The Dependence of Ramba Sihasur Villagers to Non Timber Forest Products (NTFPs) on Dolok Sipirok Nature Reserve (CADSi) in Sipirok South Tapanuli District North Sumatera Province

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Abstract

This research is concerned with the dependence of rural poor people to protection forest. As in many case they are assumed as forest destroyer or being obstacles of forest conservation program. The major obstacle in forest conservation is a lack of understanding concerning the point of view between the parties involved, especially when it comes to the perception of nature. This study designed to analyze the relationship of socio-economic and cultural factors in using Non-Timber Forest Products (NTFPs) for household, economic and tradition need requirement. It is viewed necessary in determining forest conservation program. Research about "The Dependence of Ramba Sihasur villagers to Non Timber Forest Products (NTFPs) on Dolok Sipirok Nature Reserve (CADSi)" was conducted on October 2008 until January 2009. The purpose was to assess the role and importance CADSi has for the villagers, as well as related socio-economic and cultural aspects by explaining why the villagers are still maintain their activity on CADSi when the forest ban released, explaining factors influencing, identifying kinds of NTFPs were used and describing gender roles in collection. Research used qualitative and quantitative approach to gain the data and information, that expected its useful in analysis and findings interpretation. The result has indicate that the reason of perception regarding CADSi status were poverty, remoteness, difficulties to gain information and construct communication, hence low law enforcement. Dependence was influenced by ten factors, consist of: low education and knowledge level, income level, livelihood backgrounds, household size, resident status, duration of live in Ramba Sihasur, age and sex, traditions and culture. The evidence of the dependence on CADSi were NTFPs utilization that it was categorize in nine main type of utilizations, consist of : food sources, traditional medicine and technology, decoration, construction, fuel, hunting, tradition and culture. Totally of NTFPs has utilize in Ramba Sihasur village are 463 species, consist of 322 are plants and 143 are animals. In terms of gender, father dominated the NTFPs collection, such as hunting mammals, collecting wild honey, *lak-lak*, bamboo and *tolong*, medicinal plants and animals, rattans, *ijuk*, *maragat*, cinnamon barks, roofing materials, trapping birds, and fishing.

Kata Kunci : Dependence, Forest Community, Non-Timber Forest Products, Protection Forest

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1. Introduction

High population growth has increased demand on land. This growing demand is fulfilled by clearing more forest for various uses. The alteration of forest function in quality or quantity depends on the degree of utilization, such as for timber supply or for farming (Affandi and Patana, 2004). Modern living styles and market failures have also changed the community way of thinking. There is hardly any forests dependent community that does not integrate into system of market the Economic. Recently, natural resources are valued in monetary term that is to earn cash by selling forest products (Moeliono, 2005). From the period of 1990 to 2000, the forest area in Indonesia has lost at the rate of more than 1.3 million ha per annum, primarily due to conversion of natural forest into other forms of land use, such as agricultures and plantations (Brodbeck and Mitlohner, 2003).

Considering these conditions, DFID (2002) put serious attention to help the poor people through livelihood opportunities, nutrition improvement, health servie, water supply and at the same time reducing the vulnerability. DFID pays attention to local livelihood because state rarely considers the local communities definitions of security. Livelihood security is likely to revolve around issues of resources tenure that deter-mine access to land and natural resources. State on the other hand is predominantly interested in sovereignty issues and national protection including protection national resources against invasion or attacks (Buscher and Whande, 2007).

But in main cases, state is not able to satisfy the need of population and its natural resources policies has been bias. In conservation of natural resources for example, two important things ignored these are forest community perceptions and their interactions with forest. Perception will reflect their interaction with forest. The kinds of interaction between forest community and conservation area will determine and reflect the well-being both of them as well as their inter-dependences. Unfortunately, forests community who lives around conservation area are called as ‘destroyers’, by the forest ranger. This indicates that these rangers are not aware about the roles of the forests community in forest management; from conservation and social science perspectives (Moeliono, 2008).

Forestry Ministrial Decree No 201/2006 was issued to replace previous decree. This new decree made matter worst since it put burden and confussion in the part of local peoples. According to this decree, it is not only costumary land, but also their settlement and farming areas also fall inside state forest. If previous decree prohibited local people from utilizing the forest, the later also include people properties as state forest.

Considering limited study that has been carried out, it is necessary to present research about biodiversity conservation and local livelihood on Dolok Sipirok Nature Reserve (CADSi). Having these as background, it is important to study and to collect information related to perception, interaction, dependence of local people to Non Timber Forest Products (NTFPs) in the forest area and gender roles in collect-ion. This research intended to show the kinds of factor which affect the perception and how it relate with their interaction with the forests. Out-come of the interaction is Forest Product Utilization (FPU) and the impacts (bad or good) into the forest

conservation. High density interaction and the huge number forest product utilized will show the extent to which local population depend on forest resources (Rainforest Alliance and Proforest, 2003).

2. Deforestation and NTFP utilization on protection forest

Worldwide, habitat loss, fragmentation and degradation are operating on a massive scale, and are accelerating. Habitat loss is particularly exceptional in Southeast Asia. Deforestation rates in this biodiverse region are at least two times higher than other tropical areas. Southeast Asian biodiversity faces substantial threats from anthropogenic overexploitation, such as harvesting of wild animals for bushmeat and removal for the pet trade. One of the consequences of habitat degradation and human settlement is the spread of invasive species, and also by other factors, such as climate change, nitrogen deposition and atmospheric CO_2 changes (Sodhi and Brook, 2006).

In Indonesia, forest is national development assets and capitals that play important roles in living buffer and economic movement, although on the other hand deforestation still exists. Deforestation frequency in Sumatera, Borneo, and Sulawesi between 1985-1997 is about 1,6-2 million ha per annum. During three years to go (1997-2000), deforestation in Sumatera, Borneo, Sulawesi, Maluku, and Papua increased to 3,51 million ha per years. Sustainable forest management that campaigned by the government has been failed because of centralistic convensional forest management and extremely timber oriented products with unfairly product distribution. After that, local peoples who live in or surround the forest are involve less in each steps of forest management. Commonly, they just take a part role as a labor, are not as a government main partner (Sumarhani, 2005).

One of the influence factors caused deforestation is logging which increase the vulnerability of forests substantially, such as triggering forest fire by opening up the canopy, creating piles of flammable wooden debris and facilitating access to forests for people. In 1997-1998, up to five million ha of forests in Indonesia (Sumatera and Kalimantan) have been destroyed by forest fires (Schwithelm, 1998).

In efforts to reduce deforestation, such as logging, agroforestry program was introduced, but, in reality agroforest also has bad impacts. First, there are several species which very sensitive through human disturbance and it probably produces vulnerable condition. Second, many beast play the role as pest, so that it is difficult to control their invasions. Both of previous reasons have shown that the agroforest system in certain segment of forest as origin species can not survive on it. Trade-off existences between exploitation and biodiversity was proven that just virgin or primer forest which guaranteable fully for biodiversity prevention. Third, biodiversity is more preventable in the large jungle than isolated fragment of forests, because many species will be disappeared quickly or step by step slowly in relaxation parts. So, encouraging the farmer to practice agroforestry system commonly make fragmentation process increase, it means potentially causing the species dissappear (Van-Schaik and van Noordwijk, 2002).

NTFPs is part of ecosystem service. Ecosystem services fall into several categories: (1) Goods such as timber,

food, fuel, bio-products; (2) Physical functions such as carbon storage, nutrient cycling, water and air purification; (3) Biological functions such as conservation and habitats for biodiversity; and (4) Cultural values such as recreation, traditional uses, spirituality. Forest offers an array of benefits such as aesthetic, cultural, economic, environmental, historical, recreational and spiritual (NRC, 2005b).

Munawaroh and Purwanto (2008) reveals that NTFP is all biological material except timber for constructions that is extracted from natural forest for human-being. It provides foods, medicines, spices, natural oil, resin, latex, tanin, lac, flowers, handicraft, firewoods, rattan, bamboo, and others non-timber product. Some NTFPs have been cultivated in traditional ways by local peoples or dwellers.

Not only plants, but also forests have a variety of wildlife includes birds, mam-mals, reptiles, amphibians, fish and insects. The rural people hunt them for food and to earn extra cash. Such animals are their major protein supplement. Wildlife and fresh-water fisheries are protein food sources from forests (Siwatebau, 1992). The animals also provide many valuable trade products, such as lac, edible birds' nests, honey and beeswax, bat guano, hides, bones and horn (Lwin, 1995), then wild pigs and several kinds of deers (Wollenberg, Nawir, Uluk and Pramono, 2001). Then most insects are beneficial, however, several dozen are considered to be pests because they interfere, or compete, with forest growth and productivity (Nam, Nhan, Trinh, and Thong, 2001).

There is two term that influencing forest community depend on NTFP: socio-economic and culture. The collection of NTFPs provides employment, additional income and traditional household items for the rural people (Rice, 2007). Indigenous knowledge is knowledge linked to a specific place, culture or society, dynamic in nature, belonging to groups of people who live in close contact with natural systems. Knowledge of their physical environment is embedded in epistemologies and belief systems, usually naturalistic and radically different from those of scientific systems. The spiritual beliefs, cosmologies and world views are therefore a vital part of the whole system which must be understood by outsiders attempting to understand the ways in which ethnic groups have managed their environments (Gurung, 1991).

Many aspects of daily life, from names of people, to decorative symbols and staple foods, come from the forest. Villagers said 'if the forest goes, we are gone'. People lament the loss of knowledge about the names of plants, animals and medicines from the forest that is occurring among the younger generation (Wollenberg, et. al., 2001). The communities use their forest for multiple purposes: other than being their source of livelihood, they revere some portions as being sacred, as taught by their ancestors (Talosig, 2008).

