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THE BULUNGAN EXPERIENCE – CIFOR AND RESEARCH PARTNERSHIP  
IN THE PRIMARY RAINFOREST OF BORNEO, INDONESIA  

by  
Mafa E. Chipeta  
Deputy Director-General  
and  
Jeffrey Sayer  
Director-General  

CGIAR Center for International Forestry Research  
Bogor, Indonesia

This is a forum where much will be said about the challenges of agriculture and  
productivity and about how globalisation will affect agriculture, with emphasis on crop  
and livestock commodities. This note gives an insight into the other challenge facing the  
CGIAR: how to manage natural resources sustainably under conditions of high  
expectations for development. While acknowledging the great importance of  
globalisation, it draws attention back to the rural community level where agriculture takes  
place and where all policies are subjected to their ultimate test of soundness. The  
presentation is about research in Bulungan Forest in Indonesia - part of the largest  
remaining tropical forest in Asia that Indonesia has generously placed at the disposal of  
CIFOR for research purposes.

This research responds to the widely recognised need to develop holistic understandings  
of forests and adjacent land use systems at the scale of large landscapes. It is a response  
to the argument articulated by the UN Convention on Biological Diversity (CBD) and the  
UN Intergovernmental Forum on Forests that large scale and all-inclusive "ecosystem  
approaches" be applied to the problems of forest conservation and management. Research of this type has to be participatory in nature and must involve all forest  
stakeholders. As such it must draw upon scientific competence from a diversity of partner  
institutions ranging from indigenous people and development NGOs through to  
Advanced Research Institutes in distant countries. CIFOR's own role has been to  
facilitate the development of a conceptual framework for the complex integrated  
approach to natural resources management. It has acted as a "convenor" for the diversity  
of partner organisations involved.
This is a story about research that builds up and builds upon knowledge of local indigenous peoples' lifestyles and dreams of development; involves the external stakeholders interested in exploiting the forest and other resources, often unsustainably; analyses the potential of the forest and its richness in wood, non-wood materials and biological diversity but also its other non-forest potentials. It is about assessing how all these can be brought together in such a way that development and environment are intimately and inseparably linked in a mutually beneficial union. The a story is also about partnership - CIFOR has drawn upon its tradition of collaboration to engage an impressive range of players in an enterprise that would defy the capacity of any one agency.

Bulungan research will probably be a never-ending venture but it is already a success in terms of bringing together the energies of stakeholders and experts with various interests around a common agenda.

**ADDING AN ENVIRONMENT AGENDA TO DEVELOPMENT**

**An ideal open-air laboratory**

In December 1996, the Indonesian government, through the Ministry of Forestry and Estate Crops designated 302,900 hectares of forest in the Bulungan District of East Kalimantan (on the island of Borneo) to be developed as a model of exemplary science-based management for sustainability. The Bulungan Research Forest is adjacent to the 1.7 million-hectare Kayan Mentarang National Park. Together, the two areas constitute an expanse of nearly 2 million hectares in the heart of one of Asia's largest remaining tracts of tropical rainforest. CIFOR has been invited to carry out extensive multidisciplinary research activities in Bulungan aimed at devising effective strategies for multiple use of this resource, the lessons from which may potentially be applied to other tropical forests.

Primary lowland and sub-montane forests cover the site almost entirely: it forms a natural unit for integrated management - it has production, protected and community forests. Bulungan is particularly rich in biodiversity: about 60 percent of the mammals and 70 percent of the lowland birds of Borneo may be found in the area, many of which are endangered or threatened. It has terrestrial wildlife; water resources with considerable aquatic animal life; settlement and agricultural activity on its margins, and other economic activities coming in. Like tropical forests elsewhere in the world, Bulungan forests face increased threat for a variety of uses that include industrial-scale logging for timber, shifting cultivation, collection of non-timber forest products, coal mining and oil palm plantations. Globalisation is itself a threat to the forests of Bulungan, their biodiversity and the people. But these forests are a resource of global value and the desire to capture the global benefits should be harnessed to use the forest sustainably, to preserve their biodiversity and to improve the well-being of the peoples of the area and of Indonesia as a whole.
Integrated natural resources research in the context of development expectations

