FOOD AVAILABILITY, AGRICULTURAL PRODUCTS AND FOOD CONSUMPTION PATTERN IN PEATLAND AREA ("Tabat"): Phase 1

(Study at Kalampangan, Sebangau Sub district, Palangkaraya, Central Kalimantan, Indonesia)

Clara M. Kusharto and Annis Catur Adi

Bogor Agricultural University
E-mail : kcl@indo.net.id

ABSTRACT

Geographically, those who live in non-fertile land area are potential on being vulnerable groups. Peatland can be categorized as marginal land with low fertility. Generally, this study was aimed to developing intervention model using food based approach, environment (ecological apporoach) and education strategy as an effort to increase household food security among the community living in peatland area ("Tabat" and non "Tabat" area) in Central Kalimantan. At the first phase, we studied the potencies, identified agricultural products, food accesibility and food availability in peat-land area, by conducting survey, and literature study. It was a cross-sectional study involving households which have children under two years old in peatland area ("Tabat") as the subjects of the study. The 30 households were randomly selected. The first stage was conducted in November - December 2008 in Kalampangan, Sebangau Sub-district, Palangkaraya, Central Kalimantan.Tabat" is one of alternative solutions for restoration of marginal peat land area to support economic development and food security in Central Kalimantan. The existences of "Tabat" enable people to do fish-farming using keramba along the canals. They can also plant trees, vegetables and fruits around the canals which may also become the habitat for some local fish. The food products then can be used for own-consumption or for sale as source of additional income. Regarding food consumption pattern, food which were commonly consumed by most of the children were rice, biscuits, chicken egg, chicken, lele fish, gabus fish, spinach, carrot, banana and orange/lemon.

Keywords: *tabat, peatland, food availability, agricultural products, Central Kalimantan*

INTRODUCTION

It has strongly considered that various disasters and crisis which are recently occurred in many places in Indonesia had impacts to the stability of basic need accomplishment (particularly food) of the poor household. This may influence health and nutritional status of vulnerable groups in the household. Thompson (1997) identified vulnerable groups on food insecure based on geographical condition and individual vulnerability. Geographically, those who live in non-fertile land area are potential on being vulnerable groups. Peatland can be categorized marginal land with low fertility.

Food insecurity and safety is one of the greatest challenges following poverty, mainly in marginal land areas. The general objective of the study is to develop an intervention model using food based approach, environment and education as an effort to increase household food security and food safety among the community living in peatland area ("Tabat" and non "Tabat" area) in central Kalimantan.

"Tabat" is one of alternative solutions for restoration of marginal peat-land area to support economic development and food security in Central Kalimantan, since this province has large peatland area (around 3.1 million hectare). "Tabat" is local term of Dayak Tribe which means large dike made from woods. "Tabat" is built using *gelam* woods (*Mealaleuca*) which have diameter around 20 centimeters. To strengthen it, bags of clays are arranged behind the dike. As the time longer, the surface of water on the dike becomes higher and diffuse to its surrounding area. The existences of "Tabat" enable people to do fish-farming using *keramba* along the canals. *Keramba* is fish-farming system using a kind of cage which is placed on the stream water. People may also plant trees, vegetables and fruits around the canals where the peatland has become wet land. The canals also become a habitat for some local fish such as *kapae, pepuyu* and *haruan* or *gabus*.

Agricultural production system are different according to ecological, social and cultural differences, therefore, this will influence household food availability and also influence household food consumption pattern (Fieldhouse, 1995). It can be inferred that food availability is not a single factor affecting food security. It also as a result of integration of other factors: ecology, economy and culture.

General objective of the study was to develop an intervention model using food based approach, environment and education as an effort to increase household food security and food safety among the community living in peat land area ("Tabat" and non "Tabat" area) in Central Kalimantan.

Whereas the **specific objectives** were: 1) to identify potency of local food (indigenous food production), food acessibility and food availabilty in "Tabat and non tabat areas; 2) to study food pattern, habit and its determinants (socioeconomic, demography and cultural environment) among vulnerable groups, such as infant and children under five in "Tabat area, and to develop food processing technology and educational strategy; and **3)** to do intervention collaboration with local University and Local Government.

Benefits of the Study were : 1) as an input for the planner and decision maker related to food, nutrition and health in peatland areas; 2) as a baseline information for strategy of education and development of supplemental food and processed food diversification to improve quality of food consumption, health and nutritional status of the community in peatland area; and **3)** as an additional reference on developing science related to food, nutrition and health (*human dimension*) in peat land area.

