

IWOKRAMA

Five Year Report 1998 - 2002



*Forest conservation and sustainable use through
business development, research and training*

Iwokrama International Centre for Rain Forest Conservation and Development

Five-Year Report 1998-2002

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ROYAL PATRON OF THE IWOKRAMA INTERNATIONAL CENTRE:

HRH THE PRINCE OF WALES

Iwokrama

- *is a collaborative initiative that arose from Guyana and involves the International Community;*
- *is administered by the Iwokrama International Centre governed by an International Board of Trustees that includes Guyanese and international representatives;*
- *works closely with local, national, and international partners, including indigenous people living in, and near, the Iwokrama Forest, and government agencies;*
- *focuses on managing and developing all forest values including the natural, social, cultural, and economic resources of forest ecosystems;*
- *manages the Iwokrama Forest which is part of the Guiana Shield Frontier Forests;*
- *is implemented by a multi-disciplinary team of managers, social scientists, economists, and ecologists;*
- *sustainably and equitably uses and conserves the Iwokrama Forest for local and national benefits;*
- *develops participatory and collaborative management approaches to resource management;*
- *develops research, monitoring, learning, knowledge management and evaluation systems;*
- *builds local, national, and international capacity through empowerment, training, education, learning by doing, and dissemination of information.*

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Acronyms

ASL – Above Sea Level
 ATAC – Amerindian Touchaus Area Council
 Audubon – Audubon Society
 CDC – Community Development Council
 CEW – Community Environmental Worker
 CFTC - Commonwealth Fund for Technical Cooperation
 CHW – Community Health Worker
 CIDA – Canadian International Development Agency
 CITES – Convention on International Trade in Endangered Species of Flora and Fauna
 DFID – Department for International Development
 EC – European Commission
 EPA – The Environmental Protection Agency
 GBC – Guyana Broadcasting Corporation
 GEF – Global Environment Facility
 GFC – The Guyana Forestry Commission
 GIS – Geographical Information Systems
 IAST – Institute for Applied Science and Technology
 IBOT – Iwokrama Board of Trustees
 IDRC – Canadian International Development and Research Centre
 INSAT – Information Network for Science and Technology
 IPR – Intellectual Property Rights
 IPF - Intergovernmental Panel on Forests
 ITTO – International Tropical Timber Organization
 IUCN – International Union for the Conservation of Nature
 Iwokrama – Iwokrama International Centre for Rain Forest Conservation and Development
 MAB – Man and the Biosphere
 MRU – Makushi Research Unit
 NBAP – National Biodiversity Action Plan
 NDS – National Development Strategy
 NGO – Non-Government Organization
 NRDDB – The North Rupununi District Development Board
 NTFP – Non-Timber Forest Product
 NTPP – Non-Timber Plant Product
 PRSP – Poverty Reduction Strategy Paper
 RDC – Regional Democratic Council
 RIL – Reduced Impact Logging
 SYE – Audubon School Yard Ecology programme
 UNDP – United Nations Development Programme
 UNESCO – United Nations Education and Science Council
 USAID – United States Agency for International Development
 VC – Village Council
 WWF – World Wide Fund for Nature

Preface

The role of the Iwokrama International Centre for Rain Forest Conservation and Development is to demonstrate how tropical forests can be managed sustainably, both ecologically and economically, and to develop the tools to achieve this. This role becomes ever more significant as the rate of deforestation of tropical forests increases globally. The Centre's aims, once considered so progressive and radical, now fall entirely within the mainstream thinking of much of the global conservation and development community. These aims have become particularly relevant as the long-term expected development of those once-forested countries has failed to materialise. Changes in worldviews during 2001 have placed the concept of sustainable development and the alleviation of poverty on every government's agenda. Poverty eradication is no longer something unusual. It is now vital for global cohesion.

The five-year review presented here demonstrates that the Centre is well along the path to meeting earlier expectations. In late 2000 and early 2001, Iwokrama received two extremely positive donor reviews of its progress in implementing the Operational Plan 1998-2002. The reviews concluded that the main accomplishments have formed a solid foundation for the Programme's advancement. These include completing inventories of the resources of the Iwokrama Forest, zoning the Iwokrama Forest into a wilderness preserve and sustainable utilisation area, and establishing partnerships with local communities and national agencies. Additional confirmation of the standing of the Centre was received in November 2000 when HRH The Prince of Wales bestowed his Royal Patronage on the Iwokrama International Centre following his visit to Guyana and the Iwokrama Programme. This major honour served to highlight the Programme's success under the previous Director General, David Cassells, and its future potential and significance.

During 1997-98, the Centre planned on being self-financing by 2007. The expectation was that donor funds would decline and business revenue increase proportionally. Within this concept, businesses were taken to mean "real" businesses, albeit with many innovative environmental and social principles applied and with many stakeholders seeking financial returns. We are now readjusting these earlier expectations to the reality of producing over US\$1 million annually from 180,000 ha using an endowment (made on the recognition of the intrinsic value of conservation) for the core costs and income generation from environmentally and socially correct experimental businesses in timber, non-timber forest products and ecotourism. To this, we are adding other income generated as the Centre consolidates its position as an important training and research centre, providing a national, regional, and international resource, consistent with our mandate to disseminate our technologies and models.

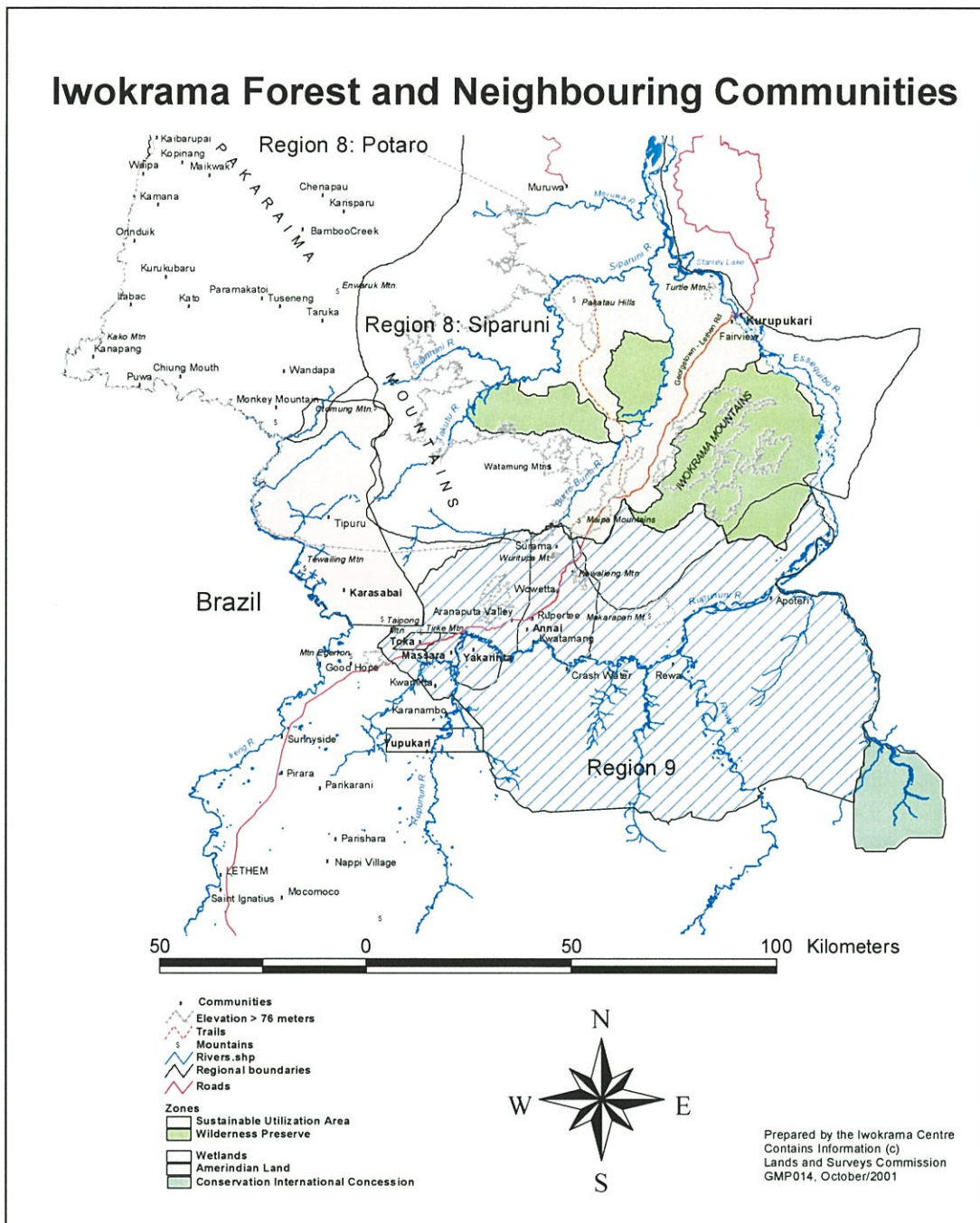
I joined the Centre in July 2001 to oversee the Centre's next phase, as it moves from a pioneer programme to an established experimental business institution. It has been a year of change for Iwokrama and me, a testing and a challenging but nonetheless satisfying year, with some major highlights. To cite but one example, the President of Guyana, HE Mr. Bharrat Jagdeo, invited me to join the Guyana delegation to the Commonwealth Heads of Government Meeting in Australia in March of this year; all of us at Iwokrama greatly appreciated this significant statement of support.

This five-year review is presented to our stakeholders and interested parties as we prepare for a Second Donors Round Table Meeting in London on 15 May 2002 to ask for support through the next five-year period. The world is seeking solutions to its many development and environmental problems and the temptation for governments is to launch new initiatives. Quietly, for the past five years, Iwokrama has been mapping the way forward; here is the evidence.

Dr. Kathryn Monk, Director General. Iwokrama, April 2002.



Map 1: General map of Guyana



Map 2: Iwokrama Forest and neighbourhood communities

Introduction

Effective natural resource management must cope with many challenges. These challenges include:

- Recognition that preservation, conservation, and natural resource use must be melded into a workable solution for natural resource management;
- Increasingly obvious ecological changes to the natural resource base affecting global climates and biodiversity;
- Increasing economic liberalization and the closer integration of the world economy;
- Increasing recognition that resource management is a complex social issue; and
- Growth in human population and growth in, and shifts in focus for, human demands for natural resources.

The **Iwokrama International Centre for Rain Forest Conservation and Development** is an autonomous institution responsible for the management of the 370,000 hectare **Iwokrama Forest** in central Guyana, South America, and the implementation of **Iwokrama's Programmes**. The management of the Iwokrama Forest has been entrusted by the Government of Guyana to the international community with the goal of showing how tropical forests can provide economic, social, and cultural benefits while conserving biodiversity. The people of Guyana are working with the international community, through the Commonwealth Secretariat, to develop the Iwokrama Centre as a demonstrative model for the following mission:

"To promote the conservation and the 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"

Guyana's offer to provide forest resources for the Iwokrama Programme was made at the 1989 Commonwealth Heads of Government meeting in Kuala Lumpur, Malaysia. The Iwokrama Centre was legally established in Guyana after Parliament unanimously passed the 1996 Iwokrama Act. HRH The Prince of Wales became Patron of the Centre in November 2000.

Iwokrama is a tangible step toward demonstrating how some of the challenges to natural resource management can be addressed. To date, Iwokrama has demonstrated the importance of participatory and collaborative management approaches in ensuring the equitable and sustainable use of tropical forest resources. In this context, Iwokrama has worked closely with local partners including the North Rupununi District Development Board (NRDDDB) and national partners including the



His Royal Highness The Prince of Wales during a visit to the Iwokrama Forest with the Honourable Minister Sawh and Sydney Allicock, Dec. 2000.
Photo by Iwokrama

Guyana Forestry Commission (GFC), the Environmental Protection Agency (EPA), the Fisheries Department of the Ministry of Fisheries, Crops and Livestock, and the Ministry of Amerindian Affairs. Among its most notable achievements, Iwokrama has:

Prepared the Ground for Developing Sustainable Forest Businesses - Iwokrama has taken stock of the available forest use options through two international workshops that led to the development of business principles and initiated developments towards agreements on IPR and benefit-sharing. Iwokrama also sponsored an assessment of the carbon sequestration potential of Guyana's forests that has shown that the net value is likely to be much less than previously expected. A reduced-impact logging feasibility study has accounted for the operational costs of selective timber felling and the factors influencing these costs. Timber and NTFP market feasibility studies have outlined the expected costs, processing options, current markets and expected returns of harvesting and processing timber and cane materials from the Iwokrama Forest. Tourist facilities, local staff skills and the range of offered activities have been upgraded to accommodate a growing number of visitors to the Iwokrama Forest. The Iwokrama Forest canopy walkway will be the first in Guyana and should significantly enhance

the base for tourism in the Iwokrama Forest. Iwokrama has also developed a nascent merchandise line and the beginnings of a sponsorship programme that will allow patrons to track progress at Iwokrama's website against the conservation or sustainable development objectives they have chosen to support.

Developed Systems and Institutional Capacity for Collaborating with Local People - the collaborative relationships between Iwokrama and local communities are underpinned by the Iwokrama Act and include partnerships based on the exchange of knowledge and skills, mutual support, and shared decision making. In this context, Iwokrama has facilitated the emergence of the NRDDDB as a representative structure for the North Rupununi. Iwokrama has also facilitated the development of the Community Environmental Worker (CEW) programme, the Makushi Research Unit (MRU), and Wildlife Clubs as local institutions linked to natural resource management.

Built National Partnerships for Natural Resource Management - Iwokrama is demonstrating how inclusion and dialogue promote efficiency and sustainability in natural resource management. Iwokrama's impact is reflected in relationships with national institutions including the GFC, the EPA, the Guyana Broadcasting Corporation (GBC), the Fisheries Department of the Ministry of Fisheries, Crops, and Livestock and the University of Guyana. Iwokrama is providing models for national agencies for participatory processes in the management of natural resources.

Developed International, Regional and Intersectoral Collaborations - Iwokrama has developed an array of institutional collaborations from local communities to national agencies and non-government groups, to regional and international research institutes, and contributed to developing protocols, policies, and legislation relating to timber harvesting, certification, and wildlife, mining, protected areas, and road management. People working at Iwokrama have come from Brazil, Britain, Canada, Guyana, Trinidad, Uganda, and the USA.

