EPA. Iwokrama is likewise committed to refraining from publication of the results its bioprospecting research and entering into commercial arrangements concerning these products until such stage as detailed protocols on intellectual property rights (IPR) and benefit sharing have been finalized to the mutual satisfaction of the Centres' Board of Trustees, the Government and local people. A consultancy is planned for early 2001 to facilitate this process.

2.3.5 *Links with cross-cutting programmes*

Iwokrama has been active in assembling very large amounts of ecological, behavioural and ethnobiological information related to macroscopic taxa in the forest and associated ecosystems, partly from scientific and partly from participatory studies. These investigations, of which the latter fall under the research theme of *'use of biological resources by Amerindian communities'*, have fed data into the zoning and mapping exercises that guide the definition and to a large extent the management of the SUA and WP through the *Sustainable Forest Management* programme. A number of field guides and other publications have been released or are in preparation based on this information, which will be extremely important in developing ecotourism use of the forest. The results of these same studies have also

[24] www.sdnp.org.gy/epa/biodiversity

contributed to the community resource mapping and management processes that under-pin the *Sustainable Human Development* programme. Amerindian contributions to the knowledge resource in this area are recognised and rewarded by assigning copyright and royalties from relevant publications to the NRDDB. Other arrangements related to intellectual property rights and benefit sharing currently await development of the IPR and BS protocols system by Iwokrama.

2.3.6 *Information and knowledge management*

Using the results of inventory studies to date, operational GIS layers have been completed for the flora and vertebrate fauna, using which Iwokrama is able to integrate distributional information with its overall zoning and planning activities. This reflects the development of a powerful GIS and relational database capacity at the IIC, and its utility in numerous aspects of Iwokrama's work plan. Even the relatively focussed biodiversity inventory work currently planned will challenge the information and knowledge management capacity of Iwokrama, as all the variables are interactive and therefore multiplicative in their implications for management. Species identifications will increase steadily, but so too will records of location, ecology, behaviour and interaction associated with each species, as will those of samples, extracts, bioassays and further tests for each species. Many of these species-specific patterns will need to be linked in various combinations if they are to become meaningful, because of the biotic interactions that are so common in rain forests and, indeed, are a chief interest of Iwokrama's research. An exponential rate of increase in data and information can be expected, and database design and capacity will need to take this into account if adequate knowledge management is to be achieved. Staff have developed a proposed information management structure for an integrated information management system for all biodiversity data though this will undoubtedly require ongoing development and refinement. See Recommendation 17.

Species lists for trees and several other taxa are available on the Iwokrama web-site[25], which is becoming an increasingly important promotional medium, with several thousand 'hits' per month. Few other web-sites currently provide hyperlinks to Iwokrama's, however, and a concerted effort to contact the content controllers at relevant sites to request such links would likely result in a very rapid increase in the number of 'hits' as a wider population of Internet searchers are guided through the Iwokrama portal. See Recommendation 18.

The Information and Communication Unit at IIC, which is responsible for the content of the web-site, also has a number of other important roles. It manages what is probably the best natural resource library in Guyana, and offers a space where students and others can study using up-to-date materials and free Internet access. It also arranges to publish and distribute Iwokrama field reports and workshop proceedings, manages contacts with the press, produces a regular *Iwokrama Bulletin* and prepares multi-media presentations on Iwokrama's work to support many different public outreach activities. As such, it has a significant influence on the intellectual life of the country as well as helping to project Iwokrama's ideas, ideals and discoveries into public consciousness.

[25] www.sdnp.org.gy/iwokrama/

2.3.7 *Influence on policies and processes*

The biodiversity management programme is expected to generate fields of influence that will validate and promote participation, dialogue, joint problem solving and the institutionalization of accountable forums in many different sectors and locations. Examples include Iwokrama's approach to planning and zoning the forest, to developing management plans for the SUA, WP, road corridor and rivers, and to addressing issues of intellectual property rights and benefit sharing. Transparency, inclusiveness and local participation can only promote good governance in a country that has a long history of excessive centralization. New and more effective and sustainable approaches are being developed that have the potential to resolve conflicts of interest and perception among stakeholders in the biodiversity conservation process at the national level, such as those that have so far prevented the establishment of a national system of protected areas.

2.3.8 *Issues arising from the programme*

The project designers appreciated that bioprospecting is only one of many uses for biodiversity-related information. This information is obtainable from ethnobiological research to take advantage of thousands of person-years of direct observation of nature, from inventory work to generate species lists, and from ecological studies to create a meaningful understanding of the natural history of each named species. Iwokrama has access to a very rich ethnobiological resource, supplemented by considerable taxonomic knowledge of the macrobiota (especially trees and vertebrate animals) and some ecological research (on the primate community and selected trees and epiphytes). Much of this has been organized and presented in the form of paper and web-site publications, but there is a huge amount still to do to manage existing information holdings. For example, the web-site has the potential to relieve the scarcity of natural history guides and other information that is available to travellers, since it is now possible to download web-site material to palm-sized computers - thus guides to animals and plants in the Iwokrama forest could be offered for sale or free download, to complement the supply of printed books and booklets. Given that effective information and knowledge management is absolutely essential to maintaining public and political support for Iwokrama, to fund raising, and to the development of key business sectors such as ecotourism, the work of the Information and Communications Unit is vital and assessing its effectiveness should be a central objective of future monitoring and evaluation activities.

Meanwhile, a general inventory of the micro- and cryptobiota is not a priority at present, and inventory work is instead targetted to a small number of taxa that are considered especially relevant to bioprospecting. This is appropriate given the immense species-richness of the Iwokrama forest and the embryonic state of the bioprospecting programme. This early stage affords an opportunity to consider and plan for later events, which will be much more demanding. It is not clear that Iwokrama has yet entirely thought through all the implications of bioprospecting, but an essential consultancy on intellectual property rights and benefit sharing has not yet been implemented. How these issues are addressed will largely define how revenues from bioprospecting are distributed among competing interest groups, and hence the impact on Iwokrama's public support and income profiles in coming years.

Because biodiversity is essentially an information resource, value adding occurs primarily by organizing information and giving it meaning. Forest-dwelling peoples add value to biodiversity by developing knowledge through observation and experiment, and possess a resource of organized information which is meaningful in their own environment because it allows success in healing the sick, procuring food, etc. Some issues related to the nature, ownership and use of such 'traditional forest-related knowledge' (TFRK) are outlined in Annex 5. Some will be relevant to Iwokrama in addressing the complex issue of property rights and benefit sharing in relation to biodiversity. Intellectual property rights refer to the claim of the organizer of the information, the deriver of meaning, whether this is a community of forest-dwelling people or a bioprospecting company. Thus the use of TFRK in bioprospecting would be just as unacceptable as industrial espionage against a bioprospecting company, unless there was a clear prior agreement with the owners of the TFRK concerned.

Physical property rights, by contrast, refer to the ownership of the resource that is organized, in this case the biota of the Iwokrama forest in which the information resides. Iwokrama has the dominant physical property right in that in law it is free to organize biodiversity information and obtain benefits thereby (which however are expected to be shared with government). It can be argued, however, that the Makushi people of the north Rupununi savannahs also have at least some claim to physical ownership because the forest lies within their ancestral domain, even if only peripherally. The same would apply, though to a lesser extent, to the Patamona and Makushi peoples living to the north-west of the forest in Region VIII. These claims could all be addressed by recognizing that physical ownership is not absolute but is instead divisible according to the strengths of competing claims. In the case of local people, one simple way to acknowledge ancestral domain would be to establish an entity capable of receiving a share of bioprospecting revenues on behalf of the peoples concerned, and disbursing grants (e.g. educational scholarships) to them in a transparent and accountable way. See Recommendation 19.

Resolving issues of ownership and benefit sharing is not a complete solution, since without data security there may be no benefits to share. Biopiracy is a risk that naturally escalates with value adding, especially in the high potential profit fields of pharmaceutical and agrochemical bioprospecting. A species that has been short-listed for pharmacological activity through TFRK or preliminary bioassay is clearly more valuable than one randomly selected from a largely unknown biota, but even random samples can represent an important leakage of potentially proprietary information. Thus there is a premium on cheap but effective anti-biopiracy measures within bioprospecting programmes. One of these is to collaborate with other bioprospecting programmes in other countries to develop a global black-list of known or suspected biopirates. This database would then be used by Iwokrama and its partners to identify undesirable companies and individuals. See Recommendation 20.

There are two more technical issues involved as well, these concerning: (a) the capacity to collect and manage samples, prepare cultures and extracts for analysis, and conduct assays for bioactivity; and (b) the capacity to manage the very large amounts of information generated by the analysis. The first is straightforward and is already being developed by Iwokrama and its partners, but the latter requires more thought before the current knowledge management system is overwhelmed.

2.4 Sustainable Human Development

2.4.1 Sub-programmes and themes

The SHD programme comprises the following sub-programmes: (i) guiding the socio-economic effects of forest utilisation; (ii) development of the neighbouring Amerindian communities; (iii) education and short-term training in response to local needs; and (iv) environmental education and awareness. Each sub-programme encompasses a number of themes[26], of which the most relevant here are those concerned with:

- guiding the socio-economic effects of forest utilisation;
- participatory appraisal and processes;
- Community Environmental Workers (CEWs);
- transmission of Amerindian knowledge;
- local institutional strengthening;
- conservation contracts and alternative income generation activities;
- environmentally, economically and socially sustainable malaria prevention and control;
- community training and capacity building;
- ranger training;
- strengthening national technical and professional education in forest ecology and management;
- national and regional professional capacity building; and
- environmental education and awareness.

Furthermore the programme links strongly to the research theme *Use of biological resources by Amerindian communities* covered in section 2.2.7 (a).

2.4.2 Guiding the socio-economic effects of forest utilisation

a. Overview of the sub-programme.

The Iwokrama Centre is pursuing a range of activities within this sub-programme, organised largely around the zoning of the forest and subsequent management planning and commercial activity, including developing Intellectual Property Rights and benefit-sharing protocols relating to the SUA.

The IIC's monitoring of activities and projects in the SUA reflect a dual mandate: to increase the contribution of the forest sector to national GDP while at the same time benefiting the livelihoods of Amerindian and hinterland communities. To these ends, the IIC has initiated research projects in NTFPs in collaboration with foreign researchers and institutions, and is exploring with potential partners options for joint business ventures in ecotourism, these initiatives framed by a concern to ensure sustainable and diversified livelihood outcomes for local primary stakeholders.

Iwokrama staff have worked closely with the NRDDB to ensure partnership in the forest zoning process and in the analysis of options for the SUA. Significant time and resources were invested in raising awareness within communities of the rationale and methodology for

[26] These themes are detailed in *"Iwokrama Themes Workplan: 1999"* and *"Iwokrama Themes Workplan: 2000"*.

zoning and SUA analysis through a series of community consultations, workshops and a roundtable session. Both the NRDDB and the Region 8 Area Council are represented on the SUA planning team which expects to have its final report completed by the middle of 2001. Once the report is out, some three to four months have been allocated to obtaining feedback from communities and reaching agreement on how best to involve them in joint commercial ventures. These discussions will be linked to the upcoming consultancy on IPR/benefit-sharing. Follow-up training with community groups in business development and management has been factored in. More specifically, and given its proximity to the Field Centre, an ecotourism contract with Fairview village will be designed, implemented and monitored.

b. Issues arising from the sub-programme.

- Strengthening local business capacity — The IIC's concern with participation and partnership in the use of forest resources has created an opportunity for primary stakeholders to gain from economic and commercial development within and around Iwokrama forest. At the same time, Iwokrama recognises continuing risks to effective partnership that result from the disparities in political and economic resources between outside commercial interest groups and local communities. See Recommendation 24.

2.4.3 Development of the neighbouring Amerindian communities

a. Overview of the sub-programme.

Through its theme on '*participatory appraisal and processes*', Iwokrama has committed itself to a participatory approach in which the IIC strives to develop processes for inclusive decision making with key stakeholders at local, regional, national and international level. At the community level, therefore, Iwokrama has adopted participatory methods to facilitate local analysis and action around sustainable forest and wildlife management. Staff members have facilitated 13 community PHRIAs, each of which involved participatory resource mapping. Through this process, local people have been encouraged to document their resources and begin to analyse how they might use them sustainably. Subsequently, and building on the PHRIAs and resource mapping, pilot participatory management plan assessments have been conducted in the communities of Fairview, Surama and Toka, with plans to extend these assessments to the other communities.

The PHRIAs, resource mapping and participatory management plan assessments will lead specifically to the identification of conservation projects and signing of conservation contracts (see below). Here Iwokrama recognises that the conservation contract process cannot be pursued in an instrumental input-output fashion. Staff in the Social Science Working Group (SSWG) are committed to encouraging a process of analysis, internalisation and ownership of emerging contracts and projects. Importantly also, through these processes, Iwokrama has built methodological capacity for participatory research amongst Iwokrama Rangers, CEWs and Makushi Research Unit members. The results of all participatory consultations since 1996 have been integrated within a draft *Needs Assessment*, which identifies needs for:

- capacity building for resource management;
- general management and social life skills;
- strengthening local institutions;

- cultural affirmation and revival;
- improving communication at all levels;
- mechanisms for participatory decision-making and resolving trade-offs;
- links to regulatory agencies; and
- village-specific needs.

Iwokrama has extended the participatory appraisal process beyond the community level. Staff in the SSWG have worked hard and with notable success to encourage the adoption of a participatory approach across the range of Iwokrama's work, for example in fostering an inclusive approach to the zoning and management planning.

Through its theme on *'Community Environmental Workers (CEWs)'*, Iwokrama is responding to a need identified by a 1998 stakeholder workshop on wildlife management. The role of the CEWs is potentially pivotal in community development, since by providing a two-way linkage between the IIC and community groups the CEWs facilitate information flows and the growth of mutual trust and understanding. The ultimate goal for Iwokrama, however, is to create effective village-government links without the IIC playing an intermediary role, and the CEWs will be central to achieving this. The CEWs also fulfil a critical role in practical village-based work in environmental education. They have been involved in a number of activities, including: (a) working with local schools to increase understanding of environment and wildlife amongst children organized in Wildlife Clubs; (b) conducting wildlife mapping in three communities; and (c) supporting environmental management by participating in assessments on water and sanitation, and in mapping household use of the Iwokrama forest (to be integrated with the GIS database).

Twenty-six CEWs are employed from the 13 villages around the Iwokrama forest. They earn a monthly stipend based on six days' work a month. A Village Administrative Support Fund for the CEW programme has been operative since November 1999. Much of the work done to date with the CEWs has centred on skills training around a number of identified capacity needs. In addition to technical skills, CEWs receive training in process issues and behaviour and attitudes. Training is piggybacked onto the bi-monthly NRDDB meetings. CEWs have also been exposed to national and international forums and debates. One CEW, along with NRDDB and MRU representatives, attended the Caribbean Foresters Meeting in June 2000 and the Forestry Expo 2000. Two CEWs made presentations at the Amerindian Heritage Month celebrations held in the Regional centre Lethem in September 2000, while two CEWs and a Ranger attended a one-month fish training programme in Mamiraua, Brazil.

Through its theme on *'local institutional strengthening'*, Iwokrama has achieved perhaps the most striking success of the SHD programme in assisting with the development of the capacity of the NRDDB. The NRDBB began in 1996 when it emerged from the community-based consultation processes initiated by the national NGO 'Red Thread' working under contract with the then Iwokrama project. A further rationale was the vulnerability of local communities to powerful outside interests, making it essential for Iwokrama to encourage the growth of a collective capacity to engage with outsiders on a more equal footing. Through the NRDDB, Iwokrama has consolidated political space for dialogue and has created a constituency for change at the local level. As NRDDB capacity has grown, it has effectively taken ownership of local networking and development processes.

Support from Iwokrama takes the form of grant financing for the two part-time posts of secretary and treasurer, provision of short courses on financial management and projects,

and facilitation of access to key information related to resource management decisions, while a Village Administration Fund has been established to disburse small sums to Village Councils to facilitate activities and meeting associated with the related CEW programme. The NRDDB comprises community leaders and representatives of the MRU and Women's Sewing Groups, and meets every two months at the newly-constructed Bina Hill Training institute near Annai. In 1998, the NRDDB started to received from Iwokrama a share of user fees charged to all guests of the Iwokrama Field Station. Following requests of Government of Guyana officials, however, these payments were suspended by the Board of Trustees in 1999 pending the outcome of the forthcoming Intellectual Property Rights and Benefits Sharing Protocol study. The NRDDB has, however, been given copyright and royalties associated with publications that make use of Makushi TFRK.

The NRDDB is constructively critical of Iwokrama, a strong indicator in itself of the increased capacity of local stakeholders. There is a perception within the NRDDB that effective partnership with Iwokrama would be improved by stronger cross-Unit policy and process integration within the IIC itself. Local stakeholders do not think in terms of Units but have a more holistic view of the programme. The IIC is aware of this and is making concerted efforts towards stronger integration of its programmes, with task teams now operating across Units and "meeting weeks" starting to facilitate cross-Unit coordination.

Other important institutional strengthening activities relate to national and international networking of local institutions around the theme of wildlife. For example, Iwokrama is developing a grant system for Wildlife Clubs, partnerships between these Clubs and zoos and other funding agencies, and has facilitated regional and national links between North Rupununi clubs and other clubs in Guyana.

Through its theme on '*conservation contracts and alternative income generation activities*', Iwokrama is responding to a key issue that emerged from the 1998 wildlife management workshop. This was the recognition that the absence of alternative livelihoods, compounded by a lack of capacity in project management and implementation, was a very serious constraint to the sustainable development of the North Rupununi communities. By developing a conservation contract approach, Iwokrama stimulates positive livelihood outcomes and is developing capacity to implement projects in sustainable forest resource management. The aim is to provide cash or in-kind compensation through village-level contracts for a variety of environmental management services, with one contract and one type of service agreed with each community. A seed grant of US$ 2,000 per village per year will be provided under this mechanism for conservation projects, linked to reasonable performance indicators.

The PHRIA process provided a forum to identify possible contract areas, and the pilot ecosystem management plan assessments conducted in Toka, Surama and Fairview also looked more closely at projects proposed by those villages. Given its location within the Iwokrama Forest, IIC staff are giving priority to working with Fairview village members to develop a community development plan for the village. The implementation of this plan will be supported by Iwokrama making payments for the environmental services such as the protection of key areas of roadside or riverine vegetation under the conservation contract scheme and by facilitating access to funding agencies to support other activities. Due to the use of a process approach, progress towards the signing of conservation contracts has been relatively slow. Through empowering communities and building consensus and ownership, the likelihood increases that conservation projects will be effective and sustainable. A process

approach is particularly important given the complexities of (overlapping) land tenure claims between communities. Iwokrama staff are confident that four to eight contracts will be signed by end of the DFID project.

Through its theme on '*environmentally, economically and socially sustainable malaria prevention and control*', Iwokrama is responding to the continuing threat of malaria to the well-being of local communities and to the success of its own programmes. The approach has been to support national malaria control initiatives by trialling good practice in community-based preventative health care. Plans were developed with the Ministry of Health in late 1999, and local understanding of malaria issues was surveyed early in 2000, with a view to holding a 'mini-summit' on malaria and implementing a community education programme and the piloting of environmentally-safe vector control measures and other initiatives. These plans have been derailed following a change of personnel within the Ministry, where the new malaria control officer has resisted Iwokrama's attempts to trial and support community-based malaria management approaches. Despite this, Iwokrama has been able to impact on communities, particularly Fairview, by facilitating the work of a Peace Corps health volunteer and through the outreach work of its own Medex staff member. Furthermore, the survey process has itself raised awareness of malaria issues within communities, and there is scope to increase impact by working closely with Radio Paiwomak, MRU and the CEWs to develop and disseminate educational messages and tools for malaria prevention, and other preventative health messages. While Iwokrama does not see large, measurable reductions in malaria incidence through the life of the DFID project, it is confident that its approach will bring longer-term change.

b. Issues arising from the sub-programme.

