

## THE RELIANCE OF FOREST COMMUNITY ON FOREST FOR LIVELIHOOD: A CASE OF KAMPUNG WAWASAN, SOOK, SABAH, MALAYSIA

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### ABSTRACT

*Tropical forest ecosystem provides important timber and non-timber forest products and services especially to communities that live within or adjacent to forests. The purpose of this paper is to describe the forest resources available and used by villagers; and the reliance of the community on forest resources for livelihood. Rapid Rural Appraisal (RRA) which consists of structured questionnaire interview and transect walk was used to determine the forest resources used, socio-economic standing, and rank the importance of forest resource. The community of Kg. Wawasan community relied on forest resource on a subsistence basis because of its vicinity to the forest, ease of obtaining forest resources, to supplement their daily needs, and far distance from markets. The community consist of low income earner (<RM1000) with limited opportunity or interest to pursue employment in other sectors. About 25 plant species were harvested from the wild for food medicine, utensil, timber and building material. About 19 animal and fish species were hunted and trapped for their own consumption. The main activities related to reliance on forest products are harvesting and gathering of plants, hunting and trapping wild animals, fishing and food preservation. Their reliance on forest products is mainly for subsistence and not for income generation due to laws that prohibits commercial activity.*

Keywords: forest community, livelihood, non-timber forest products, low income earner

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### INTRODUCTION

Indigenous communities in Sabah have had a long standing relationship with the land area, relying on the abundant resources of the forest and developed agriculture practices for their livelihood. Population was sparse and most of the land area was heavily forested and neglected. Shifting cultivation was a normal practice in the olden days until the state government began to gazette forested area as forest reserves (FRs) in stages especially in the 1960s under Malaysia forest laws to secure, protect and manage forests for multiple uses (UNDP, 2008). Subsequently, the ancient practice was not allowed in forest reserves, and slowly fell out of favor as the population grew and privileged farmers took part in government-led farming schemes. Farming schemes consolidated small holdings and introduced group farming with financial and technical support from the government (Britannica, 2017). Land ownership became important because of competition for land area allowed for agriculture that strengthen the shift from temporary to permanent and modern type agriculture. Land titles were given and secured land tenure meant that farmers began to plant tree crops with long gestation period (Miyakuni, 1999) and intercropping with cash crop which gave farmers income in the short and long term period. Current agricultural production is predominantly based on oil palm and rubber with a

variety of cash crops produced for local consumption. Urbanization has resulted in the decline in the proportion of population engaged in agriculture (UNDP, 2008).

However, landless farmers and new settlers continue to occupy government-owned forested land in the hope of taking new land under cultivation by planting fruit trees and rubber gardens (Miyakuni, 1999; Løvenbalk *et al.*, 2003). New settlement usually begins with slash and burn, then trees intercropped with cash crop and food crop. This approach has been in practice by local communities not only to secure future income but also to strengthen exclusive rights to land around trees on state land and FRs (Miyakuni, 1999). Indigenous communities that continue to depend on low-income generating jobs such as traditional and subsistence agriculture, fishing and relying on forest products harvesting largely contribute to severe poverty (UNDP, 2008). Living adjacent to and especially those living within forest reserves meant that the community lack access to clean water, electricity, basic infrastructure, road networks and limited access to the natural forest. These areas are usually great distances from schools, hospital and market places which put the communities at disadvantage for earning additional income. Productive forest and forest on state land are usually highly degraded forest lands especially and unproductive land for agriculture due to intensive logging and past shifting cultivation activity. In Sabah, the level of poverty is continually high and slow to decline due to unequal income distribution with high prevalence of hard core and rural poverty (UNDP, 2008). In Malaysia, low income earning households is categorized into 'poor' and 'extreme poverty', with differing income threshold for the three main states. Poor households earn less than for RM760 (USD 178), RM1050 (USD 246) and RM910 (USD213) monthly for Peninsular Malaysia, Sabah and Sarawak states respectively. Extreme poverty household are those than earn less than RM RM460 (USD 108), RM630 (148) AND RM590 (USD138) monthly for Peninsular Malaysia, Sabah and Sarawak states respectively (PEMANDU, 2015).

