

Non-timber forest products extraction activities of traditional communities in the upstream Mamberamo Basin of West Papua, Indonesia

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Abstract. *Rahawarin YY. 2017. Non-timber forest product extraction activities of traditional communities in the upstream Mamberamo Basin of West Papua, Indonesia. Asian J For 1: 23-26.* Forest provides a variety of resources that benefit traditional communities, including indigenous communities in Papua. The aim of this study was to investigate the utilization of non-timber forest products (NTFPs) by local communities in the upstream part of Mamberamo Basin, West Papua, Indonesia. Field surveys, direct observation and semi-structural interviews were conducted to generate data. The results showed that the local communities in the upstream part of Mamberamo Basin extract several non-timber forest products over the course of their generations to fulfill basic daily necessities and to generate cash incomes. Sago palm (*Metoxylon sago*) was among the most important non-timber forest products which are used as a staple food, while hunting freshwater crocodiles (*Crocodylus porosus*) for its skin and collecting agarwood (*Gyrinops* sp.) were the primary activities to generate cash incomes. These activities have lasted for generations, so people called them traditional conservation. They are believed to be done on a sustainable basis to keep the availability of non-timber forest products to fulfill the daily needs over generations.

Keywords: Non-timber forest products, local communities, upstream part, Mamberamo Basin, traditional conservation

INTRODUCTION

Forest ecosystem is a life-supporting system that provides a wide range of ecosystem services, especially for the surrounding communities. The components of forest ecosystem, such as wild animals, plants, water, and soil, support a better socio-economic condition for the society (Rahawarin 2010a, 2010b). Tropical forest is very rich in flora and fauna, which can be utilized to fulfill human needs, such as timber and non-timber products (NTFPs) for the present and next generations (Masripatin 2007).

Papua is located in the eastern part of Indonesia with an area of over 421,981 km². The vast area of Papua stretches over various types of ecosystems, from coastal to mountain ecosystems, including tropical rainforest with its rich biodiversity elements which serve as the source of livelihoods of traditional communities (Beno et al. 2009). Petocz (1987) and Conservation International (1999) reported that there are about 20,000-25,000 species of plants, 200,000 species of insects and invertebrates, 330 species of reptiles and amphibians, 650 bird species, and 164 mammals in the land of Papua.

Indigenous communities in Papua are highly dependent on forest resources. The utilization of forest products by local communities in Papua is not limited solely to the flora, but also to the fauna through traditional hunting. Pattiselanno (2003) claimed that hunting of some wild animals in the tropical rainforest in Papua gives a significant contribution to the communities, not only to

provide protein but also to generate income for traditional households.

However, wild animal hunting warrants investigation since this practice is not necessarily sustainable in the long run. Studies by Robinson and Redford (1994) and Robinson and Bodmer (1999) showed that hunting in several tropical rainforests was not sustainable and wild animals will be very vulnerable to over-exploitation which can lead to extinction.

Departed from such issue, it is important to investigate the sustainability of forest resources in Papua in relation to the extraction activities, not only on animals but also on other components. Therefore this research was conducted to study the utilization of non-timber forest products (NTFPs) by local communities in the upstream part of Mamberamo Basin, West Papua, Indonesia.

MATERIALS AND METHODS

This study was conducted at the upstream part of Mamberamo River, administratively located in Bernakamp, Taive, and Dabra Districts of Mamberamo Raya Regency, West Papua. In general, the location is characterized by a rigged area dominated by mountains and small rivers flowing to the sea (Figure 1).

Field surveys, direct observation and interviews were applied in this study. Through field survey and observation, primary data of flora and fauna were taken. Socio-

economic and cultural data were also gathered through oral interviews by asking the communities using key questionnaires. Sampling plots were made in the forests to collect data on the diversity and distribution of the flora, while for the fauna, enumeration technique was carried out which was based on the preliminary information given by the communities. The surrounding forests belonging to the Tabruta Tribe were surveyed based on their daily activities in the forests. Several tools were used in data collection including manual diameter tape, Haga altimeter, binocular camera, documentation tools, and stationery.