- Participation —the processes instigated by the IIC with a range of local and national stakeholders are notable for their adherence to the principles of participation and institutional and individual empowerment. Key Iwokrama staff members engaged with these processes have identified a number of ways to make them more inclusive, particularly the need to move beyond an over-reliance on the NRDDB and Village Councils as mechanisms for reaching the various interest groups that comprise each community. Staff members also identify a need to strengthen social capital within communities by encouraging collaboration around project and programme cycles. Underlying tensions around continued access to resources guaranteed by the Iwokrama Act need to be resolved by continued stress on the commonality of interests between indigenous rights of access and sustainable use and management of resources.
- Resource mapping — Iwokrama has developed it's own approach to resource mapping based on the designs of its former Social Scientist, Dr Lea Scherl. At the same time other organisations (for example the Amerindian Peoples Organisation) have developed other approaches, which may have relative advantages and disadvantages to Iwokrama's methods. Resource mapping is a key element in justifying ancestral claims and land titles, therefore using the best approaches is of great relevance to Amerindians nationwide.
- Community Environmental Workers — the CEW programme is an area that needs considerable ongoing development and support. The selection of CEWs was made by the communities themselves after considerable discussion with Iwokrama staff on the goals for the programme and, despite these discussions, the majority of CEWs appointed by the communities have been male. Such

gender imbalances are being addressed by other programmes such as the Iwokrama-supported Wildlife Clubs, where many girls are being introduced to areas which were until quite recently considered exclusively male domains. Certain village captains appear to have resented the challenge posed by the new institution of the CEW. Training of the CEWs only began in April 2000, so it is still early to assess impact. Certainly at present there is considerable variation in the capacity of the CEWs to fulfil their role as communicators and information sharers. Some CEWs show signs of jealousy towards the Rangers, who they perceive to have had a head start in training, more technical training, and greater prestige. Iwokrama staff are aware of this, and plan to use the CEWs more actively in higher-profile roles. See Recommendation 21.

- Local networking —a strong message emerging from discussions with local stakeholders is that the IIC should play a greater role in reinforcing the links between its headquarters and national stakeholders and local institutions, with some calling for a rotating presence of senior staff at the Bina Hill Institute. Many senior staff at IIC would like to spend more time in the vicinity of the Iwokrama forest but are also aware of the IIC's strategic need to facilitate institutional connections at the national level. See Recommendation 22.
- Local knowledge access — there is a need to facilitate local access to key information related to resource management decisions, such as global lessons in community conservation and development, and key information on sustainable forest management. An example of the potential utility of additional knowledge is the fact that alternatives exist to the proposed development of a wood-burning brick factory in the area by UNDP, which will increase pressure on savannah forests. Here, local interests might be served better by introducing alternatives to bricks as building materials, such as the sandbag-chickenwire-cement skim low-cost 'ecohouses' developed at the Engineering Department of the University of Cape Town, South Africa, or alternatives to wood-fired kilns (such as solar kilns), or both. Present arrangements tend to limit access to global knowledge resources to government agencies and to Iwokrama itself. A locally accessible "knowledge bank" supported by an upgraded Iwokrama Information and Communications Unit could enable communities to explore potentially more sustainable options before taking decisions with significant local resource management implications. See Recommendation 23.
- Business skills development —an indication of the growing profile and assertiveness of the Amerindian community is that private sector groups now increasingly recognise the legitimacy of Amerindian interest groups. This is consistent with Iwokrama's approach to business development, with its emphasis on joint ventures between outside investors and local enterprises. Local people cannot be expected to participate fully in such commercial opportunities, however, without prior and thorough training in the practical details of how to set up and run profitable businesses. See Recommendation 24.
- Scaling up and links with Region VIII communities —the prospect of scaling-up Iwokrama's work to other regions suggests expanding Iwokrama's geographical scope. The Amerindian Peoples Association (and it's partner the World Rainforest Movement) have formally requested expansion of Iwokrama's programmes to communities north-west of the Iwokrama forest that perceive themselves connected with it. They argue for fuller consultation in SUA planning (at present one village leader from the area is on the planning team), based on ancestral claims, especially fishing use of the Siparuni river. Other requests focus on

community development, NTFPs, health care, and natural resources management training. Some concerns have been expressed about curtailment of access rights to the river and forest, following completion of zoning. These communities are several days' walk from the Iwokrama forest edge, however, which impedes staff visits and limits the potential for micro-enterprise development based on Iwokrama resources. Extension of Iwokrama programmes to cover Amerindian communities in Region VIII should therefore be carefully appraised, as considerations relating to logistical constraints on Iwokrama, opportunity costs of expansion and limited human/financial resource availability must be weighed against the socio-economic benefits to the communities and enhanced buffering effect of participant communities against risks to the Reserve. That said, formal approaches should be made to Region VIII Amerindian Council to explore options for collaboration and explain Iwokrama's role and national mandate.

2.4.4 *Education and short-term training in response to local needs*

a. Overview of the sub-programme.

Progress on the theme of '*ranger training*' is reviewed in Section 2.3.2. It is however closely linked to the theme of '*transmission of Amerindian knowledge*', since 12 of the 13 Rangers are Amerindians and an important part of their training and social impact revolves around TFRK and the restoration and use of Makushi language and culture. Cultural affirmation and revival is viewed by Iwokrama as a critical need towards achieving sustainable livelihoods. The social and cultural capital that is built through revitalising activity and interaction around traditional culture and language is an essential component of sustainability that takes the programme beyond a narrow concentration on income-based notions of sustainability. Iwokrama staff members have been highly proactive since 1995 in stimulating and facilitating cultural revival in the region. The baseline situation was one in which children did not speak Makushi and were ashamed to see their elders speaking Makushi in front of visitors, and in which cultural capital had been eroded by the integrationist social policies of successive governments in both the colonial and the post-independence periods.

In 1996, the SSWG facilitated the formation of the Makushi Research Unit (MRU), a group of eight local women and one local man coming together to document and disseminate Makushi language and culture. Members of the MRU share and are motivated by a concern with the dying away of their language and culture. Funded partly by a grant from CIDA's Gender Equity Fund, their activities range from publishing bilingual material for schools and adults, cultural outreach work linked to income generation, to participating in research projects, such as the recent crab-oil research. Their major publishing achievement to date was a compilation on Makushi traditions known as *Makusipe Komanto Iseru*; returns from the sale of this book are estimated to be about US$3,000. Indications are already that the MRU has helped to challenge and reverse perceptions of language amongst young people and revive an interest in culture. The MRU work at schools has the potential to enforce more structural policy change within the Ministry of Education (MoE). Some teachers are still reluctant to incorporate local culture and language into teaching practice, and guidance from the MoE would help to overcome this. The MRU has scored a great success in getting MoE agreement and the Guyana Book Foundation help in distributing Makushi booklets.

Iwokrama appears to have significantly altered gender relations in local communities through the consistent use of participatory approaches in community dialogue and in the future the high proportion of female ranger trainees will contribute to women's involvement. Gender-ascribed roles amongst children are breaking down (girls were previously seen as gardeners and wildlife seen mainly as a male hunting domain) through wildlife clubs. The MRU has also contributed to changing gender relations within communities. One MRU member talked of personal empowerment as a result of her association with the MRU. She has become a "big person" in the community, holding meetings to discuss the MRU and acting as a translator for outsiders. The MRU activities also create an opportunity for income generation, with copyright of MRU publications owned by the NRDDB. Further development in gender relations appears to depend on the intrinsic gendered constraints of the communities themselves.

Through its theme on '*community training and capacity building*', Iwokrama is developing key tools to meet the broader objectives of the sustainable human development programme. The IIC has pursued a range of activities towards the objective of increasing professional capacity for public and private work related to the Iwokrama forest. At the local level, training needs assessments have been conducted on an ongoing basis during the return of PHRIA documents to villages, and an Outreach Extension Program is to be developed which will build upon the results of the community assessment. It will have at least three components: (a) a programme to supplement successful ongoing initiatives that have similar goals to Iwokrama; (b) courses aimed at raising income levels of local communities; and (c) primary school education programs carried out by Iwokrama Rangers. Meanwhile CEWs have received training in GPS use and have developed a capacity for resource mapping under the supervision of the Centre's GIS specialist. The Social Science Unit has hired an Amerindian Research Assistant to be mentored by staff of the Unit, both to further achievements of the Unit's goals and objectives, and to support the individual's continued personal development.

Iwokrama recognises that the impact of training is maximised when training workshops are linked to concrete projects. Although not actively leading on livelihoods projects, the IIC has promoted a number of training activities in support of small business and livelihood skills development where these initiatives support its mandate of collaborative resource management. These activities, which Iwokrama sees as complementary to the activities of other donors such as the UNDP's Poverty Eradication Programme, have included a two-day workshop on book-keeping and financial management held for eight Village Council members July 1999, and a Youth Apprenticeship hands-on construction skills training linked to the completion of the Training Institute and radio station building at Bina Hill.

Through its theme on '*strengthening national technical and professional education in forest ecology and management*', Iwokrama is supporting the forestry and environment programmes at UG, and education and training in other national institutions. A programme of collaboration with UG has been initiated under a Memorandum of Understanding. A meeting between Iwokrama personnel and key senior staff of the University identified the following as some areas of collaboration to be explored:

- assistance in supervising Masters degree level research;
- off-campus training of UG students at the Iwokrama Forest;
- participation in the formulation and writing of research project proposals;
- guest lectureship by Iwokrama staff at UG;
- an internship and capacity building programme at Iwokrama for UG staff on sabbatical leave, and

- development and sharing of facilities and resources for information and training.

Through its theme on 'national capacity building and regional professional capacity building', Iwokrama has contracted thirteen young Guyanese under the Young Professionals Programme – six Professional Development Fellows (PDFs) with post-graduate qualifications and seven Research Assistants with bachelors level qualifications or the equivalent. All have been engaged in a programme of work and mentorship in areas such as collaborative resource management, ecotourism management and development, forest ecology and management, wildlife management, geographic information systems and protected area management. Iwokrama has also committed itself to providing some limited help towards including National Parks Commission (NPC) personnel in relevant modules of the ranger-training programme at Iwokrama through partial funding. The IIC sees regional technical workshops as the principle vehicle for regional information sharing and lesson learning.

b. Issues arising from the sub-programme.

- Intellectual property — a theme raised by a number of local stakeholders was that of the generation, recognition and ownership of knowledge. The existence of the MRU reveals Iwokrama's concern to validate local knowledge and to strengthen and restore local culture and language, yet there is a sense that in the short and long-run, local people may be losing out to the outsiders and "experts" who come along, fill their computers with data and leave. Similarly, some local people perceive wide disparities in remuneration and recognition between the outside "expert" scientists and the input of local experts. Some speak of outside experts "exploiting our knowledge", and are concerned that their children "shouldn't have to pay for their knowledge in twenty year's time". The challenge for Iwokrama is to translate an awareness of these perceptions into a progressive strategy to build partnerships for community development, in a way that gives due regard to the generation and ownership of knowledge. See Recommendation 25.
- Continuity of capacity building initiatives — the continuity of Iwokrama's capacity building initiatives at both the community and the national levels is important and there are growing expectations amongst many stakeholders that these programmes will be maintained and further developed. In reviewing the remainder of the SHDP project and in dialogue with DFID and other donors, the Centre should give priority to:
  - Securing opportunities for a second intake of ranger trainees beginning October 2001 or January 2002. This intake should take recruits from local communities (say 6) to meet Iwokrama's own future needs for staff, and recruit an additional group of trainees (say 6) from other hinterland communities to meet the emerging resource-management needs of these communities and national agencies.
  - Offering at least three one-year Professional Development Fellowships at the post-masters or post-doctoral level at the beginning of 2002, in the areas of Forest Ecology and Management, Environmental Economics and Collaborative Forest Management and Planning.
  - Supporting these Fellowships with opportunities for short-term secondments and/or sabbatical leave for staff from GFC, other national or regional agencies, the University of Guyana and the University of the West Indies.

- Provision of two competitive scholarships per year beginning October 2001 to allow students from the communities living in or near the Iwokrama Forest to complete their secondary education and/or study at the University of Guyana. This initiative is needed to provide them with the training and qualifications they will need to assume eventually operational management positions at the Iwokrama Forest.
- Provision of two scholarships for graduate studies in wildlife biology and management to fill gaps in national capacity building in a key area of forest-based livelihood support. After completion of their graduate studies, the candidates should ideally be employed at the Centre under the Young Professionals Programme to consolidate their professional development.

2.4.5 *Environmental education and awareness*

Building on the successful community-based initiatives such as the Wildlife Clubs and the work of the CEWs, Iwokrama is developing environmental education modules for use by individuals and organizations at the local, regional and national level. The IIC has initiated a "Friends of Iwokrama" group, now continued into its second year. This group meets once every two months at well attended social gatherings where presentations on environmental themes and topics are made by both national and international speakers. Iwokrama hopes that the Friends network will eventually grow throughout the Commonwealth and other partner countries and become a focus for enhanced understanding of rain forest conservation and management issues and a force for developing broader support for the Centre and its programmes. Fortnightly 'Brown Bag' seminars are also held to disseminate research results and share management experiences. These seminars are targeted at all resource management professionals working in Guyana. They regularly attract 20-30 participants including strong representation from young Guyanese professionals working at Iwokrama, in government agencies and at the University of Guyana. The Iwokrama Foundation Day Lecture Series has been an annual event for six years and is well received by the public. Iwokrama has developed posters on themes such as the IIC's objectives, aspects of conservation, and collaborative programmes with other institutions such as Conservation International, the San Diego Zoo, and the EPA. Finally the "Iwokrama Bulletin" continues to be regularly published and circulated.

Iwokrama staff are active in interacting with local schools and clubs on topics related to Iwokrama's activities and on broader issues of sustainable forest conservation and development. Frequent mention is made of Iwokrama's work in newspaper and TV items. Visits of Region 9 school children to the Iwokrama Forest have been very successful, with parents also subsequently exposed via their children. Students have taken part in a series of activities, including formal presentations by Rangers, guided tours of Turtle Mountain, nature walks around the Field Station, and visits to the petroglyphs at Fairview. Following completion of a large visitors' Centre at the field station, environmental education displays will permit community and school visits and a range of dissemination activities in the forest.

Iwokrama is trying to make its environmental education and awareness initiatives more systematic. In August 2000, it convened a seminar on "Critical issues in Environmental Education in Guyana" to discuss integrated approaches environmental education with staff from the Ministry of Education, the Environmental Protection Agency and selected teachers from both local high schools and hinterland schools. It is also building supportive alliances with the Audubon Society's Schoolyard Ecology and Citizens Science programmes.

Internally, it has recognized the need for Environmental Education Audience Assessments to provide guidance on content and delivery mechanisms for different audience groups. The Centre has also tried to initiate essay competitions for primary, secondary and tertiary students with the Ministry of Education and would like to organise an annual Iwokrama Debating Competition on Forest Conservation and Management for secondary schools. It also recognises the need for collaborative workshops with national agencies and UG students on the theories and methods of environmental education.

Community members consulted during the mission were overwhelmingly positive in their appreciation of the value of improved understanding of their environment and its sustainable management. The MTR team observe that a strengthened role for CEWs in environmental education and awareness would be highly desirable, and that Radio Paiwomak has a particularly important potential role in education and awareness raising on malaria, Makushi culture, literature and many other subjects. Nevertheless, for this potential to be systematically realised, the IIC will need to be supported by appropriate human and financial resources.

3. The Sustainability Challenge

3.1 Introduction

3.1.1 Functions of Iwokrama

Iwokrama is a non-profit organization with both a non-profit, public-interest function and a commercial function designed to test simultaneously the commercial viability of environmentally and socially sustainable forms of forest use and management, and to generate net income to support the Centre's public service mission. The first is eligible for public funding while the second may not be (except for subsidy and specific research projects with a clear and direct public interest component, e.g. investigating the economics of conventional and reduced impact logging). The second is able to attract private investment while the first is not (except for advertising and personal or commercial sponsorship). These two aspects of the Centre's work need to be managed in quite different ways if either is to be effective (see Section 2.2.8 (e).

The logic of distinguishing public from private roles within the Iwokrama enterprise leads to the option of establishing an Iwokrama-owned holding company ('Iwokrama Holdings Ltd') to take the lead in organizing engagement with the commercial sector. This model would clarify the distinctive roles of the three main institutional actors, as follows:

- The *Iwokrama Board of Trustees* would: (a) oversee strategy and set governing policies and business principles; (b) act as the ultimate guarantor of sustainability and equitability in all Iwokrama activities; and (c) monitor negotiations and approve all agreements.
- The *Iwokrama International Centre,* led by a Director General, would: (a) develop its own business plan; (b) manage international fund-raising for an Iwokrama Trust Fund and new infrastructure at UG and in the field; (c) manage the protection of Iwokrama forest ecosystems; (d) manage links with national and international government institutions and NGOs; (e) manage research and knowledge; (f) manage links with academic institutions; (g) manage public education and

information services; (h) manage local, national and regional technical workshops; (i) provide quality assurance of corporate operations to the Board of Trustees; and (j) certify products for Iwokrama branding.

- *Iwokrama Holdings Ltd,* led by a Chief Executive Officer, would: (a) develop its own business plan and an investment prospectus comprising a folio of business plans for specific ventures, emphasizing commercial advantages available through Iwokrama's branding and certification systems; (b) manage the search for potential investors; (c) negotiate joint ventures (transparent to Board of Trustees); (d) establish Iwokrama-branded, jointly-owned subsidiary companies (approved by Board of Trustees); (e) receive excess profits from subsidiaries (with accounts to Board of Trustees); and (f) pass its own excess profit to the IIC (with accounts to Board of Trustees).

The fact that the IIC and its holding company have different roles need not imply that the whole two-part mechanism must be established immediately, which would be expensive and premature. Rather the aim here is to draw attention to the different roles in the hope that they can be performed, at least for a while, without incremental cost. For example, both may be performed by a Director General recruited with this requirement in mind, or the role of CEO of the holding company might be undertaken by one or more members of the Board of Trustees who have private-sector backgrounds. It is suggested that the Board of Directors seriously consider the financial advantages and disadvantages, and the organizational and legal aspects, of distinct organizational structures that separate the public service, and forest-related commercial activities of the Centre's work.

3.1.2 *Funding of Iwokrama*

There is assumed to be a global value associated with the experimental nature of the Iwokrama initiative and its role as a research venture. The global value of this information content is stressed as a primary output of the project, and the provision of this public good externality is one rationale for donor buy-in to the project. It is reasonable to stress that public-interest arguments alone justify public investment in Iwokrama as a cost-effective way to save, study and use sustainably some key components of global biodiversity. The total cost of Iwokrama to the global public purse is moreover unlikely to exceed that of other integrated conservation-development projects (ICDPs) that deal with comparably large areas of tropical moist forest[27]. Yet in the case of Iwokrama, there are numerous intangible benefits (like the promotion of good governance, local self-sufficiency, sustainable business activity and ecological understanding) that are simply missing from many other ICDPs.

The *Business Plan* envisions a process by which Iwokrama is funded for a limited period by governmental donors, during which time arrangements are made to attract private investors and capture a share of resulting economic activity, a process that will reduce the need for further public subsidy. There has been some slippage in the original schedule, so donor subsidies will be required for several more years than previously hoped. While ongoing support by the international community is justifiable in terms of global benefits generated by Iwokrama, it may not be an ideal strategy for achieving sustainability of the enterprise. This is because of the risks of 'donor fatigue' and the likelihood that donor funds will be tied to

[27] For example: Wells, M., Guggenheim, S., Khan, A., Wahjudi Wardojo and Jepson, P. (1999) *Investing in Biodiversity: a Review of Indonesia's Integrated Conservation and Development Projects* (World Bank, Washington, DC).

projects rather than helping to meet core costs, while also imposing inappropriate scheduling constraints.

This section addresses, firstly, the current funding outlook for Iwokrama, secondly the case for donors that are already engaged with Iwokrama, and others, to contemplate developing follow-on projects, and thirdly, the case for the world community to make a one-off grant to capitalize a sustainable financing mechanism. The combination of these interventions would resolve most of the questions that now hang over the sustainability of the IIC. The issue of how to develop the commercial aspects of the Iwokrama initiative as a whole is addressed in Section 3.4.

