



Local Knowledge Based Ecosystem Management (*Igya Ser Hanjop* and *Igya Hon Hanjop*) in the Hatam Tribe in West Papua Indonesia

Yoel Dowansiba^{a*}, Charlie D. Heatubun^b, Agus I. Sumule^c, Jonni Marwa^d

^a *Environmental Science of Doctoral Program, University of Papua, West Papua, 98314, Indonesia*

^{b,d} *Faculty of Forestry and Post-Graduate Program, University of Papua, West Papua, 98314, Indonesia*

^c *Faculty of Agriculture, University of Papua, West Papua, 98314, Indonesia*

^a *Email: yoeldowansiba70@gmail.com*

Abstract

Local wisdom in protecting and managing the surrounding environment is an important component that must be prioritized when managing the environment and its resources. The Hatam tribe has lived for generations and managed the surrounding environmental resources well until now. This research aims to reveal environmental management strategies based on local knowledge of the Hatam tribe. The research was carried out in the Arfak Mountains area where the Hatam tribe lives. The research results show that the traditional knowledge-based management strategies that still exist are in the form of *Igya ser hanjop* and *Igya hon hanjop*, although in practice they are very rarely found. To overcome the loss of traditional knowledge practices which are increasingly rare, cooperation between the government, community, NGOs and universities as well as competent research institutions is needed so that local wisdom can be maintained and used as the basis for sustainable management in the Arfak Mountains.

Keywords: Arfak Mountains; Hatam; sustainable management .

Received: 11/3/2023

Accepted: 1/3/2024

Published: 1/13/2024

* Corresponding author.

1. Introduction

The Arfak Mountains are a group of mountains in West Papua Province which is inhabited by the large Arfak tribal group. Most of the Arfak tribe's population occupies two districts, namely Manokwari district and Arfak Mountains district. Arfak Mountains Regency is a mountainous area that is administratively a division of Manokwari Regency which was formed based on Law of the Republic of Indonesia Number 24 of 2012 concerning the Establishment of Arfak Mountains Regency in West Papua Province. The area of 2,774.73 km² consists of 10 districts, namely Anggi District, Surorey, Anggi Gida, Membei, Didohu, Taigei, Catubou, Testega, Minyambou, and Testega District. Testega district has the largest area (493.34 km²) and Membey district has the smallest area (57.45 km²). The number of villages in the Arfak Mountains district is 166 villages, with the Menyambouw district having the most villages, while the Membey district has the fewest villages, respectively 37 villages and 6 villages. The population in 2021 is 38,491 people. The population density for each square kilometer (km²) is 25 people/km² [1]. The large Arfak tribe is actually a combination of several sub-tribes or sub-tribes. Without ignoring other sub-tribes in the large Arfak tribal group, the dominant sub-tribes in this group are the Hatam sub-tribe, Moile sub-tribe, Meyakh sub-tribe, and Sougb sub-tribe. Arfak tribe residents from various sub-tribes occupy urban areas to rural areas which occupy the largest portion. The Arfak tribe people who live in rural areas generally still apply traditional lifestyles both in agricultural systems and other livelihoods [2]. The rapid development of technology and information is currently able to reach the interior areas where the Arfak tribe lives, so that they can easily obtain information and innovation in their living systems. The innovations received by the Arfak tribe occur in various sectors including agriculture, medical systems, education, consumption patterns and lifestyle in general. Along with the changes that occur as a result of this innovation, lifestyle changes become something that we can easily observe in their daily lives. Apart from changes in lifestyle, technological developments including construction are also believed to have an impact on the sustainability of species in the Arfak Mountains [3]. The Hatam tribe, as the most dominant group in the large Arfak tribe, has a close relationship with the Arfak Mountains environment, part of whose territory has been designated as a Nature Reserve area based on Forestry Ministerial Decree No. 783/Kpts-II/1992 dated 11 August 1992, with the name Arfak Mountains Nature Reserve (CAPA). This area also includes eight districts, namely Warmare, South Manokwari, Tanah Rubuh, Oransbari, Ransiki, Membey, Hink and Minyambouw. The status of the area as a Nature Reserve certainly has various consequences, including social aspects for the Arfak tribal community. The area's status as a conservation area is a small part of the changes that have occurred in this area. Changes due to progress over time have brought the Arfak tribe to modern life which also has implications for changes in lifestyle, including in terms of managing their biological natural resources. The aim of this research is to reveal socio-cultural-based natural and environmental management strategies for the Hatam tribe [4].