There are several problems with the current NTFPs utilization. Several products are cultivated but many are collected from forest. This collecting is rarely controlled or managed, leading to environmental damage if too many resources are taken away. The way people make use of NTFPs depends on the opportunities and constraints they face. When conditions are favourable, such as good market access, forest products with high demand and high value will be harvested more intensively, causing further declines in resources. NTFPs could play

a greater role in supporting livelihoods if their extraction and sale was managed more carefully. Various strategies have been suggested but these have not always been successful: Increasing the production of one NTFP requires land and labour which can reduce resources available for subsistence agriculture. Depending too heavily on one product leave people vulnerable if it fails to grow or drops in value (MacGregor, Palmer and Barnes, 2007).

Dependence to forest ecosystems has shown by people who utilize NTFPs. They attempted to protect interaction with their environment. Most of the local peoples still farm inside the forest, without realizing activities threatening forest ecosystems. They were not only less awareness, but also lack of forestry and environmental knowledge. In addition, daily and economic requirements made them using forest products, e.g. cutting trees to provide building materials, firewoods, and broom sticks, etc. Jaringan Mitra Gunung Tilu (1998a) reported kind of harvesting activities of NTFP consist of collecting of sugar palm liquids, medicinal plants, wild honey and rattan. This probably occurred, because of no buffer areas existed In Kayan Mentarang National Park, it was noted that more than 200 identified species (plants and animals) were used annually, i.e., for foods, traditional medicine, building materials, earning cash, ceremonial and cultural needs (Uluk, et. al., 2001).

In terms of gender, it is very important to involve women and taking into account their participation, because they usually take different part with men in utilizing and ma-naging natural resources. Eventually, women are more active to collect forest product such as medicinal plants, and probably their perception is different with regards to utilization and to management of natural resources (Rainforest Alliance and Proforest, 2003). Absence of gender components in development program in the past based on an assumption that program would benefit both male and female in same portion, that's why government did not take gender into account. Eventhough in reality, there are many problems that put female in difficult situation (Vries, 2006).

3. Methods

This research was conducted in the enclave villages of Ramba Sihasur, that is located in the center of the Dolok Sipirok Nature Reserve (Reg. 10) (Figure 1). It is part of Sipirok subdistrict, South Tapanuli district, North Sumatera province. Data collection was carried from October 2008 until January 2009. Research used survey method, and it is a descriptive research, which aimed to gather the new data and information of local dependence on forest resources. The two approaches used were quantitative and qualitative. These aproaches were chosen to explore more about phenomena and to apply a triangulation technique as a way to minimize researcher subjectivity.

Qualitative data were collected directly from ten informants and ten key informants by conducting in depth interview. It focused on their own knowledge and perception. Quantitative ways, data were collected by doing community study taking all of house-hold (N= 45) in the villages, from them taken hundred of the villagers as respondents.

Qualitative data were analyzed by using triangulations methods where findings were classified, analyze, and interpreted by comparing and allying vari-

ous theory in one science discipline and or inter-disciplines, especially sociology, anthropology, and biology. The collected quantitative data were groupped then analyzed with descriptive statistic methods and used to interpretate and to define research findings. Data were processed using SPSS 10.5 to show the informative data such as frequency tables, descriptive statistics and chart.

4. Salient feature of research site

The acre of CADSi forest is 6.970 ha prefer to Ministrial Decree No. 2669/Kpts/Um/14/1982. Sipirok sub-district lies approximately between 900-1,800 m above sea level, with mountain-side slope between 60-90%, maximum temperature around 24^{o}C and minimum is 15 ^{o}C and humidity between 35-100%. High rainfall per annum come during 85 day (approximately three month), since October up to December, average rainfall per year is about 1.700 mm. Soil type is belonged to alluvial with blacky old brown, pH between 5-6,5. Sipirok topographical conditions are; 10,82% plain till wavy, 22,89% wavy till hilly, 66,29% hilly till mountain (Affandi and Patani, 2004).

The potency of the biodiversity in Batang Toru watersheds consist of 67 species of mammals, 287 species of birds, 110 species of herpetofauna and 688 species of plants. Twenty species of mammals and 52 species of birds are belonged to protected species. Twelve species of mammals (Orang Utan, Tiger, Forest goats, and Tapir) and three species of birds are categorized as threaten spencieses. There are 138 species of plants as Sumatera Orang Utan feed, eight species almost distincts, three endemic species for Sumatera and four species protected and two rare species such as *Rafflesia* Sp (Adiska Creation, 2007). Many kinds of animal species live there in, several of them are protected e.g., Orang Utan (*Pongo pygmaeus*), *Tragulus napu*, Deer, *Manis javanicus*, Honey Bear, *Hystrik branhyura*, *Symphalangus syndactylus*, *Felis marmota*, *Hylobates agilis*. Bird species which protected such *Garrulax leucophus*, *Rhyticeros undulates*, *Otus* Sp., *Heterophasia picaides* (PISK, 2002).

Natural forest of Batang Toru watershed holds a very crucial roles as key of biodiversity and water supplier for region. This area has the double roles as living buffer prevention systems, because this region biogeographicly being transition area of northern and southern of Lake Toba. importantly, the most dangerous problems is mining activities that was allowed by local government as way to increase the district revenue, such as Teluk Nauli Company in Anggoli Block, Agincourt Newmont Horas Nauli, Sipansihaporas Hidro-electric company and Sarulla Gases-electric company (geothermal) that managed by Medco Geothermal Indonesia company (Adiska Creation, 2007; Sirait, 2007).

Area of Sipirok sub-district is approximately 565,63 km^2 (56,563 ha). Population of Sipirok according to population census in 2000 was 29,151 individuals (±3,39% total of South Tapanuli population) with a total household was 6,282 families. By sex, there are 14,180 male and 14,971 female. Whereas at Ramba Sihasur, total population was 213 individuals, 101 were male and 112 were female. According to the respondent marital status, they consist of: a) Single: 19,6 % of male and 16,3% of female; b) Married: 72,5% of male and 71,4% of female; and c) Widow: 7,8% of male and 12,2% of female. Discussion with key

informants, said that the birth rate around two until three infant per annum village, the death rate was around one per annum at the village. Not only birth and death rate, but migration also occurred, caused by inter-village marriage. At the time of data collection, there were 13 male and 20 female (or 33%) revealed themselves as new settler.

Society and local culture development. People in Sipirok are dominantly *Batak* etnic who still belief and hold the customary idiology of *Dalihan Na Tolu*, which consist of *Somba Somba Marhula Hula* (respect to the mother and wife families), *Elek Marboru* (most friendly to the sister families), and *Manat Mardongan Tubu* (taking care and respon in term of clan linkages, to avoid conflicts and disputes). In daily activitiy, this ideology still held strongly and is still available in social community of Batak environments until now. *Dalihan Na Tolu* is used to keep relation and interaction inter-ethnic and inter-religion. Sipirok is also recognized as a famous place for social-culture tourism resorts and suitable places for study (ex. SMU Plus Sipirok, SMKN 1 Unggulan Sipirok, and some Islamic Boarding School) (Daulay, 2005).

According to head of village, the founding father of Ramba Sihasur village was Sutan Kali Tua Sagala during Dutch colonial time. He led open the forest land with his *Kahanggi* (young brothers) from *marga*[1] Sagala sub-clan, *Mora* (family from uncles) from Pane sub-clan and *Anak boru* (sons and daughters) from Siregar sub-clan. The size of the village that was allowed by by Ducth resident was about 37 ha. The number population in Ramba Sihasur (2008) was 213 people and all of them are Moslems. In the village, population number increased because of birth rate and inter-villages marriage between villagers and outsiders. So that, the new sub-clan came in, then they become various clans, e.g. *Lumbantobing, Nainggolan, Rambe, Ritonga, Pasaribu, Naibaho, Gultom,* and *Harahap*.

In Sipirok, especially in Ramba Sihasur village, people cultivate mixed-farming in upper mountain and hills, because its impposible to cultivated it as rice farming, then they conserved for mixed-farmings and plantations. They also collect forest products to fulfil their daily needs. Average size of farm land per household is only around 0,82 ha, it is quite small This explains why these people want to utilize forest land sufficient.

Infra-structure in the villages is very poor. The 12 km road consists of earth road (clay) and gravel road. Asphalt road is only available from Sipirok to Sampean village (about 5 km from Sipirok). This road condition isolates the village and hurdles socio-economic development. Education and health service are not good either. Educational facilities found in the village is only for one primary school. Health service and administrative office are not available there. House of village head is used as office, and some times they hold meeting in coffee shop, mosque, and at some one house in the village. The facility built by the villager is only one small mosque, they called it *Suro*. There is no regular public transportation to the village, so access is difficult. Only one truck serves Ramba Sihasur to market in Sipirok, operating once a week, on Thursday.

[1] *Marga* is similar with sub-clan of *Batak* etnics

5. Result and discussion

5.1 The reason for dependence on CADSi

Data and information shown that there are five main reason causing the villagers to depended upon NTFPs in CADSi, consist of: poverty, poor infrastructures and lack of access to market, lack of communication and information, traditions, and low law enforcement. These reasons were extremely push them to rely on and depend on CADSi. Poverty and vulnerability apparently opposite to CADSi's resources abundant. CADSi seems to invite its own exploitation. In reality CADSi is supposed to provide villagers' need, but on the other hand, forest conservation programs are against poverty reduction. In some cases, protected forest areas provides new economic options to improve poor people's livelihoods but in many others they restricted access to forest resources that further deprives the most disenfranchised, offering little or nothing by way of compensation. No one can stop them from utilizing CADSi forest.

Communities who live within forest area rely on forest resources for several generations since long time ago. According to their tradition and custome, they utilize forest based on traditional knowledge. Historically, they could not be categorized as illegal logger or illegal user, as they had been living there prior to creation of conservation forest. They were not the new comer, in fact they have developed strong emotional connection with forest.