Raised Funds for Natural Resource Management in Guyana - over US \$15 million has been raised by Iwokrama in the last five years to support sustainable forest management and human resource development in Guyana.

Developed an Understanding of the Iwokrama Ecosystem for Sustainable Management -

Iwokrama has documented the diversity and natural history of wildlife and other resources through local knowledge and scientific studies. In this context, Iwokrama has worked with the NRDDDB to both recognize and apply traditional ecological knowledge; including recognizing copyright vested in indigenous knowledge products. The Centre also recognizes local expertise in traditional skills and incorporates this into the Ranger Training Programme.

Developed Iwokrama Stakeholder Capacity and Skills - Iwokrama trained and employed 12 Forest Rangers based at the Field Station, 26



Iwokrama Rangers during their graduation in Lethem, Rupununi, 23 September 2001. Photo by Iwokrama.

CEWs based in their villages and 13 Young Guyanese Professionals based at the headquarters in Georgetown. Iwokrama has also supported national and international undergraduate and graduate students and a volunteer and internship programme. In addition, the Centre has provided attachment for more than 12 Guyanese interns on short projects. Short term employment of local people has also provided "learning by doing" opportunities.

Developed Information Support Systems for Natural Resource Management Planning - Iwokrama has gathered social, economic, cultural, archaeological, geographical, and biological data on the Iwokrama Ecosystem and integrated this information with Geographical Information Systems (GIS). The information gathered has been used in participatory resource management planning processes. Iwokrama has developed a strategic decision-support system, IWOPLAN, to assist in identifying the best opportunities for timber and NTFP harvesting in the Iwokrama Forest. The system integrates GIS, commercial timber and NTFP growth models and operational cost models to evaluate the best areas for harvesting, the likely costs and estimated returns for each harvest unit. The system structure is fully adaptable and can be used to support management in any area outside Iwokrama. Iwokrama has also developed

prototype models for tree distributions and growth and linked satellite radar and other images to the GIS.

Developed a Systematic Programme of Bioprospecting - Iwokrama has established a national bioprospecting screening laboratory at the University of Guyana.

Developed Public Outreach Mechanisms - Iwokrama manages an Information and Communications Unit and has run International Technical Workshops, Lunch-time Seminars, Friends of Iwokrama Meetings, and various other Public Fora and facilitated the first community radio station in Guyana – Radio Paiwomak.

Radio Paiwomak. This radio station came into being as a result of an initiative by Iwokrama in collaboration with the NRDDDB and the Guyana Broadcasting Corporation (GBC), and funding from the Canadian International Development and Research Centre (IDRC). United Nations Education and Science Council coordinated the disbursement of the funds. Radio Paiwomak has made tremendous strides since going on air in September of 1999. The radio station is a source



Computer training for community environmental workers and mapping interns at the Iwokrama Field Station: Photo by Afira Approu. Dec. 2000.

of pride among the inhabitants of the North Rupununi, and is emerging as a model. Two other communities have already expressed desires to launch their own radio community radio station. Perhaps the most significant accomplishment of the station, so far, is the recognition earned by its staff (all of whom were volunteers until March this year, when GBC employed a full-time coordinator) for exemplary volunteer service. The United Nations Volunteer Committee for the International Year of Volunteers Award, following recommendation by NRDDDB recognised and awarded Virgil Harding and Adam Nash for their efforts.

Iwokrama's accomplishments have only been achieved because of the vision, foresight and persistence of individuals and the support from numerous governments and institutions. Special recognition is due to the two founding partners: the Government and people of Guyana for their generous contribution of the Iwokrama site and early financial support to the fledgling Iwokrama Centre, and the Commonwealth Secretariat for its patronage and contribution of expertise. The United Nations Development Programme (UNDP), using Global Environmental Facility funds, implemented a project to support the early institutional development of Iwokrama. The Overseas Development Administration of the United Kingdom, the Commonwealth Fund for Technical Cooperation (CFTC) and the United States Agency for International Development (USAID) contributed funds and technical assistance in the early years. The Canadian International Development Research Centre (IDRC) was also a partner to strengthen Iwokrama as an institution and to assist with communication. Principal current donors include the British Department for International Development (DFID), the European Commission (EC), the Canadian International Development Agency (CIDA) and the International Tropical Timber Organization (ITTO).

What is Unique about Iwokrama?

Iwokrama is demonstrating how tropical rain forest ecosystems can be conserved and sustainably managed while making a substantial contribution to national and international development. Some of Iwokrama's innovative features include international governance, a focus on all forest values and an integrated approach to conservation and development. Direct responsibility for the management of 370,000 hectares of rain forest, a focus on pluralistic partnerships and a focus on achieving financial self sufficiency, positions Iwokrama at the cutting edge of sustainable forest conservation, management and development.

International Governance

The International Board of Trustees (IBOT) is jointly appointed by the Government of Guyana and the Commonwealth Secretariat and governs the Centre. Board members have qualifications and experience in a wide range of disciplines ranging from the biological sciences to economics and law. As well as representatives from Guyana and the Commonwealth Secretariat, Board members have been appointed from the UNDP, Brazil and Japan and Commonwealth countries including India, Jamaica, Ghana, Trinidad and Tobago, and the United Kingdom.

Focus on All Forest Values

Tropical rain forest ecosystems have a wide variety of both intrinsic and potential commodity values for forest goods and services. To date, market demands exist for only a few of these potential values and one of the major challenges for the Centre is to develop procedures that can translate those values not currently recognised by the market into income flows to support rain forest conservation and development.

Traditional commodity values, including timber and NTFPs will remain important, and a major

Values of tropical forests

- **Climate and biodiversity templates**
- **Cultural, aesthetic and spiritual values**
- **Environmental services including water, carbon, nutrient cycling and weather regulation**
- **Fruits, nuts, oils, resins, latexes, and fibres**
- **Ornamental plants, pets, and aquarium fish**
- **Timber and other wood products**
- **Tourism**
- **Wild meat and fish**

concern of the Centre is to develop sustainable management practices for these products. In this regard, the Centre recognises that the traditional commodities provided by tropical forests are facing increasing challenges in today's globalized markets and that the long-term downward trends in commodity prices for raw materials experienced over the last century are likely to continue. The Centre believes that high standards of environmental stewardship will be increasingly important in terms of market differentiation and anticipates increasing interest in its products and practices.

Integrating Conservation and Development

Over the last several decades, the world has grappled with the problem of developing effective conservation strategies for tropical rain forest ecosystems. Natural resource management is moving beyond the polar "preservationist" and "exploitative" views of wildland management. To manage wildlands effectively requires examination of the social, economic, and ecological consequences of resource use at local, national, and global scales. Preservation of wildlands for their inherent value, while ethically laudable from some points of view, is often unacceptable or impractical for local and national communities that depend on resources from those areas to survive. At the same time, exploitative management of wildlands for particular uses often avoids the complex ecological and evolutionary issues that must be considered for sustainability. The effectiveness of preservationist approaches in achieving their conservation objectives is diminished through conflicts with local people, the absence of national policy commitment, weak implementation at the management level because of poor training, insufficient funding and inadequate public support¹. The challenge for resource managers and land use planners is to design and effectively manage multi-purpose landscapes that can buffer and magnify the habitat significance of protected area cores and contribute simultaneously to rural development and the alleviation of poverty.

Iwokrama is taking up the challenge of integrated forest management. Under the Iwokrama Act, approximately half of the Iwokrama Forest is allocated as a wilderness

¹ Furze, B., T. De Lacy, J. Birkhead, P. Tracey and G. Witshire. (1996). Culture, Conservation and Biodiversity The Social Dimension of Linking Local Level Development and Conservation through Protected Areas. Chichester, England, John Wiley & Sons Ltd.

preserve while the other half will be managed as a sustainable utilization area. Management of the sustainable utilization area will complement the management of the wilderness preserve so that the management of the forest as whole will result in a land use pattern that maintains a sustainable mix of environmental, social and economic values.

Direct Forest Management Responsibility



View from Turtle Mountain overlooking part of the Iwokrama Sustainable Utilization Area and the Essequibo River: Photo by Raquel Thomas. Dec. 2000.

Iwokrama has direct responsibility for the day-to-day management of the Iwokrama Forest. This forest covers some 370,000 ha in the centre of Guyana and covers a wide variety of rain forest environments. The bulk of the forest lies between 50 and 100 metres above sea level (ASL) but it includes the Iwokrama Mountains which rise to some 1,000 metres ASL. The area is biologically diverse with in excess of 1,500 recorded plant species, 450 species of birds, 400 species of fish, 120 species of amphibians, and 180 species of mammals. A key feature of the area is the abundance of jaguars, harpy eagles, giant river otters, arapaima, black caiman, and giant river turtles that are endangered elsewhere in their range. Giving the Centre direct forest management responsibility ensures that the research undertaken by the Centre will find immediate application in the management of the Iwokrama Forest. This greatly increases its relevance and provides valuable opportunities for training and extension using the Iwokrama Forest as a key global demonstration area for conservation and sustainable management practices.

Pluralistic Partnerships

The various values of the tropical rain forest are of interest to a wide range of stakeholders ranging from the people living in or near particular forest areas to the global community as a whole. Iwokrama believes that one of the great challenges facing the international community is

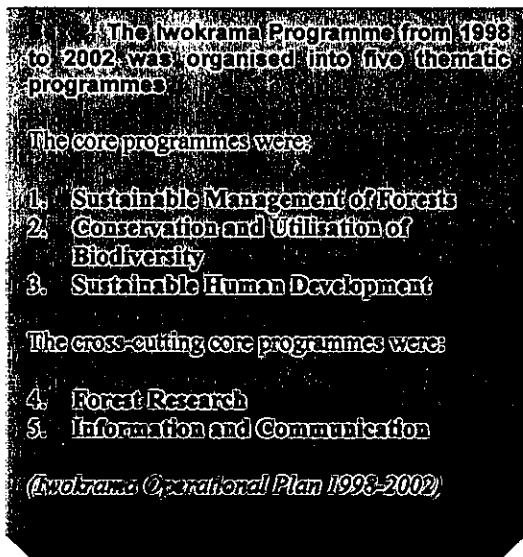
to create opportunities for involving local people in managing the global environment by providing effective linkages among stakeholders at various levels.

The Centre's structure as a partnership between the government and people of Guyana and the international community provides a model institutional structure for developing innovative partnerships that link the actions and concerns of local people with a wider set of national and, indeed, global stakeholders. These linkages are being strengthened through an active programme of collaborative forest management with the communities living in and near the Iwokrama Forest. The links will also be strengthened by the future development of a national stakeholders group to provide more structured interaction pathways for the Centre.

Financial Sustainability

A key element of the Centre's first Business Plan was the goal of becoming financially self-sufficient for core activities. This self sufficiency will be based in part on the sustainable management and conservation of the Iwokrama Forest. This focus on financial sustainability increases the relevance of the Centre and its programmes because the Centre faces the same challenges as its key stakeholders - tropical forest owners everywhere, be they indigenous people and local communities with tenure over tropical rain forest lands, governments responsible for public forest lands, or private entrepreneurs with rainforest land holdings.

Reviewing Iwokrama Activities 1998-2002



From 1998 to 2002, Iwokrama's activities were guided by the Iwokrama Act² the Operational Plan (1998-2002³) and the Business Plan (1998-2007⁴).

The activities of the Iwokrama Centre comprised three thematic and two cross cutting core programmes (see Box 2). These programmes are described in more detail in the 1998-2002 Operational Plan.

To date, the Iwokrama Centre has developed through a complex set of inter-linked donor-funded projects derived from the 1998-2002 Operational and the 1998-2007 Business Plans.

These major projects are:

- The British DFID, "Sustainable Human Development" and "Senior Staff Support" projects ;

² (1996). Iwokrama International Centre for Rain Forest Conservation and Development Act 1996. Act No. 7 of 1995. Georgetown, Government of the Cooperative Republic of Guyana.

³ Iwokrama International Centre for Rainforest Conservation and Development (1997). Operational Plan 1998-2002. Georgetown, Iwokrama International Centre for Rainforest Conservation and Development.

⁴ Iwokrama International Centre for Rain Forest Conservation and Development (1997). Business Plan. Georgetown, Iwokrama International Centre for Rain Forest Conservation and Development.

- The ITTO "Sustainable Management Model in the Iwokrama Rain Forest" project;
- The EC "Conservation and Sustainable Utilization of Biodiversity in the Iwokrama Forest" project;
- The CIDA "Contribution Agreement for Administrative Support and Community-Based Ecotourism" project.

Below, we briefly review the progress toward the outputs and objectives that has occurred as a result of these projects. For a more complete discussion of this progress, please see the Multi-Donor Mid-Term Review of The Iwokrama International Centre for Rain Forest Conservation and Development⁵ and the Report of the Final Project Evaluation Mission: GEF Assistance to the Iwokrama Rain Forest Programme⁶.

Sustainable Management of Forests

The objective of the core programme "Sustainable Management of Forests" was to demonstrate how tropical forests can be both conserved and equitably utilized, yielding ecological, economic, and social benefits to the people of Guyana and the international community.

Natural, Social, Economic and Cultural Resource Surveys

The Iwokrama Forest has been characterized as a set of 930 catchments. Information on these units has been gathered through surveys of the geology, soils, water, archaeology, zoology, botany, and mycology of the Iwokrama Forest. Forest type characterization has been prepared and refined as a result of broad scale forest inventories covering 10% of the Iwokrama Forest catchments.

The socio-economic and cultural characteristics of communities of the Iwokrama Ecosystem have been examined through geo-referenced participatory resource mapping and human-resource interaction appraisals. These analyses will serve as the basis for monitoring the socio-

⁵ The Environment and Development Group (2001). The Multi-Donor Mid-Term Review of the Iwokrama International Centre for Rain Forest Conservation and Development. Oxford, United Kingdom, The Environment and Development Group.

⁶ Baines, G. and R. Warner (2000). Report of the Final Project Evaluation Mission: GEF Assistance to the Iwokrama Rain Forest Programme. Georgetown, Guyana, UNDP.

economic and cultural impacts of Iwokrama's activities on local communities.