2. Methods

This research took place for approximately 2 months, starting from September to October 2023 in the Hatam tribe residential area. Some of the villages that were research locations include: Minyambouw village, Hink village, Syoubri village, Mokwam village, Amber village, Kwau village, Watariri village, Mirowi village, and Warkapi village.

The determination of respondents (the Hatam sub-tribe) was carried out using purposive sampling [5]. A total of 40 respondents had their information collected in this research. These respondents also included village heads and religious leaders, as well as community leaders from the Hatam tribe. Apart from these respondents, interviews were also conducted with staff of the West Papua BKSDA (Natural Resources Conservation Agency) as the institution responsible for managing the Arfak Mountains Nature Reserve where this research was conducted. At each location, key respondents were initially determined, namely village heads, customary land owners and community leaders. After that, a search was carried out using the Snowball sampling technique to obtain further respondents [6]. The use of the snowball sampling technique was carried out with the assumption that knowledge about biological natural resources around the Nature Reserve area was only understood by certain people. Information regarding the use of resources around the Nature Reserve, including socio-cultural aspects, was also obtained through open discussions with the community involving women, youth and community leaders from the Arfak tribe. Data collection was carried out using in-depth interviews, and accompanied by field observations to determine the actual conditions at the research location.

3. Result and Discussion

3.1. Social Culture of the Hatam Tribe

In general, there are four dominant sub-tribes occupying the area around the Arfak Mountains, namely the Hatam sub-tribe, Meyakh sub-tribe, Moyle sub-tribe, and Meyah sub-tribe. Among the four ethnic groups, the Hatam tribe is the largest inhabiting the northern Arfak mountain area or in the Oransbari and Ransiki, Tanah Rubu, Warmare, Prafi, Minyambou, Hingk, Catubou and Anggi District areas. The Meyakh tribe inhabits the western part or the Pantura, Masni, Saukorem, Kebar, Testega District areas. The Sougb tribe generally people from the southern part or the areas of Anggi, Membei, Anggi Gida, Isim Plains, Tahota, Didohu, Taigeh Districts. Furthermore, the Moile tribe is spread across the eastern part of the Arfak mountains or in the Minyambow District.

The Hatam people live and live in small valleys and the foothills of the Arfak Mountains, namely the coast of Cenderawasih Bay, to the east of the Bird's Head region and have been spread for hundreds of years. They are sometimes called according to their dialect, for example Tenam (Tinam) which comes from the word Knam which means village, Moile (moire) and others. The Hatam tribe itself consists of 4 dialect groups, namely the Hatam dialect (which is also called Hatam Asli or Tinam), Hatam Moile, Hatam Adihup and Hatam Uran [7]. This designation is based on the name of the dialect used so that in some information or communications individuals from certain groups when asked will say the individual or group is "moire" and not "Hatam Moire". Likewise for the Uran dialect group and other dialect groups. The Hatam Moile group is mainly expressed as a group of Hatam people who live and reside in the Mokwam, Warmare, Dindei, Umcen, Indabri and Mbenti villages as well as most of the Mupi, Warkapi and Oransbari coastlines. Likewise, vice versa, the term between a Uran dialect group that lives and lives in Oransbari (opposite the Moile group in Oransbari), or for the Tinam dialect group in Minyambouw, Demaisi, Aubehe, Chatubow, Hink and Memti District and its surroundings [8].

Study of language groupings in Papua stated that the Hatam people are also called Borai or Mansim. The term Mansim itself refers to a group of Hatam-speaking residents, who live and reside around the Arfai area to Maripi