METHODOLOGY

This study was a development study which consisted of 3 phases: *First phase*, study the potency of food (agricultural products) , food accessibility and food availability in "Tabat" and Non "Tabat". *Second phase*, develop technology and educational strategy for low income families with underfive children , and *Third phase*, intervention.

First phase was done to study the potencies and to identify food and consumption problems in peatland area, by conducting survey, and literature study. It was a cross sectional study involving households which have children under two year in peatland area (*Tabat*) as the subject of the study. The sample (subjects) was selected by using random sampling technique. The first stage was conducted in November - December, 2008 in Kalampangan, Sebangau sub district, Palangkaraya. Second and third phase, were adjusted based on the results found in the first phase of this study, and considering the availability of resources.

Data collected in this study consisted of two types: primary and secondary. The primary data include: household characteristics, Food potency, food availability and food consumption. Questionnaires and completion form after revision were used to collect the data. While secondary data included the coverage of food and agriculture program from CKPP, Palangkaraya University, NGO (Care International), Health Service, etc.

Thirty household with under two years old children in Kalampangan, Sebangau sub district, Palangkaraya were taken as the sample of this study. Households were drawn randomly from the sampling frame of listed households which meet the criteria.

Data processing consisted of editing the questionnaires, coding, arrangement of file structure, data entry, editing files, raising variables, combining and separating file. Data processing and analysis was done using Microsoft Excel 2007 and Statistical Analysis Software SPSS 15.0.

RESULTS AND DISCUSSION

1. General Characteristics of "Tabat" area in Sebangau

In general, the objectives of Inpres no 2 tahun 2007 was to accelerate rehabilitation and revitalization of peatland area in Central Kalimantan, which consists of: 1) conservation, rehabilitation and reforestation of around 1.1 million hectare (78.5%) forest ecosystem and other ecosystems; 2) cultivate food crops, horticulture, plantation, fishery, animal husbandry etc of around 0.3 million hectare (21.5%), supported by development and management of products as well as water management to improve community productivity; and 3) Local community and transmigrants empowerment by providing basic infrastructure including transportation, improvement and service of housing, improvement of human resources quality, improvement of supporting media, and other means needed in the field.

"Tabat" is one of alternative solutions for restoration of marginal peat land area to support economic development and food security in Central Kalimantan, since this province has large peat land area (around 3.1 million hectare). The existences of "Tabat" enable people to do fish farming using *keramba* along the canals. *Keramba* is fish-farming system using a kind of cage

which is placed in the stream water. People may also plant trees, vegetables and fruits around the canals where the peat land has become wet land. The canals also become a habitat for some local fish such as *kapae, pepuyu* and *haruan* or *gabus*.
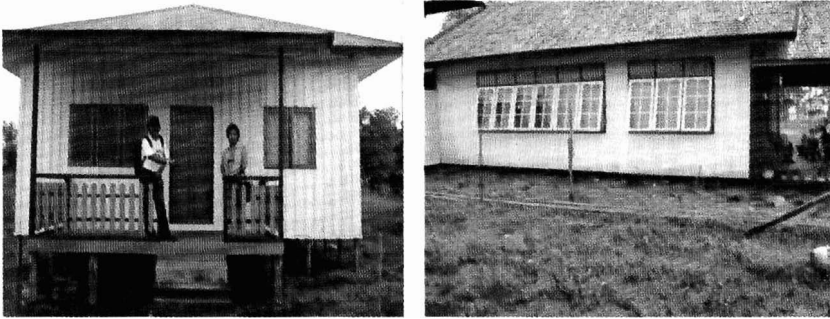

Figure 2. Condition of houses in peatland area

2. Characteristics of the Households

Most of the inhabitants were transmigrants from Java (Central and East Java) since 1980s. According to the condition of each area and the purpose of transmigration program itself, most of the head of the households work as land owner farmer (47.0%), non land-owner farmer (33.5%) and others (merchantmen). Household income were varied from Rp. 500.000 until Rp 2.000.000, with average Rp. 923.076 (above the poverty line).

The household size, were mostly (56.6%) medium, and only 43.5% which consisted of 1-4 persons (categorized as small). According to the norm of small, happy and welfare family consists of a father; a mother, and two children (BPS, 2000). The household size would influence the space per inhabitant in house building, which in turn also affects children health (Sukarni, 1989).

Television is an electronic goods with the highest number possessed (82.1%). This indicates that source of information and entertainment come from this electronic media. Attracting our attention is the hand phone (mobile phone), ownership (84.0%) because it can be used as the symbol of prestige and shows an awareness of the importance of better communication.