3.2 Current Funding Outlook

Summarized in Tables 1 and 2 are cost and revenue data from the *Business Plan*, with amendments suggested by the MTR team. Cost information represents the funding requirement of a fully-functioning research centre at current levels of staffing and programme support (Total Cost, Row 1). Revised income projections for the main revenue sources are shown in Rows 2-13 (in parentheses), these being explained in Section 3.4.

Revenues from timber (community forestry + RIL variant), ecotourism and NTFPs are expected to be brought on stream earlier than those from carbon storage and bioprospecting. This sequence is speculative, however, and depends on global events, national and international legislation and stakeholder preferences for realising the development of these options. It is also subject to luck, in that an early bioprospecting "hit" for example could bring about almost-immediate cost recovery[28].

The important bottom line is the adjusted net cash requirement in Row 19 (compared to the original requirement in Row 15). Row 19 takes the new estimates of revenue generation and offsets these against IIC cost requirements. To the resulting net cash shortfall, are added remaining donor commitments that are still online through to 2003. Row 19 is the bottom line for donor consideration, and suggests a continuing short-fall in revenue of around US$ 0.4 million in year 10 (2007), rather than the full cost recovery that had been expected by then. The near-term funding requirement is noteworthy for the shortfall that is anticipated in 2002.

The analysis presented in Table 2 highlights the fact that some 36 percent of total DFID SHDP funds remain unspent, and this may be relevant to the length of any extension to this project. If a six-month extension is granted to the end of 2001, these funds must be spent at a high rate if they are to be used in full. It may therefore be more efficient instead to extend the project by a full year, i.e. until mid-2002. Note also that, as total projected donor disbursements in 2001 exceed projected IIC costs, this further justifies an extension of DFID SHDP into mid-2002, since this will help to balance donor income in relation to costs. Assuming a DFID SHDP extension to June 2002, revised figures (in bold and in square brackets) have been included in Table 2, resulting in a more tapered donor income flow, corresponding more closely with IIC costs and potential business income streams. This adjustment would reduce the severity the anticipated 'funding crunch' in 2002.

[28] Assuming that measures were in place to ensure the capture of the resulting revenue stream, including appropriate and enforceable contracts that provide for royalties and/or share dividends

Table 1: Revised Income and Expenditure Projections, 1998-2007
Stage 1. Yrs 1 to 5. (1998-2002) Stage 2. Years 6 to 10 (2003-2007). Table revises Table 1 pp 37 of the Business Plan $'000

Year	1 (1998)	2 (1999)	3 (2000)	4 (2001)	5 (2002)	6 (2003)	7 (2004)	8 (2005)	9 (2006)	10 (2007)	Comments additional to Business Plan information
1. TOTAL COSTS	3002	4091	2915	2934	2999	3110	3265	3428	3600	3780	This represents a well-funded centre and activities. Core costs for the Centre are thought to be a minimum requirement of US$ 500-600,000 (see Business plan for breakdown)
INCOME											
2. Timber			200	350	500	545 (200)	595 (350)	650 (500)	710 (545)	780 (595)	Timber revenue stream unaltered but now begins 3 years later
3. Value Added Processing						100	150	200	300 (100)	400 (150)	Value added stream delayed by same time period
4. Non Timber Forest Products						(90)	(99)	(109)	(120)	(132)	Forecast NTFP revenues assuming a value of US$1 per hectare multiplied by a quarter of the Iwokrama area. Benefits to commence in 2003 and to grow at 10% per year.
5. Value Added Processing (NTFP)						(.9)	(1)	(1.1)	(1.2)	(1.3)	Assumes a modest value added equivalent of 1% of NTFP value
6. Bio-diversity Prospecting				10	20	30	35	40	45	50	Revenue forecast unaltered
7. Eco-Tourism & other Visitors	(51)	(39)	50	100	200 (126)	300 (138)	400 (166)	500 (216)	600 (324)	700 (486)	Figures for 1998 and 1999 are actual revenues. For 2000, figure is a forecast. Numbers in parentheses are revised forecasts. Different total visitation for 2000 then a projection growth rate of between 10 rising to 50% per year
8. Consulting opportunities			(10)	(20)	(20)	(30)	(50)	(50)	(50)	(50)	Projected income from consulting services. Best estimate.
9. Training, Information Products and Arts				60	120	180	240	250	250	250	Unchanged from business plan
10. Endowments, grants			50	250	400	600	800	1000	1000	1000	Unchanged from business plan. Reaching this figure implies substantial and successful fund-raising efforts.
11. Project Contributions To Core Costs		15	30	60	120	240	500	500	500	500	Surcharge of around 5% on research projects operating out of Iwokrama
12. Carbon Offset Investments			54	95	135 (54)	140 (95)	145 (135)	150 (140)	150 (145)	150 (150)	This element is now scheduled to commence in year 5 (2002) at the earliest

Year	1 (1998)	2 (1999)	3 (2000)	4 (2001)	5 (2002)	6 (2003)	7 (2004)	8 (2005)	9 (2006)	10 (2007)	Comments additional to Business Plan information
INCOME											
13. Information value	?	?	?	?	?	?	?	?	?	?	Non-quantifiable value attributed to generated knowledge
14. TOTAL INCOME (projected)		15	384	925	1495	2135	2865	3290	3555	3830	This line shows the projected income as forecast in the original business plan made up of the total revenues from the original projections (anything not in parentheses above)
15. ORIGINAL NET CASH REQUIREMENT (row 1 minus 14)	3000.9	4076	2531	2009	1504	975	400	138	45	(50)	This row simply shows the difference between necessary costs of the centre and the original projected earnings from all sources except donor inputs. Iwokrama forest businesses shows positive return by 2007.
16. ADJUSTED TOTAL INCOME sum rows 2-13 (figures in parentheses)	51	39	194	595	860	1704	2526	3006	3080	3364	Income generation generally revised downwards compared to row 14.
17. NEW NET CASH REQUIREMENT (row 1 minus 16)	2951	4052	2721	2339	2139	1406	739	422	520	416	Row revises the cash requirement forecast accounting for lower income forecasts.
18. Total donor funds plus other funds (mainly ecotourism 1998-2000)	987	1185	2299	2581	1648	483	ZERO	ZERO	ZERO	ZERO	See table 2. Projected income from donors in bold from table 2 is based on the assumption that the DFID SHD project is extended to mid-2001. Post-2000 ecotourism income is accounted in row 7.
19. Net balance of IIC costs and projected donor income (table 2 figures minus row 17)				+ 242	- 491	- 923	-739	-422	-520	-416	**Critical row for donor consideration.** The excess above costs in 2001 hedges against a short-fall in attaining revised income projections (i.e. a failure to obtain endowment funding). A funding 'crunch' will take effect in 2002 and then with substantially greater severity in 2003[29].

[29] Donors are requested to take note of row 19 which displays the likely income deficit pattern that Iwokrama will suffer over the next 3-4 years. **Donors must consider how to cover Iwokrama costs during 2002 and 2003.**

TABLE 2 Donor Inputs: Part A - Current Larger Projects				1998	1999	2000	Total	2001	2002	2003
PROJECTED COSTS (all figures in US$)				3,001,700	4,090,900	2,915,300	10,007,900	2,934,300	2,998,700	2,998,700
DONOR FUNDS	PROJECT DURATION	PROJECT TIMING (months remaining)	TOTAL FUNDS (AMOUNT REMAINING)	ANNUAL DISBURSEMENTS			DISBURSED TO DATE (END 2000)	PROJECTED ANNUAL DISBURSEMENTS[30]		
DFID – SSS	3 years	Mar 1998 - Mar 2001 (3 months)	400,000 (114,289)	60,504	97,634	127,573	285,711	114,289		
DFID – SHD	3 years + 6 months	Jun 1998 - extended to Dec 2001[31] (12 or 18 months)	4,800,000 (1,774,242)	646,783	772,647	1,606,328	3,025,75	1,774,242 [1,182,828]	[591,414]	
EU	3 years	Jul 2000 - Jun 2003 (30 months)	1,400,000 (1,047,073)	-	52,480	300,447	352,927	418,829	418,829	209,415
ITTO	3 years	Jul 1999 - Jun 2002 (18 months)	781,000 (681,000)	-	100,000	-	100,000	454,000	227,000	
CIDA	3 years	Sep 2000 - Aug 2003 (32 months)	1,200,000 (1,097,002)	-	-	102,998	102,998	411,375	411,375	274,250
TOTAL PROJECTED ANNUAL DISBURSEMENTS (unbracketed totals assume an SHDP extension to end 2001; bracketed figures until mid-2002)								3,172,735 [2,581,321]	1,057,204 [1,648,618]	483,665

[30] Assuming that the rate of spending of remaining funds stays constant, on a per month basis, over the outstanding period of that project. Start date used for disbursement projections is 01.01.2001

[31] Note that a high proportion of total DFID SHDP funds are unspent (36% of total budget).

Table 2 (Continued) Donor Inputs: Part B - Concluded Projects or Funding Below Us$ 140,000				1998	1999	2000	Total
				US$	US$	US$	US$
UWICED				4,950	-	-	4,950
IDRC I&C				41,166	-	-	41,166
IDRC IPR				40,723	-	-	40,723
Australian Government				83,000	37,000	-	120,000
Maldives + Mauritius				55,000	-	-	55,000
World Bank				-	24,613	49,225	73,838
MacArthur Foundation				-	30,000	-	30,000
Commonwealth Secretariat				-	32,000	56,250	88,250
Holloman Foundation				-	-	14,990	14,990
UNDP Ranger Funding				-	-	8,810	8,810
UNICEF Com. Radio Fund				-	-	3,245	3,245
Total Donor Funds				932,126	1,146,374	2,269,866	4,348,365
Revenue From Visitors				50,780	38,978	29,042	118,800
Other Income				3,871	298	318	4,487
Total Revenue				54,651	39,276	29,360	123,287
Total Funds Received All Projects				986,777	1,185,650	2,299,226	4,471,652

3.3 Development of Governmental Donor Support

3.3.1 The case for continued donor support

The donor-funded components of the Iwokrama initiative are judged successful in terms of the intentions expressed in the *Operational Plan* and project documentation, while also being effective in terms of their beneficial impact on local stakeholders, and strategic in terms of their complementarity with other components in each case. It is also apparent that continued donor support beyond the end of 2001 would be helpful, addressing both international environmental concerns and priorities of sustainable development and poverty eradication. The MTR also agrees that, in the long-term, Iwokrama has the potential to make substantial contributions to meeting International Development Targets on poverty eradication in Guyana and the region, thus rendering Iwokrama eligible for support from a range of sources.

This analysis may be particularly relevant to DFID, which has invested most in targeting poverty-related issues, and may reasonably be expected to be sympathetic to a request for a follow-on project (see Recommendation 26). The precise form of such a new project would need to be defined by a specialist mission, but its key attributes should respond to two sets of recommendations. The first set comprises Recommendations 3-7 on NTFP development, Recommendation 8 on community-based forest management using low-impact, precision harvesting of high-value timbers and NTFPs, with on-site processing and maximum local value-adding, Recommendation 11 on a process leading to the inclusion of informal chainsaw loggers in national forest management, and Recommendation 24 on capacity building including business training for local people. This would address the vital fields of: (a) how to use NTFPs as a basis for community ventures and joint-ventures with outside business partners; (b) development of grass-roots forest management with maximum impact on the well-being of the poorest and most marginal groups in Guyana, and on the environment that may otherwise suffer considerable damage; (c) strengthening of the capacity of local people to enter into equitable and profitable business ventures; (d) explicitly broadening Iwokrama's environmental education within Guyana through programmes to reach schools, Amerindian groups and other parties, using the Information and Communication Unit as key linkage to these national constituencies; and (e) provision of training services on a contracted basis to clients in national park and sustainable forestry management, nationally and regionally.

The second set comprises Recommendation 32 on the need for a knowledge management strategy, management information system and a linked participatory monitoring and evaluation system and on-site knowledge bank with free access. This would address the important fields of (a) creating an institutional capacity for adaptation to changing stakeholder demands and in response to uptake of results; (b) for effective reporting; (c) for understanding impacts on a diverse array of stakeholders and how to direct them in the field; (d) for communicating more effectively with stakeholders to meet their needs more exactly over time; and (e) for encouraging and enabling local primary stakeholders to take informed decisions. It is suggested that this component of the new project also be used to provide resources with which to ensure continuity of employment and operational support for the core staff of the Management Committee.

A further issue specific to DFID is to ensure full coordination between Iwokrama and Enterprise Development Competitiveness Initiative currently under development by DFID

Barbados, which potentially could provide support to ensure the quality of business development activities focussed around business groups involved in ecotourism and handicrafts development.

A third group of issues relevant for wider donor review relate to resolving some of the key constraints experienced by Iwokrama with current funding arrangements. These could usefully be considered by a meeting of a Donor Support Group (see Recommendation 35), and include: (a) lack of core funding for important though non-project-specific activities, such as the Director General's salary, building costs of an HQ on the UG campus[32], sustaining technical networks[33] and meeting costs of Board of Trustees meetings[34]; (b) Iwokrama's reporting difficulties across a wide portfolio of projects; (c) the time demands and opportunity costs of attending to frequent donor monitoring missions[35]; and (d) development of methods to ensure continuity in institutional memory as contracts conclude of project-funded staff. Resolution of these issues will require considerable inter-donor communication and flexibility to respond to the needs of Iwokrama as a unique international institution, falling outside normal categories of project-limited donor support.

Donor flexibility in meeting core funding needs would require adoption of the view that Iwokrama has now established its credentials and can be considered as a partner with the capacity to manage non-tied funds in an appropriate manner. As existing donor projects approach their conclusion, the impact of cessation of funding on achieving project outputs and purpose will become clear. Donors are requested to respond creatively to the option of supporting follow-on phases or new projects, in line with progress and stakeholder demands in each field of Iwokrama's work.

Finally, it is clear that developing fund raising efforts has been neglected by Iwokrama and its Board of Trustees, due to the constraints mentioned above. Dynamic staff with time and resources to dedicate to complex processes are required. Donors should seek to monitor and support progress in developing and implementing fund-raising, even beyond the option of obtaining substantial support for a GEF trust fund. It must be remembered that diversity in international funds allocated to Iwokrama, leads to a corresponding diversity in partnerships, which is part of Iwokrama's remit.

3.3.2 *The case for a GEF Trust Fund*

A feature of the Global Environment Facility (GEF) is its emphasis on establishing sustainable financing mechanisms of various kinds, and it has actively explored the use of trust funds and trust-like mechanisms in many countries. A review of 13 such funds[36] concluded that the GEF should continue to finance such mechanisms if the circumstances meet four essential conditions, which are that: (i) the issue to be addressed requires a

---

[32] Estimated construction cost is about US$ 1 million. Of special importance is the development of a stakeholder consensus on the role of the planned HQ, which would clarify particular themes within the IIC's programmes to be emphasised and enhanced by this facility. This topic that might be tackled by a DFID project design mission, and reviewed by the Donor Support Group.

[33] An estimated US$ 25,000 per year would be needed to establish and maintain the Scientific and Technical Advisory Network envisaged in the Operational Plan.

[34] Donors should consider increasing the percentage of contingencies to levels of around 15% of each total budget

[35] Iwokrama staff identified the need to prepare for and accompany donor missions as a constraint on meeting work plan commitments. In 2001 missions are expected from EC, ITTO and CIDA.

[36] GEF (1998) *Experience with Conservation Trust Funds.* GEF Secretariat (Washington, DC).

commitment of at least 10-15 years; (ii) there is active government support for a public-private sector mechanism outside direct government control; (iii) there is a critical mass of people from diverse sectors of society who can work together to achieve biodiversity conservation and sustainable development; and (iv) there is a basic fabric of legal and financial practices and supporting institutions (including banking, auditing, and contracting) in which people have confidence. Where these circumstances exist, as they do in relation to Iwokrama, formation of a Trust is an efficient way to achieve long-term aims that depend on slow processes, such as community strengthening and partnership-building with conservation agencies.

The *Business Plan* describes Iwokrama as a strong candidate for endowment funding and envisions developing a strategy to obtain the necessary capital. The *Business Plan* envisaged Iwokrama developing an aggressive strategy to raise endowment funds and that a concerted effort in this regard would begin in 1998 with a significant direct involvement of the Board and senior personalities in the Government of Guyana. To date little has been done in this area beyond the Board noting the need for a high profile champion for the Centre. The recent decision of the Prince of Wales to become the Patron of the Centre should however provide renewed impetus for efforts in this area and the GEF is a key potential source of such funds.

The main rationale for seeking a GEF grant with which to finance an Iwokrama Trust Fund is that: (i) it would consolidate the contribution of the international community in one permanent transaction, thus avoiding the effects of future donor fatigue; (ii) it would create a permanent source of core funding without the administrative and other drawbacks of project funding; (iii) it can readily be justified on the grounds of global interest and incremental value; (iv) the track record of Iwokrama and the involvement of numerous governmental donors (and engagement with the private sector) would make the proposal highly credible; and (v) the innovative and replicable nature of the Iwokrama initiative in the areas of biodiversity and sustainable management of tropical moist forest ecosystems would position the programme centrally in GEF's field of interest. If such a sustainable financing mechanism is established, the environmental and social impacts of the resulting investment portfolio should be recognized, and a requirement for ethical investments should be imposed on the fund managers from the beginning. See Recommendation 27.

3.4 Strategy for Commercial Development

3.4.1 Introduction

The Iwokrama forest grows on poor, ancient soils, and is both fragile and unproductive when viewed as a resource for industrial logging or plantation agriculture. Viewed from the perspective of the sunrise industries of bioprospecting and ecotourism, however, then the forest has strong comparative advantage as a object of investment. This is because technology and markets have evolved to the point at which they can value and use the chief attributes of the area, which are high biodiversity and natural splendour. The world's economy is becoming daily more diverse, and hungers for yet more diversity, driven by technology that can handle unprecedented amounts of information. The Iwokrama forest is an evolved system that contains an extremely dense accumulation of information. Thus it is expected that human ingenuity, modern technology, and the high biodiversity of the Iwokrama forest, put together, can in principle support a spectacular diversification of the economy.

Iwokrama's strategy, therefore, is to preserve the biotic resource while making it available for non-destructive commercial use. The expectation is that an expanding array of specialised businesses can and will develop to make creative use of the forest and its information content. The key challenge here is to establish conditions that allow private companies to do what they do best - to take risks creatively for profit - while minimizing conflict and resource degradation, and ensuring that a share of created wealth is retained to finance both the conservation process and the local human development process.

The authors of the *Business Plan* envisioned that revenues would be captured by the IIC from commercial activities using forest resources, leading in due course to a "substantial degree of self sufficiency with respect to core funding". So defined, this target is a sensible approach to uncertain business planning. Any targets in Table 1 will be contingent on the success of as yet undefined "goods" (e.g. forest timber concession or co-management arrangements) that will be subjected to an invited bidding process. At present, IIC revenues are made up of the contributions of individual donors and the projections from the revenue categories in Table 1. These commercial revenue projections merit some commentary, which is provided below.

3.4.2 Timber and reduced-impact logging

The *Business Plan* anticipates that timber revenues will represent the single most important revenue source for Iwokrama in the first few years. This assumption was based on the realistic view that, even though conventional industrial logging is a conceptually obsolete way to use a biodiverse tropical moist forest, other uses seem unlikely to generate equivalent funds quickly enough to satisfy the demand for an early disengagement of international donor support. Iwokrama therefore prioritized the study of reduced-impact logging (RIL), with a view to extracting a commercial timber harvest from the SUA with minimum damage to the residual stand. Another aim is to investigate whether RIL is financially and economically viable under local conditions, with a view to encouraging the voluntary update of locally-suitable techniques through appropriate government incentives and disincentives. In this area, Iwokrama's work overlaps with the aims of Tropenbos, GFC and increasingly the domestic and international timber industry.

To date the greater focus of research has been on the design of RIL experiments and ecological impacts of harvesting. This information will feed into the design of a management plan for the SUA. A consulting arrangement has been set up with IIED for short-term inputs for a cost-benefit study of RIL management. It will gather rigorous cost data on both RIL and conventional harvesting techniques and will involve more than a strictly financial analysis of the relative operational efficiency of different practices. The study will investigate the economic significance of any impact RIL techniques may have on maintaining or enhancing the ability of the forest to support the production of high value timber products over multiple rotations. It will also investigate the potential of RIL applications to generate additional income from the sale of environmental services such as carbon emission offsets.