Poverty caused by several factors such as; lack of farm land, no other alternative source of income. At the same time, forest regulation prohibites their access to CADSi. The whole household are poor, and deserve Direct Cash Assistance or known as BLT subsidy. Each household has more than seven members on the average. It is impossible that 0,8 ha of land per household is able to fulfil their basic need. Many of them live in small wooden or bamboo house.

Therefore, socio-economic condition in certain buffer areas in which local community undergoes land shortage they lost rights to obtain their household needs (*Man land ratio* 15 individuals/ha of rice field and 22 individuals/ha of house yards) (Yuswadi and Bowo, 2003). This condition caused high pressures (destruction and extraction of forest products) in the forest. Besides, lack of environmental awareness and knowledges have siginificant contribution in NTFP extraction as occurred in CADSi's area. Poverty, imbalance of land tenure distribution, and lack of accessibility through farming land cause high pressure on protected forest (Pasya, et. al., 2001).

Poor infrastructure and far distance to the market are two crucial factors negatively affect villagers in fulfiling their needs. Ramba Sihasur is isolated (remote) area, with bad poor road access, and too far from the market. As presented earlier, the earth road mostly consists of clay, gravel and rocky, with deep curves. If villagers want to go out side, they prefer to go on foot to avoid accident. These difficulties make them accessing forest products where they deend for a subsistence economy. There is also no communication facility, bad health service, and lack of agricultural technology. Furthermore, without access to safe drinking water infrastructure, electricity, fuel and transportation; poor people rely on natural sources of clean air and water, fertile soil, renewable

energy and biodiversity to meet their needs.

Infrastructure is in a linier relationship with access to the market, transportation, public services, and other alternatives occupation. Hence, one problem of NTFP commercialization is access to market. Rural communities do not have sufficient information regarding market demand and price. Therefore, they cannot respond adequately to market trends. Moreover, under the current situation, most of the benefits do not go to the rural community; instead it goes to local collectors and retailers who enjoy the most of the benefits (Sial, 2008).

The real condition observed during research time in Ramba Sihasur, the villagers faced difficulties to sell product and to buy needs. The reason are lacking of market price information, the distance and infrastructure. They tried hard to reach the market, but in the market they could only sell it cheap. So that production cost bigger than profit gained. Interview with informant reveals that if not because of they have to go to the market regarding urgent purpose, they would not go. These urgent purposes are such as, delivering school fee, wedding party, picking up guest, and purchasing weekly needs (frying oil, kerosine, salt, and dried fish).

The next factors were the difficulties to conduct communication and to get information. It is not only poor infrastructure condition, but also natural barrier (especially topography and climate) that obstacle the television and telephone signals. From the observation, there were only four set of television and less than ten of cellular and radio found in the village. To get cellular signal, villager constructed hand made antenne that is hung under the house roof, or if there is no antenne they have to go to the hill. This is an instance of information access difficulty, even for the cellular owners. In coping with this kinds of problem, they have to deliver message from person to person such as through villager who is going out. The same person would deliver back the information from outside. Having modern communication problem, they still rely natural signs. In terms of CADSi status, they did not know about protection forest and its regulation, which usually informed in mass media and electronic media. Since they lack of access to information.

Regarding to tradition, 54% interviewees revealed that tradition influence their activities within CADSi. This tradition does not only influence these villagers, but also villagers from outside such as Poldung Dolok, Poldung Lombang, Sampean, Silangge, even Sipirok and Simajambu villages. Culturally, *Batak* ethnic is very identic with mountain and forest, because of their ancestor had chosen the region around Toba to continue their generation. Toba region is quite far from ocean, then they still have much time to escape if enemy in unpredictable time. Beside to avoid invasion and attacks from other ethnics, mountain and forest are suitable source to do farming and livestock. *Batak* people adapt to mountain and forest natural condition very well. As shown by their traditional house, clothes, foods, and also hard character and load voice, etc. They carry out many activities within forest, and they also believe on big rocks, trees and spirits as indicated by their respect to nature that support their lifes.

As a part of *Batak* tradition, Ramba Sihasur villagers, are also share similar characteristic. Forest products utilization, especially NTFP is acquired

daily and as such they would take care these NTFPs. They claimed that CADSi was a part of them, it is like their home, where they have tradition to use and to take care as well, and hence access and control. But in recent years they have to change their tradition, because of household burdens. Moreover, as a Moslem several respondent reveals that they oftenly consider more about religion than tradition. New comers also take part in these changes. Although 99% of respondent were *Batak* peoples themselves, but economic factors pressure their willingness to utilize of the forest products.

The last one is low law enforcement that proved by policies fail to protect forests or improve the livelihoods of poor people. The growing demand for scarce forests resources means that markets are becoming increasingly competitive (Nair, 2007). In attempts enforce the regulation regarding CADSi protection, The Decree No. 44/2005 Decree of the Minister of Forestry, the government appears seriousless. It was prove by lacking of socialization and implementation to conduct forest protection management program. In village level, disturbance that usually emerge were land clearing and wild hunting. According to the CADSi's status as conservation forest, all those activities are not allow, even only to enter territory forest area. As mentioned earlier, The Decree of the Minister of Forestry No. 201/2006 state that the settlement and farming areas in Ramba Sihasur village fall under state forest. This regulation has been implemented without clear mapping and forest borders.

It was gave contribution to forest destruction becoming worst. It confuses the villager regarding the part that they can enter. They only knew that their ancestors constructed any interaction within CADSi without bending roles. Nevertheless, forest rangers left their check point. Two check points observed in the field were empty and unmanned. So that the villagers or outsiders could access CADSi whenever they will, for many kinds of activities except logging.

5.2 Factors influencing local perception on CADSi

The result shown that 44% of respondent demand for new land for farming. They expect the government to give some part of CADSi to them. It was only one respondent who agree with government policy, although she still expect the government give the other alternative source of income. This respondent had just graduated from senior high school and depends on her parent's assistance for daily needs.

From educational background, out of 45 household head, 62,3% of them graduated from Primary school, 2% Junior High School and 1,78% Senior High School (Monograph of Ramba Sihasur, 2008). Majority of them (97%) expect that the government will allow them to utilize a part of CADSi for farming with a main reason to fulfil their daily needs. They perceived that that the existing land occupation was not sufficient to provide the villagers needs and cannot provide villagers needs anymore. Lack of education and knowledge made them less aware and do not know about CADSi's status. Nevertheless, only 2% respondent who agree with CADSi protection program, but they expect the government to give another option regarding to their livelihoods. Both of respondent happened to be graduated from senior high school and female. They claimed that acknowledges about conser-

vation gotten from biology subject at school.

Income. According to income, 63,3% of them reveals that CADSi is very urgent to increase their household income and only 27,5% of male revealing the same. Then in traditional terms, 66,7% of male said that CADSi is still used, and 33,3% said not. In female side, 40,8% said "yes" and the rest (59,2%) said "no" in using CADSi.

Low income also influences households' dependence upon CADSi in Ramba Sihasur. Low income caused by tiny farm land, and recent restriction to utilize CADSi. Although the collection of NTFPs is restricted, the villagers however, continue to depend upon NTFPs. Table 6 below shown that most of the households income were ≤ Rp. 1,000,000 (77,6%). The low income level has been an accumulation of income from forestry and agricultural sectors. It was also change their perception regarding CADSi, which they thought as an alternative source of income.

Low level of income was reflected by poor farming land and no other alternatives sources of household income. Most of the villagers only rely on small farming land and ponds. But several, produce *gulo bargot* and small number of handicraft depend on market demand.

Livelihood backgrounds. Most of respondents (96%) occupation were farmer. Farmers in the village work in ricefield, ponds, mixed-farming and collecting NTFPs within CADSi occasionnally. Their farm land, ponds, and agroforest are located nearby CADSi area, so that they can access CADSi easily. Being poor farmers them-selves, they rely on CADSi to provide extra food, fuel and other materials to substitute market goods. They could not rely only on farming product, which is never sufficient. Not only farmers, but others also have to buy or take some products from CADSi. So that type of livelihood also one of influencial factors that affect perception about CADSi positive or negatively.

In working, usually all members participate as labor, even kids (above nine years old). Parents teach their children in farming and extracting forest product within CADSi. Through generations they accumulate knowledge of and adapt well to the cycles and peculiarities of their natural surroundings, extracting from them to meet their survival needs (Siwatebau, 1992).

Household size. Number of family members also influences the villagers' perception regarding CADSi status. 51,1% of household have more than seven household size (parent and children). As shown in observation in one household, there are between 1 to 3 children study outside of the village. They need money weekly or monthly to pay the school fee and to buy their other needs during study. Each parent would send money between Rp. 15,000-30,000 to a kid weekly. In addition, parent also delivers rice and other raw materials for food weekly. Because of this demand, parents have to engage their livelihood for family well-being. Farming with small area of land was not sufficient any more to cover their expense. Family burdens also shape their perceptions regarding CADSi status.

***Batak* traditions and culture.** all the villagers are Moslem and 99% among of them are *Batak* etnic, only few visitors who belong to Acehnese. Most of the villagers (54%) revealed that they use NTFP because of traditional reasons. This tradition along with culture influences their perception.

From the field observation, culture still influencing their life, 73% of respondent said that they need plant and 77% need animals to fulfil their cultural events. Eventhough they are *Batak* peoples and leave around forest region, 98% of respondent said that they do not use social symbol status in their society anymore. In term of giving name for kids, 46% said "yes" and "49" said no. "Yes" means they still name kids name or nickname after natural name taken from forest. Recently they are seldom to use natural name, because Islamic influences. But, while the research being conducted several people have natural name, e.g. *ja salohot* (Mr./Mrs. Herbs), *ja pisang* (Mr. Banana), *ja koje* (Mr. *Ficus benjamina*), *ja bargo*t (Mr. Arenga) etc. There are two reasons to these name or nickname, these are he or she like that object and have some purpose (such as praying).