Following a state directive for FAO/UNDP Forest Sector Planning Project that began in 1986, Sustainable Forest Management Licence Agreement (SFMLA) based on SFM principles was implemented in 1997. Private companies were issued long-term forest management agreements of the Forest Management Units (FMUs) (UNDP, 2008). Sustainable forest management can be defined as the process of managing forests to realise identified objectives for management of forest to ensure continuous production of forest products and services while not decreasing the inherent value and future productivity, and cause unfavourable effects on the physical and social environments (ITTO, 2004). The Community Forestry (CF) concept within FRs was introduced in 1984 but only formally began state wide in 1997 when the guideline for CF planning was placed under the responsibility of the District Forest Officer (Sinajin, 1997 cited from Su and Grace, 2005). Today, CF programs are the responsibility of the Social Forestry Unit, SFD and covered under Forest Management Plans (SFD, 2008).

In this study, the forest community are people that live within a forest reserve, their daily life, access to natural resources, means of livelihood, and movement are governed by the regulations enforced within a production forest reserve. This paper will describe the forest resources available and used by villagers; and the reliance of the community on forest resources for their livelihood.

## STUDY AREA

The study was conducted in Forest Management Unit 11 (FMU11) situated in the rural district of Sook, Keningau Sabah between longitudes 116° 15' E dan 116° 50' E and latitudes 04° 41' N and 05° 30' N. The area is licensed under Sustainable Forest Management License Agreement (SFMLA) in 1997 with a tenure period of one hundred years. The concession consist of two forest reserves, the Ulu Sungai Milian FR (77,888 ha) and Sapulut FR (30,877 ha). It is classified as class II production forest reserve (FR) for managing forest for timber and other products. It has a total area of 108,665 ha designated to four main management zones; Natural Forest Management (NFM), 50,109 ha, Industrial Tree Planting (ITP), 29,194 ha, Community Forestry Zone (CFZ), 2,132 ha and Conservation, 27,230 ha. Some 45,473 ha of forest land are heavily degraded with low timber stocking due to the past heavy timber exploitation, history of periodic forest fires and shifting cultivation activities by bordering community villages. The soil type is 55% Crocker association and 25% Maliau association which are located in hilly terrains, 10% Sinarun association on terraces with 15-20° slope, and less than 5% is Lokan association on areas with more than 25° slope. The type of vegetation is mixed dipterocarp forest and hill forest (BTSB Annual Report, 2008). The mean temperature ranged from minimum 22 to 30°C maximum, and averaged at 25.8°C temperature. Mean annual rainfall is 1825mm, which ranges from 123mm to 203mm monthly rainfall (<https://en.climate-data.org/location/36082/> accessed 16/6/17). The case study was conducted in a small settlement known as Kg. Wawasan, involving 22 families from 14 households that have settled in the area since 1985. It is located in the CFZ which covers 40% of Compartment 59 with a total area of 400 ha. Each family was involved in rubber and cash crop farming for their main income, and food crop farming for their own consumption.

## MATERIALS AND METHODS

### Rapid Rural Appraisal

Rapid Rural Appraisal (RRA) is a qualitative participatory research methodology that was used to gather and analyze information about rural communities (Freudenberger, 1995). Data gathering tools in RRA are also used in Participatory Rural Appraisal (PRA) (Asia Forest Network, 2002). In RRA, the information is gathered and extracted by the surveyors and researchers. PRA is an approach and methods for learning about rural life and conditions from, with and by rural people (Chambers, 1994). For this paper, the results are obtained through RRA which consists of non-structured interview, structured interview, and transect walk.

Non-structured interview was conducted to obtain fundamental information. The history of the FMU establishment and operations, CFZ and their experiences in managing people living within the FMU were obtained from forest managers and supervisors. The village head of Kg. Wawasan was interviewed to obtain the history of their settlement, information about villagers, agriculture activities and their dependence on forest. Structured interview (Schrevel, 2002) involved all head of families to obtain their socio-economic background, the forest resource available and usage, wealth holdings and income from various activities and dependence on forest resource. A pilot study was conducted to validate and improve the questionnaire. Two transect walks each covering 500m of Kg. Wawasan, surrounding agriculture and forest area were conducted to include different micro-ecological zones. Three main components which are tree and forests, land and agriculture, and animals or livestock were recorded. A checklist containing questions pertaining to each component will be used as a guide to obtain more information (Freudenberger, 1995). Diagrams were produced that illustrate the different landscape components throughout the transect walk and its properties. Scoring and ranking importance as an indication of reliance on forest resource for livelihood was conducted (Chambers, 1994).