Iwokrama Forest Management Planning

The Iwokrama Forest has been zoned into a Sustainable Utilization Area and a Wilderness Preserve. The zoning of the Iwokrama Forest involved substantial input from local and national stakeholders. Draft management plans for the Iwokrama Forest and the Road Corridor are presently under consultation with stakeholders and will be finalized by July 2002. The management planning process is participatory and involves local communities and national stakeholders. The draft plan for the Iwokrama Forest is based on managing the broader Iwokrama Ecosystem and integrates conservation and the use of goods, services, research and training.

Iwokrama has also facilitated community and national management planning for the areas surrounding the Iwokrama Forest. The NRDDDB is developing fisheries management co-management systems with the EPA and the Fisheries Department of the Ministry of Fisheries, Crops and Livestock. Iwokrama is also working on collaborative management systems (national wildlife legislation and national wildlife management planning) at a national level with the EPA.

The 12 trained Iwokrama Forest Rangers will play a major role in the implementation of the Iwokrama Forest management plan. Their skills include stakeholder communication, environmental education and ecotourism in addition to the more traditional ranger skills of patrolling and forest management. The rangers are strongly oriented toward both the social and biophysical aspects of natural resource management.

Sustainable Use of the Iwokrama Forest

The Iwokrama Centre has begun income-generating operations in the Iwokrama Forest. Some 400 visitors have passed through the Iwokrama Forest between 1997 and 2002 grossing US\$75,843 from 189 visitors in 2001. A tourist-oriented canopy walkway will be completed in late 2002 and improvements have been made to the Field Station tourist accommodations. Discussions have begun with potential business partners for the further development of ecotourism in the Iwokrama Forest. The Iwokrama Training Unit has also begun to sell training services to other organizations and to develop mechanisms for external training at the Iwokrama Field Station.



Scarlet macaw nesting along the road that bisects the Iwokrama Forest – such birds are a major draw for ecotourism: Photo by Fotonatura

In addition, Iwokrama is supporting the development of knowledge-based industries for the NRDDDB. The MRU has produced several booklets and, to date, grossed over US \$5000 in income. They have recently independently lent a part of this to Radio Paiwomak at interest.

Business Arrangements for Forest Management

Iwokrama held a national workshop in September 2000 to discuss the development of principles for business partnerships for the Iwokrama Forest⁷. The following guiding principles were the major outcome from this meeting: All resource utilization rights and contractual arrangements must be developed through open, competitive processes that are transparent to all stakeholders. Potential partners must be committed to independent evaluation and certification of their environmental performance and set high standards of environmental stewardship as part of their core business strategy.

- Potential partners must be committed to developing equity partnerships with both their employees and with the local communities living in the Iwokrama Ecosystem.

⁷ Radzik, V. (2000). Developing Sustainable Forest-Based Business Partnerships. Georgetown, Guyana, Iwokrama International Centre.

- Potential partners must be committed to honouring the Intellectual property rights (IPR) and Benefit Sharing Protocols being developed by the Centre with its stakeholders.
- Potential partners must demonstrate the capacity to link Iwokrama to high-value niche markets.
- Preference will be given to partners prepared to involve national entrepreneurs in joint venture operations.

These principles have been the basis for the development of the planning process for the Sustainable Utilization Area.

Impacts on National and Regional Forest Policies and Practices

Iwokrama's approach to management planning through participation, transparency and local community involvement are having broad effects on national protected area and forest planning. In addition, Iwokrama has hosted four major international workshops on Reduced Impact Logging (RIL; April 1999), Business Partnerships (September 2001), and Wildlife Management (December 2000) and Public Policy Natural Resources and Equity September 2001). The centre is also working under Memoranda of Understanding with the NRDDDB, the GFC, the EPA, the Fisheries Department of the Ministry of Fisheries, Crops and Livestock, the GBC, the University of Guyana, the Institute for Applied Science and Technology (IAST), the UNDP and Audubon Society (**See Appendix 5**).

The regional workshops and the collaborative relationships at local, national, and international levels have important consequences for national and regional forest management policies and practices. These impacts include contributions to developing national timber certification procedures and influencing national wildlife and inland fisheries management policies and approaches. In particular, the participatory approaches employed by Iwokrama are seen as contributing nationally to the development of more effective natural resource management systems.

Iwokrama also recently completed a consultancy reviewing "Criteria and Indicators for Sustainable Management of Natural Tropical Forests⁸". This document will contribute to the

⁸ Cassells, D. S. and C. Hall (2000). "Taking the Policies to the Forest." *Tropical Forest Update* 10(3).



Alberto Rodriguez of the Yekwana people from Venezuela presenting at the Iwokrama regional technical workshop on wildlife management in the Guiana Shield in December 2000: Photo by Iwokrama.

development of new ITTO guidelines that are better suited to local circumstances.

Conservation and Utilization of Biodiversity

The objective of the thematic core programme “**Conservation and Utilisation of Biodiversity**” was 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.

Sampling Inventory of the Iwokrama Forest Biodiversity

The Iwokrama Forest has been identified as a global hotspot for bat diversity, several plant families (*Lecythidaceae* and *Chrysobalanaceae*), and fresh water fish. The Iwokrama Ecosystem is located at a crossroads between Amazonian and Guianan flora and fauna, and contains many species that are currently threatened or extinct across most of their former geographic ranges, e.g., arapaima (*Arapaima gigas*), jaguar (*Panthera onca*), black caiman (*Melanosuchus niger*), giant river turtles (*Podocnemis expansa*), and harpy eagles (*Harpyja harpia*).

Faunal inventory work has continued from the initial Academy of Natural Sciences of



Jaguars are seen relatively often on the road through the Iwokrama Forest: Photo by Fotonatura.

Philadelphia, USA. The Ranger Training programme and several collaborating institutes, including the Centre for the Study of Biological Diversity at the University of Guyana, The Royal Ontario Museum, Canada and Florida International University, USA have continued inventory work. In collaboration with CABI Bioscience, UK current inventory efforts are directed toward systematic sampling of one of the least studied organisms in tropical rain forests - endophytic fungi - and focused on understanding the relationship between sample location, host plant species and endophyte diversity.

A series of publications and presentations have resulted from the faunal surveys. (See Appendix 2 and 3)

Wilderness Preserve

The boundaries of the Wilderness Preserve have been identified and a draft management plan for the Iwokrama Forest that incorporates planning for the Wilderness Preserve was completed in April 2002. The Wilderness Preserve planning process is also leading to consideration of the Iwokrama Forest and surrounding areas (the Iwokrama Ecosystem) for MAB Biosphere Reserve nomination. The management planning process for the Wilderness Preserve has also had an impact on the approach to national protected area system planning and establishment in Guyana. A member of the National Protected Areas Secretariat worked on the Iwokrama team that developed the draft Iwokrama Forest management plan.

Bioprospecting in the Iwokrama Forest

Iwokrama has developed a bioprospecting programme through partnership with CABI Bioscience, the Royal Botanical Gardens at Kew, the University of Guyana, the University of the West Indies, and the Institute of Applied Science and Technology. The main focus of this programme to date has been the establishment of a national biodiversity screening laboratory in Guyana as well as research on bioactive metabolites of pharmaceutical and insecticidal significance from endophytic fungi and their host plants. Any commercial exploitation is capped until Iwokrama has intellectual property rights (IPR) and benefit sharing agreements in place.

Iwokrama employs staff from the University of Guyana and the University of the West Indies to man the laboratory. Laboratory technicians, who also do field surveys, have been recruited from the local Amerindian communities.

Sustainable Human Development

The objective of the thematic core programme “**Sustainable Human Development**” was to help people develop their ability to benefit from the tropical rain forest and to address the complex issues related to its sustainable management.

Tools for Forest Management

Poor forest management can lead to considerable economic, social and environmental losses. Iwokrama has examined alternative approaches to producing timber, NTFPs and delivering tourist services through

a range of feasibility and cost accounting studies. A reduced-impact logging feasibility study has characterized the operational and broader economic costs and savings of better harvest planning, and two ITTO-funded studies explored a wide range of options for downstream processing and marketing of timber and NTFP materials that identify market requirements and demand, reduce waste, focus on product quality and increase local benefit delivery. A cost assessment of delivering tourist services to visitors at the Iwokrama Field Station has identified where more effective tools can be used to increase net benefit generated through this activity.

The Iwokrama strategic decision-support system, IWOPLAN, can also be applied to other forest management areas in Guyana.

Neighbouring Communities Developing in Harmony with Iwokrama

Iwokrama is committed to a participatory approach to management of natural resources and the development of commercial opportunities in the Iwokrama Ecosystem including communities in Regions 8 and 9. A striking success of Iwokrama is the development of the local governance institution – the North Rupununi District Development Board in Region 9. The NRDDDB began in 1996 and since then it has developed substantial capacity for management in the North Rupununi Wetlands and Savannahs.



A multi-stakeholder workshop on fisheries management held in December 2000 at the Bina Hill Institute in the north Rupununi. Photo by Iwokrama.

Several local community programmes based in Region 9 are contributing to the development of communities and the increasing maturity of the relationship between Iwokrama and the NRDDDB. Iwokrama has worked with the NRDDDB to develop participatory research capacity in communities through the MRU and the CEWs. The MRU began in 1996 and plays an important role in understanding local

knowledge systems and cultural affirmation. Makushi Research Unit work has recently expanded to include working with the Ministry of Education to develop Makushi language teaching in schools. The CEWs work with local schools to increase understanding of the environment, conduct wildlife and resource mapping research, and work with communities to develop natural resource management systems.

Iwokrama has also facilitated the development of 13 wildlife clubs in each of the North Rupununi villages. These clubs expose 8 to 18 year olds to natural resource management, organizational, and governance issues, and provide fora for discussions on environmental and other issues. Iwokrama has supported two Wildlife festivals in Lethem with these clubs.

Iwokrama has also facilitated the development of local natural resource management skills through five conservation contracts with the communities and management planning with the NRDDDB. Conservation contracts involve agreements between Iwokrama and communities where Iwokrama facilitates resource management processes, but more importantly require learning by doing in communities for effective natural resource management. They are also facilitating the testing of Iwokrama Forest based models on a smaller, locally based scale

Iwokrama training programmes support local community development, focusing on training to build skills for Iwokrama functions, natural resource management, and for village development. Training to date has been completed in resource survey and mapping approaches, financial management, carpentry and masonry, and participatory management. Specific examples of training include bee-keeping, sewing group development, malaria management, and links to education and health through partners such as Peace Corps and Alcoholics Anonymous.

Iwokrama has begun developing relations with the more distant Region 8 communities through the Region 8 Amerindian Touchaus Area Council (ATAC). These relationships have included incorporating Region 8 leaders into management planning processes, study visits for Region 8 leaders to visit the North Rupununi, and outreach to Region 8 communities. Representatives from both regions are included in all Iwokrama workshops and planning sessions.

Institutional Capacity for Training in Natural Resource Management

Iwokrama has established the capacity to provide training in a range of natural resources subject areas through acquisition of state-of-the-art equipment, physical facilities, and the building up of a network of trainers within Iwokrama, Guyana, and internationally. The Centre now regularly runs a modular, comprehensive, live-in one-year programme of training for rangers and guides, and is currently implementing a second round of this training. The success of this programme is, and the qualities of the graduates are, indicated from unsolicited feedback from researchers, visitors and community members. Further confidence in the programme comes from the fact that an international partner organization is sending staff on the ranger-training course and others have signalled an interest in doing so in the future. The modular structure of the programme makes it possible to meet the needs of clients beyond the tourism and natural resource sectors and short courses in several subjects are being offered currently.

The institutional capacity has been established to support and provide training for local, national and international stakeholders, partners and clients. Part of this development is the transformation of training into a service-oriented, sustainable component of the Iwokrama Centre's activities.

Trained Guyanese Carrying out Operational Tasks at Iwokrama

Iwokrama has trained 12 Iwokrama Forest Rangers. The ranger training programme is the most comprehensive course of its kind offered in the Caribbean. The Iwokrama Rangers are the basis for patrolling and enforcement within the Iwokrama Forest; recently, agreement was reached with the Guyana Police Force for rangers to be instituted as supernumeraries and rural constables. The Rangers also have developed skills in ecotourism, research, community liaison, and are able to train others in these skill areas. Eleven of the 12 rangers are from local communities.

Iwokrama has also developed a Young Professionals Programme that has supported six Professional Development Fellows and seven Research Assistants. The Centre also offers an Internship programme for promising individuals from Guyana and abroad to learn skills and join the Iwokrama effort. All participants have gained substantial experience and developed skills through the programme

for future management at Iwokrama and in Guyana.

Iwokrama has also contributed to the development of local skills in the management of natural resources. Community members carry out land and wildlife surveys and are now using information from these surveys to manage resources in the Iwokrama Ecosystem. The NRDDDB is now developing natural resource management programmes for NTFPs, timber, fisheries, and wildlife outside the Iwokrama Forest. The hope is that in the long-term communities will play a role in monitoring the Iwokrama Forest and Ecosystem.

Information from Iwokrama Promoting Sustainable Forest Use in the World

Through the present Chair of the IBOT, Iwokrama has close linkages with the World Commission on Forests. It was cited as a success story at Rio+5. Iwokrama featured at Commonwealth Heads of Government Meetings as the "Flagship" environment project for the Commonwealth. Regional linkages are also being developed with other programmes such as the EU-funded Caribbean Regional Environmental Programme, the Caribbean Conservation Association, and CARISCIENCE, which prompts basic sciences in the Caribbean.

Forest Research

The objective of the thematic core programme "Forest Research" was to compile, 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.

Policy Framework to Guide Collaborative Research

Iwokrama has developed base agreements to guide research in the Iwokrama Forest. Draft agreements are available on the Iwokrama home page (<http://www.iwokrama.org/>) and are modifiable for particular research projects. In addition, Iwokrama has developed research agreements for work with communities.

Rules and Legislation Relating to Intellectual Property Rights

Iwokrama recently completed a consultancy on IPR and benefit sharing. The consultancy began with a workshop with key stakeholders on benefit sharing and IPR in September

2001⁹. The focus of discussions was on the need to elaborate the *exchanges* of benefits between Iwokrama and various stakeholders and to operationally determine benefit sharing in a context of sharing decision-making power. This reiterates the need for a clear definition of relationships between Iwokrama and stakeholders though recognizing reciprocal contributions, interdependency and mutual expectations identified in a previous report on stakeholder involvement¹⁰ at Iwokrama. In this context, it was recommended in the report on IPR that the IBOT include key representatives of Guyana Civil Society and local communities and that Iwokrama formalize the National Stakeholders Forum.