Iwokrama aims to invite bids for a management and harvesting arrangement that will attract external investment and makes provision for revenue sharing, but the exact requirements for bidders will only be specified (via ITTO consultancies) close to completion of SUA and WP management plans. A package with a substantial element of community-based forestry is a likely outcome of these processes, suggesting the development of joint ventures with local

communities. This is consistent with social development objectives, but the extent to which commercial harvesting and processing can be reconciled with community management structures has yet to be proven. Various sources consulted by the MTR team doubted the revenue potential of a RIL-community operation. A road construction requirement might also serve to reduce the attraction to bidders. Clearly the degree of capital-intensive vertical integration will be limited. See Recommendation 8.

3.4.3 Ecotourism

Returns to ecotourism development represent an attainable source of finance for Iwokrama, which is already bringing in some revenue. The IIC has produced an extensive Strategy Document that resulted from a number of consulting inputs. This work suggests great potential, but does not contain any robust market sizing exercise based on realistic scenarios of capacity development at or around the field station. At present the development potential of Iwokrama is highly speculative as the ecotourism market is currently limited in Guyana, and overall tourist numbers are modest. There is nevertheless a perception among some potential investors in this sector that Iwokrama could be worthwhile as a ground floor investment once a clear code of practice and other rules are established. In that case, Iwokrama may be able to 'jump-start' ecotourism investments in Guyana, once systems are functioning well. However, although there are some plans for expanding the installation with added accommodation and a canopy walkway may increase visitor numbers within 2-3 years, the projected revenues from ecotourism in Table 1 have been revised downwards considerably to reflect the fact that volumes are likely to remain fairly low. Costs due to inaccessibility are the principal constraint on this income element, as are perceptions of Guyana as a high-risk destination.

3.4.4 Non-Timber Forest Products

Several NTFPs are thought to offer promise for profitable exploitation from the Iwokrama area, but the true economic potential of NTFPs may be limited because they are likely to be costly to extract and process. The IIC's research has concentrated on plant ecology, impact and methods of harvesting product identification and harvested volumes, and much less work has been done on the economics of sustainable extraction, economic valuation and value chain/marketing analysis. This represents a considerable handicap to any understanding of the true long-term potential for NTFPs as a sustainable source of revenue and as an element for the community-managed SUA concession. This gap in the understanding of the economics of NTFPs is also acknowledged by the GFC, which envisions the development of a national code of practice to regulate management and harvesting. Working in support of GFC efforts, there is potential for a substantial contribution from Iwokrama in this area..

As with timber, an important adjunct to NTFP exploitation is the desire to increase the extent of value added in resource exploitation, especially in production nearer the owning and harvesting communities. Consultation with furniture producers, however, revealed a number of challenges beyond the lack of basic ecological, price and quantity data. The most important appears to be the need to identify or develop niche markets for high value-added NTFP products. No comprehensive economic study on the potential of NTFP markets has yet been carried out. This basic market research is necessary to substantiate the crude

estimates for NTFP revenues used in Table 1, and will be carried out during the first six months of 2001 via ITTO consultancies. An important challenge for liana-based products is that they face stiff competition from rattan-based products from Asia. In the absence of more specific economic studies on the value of NTFPs, Table 1 has imputed a modest value per hectare for NTFPs. A similarly modest assumption has been made for the extent of added value.

3.4.5 *Bioprospecting*

Iwokrama's bioprospecting programme is in its infancy although early signs are that the forest may indeed be a rich and diverse source of bioactive molecular designs. Much additional work is required, on IPR and benefit sharing contracts, on anti-biopiracy cooperation and other aspects of best practice, as well as on species inventories and sample bioassay sequences, before there are grounds for amending the conservative revenue projections given in the *Business Plan*, which are thus retained in Table 1.

3.4.6 *Carbon sequestration and trading*

Iwokrama's significant amount of stored carbon represents a potential bankable opportunity if and when carbon trading arrangements are clarified at the international level. In readiness for this, a rudimentary calculation of the carbon budget for Iwokrama is available and this information is probably sufficient at the present time. The carbon projections in Table 1 have been delayed by at least two years from the original schedule. In the meantime, some indication on possible outlets for this carbon could be explored in readiness for changes in international arrangements, and contacts developed with experienced intermediaries and carbon brokers[37].

3.4.7 *Endowments and grants*

This category relates principally to *ad hoc* fund-raising activity by the Board of Trustees and the Director General, but the IIC is also planning other initiatives which will include contacts with potential corporate and Foundation sponsors in the US, a mail out to past Iwokrama visitors with an invitation to sponsor identified forest patches, creation of a Friends of Iwokrama initiative in the UK, and targetted solicitation of the large Guyanese expatriate population. There are by now hundreds of proven techniques for conservation fund-raising, and a much more focussed approach to this is an essential step for Iwokrama given its chronic shortage of core funding and the impending gap in all funding in the medium term. One possible opportunity is the potential to persuade private companies[38] that hold government bond debt to transfer their bonds to Iwokrama, which could then convert them domestically. This could only happen if it had the full support of the Government of Guyana *vis-à-vis* alternative options that the Government may be considering for this aspect of its debt-management portfolio. Formal Government endorsement of the concept would therefore be required before any approach was made to bond holders regarding any debt-for

[37] For example, Smartwood, USA, or Jan Fehse at www.ecosecurities.com.

[38] Including Esso, Caterpillar and at least 18 other companies.

nature strategy. Another pre-requisite would be clear policy by the Board of Trustees on the extent of engagement with private enterprise for such an initiative, given that participating companies may want to be recognised as associated partners. See Recommendation 29.

3.4.8 Institutional roles in commercial development

The key to making a successful application for funds in normal circumstances is clarity of purpose, and this will increasingly be demanded of Iwokrama in future as public donors look for exit strategies and private investors look for security. The IIC requires a reliable supply of internationally-sourced core funding, and additional capital with which to build permanent infrastructure at UG and in the field. Meanwhile, the Iwokrama forest requires investors for stand-alone ventures or joint ones with the IIC and/or with local businesses in various combinations. The chance of obtaining these resources for these purposes will be greatly enhanced if the two processes are clearly distinguished in the minds of fund-raisers and potential donors and investors. See Recommendation 30.

4. Conclusions and Recommendations

4.1 Highlights of Progress

Based on the findings of Section 2, Iwokrama has made impressive progress since mid-1998. This is especially evident in the following areas:

Developing an understanding of the greater Iwokrama forest ecosystem. Iwokrama has been very effective in documenting the diversity and natural history of wildlife and other forest resources both directly, using scientific methods (inventory, taxonomy and systematics, long-term field study, etc.), and indirectly, using ethnobiological techniques to take advantage of the deep knowledge of the local environment that is possessed by local people, most of whom belong to Amerindian groups that are indigenous to the general area. By these means, ecological and economic linkages around the forest have been clarified, including those among the forest, the North Rupununi savannahs, the associated river systems, and the people who inhabit and use the landscape as a whole.

Managing technical and other information to support planning. Iwokrama has also been effective in organizing and using the information it has obtained to map and classify the many forest types and community lands in and around the forest. Social, economic, cultural and ecological values have been defined and locations scored and mapped using GPS and GIS technology to support both participatory and technical resource management planning. This information has fed into the process of mapping and zoning the Iwokrama forest, resulting in the definition of the SUA and WP that will under-pin all subsequent work. This process has had the effect of building a range of capacities and applied skills at Iwokrama that are now available to be used in many other ways.

Developing human resources and capacity. At the field level, the largest single HRD intervention by Iwokrama is the Ranger training programme. This is nearing completion, and has taken 13 individuals through a comprehensive curriculum taught by expert instructors both national and international. This training has equipped Rangers for wide

range of duties, including forest management, enforcement, assisting visiting researchers, guiding visitors, and working as a key interface between Iwokrama and local communities. The latter role links with that of the Community Environmental Workers (CEWs) who are employed by Iwokrama in each of the communities of the North Rupununi and Fairview. At the level of the IIC, Iwokrama has recruited thirteen young Guyanese under the Young Professionals Programme – six Professional Development Fellows (PDFs) with post-graduate qualifications and seven Research Assistants with bachelors level qualifications or the equivalent. All have been engaged in a two-year structured professional experience programme working with senior staff. The YPs were selected to work in the areas of forest conservation and management, protected areas management, collaborative and community development, forest ecology, ecotourism management and development, wildlife management and geographic information systems.

Public outreach. The Information and Communication Unit (ICU) has been active in managing a well-used public library and research space, a web-site and a multimedia publications service. The IIC also runs an active series of informal seminars, more formal public lectures, public forums, and technical workshops. Interested individuals find contact with the Centre and its programmes through the *Friends of Iwokrama Association.*

Collaboration with local communities. One of the most successful of Iwokrama's initiatives has been its work with local communities. Iwokrama facilitated the emergence during 1996 of a permanent local forum, the NRDDB, which has an increasingly strategic role in promoting dialogue and consensus, articulating local aspirations, and providing an interface between local people and the outside world (including Iwokrama, government and donor agencies). Iwokrama also helped to establish the MRU, which has made an important start in documenting many aspects of local tradition, language and ethnobiological knowledge among the Makushi inhabitants of the northern Rupununi savannahs. This work preceded a process of participatory community resource assessment (i.e. PHRIA) that has yielded a detailed account of each community *and their resource use patterns both to inform reserve planning and* for use as a basis for community development planning. The success of the NRDDB and MRU in particular are signs of the emergence of a strong local sense of self-identity, self-reliance and common purpose. These initiatives have combined with others such as Ranger and CEW recruitment and training, establishment of Wildlife Clubs at local schools, assisted with the construction of a community training centre (the Bina Hill Institute) and helped found a community radio (Radio Paiwomak) in partnership with the Guyana Broadcasting Corporation (GBC) and the local communities through the NRDDB. The net result is an unusually intimate and mutually supportive relationship between Iwokrama and most local communities.

Collaboration across national and sectoral boundaries. A number of technical workshops have been organized by Iwokrama, drawing representatives from different sectors within Guyana (government agencies, private businesses and NGOs) as well as from other countries in the region (principally Suriname, Venezuela and Brazil). Subjects have included reduced impact logging (which initiated a national debate leading towards the development of a certification system for sustainably-produced timber) and the conservation and sustainable and equitable use of wildlife resources. Workshops are designed through multi-stakeholder planning meetings, resulting in a content that closely matches the needs and interests of the participants.

Partnerships for good governance. A common theme among several areas of progress is that Iwokrama is demonstrating case by case how inclusion and dialogue promote efficiency and sustainability, and in the process contributing to the development of consultative protocols for use in many development and resource-using activities. This is a major cross-cutting influence in favour of good governance, which the *National Development Strategy* of 2000 identifies as an essential pre-condition for sustainable development. It is reflected in the Memoranda of Understanding that Iwokrama has established with national institutions, including:

- the Guyana Forestry Commission (GFC), February 1998;
- the Environmental Protection Agency (EPA), July 2000;
- the Guyana Broadcasting Corporation, March 2000;
- the Guyana Marine Turtle Conservation Society;
- the Fisheries Department of the Ministry of Agriculture, November 2000; and
- the University of Guyana (UG, in preparation).

Participation in national committees. Iwokrama staff have provided advice or been active participants in a number of national committees and working groups, including:

- the National Biodiversity Advisory Committee (NBAC);
- the Information Network on Science and Technology (INSAT);
- the Tourism and Hospitality Association of Guyana (THAG);
- the Guyana Elections Commission;
- the National Protected Areas Secretariat;
- the National Interim Working Group on Forest Certification;
- the National Working Group on Consultation for Wildlife Conservation Regulations; and
- the Inter-Agency Co-ordinating Group for North Rupununi Development.

Influence on emerging thematic processes. There are a number of national-level thematic processes to which Iwokrama has contributed strongly and will continue to do so. These are hard to classify as outputs of individual projects, yet they are of great strategic importance to the success of Iwokrama and to the sustainable development of Guyana. The MTR assessment of the early effectiveness of this work and future impacts is very positive, and indicates that Iwokrama has become aligned within the DFID Sustainable Livelihoods approach, as an institution with the capacity to influence policy, institutions and processes in rainforest management. Emerging thematic processes include the following:

- Development of reduced impact logging techniques and implementation of the Code of Practice produced by the GFC.
- Development of new planning and operating standards for industrial timber concession management.
- Road and river management planning capacity.
- Development of national GIS capacity.
- Development of equitable arrangements for bioprospecting.
- Development of a national protected area system.
- Development of national wildlife management capacity.
- Restoration of Amerindian culture and traditional forest-related knowledge.
- Environmental education.
- Development of non-timber forest products and their downstream processing, and thereby the biodiversification of the forest-based economy.
- Development of ecotourism as part of a broader effort to market Guyana as a destination for visitors to the southern Caribbean and South America.

- It is also increasingly expected that, following GFC's lead, Iwokrama could support efforts to improve forest management practices by small-scale chainsaw loggers.

Lesson learning in sustainable livelihoods. Iwokrama has shown how strong links exist between different kinds of capital in rainforest contexts with Amerindian populations, and has developed approaches potentially relevant to other forest management contexts. The innovative sustainable livelihoods (SL) work of this project merits research and advisory support from DFID, to draw out key lessons on generic issues, and provide a deeper theoretical underpinning for the work. Iwokrama's sustainable livelihoods work presents many innovative features, including: (i) the focus on the respect for indigenous knowledge and its use in wildlife management and other areas of natural resources management; (ii) use of wildlife as an entry point into both conservation and sustainable livelihoods; (iii) the role of women in the restoration of indigenous knowledge; (iv) development of local institutions (i.e. NRDDB) to facilitate decentralization; (v) local empowerment and multiple collaborative relationships; (vi) making linkages and promoting synergies between micro and macro levels; and (vii) developing livelihoods based on intact rainforest resources and forest margins.

More engagement with DFID would permit generation of information to feed into existing efforts to institutionalise SL approaches within the work of DFID and of other donors. A key point would be to strengthen the case for the role of the SL framework beyond its role in analysis. Iwokrama's staff have successfully applied the basic principles lying behind SL approaches, but have had little formal training in the emerging body of SL theory and practice. An advisory visit would thus strengthen capacities to work in all sectors of the framework, with particular emphasis on policies, institutions and processes. This would be further contribute to Iwokrama's crucial interventions in national and regional processes by strengthening staff policy/processes influencing skills. The innovative sustainable livelihoods work carried out under this project merits research and advisory support from DFID, to draw out key lessons on generic issues, and provide a deeper theoretical underpinning for the work.

4.2 Output to Purpose Linkages

4.2.1 Sustainable forest management

The purposes set out for the SFM programme involve: (i) demonstrating rainforest conservation and equitable use; (ii) delivering multiple products and services; (iii) integrating research, training and education activities; and (iv) generating ecological, economic and social benefits for the people of Guyana and the international community. Progress on each of the outputs specified in the *Operational Plan* and ITTO project to date is very positive, and a high probability exists of these outputs leading to purpose achievement, though a long time frame (beyond the end of the DFID and ITTO projects) up to 10 years from present is indicated for convincingly demonstrating SFM. The refinements and new opportunities listed as recommendations would fine-tune the existing output-to-purpose linkages, and should not be seen as necessary conditions for achieving the purpose, rather as further contributory elements.

Further issues around the relevance of Iwokrama's programme turn on the conceptual differences between *models* and *processes*. One definition of Iwokrama's mandate might be that the IIC should dedicate attention phase-by-phase to resource and socio-economic data collection, zoning, management plan preparation and implementation (and all other management planning activities), based on the understanding that this sequenced set of programmes and activities make up a unitary model, which is to be demonstrated and then transferred to other 'users'.

This narrow definition of the IIC's mandate would encounter transferability constraints due to the model's high cost and the perception amongst some stakeholders that the research focus is over-dominant. Already within the timber industry comments were received to the effect that Iwokrama's 'excessive' staff levels and costs make their work inapplicable to timber concessions. A further constraint on transferability relates to the high specificity of SUA planning model to local conditions. For example, success in ecotourism development will depend on a series of specific factors such as Iwokrama's location at the savannah-forest interface, good road/air access, the existence of a field station, the attractiveness to tourists of access to wildlife research results and the opportunity for genuine contact with indigenous people and their knowledge. These favourable circumstances make Iwokrama particularly attractive for ecotourism and imply that the overall 'SUA management model' would be seen as less replicable, for example by timber industry and other actors that manage forest areas without these comparative advantages.

An alternative interpretation that fits with Iwokrama's own perspectives, would be to view the Centre's contributions as intelligent interventions in a range of local-national-regional-international processes, each one of which clusters around activity sets demonstrated at field level. These activity sets might be characterized as follows:

- RIL + improved forest management + forest certification + support to improving the formal timber industry sector;
- community forestry + improved recovery + local organisation + support to improving the chainsaw logging sector;
- Amerindian knowledge + maintaining local language + resource management;
- community ecotourism + conservation contracts + wildlife management + indigenous knowledge application;
- community forestry + Amerindian participation + NTFP/timber extraction and value-adding + women's involvement + craft micro enterprises/development of handicrafts markets;
- biodiversity utilization + bioprospecting + IPR protocols + international collaborative systems;
- consultative protocols for stakeholder participation + development of local representative organisations + NGO-Government collaboration + phased decentralization.

The overall SFM model therefore disaggregates into 'modules' of overlapping activity spheres that link coherently; yet each have particular primary stakeholders. Time-scales to produce useful results also vary. This conceptualisation illustrates how the Iwokrama approach ties in clearly to the DFID Sustainable Livelihoods framework. One example are the links that have been shown to function between restoring Amerindian culture/resource knowledge and improved community organization (human and social capital); conserving key resource stocks (natural capital); and the creation of opportunities for ecotourism and

micro-enterprise development (financial capital), all within wider improvements in governance. Key aspects of Iwokrama's experience to date include:

- Groups of stakeholders with a particular interest in the positive livelihood outcomes arising from the outputs of each module can be identified.
- Collaboration between multiple actors is facilitated and takes account of the synergies between interventions in various sectors.
- Macro-micro links are actively fostered by Iwokrama, as field results feed into and inform policy development and other wider dissemination processes.
- Favourable national policy development produced through Iwokrama's work in each 'module', in turn leads to widely dispersed positive livelihood outcomes.
- Modules contribute to the sustainable accumulation of different kinds of capital by stakeholders through mutually supportive linkages.

This multi-faceted participatory approach to action-learning is relevant to all aspects of natural resources management. The management of natural resources almost always involves political decisions about who gets what, where and why at the interface of public and private goods considerations in situations where strong differentiation in stakeholder interests and power exist. The overall relevance of Iwokrama's complete 'package' will increasingly become evident as national protected area systems develop in Guyana and the region, and Iwokrama should therefore make particular efforts to contribute to the development of a national protected area system (see Recommendation 34). It will also become increasingly relevant as Guyana and other countries embark on legislative reform in the natural resources sector, begin to develop national forest plans and work to resolve the complex social, technical and institutional issues associated with activities such as chainsaw logging. A key priority for the IIC is to reaffirm its mission as contributing to the generation of field-level experiences in an action learning context relevant to particular dissemination and policy development processes, each set around specific clusters of practical activities.

4.2.2 *Biodiversity conservation and use*

The purposes of the biodiversity programme involve: (i) managing a totally protected area (TPA) within the Iwokrama forest primarily for wilderness values and the preservation of species richness; and (ii) developing and using a bioprospecting capacity to identify and bring to market new products and processes based on the biodiversity of the Iwokrama forest as a whole. The outputs by which these purposes are to be achieved comprise: (i) participatory management planning and implementation; (ii) inventory of biodiversity assets and managing the resulting information to support forest management, ecotourism, education, etc.; and (iii) a bioprospecting programme with clear legal foundations and that operates through equitable business partnerships. These outputs seem reasonably likely to lead to the achievement of the purpose, but this will depend as much on *how* they are done as on whether they are done.