### Data analysis

Data was compiled and analyzed using IBMSPSS ver. and Microsoft Office Excel 2010. Total monthly household incomes were computed as, (forest income + agriculture income + wage income). Wage income is the total value of earnings from hiring out of labor on another household, wage from employment in other sectors and pension (Langat et al., 2016). Socio-economic information was presented as descriptive analysis. In terms of importance of forest resources, household were asked to rank the importance of forest resources based on seven-point level (1 = not important to 7 = most important). The analysis with the use of graphs and plots will clearly show the socio economic description of the community, the natural endowment and the agriculture activity, the various forest products used and the importance of forest resources to indicate their reliance on the forest for livelihood.

## RESULTS

### Socio-economic

There were 22 all male respondents representing head of each family from Kampung Wawasan. The respondents were from the Dusun ethnic indigenous group of Sabah but migrated from Ranau District in search of arable agriculture land in the Interior Division in Keningau District. About 80% were Christians while the rest were Muslim. There was a wide age distribution, ranging from less than 20 to more than 60 years old. Forty-five percent of the respondents had at least secondary school education, 18% had primary education, and 36% had no schooling. About 95% are married and 5% not married. The period of residency amongst respondent differed from a little less than 20 years with the longest having stayed about 30 years (since 1985). Their primary income was obtained from farming, and summarized as 4.5% (>RM1500/month), 9% (RM1250-1500/month), and 86% (<RM500/month). All of the household built houses made of locally sourced wood and bamboo for flooring and walls, and used zinc for the roof. Living within the FRs has restrictions including the collection of timber or non-timber forest products (NTFPs) for commercial exploitation or monetary gain was strictly prohibited. Forest products are only used for daily sustenance since market places are too far away.

### The usage of forest products for livelihood

A total of 25 species of wild plants (Table 1) and 19 species of wild animals and fishes (Table 2) were listed as being harvested from the forests for their consumption. In Table 1, the portion of the plant and their various uses are described in detail together with additional information about the respective species.

**Table 1: List of plants harvested from the forest for consumption**

No.	Vernacular Name	Scientific Name / Family	Plant type/Uses/Other description	Other description
1	Bambangan/ embang/ mawang	<i>Mangifera pajang</i> Kost/ Anacardiaceae	Tree/Aromatic fruit eaten raw, fermented, seasoning, young leaves edible/	medicinal properties as anti-cancer, anti-cholesterol
2	Beluno/binjai/ Machang	<i>Mangifera caesia</i> Jack / Anacardiaceae	Tree/Fruit eaten raw, salad, flavoring, wood for timber	poisonous sap can injure
3	Bambu / Bamboo	<i>Bambusa</i> sp. / Poaceae	Graminoid/Young shoots for foot, stem for utensil, building material, cooking vessel	
4	Dalai/Job's tears	<i>Coix lachryma-jobi</i> / Poaceae	Graminoid/Hard-shelled pseudocarp is hard, oval used as beads; boiled and sweetened with sugar as a drink	2 varieties; hard & soft shelled; soft-shell are cereal crop with medicinal properties
5	Asam gelugor	<i>Garcinia atroviridis</i> Griff ex T. Anderson /	Tree/Edible fruit and leaves for flavoring &	Fruit is preserved by drying. Wood can be