From generation to generation, parent teach their children about religious and cultural values. According to the informan, CADSi's product is necessary to support their tradition, such as *mangan-mangan* (something like picnic), *marjamu* (traditional party), and healings. Healings belief used to drive the ghost away, it is done by *Datu* or medicineman. The villagers also still rely on NTFP's as a sign of good or bad furtune, like guest will becoming soon if butterfly enter the house. In sum, they have close relationship with CADSi in many matters.

Eventhough, Islamic religion has influenced their social system, but they still conduct several non Islamic tradition, for instance they are prohibited to cut the trees around water spring, aims to keep water supply. Then when they collect the firewoods or another NTFP, they are forbiden to say "rough or bad talking or grumble" called *panyaor-nyaorkon*, even crying, screaming, and throwing waste. It is meant to respect nature.

Not only religion, but also modern knowledges made them not to concern much to use culture patterns, especially mistics things. Lacking of community attention through traditional ritual activities and taboo values, appeared to be influenced by the villagers rasionality being increased regarding occurrence of natural phenomenon. Beside that, modern technological development such as chaisaws, hunting guns, also fastly and transportation means help peoples to cope with difficulties and "natural challenges". Cultural values of ordinary traditional community "obey or whorship to-wards nature" has been changed to become "losing nature" by using modern technology. At the end, community perception through ritual meanings and traditional ceremonial events has undergone distortion from respectful vision and adaptable with nature become only "social ritual" as well to keep "harmony" with their own environments (Yuswadi and Bowo, 2003).

Age and sex. Age factor do not really influence their interaction with forest protection. Although 92% of respondent were in productive ages, other villager e.g. children and several person who grouped in non-productive age also participate in utilizing NTFPs. The strong reason was economic pressures and increasing of population number. So that they need more employers to cultivate farm and to collect NTFPs. People is study area are usually work as farmer since they were young. Parents and children work in

their own farming and sometimes work for the other villagers as paid labor.

Nair (2007) reveals that the interplay of social factors often make the NTFPs sector is a low wage trap, inhibiting any development. Since wages are low, households have a strong compulsion to employ all family members including children, who drop out of the school at a very early age to join the labour force. This is one reason why the villagers want to convert CADSi to become farming lands. It is nothing to do with age , but because they have the same orientations and desires.

Nevertheles, sex affects their perception through CADSi, because not only male but also female access to CADSi forest. Both have distinguished perception in several points, such as, kinds of food that collected from CADSi. 76,5% of male and 38,8% of female reveals that CADSi provides all kinds of foods. Then 7,8% of male and 53,1% of female said that CADSi is necessary to provide protein and vitamin.

Resident status and life duration in Ramba Sihasur village. Respondents were divided into two kinds of status: native people (who born and life in Ramba Sihasur) and new comer (who came to Ramba Sihasur because of marital bending and occupations. Total frequency of native people was 67 and new comers was 33. In detail, the longest lives duration in the village (x_{max}) of local people were >60 years-old (3%) and comer between 31-40 years-old (2%), and the shortest (x_{min}) of local people were between 11-20 years-old (2%) and comer were between 1-10 years-old (11%). Respondent who was borned in Ramba Sihasur, of course, very familiar with tradition, physical condition of CADSi and community activities within CADSi. Whereas new comer were still need more time for adaptation processes, then finally they also become CADSi's product users.

Most of the respondent who live in Ramba Sihasur were between 21-30 years-old (30%). This is the productive age to utilize forest resources. Longest duration and adaptable respondent who still in productive age, made their perception relative agree with CADSi utilization, even opening new land. Generally, they thought that CADSi play the role in income sources, except farming. So that, local people who have longest duration of life in the village and include as a productive workers has large access to utilize CADSi, and they have high dependence to CADSi.

For instance, comers only recognize and used 45,8% of plants and 46,2% of animals that come from forest. It is caused by less knowledge and experience of the comers to recognize forest environment as their new livelihood sources. They only use NTFPs that ever used before. Oftenly they used product without recognize its name, but knew the function as done by native people. Comers have less knowledge to recognize kinds of firewood, except *Tambiski,* durian's and cinnamon's tree. All those firewood are very familiar for the villagers in Sipirok. Then according to keep healthy, comers are seldom to produce traditional medicines, especially the medicine that made from animals. Usually they ask someone to help them, such as husband, wife, neighbours, etc., to produce medicine is needed.

Tabel 1 Number of species per category of uses and sources

No.	Category	Number of Family	Number of Species	Sources (%)		
				Forest	Non Forest	Both
1	Medicinal plants	33	77	48,3	42,8	9
2	Medicinal animals	12	12	100,0	0	0
3	Spices	13	24	29,1	66,6	4,16
4	Vegetables	23	50	32,0	46,0	22,0
5	Edible fruits	27	76	48,6	47,3	3,94
6	Flowers	49	80	57,5	42,5	0
7	Wrapping materials	5	9	66,6	33,3	0
8	Toys	7	9	55,0	45,0	0
9	Bending materials	4	5	80,0	20,0	0
10	Edible seed, stems, tuber and rhizome	4	11	45,4	54,5	0
11	Building materials	2	7	100,0	0	0
12	Technological uses	5	8	28,5	71,4	0
13	Firewoods	-	14	100,0	0	0
14	Cultural uses and border markers	16	24	41,6	58,3	0
15	Mystics and natural alarms	12	17	100,0	0	0
16	Hunting materials	8	19	78,9	21,1	0

5.3 NTFPs Utilization in Ramba Sihasur

Various reasons and influencial factors mentioned above reflect the villagers' dependence on CADSi. Dependence of Ramba Sihasur villagers is quite high. NTFPs utilized consist of bamboo, firewoods, fibers, fruits, medicinal things, sugar, rattans, tree barks, vegetables, forest river fish and shrimps, and also some animal. Other than rice that produced from paddy field, other needs were taken from CADSi's forest. Those products are utilized by the villagers can be grouped into two categories: (a) Commercialize products and (b) consumptive one, which is consumed and non-commercialize. Two main factors are markets that is too far and poor infrastructures bad condition. They only collect products in small amount at certain time.

5.3.1 Consumptive NTFPs (Non-Commercialization)

5.3.1.1 CADSi is a source of fundamental requirements

Data shows that there are 456 kinds of NTFP were used by the villager consist of 322 species of plants and 134 species of animals. They used NTFP for many kinds of requirement, such as food, medicine, seeds, cultures, economics, land markers, construction, and tools.

5.3.1.1.1 CADSi as a source of food

Because of poor conditions and insufficient of food supply, the villagers rely on food from the wild. Nineti-nine percent of respondent answered that CADSi is necessary to provide foods. They also reveal that each type of food has particular contents , such as protein, carbohydrate and vitamin. Fifti-eight percent answered that CADSi provides all type of food and the other 30%

reveals that it provides protein and vitamin. The reason why they do not choose CADSi's product as a priority source of carbohydrate because they have domesticated several forest plants at the farm land, except paddy.

a. Carbohydrate which is obtained from palms, rhizomes and tubers

There are eleven species as sources of carbohydrate which consist of five (41,6%) are forest products (F), four (33,3%) from agriculture farm (NF), and three (25,0%) are taken from both (F, NF). Although the villagers are accustomed to consume rice as a particular source of carbohydrate, they also consumed NTFPs such as *lalat* (cassava tubers), *gadung* (*Ipomea batatas* Poir.), and taro (tuber of *Colocasia esculenta* and *C. giganteum* Hook.).

b. Vitamin obtained from vegetables and fruits

The villagers have never lacked of vegetables, because they can pluck and harvest from mixed-farming and in forest or asking from neighbours for free. There were 23 families with 50 species of plants consumed as vegetables; 23 species (46%) are non-forest vegetables, sixteen species (32%) are from forest, and the rest eleven species (22%) are found in both areas. Forest vegetables consumed such as; *pahu* (*Diplazium esculentum* Swartz) useful part are young leaves and stems. *Pahu* is also mixed with *palak* (*Etlingera elatior* ovary) to add taste and aroma.

There are 25 families with 76 species of fruits consumed in the village, 37 species (48,6%) are from forest and 35 species (46%) from non-forest, and two species (3,94%) from both areas, and one species (1,3%) from the market. Forest edible fruits occasionally consumed, such as *Hapundung* (*Baccaurea racemosa* Muell. Arg), *jung-jung buit* (*NI*), *kuranji* (*Dialium indum*), and *markisa harangan* (*Passiflora suberosa*), usually consummed when paddy harvest end. *Hosur-hosur* (*Calamus rotang* syn. C. roxburghii), *ruham* (*Flacourtia rukam* Zoll. & Moritzi), and *sihim* (*Daemonorops draco*), are ordinary collected when they collect rattan and or do hunting. *Gala-gala* (*Ficus* sp1.) and *dong-dong* (*Ficus racemosa*) are eaten after fishing and or before and after bathing in the rivers. S*iala waran* (*Hornstedtia scyphifera*) or under-ground fruits is collected by digging it within forest or in river banks.

d. CADSi as a source of protein

In fulfilling protein requirements, the villagers consume around 29 species of birds, 28 species of fishes, eight species of mammals, one insect, one pelecypod and three crustaceans. Edible forest birds frequently consumed, such as *Ruak-ruak* (*Porzana fusca*) and *Sittar-sittar* (*Porzana cinerea*).

