12.315

PN-ACC-039
106676

ANNUAL REPORT

Covering Period: October 1, 1998 to September 30, 1999

Submitted to the U.S. Agency for International Development; Bureau for Global Programs, Field Support and Research; Center for Economic Growth

"Managing Rattan Diversity for Forest Conservation"

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Institution: Herbarium Bogoriense

Project Number: 12.315

Grant Number: HRN 5600-G-00-93-00047-00

(formerly HRN-5600-G-00-3047-00)

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Project Duration: October 1, 1993 to September 30, 2000

NOV 22 1999

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Executive Summary:

This project is investigating the ecology, use, cultivation and management of rattan in Lore-Lindu National Park (LLNP), Sulawesi, Indonesia. Specifically, we are investigating: 1) rattan abundance and site preferences; 2) seed production, survival, growth and resprouting rates; 3) human impacts on rattan resources and their role in local livelihood strategies; 4) the cultivation and management of the premier rattan, Calamus zollingeri; and 5) a model for sustainable rattan harvesting.

During the past year, project collaborators: 1) monitored rattan and associated environmental characteristics in five permanent transects, specifically recording plant/cane resprouting and growth rates, response to and evidence of cane harvesting, light and soil conditions, and natural and human-caused tree falls; 2) monitored seedling survival and growth rates in four farms and one primary forest site into which rattan had been transplanted in 1998 (findings - survival rates of >96% greatly exceeded expectations); 3) analyzed rattan leaves and canes to ascertain nutrient losses associated with harvesting (findings - nutrient losses are minimal); 4) sampled rattan abundance, distribution and site preferences in additional montane forest sites; 5) conducted detailed socioeconomic studies in one village to ascertain changes over the past three years (findings - significant changes in livelihood strategies and forest and agricultural practices have occurred); 6) submitted manuscripts to the journals *Agroforestry Systems* and *Palms*; and 7) presented a poster at the 2nd International Canopy Conference, Marie Selby Botanical Gardens, Sarasota, FL and invited presentation at the University of Michigan and Cornell University. During the past year there was close collaboration between the PI and the social scientist co-PI that included training and employing two Indonesian social scientists re. field survey research methods.

Section I

A) Research Objectives:

The primary goals of this project are to investigate the ecology, local use and potential for sustained-yield management of economically-important rattan in southern Lore-Lindu National Park (LLNP) in Central Sulawesi, Indonesia. Specific project objectives include: 1) ascertaining the abundance and site preferences of C. zollingeri and other economically-important rattan in natural forests; 2) determining seed production rates, survival, growth and vegetative reproduction of economically-important rattan in natural forests; 3) determining human impacts upon rattan resources, including extractive and cultivation practices, and the role of rattan-based activities in local livelihood strategies; 4) evaluating the ecological and socioeconomic viability of cultivating and managing C. zollingeri in natural forests and perennial-based farming systems; and 5) developing a model for sustained-yield C. zollingeri management in natural forests and protected areas that balances local economic concerns with the conservation of biological diversity. During the past year, research efforts focused on objectives #1, 3 and 4.

B) Research Accomplishments:

Since the last annual report, project collaborators: 1) Continued to monitor rattan plants and canes, and environmental factors in five permanent transects. Specifically, we recorded growth rates, response to harvesting, light and soil characteristics, and evidence of cane harvesting, and natural and human-caused tree falls. 2) Monitored the survival and growth of rattan seedlings transplanted into four hillside farms and one remnant primary forest parcel near Moa. Survival rates of >96% greatly exceeded expectations and growth was vigorous. 3) Collected and completed additional analyses of rattan leaves and canes to ascertain nutrient losses associated with cane harvesting. We found that cane harvesting has no significant effect on nutrient stocks in the ecosystem. 4) Sampled rattan flora, abundance, distribution and site preferences, and collected herbarium specimens in two additional montane forest environments. We found that there is a unique and more diverse rattan flora in montane zones (at approximately 1100 m) and we submitted rattan specimens to Herbarium Bogoriense and Kew, England for identification. 5) Conducted detailed socioeconomic studies in one case study village (Moa) to document changes that may have occurred since the first survey three years ago. We found that there has been a significant increase in the cultivation of cacao under largely full-sun conditions and that this is likely to result in adverse socioeconomic and agronomic effects (i.e., reduced food production and reduced productivity and stability of yields, respectively) and that rattan remains crucial to household livelihoods. 6) Prepared and submitted manuscripts for publication in the journals *Agroforestry Systems* and *Palms;* and 6) Attended and presented aspects of the work at the 2nd International Canopy Conference, Marie Selby Gardens in Sarasota, FL and at the University of Michigan (South and Southeast Asia seminar series) and Cornell University (Natural Resources seminar series.