		Clusiaceae	cooking, sour/medicinal plants used for women after child birth, ear ache	used as timber.
6	Hintotobu	<i>Ficus septica</i> / Moraceae	Shrub or small tree/ Latex, leaves, fruit & root has medicinal value	Latex for treating wounds, leaves/fruit for purging, headache, cough, colds, fever; root poultice for boils
7	Kapur	<i>Dryobalanops</i> spp. / Dipterocarpaceae	Tree/wood for timber/construction	
8	Kedondong	<i>Canarium dichotomum</i> (Bl.) Miq. / Burseraceae	Tree/Fruits eaten raw, salad with rice	
9	Lamiding/ Miding	<i>Stenochlaena palustris</i> (Burm.f.) Bedd / Blechnaceae	Fern/young shoots for vegetable, eaten cooked, rhizome can be used for binding, making baskets;	Fronde has mild laxative to treat diarrhea, fever
10	Mahang	<i>Macaranga</i> spp. / Euphorbiaceae	Tree/Light timber	Not for construction
11	Panggi/ Keluak/ Kepyang	<i>Pangium edule</i> Reinw./ Flacourtiaceae	Tree/ Fruit edible after removal of toxic substance, taste almond-like, used for cooking and preserving fish (fermented)	Highly poisonous, seed contain hydrocyanic acid
12	Pengolaban/ Medang/ Engkala	<i>Litsea garciae</i> Vidal / Lauraceae	Tree/Fruit edible, eaten after boiling, creamy & avocado-like, wood for construction	Oil extracted from seed can be used to make candle & soap
13	Petai / Bitter bean/ Stink bean	<i>Parkia speciosa</i> Hassk. / Fabaceae	Tree/Fruit edible eaten raw or cooked with rice; seed has strong odor, pickled in salt; young leaf, pod and flower stalks edible; wood for construction,	Seed has medicinal values – treat liver disease, oedema, kidney inflammation, wounds, ulcers, diabetes, dispel intestinal worm
14	Polod	<i>Arenga undulatifolia</i> Becc./ Arecaceae	Palm/apical bud or heart of palm as vegetable; utensils, roof thatching	Over consumption of heart of palm can cause toxic effects; traditionally used for making blowpipe darts; fruit is poisonous, contains oxalate crystals, used criminally
15	Rumbia/ Sagu	<i>Metroxylon sagu</i> Rottb. / Arecaceae	Palm/ Fronds used for roof thatching, young leaves and heart of palm as vegetable, grub of <i>Rhynchophorus</i> spp. on decaying trunk edible	Trunk can be processed into starch as staple food
16	Seraya	<i>Shorea</i> spp. / Dipterocarpaceae	Tree/ wood for construction	
17	Takob akob/ Asam aur aur/ Kundong/ Kandis	<i>Garcinia parviflora</i> (Miq.) / Clusiaceae	Tree/Young shoots & leaves eaten as vegetables; fruit eaten raw or ingredient for cooking, sour; young fruit and rind are dried for flavoring dishes; wood for light construction	Wood for carving
18	Tandaki/ Palm grass/ Bristle grass	<i>Setaria palmifolium</i> Willd. Ex. Poir/ Poaceae	Graminoid/Young flower shoots and grain are edible but small; medicinal plant	
19	Temberuak	<i>Plectocomiopsis geminiflora</i> (Griff.) Becc. / Arecaceae	Palm, rattan/rattan shoots edible but bitter	Cane poor substitute for rattan
20	Terap/ Timadang/	<i>Artocarpus odoratissimus</i>	Tree/Ripened fruit eaten	

	Mahang	Blanco/ f. Moraceae/ sf. Artocarpeae	raw, sweet creamy & strong scent; seeds edible after boiling or roasting, taste nutty; young fruit cooked as vegetable	
21	Tombirob/ Pulau	<i>Alstonia scholaris</i> / Apocynaceae	Tree/wood for light construction, utensil	Medicinal value of the bark, leaves, roots. Latex for chewing gum.
22	Tongkat ali/ Pasak bumi	<i>Eurycoma longifolia</i> / Simaroubaceae	Shrub or small tree/ root is boiled & the water consumed as health tonic, aphrodisiac, fever, diarrhea, dysentery, indigestion; very bitter	Poultice for headache and stomach ache
23	Tuhau/Tipu/ Tubu/Topos/ Tepus	<i>Etilingera coccinea</i> / Zingiberaceae	Shrub/Young shoots eaten raw or cooked as vegetable, pickled; use as a spice; fruit edible & sweet, strong smelling	Leaf for treating fever; sheath for basket and rice wrapping
24	Wadan	<i>Dinochloa scandens</i> (Blume ex Nees) Kuntz/ Poaceae	Graminoid/Young shoots eaten as vegetable; culms for utensil, building material	
25	Paku-pakis/ Pako	<i>Diplazium esculentum.</i> / Athyriaceae	Fern/Fronds cooked as vegetable or salad	Mild amount of fern toxin