Aside from river, the villagers catch fish in water springs and in their own ponds, usually using traditional tools. There are 17 species (53, 1%) of fishes catched from forest river, six species (18, 7%) from ponds and nine species (28,1%) are from both sources. Two familiar forest fishes are *bakok* (*Channa striata Bloch.*) and *itu-itu* (*Clarias sp*1.) which live in water springs. *Baung* (*Mystus nemurus*, and *M. cavasius*), *dung-dung* (*Channa* sp1.), *gappual* (*Acanthopsis choirorhynchus*), *haporas* (*Barbichthys laevis*, *Barbus tetrazona*, and *Rasbora elegans*), *haruting* (*Channa micopeltes Cuvier*),

sulum (*Crossocheilus siamensis*), and *lappam* (*Hampala macrolepidota*), are catched in the river using fishing gear. *Dung-dung* is quite a big fish, it looks like a phyton, known as *Raja ni Ihan* (The King of the Fishes). In local tradition, when a villager catches this kind of fish, he/she usually shares it with other fellow villager. Fresh water shrimp and fishes collected from the river serve the major portion of protein needed by community. They use *bubu* (formed as well as cone, made from bamboo) a kind of fish trap to catch fish (Ngakan, *et. al.*, 2006).

c. CADSi as a source of spices

CADSi is also necessary in providing cuisine spices, because the distance to market make it impossible for people to buy it. These spices are only taken from garden, but also from CADSi forest. As a matter of fact, 96% of respondent mentioned that they need CADSi to provide spices. The following excerpts represented this dependence found twelve families, 22 species of plants which are used traditionally for spices. Five species (22,7%) were origin from forest and 16 species (72,7%) from non-forest. For instances, *handis* (*Garcinia* sp.) and *simarpuyu* (*Hibiscus sabdariffa* L.) are as substitute for Tamarin, it is very useful as condiment of *gulai ihan* (fish curry) and *juhut* (meats).

5.3.1.1.2 CADSi as a source of medicines

NTFPs role in human health is also important for Ramba Sihasur remote village. Old tradition that is still carried on is traditional medicine (herbs and animals) for their healing. Since the distance between their village and modern medical centres is quite far, the villagers rely on traditional medicines. It is only when the situation getting worst then they seek modern medical treatment e.g. during complicated laboratory requirement, serious accidence and prolonged illnesses.

In general, respondent answered they used natural medicine oftenly (79%). In detail, 90,2% of male and 67,3% of female answered “often”. Brief explanation as written below:

a. Medicinal plants

CADSi provides many species of plants which are very useful for the villagers, even outsiders. Poverty and poor infrastructure made them to rely on traditional medicines. They use a part of the plants or mixed one with another. In this research, 83% of respondent needs medicinal plants. They use not less than 77 species of medicinal plants, these consist of 37 species (48%) of forest plants, 33 species (42,8%) are mixed non-forest and seven species (9%) are from both sources.

There are several uses of medicinal plants, such as: chewing and putting to injure part, eaten directly, chewing and spreading boiling and drinking, roasting and compressing, boiling and sauna bathing, and etc. Medicinal plants that chewed and spreaded are *salimbatuk* (*Acorus cala-mus* L.), *pining* (*Areca catechu* L.), and *pege* (*Zingiber officinale* Rosc.). Chewed and sported, such as: *bau-bau* (*Ageratum conyzoides* L., *Crasso-cepalum cretidioides*, and *Emilia sonchi-folia* DC.), *siroppaspara* (*Mikania micrantha* H. B. K.), *lalat*, *duhut-duhut* (*Siegesbeckia orientalis*), *haturangga aek* (*Impatient balsamina* L.), *haturangga hayu* (*Melaleuca leucadendra* L.), *kantang udara* (*Dioscorea* sp.),

arsam (*Gleichenia linearis* (Burm. f.) C. B.), *appa-paga* (*Centella asiatica* (L.) Urban), *sarindan* (*Loranthus* spp.), *sihirput* (*Mimosa invisa*) and *soit* (*NI*), *tappar setan* (*Stacyrtarpeta jamaicensis* (L.) Vahl.). Edible directly are *pote, pultak-pultak, sinyar-sinyar, kopi* (*Coffea arabica* L. and *Coffea robusta* Lindl.ex De Willd), *burangir* (*Piper betle* L.), and *sanduduk.* For drinking as well as *aek ni bulu* (*Gigantochloa apus* Kurz.). Boiling and drinking: *harambir* (*Cocos nucifera* L.), papaya leaves, *jarak* (*Jatropha curcas* L.), *dulang-dulang* (*Ricinus communis* L.), *jambu horsik* (*Psidium guajava* L.), *siduhung anak* (*Phyllanthus niruri* L., and *P. urinaria* L.), *hayu saidina ali* (*Eurycoma longifolia* L.), *sarindan* (*Loranthus* sp.), *latcat* (*Lansium domesticum* Correa), *putri malu* (*Mimosa pudica* L.), *sima-rpuyu*, and etc. Roasting and compressing: banana leaves and *oppu-oppu* (*Crinum asiaticum* L.). Boiled and bathed: cinnamon leaves and branch, root of *sanggar-sanggar* (*Cymbopogon nardus* L.), and clove leaves.

b. Medicinal animals

Regarding to medicinal animals, 83% of respondent reveals that they still use traditional medicines. There are of twelve species from twelve different families, and seven classes are used. Only one species of arachnids (*Scorpio* sp) were used, known as *Hala*. The villager used its front arms for choker. It is very useful for massages and dissipating ghost. From bird family, they use *Siburuk* birds (*Centropus sinensis*) where the meat is fried first then soaked in a bottle. It is then loaded with palm oil for massages. With regards to insect, they use three speciesses, these are *Ipos* (*Blattella asahinai*) that is eaten or just put it to heal toothache; *aek loba* (honey) got from bee (*Apis dorsata* Fab.) nests, and *undur-undur* (*Myrmeleon* sp.) used for stomache, by boiling and drink it. From fishes family, *Haruting* is eaten for to heal itches. From mammals, there two species: *Bedu* (*Capricornus sumatrensis*) and *Tanggiling* (*Manis javanica*). *Bedu*'s horn usually eroded and soaked in the condensation of palm oil, it is used to take out thorns and nails from the body. *Tanggiling*'s tongue is used to fix legs slide down. From Myriapod class, there is only one species used, that is *Lipan* (*Scolopendra* sp.) where its oil is used for the treatment like as *Siburuk* oil. In reptiles group, three are species: *Gin-doran* (*Bronchocela jubata* D. & B.) and *pelang* (*Mabuya multifasciata*) which usually roasted then boiled for ashma treatment. The last one is *Jobar* (*Varanus salvator*) which is used for itches.

5.3.1.1.3 Firewoods

Generally Ramba Sihasur villagers use firewoods as fuel for cooking. There are seven specieses of plant that used as firewood. These woods are chosen because of strong, hard, proof agains of decayed or rotten. The woods remained, such as *Tambiski* (*Euria acuminata*). Firewoods are collected in the edge and inside the forest where women play dominantly role. But occasionally, male also collect firewood, when they produce *kolang-koling* and palm sugar.

5.3.1.1.4 Construction materials

Sixty-two percent of respondents answered that they use NTFPs for construction materials. There are six species that belong two families which are used. These are leaves of *Ibus* (*Corypha utan* Lamk), *Nipa* (*Nipa fructican*), *Ri*

(*Imperata cylindrica* (L.) Beauv.), *Rumbia* (*Metroxylon sagu* Rottb.), *Salak* (*Salacca edulis* (Gaertner) Voss), and *Ijuk* (sugar palm fibers). For *Ijuk* and *Ri* are for house and hut roof, then *Ibus, Nipa, Rumbia,* and *Salak* leaves are for roof of buildings.

5.3.1.2 Traditional technological needs requirement

The villagers do only use metal equipment, but also traditional tools. Ninety percent of respondent revealed that NTFPs were are important in assisting their works. Male and female have similar perception on this. The villagers need tools for their daily activity, such as; cooking, farming self protection, praying mat, rope, leaves used as wrapping material and roof. The material are taken from the forest such as hoe, *bodok*, *tajak*, knife, and shicle sticks, which useful at house and at farm. In the house, they make *sanggak* for hen to lay their eggs, *tolong* (*Saccharum edule* Hassk) used to fence the house. In the kitchen they use *sonduk, lage, sange* (meals cover), *parapi* (firewood drying up the soil stove), *sangge* (spices place), *hirean* (drying ropes), *garpa* (wood or bamboo that used to proppering the doors), *salean*, etc. Traditional tools for farming are; *sige* (*maragat ladder*), *garung* (medium of *ngiro, jujar-jujar* or *gala*. For communication, they use *tung-tung* that made from bamboo and *hapas* (*Ceiba petandra*) stems and bamboo.

5.3.1.2.1 Household daily tools

NTFP's are also used to make *hadangan* (traditional bags) and *karanjang* (traditional basket) to carry farming or hunting materials. The *hadangan* is made of *bayyon* (*Scirpus mucronatus*) and the rope form *lak-lak*, and then *karanjang* from *bulu raga*. *Anduri* used to clean the rice, separating the rice of husk. It made from *badoar* and rattan. Two traditional mats made from NTFPs are *lage* and *bide*. *Lage* used for sleeping and praying mat, also for ceremonial event. *Bide* is also used for ceremonial event (usually to substi-tute the carpet) and drying mat for coffee and paddy. It is made from rattan, *lak-lak* and *ijuk*.

5.3.1.2.2 Traditional farming tools

Farmers usually use wood for farming equipment stick. For example, *bodok* (use to cut the grasses in *saba*), *tajak* (smaller than *bodok*, used in mixed-farming), hoe, *gupak*, *parang*, and *parang bengkok* (bill hook) sticks. These materials are very strong and long durability. Before use, the raw materials are countersinked in ponds water less than weeks to avoid decayed. After that the stick will be shaped according to the tools.