3. Resources and Agricultural Products of the Households

Agriculture Resources of land and livestock

Land is an essential production factor in agricultural activities. Most of the households have more than 1 hectare of land and only 5.6% have less than 0.5 hectare of land. It was probably due to transmigration program which allow household to own relatively large size of land. On the contrary, households who have relatively small size of land were not transmigrants, and the main occupation was not as farmer.

Rural people usually consider livestock as their saving. Types of the livestock raised by the households were mostly chicken. Other kind of livestock was duck, goat, and cow. Chicken was commonly raised in rural area due to its easiness to be exchanged for money. In addition, poultry rising can produce meat and eggs for daily.

Type of vegetables planted

Besides considering the potency of land availability, selection the type of vegetables commodity planted in an area should be market oriented (vegetable is perishable goods). Types of the vegetables recommended: red pepper, tomato, cabbage, broad bean, long bean, spinach, mustard green and soy bean.

Tabel 1. Distribution of Household according to Agriculture Resource Property

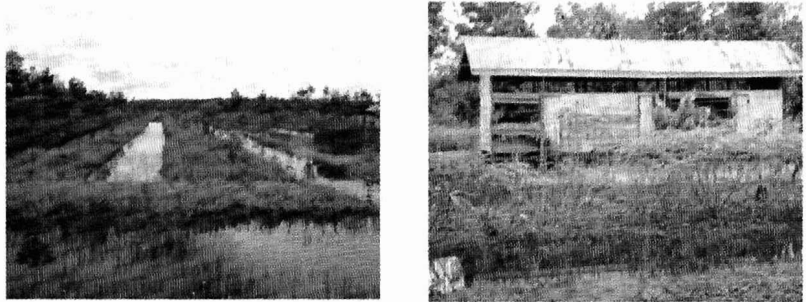| Land (N = 18)			Livestock (tail) (N = 14)		
Size (Ha)	n	%	Kind of livestock	n	%
< 0.5	1	5.6	Chicken	11	78.7
0.5 – 1	4	22.3	Duck	1	7.1
1 - 2	10	55.5	Goat	1	7.1
>2	3	16.6	Cow	1	7.1
	18	100.0		14	100.0

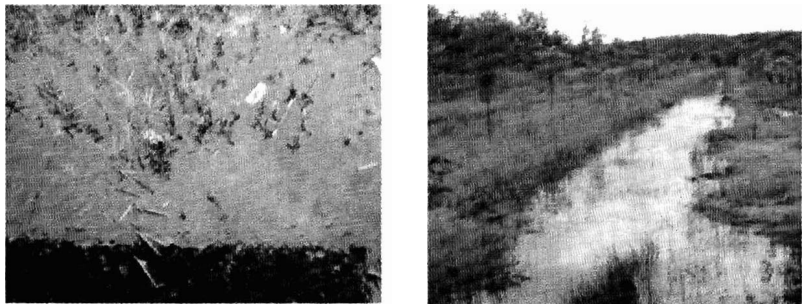**Figure 3.** Agricultural land and livestock

Figure 4. Fish potency around the houses and non-irrigated field

Regarding the types of fruits planted, they can also plant trees, fruits around the canals which the peat land has become wet land. The types fruits planted, were including: papaya, rambutan, guava, mango and banana are seasonally abundant.

Fish Resources

The existence of "Tabat", enable people to support their food availability by doing fish-farming using "keramba" along the canals. Keramba is fish farming system using a kind of cage which is placed in the stream water. The canals also become the habitat for some local fish such as *kapae (lele), haruan (gabus), pepuyu, sepat, patung, kapar* and *saluang*, which can be used for their own consumption or for sale to get additional income.

2. Food Accessibility and Food Availability in the Households

Daily food source of household was mostly obtained by purchasing and own production (93.3 %) and only 6.7 % of the households obtained their food from purchasing. It was due to the condition of its geographical areas in Kalampangan, Sebangau as agricultural area which is known of its agricultural products, and most of the head of the households work were transmigrants which rely on agricultural activities.

3. Food Consumption

Geographically, vulnerable group for food insecurity was found in non-fertile area. Peatland can be classified as marginal land with low fertility. Whereas individually, pregnant women, lactating women and children are classified as vulnerable groups. However, in this study, we only studied further on the food consumption pattern of children under two year old.