CIFOR took on Bulungan as a place that would allow all aspects of its biophysical, socio-cultural, economic and policy/institutional research to be practised in one location. Here the imperatives of sustainable management of natural resources are being pursued in a situation of societal transition: the inhabitants range from tribal people still pursuing hunter-gatherer lifestyles to near-urban ones in the provincial capital. There is an increasing inflow of outsiders seeking economic opportunities in mining, logging, oil-palm growing etc. There are high expectations among the indigenous local population that their area can catch up with the far higher level of material development (some of it forest-based) on the Malaysian side of Borneo Island and elsewhere in Indonesia.

CIFOR research seeks to determine: what are the realities of life today; where has society come from? what are the ambitions and expectations of the indigenous people and how do they relate to those of developers coming into their land? what are the biological potentials of the natural resources (including forests) and how do they fit into the development dreams of all stakeholders? Furthermore CIFOR seeks to ascertain how current and contemplated developments will affect the production potential for wood and for non-wood products and the biological richness of the forests. CIFOR is also assessing how upstream activities such as logging are affecting the condition of downstream water resources in the rivers and the aquatic resources therein. Finally, CIFOR is testing more environmentally benign methods of industrial logging.

The socio-economic setting

Bulungan is among the most underdeveloped areas of Indonesia; the local people's primary desire is therefore development and many view forest interventions from their potential to contribute to this. Economic opportunities desired by the local people are wage jobs in the growing coal-mining industry, in industrial-scale logging operations, and in the oil-palm fields being established on Bulungan margins. Roads are accelerating socio-economic transition: until the advent of the 1990s there were no roads and logging and other "modern" ventures were therefore restricted to locations accessible by river. With the coming of the roads, many forests outside of Bulungan reserve itself have by now been exploited, and coalmines are opening up in the middle reach of the Malinau River.

The indigenous groups in the Bulungan region, collectively known as Dayaks, were originally nomadic; increasingly they are rice farmers who practise extensive shifting cultivation, agroforestry and harvest a wide range of non-timber forest products. Official statistics show a small population (relative to expanse of land). According to a CIFOR researcher (Kaskija, 2000) the region has a long history of attempts by central governments to engineer tribal societies: the colonial Dutch, just as the Indonesian government after them, ordered the Penan (a Dayak sub-group) to move into “proper” villages. Recently, even without official pressure, most have moved close to the district
capital, although many maintain a double life, with extended periods of life upstream to
hunt and to farm their plots.

Some of the nomads have taken up wage-labour. A few have fully retained their
traditional ways based on hunting and gathering, selling surpluses to the modern sector.
Bulungan therefore shows much socio-cultural diversity along the continuum of
transition between indigenous cultural ways and modernity. Its people exhibit varying
degrees of dependence on the forest: on wild animals for meat; on non-timber products
used in food, utility instruments or construction, or (depending on external demand and
prices) for sale. Therefore, there are almost no cases of complete independence from the
forest as a basis for livelihoods or income.

THE BULUNGAN REALITY CHECK

Partnership as key

It is evident from the introduction that the potential research agenda is vast and is diverse.
The expectations of local people, the plans of the government and actors/investors, and
growing exposure of local communities to outside developments offer a large agenda of
social-economic and policy research to complement biophysical investigations on the
Bulungan ecosystem.

It is difficult for any one organisation to shoulder all that needs doing single-handed,
hence CIFOR’s drive for partnerships. Partnership takes various forms: sharing of
knowledge, especially indigenous forest-related knowledge of local communities;
dialogue with local communities, NGOs and other site-level institutions; co-operation
with and administrative facilitation by decentralised governments; co-funding; and
contribution of expertise.