Compilation of Indigenous Knowledge about the Iwokrama Forest

Iwokrama facilitated the development of the MRU in 1996. The MRU have worked toward developing an understanding of the resources in the Iwokrama Forest and North Rupununi¹¹. In addition, work on wildlife management has been a key entry point for developing natural resource management relationships between Iwokrama and local communities¹². Iwokrama's approach to wildlife research is not typical of neotropical wildlife research programmes; the high levels of local involvement permit the interaction of social and biological science in addressing management research issues. The recognition of local knowledge^{13, 14} has led to local

⁹ Mangal, S. (2001). Key Elements of Benefit Sharing for the Iwokrama Programme: Feedback from Local, National, and International Stakeholders. Georgetown, Guyana, Iwokrama International Centre.

¹⁰ Scherl, L. M. (1999). Stakeholder Involvement and Mechanism for Participation in Iwokrama. Georgetown, Guyana, Iwokrama International Centre for Rainforest Conservation and Development.

¹¹ Forte, J., ed. (1999). Makusipe Komanto Iseru: Sustaining Makushi Way of Life. Annai, Guyana, North Rupununi District Development Board.

¹² Forte, J., M. Janki, G. Watkins. eds. (1999). Community-based wildlife management in the North Rupununi. Guyana, North Rupununi District Development Board & Iwokrama International Centre for Rain Forest Conservation and Development.

¹³ Makushi Research Unit and J. Forte, eds. (1999). Birds of the North Rupununi District. Guyana, North Rupununi District Development Board.

ownership of management prescriptions and stronger local compliance than would normally occur.

Identification of Non-Timber Forest Products and Production Procedures

Work on NTFPs has been an active research theme at Iwokrama. Research has focused on wildlife and fish (*Arapaima gigas* and aquarium Fish) as well as on NTFP species that could form the bases for industries. In this context, research studies of Balata (*Manilkara bidentata*), Nibbi (*Heteropsis flexuosa*), and Crabwood Oil (*Carapa guianensis*) have been completed or are ongoing.

Established Trials and Demonstrations for Sustainable Timber Production

In 1999, Iwokrama jointly hosted a workshop with Tropenbos and the GFC on RIL. The workshop lead to a review document in a Special Issue of the International Forestry Review¹⁵ dedicated to the workshop proceedings. The workshop had several consequences including a training course for Guyanese foresters in RIL, the development of a national working group on certification and an ongoing cost-benefit study of operational scale RIL currently being run jointly by Tropenbos, Iwokrama and the GFC in the Demerara Timbers Ltd concession neighbouring the Iwokrama Forest. Finally, one of the Iwokrama Young Professionals and a student from the University of the West Indies completed a study of carbon storage capacities of native forest types and fluxes after RIL and conventional logging applications.

Iwokrama has encouraged independent researchers to use the research facilities at the field station. In April 2002, the Centre provided a bursary to the University of Guyana to support several students to undertake research projects in the Iwokrama Forest.

¹⁴ Makushi Research Unit and J. Forte, eds. (2000). Fishes of the North Rupununi District. Guyana, North Rupununi District Development Board.

¹⁵ Hammond, D. S., P. van der Hout, R.J. Zagt, G. Marshall, J. Evans, D.S. Cassells. (2000). "Benefits, bottlenecks and uncertainties in the pantropical implementation of reduced impact logging techniques." International Forestry Review 2(1): 45-53.

Information and Communication

The objective of the thematic core programme “**Information and Communication**” was to establish an international information and communication resource unit. This unit was to serve as a channel for dissemination of knowledge gained from the Iwokrama Centre, to facilitate dialogue between Iwokrama staff, local communities and diverse regional and international stakeholders and support the research activities of the Centre.

Guyanese Public with Greater Appreciation of Forest Resources

Apart from developing wildlife clubs in all of the communities of the North Rupununi, the Iwokrama-facilitated CEWs have contributed substantially to understanding of resource management approaches and the different values of forest resources. Students from local primary and secondary schools have also visited the field station and Iwokrama Forest.

Nationally, Iwokrama has facilitated the development of a “Friends of Iwokrama” group that began in 1999 and meets every two months to discuss natural resource management issues. Iwokrama also hosts fortnightly “Brown-Bag” seminars that attract up to 30 natural resource management professionals to listen to national and international speakers. Staff and students from the University of Guyana are also frequent participants. In addition, the Iwokrama Foundation Day lecture series, now in its eight year, continues to attract a large public audience. Iwokrama staff members also have an active programme of outreach to local schools and groups.

Iwokrama has worked to develop publications and posters that raise awareness and increase public appreciation for Guyana’s forest resources. Iwokrama activities regularly appear in the national press and local television stations. Iwokrama is also developing a partnership with Audubon and the EPA to implement national programmes in School Yard Ecology (SYE) and Citizen Science that raise awareness about research and management issues.

Constructive Two-Way Dialogue with Stakeholders

CEWs, the MRU, and Wildlife Clubs form part of the basis for a two way flow of information between Iwokrama and communities. In addition, village leaders meet with Iwokrama staff every two months to

discuss issues of importance at the NRDDDB meetings.

Iwokrama is also developing relations with Region 8 communities through the Region 8 ATAC and an outreach programme to these villages.

Environmental Education

Iwokrama’s major environmental education thrust has been in the SYE¹⁶ programme in partnership with Audubon and the Ministry of Education. The programme began in 2001 and is expanding in 2002.

Disseminating Results through Culturally Appropriate Material

Iwokrama produces a regular newsletter and numerous publications (see Appendix 1).

Information Network with Collaborators

Iwokrama is one of the founding members of Guyana’s **Information Network for Science and Technology (INSAT)**, created to facilitate the exchange of information among member organisations. Among the services offered by INSAT is access via the internet to consolidated bibliographic information from nine national environmental organisations (<http://www.insatguyana.net/>).

Databases of Information Relevant to Iwokrama

The Iwokrama Information and Communications Unit houses one of the most complete libraries on natural resource management in Guyana. Species lists for vertebrates and trees are available on the Iwokrama web site (<http://www.iwokrama.org/>).

Geographic Information System in Use

Operational GIS systems have been developed at Iwokrama including information on the Iwokrama Forest and neighbouring areas. The Centre’s GIS was key to the decision model developed to zone the Iwokrama forest. Other areas where the GIS has been used are in community resource mapping, road management planning and ecotourism development. GIS staff members have also contributed to the formulation of Guyana’s National Policy on Geographic Information. Iwokrama has also developed initial prototype

¹⁶ Mangal, S. (2001). Schoolyard Ecology: Guyana. Report on the Schoolyard Ecology Workshop in Guyana. Georgetown, Guyana, Iwokrama International Centre; Audubon Society; Ministry of Education.

spatial models for Greenheart distribution and a tree growth. In addition, Iwokrama has examined the application of satellite radar for the delineation of seasonal under-storey flooding of the forest.

Infrastructure Development

Headquarters

The Centre's headquarters are currently sited in a rented building in Bel Air. The site for a permanent headquarters at the University of Guyana, Turkeyen Campus has been allocated and surveyed, and was formally dedicated on 17 January, 1997. An architectural design for the proposed headquarters building was prepared and submitted to the centre for consideration. No funding for such a building was forthcoming during 1998-2002. The Centre has, in April 2002, a fleet of seven vehicles (one Toyota cab truck, Three Land Cruiser pick-ups, two motor cycles, and one newly purchased one Bedford truck) that is used for logistic and administrative purposes, as well as to transport visitors and tourists to the field station.

GIS

The GIS Unit was established to exploit the significant advances in approaches to evaluating and using geographic information in natural resource management. The GIS Unit currently includes a GIS data analyst, database technician, information and technology (IT) officer with the primary function of support to other Centre programmes. The core activities of the Unit include building and maintaining the GIS data repository; providing GIS training and technical support to Iwokrama staff; liaising with other organisations working in GIS; and providing map products based on GIS data; and research.

The Unit possesses a 36-inch colour plotter, a high-resolution laser printer, scanner, large-scale digitizer and four networked PCs with a server. GIS related software are used in the unit includes, ESRI ArcExplorer 3.1, ESRI ArcView 3.2 with Spatial Analyst and 3-D Analyst extensions, ESRI PC Arc/Info 3.5.2, ESRI DAK 3.5.2, ESRI ArcGIS 8.1 with extensions for Spatial Analyst, 3-D Analyst and ArcPress, ESRI MapObjects 2.1 and MapObjects LT, Idrisi 32.01, ERDAS Imagine 8.4 , S-Plus 2000 and S-Plus for ArcView GIS 1.1 (statistics and graphics), and Lindo Systems Lingo v.6 (Linear programming optimization).

Information and Communication Unit

The ICU is housed at the headquarters. The operation revolves around a well developed reference library that makes available publications and audio visual information on the conservation, use and development of tropical rain forest to staff members and members of the public. The library holding presently includes more than 800 books, 133 video cassettes, two televisions, two video cassette recorders, one multi-media projector, one over-head projector and numerous journals and magazines. The library is open during office hours throughout the week and is used by professionals, students, and the general public.

National Biodiversity Prospecting Laboratory

The national biodiversity screening laboratory was established at the University of Guyana, Turkeyen Campus in June 2001. Laboratories in the Annex Building of the Department of Chemistry were renovated and refurbished for offices, natural products laboratory and culture, media preparation and extraction rooms over a six-month period. Renovation and refurbishment was funded mainly by the EU and partly by the University of Guyana. The laboratories have been outfitted with several pieces of modern equipment including cooled incubators, UV light incubator, spark-free refrigerator, microscopes, autoclaves, balances, drying oven, rotary evaporator, vacuum pumps, orbital shaker, centrifuge, sample concentrators, chromatography equipment and computers to facilitate the culture, storage, identification and cataloguing of microorganisms as well as the extraction, isolation and bioassay of compounds obtained from microorganisms and plants collected from the Iwokrama Forest. One Bio-inventory Scientist, one Natural Products Chemist, and three Laboratory/Field Technicians operate this facility. Project collaborators from CABI, RBG Kew and UWI have made five visits to Guyana since January 2001 to assist in the development of the national laboratory through capacity building and technology transfer.

Field Station

Field station and visiting head office staff are housed in four buildings with eight single rooms. Five separate cabins have been set aside for tourist accommodation. These tourist buildings can accommodate a maximum of six persons each; however are best suited for double occupancy or families. Students at the field station include Iwokrama Ranger trainees and primary school children. These visitors are

accommodated in a big dormitory that can accommodate 20 persons sleeping in hammocks. The field station also operates a fleet of canoes and outboard motor boats for the purpose of transporting staff and visitors.

Teaching and Research Capacity

A teaching centre was constructed at the FS to offer better facilities for students and researchers. The facilities include an open-air teaching/recreation hall, a computer/audio visual laboratory, dry and wet labs, and associated furnishings/equipment. In addition, the Centre built up an extensive range of state-of-the-art equipment for use in field training and research.

The Centre also established and equipped an automatic-recording weather station for monitoring and research purposes.

Trail Systems

There is a network of forest trails in the Iwokrama Forest. Tourists, Rangers, students, and researchers use these trails.

Satellite Camps

Satellite field camps have been established at Turtle Mountain, Kabokalli, Whitewater and Sandstone. These camps are sites for Rangers on forest monitoring exercises, researchers and tourists.

Five-Year Expenditure Report

Administration and Financial Services

The main objectives of this unit are to provide the administrative and financial framework that enables implementation of the core programmes. In addition, high quality financial and donor reporting are integral to its proper functioning.

Financial Reporting

Iwokrama International Centre has prepared Financial Statements for the external auditor – Deloitte & Touche from calendar year 1996. The Centre's Financial Statements have been prepared simultaneously and independently from the Financial Statements of The Iwokrama Rain Forest Programme that are audited by the Office of the Auditor General who are the Government Auditors. Financial reporting on the Iwokrama Programme commenced in calendar year 1993 with funding from Global Environmental Trust Fund (GEF) and most of the funding was expended by mid 1998 with the residual funds being used to build the Workers Accommodation at the Iwokrama Field Station during 1999 and 2000.

The audit conducted by Deloitte & Touche encompasses all non GEF funds received by the Centre, with individual analysis being made of each donor's contribution, the methods of recording the disbursement, contract requirements and the charges against the funding. Internal control measures are constantly reviewed to improve the integrity of the financial system and to ensure the accounting system provides a satisfactory basis for the preparation of reliable financial reports.

Donor Reporting

The donor reporting responsibilities of the Centre are quite extensive and include fifteen separate donors spanning twenty different projects, with the reporting requirements of the major donors being unique to each donor. The reporting process is facilitated by a computerized multicurrency accounting system that allows for segmental extraction and output of financial transactions. However, the varied reporting formats of the major donors and the mixed (quarterly; annually; fiscal year versus calendar year) reporting periods require customization of the reports by donor.

With donors and donor projects expected to increase in the coming years, consideration should be given to standardizing the report

format for the several donors to smooth the reporting process, while ensuring the controls and safe-guards that donors require are maintained.

Funding

Over the last eighteen months, it has become apparent that the source of donor funding is drying up without a proportionate increase in revenue from business activities or new pledges from donors. Whilst revenue is being generated from ecotourism activities and research visitors among others, significant business activities such as timber harvesting, processing of non-timber forest products have not yet come on stream.

For the period 1997-2001, internally generated revenue totalled US\$375,000 with 67% arising from visitors to the Iwokrama Field Station and the other significant component of US\$98,000 being obtained from consultancies undertaken by Iwokrama staff. Merchandising of Iwokrama products and interest earned from our foreign currency bank accounts make up the balance of internally generated revenue.

Financial Management

One of the major challenges is to ensure that funds pledged by donors are available for the implementation of the project activities. This is not always a smooth process as lengthy time delays between project requests have occurred, with alternative measures being put in place to provide the programme units with the funds needed for timely expenditures on the projects.

The issue of support costs for the diverse projects carried out by the Centre continues to frustrate, as Donors are reluctant to provide core funds for areas that are not directly linked to project outputs. Even so, the needs for administration and financial services, operating capital and institutional funds are crucial to achieve project outputs.