The existence of the TPA is deeply embedded within the Iwokrama initiative, and enjoys strong governmental and local support along with the rest of the enterprise. This makes it very likely that the TPA can make the difficult transition from a 'paper park' to a real one, i.e. one that is permanently accepted and valued by local society. Although the boundaries of the TPA have yet to be defined, and the management plan still only comprises some general principles on permitted and prohibited activities, the process by which this situation will be changed is clear and well underway. The linked biodiversity inventory and bioprospecting

activities are still being established and some key issues are outstanding that are related to knowledge management capacity, legal context, and the distribution of benefits arising from bioprospecting discoveries. Nevertheless, overall progress on each of the outputs specified in the *Operational Plan* and EC project document to date is positive, and a high probability exists of these outputs leading to purpose achievement provided Iwokrama continues to learn from and cooperate with other institutions around the world which have already met and overcome the unique challenges associated with bioprospecting.

4.2.3 *Sustainable human development*

The purpose of the Sustainable Human Development (SHD) project is to build capacity to address complex issues related to forest management among four primary stakeholder groups, which can be characterized as follows: (a) Iwokrama staff, comprising all Guyanese staff in full-time employment, such as Young Professionals and Rangers; (b) local people, comprising approximately 3,500 inhabitants of 13 communities in the north Rupununi savannahs and Kurupukari/Fairview; (c) governmental delivery agencies, comprising the Ministries of Health and Education and the Guyana Forestry Commission; and (d) non-governmental delivery agencies, comprising in particular the North Rupununi District Development Board (NRDDB).

Five outputs are expected to contribute to achieving this purpose, which is expected to be largely achieved by the end of 2001. These outputs comprise the results of interventions that are intended to develop analytical tools, processes for sustainable livelihoods, skills, understanding of sustainable forest management, and information support systems.

Progress on each of the SHD project outputs is very positive, and there is a high probability that the programme/project purpose will be fulfilled. This high probability is due to the IIC's adoption of a facilitatory (rather than a directive) role, bringing stakeholders together around a number of processes and issues that are of direct relevance to the success of the project. Rather than being driven by outputs, the IIC has consistently prioritised the process of institutional capacity building at all levels and amongst all stakeholders.

Analytical capacity is being built amongst stakeholders through the forest zoning and SUA planning process. The IIC has worked closely with the NRDDB to ensure partnership, with significant time and resources invested in raising awareness within communities of the rationale and methodology for zoning and SUA analysis. Social and economic appraisal methods have been employed through the resource mapping within communities through and the zoning and SUA analysis with a range of stakeholders. Technical publications for the PHRIA and resource mapping processes are almost complete. A guide to zoning methodology and fauna/flora guides are available on the Iwokrama web site, while publications on RIL and a wide range of field results are increasingly available, as are workshop proceedings. MRU publications documenting indigenous knowledge are now widely available.

The IIC strives to develop processes for inclusive decision making with key stakeholders at local, regional, national and international level. At the community level, the IIC has adopted participatory methods to facilitate local analysis and action around sustainable forest management and rural livelihoods. Staff members have facilitated PHRIAs in neighbouring communities, which have also mapped their resources using participatory methods.

Through this process, local people have been encouraged to document their resources and to analyse how they might use them sustainably. Subsequently, and building on the PHRIAs and resource mapping, pilot participatory management plan assessments have been conducted. The PHRIAs, resource mapping and participatory management plan assessments are designed to lead to the implementation of conservation contracts, support alternative livelihoods and generate local project management capacity, thus contributing to overcoming some of the sustainable development constraints affecting North Rupununi communities.

Through its support for the NRDDB, the UNESCO-funded Radio Paiwomak and institutional networking more generally, the IIC has helped to increase the flow and exchange of information and services to local stakeholders. It has indirectly influenced debates on Amerindian land rights through its support of the NRDDB's continuing discussions with government and is playing a similar facilitatory role in building the capacity of relevant agencies and institutions to increase literacy levels amongst local communities and reduce the incidence of malaria. The IIC has consistently resisted the temptation to replace or circumvent the interventions of the relevant agencies, even when, as in the case of malaria prevention with the Ministry of Health, the institutional relationship has been far from easy. However, these processes are necessarily time-consuming. In order to lead to sustainable outcomes, they must not disempower those agencies with responsibility for delivering these services. Indeed, the output to purpose momentum in this area is overall very positive, with institutional dialogue and demonstrated good practice having a growing influence.

The IIC has played a significant role in developing skills amongst stakeholders at all levels. Its support of the highly successful Makushi Research Unit has empowered local women, challenged gender roles and relations and raised the profile of local language, knowledge and skills. Its training programme for Rangers and Community Environmental Workers (CEWs) reflects its commitment to building local capacity for sustainable forest management and to increasing environmental awareness amongst local communities. National and regional capacity has been built through the cumulative impact of a range of training and information-sharing activities, including in-house short courses, regional technical workshops, summer intern programmes, the YP programme, individual training for Caribbean foresters, facilitation of five international PhD studentships and training for some 60 undergraduates (4 week biology classes).

The IIC continues to promote wider understanding of sustainable forest management among a range of stakeholders, including the timber industry (through RIL and certification process), communities (wildlife management), national and local groups (SUA planning) and micro-enterprise and small industry (NTFP) development. Working with GFC and other stakeholders, Iwokrama may be able to support efforts to improve chainsaw logging by drawing on experience gained in community forestry. Rigorous investigation of the opportunities and constraints associated with conventional and community-based approaches to timber management will increase the likelihood that the project purpose will be fulfilled.

Finally, and as discussed briefly above, the IIC recognises the crucial role of information as the key to sustainable impact in moving from outputs to purpose. "Protocols" in the form of established participatory forms of consultation and information sharing have increased transparency and trust between stakeholders at all levels. Technical systems for information

management have been implemented by the Centre through an established Local Area Network at HQ. Information is publicly accessible through the IIC's well-developed, regularly-updated and popular website. Iwokrama's dissemination activities through its field centre and a range of media have raised the profile of the IIC among a range of interest groups. In the face of some local concerns regarding the extraction and use of knowledge by outsiders, local ownership and retention of knowledge might be significantly enhanced through a 'knowledge bank' initiative.

4.3 Participation and Impacts on Stakeholders

Iwokrama is committed to generating tangible economic benefits at all scales from the local to the national and global, through a participatory approach, and strives to develop processes for inclusive decision making with key stakeholders at all levels. The investments orchestrated by Iwokrama are directed to an environment with little economic activity and borderline ecological productivity, so the opportunity costs of conservation and sustainable forest-based development are low and potential beneficiaries abundant. Thus, as far as the MTR team could determine, there are no significant costs to any stakeholder group in this enterprise. The ways in which stakeholder groups participate in the Iwokrama initiative are described in Annex 7, and likely benefits to them are summarized below.

Amerindians in and around the Iwokrama forest are receiving benefits in the form of a managed landscape that will preserve physical and biotic elements both iconic of and supportive of their traditional way of life. They are expected also to participate directly and indirectly in benefit streams from all forms of economic activity that will use the forest's resources and that Iwokrama is intended to stimulate.

Amerindians in other areas of Guyana are benefiting indirectly from the development and application of locally relevant forms of participatory conservation and planning mechanisms, and benefit-sharing arrangements, that are being put in place by Iwokrama. Other benefits are likely to accrue to this population due to the Centre's respect for Amerindian language, culture, self-organization, confidence and assertiveness, which will promote more active participation in national life by historically marginalized groups. This can only help to correct an historical pattern of relative deprivation, and also holds an important lesson for many other countries and peoples in the Americas and elsewhere.

Public, political groups and government agencies in Guyana are benefitting from Iwokrama's influence on policies and processes. The Iwokrama programme generates fields of influence that validate and promote participation, dialogue, joint problem solving and the institutionalization of accountable forums in many different sectors and locations. Transparency, inclusiveness and local participation are hallmarks of every Iwokrama initiative, which can only promote good governance in a country that has a long history of excessive centralization. New and more effective and sustainable approaches are being developed that have the potential to resolve conflicts of interest and perception among stakeholders in the sustainable development process at the national level.

The national and international scientific community are expected to benefit from increased knowledge and understanding of the ecological, economic and social processes needed for sustainable tropical forest conservation and management, the preservation of a large biodiversity resource and a set of viable natural ecosystems for future study, and the

provision of access and support services to enable most efficient use of research time, especially in the context of long-term research programmes.

The private sector is expected to benefit from access to improved forest management and planning technologies and understanding of the processes of sustainable forest management and forest-based development, and the availability of new business opportunities in and around the Iwokrama forest. Many of the latter are effectively subsidized due to the investment by Iwokrama in gathering and organizing information on the biological and social resources of the programme area, and in facilitating the emergence of strong local communities with whom mutually-profitable partnerships can be negotiated.

Iwokrama staff are benefitting intellectually and financially from their participation as employees and trainees (and potential investors, shareholders and entrepreneurs) in all aspects of the programme and spin-off economic activities. They are also benefiting socially and spiritually from the opportunity for direct involvement in the stewardship of a globally significant natural ecosystem and an action-learning experiment in sustainable conservation and development that has international significance.

Other interested parties include *local, national and international NGOs* (which have an interest in biodiversity conservation, Amerindian well-being, etc.), *the people of Guyana* (who will benefit from improved governance, higher environmental literacy, and an expanded tax base associated with economic activity in the Iwokrama forest area), *international development institutions* (which will learn numerous lessons from the Iwokrama initiative, including a new process model for linking local action to global environmental management and establishing satisfactory and durable benefit-sharing arrangements), and *the world community as a whole* (which will benefit from the preservation of biodiversity, unique ecosystems, traditional forest-related knowledge, and the use, option, bequest and existence values associated with these resources).

4.4 Participatory Monitoring and Evaluation

4.4.1 Principles of participatory M&E

The MTR team strongly commends IIC's adoption of a process approach in its evolving relationships with local and national stakeholders. The PHRIAs, community resource mapping, NRDDB meetings and other fora have provided an excellent quantitative and qualitative baseline against which to measure the impact of the SHD programme in particular at different levels and in a range of contexts. Use of a participatory methodology for monitoring and evaluation (M&E) will allow for continued application of the key principle of process over input-output models. Through participatory M&E, a concern with the counting of quantitative indicators by outsiders (numbers of community meetings held, numbers of conservation contracts signed, etc.) is replaced by a higher priority given to the qualitative evaluation of change by stakeholders themselves (legitimising local knowledge and priorities), with outsiders playing only a facilitating role.

Participatory M&E is an important knowledge management tool and is based on a key principle of institutional learning. Thus, rather than concentrating on programme inadequacies and weaknesses, stakeholders are encouraged to ask "What can we learn from what we have already accomplished in order to improve the programme in the future?"

Hence a participatory M&E process can also play a vital role internally in IIC as the implementing agency, contributing through staff participation and joint reflection, to stronger communication, to more relevant, effective and sustained action, and to improved outcomes.

4.4.2 Participatory M&E methodology

Participatory M&E uses a range of largely (but not exclusively) qualitative methods (including open-ended interviews and focus group discussion) and a number of often visual participatory tools (including mapping and diagramming) to facilitate local analysis of change and translation of this analysis into future action. It recognises that communities and institutions are not homogenous, but instead mask competing interest groups and socially-constructed power differences. The methodology purposively seeks to analyse difference rather than seek the norm. The main output from these methods is stakeholder consensus on key indicators to be measured, frequency and means of verification, and identification of groups to participate as information collectors (probably in this case the CEWs) or key informants.

The methodology can and should be applied across a range of primary and secondary stakeholders in the programme. Within the neighbouring Amerindian communities, participatory M&E will build on the participatory learning and action instigated by the PHRIAs and resource mapping. At the community level, the CEWs will play a vital role in participatory M&E and already have considerable experience of working with participatory methods through PHRIA. Uniquely, they are both insiders and outsiders, being a two-way link between Amerindian communities and outside agencies.

Beyond the community context, and in addition to the institutional context of IIC programme staff, the methodology can be applied amongst other stakeholders in a range of programme contexts. Most of these are likely to include community representatives themselves, and the approach will build again on the methodological groundwork of collaborative process and institutional networks laid through the first phase of the programme. Such networks might include at appropriate points in time:

- NRDDB, local government and regional representatives of donor/NGO projects;
- stakeholders brought together for zoning and management planning purposes;
- MoH staff, Peace Corps volunteer, community-health specialists, and community representatives;
- MoE staff, MRU representatives, local schoolteachers, linguists, and community representatives;
- Timber industry; community forestry stakeholders including chainsaw loggers, NTFP producers, and GFC; and
- Private enterprises involved in partnerships with Iwokrama and local community small businesses.

Facilitated by research teams, these stakeholders are encouraged to share their experience of change, collect additional information and analyse the data collected and experiences

described in order to formulate conclusions about change and future action to improve progress towards agreed outcomes[39].

4.4.3 *Implementation*

Below we suggested an indicative roll-out itinerary for participatory M&E. The process is cyclical, with research teams facilitating re-evaluations during the programme.

Activity	Time (e.g.)	Comment
Scope for trainers in participatory M&E methodologies	May	Prioritise Guyanese (then regional) trainers
Identify research team members	May	Prioritise CEWs. Include local social scientists and/or SSWG as team leaders. Push for agency representatives as research team members
Conduct training and participatory development of indicators	June (2 weeks)	Avoid making the training tool-driven. Emphasise attitudes and behaviour. Develop field guides with research questions and methods.
Implement participatory M&E in a range of institutional contexts	Various	Tailor research team composition to institutional context. Tailor methods to institutional context. In community context, feed M&E into management plan process. Conduct feedback sessions and agree subsequent action.

The training and development process outlined above would use the SL framework as an organising framework for discussion. An advisory visit would facilitate the design and implementation of the framework and would apply the latest M&E approaches generated through DFID's experiences. See Recommendation 28.

A further option to strengthen M&E capacity is to send a staff member with special interest in the area to attend a UK-based training course, such as that offered by the Overseas Development Group, University of East Anglia[40].

4.5 Remaining Weaknesses and Scope for Improvement

Rapid progress on the broad range of fronts outlined above could not be expected to occur without at least some late starts and gaps in programme coverage. These are few but important, and include the following:

- *Lack of an in-house resource economist,* so that data and analyses to refine key assumptions in the *Business Plan* are missing, the credibility of investment

[39] Key resources for participatory M & E include: (i) Gosling L & Edwards M (1999) *Toolkits A Practical Guide to Assessment, Monitoring, Review and Evaluation Development,* Manual No. 5, Save the Children (UK); (ii) *PLA Notes* available from www.iied.org/bookshop; (iii) www.mande.co.uk; and (iv) www.bond.org.uk/guidancenotes.

[40] ODG runs a course on 'Monitoring and Evaluation of Development Activities, in August each year. See: www.uea.ac.uk/odg/

prospects and cash-flow projections are undermined, and the basis for international fund raising is weakened. See Recommendation 31.

- *Increasing need for management information systems,* to ensure full knowledge management support to the Management Committee in making decisions and for managing staff, money, materials and information, including participatory monitoring and evaluation systems to track inclusion and impact indicators amongst local and other stakeholders. See Recommendation 32.
- *Need for local community representation on the Board of Trustees,* to ensure full transparency and the responsive protection and advancement of local community interests and to enhance the development and maintenance of effective partnerships for rain forest conservation and development at Iwokrama, by ensuring that the Board has direct access to the communities' detailed local knowledge of the Iwokrama Forest and surrounding environments and conditions to inform its deliberations. See Recommendation 33.
- *Opportunities to encourage the development of a national system of protected areas,* particularly through influence on policy, and processes that involve stakeholders in PA management planning. See Recommendation 34.
- *Need for a clear strategy for achieving institutional sustainability,* including an effective fund-raising system to meet the need for unallocated core funding to support essential but not directly project-related work (such as convening meetings of the Board of Trustees), to capitalize a trust fund, to replace the Director General when the incumbent leaves in mid-2001, and more generally to ensure the continuity of staff and programmes through a funding crisis in 2002 when most donor-funded projects conclude. See Recommendation 35.
- *Need to strengthen collaboration at all levels,* to increase support for Iwokrama and its programmes and to maximise stakeholder knowledge and application of the lessons being learned. In this, the Centre should take particular advantage of its maturing programmes in forest management and planning to deepen collaboration with national stakeholders, particularly in the Guyana Forestry Commission and the forest sector.
- *Need to strengthen environmental education programmes,* ensuring that they are more systematically targeted and managed and to obtain maximum synergies with other programmes operating in Guyana. In this, the IIC should give high priority to recruiting an experienced environmental education specialist to undertake Environmental Education Audience Assessments, plan and manage the IIC's environmental education and awareness programme and build collaborative linkages and partnerships to enhance programme effectiveness and national capacity in this key area. See Recommendation 36.

4.6 Recommendations List

The refinements and new opportunities listed as recommendations are seen here as measures to fine-tune existing output-to-purpose linkages, and should not be seen as necessary conditions for achieving the overall Iwokrama purpose, but rather as further contributory elements.

Recommendation 1. Iwokrama should work with the GFC and other forest sector stakeholders through their existing Technical Working Group on Forest Resource Information Management and Processing. This is to ensure that the ITTO Growth and Yield

Assessment consultancies are undertaken in a manner that ensures the maximum feasible integration between Iwokrama's growth and yield models and forest management information systems and those systems used by the GFC and other forest sector organizations and companies.

Recommendation 2. Iwokrama should collaborate with other private commercial and research organisations in a programme to generate information on typical NTFP stock levels in Iwokrama and other forest areas nationally, potential harvest intensities and yields, rotation lengths and other parameters that permit prediction of income per area.

Recommendation 3. Iwokrama should organise a national Technical Workshop on NTFPs to deepen awareness and establish research priorities. These will include economic valuation methods for NTFPs and NTFP market development issues amongst the national development community and rural producers. The workshop would be run to coincide with the ITTO funded Forest Product Development consultancy. Prior community NTFP workshops examining these themes could be carried out to generate a local process feeding into the national workshop[41].

Recommendation 4. Iwokrama should explore options with GFC and other relevant national agencies and stakeholders to carry out the collaborative preparation of a draft Code of Practice for NTFP management, drawing on international best-practice, which could be debated in the proposed National Workshop. Arrangements to develop the Code could be integrated within the ITTO consultancies and/or assigned to a Young Professional.

Recommendation 5. Iwokrama should review the option of carrying out harvesting trials to research the feasibility and benefits of integrating NTFP harvests from within areas designated for timber extraction, prior to logging, focussing on complete utilisation of selected NTFPs from trees selected for felling, integration of climber cutting, timing of operations/logistics, harvesting intensities of NTFPs from trees to be left in the stand and the overall cost implications/benefits of integrated harvesting.

Recommendation 6. Due consideration should be given in the SUA planning process to the establishment of extractive reserves in stands with high densities of NTFPs, and specific management plans developed for these.

Recommendation 7. Iwokrama should fully explore the establishment of active financing mechanisms for NTFP, ecotourism, and timber-based enterprises within the communities that live in or near the Iwokrama Forest. Consultations should occur with the UNDP-developed micro-credit scheme operating in the Rupununi region or other interested collaborators, in order to ensure that capital becomes available for small business development, timed to coincide with the start-up of Iwokrama business partner(s) operation in the first half of 2002.

---

[41] The workshop would be carried out in collaboration with Handicrafts Association(s) and with a *dominant* presence of Amerindian representatives from around Iwokrama and nationally and would be of an operative, planning character, focussed on inputs to Iwokrama's NTFP work, with national stakeholders participating in the Iwokrama problem-solving process. Products from the Workshop would include a handicraft inventory, economic studies of the sector (including chain analysis of marketing routes), social studies of the gender and equity aspects of the sector, review of harvesting and marketing options for a range of timber and NTFP-based products and an emerging consensus on skills requirements and potential business financing partnerships.

Recommendation 8. In seeking commercial partners, Iwokrama should make a deeper examination of the opportunities and constraints associated with the different approaches to timber management. In order to secure equitable outcomes, Iwokrama should review timber harvesting and timber marketing strategies from the perspective of community-based management. This review is needed in order to ensure that local stakeholders are not delivered relatively late and powerless into commercial ventures. To this end, DFID forestry advisers should supply Iwokrama with relevant documents from the Quintana Roo Project and other relevant community forestry experiences[42].