**Table 2: List of animal and fish harvested from the forest for consumption**

No.	Vernacular/Local Name	Scientific Name	Family	Type
1	Asiatic soft shell turtle/ labi-labi	<i>Amyda cartilaginea</i>	Trionychidae	Reptile
2	Asian water monitor/ Biawak air	<i>Varanus salvator</i>	Varanidae	Reptile
3	Borneo Phyton/ Ular sawa borneo	<i>Phython breitenstein</i>	Phythinidae	Reptile
4	Catfish	<i>Clarias</i> spp.	Clariidae	Fish
5	Patin/ Stripped catfish	<i>Pangasius hypophthalmus</i>	Pangasidae	Fish
6	Pelican	<i>Tor douronensis</i>	Cyprinidae	Fish
7	River eel	<i>Anguilla</i> sp.	Anguilidae	Fish
8	Snakehead/ Ikan haruan	<i>Chana striatus</i>	Channidae	Fish
9	Tilapia	<i>Tilapia</i> spp.	Cichlidae	Fish
10	Baong kuning	<i>Mystus planiceps</i>	Bagridae	Fish
11	Barking deer/Red muntjac/ Kijang	<i>Muntiacus muntjak</i>	Cervidae	Mammal
12	Horseshoe bats	<i>Rhinolophus</i> spp.	Rhinolophidae	Mammal
13	Bornean bearded pig	<i>Sus barbatus</i>	Suidae	Mammal
14	Sunda clouded leopard	<i>Neofelis diardi</i>	Felidae	Mammal
15	Greater mouse deer/ pelanduk	<i>Tragulus napu</i>	Tragulidae	Mammal
16	Malayan porcupine/ Landak raya	<i>Hystrix brachyura</i>	Hystriidae	Mammal
17	Palm civet/Toddy cat/ Musang pulut	<i>Paradoxurus hermaphroditus</i>	Viverridae	Mammal
18	Pangolin/Tenggiling	<i>Manis javanica</i>	Manidae	Mammal
19	Sambar deer	<i>Rusa unicolor</i> (syn. <i>Cervus unicolor</i> )	Cervidae	Mammal