For instance, bamboo harvesting should be carried out by selective cutting. One-year old culms should not be harvested. Cutting is generally done by using a small axe, machete, bill hook or saw. The Bamboo is harvested after 3–5 years old. There are up to five shoots in the first and second year for each clump. Mature culms are found at the centre of the clump. Two or three year old culms are cut for poles, construction work and wicker work. The culms should be cut close to the ground. Over-mature culms are too brittle while immature ones are not durable (Subansenee, 2008).

In *gulo bargot* production, the villagers need several tools, such as *garung* (*ngiro*'s medium) and *sige* or *maragat* ladder that are made from

bamboo, *gual* or *maragat* hummer made from and scabbard of *lukkas* or *maragat* sharp knife that made (*goti and kapas*), *imbalo* or *teni porkis* (the ant droppings). *Bargot* branch and tree bark is usually removed by using a sharp knife and peeling it along the trunk of the tree.

5.3.1.2.3 Bending materials

In Ramba Sihasur, it is common to use plant as bending materials. There are seven species that belong to five families used for bending materials. The familiar bender are namely *siala* stems, *sarusur*, *andor bunga* (*Ipomoea cairica* (L.) Sweet), *andor bunga, andor hoda, sikkut* (*Setaria palmifolia* (J. Koenig) Stapf), *sampilulut* (*Urena lobata* L.), and *sangge-sangge*. *Sangge-sangge* is used to bend paddy stems before planted, it has conscious smell that can make pest e.g. grasshoppers and beetles away or aimed to dissipate pests. *Andor* is used to bend firewoods. *Sarusur* is made from banana stems, it is dried before use.

5.3.1.2.4 Wrapping materials

There are nine species belong to five families of plants used as wrapper. *Sikkut* leaves as used to wrap rice, fried banana, and meats. Two species of Moraceae, they are *gumbot* and *pirdot*. *Gumbot* is used to wrap rice and pocal, whereas *pirdot* used to wrap *pocal*. Both of them are given good aroma of the dish. Banana leaf is used to wrap rice and *lappet*. Before using, the leaves ar heated. *Sarusur* is also used to wrap the sugar palm. *Sitarak* or old corn leaves, corn *lappet* and *wajid* (dish made from sticky rice or *sipulut*[2]).

[2] Shape is appearly similar like paddy, but *Sipulut* used as cake material not for daily consumed as well as rice

5.3.1.2.5 Source of toys

Toys are made from eleven species that belong to eight families (see Table 24). Not only parents that make toys for kids, but also kids themselves can make it. Plants that used e.g. *pining, bargot, hotang* (*Calamus manan*), *sanggar* (*Themeda gigantea*), *hapea, dap-dap, mali-mali, jambu aek* (*Eugenia aquea* Burm. F), *utte manis,* and *siala*. *Pining* front leaf used for *sarat-sarat*, which one person pull and another as passenger. *Bargot* branch is the material for car toy and the midle leaves used as traditional calculator. It is usually used by pupils at math class. It made one hundred pieces, within ten bendings. Rattan stem used for *marcungkil* or *patok lele* games. This toy is divided into two parts, long and short sticks. Long stick called beater stick which beated called *anak ni cungkil*. *Koca* or hapea's fruit is used for *markoca* game. This game uses two koca which they made overlap, then hit by hands to broke koca. Broken koca means lose. *Koca* also used to make bamboo propeller. Not only bamboo, but only *dap-dap* fruit cover also can be made as propeller. Children use sugar palm ribs as a stick. Calyx of *Jambu aek, mali-mali* fruits and *utte manis*'s exocarp are used as bullet of *dotang-dotang. Dotang-dotang* is small cannon of bamboo, it is made from *bulu poring* and sugar palm ribs.

5.3.1.2.6 Hunting and fishing tools

Hunting and fishings are only carried out by men. Hence, it is male give their per-ception. Forti-four percentof respondent revealed that they still do hunting and traping within CADSi forest. There are nineteen species of plants used to make hunting tools. First, to trap mammals,

Table 2 Dependence of the Ramba Sihasur (HCV 5 step 2) (2008)

Need	Sources					
	Forest	Cultivation	Purchased	Aid	Others	Explanation
a. Food :						
- Carbohydrat	1 (41,6)*	3 (33,3)	0	0	0	Occasionally they harvest *Suhat*, *Tubis*, ect.
- Animal protein	3 (47,5)	1 (4,2)	1 (0,7)	0	0	Moderate
- Vegetables	2 (32,0)	3 (46,0)	0	0	0	Forest provides fruits occasionally. The villagers also get fruits and vegetables from their gardens
- Fruits	2 (48,6)	2 (47,3)	1 (1,3)			
b. Household tools	2 (50,0)	2 (50,0)	1 (0)	0	0	Most of traditional tools are home made, but they also buy several in the market
c. Fuel	3 (100)	0	1 (0)	0	0	They very seltom to buy cerosine for stove
d.Medicines						They rely on forest, but now
- Animal	3 (8,5)	0	1 (0)	0	0	they plant it in the garden and
- sources	2 (48,3)	2 (42,8)		0	0	several must buy in pharmacy
- Plants sources						shop
e. Animal diets	3 (4,9)	0	1 (0)	0	0	Rely on forest
f. Construction materials	3 (100)	0	2 (0)	0	0	Generally taking from forest, but now they construct permanent house from cement with zinc roof

the villagers use *binjara*, *gasip*, *bostang*, and *pilubang*. *Binjara* and *gasip* are used to catch dear, monkey and pig that eat there mixed-farming products. It made form stems and branches of trees. *Bostang*, a bit similar with *binjara and gasip*, but it made from stems, branches and iron claws, sometimes used to trap tiger. *Pilubang* made form stems and branches plus deep hole in the ground. When animals fall down into the hole, they are trappd and can not escape.

Second, bird hunting tools consist of *sambil*, *pulut*, *pike*, *katapel*, and *hultop*. *Katapel* is made from branches of *Coffee robusta* tree and *Cinnamomun burrmanii*. *Pike* or bird trap cage made from *sanggar* (*Themeda gigantea*), *bulu godang*, and stems of various trees. *Pulut* or adhesive latex used to trap bird that will sticked on it. It made from mixed-rubber of *haruaya* (*Ficus benjamina*), *torop* (*Artocarpus elasticus*), *sibodak* (*Artocarpus integra*) and *hapea* (*Hevea brasilliensis*). *Sambil* consist of two types, they are *sambil andor* to catch mammals and *sambil pidong* to catch the birds. *Sambil andor* made from *gitan* (*Calamus* sp1.) and *andorhoda*, stems, and *sambil ni pidong* is from *ijuk* and *jabut* (coconut exocarp fibers). *Hultop* (blow bamboo pipe) is made from *bulu menek* or sometimes called as *bulu hultop* (*Bambusa* sp2.).

Third, the traditional fishing tools consist of *bubu*, *hail*, *petok*, *radis*, and *tuba*. *Bubu* is made from *bulu gala* (*Bambusa multiplex*) and it is bended using *ijuk*. *Mambubu* or fishing by using *bubu* and *siala* stem to attract fish. *Hail* is used for fishing stick from *bulu*

pamoran (*Bambusa* sp1.), fishing, rope and hock. *Petok* as well as arrow, but its bow is made from *bulu godang* (*Bambusa maxima*) and rattans, then its dart made from the same bamboo or woods. One of the bamboo uses is for making bows and arrows. Bows are made from *Dendrocalamus* sp., but only those which grow on particular micro-sites produce good bows. Arrows are made from a high altitude bamboo and require considerable skill to craft.

The villagers also use *Radis*, which is the old fishing method, looks similar with fishing, but it uses grass or earth worm as bait. The bait is bended by the grass, then put it into eel or others fish hole or nest. *Tuba* (*Gonystylus macrophyllus* (Miq.) Airy Shaw) is used as traditional poison to catch fish; the leaves and stems are hit before putting into water. Before using *tuba*, river flow must controlled and then *tuba* is spread in up-streams. Sometimes river flow is blocked to make sure *tuba* poison works.

The other tools that still used is *Tanja* to kill mammals and fish. In former time the villagers use bamboo with sharp-pointed as *Tanja*. But now they use iron, then wood or bamboo are used as the sticks.

5.3.1.3 Decorative NTFPs (Non-commercialization)

In terms of wild flowers collection, only 58% of respondent answered “moderate” (most of them were female). They collect flowers occasionally from CADSi. Usually they collect it from other places or from neighbours. They claimed that, since a long time ago, their ancestor had attempted to domesticate forest flower in the home yard. From Table 12 of useful plants in Ramba Sihasur, there are 57,5% of flowers origin from CADSi and the rest, 42,5% origin from outside. There are 80 species of flowers in 49 families that origin from forest and non-forest.

5.3.2 Productive NTFPs for Commercialization

In this research, source of household income are from forest and from agriculture sector. The result shows that their monthly income is between Rp. 250,001-500,000 per households. Forest income are generated by selling *Ijuk, hulim, gulo bargot, anduri, bide, sonduk* and other products. Income from agriculture, mixed-farming and *saba*, range from Rp. 250,001 to 500,000 per households per month. Forest is the second important source of income, because their access to and control over CADSi decreased.