Recommendation 9. Iwokrama should explore the option of requesting ICRAF to station a regional representative at Iwokrama, partly tasked with developing collaborative agroforestry outreach programmes. Expressions of interest should be sought from international NGOs that are interested to engage in community agricultural development, for example the US NGO World Neighbours (which has recognised capacity in farmer-to-farmer extension approaches), and Iwokrama should support fund-raising by potential partners.

Recommendation 10. The terms of reference for the ITTO Business Management Adviser should include the duty to develop analyses to support preparation of a *Forest Business Plan*, as distinct from the general IIC *Business Plan*. The aim should be to indicate clearly the proportion of net income from extractive, local goods manufacturing and ecotourism that might accrue directly to Iwokrama, apart from income received by collaborating communities and business partner(s).

Recommendation 11. Iwokrama should work with the GFC and other regional partners to ensure that there is research and development support to improve chain-saw logging operations in Guyana and the region. Policy development and other forest management development processes for this sector would draw on experience gained in community forestry around Iwokrama. A workshop for chainsaw associations and operators on techniques to improve recovery rates could be carried out in liaison with equipment suppliers, once initial results from Iwokrama trials of appropriate saw-milling equipment are available.

Recommendation 12. Iwokrama should seek to establish more explicit links with the DFID FRP, by placing itself as a competent intermediary between outside researchers and local research participants, and as a partner with resources to steer research results into national and regional processes. A formal meeting between Iwokrama and FRP might pay attention to additional protocols for generating proposals, in order to take advantage of Iwokrama's

[42] The review could involve the following steps: (i) a literature review of community rainforest management experiences in South America and elsewhere, including the DFID-supported Quintana Roo project, to identify lessons relevant to Iwokrama forest management systems; (ii) prepare a strategy paper to outline approaches to community forestry design, clarifying the integration between ITTO consultancy inputs, the SUA planning process and business partner proposal development; (iii) discuss with Amerindian stakeholders issues relating to the design of future enterprises and community organizational arrangements; (iv) identify knowledge gaps and define strategies for meeting enterprise design requirements; (v) in consultation with the NRDDB, define technical, institutional, social and economic aspects of Iwokrama community forestry, including potential forms of cooperative or other organisation, low-impact extraction and milling methods, equipment and management skills requirements, benefit-sharing options, a business risk analysis and a menu of methods to add value to raw timber; and (vi) consider carrying out a study visit with Amerindian leaders to Quintana Roo in late 2001 or early 2002.

local stakeholder participation mechanisms, and to foster research partnerships with national agencies such as the GFC and IAST.

Recommendation 13. Iwokrama should explore with GFC and the timber industry the option of establishing a joint tree-spotter training programme, potentially based on the ranger training module. This might be carried out as part of an FRP study seeking to identify key complex species groupings and to develop a regional compendium of common names.

Recommendation 14. Iwokrama should give priority to working with the GFC and other partners to maintain a contemporary information profile of the forest sector in Guyana. This would include a 'meta-analysis' of existing studies on the economics and trends within the timber industry with a view to determining precisely the magnitude of financial costs and benefits and some estimation of the internal rates of return to operators. This review would allow a further study of the magnitude and significance of the external costs and benefits of SFM (to estimate economic rates of return).

Recommendation 15. Iwokrama should review options to develop a forest management consultancy business, possibly as a separate cost centre spun-off from the main IIC research unit, to offer planning services to the national timber industry. This would draw on Iwokrama's skills in interpretation of GIS information, remote imagery and inventory data. Former staff of the Tropenbos Guyana programme and current staff of UG and other institutions may be important business participants. An initial workshop with relevant stakeholders should be held to ensure as full a consensus as possible on the menu of services, structure, physical location and operation of this business.

Recommendation 16. The positive and negative effects of the proposed Mahdia road link should be reviewed by Iwokrama in collaboration with the SUA Planning and Road Management teams, in order to prepare a submission to the BoT in anticipation of a formal proposal from mining interests and Government. A statement on whether or not this road is expected to proceed should be sought from Government in early 2001, in order to permit the definitive zoning of the SUA and WP and completion of management plans and business plans.

Recommendation 17. A realistic assessment should be made of information and knowledge management needs associated with the biodiversity inventory and bioprospecting sub-programmes.

Recommendation 18. Further effort should be directed to increasing the number and quality of connections from other web-sites to Iwokrama's own.

Recommendation 19. The feasibility should be considered of establishing a benefit-sharing mechanism to react to shared physical ownership of the Iwokrama forest on the basis of Amerindian ancestral domain.

Recommendation 20. Other bioprospecting concerns should be invited to participate with Iwokrama in a shared knowledge base on known or suspected biopirates. More generally, Iwokrama should recognize that it is expected to take the lead in bioprospecting development in Guyana, and should deliberately set high standards of innovation, local

benefit promotion (such as inward technology transfer) and collaboration with other groups in the same business to protect each other's interests.

Recommendation 21. Participatory monitoring and evaluation processes should be implemented with local stakeholders, with the CEWs playing a central role. Support from a DFID specialist should be sought to support implementation.

Recommendation 22. An Iwokrama staff member should be based at the Bina Hill Institute, assigned to the training institute as counterpart support for the NRDDB and working closely with CEWs as their principle community institutional contact.

Recommendation 23. A locally-sited "knowledge-bank" with open access and supported by an upgraded Iwokrama Information and Communications Unit should be developed so that communities living in and near the Iwokrama Forest have access to information and knowledge about development alternatives.

Recommendation 24. Iwokrama should seek to maintain and further develop its capacity-building activities giving priority to: (i) further ranger intake and training; (ii) meeting the needs of hinterland communities and other forest sector stakeholders; (iii) maintaining the Young Professionals programme at both the PDF and RA levels; (iv) providing sabbatical opportunities for staff from relevant national and regional institutions; (v) providing scholarships and other programmes to enhance the capacity of Amerindian people to assume senior operational posts at Iwokrama and in the broader natural resources sector and to fill key gaps in national and regional capacity such as in the area of wildlife biology; and (vi) providing business training for local people. The last should include legal, book-keeping, reporting, taxation, shareholding, investment, profit-sharing, contractual and other issues pertaining to all businesses, and related skills such as how to assess market opportunities and the equity of proposed joint ventures. In parallel, consultations should occur with the UNDP-developed micro-credit scheme operating in the Rupununi region, in order to ensure that capital becomes available for small business development orientated to ecotourism, NTFP and timber value-adding enterprises, timed to coincide with the start-up of Iwokrama business partner(s) operation in the first half of 2002.

Recommendation 25. Iwokrama should take steps to develop certification of knowledge inputs by local stakeholders to implement a policy of acknowledging named local experts in scientific publications, and to develop with the NRDDB, Village Councils and the Government of Guyana a policy on distribution of revenues from bioprospecting.

Recommendation 26. A proposal for continued DFID support beyond 2001 should be developed to address: (a) community-based forest management using low-impact, precision harvesting of high-value timbers and NTFPs, with on-site processing and maximum local value-adding, and business training for local people; (b) the design of a knowledge management strategy, management information system and a linked participatory monitoring and evaluation system and on-site knowledge bank with free access; (c) the future role of Iwokrama in Guyanese forest research; (d) stakeholder perceptions of the best role for an Iwokrama Headquarters building and (e) the need to ensure continuity of employment and operational support for the core staff of the Management Committee.

Recommendation 27. A proposal should be developed to seek GEF funding for an Iwokrama Trust Fund.

Recommendation 28. DFID and Iwokrama to co-ordinate an advisory consultancy to support lesson-learning in Sustainable Livelihoods, carry out training and to develop participatory M&E systems.

Recommendation 29. The feasibility should be considered of appointing an international fund-raising group to work on a commission basis.

Recommendation 30. The commercial and non-commercial roles of the IIC should be clearly defined so that the two processes and their targets are clearly distinguished in the minds of fund-raisers and potential donors.

Recommendation 31. A full-time resource economist should be recruited to lead IIC research on key issues such as certification, NTFP valuation and niche marketing, non-market valuation, optimal incentive structures, etc.

Recommendation 32. A knowledge management strategy should be developed for the IIC as a whole, allowing the design of a management information system to support the Management Committee and a participatory monitoring and evaluation system to track indicators of well-being among all stakeholders.

Recommendation 33. A representative of the local communities living in or near the Iwokrama forest and nominated by the NRDDB should be appointed to the Board of Trustees to ensure full transparency and the responsive protection and advancement of local community interests and to enhance the development and maintenance of effective partnerships for rain forest conservation and development at Iwokrama, by ensuring that the Board has direct access to the communities' detailed local knowledge of the Iwokrama Forest and surrounding environments and conditions to inform its deliberations.

Recommendation 34. Iwokrama should work in partnership with Government agencies and other stakeholders to support efforts to develop the national protected area system through influence on policy and processes and involvement of stakeholders directed at innovations in collaborative PA management and planning.

Recommendation 35. A Donor Support Group meeting should be held as soon as possible and involve the participation of the outgoing Director General. Items to be discussed should include the basis for and steps towards obtaining: (a) renewed global funding of the IIC and associated activities; (b) capitalization of an Iwokrama Trust Fund; (c) arrangements for global non-governmental fund raising; and (d) arrangements for global marketing of investment opportunities.

Recommendation 36. To ensure that Iwokrama's Environmental Education and Awareness Programmes are more systematically targeted and managed and to obtain maximum synergies with other programmes operating in Guyana, the IIC should give high priority to recruiting an experienced environmental education specialist to undertake Environmental Education Audience Assessments, plan and manage the IIC's environmental education and awareness programme and build collaborative linkages and partnerships to enhance programme effectiveness and national capacity in this key area.

Annexes

Annex 1: Terms of Reference for the MTR

A1.1 Objectives

The objectives of the review mission are:

- to examine the progress the Centre has made with the implementation of its Operational Plan (1998-2002) since the Donor's Round Table in Brussels in January 1998; and
- to recommend changes that may be needed in the management and funding of the Centre in the remainder of the first phase of operation.

A1.2 Tasks

The mission members will undertake the following tasks:

- Familiarize themselves with the Centre's Operational Plan, Business Plan (1998-2007) and the Centre's individual funded project documents, focusing on expected outputs and key performance indicators;
- Review the funding obtained to date compared with that envisaged under the Operational Plan;
- Review progress to date with the implementation of projects for which funding has been secured giving particular attention to progress with the DFID funded Sustainable Human Development Project, the EC funded project on the Conservation and the Sustainable and Equitable Utilization of Biodiversity, the ITTO Project on the development of a Sustainable Forest Management Model in the Iwokrama Forest and the CIDA funded Iwokrama Support Project;
- Examine what financial audits have been undertaken for the Centre as a whole and/or its component projects;
- Examine the knowledge, understanding, support and ownership of the Centre and its programmes amongst key stakeholder groups including the local communities living in or near the Iwokrama Forest, staff of relevant national agencies and institutions (in particular the Forestry Commission), civil society groups and the private sector;
- Identify the key obstacles to the successful implementation of the Centre's Operational Plan and what these mean in terms of the institutional sustainability of the Centre. In this regard the Review Team should re-examine the assumptions of the Centre's Operational Plan and Business Plan in the light of the progress achieved to date and make suggestions for any needed modifications to these documents for the consideration of the Centre's Board of Trustees;
- Identify the priority actions and fund raising requirements that need to taken or met to improve programme effectiveness and ensure the successful implementation of the Operational Plan over the next two-three transitional years before the Centre begins to generate substantial income from the Iwokrama Forest and other sources; and,
- Make recommendations on the nature of an ongoing participatory monitoring and evaluation programme to ensure the maximum feasible stakeholder

involvement and ownership of the development and implementation of the Centre's programmes.

A1.3 Fulfilment of the Terms of Reference

a. Review progress of the DFID, EC, ITTO and CIDA projects.

- This is addressed by the entirety of Section 2.

b. Examine financial audits.

- This is addressed by Sections 2.1.2 and 3.2.

c. Examine knowledge, understanding, support and ownership of Iwokrama amongst key stakeholder groups.

- This is addressed by Sections 2.4.3, 2.4.4, 2.4.5 and 4.3, and Annex 7.

d. Identify key obstacles to successful implementation of the Operational Plan.

- This is addressed by Section 4.5.

e. Identify the priority actions and fund raising requirements.

- This is addressed by Sections 2.2.8, 2.3.2(b), 2.3.3(b), 2.3.4(b), 2.3.6, 2.3.8, 2.4.2(b), 2.4.3(b), 2.4.4(b), 3.3, 3.4 and 4.6.

f. Make recommendations concerning a participatory monitoring and evaluation programme.

- This is addressed by Section 4.4.

Annex 2: Purpose and outputs summary table

IWOKRAMA PURPOSE	OPERATIONAL PLAN				IWOKRAMA ACT			
	To promote the conservation and sustainable and equitable use of tropical rain forests, in a manner that will lead to lasting ecological, economic and social benefits to the people of Guyana and to the world in general, by undertaking research, training and the development and dissemination of technologies.				" To conserve biological diversity and to promote sustainable management and utilisation of the Programme Site; and to study, develop and demonstrate methods and techniques for the conservation and equitable and sustainable utilisation of tropical rain forests that will bring lasting ecological, economic and social benefits to the people of Guyana and to contribute to the world's knowledge of critical aspects of rain forest management and development".			
PROGRAMME	SUSTAINABLE FOREST MANAGEMENT		CONSERVATION AND UTILIZATION OF BIODIVERSITY		SUSTAINABLE HUMAN DEVELOPMENT		FORESTRY RESEARCH	INFORMATION AND COMMUNICATION
SOURCE	OPERATIONAL PLAN	ITTO PROJECT	OPERATIONAL PLAN	EC PROJECT	OPERATIONAL PLAN	DFID SHDP	OPERATIONAL PLAN	OPERATIONAL PLAN
PURPOSE AT PROGRAMME OR PROJECT LEVEL	To demonstrate how tropical rain forests can be both conserved and equitably utilized, yielding ecological, economic and social benefits to the people of Guyana and the international community.	Develop a demonstration model of sustainable commercial management of part of the Iwokrama forest to deliver multiple products and services, which fully integrates research, training and education activities.	To manage part of the forest as a wilderness preserve and systematically prospect the rich biodiversity for new products from the forest, thereby increasing local scientific and technical capacity.	To contribute to the wider programme of the Iwokrama Centre through management planning for the Wilderness Preserve, development of the knowledge base for effective management and development of natural products for income generation	To help people develop their ability to benefit from the rain forest and to address the complex issues related to its sustainable management.	To contribute to the wider programme of the Iwokrama Centre by helping stakeholders – staff, local people, governmental and non-governmental delivery agencies - to develop capacity to address complex issues related to forest management	To compile, adapt, refine, generate and disseminate knowledge and technologies needed to improve the conservation, management, and utilization of the resources of tropical rain forests in order to provide a sustainable basis for human development.	To establish an international information and resource unit, which will serve as a channel for dissemination of knowledge gained from the Iwokrama programme, will facilitate dialogue between Iwokrama staff, local communities and diverse regional and international stakeholders and will support the research activities of the programme.

PROGRAMME	SUSTAINABLE FOREST MANAGEMENT		CONSERVATION AND USE OF BIODIVERSITY		SUSTAINABLE HUMAN DEVELOPMENT		FORESTRY RESEARCH	INFORMATION AND COMMUNICATION
SOURCE	OPS PLAN	ITTO PROJECT	OPS PLAN	EC PROJECT	OPS PLAN	DFID SHDP	OPS PLAN	OPS PLAN
OUTPUTS	Research and utilization planned according to baseline natural resource information, socio-economic characterisation of Amerindian communities and traditional forest use patterns	A forest management plan to be used by GFC and others as a model and training tool.	Sampling inventory of Iwokrama biodiversity	Comprehensive inventory used for SFM and offering opportunities for training, capacity building and knowledge dissemination	Management tools developed and used to set priorities and in analysis of strategies	Analytical tools developed for forest management, planning and monitoring	Research policy framework established	Constructive dialogue maintained with neighbouring communities and other stakeholders
	A management plan, which integrates goods, services and scientific research and training.	Feasibility study and business strategy for utilization of the forest in accordance with ITTO guidelines and GFC code of practice.	Wilderness reserve adequately protected	WP and road corridor managed according to participatively-developed plans. WP given international status	Communities developing in harmony with Iwokrama and receiving benefits	Systems and processes for sustainable rural livelihoods in forest areas developed and tested in communities in and around Iwokrama Forest	Compilation and evaluation of IPR regulations	Information services supporting results dissemination
	The forest in sustainable use as prescribed in the management plan, through operations management directly or in business collaborations with private enterprise.	Commercial arrangements in place for sustainable management and harvest of the Iwokrama forest as a demonstration.	Biodiversity prospecting programme based on clear legal foundations and operating through business partnerships.	Systematic bioprospecting programme operating through equitable partnerships	Institutional capacity developed for training in forest management and biodiversity conservation.	Iwokrama stakeholder capacity (skills) developed	Compilation of indigenous forest knowledge	Information networks link Iwokrama with collaborators

PROGRAMME	SUSTAINABLE FOREST MANAGEMENT		CONSERVATION AND USE OF BIODIVERSITY		SUSTAINABLE HUMAN DEVELOPMENT		FORESTRY RESEARCH	INFORMATION AND COMMUNICATION
SOURCE	OPS PLAN	ITTO PROJECT	OPS PLAN	EC PROJECT	OPS PLAN	DFID SHDP	OPS PLAN	OPS PLAN
OUTPUTS	A positive impact on national and regional forest policies and practices through demonstrations and training using Iwokrama forest operations, results and facilities	Increased availability of sustainably produced tropical timber and other forest products and services for both national and internat. markets.			Guyanese including local Amerindians to the maximum possible, carrying out most operational tasks.	Understanding developed for sustainable forest management [as a contribution to the Sustainable Forest Management Programme]	Identification of promising NTFPs and value-adding and marketing options	Databases developed from Iwokrama research and other sources
					Greater appreciation by Guyanese public of national forest resources	Information support systems developed for stakeholders	Establish trials and demonstrations for sustainable timber production	GIS system in use covering bio-physical and socio-economic data
					Improved international scientific understanding		Studies on total forest economic value	

Annex 3: Key Issues in Developing Community Forestry in Iwokrama

A3.1 Social and institutional aspects of community forestry

The social and organisational aspects of forest management enterprises are as essential as the technical aspects; success in each is interdependent. Organisational development will require evolving decision-making capacity, efficient work organisation systems, a staff human resource development strategy, successive professionalisation of posts, appropriate hierarchies and measures to ensure staff and skills continuity. Some key issues that could usefully be addressed in the planning and early implementation stage of the forest management operation are:

- *Organisational options.* Advantages and disadvantages of option to constitute a cooperative or society of the 13 communities with legal status permitting business operation. Other organisational options. Establishing a Board of Directors. Control over leadership through shareholder councils.
- *Planning the development of an enterprise culture.* Development of election systems for managerial leaders. Business skills development and professional training for more responsible positions. Training for community association strengthening, administration and finance, marketing, and contract negotiation.
- *Role of NRDDB.* Separating out community and business administration. Avoiding politicisation. Ensuring that political and community representation functions are kept separate from management and technical support functions. Ensuring other community interest group representation.
- Definition of *optimal structures* for successive business stages: (a) timber harvesting and extraction; (b) NTFP harvesting and extraction; (c) value-adding enterprises for timber and NTFPs; (d) marketing raw and processed materials. Ensuring other community interest group representation.
- *Planning, monitoring and cost control systems;* training of field supervisors. Control over leadership through shareholder councils. Professional accounting systems; budgeting and expenditure controls. Information flows between management and members.
- *Organisation of the labour roster.* Personnel rotation in forest management operations. Definition of tasks, staff specialisation for specific operations and coordination mechanisms. Logistical aspects of worker movement and transport to field camps.
- *Anticipating and monitoring the social impacts of the forest management enterprise.* Compatibility of periods in forest management activities with the agricultural seasons. Anticipating risks of reduced crop production as a timber-based cash economy develops. Effects of labour influxes (should labour be required from outside) as the economy develops. Monitoring the impact of improved incomes on poverty levels and distribution. Anticipating social differentiation processes.
- Achieving *women's participation* in timber and NTFP extraction operations and value-adding business.
- Ongoing *provision of technical advice.* Formal linkages with GFC to ensure some technical inputs, beyond approving permissions and monitoring. Avoiding dependency on technical advisers.