in the southern part of Manokwari city. The naming of Borai or Mansim as another name for Hatam is based on the use of pronouns by Ross Malcolm in analyzing the Hatam language against languages in Papua, especially the West Papuan language family group [8, 9]. The physical characteristics of the Hatam people are brown skin, black eyes, curly hair, and a medium skull volume (dolicephal). Other information determines that the Hatam people and Papuans belong to certain races from the 4 main races, namely the Australoid, Mongoloid, Negroid and Caucasian races. The Negroid race may be close to the same, especially in physical terms, namely hair and skin, but differ in the shape and size of the skull and the blacker skin color of the population in the African region. The closeness of the physical characteristics of skin color and hair is one of the reasons A.L Kroeber, a British anthropologist, made a classification by placing Melanesia and Papua as part of the Negroid race from African human fossils (*Homo Sapiens Aselaar*) found in the Sahara desert. Another expert, Teuku Jacob, places humans in Papua as a special race, perhaps even belonging to the Australoid race group whose remains currently live in Australia. This statement is based on the discovery of the Wajak man (*Homo Wajakensis*) in the Wajak village in the Brantas river valley near Tulungagung, East Java. The origins of the Hatam tribe can also be traced through existing stories or fairy tales, one of which is a story or tale about ancestors based on their family who came from certain animals. Agus Sumule, a researcher from the University of Papua stated that the Hatam tribe believes they came from a dog named Serce [4]. This dog place is located in the Hulu Wanon River, namely a cave called Sen Mimbran. Sen means Sungai Mimbran means reeds, so it means the river that comes out of the reeds. They belong to the Serce Mandacan, Muit, Tbyai, Salabai and Indouw clans. Apart from that, there are also a small number who come from snakes, namely those who join the Iwou clan. This snake also comes from the same area as the Serce dog, namely from the Upper Warori River. The clans included in the Hatam tribe can then be grouped into two, namely (1) those originating from Serce dogs and snakes originating from the Warori River, namely Serce, Mandacan Muit, Tbyai, Salabai, Indouw and Iwou (2) originating from outside, namely as a result of out-marriage such as Sayori (from the Moule and Mansim family) and Towansiba (from the Sougb tribe).

Regarding the origins of the Hatam people, several myths and legends have been told by parents to children from generation to generation and continue to live today, although some parts have degraded so that they cannot be told in full to the current generation. Nowadays it seems that it is no longer a habit for parents to tell myths or fairy tales to their children as a method of socialization. Parents admitted that they never told their children, when asked what stories they told their children. Myths, stories or fairy tales are only conveyed specifically to men who are in the line of rulers or traditional tribal chiefs or other traditional figures. Thus, not everyone can hear fairy tales from their parents, only children or descendants of people who have power can get fairy tales and that is only limited to boys. This is reinforced by the division of space between men and women in a house. The tradition of telling certain stories such as history and myths is only done by adult men to boys so that women have no knowledge of those stories [4].

Religion

The people of the Arfak tribe are currently devout Christians. The event of the arrival of the gospel on Mansinam Island which was initiated by two important figures, namely Ottow and Geisler, also brought changes to the lives of the Arfak people. The religious life that exists in their lives is reflected in the religious symbols

that we can easily find in residential areas and people's homes, including worship facilities in the form of churches. Churches are Christian worship facilities found in almost every village in the Arfak tribe's residential area, including the Hatam tribe. The existence of a church building is not merely a place of worship, but rather concrete evidence of a change in the belief system from beliefs that were hereditary (inherited from ancestors) to a belief system based on Christian religious teachings. If in the ancestral heritage belief system the belief is more in spirits (forest dwellers, trees, rivers, rocks, and so on), then currently the people of the Arfak tribe believe in God, and at the same time Jesus Christ as their savior.

The main occupation of the Arfak tribal community around the CAPA area is in the agricultural sector, namely field or garden farmers, as well as forest product extractivism. Apart from these main livelihoods, it is not uncommon to find members of the Arfak tribe who work as teachers, civil servants, regional officials and even regents and governors. As field/garden farmers, the Arfak tribe people have deep ties to the surrounding environment, including in aspects of its use. As a farming community, the techniques applied are a combination of techniques inherited indirectly from previous generations, with innovations they obtain from other people outside the group or from related parties. Currently, the Arfak tribal community around the Arfak mountain nature reserve applies a settled agricultural system and a shifting cultivation system. The settled farming system is carried out in almost all locations by utilizing yard land and garden locations close to settlements. Meanwhile, shifting cultivation activities are carried out by utilizing land that is far from their settlements. The system for cultivating food crops and other economic crops is carried out using traditional methods based on the knowledge they have acquired from generation to generation. It was also revealed that they had attended training related to food crop cultivation, but it was not ongoing so it did not contribute much to their agricultural knowledge system. Apart from farming, the Arfak tribal community around the Arfak Mountains Nature Reserve also carries out forest product extractivism activities to meet their daily needs. Extractivism carried out in surrounding forest areas is carried out according to their respective ownership areas or based on the customary land they own. One of the common extractivist activities is hunting. Types of game animals that are hunted include: cuscus, moles, various types of birds.

The Arfak tribe, like most ethnic groups in Indonesia, has a government system, either traditional or a government system based on Law number 6 of 2014 concerning Villages, namely village or village government. In the Arfak breadfruit life system, they are known as Andigpoy and Pejointi, namely community leaders whose positions and roles are very important in their communal lives. Pejointi are people in the Hatam tribal community who are seen as having abilities that exceed the average, such as communication skills, level of education, and so on, while andigpoy are people who are elders in their group. These two components have an important role, especially in terms of making decisions on a problem faced together, or in terms of resolving other customary problems, including in terms of joint use of resources.