Case in Luwu shows that wild honey, resin, and gaharu and other kinds of NTFPs that were collected by hamlet community for cash. Since NTFPs could fill their need for cash and other living-requirements anytime they want, there was a tendency that the hamlet community did not plant their farming land intensively using crops or fruit trees (Ngakan, et. al., 2006). Thus, in Ramba Sihasur, there were only seventeen (5.27%) of forest species commercialize. It was probably caused by infrastructure obstacles and less market information. The following is commercial NTFPs collected:

5.3.2.1 *Ijuk, kulang kaling, gulo bargot, and lidi*

Ijuk is one of the raw materials of the broom, it is the dominant income sources that generated from forest, second one is coffee. Ijuk is collected once a

month, except during paddy harvesting time. It is sold at Rp. 3,500 per kg in the market and Rp. 2,500 per kilogram in the village, each collector can collect between 3-10 bounch of ijuk, each bound is between 50-100 cm in diameter and between 100-150 cm in length. *Kulang kaling* is produced before coming the month of *Ramadhan*. It has been processed around three to four month before Ramadhan. Each household could produce between 4 - 6 cans or 100-200 kg weekly, selling price is around Rp. 2,000 per kilogram. *Kulang kaling* production process usually is done inside the forest where the villager stay at temporary hut. Production in the village is done by female and kids while in the forest is done by male (Affandi and Pattana, 2006).

5.3.2.2 *Hulim*

Hulim is the second source of income after *gulo bargot*. The villagers collect the bark of *hulim*, and dry it out by using solar energy in the yard. *Hulim* naturally grows in the forest, but the villagers also attempt to domesticate it since a long time ago. *Hulim* market is also uncertain, depend on weather and number of tree they have. Usually they sell it once a month. *Hulim* price in the village was Rp. 3,000 and in the market was Rp. 3,500 at the time of data collection.

5.3.2.3 *Soban*

Soban is collected with a purpose to fulfil household requirement for fuel. But occasionally some villagers sell it. In general, collecting *soban* is done twice until fourth annually, before and after planting paddy then after harvesting paddy. Before using it, firstly soban is dried in the yard of house than after stored under the house, called it *Taruma*. The *soban* price in Sipirok was Rp. 150,000 per m^3 while in the village the price was Rp. 10,000 a bounch.

5.3.2.4 *Wild honey*

Wild honey is produced by *loba* or forest bee (*Apis dorsata* Fab.). Usually they construct their nest at the tree branch as height as 20 until 25 m above the ground. The size of the nest could be as big as goat and even buffalo. It produces much wild honey. Collecting must be done by expert. Collectors work in the evening until night to avoid bee stings. They set fire on the dried coconut leaves which are wrapped by other plant young leaves to resist fogs. Fogging will remove bee and leave their nest. Most of honey collected is sold in Sipirok. The price of wild honey was Rp. 30,000 a bottle of siroup (630 ml) when data for this research was being collected.

Similar finding was also reported from Myanmar where harvesting honey from natural bee-hives in the forests is profitable for rural people. People prefer wild honey to the honey from the hives of bee-keepers. Two of the commonest honey-bees *Apis indica* and *A. dorsata* (Lwin, 1995).

5.3.2.5 *Bide, lage, sonduk* and *anduri*

Almost 80% villagers produce *bide* only three household which always produce it where they can earn between Rp. 150,000–250,000 per *bide*. They can produce between one or two bide per month. Raw materials for *bide* are *lak-lak*, *hotang andor* (*Calamus* sp1.), *ijuk*. *Lage* is made from *bayyon* (*Scirpus mucronatus*) (see Annex 7, Figure 18c), and *anduri* is made from *badaor*

(*Calamus* sp 3.) and *bulu raga* (*Bambusa* sp 3.). Recent price of *lage* was Rp. 50,000. S*onduk* is made from materials such as *hotang* (*Calamus manau*), *bulu godang* (*Bambusa maxima*), *hulim*, and *takar* (the endocarp of coconut fruits). The price of a *sonduk* is around Rp. 2,000, then an *anduri* was around Rp. 20,000. *Sonduk* is produced by about six households and *anduri* less than ten households.

Low income from agriculture made the villager rely on CADSi as source of fundamental needs and income requirement. According to this (Pinedo-Vasquez, *et.al.*, 2000) reported a research in Brazil that the increasing demand for fruits and timber in the market, and the decline in prices for agricultural products, have changed the role of agriculture, agroforestry and forest extraction in the household economy. In the past, crop production was mainly for the market and was the main source of cash income for smallholders in two different villages, and agroforestry and forest products were mainly for their subsistence. Currently, agricultural activities are mainly for the production of subsistence products while agroforestry and forest management have become the main activities for income generation. Emphasis on agroforestry and forest products explains why smallholders are reducing the size and number of agricultural fields.

5.3.2.6 *Parira*

Anually, *parira* mature on September and October, close to Ramadhan. *Parira* is harvested by the villager mostly from CADSi. Beside for consumption, they also selling it to Sipirok market, with price around Rp. 5,000-1,0000 per a bounch.

5.3.3 Cultural Materials and Boundary Markers

Beside kinds of fundamental needs and cash benefits that rural people receive from forest utilisation, there are also considerable indirect and non-financial benefits, such as spiritual and cultural values, shelter and some inter-cropping. Eventhough in Ramba Sihasur villagers are the Moslem, but they still follow their ancestor traditions Interviews result show 59% of the respondent reveals that NTFPs often used in cultural activities, as revealed as follows. In detail, 73% of them using plants and 77% of them using animals as instruments or other materials to perform cultural activities.

5.3.3.1 Plants use

There are three cultural events that still exist and use plants as instruments. Result has shown that 16 families of 24 species of plants are used for both purposes. These events are: First, *Manaekon bukkulan*[3], means that the house owner grateful to the God, an event when the villagers almost celebrate the finishing of house construction. They hang out banana fruits, buds of coconut and flags in the top of the constructions. No specific of banana used, but the one that can be obtained easily, such as *Sihawa* and *Sitambatu*. This event's goal is to avoid ghost interference. They believe that their house will endure for a long time, and ghost will protect that area.

Second, *marjamu* (wedding party). They use *Burangir* (*Piper betle* L.) leaves as substitute of the inviting card. For accessories, they construct *Gaba-gaba*, which is made from *Bargot* and *Harambir* young leaves. Several shaped as well as flag and fen-ce, then

the others with various shape. Then, in the kitchen youth people or called *Naposo nauli bulung* doing *manduda* events. Before cooking, a part of them goes to the forest to collect wrapping leaves, fruit and sometimes firewoods. Then the others goes to the mixed garden to collect vegetables, usually they put it into *hadangan. Manduda*'s part is done by young men or *Naposo bulung* unhusk paddy and *ikkayu lalat* within *losung* (mortar) by *indalu* (a big stick to unhusk the rice). The young women or *Nauli bulung* clean up the paddy by using *anduri* (weaving bamboo and *badoar*) and taking out *ikkayu lalat* then put it into the other media.

Third, *Marpangir,* bathing to clean sins before Ramadhan is coming. *Pangir* came from the orange name which only used for it. Young women usually cultivate and mix kinds of plants to generate good aroma. *Pangir* ingredients are leaves of *Tapak leman* (*Nothopanax scutellarium* Merr.), *Hasobe* (*Coleus omboinicus* Lour.), *Pandan musang* (*Pandanus amaryllifolius* Roxb.), *Utte Pangir* (*Citrus* sp.1) and *Jeruk nipis* (*Citrus aurantifolia* L.), fruits and leaves of *Utte datu* (*Citrus hystrix* Dc.), flowers of *Kaca piring* (*Elephantopus scaber* L.), *Melati* (*Jasminum sambac* (L.) Ait.) and *Ros* (*Rosa hibrida* L.). The last one is the stem of *Habelu* (*Zingiber* sp.1), which have unique good smell. *Habelu* is very identic with *Pangir,* because it used only for *Pangir.*

For land boundary markers, they usually use two kinds of *Hatunggal*, which is differentiated by leaves and stems color. These are, *Hatunggal narata* (*Cordyline fructicosa*) and *Hatunggal narara* (*Dracaena fragrans*). These differences do not have different meanings of using. From the interviews, several informant said that *Hatunggal* also used as a boundaries between two worlds: human and ghost. They believe that ghost also understand with this markers. The other ones are *Dap-dap* (*Erythrina lithosperma* Miq.) and *Hayu ombun* (*Gliricidia sepium* (Jacq.) Kunth.), but these two frequently planted within the mixed-farming as cover plants.

5.3.3.2 Animals use

Different from plants, animal uses are usually more identic with mystic and natural sign to indicate the time changes. There are three kind of birds, eight families of insects, two species of mammals, and two species of reptiles used by the villagers.

Birds consist of *Halihi or eagle* (*Buteo buteo*), *Lali or falco* (*Falco severus*) and *Pio-pio* (*Bubo sumatranus*). *Halihi* and *Lali* usually fly around and with sound "*kuliik…kulikkuk…*" again and more, to inform people bad fortune will come; it could be fire, death, and etc. But *salihi* sign is usually clearer, because it flies around the place of the accident to happen within hours, and also higher then *Lali*. They fly at noon, from 10 am until 2 pm. Whereas *Pio-pio* or Sumatran Owl called in the village edges with sound "*pio pio-pio pio…*". Usually it stands on the branch or trunks of the tree in the afternoon till evening. They choose the higher tree where the villager can hear easily. Both signs occurred between one to three days before bad thing comes.

Insects consist of nine species with different roles. Their roles divided into two, as good and bad alarms. The good one sends message that there will be guest coming. This alarm rangby four kinds of dragon flies *Siri-siri laut*

(*Aeshna* sp.1), *Siri-siri narata* (*Anax junius*), *Siri-siri harangan* (*Neurothermis* sp.), and *Siri-siri nagorsing* (*Pantala flavescens*). These dragon flies also believed to have mystic power, usually parents catch them and put it to their kids *pusot* (plasenta hole at his or her stoma), and then let them away. Beside dragon fly, *Raba-raba* (*Attacus atlas* L.) and *Salipot-pot* (*Photinus greeni*) are also used. The bad side or the ugly fortune alarms, such as *Sikirik* (*Gryllus bimaculatus* De Geer.), *Sikirik saba* (*Gryllotalpa orientalis*), *Siapor moka* (*Manthis religiosa*) and *Siapor losok* (*Tettigonia viridissima*). Furthermore, *Sese* (*Cicada* spp.) are helpful to warn people in the afternoon and evening.