Table 1. Five-Year expenditures for the Iwokrama Centre (US\$)

	Total	2001	2000	1999	1998	1997
Revenue¹⁷						
Grants	6,940,817	2,771,941	2,158,083	1,451,557	540,245	18,991
Field Station Income	252,232	75,843	34,847	39,178	71,496	30,868
Consultancy Income	98,023	-	88,240	9,783	-	-
Other Income	24,552	6,731	17,724	97	-	-
Total Revenue	7,315,624	2,854,515	2,298,894	1,500,615	611,741	49,859
Operating Expenses						
Sustainable Forest Management	1,389,874	623,197	294,648	460,126	7,209	4,694
Sustainable Human Development	2,194,319	940,648	710,867	346,873	195,931	-
Conservation & Utilisation of Biodiversity	874,717	501,263	296,981	76,473	-	-
Forest Research	457,082	117,250	224,670	115,162	-	-
Information and Communication	520,695	108,776	170,995	160,042	68,452	12,430
Administration & Finance	1,521,383	422,383	510,245	241,653	321,548	25,554
Institutional Arrangements	200,266	97,672	42,068	60,526	-	-
Total Operating Expenses	7,158,336	2,811,189	2,250,474	1,460,855	593,140	42,678
Revenue over Expenditure	157,288	43,326	48,420	39,760	18,601	7,181

¹⁷Expenditures do not include those under the UNDP-GEF national project because of the separate audited financial statements that are certified by the Government Auditors for the Iwokrama UNDP-GEF Project. The expenditures included herein are extracted from the audited financial statements certified by Deloitte & Touche.

Table 2. Donor contributions¹⁸ to the Iwokrama Centre 1997-2001 (US\$)

Donors^{19, 20}	Total	2001	2000	1999	1998	1997
Centre for Ecology & Hydrology, UK	21,053	21,053	-	-	-	-
CIDA Admin Support & Ecotourism Development	402,936	299,938	102,998	-	-	-
Commonwealth Secretariat Senior Staff Support	73,312	70,837	-	-	-	2,475
Conservation Food & Health Inc., USA	15,500	15,500	-	-	-	-
Conservation International, Ranger Training	60,000	60,000	-	-	-	-
Cropper Foundation	40,012	40,012	-	-	-	-
DFID Senior Staff Support	385,332	99,622	127,572	97,634	60,504	-
DFID Sustainable Human Development	4,478,304	1,203,777	1,855,097	772,647	646,783	-
DFID Wildlife Conservation Regulations	16,604	16,604	-	-	-	-
European Community Conservation and Utilisation of Biodiversity	840,773	487,846	300,447	52,480	-	-
Global Environmental Facility	21,055	-	-	-	13,835	7,220
Holloman Foundation, USA	16,744	16,744	-	-	-	-
IDRC Information & Communication	61,664	10,230	10,268	-	41,166	-
IDRC Intellectual Property Rights	40,723	-	-	-	40,723	-
ITTO Sustainable Forest Management	249,990	150,000	-	99,990	-	-
McArthur Foundation	30,000	-	-	30,000	-	-
National Audubon Society Schoolyard Ecology	8,487	8,487	-	-	-	-
National Audubon Society Environmental Monitoring	36,737	36,737	-	-	-	-
UNDP Ranger Training	8,689	8,689	-	-	-	-
University of the West Indies Centre for Environmental Development	19,800	-	-	-	4,950	14,850
Totals	6,827,715	2,546,076	2,396,382	1,052,751	807,961	24,545

¹⁸ Donor funding from 1997 to 2000 is extracted from audited financial statements certified by Deloitte & Touche; 2001 figures are sourced from draft financial reports.

¹⁹ Funding from the GEF was the main funding source of the Iwokrama Project from 1994 to mid-1998 and is not included in the above table, except where it represents inflows to clear expenditures incurred by Iwokrama Centre on the GEF Project. The GEF funding is recorded under separate Financial Statements, with the audit being conducted by the Government Auditors.

²⁰ Direct disbursements to cover salaries of Iwokrama staff that came from the Commonwealth Secretariat, World Bank and Australian Government are not included in this analysis.

The Context for Iwokrama

The International Context

Tropical rain forests are crucial to human survival and development. Tropical rain forests cover 6% of the planet; yet, they are home to over 50% of the world's plants and animals. The Amazon basin is also thought to account for 10% of the world's primary production and carbon storage. An estimated 142,000 km² of tropical forest is lost every year (1% of the total tropical forest area). To date, 55% of the world's tropical forests have been converted to non-forest uses.

The loss of tropical forests has important local, national, and international consequences. Forests provide sustenance and a source of food, housing and medicines for local people. The future economic basis of many developing countries comes from the resources that are found in tropical forests. Ultimately, the consequences of forest loss will be felt by the international community through biodiversity loss, climate change, and poverty driven political instability. One of the major global challenges is the development of mechanisms for the management of tropical forests to meet the needs of local, national, and international stakeholders.

The Iwokrama International Centre is considered as part of the Commonwealth's action on the implementation of the 1992 Rio Agenda on forests, biodiversity and climate change. In this context, Iwokrama is seen as the Commonwealth's flagship environmental programme.

Box 3: The 2002 Commonwealth Heads of Government Coolum Communiqué mentions Iwokrama in paragraph 36 headed Climate Change

"Heads of Government expressed concern about the consequences of global warming and climate change, especially for vulnerable small island states and other low-lying areas. They welcomed progress made by the Iwokrama International Rain Forest Centre in Guyana in conserving and sustainably utilising tropical rain forest resources."

The 2000 IUCN World Congress in Amman, Jordan, also recognized the work of the Iwokrama Centre in the preamble to the resolution²¹:

Recognition to "the Government of Guyana's contribution to the world through its generation donation of land for the establishment of the Iwokrama International Centre for Rain Forest Conservation and Development to promote sustainable forest management"

The United Nations Intergovernmental Panel on Forests (IPF) and the independent World Commission on Forests and Sustainable Development both re-iterate the need for demonstrative models of tropical forest management. Iwokrama provides a rare opportunity to implement an integrated forest ecosystem use and conservation programme in an adaptive management setting informed by sound research. Iwokrama addresses key general recommendations of the IPF including:

Encouraging countries to develop, implement, monitor and evaluate national forest policies which use holistic intersectoral approaches based on ecosystem concepts which integrate the conservation of biodiversity and the sustainable use of biological resources

Urging countries to include capacity building as an objective of national forestry programmes, paying particular attention to training, extension services, technology transfer and financial assistance for developing countries, taking due account of local, traditional knowledge; and

Encouraging countries to develop the concept and practice of partnership, as one of the potential approaches for improved coordination and cooperation between all national and international partners

Iwokrama also addresses the ten summary recommendations of the report of the World Commission on Forests and Sustainable Development²² including:

²¹

www.iucn.org/amman/content/resolution/res53.pdf

²² Krishnaswamy, A. and A. Hanson (1999). Our Forests, Our Future. UK, World Commission on Forests and Sustainable Development: 37.

Stop the destruction of the earth's forests

Use the world's rich forest resources to improve life for poor people and for the benefit of forest-dependent communities

Put the public interest first and involve people in decisions about forest use

Get the price of forests right, to reflect their full ecological and social values, and to stop harmful subsidies

Apply sustainable forest management approaches so we may use forests without abusing them

Develop new measures of forest capital so we know whether the situation is improving or worsening

Plan for the use and protection of whole landscapes not the forest in isolation

Make better use of knowledge about forests and greatly expand this information base

Accelerate research and training so sustainable forest management can become a reality quickly

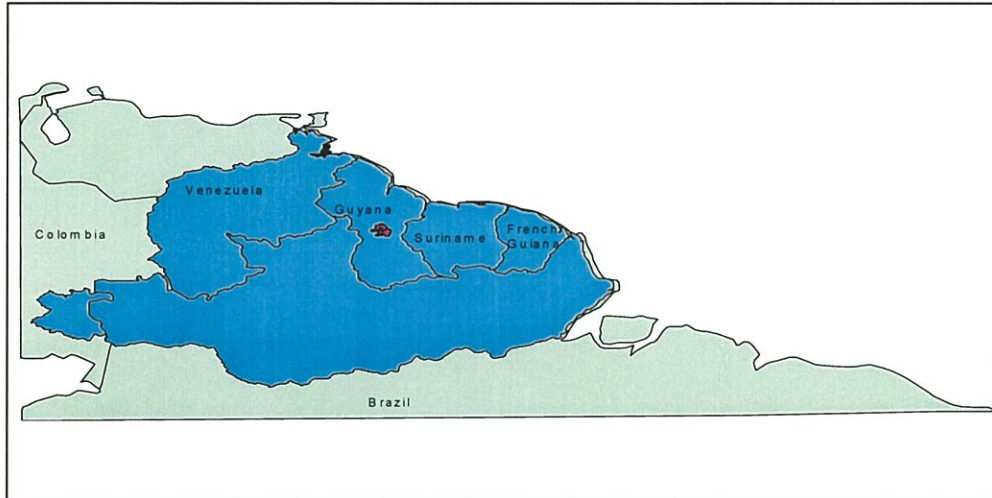
Take bold political decisions and develop new civil society institutions to improve governance and accountability regarding forest use

Special attention is given to Iwokrama and forest management in the full Report of the World Commission on Forests and Sustainable Development²³.

Iwokrama is also important in the context of the Convention on Biological Diversity, which obliges all agreeing parties to conserve biodiversity and equitably share the benefits from its wise use. Iwokrama champions the conservation and equitable sharing of benefits as part of its main programmes. Iwokrama was also discussed as a success story from Latin America and the Caribbean at the Special Session of the General Assembly to Review and Appraise the Implementation of Agenda 21 at the EARTH SUMMIT+5 in New York, 23-27 June 1997.

²³See page 106, Box 4.15 in Salim, E. and O. Ullsten (1999). Our Forests, Our Future: Report of the World Commission on Forests and Sustainable Development. Cambridge, UK, Cambridge University Press.

Forest conservation and sustainable use
Finally, Iwokrama is working with the EPA to develop an understanding of the wildlife trade in Guyana. This work is part of a national management planning process to satisfy Convention on International Trade in Endangered Species of Flora and Fauna (CITES) requirements. The final goal of this work is to provide locally situated solutions to wildlife trade management problems.



Map 3: The Guyana Shield

The Regional Context

The Guiana Shield is becoming a global focus for the conservation and sustainable use of forest resources. Several features distinguish Guiana Shield forests from other Neotropical forests. Pressures on natural resources tend to be relatively low in the Guiana Shield because of low human population densities, the low agricultural potential of highly weathered forest soils, low commercial timber volumes and growth and relative inaccessibility²⁴. The combined result of these features is that Guiana Shield forest ecosystems represent the highest per capita forest areas and constitute one of the largest relatively well preserved landscapes remaining in the world²⁵.

Another characteristic of Guiana Shield countries is economic restructuring and rapid development in the last thirty years. These changes are occurring in response to economic adjustments resulting from oil price fluctuations, inappropriate economic strategies, and civil unrest. Recent economic developments in the Guiana Shield include

growing pressures on national governments to attract large-scale investments for natural resource exploitation (gold, timber, diamonds, and bauxite). This large-scale resource exploitation is often associated with increasing road access to new areas. At the same time, economic shifts have caused local livelihood strategies to move toward dispersed extractive commercial enterprises including small-scale gold mining, chain saw logging, and wildlife trading. Recent declines in world market prices for the region's commodities including gold, bauxite, timber, diamonds, sugar and rice have exacerbated existing debt burdens and reduced national income that can be directed towards development. These economic and social changes increase pressures on the presently relatively well-conserved Guiana Shield forest ecosystems. Unfortunately, national natural resource management systems have also weakened as human and financial resource bases have dwindled over the last 30 years.

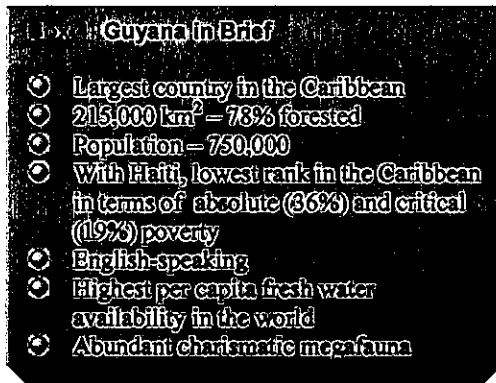
The Guiana Shield forest ecosystems therefore offer numerous opportunities for developing effective resource management systems because of their presently well-preserved nature. Growing threats at local and national levels and severe human and financial resource constraints to developing effective natural resource management systems also exist however. The challenge for Guiana Shield countries is to develop management approaches, within human and financial resource constraints, that can capture the full range of forest values and consequently reduce the threats to these values.

²⁴Haden, P. (1999). *Forestry Issues in the Guiana Shield Region: A Perspective on Guyana and Suriname*. Brussels, Overseas Development Institute.

Ojasti, J. (1996). *Wildlife Utilization in Latin America: Current Situation and Prospects for Sustainable Management*. Rome, Food and Agriculture Organization of the United Nations.

²⁵ Carter, S. K. and F. C. W. Rosas (1997). "Biology and conservation of the Giant Otter *Pteronura brasiliensis*." *Mammal Review* 27(1): 1-26.

The National Context



Despite severe economic constraints, the Government of Guyana has demonstrated commitment to the effective management and conservation of biodiversity. Guyana has undergone a series of policy, legislative, and institutional changes over the last 10 years. New plans, policies, and legislation include the Iwokrama Act (1996), the Environmental Protection Act (1996), the National Environmental Action Plan (1997²⁶ and 2001-2005²⁷), the National Strategy for the Conservation and Sustainable Use of Guyana's Biodiversity (1997), the National Biodiversity Strategy (1988) and Action Plan (NBAP; 2000²⁸), National Forest Policy (1999), National Forestry Action Plan (1989), the National Development Strategy (NDS; 2001-2010²⁹), and the draft Poverty Reduction Strategy (2002). Iwokrama is part of Guyana's institutional efforts to conserve and use forests and biodiversity. In addition to Iwokrama, eight Government agencies have responsibilities relating to natural resource management. All of these have working relations with Iwokrama:

- **The Environmental Protection Agency** is the umbrella agency for natural resource

²⁶ (1997). Guyana National Environmental Action Plan. Georgetown, EPA.