Host partners

Central to success in research is, of course, partnership with the villagers: CIFOR works
with some 27 villages in the Upper Malinau. Traditional knowledge is at the core of
understanding man/ecosystem interactions that explain the present condition of the forest
and give clues to how future development can best meet the local expectations. CIFOR
also maintains the close involvement of the provincial government of East Kalimantan
and lower-level local government as well as company officers from the parastatal
company INHUTANI II. The local coal industry is also considered a legitimate
stakeholder the views and interests of which need to be heard no less than those of the
local community. At national level, the research department of the Ministry of Forestry
and Estate Crops (MOFEC) is CIFOR’s main partner. It is a co-funding agency but also
provides inputs in kind such as expertise.
Core funding

For funding purposes, research in Bulungan has been organised under a number of "projects". The CIFOR budgetary and personnel input is an amalgamation of inputs from four of its six projects under the CGIAR Agreed Research Agenda: Adaptive Co-Management of Forests, Sustainable Forest Management, Forest Products and People, and Biodiversity and Genetic Resources. For these projects, Bulungan is an ideal proving ground for science, and a melting pot for ideas, and a perfect operational theatre for inter-disciplinary work. The CIFOR core resources have leveraged much larger funding by the International Tropical Timber Organisation (ITTO), the John D. and Catherine T. MacArthur Foundation, and the Indonesian government.

The ITTO-funded project

Since 1997, CIFOR has been working with the International Tropical Timber Organisation and the Government of Indonesia in the three-year project "Forest, science and sustainability: the Bulungan model forest". The project started in December 1997 for a duration of 36 months and a budget of US$ 1.4million (of which ITTO $0.9million, Indonesia $0.4million and CIFOR $0.1million). The development objective is to achieve long-term forest management for multiple uses, integrating social, environmental, biodiversity and silvicultural aspects. The immediate objectives are to assess and study: (a) the effect of Reduced-Impact Logging on biodiversity, conservation, ecology and socio-economics, (b) rural development trends and future policy options including the effects of macro-level development activities on people dependent on the forest, and (c) trends and possible future scenarios in forest-dependence, livelihood strategies and institutions for forest management and rural development.

The exploratory research on Reduced-Impact Logging (RIL) aims to ascertain the viability of environmentally more benign practices for possible implementation throughout Indonesia’s forestry sector. In social science and economics research, studies at Bulungan are developing innovative models of forest management that use adaptive and collaborative approaches to meeting the diverse needs of local people and other stakeholders. This work, done in partnership with numerous communities and NGOs, includes research on non-timber forest products and analysis of rural development trends and their impact on forest-dependent people.

The John D. and Catherine T. MacArthur Foundation

The second largest project is funded by the John D. And Catherine T. MacArthur Foundation which is providing $0.34million for a 3-year project “Building Capability of Indonesian Scientists in Conservation Science, Ecology and Sustainable Management of Tropical Forests”. It supports Indonesian graduate students and young natural and social scientists to undertake research and is developing facilities for field research and training at the Bulungan Research Forest.
With the MacArthur grant CIFOR has: constructed a temporary field station; rented and improved a guesthouse; constructed an elevated walkway from the station to the river through the forest, to enable visitors/researchers make observations; installed a radio communication link among the field station, guesthouse, INHUTANI II camps, and CIFOR Headquarters in Bogor; purchased a motorised canoe and field research equipment; recruited a resident field research manager and support staff; and provided maintenance costs for the facilities. Furthermore, it has sponsored two INHUTANI II staff to take part in a FAO study tour on Reduced Impact Logging operations in Sabah, Malaysia.

**Key contributions in kind**

Important contributions in kind, that would otherwise have required a far larger financial investment include loan of free tractors by Messrs PT Trakindo Utama (the Indonesian Caterpillar distributor) and State Timber Corporation II (INHUTANI II) - which met the shipment cost for the tractors. The leading contributor of seconded personnel is CIRAD Forêt of France whose scientists have played a key role in initial studies on RIL under the ITTO project. The United States Forest Service also provided personnel early in the study for RIL research.

**Indonesian centres of excellence**

Under a Memorandum of Understanding concluded between CIFOR and the Graduate Program of Forestry, Mulawarman University (GPF-UNMUL), Samarinda, Indonesia, CIFOR will provide research fellowships totalling US$44,000 over a three-year period to at least 16 students of GPF-UNMUL and will help research supervision. UNMUL has already helped to identify, quantify and estimate income contribution of most traded goods in the area (including forest products and crops) for local villagers. It has also studied the impact of concessionaires’ employees as harvesters and as a cash market for forest products. CIFOR has also contracted the Faculty of Forestry, Mulawarman University to conduct field and laboratory studies on soil characteristics within the conventional logging and RIL blocks of forest in the Malinau concession of the PT INHUTANI II.