Secondary data on biophysical conditions of the surrounding forests in which extraction activities were carried out by the communities were collected through literature research of documents from relevant stakeholders. The data were analyzed descriptively.

RESULTS AND DISCUSSIONS

Distribution of Non-Timber Forest Products

The main distribution of Non-Timber Forest Products (NTFPs) is located upstream of Mamberamo Basin. This

area consists of various landscapes, including lowland forest, swamp forest, and man-made agricultural lands (Figure 1). Based on a report published by the Agricultural Service of Mamberamo Raya District (2012), the total area is about 317,353 Ha which is dominated by lowland forest (96.68%) from the Plateau of Taribu Mountain at Taria Village, Bernakamp village to the Rotia Mountain in the Dabra area. Swamp forest (2.64%) is distributed in the Mamberamo Basin along the tributaries which flow to the northern part which form many small lakes. These areas are used for farming *Mozambique tilapia* (*Oreochromis mossambicus*), common carp (*Cyprinus carpio*), and freshwater crocodiles (*Crocodylus porosus*). There are around 20-25 lakes regularly used to fulfill the household needs. The total area intended for fish and crocodile farming is about 1-2 Ha. In addition, the swamp forest around the upstream of the river are planned for cultivation of sago (*Metroxylon sagu* Rottb.), and a handful of areas is allocated for hunting wild boar (*Sus scrofa*). The locations for sago are quite limited which are around the lowland forest.



Figure 1. A. The vegetation condition of Taribu Mountain; B. The landscape of Rotia Mountain; C-D. The lowland tropical forest viewed from the upstream of Mamberamo river, West Papua, Indonesia

The percentage of NTFPs from agriculture sector is only 0.58%, mainly used as the source of carbohydrates, vegetables and protein, including protein from animals. The total cultivating area for each household is approximately around 0.25-0.5 ha.

The previous studies by Allen et. al. (2002) and Binur and Ohee (2010) reported that there were 22 species of NTFPs found the upstream of Mamberamo River (Table 1). Based on the interviews in this study, the communities consider NTFPs commodities as the primary source to generate household income, namely the extraction of agarwood and crocodile skin for accessories. Other products also generate income, but are less significant, such as the yields from gardening, hunting and fishing.

Utilization of Non-Timber Forest Products

The communities who live upstream of the Mamberamo River extract the NTFPs based on their traditional ways and beliefs. For example, agarwood from the lowland forest is extracted using traditional ax or blade by cutting the tree and taking out the resin then sold it. There are no specific skills needed for the management and processing.

Sago as the major source of staple food for the traditional communities is extracted using simple traditional methods by cutting down the tree using an ax, rinsing with water to disentangle the starch and sago residue, and packing the starch with a traditional bag made from sago leaves. Besides the starch, the midribs of Sago plants are used to make roofs of the traditional houses around the Mamberamo River. Those processes are managed in the traditional way without formal education. Instead, the information is just passed from generation to generation within the communities.

Crocodiles hunting activities are carried out by setting the fishing equipment or catching them directly from rivers, usually in the evening. The animals are then transported to the house in order to take out the skin. The young crocodile's meat is cooked or grilled for consumption. The skin is preserved by pouring it with salt then covering it with a plastic bag.

Generally, the upstream communities in Mamberamo do not work as fishermen to get cash income, but they do fishing only to fulfill their daily needs (Polhemus and Richards 2001). Other NTFPs intentionally planted in the surrounding area are *Areca catechu*, taro and cassava for consumption.