²⁷ EPA (2001). Guyana National Environmental Action Plan (NEAP) 2001-2005. Georgetown, Guyana, Environmental Protection Agency.

²⁸ (1999). National Biodiversity Action Plan. Georgetown, Guyana, Environmental Protection Agency (EPA): 135.

²⁹ National Development Strategy Secretariat (2000). National development strategy: (2001-2010) a policy framework. Georgetown, Guyana, National Development Strategy Secretariat.

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management and is charged with biodiversity protection, public awareness and environmental regulation and monitoring.

- **The Fisheries Department** of the Ministry of Fisheries, Crops, and Livestock is responsible for fisheries policy, planning, and regulation and the development of aquaculture.
- **The Guyana Forestry Commission** is charged with the sustainable use and conservation of forests in Guyana, developing policy, and monitoring and enforcement in the forestry sector.
- **The Lands Commission** is the principal steward of State Lands and administers land lease for agricultural purposes, carries out land surveys, produces maps and stores and distributes geographical information through the GINRIS structure.
- **The Ministry of Agriculture** administers the agriculture sector including crops, lands, hydrometeorology and climate change.
- **The Ministry of Amerindian Affairs** represents the Amerindians of Guyana and implements the outdated Amerindian Act (1969) which includes components relating to natural resource management on Amerindian Titled Lands.
- **The Ministry of Foreign Trade and International Cooperation** works on IPR and is the focal point for regional and international environmental initiatives; the Ministry also publicizes the work of Iwokrama through overseas missions.
- **The Wildlife Unit** of the Office of the President houses the wildlife management authority and regulates the trade in wildlife. Iwokrama has worked closely with all these agencies.
- **In addition, the University of Guyana** and several associated institutes carry out training and research relative to national human development and resource management and maintain facilities and expertise available to work with Iwokrama. Conversely, several Iwokrama staff members have also lectured at the University
- **The Centre for the Study of Biological Diversity** at the University of Guyana

maintains the national collections of biological specimens and information databases. The Centre also carries out systematic research and uses this information to help identify management areas in Guyana.

- **The Environmental Studies Unit** at the University of Guyana carries out research and training in environmental management, land use planning and environmental education.
- **The Institute for Applied Science and Technology** with UG is the focal point for research, development and technology transfer. The Institute is also developing a database on research and technology innovations.
- **The Guyana School of Agriculture** provides training in agriculture and forestry.
- **The National Agricultural Research Institute** carries out research on soils and germ-plasm management and also has worked on IPR.
- **School Curriculum** Iwokrama's activities are increasingly becoming part of the national school curriculum. Questions pertaining to the Iwokrama Forest and the work of the centre have been appearing on primary and secondary school examination scripts. This development has prompted Iwokrama to engage the national agencies concerned to develop structured resource material and have them distributed nationally.

Finally, several conservation and development non-government organizations work in Guyana all of which have working relations with Iwokrama:

- **Conservation International** works with environmental education, biodiversity inventory, protected area development in the Kanuku Mountains, Rupununi, and with the development of innovative funding mechanisms for forest conservation.
- **The Forest Products Association** represents forest producers in Guyana and has substantial practical knowledge of timber production and forest uses.
- **The Guyana Marine Turtle Conservation Society** focuses work on the

Forest conservation and sustainable use

conservation of the four marine turtle species that nest in Guyana. Iwokrama has collaborated with the GMTCS on environmental education programmes.

- **The Karanambu Trust** focuses work on the conservation of Giant River Otters and the management of the North Rupununi Wetlands.
- **The Tourism and Hospitality Association of Guyana** represents private sector interests in tourism and lobbies for policy development in Guyana.
- **The World Wide Fund for Nature Guiana Shield Forest Ecosystem Conservation Project** is based in Suriname and focuses on forest conservation, biodiversity protection and general conservation support.

The Local Context

The physical demarcation of the Iwokrama Forest is somewhat arbitrary with respect to the structure and dynamics of the ecosystem in which the forest stands. Resources flow now, and have flown historically, between the Iwokrama Forest and surrounding areas. The Iwokrama Forest is ecologically linked to the Rupununi and Pakaraimas through wildlife and fish migrations and through forage areas for large predators such as harpy eagles and jaguars. In addition, Makushi, Patamona and Wapishana peoples have historically extracted gold, balata, curare, fish, wildlife and other products from the Iwokrama Forest. Local people still depend on resources in the Iwokrama Forest, and the forest includes numerous resources such as wildlife, fish, timber, minerals, medicinal plants, and farming lands that have been, and could be in the future, of great importance to local communities.

The areas surrounding the Iwokrama Forest represent mountains, wetlands and river systems of global importance. Over 400 species of fish were recorded from surveys of the Essequibo, Burro-Burro, and Siparuni Rivers; the surveys did not extend into the upper Essequibo, Rewa, and Rupununi Rivers. Comparable wetlands in South America such as the Varzea of Mampiraua and the Pantanal wetlands contain 400 and 200 species of fish respectively. The Rupununi, Rewa, and Essequibo Rivers are home to healthy populations of the endangered species giant river turtles (*Podocnemis expansa*), black caiman (*Melanosuchus niger*), and giant otters (*Pteronura brasiliensis*). Early work also

revealed healthy populations of Pimelodid catfish (*Phractocephalus hemiliopterus*, *Brachyplatystoma* spp., *Paulicea luetkeni*, *Pseudoplatystoma* spp.), recovering populations of Arapaima (*Arapaima gigas*), large Characids (*Colossoma bidens*, *Myleus pacu*), the peacock bass (*Cichla ocellaris*), and the fresh water drum (*Plagioscion squamosissimus*).

The Iwokrama Forest is in Regions 8 and 9 of the ten administrative regions of Guyana and also straddles the ancestral domain of the Makushi and Patamona peoples. Iwokrama presently works most intensively with the fourteen communities of the North Rupununi consisting of approximately 3,367 people. One of these communities, Fairview, is officially in Region 8 but is under Region 9 administration. Eight of the communities are situated on lands legally recognized under the Amerindian Act and have legal authority vested in village councils. The Annai Amerindian District includes Annai Central, Surama, Rupertee, Wowetta, and Kwataman villages. Toka, Massara, and Yakarinta villages all have their own land titles. Kwaimatta is presently under the jurisdiction of Massara. Apoteri, Rewa, and Fairview villages are Amerindian communities that do not have legally recognized titled lands. Aranaputa village is a mixed Coastlander-Amerindian community situated on State lands. In addition to these communities, several smaller communities exist, such as Simuni, Crash Water, Mora, Kuribu, Kokobai, Haiawa and Makarapan.

In 2000, Iwokrama began working with the Region 8 Area Council and hopes to develop strong links with communities in the Pakaraima Mountains including Taruka, Monkey Mountain, Kurukubaru, Paramakatoi, Tuseneng, and Kato.

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Deputy Secretary-General
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Appendix 2: Staff List

Headquarters - Georgetown	
Name	Designation
Monk, Kathryn	Director-General
Programme Support	
Allen, Ovid	Office Assistant
Bacchus, Jean	Secretary
Chin, Janse	Receptionist/Cleaner
Callender, Dawn	Senior Accounts Clerk
Dos Santos, Juliet	Executive Assistant
Eastman, Natisha	Cleaner
Hinds, Nigel	Accountant
Reece, Lindon	Purchaser / Expeditor
Seegobind, Mahadeo	Driver / Mechanic
Singh, Lilowtie	Accounts Clerk
Walton, Peter	Director of Programme Support
Warrinna, Dionne	Accounts Clerk
Banwarie, Denzil	Gardener
Wildlife	
Brasche, Terrence	Coordinator for Citizen Science Project
Chin, Chris	Research Assistant
Jafferally, Deirdre	Research Assistant
Prince, Waldyke	Environmental Monitoring Project Manager
Watkins, Graham	Senior Wildlife Biologist
Social Sciences	
Approo, Afira	Research Assistant
Forte, Janette	Senior Social Scientist
Radzik, Vanda	Community Development Fellow
Roberts, Grace	Research Assistant
Forest Ecology	
Hammond, David	Principal Forest Ecologist
Kahembwe, Francis	Forest Manager
LaGoudou, Lindford	Field/Lab Technician
McTurk, Melanie	Lab Technician
Ousman, Sharon	Project Manager – Crabwood Oil / Road Management and SUA Planning.
Pingal, Ramish	Natural Products Chemist
Prashad, Chanchal	Research Assistant
Roberts, George	Field Technician
Simmons, Coralie	Biodiversity Inventory Scientist
GIS	
Bollers, Roxroy	Database Technician
Datadin, Vijay	GIS Manager
Ganie, Qamar	Information Technology Officer
Grimmond, Joselyn	GIS Data Analyst

Information and Communications	
McAllister, Wycliffe	Information Officer
Ecotourism	
McDermott, Colette	Ecotourism Officer
McDonald, Joan	Research Assistant
Human Resource Development	
Hoosein, Macsood	Training Coordinator
Nokta, Shyam	Consultant
Field Station-Kurupukari	
Support Staff	
Andries, Emmanuel	Boat Captain
Butler, Lloyd	Mechanic
Foo, Anthony	Administrative Officer
Hamilton, Livingston	Driver/Mechanic
Humphrey, Bercina	Medex
Jameer, Maiodeen	Driver/Mechanic
Jarvis, Colin	Driver/Mechanic
Jonas, Roger	Boat Captain
Moffett, Colin	Assistant Administrative Officer
Narine, Chris	Handyman
Peterson, Anderson	Cook
Roberts, Benita	Housekeeper
Roberts, Olinda	Assistant Cook
Sandy, Eustace	Bowman
Sancho, Sydney	Gardener
Williams, Roger	Boat Captain
Williams, Rudolph	Bowman
Rangers	
Allicock, Bradford	Head Ranger
Allicock, Ovid	Ranger
Allicock, Ron	Ranger
Fraser, Julian	Ranger
Jacobus, Colin	Senior Ranger
Joseph, Gillian	Ranger
Prince, Kathleen	Ranger
Torres, Dexter	Ranger
Torres, Paulette	Ranger
Ranger Trainees	
12 Ranger Trainees began a 12 month Training Programme in January 2002	
Cornelius, Andrew	Ranger Trainee
De Mendonca, Michael	Ranger Trainee
Francis, Floria	Ranger Trainee
Hendricks, Simon	Ranger Trainee
Honorio, James	Ranger Trainee
Haynes, Lakeram,	Ranger Trainee
James. Henry	Ranger Trainee
John, Nigel	Ranger Trainee
Joseph, Elvis	Ranger Trainee
Scipio, David	Ranger Trainee
Singh, Kurt	Ranger Trainee

Smith, Ewart	Ranger Trainee
Allicock, Caroline	Community Environmental Worker
Allicock, Dilys	Community Environmental Worker
Alexander, Matthew	Community Environmental Worker
Antone, Roderick	Community Environmental Worker
Benjamin, John	Community Environmental Worker
Bartholomew, Arnold	Community Environmental Worker
Domingo, Reynold	Community Environmental Worker
Edwards, Hinslee	Community Environmental Worker
Edwards, Rudolph	Community Environmental Worker
Jacobs, Henry, G	Community Environmental Worker
James, Campbell	Community Environmental Worker
Jacobus, Yvette	Community Environmental Worker
Leo, Roach	Community Environmental Worker
Moses, Danford	Community Environmental Worker
Merriman, Ernest	Community Environmental Worker
Sandy, Keith	Community Environmental Worker
Thomas, Handley	Community Environmental Worker
Toka Friends of the Environment Club	Community Environmental Worker
Vanlong, Cyril	Community Environmental Worker
Makushi Research Unit	
One Researcher in each of the 13 Communities in Region 9	
Andries, Vivienne	Makushi Researcher
Augustine, Doris	Makushi Researcher
Allicock, Paulette	Makushi Researcher
Alvin, Nora	Makushi Researcher
Cambridge, Ceciline	Makushi Researcher
Ewell, Leoni	Makushi Researcher
Jeffreys, Cecilia	Makushi Researcher
James, Florencia	Makushi Researcher
Milton, Sylvia	Makushi Researcher
Nash, Pamela	Makushi Researcher
Roberts, Benita	Makushi Researcher
Singh, Lucillia	Makushi Researcher
Xavier, Ascenia	Makushi Researcher
Previous Employees (1998-2002)	
Arjoon, Deokie	Wildlife Research Assistant
Alyward, Bruce	Principal Economist
Allicock, Daniel	Field Supervisor
Antone, Vitus	Forest Ranger
Bowen, Edghill	Forest Ranger
Bhoonath, Birbal	Information Specialist
Cassells, David	Director-General
Frederick, Ken	Storekeeper / General Clerk
Girard, Felix	Administrative Officer
Hughell, David	GIS Specialist
Hunnisett, Gary	Human Resources Dev. Specialist
Jacobs, Katley	Field Technician
James, Samantha	Information Specialist
John, Standley	Bowman
Mangal, Simone	Collaborative Management and Community Development
McBirney, Errol	Boat Captain
Mendonca, Aubrey	Technology Research Assistant

Martinborough, Twydale	Research Assistant
Norman, Zacharias	Forest Ranger
Robertson, Zeta	Char Person
Sandy Yung	Field Technician
Salvador, Ronald	Field Technician
Thomas, Raquel	Forest Ecology and Management
Toney, Carlotta	Assistant Cook
Willems, Natasha	Library Research Assistant
Welch, Vibert	Field Station Manager
Zephyr, Ramona	ICU Research Assistant
Consultancies/Contractors (Current)	
Allcock, Emily	Financial Management Facilitator
Carto, Mena	Review existing operational policies
Davis, Rodney	Fisheries Research Project
FRR Ltd (Johns, Andrew)	Harvest Impact Monitoring Protocols & Research Proposals
Norman, Zacharias	Fisheries Research Project
Rogers, Neil	Tourism Marketing
Wigsten, Jan	Tourism Product Development
Previous Consultancies / Contractors (1998 – 2002)	
Allen, Christie	Remedial Instructor
Alder, Denis	RIL Feasibility Trial / Biophysical Impact Assessment
Bermudez, Edith	Computer Trainer/Publications/ Software
Bourne, Godfrey	Biologist Instructor
Caldecott, Julian	IRP/Benefit Sharing
Davis, Rodney	Arapaima survey
Davis, Wes	Communications – Photography
Design and Construction Services Ltd	Technical drawings – Canopy walkway
Edwards, Lawrence	Field Technician
Eco Tour Production	Ecotourism Product Review
Fredericks, Pius	Field Assistant
Fraites, Phoebe	Annual Report
Green & Kelson	Canopy Walkway
Hall, Clayton	Principal Research Fellow
Harris, Bonita	Oral Communications
Hammond, Allyson	Medex
Isaac, Eugene	Arapaima survey
James, Samantha	Web Site Publisher
LTS International	Forest Products Market Study
Malver, Olaf	Principal Ecotourism Development Fellow
Martinborough, Twydale	Crabwood Market Survey
Moran, Dominic	Multi-Use Management Plan for the SUA in the Iwokrama Forest
Milton, Faizul	Video Productions
New Technology Enterprise	ACCPAC Installation
Patricio, Patricia	Product Development – Fishing Tours
Sayer, Jeffrey	Wilderness Preserve Management
Shah, Ryhaan	Photography
Thomas, Raquel	Zoning Process Report / Botany
Torres, Augustine	Canopy Walkway

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URS Australia PTY Ltd	NTFP Market Survey
Validum, Lloyd	Malaria Summit
Welch, Vibert	Financial Management Training
Williams, Raymond	Boat Builder

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Appendix 4: Staff Presentations

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- Forte, J.** 2001. Prospects for participatory development in the Iwokrama Rainforest Programme, Caribbean 1: Prospects for Participatory Development in the Caribbean. Presented at the 97th Annual Meeting of the Association of American Geographers, New York, USA, August.
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Kranz, K.R., and G. Watkins 2001. Opportunities for partnerships between *in-situ*

conservation programmes and zoos and aquaria. Presented at the Symposium on Critical Issues in the Conservation and Sustainable and Equitable Use of Wildlife, Georgetown, Guyana, December.