The Indonesian Institute of Sciences (LIPI) has provided teams from its Research and Development Center for Applied Chemistry and the Research and Development Center for Biology to conduct a vegetation study, plant inventory and plant collecting for chemical screening. A CIFOR-LIPI collaborative survey was carried out fish fauna in Bulungan Research Forest including their abundance and biodiversity in the logged and unlogged areas as well as to the importance of fish as a source of food for local people. LIPI has also co-ordinated and guided UNMUL interns and research assistants in the field. The Wildlife Conservation Society Indonesia programme (WCS-I) has carried out related biodiversity assessment but on terrestrial wildlife. WCS-I will carry out further work under a Global Environment Facility project funded through UNDP.
External centres of excellence

Interns or experts from overseas centres of excellence are an important form of partner contribution. Interns are students who have the required scientific knowledge but require a period of supervised fieldwork; often the data they collect goes towards university thesis preparation. Overseas internships and expert co-operation so far has been:

- three interns from the French tropical agricultural engineering school (CNEARC) associated with 3 students from Universitas Mulawarman (UNMUL) for 3 months in the villages on joint research;
- Swedish Agency for Research Co-operation (SAREC) has funded a Uppsala University, Sweden researcher on anthropological attributes of the local populations relevant to their attitudes to the forest and to development opportunities and resources in general;
- a Mexican Masters student at Wageningen Agricultural University, the Netherlands completed a study of secondary forest use by local people;
- Oxford University, England – an intern worked on a method of studying carbon sequestration in logged and unlogged forests;
- A graduate student from Switzerland's Ecole Politecnique de Laussane is doing in-depth studies on aquatic biodiversity responses to vegetation disturbance by industrial logging;
- University of London, England - a graduate student of field tested the Ecological Criteria And Indicators For Sustainable Tropical Forest Management in the INHUTANI II Malinau concession;
- Yale University, USA (privately-funded student) is conducting research on co-management and collaboration among stakeholders;
- University of Stirling, Scotland - a scientist visited the research sites in connection with his intention to establish future collaboration.

Other co-operation with centres of excellence has included the SE Asian Center for Tropical Biology (BIOTROP), Bogor Agricultural University (IPB), the US-based Tropical Forest Foundation, the Dutch Research Foundation TROPENBOS, and the International Center for Research in Agroforestry (ICRAF). Some Indonesia-based NGOs have also participated, such as BIOMA, SHK, Plasma, and WWF Indonesia.

RESULTS

Research in a complex ecosystem of Bulungan's size is a living task - it will continue for
a long time. Selected results, on which will be built more findings over time, are:

**Reduced impact logging** (for environmentally benign harvesting of timber)

The preliminary study showed that the RIL technique compares as follows with conventional logging:

- has improved productivity. The RIL technique increases the planning cost but the additional costs incurred are offset by the lower cost of felling and skidding due to increasing productivity in a better-planned operation;
- the amount of waste is reduced by proper road layout and correct felling - this improves revenue capture by a company that would otherwise lose it in conventional logging;
- land openings caused by skid trails and log landings were significantly lower in RIL. Damage to remaining trees is also less;
- the RIL technique gives higher net financial return and is altogether less destructive. It is thus promising for adoption by concession owners engaged in logging but needs strong training for effective adoption.

**Impacts on aquatic biological diversity**

Plant and animal diversity have been assessed and baseline information for future reference is in hand in many cases. For example, regarding fish in the river, before disturbance, there were 43 fish species in 10 families, 4 orders and 29 genera, of which the number of fish species in streams passing through the logging area were 8-14 species. Provisional indications are that in segments of the stream downstream to recent logging activity, there are fewer fish species compared with the upper part of the same stream. Also, small shrimps, *Macrobrachium* spp. which were ubiquitous and abundant in most sampling stations were absent in downstream areas.

**Indigenous people**

The research has given some important insights into the priorities of indigenous people and their interaction with the forest and other resources of the area. Some of these are listed below - it must be stressed that research continues which may lead to some adjustment over time.