Table 1. List of Non-Timber Forest Products utilized by indigenous communities in the upstream river of Mamberamo, West Papua, Indonesia

Name of species		Parts of plants	Purposes
English name	Scientific name		
Agarwood	<i>Gyrinops</i> sp.	Resin and tree bark	The resin is traded whereas the tree bark is used for walls of houses.
Betel palm	<i>Areca catechu</i>	Fruits	Chewed in <i>pinang-sirih</i> activities either for self-consumption or for sale.
Cananga	<i>Cananga odorata</i>	Stems and bark fiber	Stems are used for construction materials and bark fiber for material and traditional bag (<i>noken</i>).
Crocodile	<i>Crocodylus porosus</i>	Meat and scale, skin	Meat is eaten and skin is sold.
Dammar	<i>Vatica rassak</i>	Sap	Used to make candles for light.
Figs	<i>Ficus</i> sp.	Tree bark and fiber bark	Tree bark is used for covering the food whereas the bark fiber is made into traditional bag and clothes.
Fijian longan	<i>Pometia pinnata</i>	Fruits	Used as edible fruit
Common carp	<i>Cyprinus carpio</i>	Meat	Meat is eaten and sold.
Guava	<i>Syzygium</i> sp.	Fruits	Used as edible fruit.
Masohi	<i>Cryptocarya</i> sp.	Bark	The bark is sold.
Melinjo	<i>Gnetum gnemon</i>	Bark fiber, leaves and fruits	Leaves and fruits are edible. Bark fiber is made into <i>noken</i> .
Mozambique tilapia	<i>Oreochromis mossambicus</i>	Meat	Meat is eaten and sold.
Orchid	<i>Dendrobium</i> sp.	All parts of the plant	Used as decorative plant
Palm	<i>Orania</i> sp.	All parts of plant	Leaves and midribs are used for construction materials, whereas stems are used to make bows and arrows.
Palm	<i>Hydriastele</i> sp.	Stems and all parts plant	Stems are used for construction and hand-made crafts. Palm is used for home decoration.
Palm	<i>Linospadix</i> sp.	Leaves	Leaves are used for construction.
Rattan	<i>Korthalsia zippeli</i>	Stems	Stems are used for materials and construction, i.e., chairs, tables, and fences.
Red fruit	<i>Pandanus</i> sp.	Fruits and leaves	Fruits are edible and leaves are used for housing floor materials.
Sago	<i>Metroxylon</i> sp.	Sago starch, leaves, stems midribs and trunks	Sago starch is commonly used as a staple food and sold; leaves and midribs are used for construction materials; stems are applied for media, sago caterpillar for food protein.
Stinging tree	<i>Laportea indica</i>	Leaves	Used as traditional medicine.
Wild boar	<i>Sus scrofa</i>	Meat and teeth	Meat is eaten and sold, while teeth are used for accessories/souvenirs.
Yellow fruit moonseed	<i>Arcangelisia</i> sp.	Stems	Used as traditional medicine

Traditional conservation of NTFPs

With regard to the availability of NTFPs, conservation and preservation actions are required. There are a number of solutions in order to keep the benefit of NTFPs while maintaining future availability for generations to come. It is clear that the utilization of NTFPs for self-consumption and small-scale commercial activities are managed in a sustainable way by considering the natural capacity. However, extensive activities and cultivation are mandated to do in the communities to reduce the over-exploitation in the natural habitat. Land is continuously managed for growing some edible crops and domesticated animals. For example, during dry season when level of water in the river is reduced, the communities tend to alter their daily activities into the swamp forests and rivers. On the other hand, during rainy season the communities are focused on the high land to extract NTFPs.

The communities believe that by managing the forest and nature in a sustainable way, they will continuously get benefits from them. Such beliefs that traditional communities carry have been made into some traditional regulations and customs. For example, every hunting activity should get permission from the traditional leader. Sumule (1995) and Pattiselano (2006) reported that some areas in Papua belong to certain ethnic groups or clans; therefore, besides requesting the permit, they also should share some of their hunting product with the communal landholders.

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