Frequency of Staple Food.   Table 3 shows that cereal food or rice is consumed daily, whereas corn, cassava, sweet potato and potato are rarely consumed by the children. Eating rice as the major food has been the typical culture of Indonesia. There are several reason why rice is chosen as the major food, among others are 1) it has good flavor, 2) it is quick and practical to serve, and it contain better nutrition composition compared to corn, cassava and others.   There are several reason why noodle and biscuits are chosen as the major food product among others, are due to its good flavor, and its quick and practical to serve.

Accessibility of food source	N	%
Purchasing	2	6.7
Purchasing and production	28	93.3
	30	100

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Table 3. Consumption of staple food and its products by children under two years old

Type of Major Food	N	%	Frequency of Consumption (n / %)		
			Monthly	Weekly	Daily
Rice	28	96.5	0	0	28 (96.5%)
Corn	28	96.5	14 (48.2 %)	10 (34.5 %)	4 (13.8 %)
Cassava	28	96.5	25 (86.2 %)	1 (3.4 %)	1 (3.4 %)
Sweet Potato	28	96.5	19(65.5 %)	7 (24.1 %)	1 (3.4 %)
Potato	26	89.6	15 (51.7 %)	9 (31.0 %)	1 (3.4 %)
Bread	29	100	20 (69.0 %)	8 (27.6 %)	1 (3.4 %)
Noodle instant	29	100	12 (41.4 %)	6 (20.7 %)	8 (27.6 %)
Bihun	17	58.6	17 (58.6 %)	0 (0 %)	0 (0 %)
Biscuit	29	100	11 (37.9 %)	13 (44.8 %)	5 (17.2 %)

Note : Total sample was 30 and 1 children only consumed breast milk

Tabel 4. Consumption of animal food and its products by children under two years old

Type of food	n	%	Frequency of Consumption (n / %)		
			Monthly	Weekly	Daily
Large Animal					
Beef / Cow meat	25	86.2	25 (86.2 %)	0 (0 %)	0 (0 %)
Liver / Cow meat	17	58.6	16 (55.2 %)	1 (3.4 %)	0 (0 %)
Sausage / Cow meat	9	31.0	9 (31.0 %)	1 (3.4 %)	1 (3.4 %)
Small animal					
Chicken	28	96.5	12 (41.4 %)	6 (20.7 %)	8 (27.6 %)
Chicken Liver	28	58.6	17 (58.6 %)	0 (0 %)	0 (0 %)
Eggs					
Chicken egg	29	100	1 (3.4 %)	7 (24.1 %)	21 (72.4%)
Duck egg	15	51.7	12 (41.4 %)	3 (10.8 %)	0 (0 %)
Bustard egg	18	63.1	18 (63.1 %)	0 (0 %)	0 (0 %)

Note : Total sample was 30 and 1 children only consumed breast milk

Frequency of animal food. The types of animal foods consumed almost every day by the children were sausage, chicken and chicken egg. Eggs as the source of animal sources food is relatively cheap, and easy to be accessed. Beef was usually consumed only once or more in a month. This type of meat is rich in iron, which can reduce the risk of suffering anemia. The types of food were mosly purchased.

Frequency of Fish. Some of the children consumed fish almost every day (including sarden, *kembung*, anchovy, *ikan mas, nila, lele* and *ikan gabus*). *Lele* and *gabus* were consumed by most of the children, while cockle shell and shrimp were less or rarely consumed. Cockle shell and shrimp were relatively expensive, whereas *lele* and *gabus* were relatively cheap and can be accessed easily.

Frequency of Legumes. Soybean are major sources of vegetable protein, however, soy bean was not consumed daily by the children (Table 6). Tofu and Tempe were consumed daily by more than 70 % of them. Soybean cake has higher biological value than unfermented soybean although derived from the same soybean (Winarno, 1995). Almost all of the foods containing vegetable protein were obtained by purchasing, mainly the processed one. While raw vegetables (without processing), were mostly obtained by own production.

Frequency of Vegetable. Vegetable are sources or regulator substance which are benefical for growth and development of children. Supply of vitamins and minerals is essential in regulating biochemical process in human bodies. Most vegetables were obtained by own production around the house. Spinach and carrots were the most favorable vegetable for children. Asparagus was the least favorable vegetable, and rarely consumed by the children.

Frequency of Fruit Consumption. Fruit are source of vitamins and minerals. However, the children were still rarely consumed it. Most of the children consumed fruits in monthly basis. Banana and fruits were fruits which were mostly consumed. Banana and papaya can be obtained from on production, while orange and apple should be obtained by purchasing.