The use or unuse NTFPs for culture and mystics seems contradict with their religion and believeness of being Islam. There are many kinds of uses. Following Gurung (1991), indigenous knowledge is knowledge linked to a specific place, culture or society, dynamic in nature, belonging to groups of people who live in close contact with natural systems. Knowledge of their physical environment is embedded in epistemologies and belief systems, usually naturalistic and radically different from those of scientific systems. The spiritual beliefs, cosmologies and world views are therefore a vital part of the whole system which must be understood by outsiders attempting to understand the ways in which ethnic groups have managed their environments.

5.4 Gender role in NTFP's collections

In Ramba Sihasur as well as other rural areas, the villagers male and female, parent and their child, young and old are workers, in same or different time or places. Labor division in collecting forest product had been constructed since years ago, no one knows who initiate it. From table, we know that male role is more dominant in many part of NTFPs collection. Interviews indicate that these occupations need more energy and time, because usually the place is far from shelter and quite dangerous. In one household, mother and father are handling the activities with the help of their children. Father took part in collecting wild honey (81 %), *lak-lak* (64%), bamboo and *tolong* (54%), medicinal plants (38%) and animals (75%), rattans (76%), *ijuk* (56%), *maragat* (62%), cinnamon barks (48%), and grass for houses and huts roof. Then hunt-ing mammals (80%), trapping birds (34%) and fishing in the forest river (44%). The occupation that done by father and son together are trapping birds (32%), fishing (27%), collecting insects for bird feed (55%) and *ijuk* (24%). Eventhough male are dominant on this, but female (especially mother) assist in the next process, such as drying, cultivating, and cooking. Table 15 shows their differented role in collecting NTFPs from CADSi forest.

6. Conclusion and Recommendation

6.1.Conclusion

Research findings led to the conclusion that there were four reasons that caused the villagers to maintain their activities within CADSi forest. First, poverty incidence; most of the villager are farmers who have small acre of farming land, have low income and lack of knowledges and skills. Second, remoteness with poor infrastructure and access to market, has no health centre (even only midwive services) and administrative office, only

one school building (elementary level), and one vulnerable irrigation. Third, difficult access to get information communication made them less informative regarding market price, forestry regulation, and development policy. Fourth, unequal and lack of law enforcement;the law enforcement appears to be implemented only to the villagers, where they are prohibited to conduct logging and land clearing, but on the other side, outsiders are allowed to carryon activities within CADSi

Local perception regarding CADSi's status was influenced by ten factors; low education and knowledge level, income level, livelihood, household size, and residents status, length of life in Ramba Sihasur, age and sex, and traditions and culture. All of those made their perceptions vary and incline to utilize CADSi, especially NTFPs. Farmers with *Batak* tradition who have low education and knowledge and belong to productive ages with low income are in high dependence to NTFPs. Most of them, indigenous people and live in Ramba Sihasur since they were born, realy upon CADSi forest.

NTFPs utilized by local people can be categorize into nine types based on their function and their utilization. These are for food, traditional medicine and technology, decoration, construction, fuel, hunting, tradition and culture. Total species of NTFPs utilized were 463 species; consist of 322 of plants and 141 of animals. In detail, NTFPs are utilized to fulfill require for vitamin; vegetables, edible fruits; for carbohydrates from palms, rhizomes and tubers; spices, medicinal plants and animals, technological uses, wrapping materials, toys, bending materials, flowers, construction materials, firewoods, hunting materials, mystics and natural alarms, then cultural uses and border markers.

Gender play important role in NTFPs collection in the family where each family member participates in differrent part of activities. Father is very dominant among family members, he does hunting mammals, collecting wild honey, *lak-lak*, bamboo and *tolong*, medicinal plants and animals, rattans, *ijuk*, *maragat*, cinnamon barks, roofing materials, trapping birds, and fishing.

6.2. Recommendation

This research conducted in Ramba Sihasur villages is expected to be useful as source of information for CADSi management and local livelihood protection. There are many expectations to all stakeholders to consider, especially in policy making regarding CADSi's conservation issues and poverty of forest villagers. To stimulate the development of NTFPs as a strategy to alleviate rural poverty, it is important to take into account the followings:

Poverty and remoteness are particular enemy in the village and claimed as main reasons to maintain activities within CADSi. There are two option are proposed that possibly able to cope this condition, relocation and community forest management (such as agroforestry). Relocation is very conducive to present, but with several condition, including new house, farm-land, seeds, livestock and capital employed as similar as given by ex. Governor Raja Inal Siregar to migrants in *trans* village. Second, government as forest manager have to consider local wisdom and also forest existence, so that law enforcement also can be implemented properly.

Factors influencing became important related to the villager

perceptions and dependence on CADSi. To build good perception and to decrease of high dependence will be succeed if they can get new alternative source of income and public service (health, food security, access to market and information) were available.

Research result has shown that the villagers were really have high dependence on CADSi's products. They chosen its product to against poverty, but in other side it also threathened forest existence. Therefore improving forest based livelihood must be integrated into broader rural livelihood initiatives such as agriculture intensifica-tion and marketing. Local communities must have good access to market inform-ation especially about consumers demand. Hence, domestication also option that need to implemented with aims to decrease activities within CADSi.

According to gender roles in NTFPs utilization, male and female, participated as employment. Therefore training is very important to provide for them, to develop their skill and experience related to utilize forest and agriculture products, also managing CADSi. Training program can collaborate with local institution, such as PKK (female board), *Naposo-Nauli bulung* (young male-female board) and farmer groups.

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ANNEXES

Annex 1.

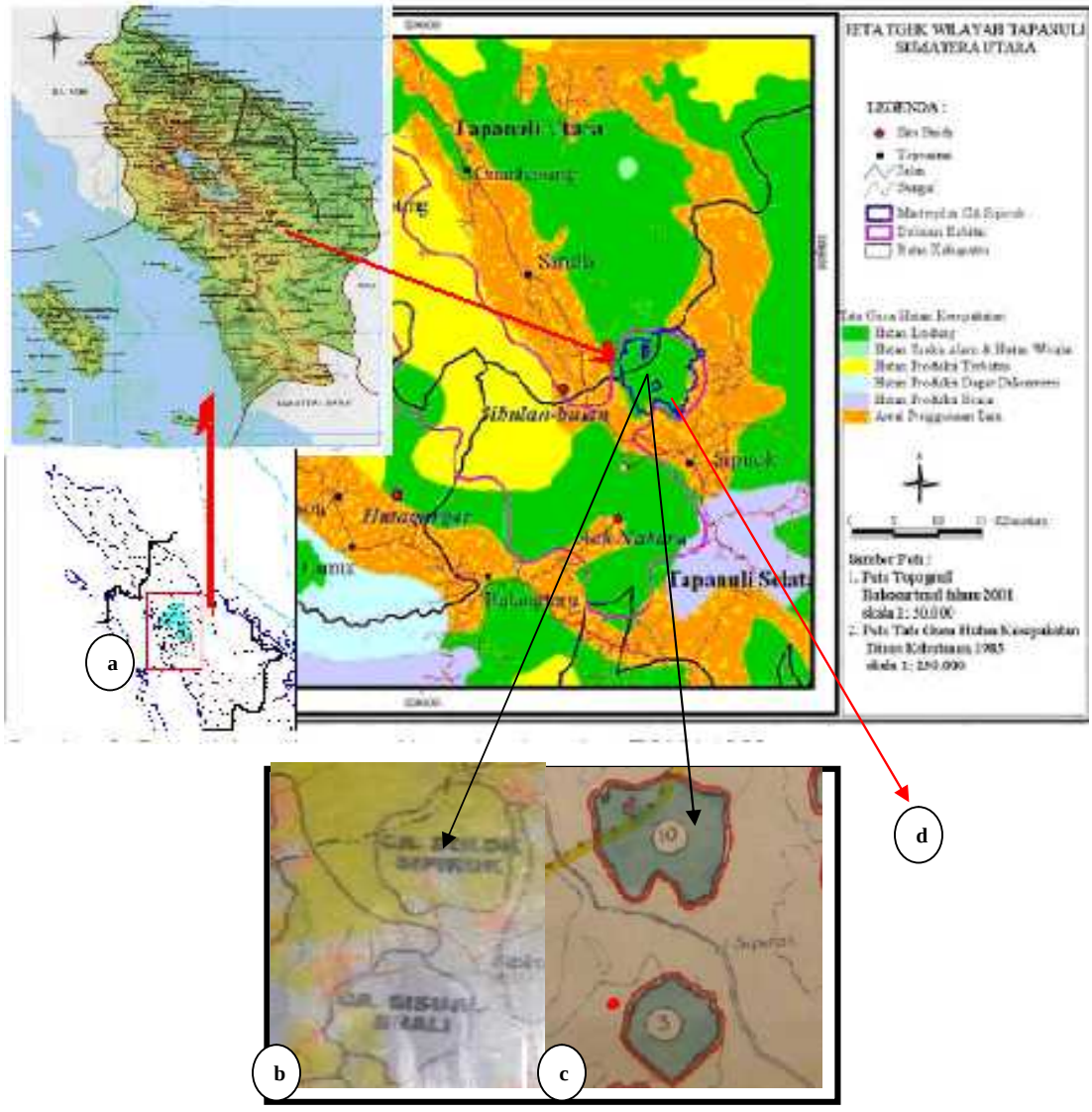

Figure 1. A. CADSi area: (a) Determination of Forest Region Based on TGHK 1982; (b) Map of Forest Region in Tapanuli Residence, Boschwezen Taroetoeng 1920; and (c) Map of Forest Potential for Fires. B. (d) Ramba Sihasur village