3.2. Traditional Knowledge About the Environment

The Arfak tribe and the environment around the Arfak Mountains Nature Reserve are a holistic unity that cannot be separated. For generations, the environment and the resources within it have been controlled and utilized by them to fulfill their daily needs from time to time. In a time span that is difficult to predict, the Arfak tribe

community has built a systematic knowledge system regarding the existence of the surrounding environment, including what benefits it provides for them. The harmonious relationship between the Arfak tribe and the surrounding environment is reflected in the existence of the Arfak tribe in the Arfak Mountains Nature Reserve area to this day.

The Arfak tribe is one of the ethnic groups that still has very good knowledge of the surrounding environment. Knowledge based on experience from generation to generation places them in the position of being the group that best understands the environment in the Arfak Mountains area. In general, the Arfak tribal community groups the environment based on height and characteristics into four categories, namely: (sorted based on the lowest position above sea level) mukti, resim, hubim (Hatam) or sebim (moile), and hampiabei (hatam).

- Mukti (Coastal and Coastal Forest Ecosystems)

Mukti is the term in the Hatam language for the area directly adjacent to the coastline, and includes coastal forest areas. Due to its location in an area directly adjacent to the coastline, the composition of plant species in this area is plants that have a fairly good tolerance for exposure to salt from sea water. The types of plants in this area include various types of pandan (*Pandanus* spp.), ketapang (*Terminalia catappa*), beach kale (*Ipomoea pescaprae*), ironwood (*Intsia* sp.), hibiscus (*Hibiscus tiliaceus*), keben (*Barringtonia asiatica*), ink tree (*Premna corymbosa*), and coconut (*Cocos nucifera*), lingua (*Pterocarpus indicus*), and beach pandan (*Pandanus tectorius*).

Mukti for communities in the lowlands of Mupi, Warkapi, Oransbari, and Ransiki is also used as a garden area. With commodities including cassava (*Manihot esculenta*), sweet potato (*Ipomoea batatas*), taro (*Xanthosoma* sp.), taro (*Colocasia esculenta*), papaya (*Carica papaya*), and various vegetables such as gedi (*Abelmoschus manihot*), katuk (*Sauropus androgynous*), and mustard greens (*Brassica* spp.). The agricultural systems used are shifting cultivation and settled agricultural systems. The settled farming system is carried out by the community in Warkapi village and its surroundings. The use of the permanent system is more due to the limited area that can be used as gardens/fields (generally applies to residents who are not direct customary owners). The residents (Arfak tribe) who occupy an area that is not their customary area, they are only given permission to stay and open a cabin in a location determined by the customary owner. Thus they cannot freely move locations to garden. This condition is different from those who live and occupy their customary areas as a place to live and garden. Customary owners will be free to carry out shifting cultivation when the productivity of the land being cultivated has decreased.

- Resim (Lowland Forest Ecosystem)

Resim is an area that borders the coastal forest. This area is also called a hot area by the Hatam people. The diversity of plants in this area is more diverse than in the Mukti area. In forest grouping, the regime area actually includes lowland forest ecosystems. Resim is an area that is commonly used as an agricultural area by both the Arfak tribe and residents of other ethnicities. Agricultural commodities commonly found in this area include food crops such as: cassava (*Manihot esculenta*), sweet potato (*Ipomoea batatas*), rice (*Oryza sativa*), peanuts

(*Arachis hypogaea*), various types of bananas (*Musa* spp.) , papaya (*Carica papaya*), coconut (*Cocos nucifera*), rambutan (*Nephelium lappaceum*), durian (*Durio* sp), langsung (*Lansium domesticum*), and various types of vegetables such as gedi (*Abelmoschus manihot*), kale (*Ipomoea aquatica*), katuk (*Sauropus androgynous*), and bitter melon (*Momordica charantia*). Apart from food plants, in the regime areas you can find many types of wild plants such as matoa (*Pometia pinnata*, *Pometia acuminata*, and *Pometia coriaceae*), sengan (*Paraserianthes falcataria*), ironwood (*Intsia bijuga*, *Intsia palmbanica*), various types of bamboo, rattan, and palm. Types of animals commonly found in this area include deer, wild boars, kangaroos, tree mouse, various types of snakes, frogs, cassowaries, bats, and many more. Based on the knowledge of the people of the Arfak tribe, wild boars are one of the animals characteristic of regime areas which are very rare or even difficult to find in colder areas.