#### The land resources

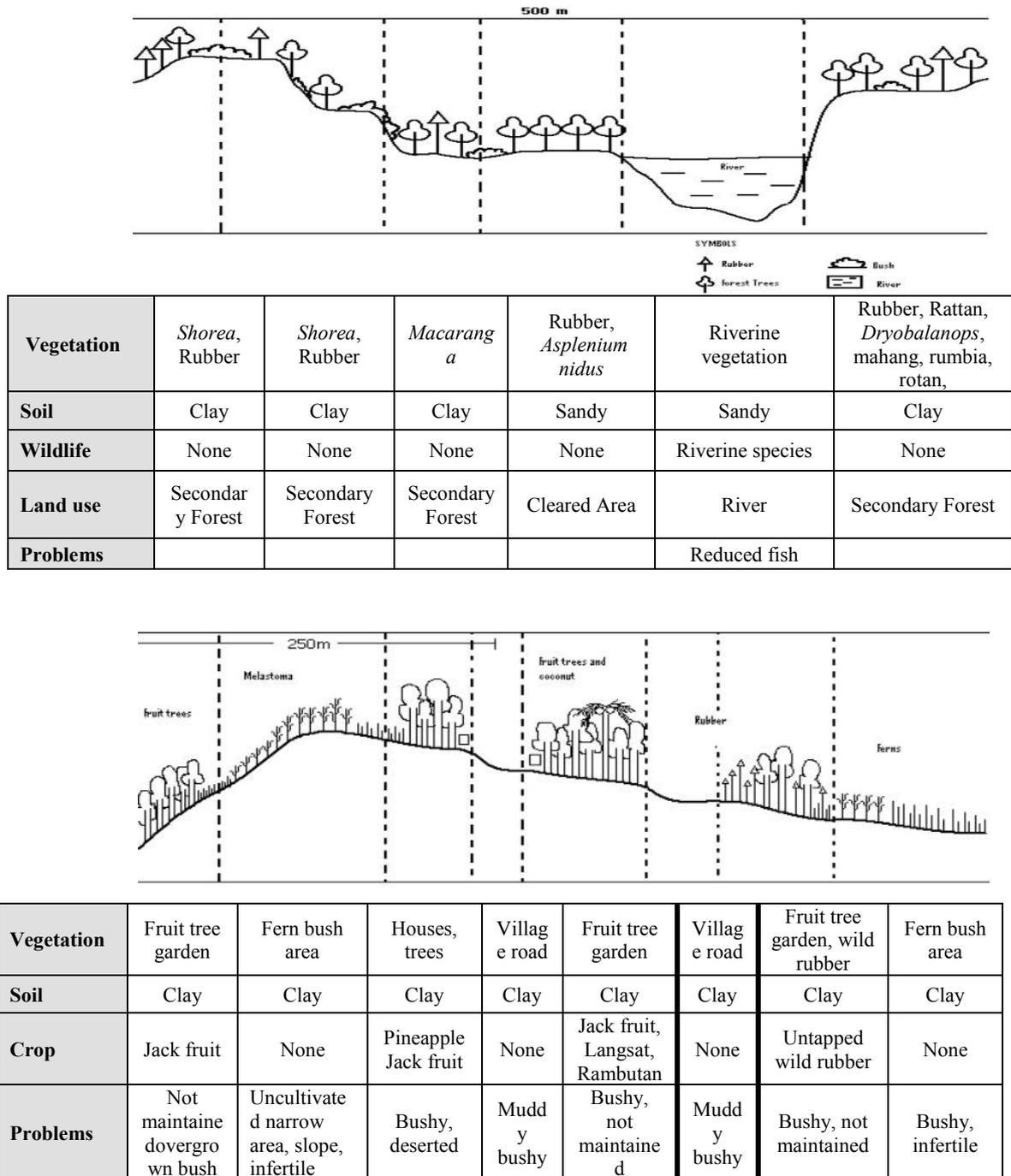


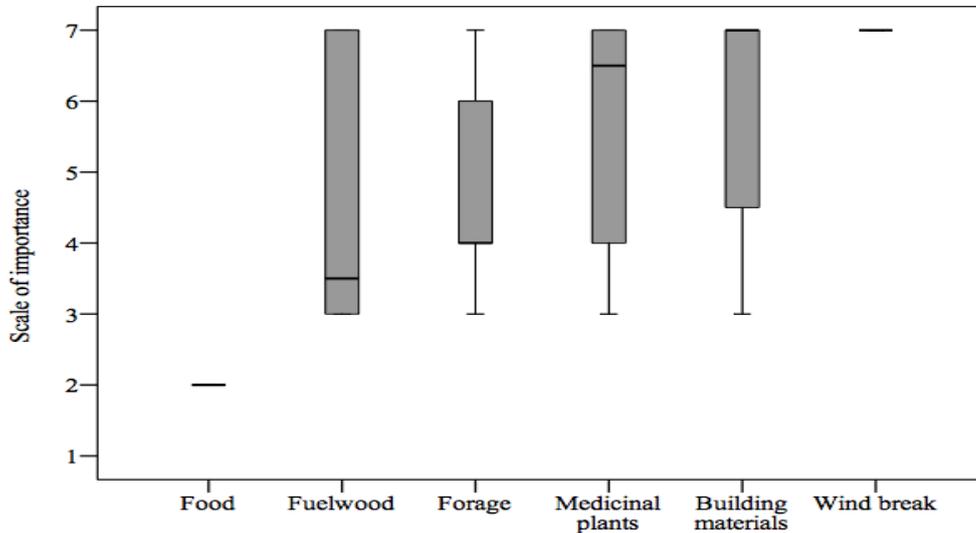
Figure 1: Diagram of two transect lines of 500m within adjacent forested area of the community forest zone

The diagram of two transect lines each measuring 500m were conducted in the CFZ is presented in Figure 1. It illustrates the landforms and vegetation, and a table which shows vegetation type, soil, crops and possible problems across the transect walk. The two transect walk are different from each other, as the first transect has more forest coverage mainly secondary forest and not planted with crops. Therefore, the area was used to collect timber and NTFPs for daily consumption. A river was within the transect walk and identified as a source for fish. The second covered landscapes that contain homes and areas used for tree-based planting or agroforestry with sparing patches of infertile bush and fern areas. The clay soils are possible less suitable for intensive agriculture but suitable for the growth of wild ferns, which also provides food for the community.

#### The importance and reliance of local community on forest resources

The ranking of forest resources importance based on household perspective are visualized in box plot (Figure 2). The usage of forest resources including: food, fuelwood, forage, medicinal plants, building materials, and wind break. The categories of forest resource usage are based on household feedback. The results show that food was ranked as the most importance by household,

followed by fuelwood, and forage. Other non-timber forest products such as medicinal plants were ranked in the fourth place and seemed to be less important to household. Moreover, the importance of forest resources as building materials and wind break were likely to have less attention by household. A majority of household highlighted that most of them use forest resources for food purpose (100%) followed by fuelwood (96%). Interestingly, fifty-five percent of household mention that the forest forages are important for them. While, other forest resources usage including medicinal plants (27%), building materials (18%), and wind break (9%) have less usage by household (Figure 3). This explicates that the usage of forest resources is limited due to forestry regulation and most of household are not allowed to harvest forest resources from the forest reserve area.