C) Scientific Impact of Collaboration:

The project seeks to strengthen the research and conservation management capabilities of Herbarium Bogoriense, the Directorate General of Forest Protection and Nature Conservation (PHPA) and Indonesian conservation organizations. Specifically, the project seeks to: 1) improve ecological and

social science research skills among participating conservation personnel and students; 2) develop analytical techniques for conservation and sustainable management of a threatened plant resource; and 3) generate a methodological approach that seeks to balance biodiversity conservation, protected areas management and the economic needs of local people.

During the past year, project personnel collaborated in field research activities specifically in socioeconomic studies. The PI and social science co-PI trained and then employed two Indonesian social scientists (who work with NGOs in Central Sulawesi) in survey methods and data analysis. The results of the project, specifically that rattan harvesting does not appear to have adverse effects on biodiversity conservation objectives, is resulting in PHPA and The Nature Conservancy (TNC) rethinking their blanket prohibition against rattan cane harvesting in LLNP. P.I. Siebert and Co-P.I. Mogea also collaborated on project administration and management, with the latter assuming responsibility for the acquisition of equipment, materials and journal subscriptions for Herbarium Bogoriense.

D) Description of Project Impact:

Preliminary results from the project are being used to guide on-going and future research and are being used by TNC and PHPA in their collaborative protected area management efforts in and around LLNP. This includes consideration by the Government of Indonesia (PHPA) to designate "traditional use zones" in and around LLNP for sustainable extraction of rattan canes by local communities. TNC is currently working with PHPA to explore this option. Results of the research were presented at one international meeting (November 5-7) and at the University of Michigan (December 4) and Cornell University (Feburary 22).

E) Strengthening of Developing Country Institutions:

During the past year Herbarium Bogoriense acquired supplies through funds subcontracted by the project, including: herbarium maintenance materials (chemicals and mounting paper); field equipment; and subscriptions to several international journals. The project also supported training and field work by two Indonesian social scientists from Palu, Sulawesi who should be able to utilize their new skills in on-going NGO-related work.

F) Future Work

We remain on schedule in terms of on-going work. Researchers Siebert, Belsky and Indonesia counterparts plan to collaborate in the preparation of additional manuscripts during the coming year and in additional field work in August-September, 2000. In 2000 we plan to continue monitoring activities of wild and cultivated rattan, expand the geographic range of rattan abundance and distribution studies, continue work on rattan systematics, further develop a model of sustainable rattan cane harvesting, and offer a workshop re. rattan ecology, use, management and cultivation to PHPA, NGO and other interested officials in Palu, Sulawesi. We will also continue to collaborate on project administration and management.

We are seeking a two year no-cost extension of the project (i.e., through September, 2002). Extending the project will enable us to continue monitoring studies for an ecologically more meaningful period of time (i.e., develop more rigorous guidelines/model re. sustainable cane harvesting and

cultivation) and to expand field work (particularly to additional montane forest sites which remain poorly known).

Section II

A) Managerial Issues:

No major managerial problems were experienced during the past 12 months.

B) Budget:

We are seeking a two year no-cost extension to increase the scope and duration of our research. This will be particularly beneficial in monitoring rattan growth and yield in natural forests, in assessing the effects of harvesting on subsequent cane production, in monitoring the rattan cultivation trials, and will enable us to develop a more rigorous model of sustainable rattan management.

C) Special Concerns:

The current economic and political instability in Indonesia has not adversely affected the project. However, co-PI Mogea has found it increasingly difficult to travel out of Bogor. During the past field season PI Siebert contracted cerebral malaria; he was treated in Singapore and has fully recovered.

D) Collaboration, Travel, Training and Publications:

Investigators Siebert and Belsky collaborated on socioeconomic and policy studies and incorporated two Indonesian social scientists in the field research.

Travel completed during the past twelve months included:
Siebert - March/April (8 weeks): Palu/Lore-Lindu, Sulawesi;
Belsky - March/April (8 weeks): Palu/Lore-Lindu, Sulawesi;
Siebert - Fall (September-December): University of Michigan (sabbatical leave, not funded by project);
Siebert - November (3 days): Sarastoa, FL (attend conference); and
Siebert - February (3 days: Cornell Univ. (present seminar; not funded by project).

Travel expected during the next 12 months:
Siebert - to Kuala Lumpur, Malaysia & Sulawesi (August-September, 2000)
Attend and present a paper at the IUFRO meetings in Malaysia,
Continue ecological studies of marked rattan, monitor rattan seedling survival and growth in transplant sites, continue and expand ecological studies in montane forests, and offer rattan workshop in Sulawesi.
Mogea and other Indonesian collaborators - to Sulawesi (August-September, 2000)
Collaborate in the above activities.

E. Request for AID or BOSTIC Actions:

Approve no-cost extension request.