**Property rights**

- the indigenous Kenyah, Punan and Merap peoples claim ownership of much of the area, which is used regularly for agriculture, hunting, fishing and the collection of
forest products, both for subsistence and trade. Some village boundaries are disputed and participatory mapping techniques are helping to clarify the basis for these conflicts;

- it appears that there is a long history of forest use and ‘management’ by local peoples that includes the planting of non-timber forest products such as rattan in the area, and ownership over birds nests based on rights agreed by previous sultans. Information on these is being documented and research is underpinning the legitimisation of these rights;

- there are many old village sites in the area and

- logging firm Inhuntani II is said not to pay any special regard to traditional land rights and at least one grave site area has been bulldozed (in ignorance);

- in places, despite the limited area of the current village boundaries, some areas appear to be evolving into ‘de-facto’ agreed protected areas.

**Livelihoods from the forest**

The perceptions of communities show diversity and only further assessment will reveal the broad basis for possible general prioritisation of action. Indications based on some communities are:

- Food is considered the most important class of forest product, followed by construction materials, and then craft materials. Amongst food, wild pigs are the most prized commodities, though fish and hill sago are also crucial;

- Flood damage and crop failure has a long history in the area. The forest is seen as an insurance against these and other catastrophes;

- Punan people make considerable use of forest species, and little of weedy species. For Kenyah/Merap (more agriculturally based) this situation is reversed;

- Some forest products were depleted (such as rhino horn) or went (or are going) close to depletion (such as gutta percha in the past, gaharu at present);

- The state logging company cuts down the undergrowth in all compartments that have been logged – this slashing damages more non-timber products that local people need than the timber extraction alone does;

- Local people claim non-timber forest products (NTFPs) to be the best source of income, but it might not be true for everybody. It appears that the NTFP trade has
gone through booms and busts over the last 100 years;

- NTFPs in Bulungan are cultivated in some localities and not in others;

- A shortage of preferred construction materials is already being felt in some localities despite the large extent of surrounding forest;

- People report a decline in many forest products (e.g. wildlife, rattan and construction timber);

- There is a considerable trade in cage birds;

- Local people place high value on maintaining primary forest (top of everyone’s lists of priority land types);

- Many Punan do not keep adequate rice reserves to see them through the year.

LESSONS TO DATE AND FUTURE DIRECTIONS

The research on social aspects has to date focused on the local indigenous populations. This is not for lack of interest in other stakeholders but in order to bring their knowledge level to a "level playing field" with others. As things stand, all other stakeholders - the local government, the logging firm, the coal mining company, the national government - all these can articulate their position and intentions easily and with clarity. The local people cannot do the same. The research has sought to find out their attitudes; what they know of the history of the forest and its use; nature of forest use and its place in livelihood strategies; property regimes and dependence levels and characteristics; desires for the future of the forest etc.

The ultimate goal is to develop information that explicitly includes factors that could determine good land-use. Research has yielded useful knowledge but has also led to new methodologies and clearer definition of further questions to research.

There is a learning process even as research proceeds. Among key lessons being learned from Bulungan is that the interface with agriculture and the general economy is as an integral part of natural resources research and CIFOR should maintain its broad approach rather than focusing narrowly on the forest. Also important is that from the local community perspective, the forest is important as a source of food - quite apart from its other functions. Livelihoods are a central preoccupation in the views of local people to the forest.

Thus in formulating the follow-up to the ongoing ITTO project, the intention is to build upon the knowledge developed so far. The new phase will seek to start drawing some "best practices" extracted from Bulungan work. There has been extensive consultation.
that has led to a conceptual framework (see Diagram 1) that identifies sub-optimal land use and management as the core problem. The important components of this central problem involve: changing livelihood options, lack of “best management practices”; lack of appropriate institutional capacity, and increasing competition for land and non timber forest resources.

Diagram 1: The conceptual framework for long-term Bulungan research

Future research will seek knowledge essential for addressing these problems. To maintain success, CIFOR will retain its partnerships and will invite even more collaborators. In research, as in other forms of human enterprise, unity gives strength.
SOURCE DOCUMENTS

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