A3.2 Economic and financial aspects

Credit funds to meet long-term capital requirements. Exploring options to access international funds available for sustainable community forest management.

Managing savings. Use of revenues for reinvestment. Avoiding pressure to excessively distribute earnings to members. Minimising loans requirements to capitalise the business.

Meeting *timber market standards*, especially export quality. Ensuring rapid response to demand. Production of stable volumes of demanded species. Implementing a harvesting plan despite demand fluctuations.

Establishing *marketing units* to ensure supply of reasonable volumes (species, products, quality, price, supply). Promotion of partnerships between communities and outside private investors.

Reducing harvesting costs of lesser-known species to ensure these remain competitive.

Definition of drying and milling technologies. Links to timber technology institutions and research. Anticipating problems of mass production.

Ensuring *reasonable margins* as competition increases in the informal chainsaw sector, potentially driving prices even lower.

A3.3 Forest management aspects

Applying uniform *inventory* designs and data quality through adequate organisation, skills and equipment. Formation of specialised groups to undertake inventories.

Adapting *agricultural tractors* for extraction.

Integrating timber and NTFP extraction.

Developing low-impact *road construction* techniques, with attention to alignments, drainage and burrow pit management. Identification of appropriate and cost-effective road widths for each part of the extraction network.

Annex 4: People met by the MTR team

Meetings during the Iwokrama mid-term review, Guyana 2000 - Julian Caldecott (Team Leader, Biodiversity) and Torsten Kowal (Forestry), 23 Nov-12 Dec; Dominic Moran (Economics) and Jeremy Holland (Social Development) 03-12 Dec (meetings unique to Holland noted 'Holland' below).		
Date	Names	Location and Subject
23 Nov	David Cassells	Georgetown (GT). Briefing: overview.
	David Hammond, David Hughell	GT. Briefing: forest inventory and zoning, GIS and the transition to sustainability.
	Gary Hunnisett, Maksud Hoosain, Shyam Nokta	GT. Briefing: human resource development.
	Sharon Ousman, Colette McDermott, Shyam Nokta, Simone Mangal, Raquel Thomas, Vijay Datadin	GT. Briefing: the Young Professionals programme.
24 Nov	Janette Forte	GT. Briefing: cultural/socioeconomic issues and sustainable human development.
	Graham Watkins	GT. Briefing: community-based wildlife resource management.
	Vanda Radzik	GT. Briefing: poverty, resource tenure and sustainable human development.
	Simone Mangal	GT. Briefing: stakeholder/beneficiaries and their roles.
25 Nov	Iwokrama team	GT. Discussion on matters arising from briefings.
	Jean La Rose, Tony Melville, David, Kit Williams, Marcus Colchester	GT. Perspectives on Iwokrama of the Amerindian Peoples Association; potential role in Iwokrama of the Region 8 Amerindian communities.
26 Nov	David Cassells	GT. Structure and content of the MTR report.
	David Hammond	GT. Briefing: research, development, conservation and use of biodiversity.
	Raquel Thomas	GT. Briefing: carbon sequestration research.
	David Cassells, Collette McDermott	GT. Briefing: ecotourism.
27 Nov	Colin Edwards	Annai. Rock View Lodge as a tourism facility: visitation patterns and synergy with Iwokrama.
27 Nov	Captain (Errol McBirney) and Community Environmental Workers of Kurupakari-Fairview	Field Station and vicinity (FS). Orientation on Fairview, local perception of Iwokrama and roles of CEWs and Junior Wildlife Club.
27 Nov-01 Dec	Rangers: Bradford Allicock, Ovid Allicock, Ron Allicock, Vitus Antone, Edghill Bowen, Julian Fraser, Colin Jacobus, Zacharias Norman, Michael Patterson, Kathleen Prince, Dexter Torres, Paulette Torres	FS. Individual meetings and an inclusive workshop on Ranger training, experience, roles, duties, motivations, ambitions and perceptions of Iwokrama.
28 Nov	Peter van der Hout, David Hammond, Francis Kahembwe	DTL concession. Design and significance of the Reduced Impact Logging (RIL) study.
28 Nov	Rene van Dongen	FS. Community resource mapping process.
29 Nov	Gary Hunnisett	FS. Managerial and ecotourism issues.
29 Nov	David Hammond, Francis Kahembwe	FS. Analysis of stakeholder/beneficiaries in the forest management programme.
29 Nov	Gary Hunnisett, Fred Allicock, Colin Edwards and others	North Rupununi Savannah. Inspect Bina Hill Institute for Education, Research and Training, Radio Paiwomak and general area. Observe area launch of Guyana Action Party. Visits to individual households in Sarama village.

30 Nov	Fred Allicock (member, SUA planning team) and Sidney Allicock (Chair, NRDDB)	Surama. Local perceptions of Iwokrama; impact on gender equity, community organization and environmental education; options for community-based, multiple-output forest management.
30 Nov	Lorna Hall	Southern Iwokrama. *Balata* and other NTFP research.
30 Nov	Gary Hunnisett	FS. Inspect Turtle Mountain ecotourism site.
30 Nov	Kirstin Wright and Barth Wright	FS. Non-human primate research programme; role of field research in ecotourism.
01 Dec	Vibert Welch	FS. Development and administration of the Iwokrama Field Station.
01 Dec	All Rangers	FS. Short workshop with rangers on role and perspectives.
01 Dec	Gary Hunnisett, Francis Kahembwe	Overland travel FS to GT.
02 Dec	David Cassells	GT. Progress to date and future itinerary.
03 Dec	Team	GT. Team meeting.
03 Dec	National/local Amerindian representatives: Elvis Joseph (CEW), Colin Cloki (GOIP Committee), Christina Low (GOIP Chief), Nachel Alexander (CEW), Michael DiMendozo (CEW), Fred Allicock (SUA planning Team), William Bremner (NRDDB), Erol Madwarni (Fairview Council Chair), Paula Allicock (MRU), William Andres (NRDDB Vice-Chair), Terence Brash (teacher), Sidney Allicock (NRDDB Chair), Peter Persand (Amerindian Action Movement of Guyana), plus five others.	GT. Amerindian perspectives on the strengths and weaknesses of Iwokrama and suggestions for action. Invitation of representatives to concluding dialogue of the MT team.
04 Dec	Sonia Roopnauth (Ministry of Trade, Tourism and Industry); Paul Stephenson (Cara Hotels), Jean Guillaumot (Le Meridien, Pegasus), Olaf Malver (IIC)	GT. Ecotourism development opportunities for Iwokrama in light of Government strategy (in preparation) and private sector investment attitudes.
04 Dec	Samantha James	GT. Briefing: Information and Communication Unit.
04 Dec	Minister Vibert de Souza (Minister of Amerindian Affairs)	GT. Iwokrama relationship with Amerindian issues and interests
04 Dec	Janette Forte	GT (Holland). Detailed briefing on SHD programme and the role of the SSWG
05 Dec	Peter Walton	GT. Development of managerial systems: organization and lines of accountability, Management Committee as a mechanism for collective leadership and institutional memory (members: David Cassells, David Hammond, Gary Hunnisett, Peter Walton, Janette Forte, David Hughell, Graham Watkins), and knowledge management issues.
05 Dec	Kamoji Wachiira (CIDA representative)	GT. Perspectives on CIDA project; sustainability and international fund raising; relationship to governance issues.
05 Dec	Clayton Hall (Iwokrama Research Fellow and Chair, Friends of Iwokrama), Patrick (WWF Guyana-Guiane-Suriname Forest and Environmental Conservation Programme)	GT. Philosophy and practice of Iwokrama; Amerindian cultural issues; national perceptions of Iwokrama; forest resource management strategies; implications of road developments.
05 Dec	James Singh (GFC), Gavin Nicol & Gary Clarke (DFID-GFC support)	GT. Discussion of perceptions and priorities of Iwokrama and links with GFC priorities
05 Dec	Vibert Welch	FS (Holland). Institutional relations with local stakeholders and HO.

05 Dec	Iwokrama rangers	FS (Holland). Perceptions of Iwokrama and its impact.
05 Dec	Residents of Fair View village (including the village councillor)	FS (Holland). Fairview School hall. Perceptions of Iwokrama and its impact.
05 Dec	Benita, MRU member	FS (Holland). Perceptions of Iwokrama and its impact.
06 Dec	Per Bertillson (Director, EPA), Denise Fraser (Operations Director, EPA)	GT (UG campus). Mandate and role of Environmental Protection Agency; links with Iwokrama; development of EIA and bioprospecting regulations; National Biodiversity Action Plan
06 Dec	John Caesar (Dean, Faculty of Life Sciences), Marlene Cox (Deputy Vice-Chancellor), Philip Da Silva (Head of Biology), Cynthia Watson (Scientific Officer, Biodiversity Centre)	GT (UG campus). Iwokrama-UG links; plant chemistry laboratory; biodiversity centre.
06 Dec	Jocelyn Dow, Liana Cane	GT. Discussion of NTFP economic potential for wider commercialisation and value added
06 Dec	Ms Toni William, FPA and Guyana Shield Forest Resources	GT. Discussion of Forest Producers'/industry perspectives and the changing industrial structure in Guyana
06 Dec	Residents of Surama Village	FS (Holland). Surama Village Hall. Perceptions of Iwokrama and its impact.
07 Dec	Lester Dookarn, Administrative Credit Officer (UNDP PAP microcredit project)	Annai (Holland). CIDA project. Perceptions of Iwokrama and its impact.
07 Dec	NRDDB and other local stakeholders (including CEWs, MRUs and sewing group members, village council members)	Bina Hill Training Institute (Holland). Perceptions of Iwokrama and its impact.
07 Dec	Richard Olver (Resident Representative, UNDP and donor coordinator), Denise deSouza (Asst ResRep, UNDP)	GT. Guyana political economy, donor constraints and Iwokrama context; strengths and weaknesses of Iwokrama; links with UG; development of corporate commercial arrangements at Iwokrama (holding company model); innovative financing mechanisms.
07 Dec	William Grissley (Interamerican Development Bank)	GT. Chain-saw logging; IDB as a GEF implementing agency.
07 Dec	Ben ter Welle (GTZ) and Bernard De Souza (Conservation International)	GT. Views on Iwokrama's research direction post-Tropenbos and insights into the C.I. concession lease arrangement for conservation gain.
07 Dec	Hans Beck, Mrs Donna (Ministry of Finance)	GT. Discussion of current national debt structure, and potential for debt conversion.
07 Dec	Maria Persaud (Caribbean Resources Limited)	GT. Discussion of industrial performance and sector operating and processing costs.
07 Dec	Maria Cox – Ministry of Agriculture	Discussion of national agricultural structure and perceptions of Iwokrama
08 Dec	Navin Chandarpal (Senior Scientific Adviser, GoG)	GT. Sustainability; fund-raising; sovereign debt; local representation on BoT
08 Dec	Sarah Barlow (DFID Caribbean -Enterprise Development) and Martin Webber (consultant to DFID on enterprise development in Guyana)	GT. Discussion of market potential for NTFPs and other forest goods and services. Business development strategies related to Iwokrama.
08 Dec	Team	GT. Team meeting
10 Dec	Janette Forte, Vanda Radzik	GT (Holland). Detailed briefing on SHD programme and the role of the SSWG

11 Dec	David Cassells (IIC), David Hughell (IIC), David Hammond (IIC), Kamoji Wachiira (CIDA), Macarena Vergara (EC), Graham Chaplin (DFID, Barbados), Richard Dewdney (DFID, London), Peter Walton (IIC), Angela Cropper (Chair, BoT), Per Bertillson (EPA), Vibert de Souza (Minister of Amerindian Affairs, GoG)	GT. Team briefing on MTR findings and discussion therof.
12 Dec	David Cassells (IIC), David Hughell (IIC), David Hammond (IIC), Macarena Vergara (EC), Graham Chaplin (DFID, Barbados), Richard Dewdney (DFID, London), Peter Walton (IIC), Angela Cropper (Chair, BoT), Gary Hunnisett (IIC)	GT. Further briefing on MTR findings and discussion therof; Mahdia road issue and impacts on planning and zoning of the Iwokrama forest; 'output to purpose' reviews for DFID projects.
Before or after MTR	Simon Armstrong (ECTF), Emily Fripp (ERM most recent ODI Fellow in GFC), Mary Anne Grieg Gran and Natasha Landell-Mills (both IIED), Bruce Aylward (World Commission on Dams, formerly of IIC), Paul Van Gardingen (Univ. of Edinburgh), Mary Hobley (DFID consultant), Howard Wright (OFI), Duncan McQueen and John Palmer (FRP, NRI), Pat Hardcastle (DFID consultant, FCSP MTR team) and Marcus Colchester (World Rainforest Movement)	

Annex 5: Traditional Forest-Related Knowledge

Summarized below are the conclusions of a Report of the UN Secretary-General on traditional forest-related knowledge that was commissioned by the Intergovernmental Panel on Forests in 1996[43]:

Traditional forest-related knowledge (TFRK) is made up of the following linked features:

- *information* about the various physical, biological and social components of a particular forested landscape;
- *rules* for using them without damaging them irreparably;
- *relationships* among their users;
- *technologies* for using them to meet the subsistence, health, trade and ritual needs of local people; and
- *a view of the world* that incorporates and makes sense of all the above in the context of a long-term and holistic perspective in decision-making.

These aspects of TFRK have various kinds of meaning and potential usefulness to global society, but most of the knowledge concerned cannot, and the rest should not, be taken from its owners without their consent. It must therefore be accessed through negotiation and partnership. Most TFRK will mean little outside the environment where it arose, however, and is likely to be most valuable only as a means to achieve on-site sustainable forest management. To do this requires that the owners of TFRK are involved in:

- *ownership partnerships*, in which local people and the state agree ownership regimes for forest land;
- *planning partnerships*, in which traditional and other forms of knowledge are used together in making decisions on the use of forests; and
- *management partnerships*, in which the partners collaborate to put their plans into effect.

Stumbling-blocks here include misunderstandings arising from cultural differences, and solutions include mutual respect and shared learning, aided by arbitration. The process requires that certain kinds of authority over forest resources are re-distributed to allow local participation, as is now happening in some countries.

Some forms of TFRK have meaning outside their local context and can have a role in commercial biodiversity prospecting. They can be made available on a contract basis between the owners and prospectors. National framework laws and international agreements are required to render such contracts enforceable, and to establish fair and equitable benefit-sharing arrangements. Patent laws can then continue to protect the investments required to develop new products.

---

[43] Ad Hoc Intergovernmental Panel on Forests, third session (9-20 September 1996): Implementation of Forest-Related Decisions of the United Nations Conference on Environment and Development at the National and International Levels, Including an Examination of Sectoral and Cross-Sectoral Linkages, Programme Element 1.3: Traditional Forest-Related Knowledge (Report of the Secretary-General, drafted June 1996 by Julian Caldecott for the World Conservation Monitoring Centre).

Other forms of TFRK, including plant varieties, planting and harvesting systems, technologies and world-views have less or no commercial potential but are nevertheless the intellectual property of their originators and owners. To protect this interest, an holistic approach to intellectual property is needed, the aim of which would be to ensure a fair return rather than to exclude or monopolize. National framework laws and international agreements are needed to establish the right of collective ownership of such knowledge. Further study and consultation is needed to define the wording of such laws and agreements, but once they are in place the owners of TFRK can then make their own choices about whether, when and how to share it with others.

Since most TFRK cannot usefully be digitized, the role of computer database technology will be limited mainly to the sharing of anecdotal information through the Internet, and certain specific tasks linked to biodiversity prospecting. In these cases, translation and data security are respectively the main design issues. Digital mapping (using GIS and GPS) combined with social mapping will have an important role in establishing forest ownership, planning and management partnerships, and anecdotal information can be culturally and geographically located in the same system to assist in forest management tasks. Precise design specifications await further study and consultation with TFRK owners and potential users.

It is suggested that governments give priority to finding ways to ensure:

- that groups possessing TFRK are recognized in law so that they can enter into access agreements concerning TFRK;
- that the TFRK concerned is recognized in law as the common property of the group entering into the access agreement;
- that all access to TFRK is through an access agreement with its owners, where these can be identified;
- that access agreements define terms for the three main circumstances in which access to TFRK might be sought, these being: (a) where the aim is to manage a forest by partnership between the people who live there and the government; (b) where the aim is to invent patentable products for commercial use; and (c) where the aim is to share knowledge freely with others.

The main obstacle to achieving such settlements is likely to be a reluctance to recognize the ownership of TFRK because of the need then to negotiate consensual agreements with its owners. International *fora*, including the Intergovernmental Panel on Forests, provide an opportunity for governments that have taken this path to reassure others that TFRK is indeed useful in managing forests sustainably and in locating valuable new products, and that accessing it on fair and equitable terms can only benefit each country in its efforts to achieve sustainable development.

Annex 6: Examples of bioprospecting discoveries

TYPE OF MEDICINE	USE OF MEDICINE	SOURCE SPECIES	SOURCE SITE
Reserpine	Reduces hypertension	Rauwolfia serpentina	India
Tubocurarine	Muscle relaxant	Chondrodendron tomentosum	Brazil
Vinca alkaloids	Anti-cancer agents	Catharanthus roseus	Madagascar
Diosgenin	Oral contraceptive	Dioscorea spp.	Mexico
Quinine family	Anti-malarial agents	Cinchona ledgeriana	Peru
Cocaine family	Local anaesthetics	Erythroxylum coca	Andes
Emetine	Amoebicide	Cephaelis ipecacuanha	Brazil
Aspirin family	Analgesic/anti-fever	*Salix* spp.	Europe
Erythromycin	Antibiotic	Soil fungus	Philippines
Haemotoxins	Surgical anti-coagulants	Malayan Pit Viper	Malaysia
Taxol	Anti-cancer	Taxus brevifolia	NW America
Gingko flavonglycocides & terpenelactones	Enhances blood flow in the brain	Gingko biloba	China

The following press release is provided as an example of current commercial thinking in relation to bioprospecting:

Diversa Signs First Agreement Granting Legal Access to Biodiversity in Africa

"San Diego, CA, December 7, 2000 – Diversa Corporation (Nasdaq: DVSA) today announced the signing of a biodiversity access agreement giving the company rights to obtain environmental samples from South Africa, a region known for the diversity of its ecosytems. This diversity is exemplified by the Cape Floristic Region, which contains over 9,000 plant species, 70% of which are endemic to that region, making it one of the world's most biologically diverse environments. In addition, South Africa contains areas of extreme climatic diversity, ranging from deserts to semi-tropical jungles. Within these diverse regions, there are identified "hot spots", which are high in species richness, have a high concentration of endemic species and a high rate of habitat loss. By obtaining small samples from these sites, Diversa is expanding its broad and diverse microbial genomic libraries for the purpose of developing products for the pharmaceutical, agricultural, chemical processing, and industrial markets.

"This latest agreement is part of Diversa's global biodiversity access network, based on pioneering research collaborations, which grant legal biodiversity access to regions such as Alaska, Costa Rica, Bermuda, Indonesia, Yellowstone National Park, and Russia. This agreement gives Diversa the rights to discover genes and commercialize products from

environmental samples provided by CSIR (Council for Scientific and Industrial Research), a research organization currently undertaking nearly 10% of all research and development activities on the African Continent. In exchange, Diversa will support the ongoing bioprospecting activities of the CSIR organization and its collaborators and pay royalties on Diversa's revenues from any products developed from samples provided.

"Diversa Corporation is a global leader in developing and applying proprietary technologies to discover and evolve novel genes and gene pathways from diverse environmental sources. Diversa is utilizing its fully integrated approach to develop novel enzymes and other biologically active compounds, such as small molecule drugs. Diversa's proprietary evolution technologies facilitate the optimization of genes found in nature to enable product solutions for the pharmaceutical, agricultural, chemical processing, and industrial markets. Within these broad markets, Diversa is targeting key multi-billion dollar market segments where the company believes its technologies and products will create high value and competitive advantages for strategic partners and customers. Diversa's strategic partners are market leaders and include The Dow Chemical Company, Novartis Seeds AG, Novartis Agribusiness Biotechnology Research, Inc., Aventis Animal Nutrition S.A., Celanese Ltd., Invitrogen Corporation, and Danisco Cultor."