Tabel 5. Consumption of fish and its products by children under two years old

Type of food	N	%	Frequency of Consumption (n / %)		
			Monthly	Weekly	Daily
Shell	3	10.3	3 (10.3 %)	0 (0 %)	0 (0 %)
Shrimp	23	79.3	21 (72.4 %)	2 (6.9 %)	0 (0 %)
Sardines	24	82.7	21 (72.4 %)	2 (6.9 %)	1 (3.4 %)
Tongkol	15	51.7	13 (44.8 %)	2 (6.9 %)	0 (0 %)
Kembung	11	37.9	8 (27.0 %)	0 (0 %)	3 (8.3 %)
Anchovy	19	65.5	17 (58.8 %)	0 (0 %)	2 (6.9 %)
Mas	24	82.7	14 (48.2 %)	8 (27.6 %)	2 (6.9 %)
Nila	18	63.1	13 (44.8 %)	4 (13.8 %)	1 (3.4 %)
Lele	28	96.5	14 (51.7 %)	7 (24.1 %)	6 (20.7 %)
Gabus	27	93.2	7 (24.1 %)	4 (13.8 %)	5 (17.2 %)

Note   Total sample was 30 and 1 children only consumed breast milk

Tabel 6. Consumption of legume and its products by children under two years old

Types of food	n	%	Frequency of Consumption (n / %)		
			Monthly	Weekly	Daily
Soybean	19	65.5	18 (62.0 %)	1 (3.4 %)	0 (0%)
Mung bean	19	65.5	28 (42.8 %)	5 (17.2 %)	0 (0 %)
Peanuts	25	86.3	24 (82.7 %)	1 (3.4 %)	0 (0 %)
Tempe	28	96.5	0 (0 %)	5 (17.2 %)	23 (79.3 %)
Tofu	28	96.5	1 (3.4 %)	6 (20.7 %)	21 (72.4 %)

Note : Total sample was 30 and 1 children only consumed breast milk

Tabel 7. Consumption of vegetable and its products by children under two years old

Type of Food	N	%	Frequency of Consumption (n / %)		
			Monthly	Weekly	Daily
Spinach (bayam)	28	96.5	4 (13.7 %)	5 (10.3 %)	19 (65.5%)
Kangkung	27	93.1	7 (24.1 %)	6 (20.7 %)	13 (44.8 %)
Mustard green (sawi)	25	86.3	8 (37.6 %)	8 (27.6 %)	9 (31.0 %)
Carrot (wortel)	28	96.5	13 (44.8 %)	10 (34.5 %)	5 (17.2 %)
Tomato (tomat)	26	89.6	9 (31.0 %)	6 (20.7 %)	12 (41.4 %)
Stringbean (buncis)	24	82.7	19 (65.5 %)	3 (10.3 %)	2 (6.9 %)
Asparagus	28	27.6	8 (27.5 %)	0 (0 %)	0 (0 %)

Note : Total sample was 30 and 1 children only consumed breast milk

Tabel 8. Consumption of fruits and its products by children under two years old

Kinds of Major Food	n	%	Frequency of Consumption (n / %)		
			Monthly	Weekly	Daily
Pisang (banana)	29	100	12 (41.3 %)	13 (44.8 %)	4 (13.8%)
Mangga (mango)	28	96.5	26 (89.6 %)	2 (6.9 %)	0 (0 %)
Jeruk (orange)	29	100	20 (69.0 %)	6 (20.7 %)	3 (10.3%)
Appel (apple)	25	86.3	24 (96,0 %)	1 (4.0 %)	0 (0 %)
Jambu biji (guava)	21	72,4	17 (80.9 %)	2 (9.5 %)	2 (9.5 %)
Pepaya (papaya)	28	96.5	15 (53.6 %)	6 (21.4%)	3 (10,7 %)

Note : Total sample was 30 and 1 children only consumed breast milk

CONCLUSIONS AND RECOMMENDATION

Kalampangan, Sebangau is highly potential to supply agricultural products in Central Kalimantan. However, the managemenent should consider market aspects as well as considering socio economic condition and cultural aspects of the community, including food habit. Rice, biscuits, chicken egg, chicken lele, gabus, tempe, tofu, spinach, carrot, banana and orange/lemon were types of food which were consumed in daily basis by most of the children.

Based on the potency of local food availability (fish, nuts/legumes, sweet potato, banana, etc) are abundant during season and the study founds thats children like to consume biscuits. therefore, in next phase it is recommended to develop food processing technology for local food (used indigenous foods) in the form of "functional biscuit" as alternative supplementary feeding for malnourished children which was also proved in Sukabumi (West Java) study (Riewspassa, 2007; Kusharto *et al.*, 2008/9).

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