Mangal, S. 2000. Mechanisms for involving indigenous peoples in planning protected areas systems. Presented at the UNESCO Seminar on Management of Natural Heritage Sites. Georgetown, Guyana, November.

Mangal, S. 2000. Critical issues in developing co-management systems for neo-tropical forests. Presented at the DFID-sponsored Workshop, Belem, December.

Mangal, S. 2000. Participatory processes and stakeholder analyses for community forestry. Presented at the Caribbean Foresters Meeting, Georgetown, Guyana.

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McDermott, C. 2000. The Iwokrama Forest: A pluralistic partnership for ecotourism and sustainable forest conservation and development. Presented at the Ecotourism Association of Australia Annual Conference, Melbourne, Australia, October.

Monk, K.A. 2001. A look at the other side of the world. Presented at the Iwokrama International Centre Public Forum, Georgetown, Guyana, June.

Monk, K. A. 2001. Iwokrama International Centre for Rain Forest Conservation and Development: A review of the programme 1997-2001, and challenges for the future. Presented at a seminar for CIDA, Georgetown, Guyana, September.

Monk, K.A. 2001. Iwokrama: The need for protocols on benefit sharing and intellectual property rights. Presented at the Workshop on Public Policy, Natural Resources and Equity:

Development as if Equity Matters, Georgetown, Guyana, September.

Monk, K.A. 2001. Iwokrama International Centre for Rain Forest Conservation and Development: An example of progress or of constraints in action? Presented at the Workshop on Caribbean Protected Areas – Development & Management, Caribbean Regional Environmental Programme and Caribbean Conservation Association AGM, Bridgetown, Barbados, October.

Monk, K.A. 2001. The search for alternative methods of forest conservation and development: A global perspective for the future. Presented at the Symposium on The Biodiversity of Guyana, Georgetown, Guyana, October.

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Nash, P., D. Arjoon, , and T. Brasche. 2000. Case study: North Rupununi Junior Wildlife Conservation Development Council: The next generation in wildlife management. Presented at the Symposium on Critical Issues in the Conservation and Sustainable and Equitable Use of Wildlife. Georgetown, Guyana, December.

Pingal, R. and C. Simmons. 2001. Iwokrama's bioprospecting program. Presented at the Caribbean Academy of Sciences conference, Georgetown, Guyana, June.

Pingal, R. and C. Simmons, P. Cannon, R. Paterson, M. Simmonds, R. Kokubun, B. Mootoo, A. Maxwell, and H. Jacobs. 2002. Bioprospecting for bioactive metabolites from endophytic fungi and plants of the Iwokrama Forest. Presented at the Mona Symposium

(nineteenth) on Natural Products and Medicinal Chemistry, UWI Mona, Jamaica, January.

Simmons, C. 2000. Identification of fungi of agricultural and environmental significance. Presented at CABI Bioscience International Conference, Egham, UK, July.

Simmons, C. 2001. Endophytic fungal diversity within the Iwokrama Forest. Presented at the Annual General Meeting of the Caribbean Academy of Sciences, Georgetown, Guyana, June.

Simmons, C. 2001. Conservation and sustainable use of agro-biodiversity: Presented at the Bioprospecting, Access and Benefit Sharing CDB Conference Centre, Widley, St. Michael, UK, November.

Walton, P. F. 2000. Managing change. Presented at the UNESCO/WWF Guiana Shield International Workshop on the Management of Natural Sites, Georgetown, Guyana, November-December.

Watkins, G.G. 1998. Community-based wildlife management with the North Rupununi Makushi people. Presented at University of Guyana/University of Utrecht/Tropenbos Guyana International Workshop on Carib Studies in the Guianas: Ethnobotany, Language and Society, Georgetown, Guyana.

Watkins, G.G. 1999. Community-based conservation in the North Rupununi, Central Guyana. Presented at Philadelphia Zoo, Philadelphia, USA.

Watkins, G.G. 1999. Review of the Iwokrama faunal survey – Lessons for research. Presented at the Academy of Natural Sciences Lunch Time Seminar, Philadelphia, USA.

Watkins, G.G. 1999. Tropical forest management. Presented at the University of Pennsylvania Brown Bag Series. Philadelphia, USA.

Watkins, G.G., and J. Forte. 2001. Local ecological knowledge and neo-tropical wildlife management. Presented at a Symposium on Critical Issues in the Conservation and Sustainable and Equitable Use of Wildlife, Georgetown, Guyana, December.

Watkins, G.G., North Rupununi District Development Board, and K. Kranz. 1999. Community-based wildlife conservation, research, and Education in the North Rupununi

and Iwokrama Forest, Central Guyana.
Presented at the 1999 American Zoological
Association Conference – “Strengthening the
Bond”, Minnesota Zoo, USA.

Watkins, G.G., D. Arjoon, D. Jafferally, W. Prince, , Toka Friends of the Environment Club , Toka Village, Massara Village, Yakarinta Village and the North Rupununi District Development Board. 2001. A collaborative study of white-tailed deer (*Odocoileus virginianus gymnotus*) populations in the North Rupununi savannas, Central Guyana. Presented at the symposium on The Biodiversity of Guyana: A Global Perspective for the Future. Smithsonian Institute, Georgetown, Guyana, October.

Watkins, G.G., W. Prince, D. Jafferally, C. Chin, D. Arjoon, Rewa Village , Fairview Village, Apoteri Village, Crashwater Village and the North Rupununi District Development Board. 2001. Population status of the black caiman (*Melanosuchus niger*) in the North Rupununi Wetlands, Guyana. Presented at the Symposium on The Biodiversity of Guyana: A Global Perspective for the Future. Smithsonian Institute. Georgetown, Guyana, October .

Wilson, W., B. Piperata, and J. Forte. 2001. Birth order and growth among Makushi Indians of Guyana. Presented at the American Association for Human Biology. Kansas City, USA.

Appendix 5: Voluntary support to local institutions

INSTITUTE	POSITION	DATE	NAME
Environmental Assessment Board	Member		Janette Forte
Environmental Protection Agency	Member national biodiversity committee		Macsood Hoosein
Environmental Protection Agency	Member National Environmental Education Advisory Committee	1997 to 2001	Juliet Dos Santos
Environmental Protection Agency	Advisor National Wildlife Surveys programme	2001 to 2002	Graham Watkins Simone Mangal
Guyana Forestry Commission – GIS Unit	Member of development team		Vijay Datadin
Guyana Forestry Commission	Member Forest Research Co-ordinating Committee		Janette Forte
Guyana Integrated Natural Resources Information System (GINRIS)	Member Technical Committee		Vijay Datadin
Guyana Marine Turtle Conservation Society	Members	2000 to present	Kathryn Monk, Shyam Nokta, Chris Chin
Guyana's Draft National GIS Policy	Contributors		David Hughell Vijay Datadin Joselyn Grimmond
Guyana National Museum Committee	Member	January 2001 to March 2002	Graham Watkins
Guyana National Museum Committee	Member	March 2002 to present	Coralie Simmons
Guyana School of Agriculture	Part-time lecturer	1998 to 2000	Graham Watkins
Information Network for Science and Technology (INSAT)	Member of the Steering Committee		Wycliffe McAllister
Jesuit Scholarship Fund Committee	Member		Janette Forte
Ministerial Advisory Committee on Tourism (MACT)	Chairman	August 2001 to present	Shyam Nokta
Ministerial Advisory Committee On Tourism	Member		Colette McDermott
National Protected Areas Secretariat	Member	June 2000 to present	Shyam Nokta
National Wildlife Legislation Steering Committee	Member	2001 to 2002	Graham Watkins Simone Mangal Macsood Hoosein
The Ministry of Tourism and Industry	Co-ordinator National Task Force	January 2001 to July 2001	Shyam Nokta
The University of Guyana	Part-time Lecturer Faculty of Arts – Department of Caribbean & Tourism Studies	September 1999 to July 2001	Shyam Nokta

Forest conservation and sustainable use

The University of Guyana	Part-time Lecturer Faculty of Natural Sciences	1998 to 2000	Graham Watkins
The University of Guyana	Part-time Lecturer Anthropology	1998 to present	Janette Forte
The University of Guyana	Advisor Fourth Year Students Project Faculty of Natural Sciences	June 2001-present	Ramish Pingal
Tourism and Hospitality Association of Guyana	Member of the Executive Board		Colette McDermott
Tourism Standard, Guyana National Bureau of Standards	Member of the Technical Sub-Committee		Colette McDermott
Tropenbos - Guyana	Member of the Editorial Team – Reduced Impact Logging News Letter		Raquel Thomas
UNDP-PROFOR Project	Member of the Interim Working Group on Certification		Janette Forte Simone Mangal
UNESCO Subcommittee on Conservation and Legislation on the National Heritage of Guyana	Member		Peter Walton

Appendix 6: Memoranda of Understanding

GUYANA

CONSERVATION INTERNATIONAL, Guyana, Ranger Training October 2001 to August 2002 and September 2002 to July 2003

ENVIRONMENTAL PROTECTION AGENCY (EPA) Framework Co-operation – August 2000

GUYANA FORESTRY COMMISSION Collaboration on a regular basis - Feb 1998

MINISTRY OF AGRICULTURE (FISHERIES DEPARTMENT) Framework Co-operation, Nov 2000

THE GUYANA BROADCASTING CORPORATION, Community Radio – March 2000

NORTH RUPUNUNI DISTRICT DEVELOPMENT BOARD, 3 July 1999.

GUYANA MARINE TURTLE CONSERVATION, 23 June 2000.

INTERNATIONAL

NATIONAL AUDUBON SOCIETY 2001 – 2005

THE CENTRE FOR INTERNATIONAL FORESTRY RESEARCH, Indonesia - 1997

CORNELL LABORATORY OF ORNITHOLOGY, USA Training for Iwokrama Rangers - 9 – 31/01/2000

KEAN UNIVERSITY, USA Pilot primate survey, Dr. Roxi A. James - 5 – 21/6/1999.

ECOLE SUPERIEURE DE COMMERCE INTERNATIONAL (ESCI), FRANCE Internship – 18/4/2002 – 30/8/2002

EDEN PROJECT LINK (NARI Guyana and RGS) Guyana Cocoa Research Initiative – 1998
C/o University of West England

FIONA REID Artist - January 1999 annual automatic renewal

FOTONATURA, Holland - 5mths 1997, 3mths 1998

(G.S.E.S) UNIVERSITY OF STRATHCLYDE, United Kingdom Studentship - 16/7/1998 (one year)

OXFORD UNIVERSITY, United Kingdom - Expedition to Guyana - 15/6/1998 -1999

ROEHAMPTON INSTITUTE LONDON, United Kingdom Studentship, Christie Allan - 1998 – 1999.

THE ROYAL ONTARIO MUSEUM, Canada – Draft - 5/10/14/11/99

United National Development Programme, Guyana – Technical Support Services – 2/5/2002

UNIVERSITY OF CALGARY, Canada August 1999

UNIVERSITY OF COLORADO, USA – Research Projects May – June 1997

UNIVERSITY OF GLASGOW, United Kingdom Exploration Society - June 1995.

THE UNIVERSITY OF HEREFORDSHIRE HATFIELD, United Kingdom - 1997

Appendix 7: Socio-economic Background to Regions 8 and 9

The indigenous peoples of the area are the fourth largest ethnic group in Guyana with a population estimated as 48,859 (24,955 male and 23,904 female; 6.3% of the total population³⁰. Seventy percent of Amerindians live in the interior of Guyana, whereas most East Indians and Afro-Guyanese and the other minorities live in the coastal plains of Guyana. In Regions 8 and 9, Amerindians comprise 73.5 % (4,218 people in Region 8) and 81% (12,194 people in Region 9) of the regional population respectively³¹. Twenty-two percent of the population in Regions 8 and 9 are settlers; the first of whom arrived as cattle ranchers in the late 19th century.

Two percent of the total Guyanese population resides in Region 9 and 22.5% of the total regional population of 14,947 live in the Project Area. The population in the North Rupununi is almost equally divided between those under ('consumers') and over 15 years of age (producers; see Table 1). The average household size of six in the Project Area is higher than the national average of 4.28 persons.