Annex 7: Participation by stakeholder groups

A7.1 Sustainable Human Development Stakeholder Impact Matrix

Stakeholders	Entry Points	Related Activities	Effects to date	Anticipated Impacts	Indicators	Notes & Links
Amerindians in and around the Iwokrama Forest	North Rupununi District Development Board (NRDDB)	Facilitation of executive / action committee planning & operations sessions Implementation / operationalisation & monitoring of NRDDB Institutional Strengthening Grant. Implementation of Community Radio Station project; Implementation of Youth Apprenticeship hands-on construction skills training linked to completion of Institute & Radio station building. Procurement, installation & testing of four radiophones for distant villages. Facilitation of community consultations / workshops & roundtable on Iwokrama Forest Zoning re SUA & WP.	Improved mechanisms for communications, consultations / decision-making between Iwokrama & representatives of 13 constituent NRDDB communities. Improved organisational mechanisms in place at NRDDB executive level through hiring of secretary & treasurer as part- time employees at NRDDB. Increased ownership / management of NRDDB processes & institutions in hands of community.	The NRDDB has established viable institutions and related bodies owned / operated by itself. Developed capacity for full & equal partnerships / joint ventures with Iwokrama and collaborating development agencies. The NRDDB has developed mechanisms for managing conservation & development programs.	Minutes / recorded decisions of bi-monthly NRDDB statutory meetings. Reports of executive secretary & treasurer Construction of Bina Hill Institution for Research, Training & Education Radio Paiwomak studio premises. Daily community broadcasts from Radio Paiwomak. Daily radio-phone communications between & amongst communities. SUA/ NRDDB sub-committee formed	NRDDB serves as umbrella organisation and inter-agency link for 13 constituent communities. Other key agencies operating in district include: CIDA, UNDP, UNICEF, IICA, Peace Corps, YCI, VSO. Links with IUCN Netherlands re Bina Hill Institute. Links with UNESCO/ GBC (state-owned radio station). Links with Iwokrama Forest Zoning program
	Village/Community Councils of North Rupununi	12 Participatory Human Resource Interaction Appraisal (PHRIA) Maps and Reports produced through a collaborative process in 1999, and returned to communities in 2000.	Key for identifying trade-offs in uses. 'Entry point' at village level are established relationships and understanding social relationships.	Engender sense of connection & ownership. Break down mistrust. Understanding of resource needs.		Expanded into ground truthing of 1: 50,000 maps. Also expanded into Management Plan Assessments.
	Village/Community Councils of North Rupununi	Participatory Development of Cartographic Maps for 12 communities	Mapping completed in 5 villages.	Base for: Conservation Contracts; Land Title Resolution; Resolving Trade-offs to ensure effective resource management.		Ground truthing of PHRIA maps carried out by CEWs and other villagers, under general supervision and direction by Iwokrama.

	Village/Community Councils of North Rupununi	Village Administrative Support Fund for CEW programme operative since Nov 1999 2 day Workshop on Bookkeeping/Financial Management held for 8 reps of village councils (July 26-27, 1999).	Facilitation of meetings related to CEW programme. Capacity building in financial management. Templates used in Workshop now in use by communities.	Deepening of collaborative resource management between NRDDB communities and Iwokrama		Recently completed participatory evaluation of CEW programme with Village/Community Councils.
	Village/Community Councils of North Rupununi	Draft Needs Assessment prepared in a collaborative way based on the following sources: all consultations since 1996; PHRIA; Pilot Management Plan Assessments in 3 villages; NRDDB bi-monthly meetings; Village visits; CEW and MRU research; Wildlife Research & Monitoring.	Critical Needs identified: Capacity Building; Management Skills; Social Life Skills; Strengthening Institutions; Cultural Affirmation; Improving communication; Participatory decision making; Links to regulatory agencies;. Village-specific needs.	Basis for collaborative resource management with Iwokrama and for		
	Community Environmental Workers (CEW)	On-going Training (practice and theory) in Environmental Education. 1 CEW (along with NRDDB and MRU reps) attended the Caribbean Foresters Meeting (June 2000) and the Forestry Expo 2000, adding to their Environmental Education base.	Capacity and technical skills of CEWs increased.	CEWs transfer knowledge to Wildlife Clubs and other villagers. Information will also enhance practical village-based work in environmental education.		Linked to Wildlife Clubs, bilingual booklets produced by MRU, also used. Training materials published under joint sponsorship with interested national agencies, etc. for wider dissemination.
	Community Environmental Workers (CEW)	On-going Training (practice and in workshops) in effective communication. 2 CEWs made presentations at the Amerindian Heritage Month celebrations held in the Regional centre, Lethem (September 2000).	Support for Iwokrama links with communities in wildlife training and management increased among stakeholders outside of immediate target communities.	Support for collaborative management of resources and working with local communities at the regional and national levels.		One area of CEW work is to provide the link between Iwokrama-Village-NRDDB, and to be the node for two-way communication.

	Community Environmental Workers (CEW)	On-going training in Guyana and Brazil in Research skills for wildlife management. 2 CEWs (and a Ranger) attend one-month fish workshop in Mamiraua, Brazil.	Local level awareness and monitoring of natural resources. Wildlife surveys carried out in 3 communities.	Community Capacity for Citizen Science and Management built.		Collaboration with another DFID-funded programme in Mamiraua, Brazil.
	Community Environmental Workers (CEW)	On-going collaborative gathering of information on locally-important issues, like use areas within the Iwokrama Forest, potable water and sanitation assessment in 12 villages, etc.	Information forms part of data base used by Management Team for the Sustainable Use Area.	Building partnerships. Appreciation of value of CEWs increased.		
	Makushi Research Unit (MRU)	Provision of logistical support for implementation of CIDA supported Makusipe Komanto Iseru phase II project – research / production of 3 bi-lingual EE booklets, 1 alcohol abuse social sensitisation booklet & 1 children's book: "Iwokrama Stories". Dissemination of MRU booklets / holding of community- classes conducted by MRU teams at community fora and special events: e.g. CTO Tourism promotion – May 2000, in Annai; National Forest Exposition, June 2000. Facilitation of MRU representation at first Caribbean Regional Gender & Environment Conference in Trinidad in February 2000 organised by PANOS. Facilitation of MRU representation in Caribbean Annual Foresters Conference held in Guyana, June 2000. Conducting of crab-oil survey in collaboration with communities.	Increased recognition of role of Makushi women in establishing traditional knowledge-based industries. Enhanced revitalisation of use of native language in recording environmental education information. Increased income through sales of products that are copyrighted in the name of MRU/ NRDDB. Increased voices of Makushi women speaking in their own right in local, national & international fora Increased contracts awarded to MRU for reviewing / researching / information gathering on traditional knowledge.	Establishment of viable Traditional Knowledge-Based Industry built on the pioneering work of the MRU. Establishment and operationalisation of MRU Fund with management / decision-making vested in MRU. Establishment of MRU as independent Community Based Organisation with links to & representation on NRDDB. Establishment of Makushi Language and Indigenous Skills courses / workshops at Bina Hill Institute facilitated and / or supported by MRU.	Number of books/ booklets produced and disseminated by MRU. Number of contracts awarded to MRU by Iwokrama and other agencies. Agreements with other agencies such as the Ministry of Education in support of use and application of MRU products. Alliances with other Indigenous communities in Guyana and in Brazil to promote Indigenous language and traditional knowledge. Number of MRU members represented on local decision-making bodies.	MRU grew out of the Iwokrama project (GEF funded) executed by UNDP, conducted by the Amerindian Research Unit of UG. Then supported by the CIDA Gender Equity Fund. Involved the handing of copyright to the NRDDB/ MRU. Iwokrama worked in collaboration with CIDA and in a successful collaborative effort that increasingly empowered the MRU Contracts for the Malaria Survey and Crab-oil survey were directly implemented through DFID-Iwokrama support for attending conferences and for book sales.

		Review / Editing of Local Ecological Knowledge booklet with communities. Conducting of KAPB Malaria Survey in 13 communities in collaboration with CEWs. Review & selection of Local Indigenous Experts to conduct Iwokrama Ranger Training program in Indigenous Skills.				
	Women's Groups	On-going support for gender equality / increased representation of women on NRDDB Facilitation of linkages between MRU and Women's Groups Through Iwokrama Institutional Strengthening grant to NRDDB, support provided for workshops for women reps from 13 communities to participate in capacity building & training for financial management and taking ownership of UNDP sponsored "Women's Revolving Fund" Promotional support for sales of Women Groups' embroideries on traditional lifestyles scenes at various Iwokrama events. 22 sewers from 7 village sewing groups contracted to make Iwokrama badges and armbands.	Enhanced women's representation on local and national levels linked to Iwokrama sponsored events. Increased ownership / access by women of community development funds and opportunities. Increased exposure and sales of embroidered products that affirm Makushi traditions and lifestyles.	Local decision-making bodies enshrine gender equality in keeping with NRDDB Constitution provisions; National Constitution articles and international conventions such as CEDAW and Agenda 21 conventions. Women have established viable development organisations and financial mechanisms with capacity to manage local knowledge-based industries and market related products.	Number and level of women leaders and/ or representatives on NRDDB and other CBOs related to Iwokrama. Level of involvement by women representatives in Iwokrama sponsored projects and programs Number of women benefiting directly from Iwokrama contracts and related opportunities.	Women's Groups per se have not, to date, benefited greatly from the DFID / Iwokrama project. But, longstanding links with the Senior Social Scientist and Community Development Fellow and the women's groups have been maintained and enhanced. Iwokrama has worked in synergy through the SSU personnel with other agencies such as UNDP & CIDA & Peace Corps to support women's participation in community development.
	Tertiary level educational support	Iwokrama staff and others jointly fund a one-year scholarship for Bertie Xavier to study in Georgetown for a year in preparation to study Wildlife Biology at UG	Since the start of Iwokrama, a growing number of North Rupununi students are pursuing higher education.	Capacity building enhanced. More young people in the North Rupununi will aim for tertiary level education.		Collaboration in fund raising for scholarships with 2 primatologists. Also with the Jesuit Scholarship Fund, Guyana.

Amerindians in other areas of Guyana						
	Tertiary level educational support	Social Science Research Assistant, Sabanto Tokoroho, Arawak from Region 2, supported to attend classes at UG	Iwokrama's support of Ms Tokoroho's pursuit of a degree, and her training while on the job, is highly visible and welcomed among national Amerindian stakeholders.	Upon graduation, Ms Tokoroho will increase the small cadre of Amerindians trained at the tertiary level. She is also adding to her considerable experience thru' on the job training at Iwokrama.		Ms Tokohoro is linked to GOIP, a national Amerindian organisation, and to the Region 8 communities, among which she worked for some years. Both are key Iwokrama stakeholders.
Guyanese public						
	Guyana Forestry Commission/PROFOR	Active participation in weekly meetings from July 2000 to present. Chair of Rights Sub-Group in the Elaboration of Critical Issues.	Draft Report of Rights Sub-Group prepared and disseminated among group members. Growing appreciation of critical social issues among diverse stakeholders in the Forestry sector.	Greater appreciation of the need for participatory processes and partnerships in the forestry sector.		Sub-group brought together representatives of indigenous organisations, the GFC and Iwokrama
	Tertiary level educational support	Social Science Unit members teach a course titled 'Introduction to the Indigenous Peoples of Guyana' to 70 UG students.	Classes held thrice weekly; students from Environmental Studies, Tourism and Geography programmes. Students use Iwokrama ICU facilities (web access and library holdings) .		Deepening awareness of Iwokrama and issues of environment and conservation among Guyanese who will enter the job market in a few years.	
Political groups and government agencies	Ministry of Housing & Water	Briefing Minister Baksh on critical water issues in North Rupununi. Briefings with and supply of background documentation on indigenous issues to WELL Consultants to the Ministry of Housing & Water	Recommendations on the way forward in interior communities incorporated in WELL Environmental Sanitation Report, sent to Iwokrama for comments.	Building links between key stakeholders (relevant Ministry and interior communities) thru' facilitatory role.		Information on potable water conditions in North Rupununi villages collected in PHRIA Reports and further elaborated in a Water and Sanitation Assessment carried out by CEWs.

	Ministry of Health	Several meetings to establish Malaria component of SHDP.	No agreement reached on proposed Mini-Malaria summit.			Project has been redesigned as a community-based Malaria / Environmental Health initiative that will produce and disseminate popular education messages through booklets, community radio programs, village campaigns and incentives.
	Ministry of Educaion	Meetings and exchange of correspondence leading to agreement to pilot the Makushi Research Unit's EE bi-lingual booklets on Birds, Fishes and Cassava in the 13 N. Rupununi primary schools.	Support guaranteed from local NGO, the Guyana Book Foundation to purchase and transport sample sets of booklets (20 sets of each title) to schools. Commitment inked by Brazilian-based Makushi linguist to conduct seminar with MRU members and training workshops.	MRU booklets and related school pilot will serve as demonstration / model for wider program. Indigenous culture and knowledge affirmed and recognised nationally.	Level of participation by schools in pilot project; Quality of dissemination / utilisation of texts by teachers & facilitators; Feedback from and level of participation by school children; Feedback from parents and teachers about project.	This project is planned to come on stream in 2000. Project will demonstrate the value of the MRU and its products, and will be a significant milestone at the national level for the recognition of Indigenous languages for EE.
	The Ministry of Information / The Guyana Broadcasting Corporation (GBC)	Meetings and exchange of correspondence leading to the signing of a MOU between Iwokrama and the GBC in order to implement the UNESCO sponsored Community Radio project. Establishment of Radio Paiwomak under the aegis of the NRDDB and located in the Bina Hill Institute. Formalising of protocol and partnership with GBC through the chairman of GBC and PS in	Milestone achievement as the first Hinterland / Indigenous community radio station in Guyana. Radio Paiwomak established and operational with strong community ownership invested in it from inception. Information & communications	Basis established for developing a model communications node with links to Iwokrama's ICU, Guyana's GBC and other UNESCO supported community radio networks. Establishment of telenet centre with internet / radio link.	Articles and promotions about Radio Paiwomak in national media. Radio Paiwomak log book / records. Utilisation of radio service residents. Level of participation in programming by: village leaders, school children, women's	The Community Radio project was sponsored by UNESCO with IDRC and implemented by Iwokrama with some finances from SHDP/ DFID. The project had a long gestation period due to sensitivity on part of govt. Careful trust-building and negotiations with

		Ministry of Information. Orientation and introductory training session at GBC national studios held for community radio operators. Protocol for political campaigning for upcoming elections signed by national media and endorsed by GBC discussed and made available to Radio Paiwomak.	improved and enhanced.	Education, communications and general level of information increased and improved through Community Radio Station programs.	groups, Iwokrama personnel, other agencies, etc... Number of radios purchased by residents. Feedback from communities and related radio service user groups.	Minister and GBC personnel resulted in MOU and successful implementation of phase I. Phase II planned with NRDDB, UNESCO, Iwokrama & GBC.
Local and international NGOs						
	Guyana Marine Turtles Conservation Society (GMTCS)	Advisor during 2000 to GMTCS in their education outreach, development of project proposals and interest in fostering links between the North West and Rupununi District communities.	Capacity developed in GMTCS regarding project development, and participatory processes.	Networking between Iwokrama and conservation and development NGOs.	Greater local participation in and appreciation of the goals of GMTCS.	Deepening of links between WWF, Guyana, GMTCS, Iwokrama and local communities.
International development institutions	13th Annual Caribbean Foresters Meeting (June 13-16, 2000)	'Learning to Listen: Approaches to Communication in Community Forestry' made by J. Forte and S. Mangal.				
	Guiana Shield Workshop on the Management of Natural Sites, (Nov 2000) sponsored by the Guyana National Commission for UNESCO, and WWF (Guyana) – 50 regional participants	'Methodologies for Involving Indigenous Peoples and Local Communities in Selecting Natural and World Heritage Sites' J. Forte and S. Mangal Workshop groups facilitated and rapporteurs' reports submitted by 5 Iwokrama staff	Ideas raised were reflected in the suggestions on the way forward and will be incorporated in the Workshop Report.	Awareness of the issues around inclusion of indigenous peoples in the management of natural sites deepened among stakeholders.	Copies of the presentation distributed to all participants to form the basis of reporting back talks in their respective institutions.	This presentation was requested by the Guyana National Commission for UNESCO.

A7.2 Sustainable Forest Management Stakeholder Impacts Matrix

Stakeholders	Entry Points	Related Activities	Effects to date	Anticipated Impacts	Indicators	Notes & Links
Amerindians in and around the Iwokrama Forest	NRDDB	Facilitation of wildlife management process as a result of requests from NRDDB	Increased communication between NRDDB, government agencies and other stakeholders Plan of Iwokrama activities implemented Educational visits to communities and from schools to field station Research program	Wildlife management systems in place	Reports and books on community based wildlife management Increased abundance of Arapaima gigas in the North Rupununi	Driving process for Iwokrama wildlife programmes
	Village/Community Councils of North Rupununi	3 Management plan assessments completed in Surama, Fairview, and Toka	Key information for identifying tradeoffs and conflict in uses. Capacity assessments Base for research planning in villages			Basis for community based research planning
	Community Environmental Workers (CEW)	On-going training in Guyana and Brazil in wildlife research skills 2 CEWs (and a Ranger) attend one-month fish workshop in Mamiraua, Brazil. CEWs involved in surveys in Toka, Iwokrama Forest and River	Local level awareness and monitoring of natural resources. Preliminary wildlife surveys carried out along river, in the Iwokrama Forest, and in the savannahs.	Community Capacity for Citizen Science and Management built.		Collaboration with another DFID-funded programme in Mamiraua, Brazil.
	Wildlife Clubs	Develop and support wildlife clubs in the North Rupununi Link clubs to other clubs in Guyana and to zoos and schools in the USA Training in: Organization Mapping and GPS Biological monitoring Proposal writing Grant support	Twelve wildlife clubs developed in the North Rupununi with 320 members (10% of the North Rupununi population) Clubs generating internal funding for activities & accessing external funding from zoos	Capacity of young people for management developed.		

	Community wildlife experts	Involvement in gathering local ecological knowledge	Local ecological knowledge books to be published under NRDDB Knowledge used in management			
Guyanese public						
	Tertiary level educational support	Teaching of courses at the University of Guyana in wildlife management and herpetology. Two-month field opportunity for 14 University of Guyana students in the Iwokrama Forest – training in wildlife research techniques	Students also use ICU facilities (web access and library holdings) at Iwokrama Centre.		Deepening awareness of Iwokrama and issues of environment and conservation among Guyanese who will enter the job market.	
	Research Assistants at Iwokrama	Opportunities for four biology graduates from the University of Guyana to develop field experience and research skills. Four persons hired for two-year contracts.	Research assistants completed research and publications. Research assistants completed parts of ranger training course	Opportunities for students to bridge the gap between University of Guyana and MSc PhD level courses	Poster and paper publications authored by research assistants	
	Wildlife Traders	Links built to wildlife traders through national wildlife surveys with the EPA				
Political groups and government agencies	Environmental Protection Agency Fisheries Department	Ongoing projects in collaboration with EPA: National survey of the wildlife trade National guides to vertebrates (web page and booklets) and educational posters National consultation with communities on wildlife conservation regulations	Capacity building in participatory methodologies Communication between wildlife traders, middlemen and govt agencies	Building links between key stakeholders and longer term effective management planning		
Local and international NGOs						
	Members of American Zoo and Aquarium Association, San Diego, Philadelphia and Columbus Zoos, Disney's Animal Kingdom, National Audubon Society	Direct communication NRDDB-AZA institutions through attendance of AZA annual meetings Contribution systems to wildlife clubs National workshop on giant otter conservation Schoolyard Ecology project		Increased networking between Iwokrama and other conservation and development NGOs.		Deepening of links between NGOs, Iwokrama and local communities.