Note: Box plots present the importance ranking of forest resources based on seven-point scale (1 = most important and 7 = not important)  
The position of usage of forest resources are based on rank of importance (ranked from the highest)

Figure 2: Importance ranking of forest resources

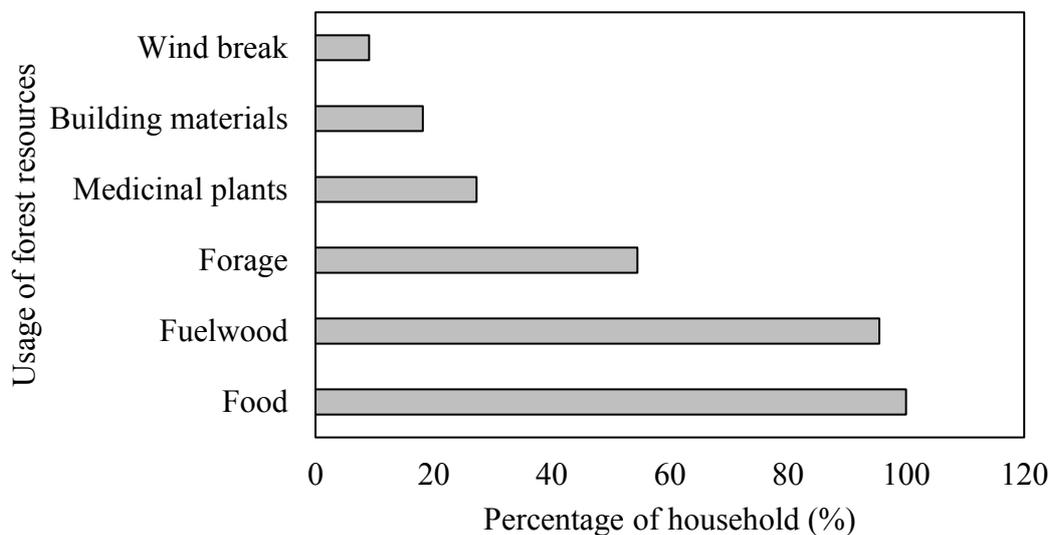


Figure 3: Proportion of forest resources usage by household

## DISCUSSION

The dependence of the community on natural resources, need to be understood in the local context as in their utilization as a result of natural attribute and the social structure of the community (Stedman 2004). The relationship and dependence of communities on any resources can be distinguished in the form of cash economy dependence on resources (Nord, 1994) or subsistence dependence. Often community dependence on forest resources is associated with periodic unemployment (Howze, 1993) and poverty (Bliss et al., 1992). The community of Kampung Wawasan moved into the forest reserve from another location with the primary aim of making a living off agriculture and securing rights over the land. Clearing forest land, shifting cultivation and thence permanent fruit tree and rubber cultivation was common practice by local people to lay claims on land (Løvenbalk et al., 2003; Miyakuni, 1999). Similarly, the community of Kg. Wawasan practiced fruit-tree and rubber-based

agroforestry (Maid et al., 2010). Small portion of the area was cleared for agriculture due to their small population, limitation of good road access, usage of minimal machinery, and distance from market places. The Forest Management Unit 11 (FMU 11) concession area was awarded in 1997 whereby managing community forestry was part of the forest management plan. This meant that community were restricted from opening up new areas for agriculture, and could not gather from the forest more than their daily requirements. Thus, livelihood cannot be improved whilst living in the forest reserve because income generation cannot be increased from the exploitation of forest resources and traditional agriculture methods. Throughout Sabah, pockets of community continue to live within FRs have very uncertain livelihoods due to ambiguous status over land rights and access to land which brings about restriction over land use and collection of forest products. Furthermore, there are great distances to basic facilities and thus lack access to medical and health care services, education services, and access to markets that would support economic activity (UNDP, 2008).

