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# THE NEW YORK BOTANICAL GARDEN 86280

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Project No.: 936-4200

To Whom It May Concern:

As per the requirements of the above referenced grant agreement, The New York Botanical Garden is pleased to submit two copies of a narrative report for the project: "Ecology, Use, and Management of Native Fruits in West Kalimantan, Indonesia."

Please contact me at (718) 817-8671 or by fax at (718) 220-6504 if you have any questions.

Sincerely,

Deborah P. Hertz  
Grants and Contracts Manager

CC: Dr. Christine Padoch  
Dr. Chuck Peters

enclosures

Recent fieldwork conducted as part of the project Ecology, Management and Conservation of Native Fruits in West Kalimantan, Indonesia has concentrated on three main areas: (1) floristic surveys of forest and cultivated fruits in various districts ("kabupaten") of West Kalimantan; (2) management and yield of market fruits in the peat environments of Punggur, and (3) market studies of selected fruit species of importance.

Over the past months, Dr. Charles Peters has completed several quantitative inventories of forest fruits in the Sambas, Sanggau and Kapuas Hulu districts. In an attempt to document the fruit resources existing in primary, undisturbed forest, these inventories were specifically conducted in areas zoned as either Nature Reserve (*Cagar Alam*), wildlife Reserve (*Suaka Margasatwa*) or protection forest (*hutan lindung*). Official permission to conduct research in these conservation areas was obtained through the Office of Forest Protection and Nature Conservation (PHPA) of the Department of Forestry. The fruit surveys in Kapuas Hulu were conducted within the Danau Sentarum Wildlife Reserve, the Sambas work was focused on the Raya-Pasi Nature Reserve, and the Sanggau transects were sampled in a variety of different protection forests located in the Bonti, Jangkang and noyan sub-districts. Fixed-width transects were used to document the density and population structure of fruit trees in different habitats; use information about different species were recorded in unstructured interviews with local villagers. Over 5.0 kilometers of transect were sampled in these surveys, and use, density and populations structure data were collected for over a hundred different species of edible fruits. The Anacardiaceae (*Bouea Mangifera*), Bombacaceae (*Durio*), Euphorbiaceae (*Aporosa*, *Baccaurea*, *Elateriospermum*), Moraceae (*Artocarpus*) Meliaceae (*Lansium*), Myrtaceae (*Eugenia*), and Sapindaceae (*Dimocarpus*, *Nephelium*) were found in the most important native fruit plant families.

In addition to his work in undisturbed forest, Dr. Peters has also conducted fruit inventories in a variety of different managed forest or agroforestry systems. A 0.5 hectare sample conducted within an Iban forest orchard (*tembawang*) in Kapuas Hulu, for example, revealed that local forest managers plant over 50 different species of useful plants. Included in this total are four species of durian (*Durio* spp.), nine species of *Artocarpus*, seven varieties of rambutan (*Nephelium* spp.), eight types of mango (*Mangifera* spp.) and three species of illipe nut (*Shorea* spp.). In terms of structure and function, these managed systems closely resemble the local hill forests. The important difference, however, is that the Iban obtain an important source of income from the orchard. Dr. Peters has conducted similar floristic studies of managed forests near the villages of Bagak Sawah (Sambas district) and Tae (Sanggau district). It should be noted that the latter village is also the principal site of Dr. Christine Padoch's detailed studies on the traditional management of native fruits.

Christine Padoch continued her study of transition from shifting cultivation to a pattern of permanent-field rice cultivation and agroforestry in the village of Tae. With the help of research assistant Adi Susanto, data were collected to document the economic and social concomitants of this transition. Through interviews with each of the household heads in the hamlets of Tae and Padang information was collected throughout the year on labor inputs in the various types of agriculture, including fruit cultivation in highly diverse

tembawang. Data were also collected on recent fruit plantings and on harvest and sales of important fruits, particularly durian.

As the patterns of marketing of fruit are changing rapidly in the area, extensive data was also collected on marketing and changes in tenure and access to economically important fruit-bearing trees. Information on the demographic situation and dynamics of Tae and Padang was also updated.

Several scholarly and semi-popular articles which included data collected in Tae were written and a few were published.

Elysa Hammond, a doctoral student at the Yale School of Forestry, has continued her studies of the market-oriented agroforestry systems developed by Buginese and Madurese settlers to produce commercial fruit (e.g. lansat, rambutan and durian) in the vast peat swamps surrounding Pontianak. Hammond's current research addresses the issue of long term sustainability by monitoring the change in selected soil properties (physical and chemical) as the ecosystem is gradually transformed from logged-over peat swamp forest to productive, intensively managed fruit orchard. To facilitate comparisons, replicate soil samples were collected from the same chrono-sequence of sites used to describe the composition, structure, management, and productivity of different developmental stages. These samples are currently being analyzed at the soils laboratory of the University of Tanjungpura in Pontianak.

Dr. Syamsuni Arnani of the University of Tanjungpura has re-instigated his bi-weekly surveys of the eight produce markets in Pontianak to monitor fluctuations in the quantity and price of different native fruits. One major fruiting season has already been recorded. Dr. Arnani has also recently started a series of detailed studies to trace back and document the marketing networks used with especially high-value fruits such as durian, rambutan, and lanset. These studies are of great interest given that an increasingly large quantity of native fruit is being sold to buyers from Sarawak.