Table 3: Age distribution in North Rupununi communities

Age Group	Male	Female	Total
Under 15	816	771	1587
Over 15	929	851	1780
Total	1745	1622	3367

Languages

The people of the North Rupununi speak several languages. The population within the Project Area is self-ascribed as 91% indigenous - 77 percent Makushi, 11% Wapishana, and 3 percent Arawak. Five percent of households were said to be 'mixed,' those in which the head of household is half "Coast Lander"/half Amerindian. Three percent of households were described as 'Coast Lander', which refers to persons of African or East Indian descent, the majority

³⁰ Bureau of Statistics (1993). Report on Household Income and Expenditure Survey 1992-1993. Georgetown, Guyana, Bureau of Statistics.

³¹ Ibid.

populations of the coastal area. Most people in the area speak Makushi. Annai Central, Rewa, Toka, Massara, Wowetta, Rupertee, Kwataman, Surama and Yakarinta villages are Makushi communities. Apoteri village is a mixed Wapishana-Makushi community. Aranaputa village is mixed coastlander-Makushi community and Fairview village is predominantly Arawak/Makushi where people speak English. English is the most common language in schools in this area. At home and in general discussions, however Makushi is frequently the preferred language. Wapishana, Patamona, and Portuguese, are also spoken in some of the communities in the area.

The people of the Pakaraima Mountains also speak several languages. Most people are Patamona and speak Patamona, Portuguese and English.

Socio-Political Institutions

Most villages in Regions 8 and 9 are governed by either Village Councils (VCs) or Community Development Councils (CDCs). Village Councils are recognized under the Amerindian Act and govern Amerindian settlements. The Village Council (VC) consists of elected councillors and a village captain or Touchao. Captains have, since 1962, been nominated by these elected councils, to whom they are responsible³². Amerindian villages that are not recognised under the Amerindian Act and villages that have been established by land development schemes or villages settled by coastlanders have elected CDCs headed by a chairperson. The VCs and CDCs are responsible to the regional democratic councils (RDCs) that make representation to central government and govern the regions.

Regional Democratic Councils are based in the administrative centres of the regions: Lethem in Region 9 and Mahdia in Region 8. The RDC system was set up in 1981 as a participatory approach to local government to maintain infrastructures in the regions. Unfortunately,

³² Forte, J. and L. Pierre (1994). Baseline Information on Amerindian Communities in Region 9. Report produced for the Guyana Organisation of Indigenous People (GOIP). Georgetown, Amerindian Research Unit.

the RDC system lacks the institutional and human capacity to function effectively³³.

The NRDDDB is a locally formed Non Government Organization (NGO) that consists of the village leaders and other community representatives. The NRDDDB was developed, in part, to facilitate interaction between the Iwokrama International Centre and local communities. The NRDDDB acts as a representative body for the communities and is taking responsibility for the coordination of many education, development, cultural and research programmes in the North Rupununi. The Amerindian Touchaus Area Council (ATAC) similarly represents the Amerindian communities of Region 8.

Local Livelihoods

At independence in 1966, the Cooperative Republic of Guyana inherited a narrow-based economy dependent on the export of bauxite, sugar and rice. Trade in extracted minerals and timber has since supplemented these exports. Economic decline from the 1970s to the 1980s and government policies during this period lead to a rapidly increasing national debt. In response to these economic problems, the Government of Guyana, IMF, and World Bank introduced a structural adjustment programme that included reduction in government spending and promotion of foreign exchange generating exports. The government spending cutbacks include further spending reductions on the health and education sectors.

Communities in the interior of Guyana, in particular Amerindian communities, have been heavily influenced by the development of extractive industries and the structural adjustment programme. These changes have increased the numbers of interior communities that have inhabitants earning cash from extractive industries. Unfortunately, interactions between interior communities and extractive industries have transformed social and cultural values as communities have become involved in cash economies³⁴.

In the main, Amerindians have lacked the necessary tools and training for living with these new economic systems. Amerindians

³³ Thomas, C., J. Forte, D. Culpepper, S. Campbell, B. Rutherford-Rodrigues, H. Massay. (1997). Guyana Human Development Report 1996. Georgetown, Guyana, Government of Guyana and United Nations Development Programme (UNDP) in Guyana.

³⁴ Ibid.

have lost traditional ways of life and populations have become more concentrated in smaller areas and become more sedentary. These changes have contributed to the local mismanagement of natural resources including the over harvest of wildlife, and the intensification of shifting cultivation. At the same time, transport costs have increased as government subsidies have been removed. Consequently, food prices have risen in communities that have developed a dependence on purchasing food. Meanwhile, government health and education programmes are under financed. Cash crops are difficult to produce because there are few agricultural tools and little technical aid available. Perhaps more important, agricultural products from Regions 8 and 9 cannot compete with products from areas in Guyana closer to the markets, or areas in the Caribbean with cheaper production costs.

The consequence of the past 30 years is that Amerindians are presently the poorest members of Guyanese society. The percentage of the population considered below the poverty line (less than US\$529.00 a year) is 87.5% for Amerindians against a national average of 27.7%³⁵. In Regions 8 and 9, 94% of the population is considered below the poverty line³⁶. The poverty in the interior of Guyana is readily exacerbated during periods of low rainfall when subsistence crops fail and villagers become dependent on purchased food supplies and food relief programmes. A serious lack of food security exists in Regions 8 and 9, because of the difficulties associated with agriculture and an increasing absence of food self sufficiency.

In sum, while Amerindians have been introduced to cash economies, they have not been equipped with the necessary tools to develop in such an economic context. Getting credit is extremely difficult for Amerindians because they have no individual property rights. While they hold communal title to land, they do not individually own land and so conventional credit access systems are normally beyond their reach. In addition, banking facilities are absent from many parts of the interior of Guyana making it very difficult to integrate into an economy based on these tools.

Subsistence farming and fishing are the main local economic activities. Farms are often

³⁵ Ibid.

³⁶ Ibid.

located 10-20 km from villages. This distance is often determined by attempts to find undisturbed forests that tend to not have Acoushi ants (*Atta* spp.) which can devastate crops. The main local crop is cassava, which is used to produce farine, cassava bread, tapioca, and various beverages. Other crops include sweet potatoes, yams, peppers, pineapples, papaws, peanuts, beans, maize, tobacco, cotton, fish poison plants and bush medicines produced. Fish are the major source of protein in the region. As such, fishing is an extremely important subsistence activity. Some local commercial exploitation of wildlife occurs for the meat and pet trades. Present rates of exploitation of arapaima (*Arapaima gigas*) and river turtles (*Podocnemis expansa*) are apparently not sustainable. Future livelihoods will ideally be based on high value, low volume, high quality niche marketed products. Amerindian craft production and ecotourism are examples of businesses with potential comparative advantages in the area.

Transportation

Transport among communities and between communities and administrative centres in the North Rupununi is very difficult. Working airstrips are located at Annai, Apoteri, and Karanambu, and unused airstrips at Toka, Yakarinta and Surama. Most bulk goods transported between Georgetown and Lethem occurs by truck. Few other forms of local transport are available, and most people move around on foot, by boat, on bicycles, on carts, and by horse. A few private vehicles are available in Annai, Surama, and Aranaputa.

The Linden-Lethem road covers a distance of 448 km between Linden (bauxite mining town on the Demerara River) and Lethem on the Takutu River. The section of the road between Mabura Hill and Kurupukari is passable only using 4WD vehicles. Construction of the road began through of an agreement between Guyana and Brazil in the early 1990s. A Brazilian engineering company Paranapanema was awarded the contract for surveying and designing the Lethem to Kurupukari section, upgrading the Lethem to Annai section and constructing the Annai to Kurupukari section of the road. The general idea behind the road was that it would facilitate development of the Rupununi, provide a goods corridor for materials from Roraima State, and promote free movement and trade between Rupununi and Roraima. These consequences of road development have yet to be realised because of the poor quality of the road. Recently, substantial pressure has been brought about to finish the road and the Government of Guyana has announced plans for the completion of the

Forest conservation and sustainable use road. The improvements in the Lethem to Annai road have substantially increased outsider access to the area with resultant population declines in high value wildlife and fish species as markets in Brazil became accessible. In particular, savannah deer (*Odocoileus virginianus*), arapaima, giant river turtles, fresh water drum, peacock bass, and large catfish populations declined between 1980 to 1996 because of over-harvest for markets in Brazil and Georgetown. Since 1998, the NRDDB, Iwokrama, and communities have been working with Government of Guyana agencies to manage these species – one result of these programmes is an increasing population of arapaima.

Health

Over the past 20 years, malaria has resurfaced in the interior of Guyana. In 1997, approximately 32,103 cases of malaria were recorded in Guyana, estimated to represent a total infection rate of 64,206³⁷. The resurgence in malaria results from a more mobile population involved in extractive industries, rudimentary health care, and the periodic absence of microscopes and medicines in interior locations. Over the past 10 movement of Brazilian *garimpeiros* (Brazilian miners) has accelerated across Guyana's borders. While government efforts to place community health posts in most communities have been successful, drugs and trained personnel to deal with malaria are still in short supply. In many communities, courses of drugs for treating malaria are not completed, and in mining areas, drugs such as Chloroquine and Mefloquine are used in a way that encourages drug resistance. Within regions 8 and 9, treated mosquito nets and residual insecticides are desperately needed. Costs for these items are high and so often the malaria problem works hand in hand with poverty.

Water-borne diseases also affect most of the people in Regions 8 and 9. Water-borne diseases are associated with the lack of sanitation and low water quality that is found in most communities. Many of the communities in Regions 8 and 9 depend on nearby creeks and rivers for potable water. The numbers of cases of water-borne diseases increases during the rainy season, supporting the association between the absence of sanitation and disease. Region 9 has the

³⁷ Validum, L. 1998). "Guyana relapsed." *Guyana Review* 6 (8): 12-13.

highest percentage of children affected by diarrhoea in Guyana³⁸.

Dental health could be rapidly improved by increasing the availability of fluoride in diets. Tuberculosis also appears to be prevalent in Amerindian populations. In TB clinics in Georgetown and Best Village, some 17.5% of referred cases from 1986 - 1992 were Amerindians. This is despite the fact that only 5% of Guyana's population is Amerindian and it is difficult to get to Georgetown from the interior³⁹. In Region 8, respiratory tract infections affect over 50% of the children⁴⁰.

Human Immuno-Deficiency Virus is also a growing problem in interior communities near to mining or timber areas. Increases in sexually transmitted diseases mirror the increased rate of movement of Amerindians to work in extractive industries. Cervical cancer is another major health issue of concern in Regions 8 and 9⁴¹. Alcohol and substance abuse is also a rapidly growing problem in Region 8 and 9 communities.

In addition, diarrhoea, flu, scabies, respiratory infections, and pneumonia are the major diseases in the area. The main causes of child death in the region are diarrhoea, malnutrition, malaria, and snakebite.

In the North Rupununi, because of the inaccessibility of many communities, health care coverage is still minimal. Most communities in the North Rupununi obtain water from wells, although, Apoteri and Rewa villagers also use river water. In a 1993 survey, only 164 of the 467 households in the region had pit latrines. The community health worker (CHW) programme is in operation in the area, though delivery of health care is still restricted. The nearest hospital is in Lethem,

³⁸ National Development Strategy Secretariat (2000). National development strategy: (2001-2010) a policy framework. Georgetown, Guyana, National Development Strategy Secretariat: xxx +348.

³⁹ Amerindian Research Unit (1993). Situation Analysis of the Status of Children and Women in the Guyana Amazon. Georgetown, University of Guyana.

⁴⁰ Radzik, V. (2000). UNICEF Amazon Programme Mid-Cycle Review - Guyana. Georgetown, UNICEF.

⁴¹ Pierre, L. (1997). Indigenous Women. Georgetown, Guyana, National Commission on Women.

though a sub-district hospital was completed in Annai in 2000.

Education

People in the interior of Guyana, in particular in the Amazonian regions of Guyana, do not have the same educational opportunities as people in the coastal regions. Eighty percent of Amerindians are considered functionally illiterate^{42, 43}. In addition, 7.6% of Amerindian men (nationally 3.4%) and 9.6% of Amerindian women (nationally 3.92%) have received no formal schooling⁴⁴. The drop out rates during the final four years of school is very high in Amerindian schools. Two percent of Amerindian men and women reach secondary schooling after attending school and only 1% of the Amerindian men and women who enter school reach tertiary levels⁴⁵.

In the North Rupununi, one-third of the population is enrolled in a village primary school and there are primary schools (ages 6-15) in all of the larger villages, except Rupertee. The children of Rupertee and a section of Kwataman (known as West Kwataman) attend Annai Central Primary School. These primary schools are known as all-age schools because they cater for children who have no opportunity to attend a secondary school. Few children from the Project Area have attended a secondary school.

There are 13 trained and 38 untrained teachers staffing these schools and the total enrollment is approximately 1,165. The major problems at local schools include poor administration and the difficulty of English being the major language for teaching and yet it is often the second language spoken at home. In addition, children often have to travel great distances to get to school, and many children have domestic responsibilities that may make schooling difficult. Because of disappointment for parents in the results of schooling,

⁴² Radzik, V. (2000). UNICEF Amazon Programme Mid-Cycle Review - Guyana. Georgetown, UNICEF.

⁴³ UNICEF (1995). The Functional Literacy Survey of Out of School Youth. Georgetown, UNICEF.

⁴⁴ Bureau of Statistics (1993). Report on Household Income and Expenditure Survey 1992-1993. Georgetown, Guyana, Bureau of Statistics.

⁴⁵ Bureau of Statistics (1999). Report on Household Income and Expenditure Survey. Georgetown, Guyana, Bureau of Statistics.

incentives for educating children reduce rapidly.

Until this year, secondary education was available only in Lethem and Georgetown. The regional administration has built a secondary school in Annai that has begun accepting students this year. Various financial and social constraints would determine if a child was sent to secondary school; for example, most parents are wary of sending their children to Georgetown or Lethem where the children's welfare may be in question.

A series of special educational needs exist for people in Regions 8 and 9 including language education. Makushi, Wapishana, and Patamona are spoken at home in the rural communities in this area. There is therefore an urgent need for the introduction of bilingual education. Local communities would also like to see education be more relevant to their lives rather than be taught material that is coast oriented and difficult for the people of the interior to deal with. Curricula and courses that deal with issues such as resource exploitation, accessing funds for projects, infrastructure development, and ecotourism would be more valuable.