The community will need to adapt productive methods of agriculture through agroforestry and mixed species planting to increase agriculture output and diversity. For example, forest-dependent communities in Canada are experiencing changes by becoming less economically reliant on the forest sector and participating in a more diversified economy (Natural Resources Canada, 2009). The driver for the shift from decades of reliance on forestry industry is due to numerous obstacles such as the global economic crisis, competing markets, competing use of forest land for other uses and land claims, climate change (extreme weather and water shortage), and biotic (pest and diseases) pressures that forced communities to enhance their adaptive capacity. Young people respond by emigrating to find employment in other sectors (Joseph and Krishnaswamy, 2010) to improve their well-being. Therefore, the younger people of Kampung Wawasan ability and interest to participate in other income generation activities and reduce reliance on forest products and service will be crucial for their livelihood improvement.

Stedman et al. (2004) presented an overview of the relationship between resource dependence and human well-being in Canada, revealed great deal of variation in the effect of 'resource' dependence on indicators of well-being (e.g. human capital, unemployment, income). Poverty is widely used as an indicator of well-being, and agriculture exhibit fairly positive outcomes. In this study, income was primarily generated from cash crop on an annual basis, while rubber only generate income in the 5<sup>th</sup> year after planting during most time of the year. Income is insecure and dependent on climatic conditions and season. The community is at risk of losing income in the event of cash crop failure and extreme climatic conditions. This can aggravate the high poverty rate in Kampung Wawasan. Dependence on non-industrialized forest and agriculture sector in rural Canadian society was also associated with negative findings such as community stability (Kaufmann and Kaufmann 1946), poverty rates, low income (Bliss et al. 1992) and unemployment (Howze 1993). The impact of agriculture on rural community livelihood depends on geographic space that encompasses natural endowments such as land, climate, and topography and social relations (Lobao, 1990). In Kg. Wawasan, the surrounding forest is high degraded and reduced to secondary forest. It also has to share the forest resources with villages around the FRs. In terms of social relations, as settlers they may be considered outsider or non-locals by surrounding villagers and lose out on trade.

Although, this study did not obtain the monetary value of forest resource usage, it is vital for their survival and daily living. The Kampung Wawasan community made no reference to economic dependence based on share of income derived from forest resources perhaps fearing actions taken against them. Living in the FRs and not having legal status, basic amenity such as treated water, electricity, market, and transportation are absent. This predicament seems to be repeated in other developing country (Langat et al., 2016; Banarjee and Madhura, 2013; Nayak et al., n.d.). The more advantaged household that own cars or motorcycle have means to travel to buy and transport basic necessity. Some own generators for generating electricity and portable gas for cooking. Poor household that lack all of these facility must rely heavily on forest and agriculture resources for food and have the knowledge on food preservation. Forest are the main source of food, water, fuelwood for the household in Kampung Wawasan. Although not ranked highly, all the household sourced wood and bamboo to build their houses, storage structures and utensils. In Kenya forest income share are higher for poor households, contributing up to 33% of the total household income which include fuelwood (50%), food (27%), construction material (18%), fodder and thatching material (5%) despite being illegal for collection (Langat et al., 2016). In India, rural communities depend on the forest to rear their livestock and also to support agricultural activities which can potentially lead to degradation of its forest. Degradation of forest can reduce the livelihood of the communities dependent on forest (Banarjee and Madhura, 2013). Farmers collect resources from the forest for agricultural implements such as fencing, leaf litter for manure and herbs for pest problems (Nayak et al., n.d.). In order to conserve and maintain the integrity of the surrounding forest, the villagers of Kg. Wawasan should be encouraged to plant tree species useful for construction, fuel wood and bamboo and rear some livestock within the CFZ for their own consumption or for additional income. Furthermore, rural household should pursue a wide range of livelihood strategies and engage in activities in higher economic return. This could be possible for better endowed household than poorer household (Babulo et al. 2008). Therefore, authorities managing the forest community could offer financial loans or assistance so that poor families can engage in economic activities.

## CONCLUSION

About 25 plant species were harvested from the wild for food medicine, utensil, timber and building material. About 19 animal and fish species were hunted and trapped for their own consumption. The main activities related to reliance on forest products are harvesting and gathering of plants, hunting and trapping wild animals, fishing and food preservation. Their reliance on forest products is mainly for subsistence and not for income generation due to laws that prohibits commercial activity. The community heavily relies on the forest to source water, food, fuelwood, building material and utensils, and medicinal use.

## ACKNOWLEDGEMENTS

The research was funded by the Ministry of Education Malaysia (MOE) through research grant FRG0103-NSH-1/2007, and we thank Bornion Timber Sdn. Bhd. for technical assistance and access to the site.

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