- Hubim (Highland Forest Ecosystem)

The area called hubim in the Hatam language or sehim in the Moile language is also known as the cool area. Sehim is located between hot areas and cold areas. Due to its location, this area is also known as the meeting area between Resim and Hampiabei. Hubim generally has cool air conditions, especially during the day, and will feel colder when night falls. The villages of Mokwam, Syoubri, Kwau, Amber, and Minyambouw and their surroundings are several villages located in the hubim/sehim ecosystem type.

Various types of animals such as cuscus (*Spilocuscus maculatus*, *Phalanger orientalis*), tree kangaroo (*Dendrolagus* sp.), long-snouted porcupine (*Zaglozus bruijni*), and various types of birds, especially birds of paradise endemic to the Arfak mountains, namely Parotia Arfak (*Parotia sefilata*), Vogelkop Superbird of paradise (*Lophorina niedda*), Long-tailed Paradigalla (*Paradigalla carunculata*), and Astrapia Arfak (*Astrapia nigra*). Apart from that, this area is also the habitat of one of the exotic birds, namely the bower bird or better known as the smart bird by the people of the Arfak tribe. One characteristic that is quite easy to know that we are in a hotbed area is when we can easily find beard moss attached to tree branches, apart from of course the cool air that feels touching the skin Fig.1).



Figure 1: Hubim (Highland Ecosystem)

Traditional agricultural practices carried out in the Hubim/Sebim area are basically not much different from those carried out in the Regim area, especially in terms of the techniques applied. Differences appear in the agricultural commodities cultivated. Farmers from the Arfak tribe in the Hubim area cultivate vegetables such as potatoes, Chinese cabbage (packaged mustard greens), cabbage, chayote, spring onions, carrots, beans, as well as fruit such as passion fruit, tamarillo and strawberries. According to respondents, this plant is a special plant for the Hubim area so it is very suitable to be planted in their area. The results are different if the plants are planted in regime areas, where the results obtained will be much smaller and the quality is also lower than the results obtained in the hubim/sebim areas.

Apart from beard moss or beard moss, the giant banana plant (*Musa ingens*) is also one of the characteristics of the ecosystem or hubim/sebin area. This banana is often found in the Kwau area and around Mokwam. This plant is one of the regional characteristics and also an attraction for people outside Papua. Giant bananas are often found in the secondary forests of the Kwau area, so we can easily encounter them when passing through this area.

- Hampiabei

Hampiabei is a mountainous area with the lower boundary being the hubim/sebim. The location of Hampiabei, which borders the upper boundary of the Hubim/Sebim to the highest peak area, causes this area to have a lower temperature than the Hubim/Sebim itself. In this area the size of woody plants (trees) is not as large as in the hubim/sebim area and in the regime. Just like in cool areas, the trees in the Hampiabei area are covered with beard moss. Hink Village and its surroundings, as well as Anggi and its surroundings up to the mountain top are some of the areas included in the Hampiabei area. Similar to other areas in the Arfak Mountains, traditional communities in this area also make gardening their main livelihood (Figure 2).



Figure 2 : Agricultural systems in Hampiabei. Mustard greens plantation (left), and garden products in the Hampiabei area (right)

The traditional agricultural system applied in Hampiabei is the same as in Hubim/Sebim. Agricultural commodities such as spring onions, carrots, mustard greens, celery, chayote and strawberries are superior commodities in this area. Apart from these commodities, currently coffee plants are also being developed based

on collaboration with local NGOs. The development of coffee crop commodities which are jointly cultivated is quite profitable for farmers, because farmers do not need to pay transportation costs to sell coffee beans, but are directly picked up by NGOs and then sold outside the area.

3.3 Local Knowledge Based Environmental Management (Igya ser Hanjop and Igya Hon Hanjop)

Managing a residential area consisting of many individuals has its own level of difficulty. Various multidisciplinary approaches are certainly needed to be able to accommodate all the interests of members of the community. The local government system that exists in the Arfak tribe has so far contributed to the conditions that exist and are currently developing in every residential pocket in the Arfak Mountains Nature Reserve area.

Realizing the importance of the environment in the Arfak Mountains, the Hatam people place the surrounding environment (especially the forest area) as a "mother" who always provides food from the forest in their lives. The placement of forests in this vital strata is also their responsibility to maintain, preserve and protect the surrounding environment with existing natural resources, because the people of the Arfak mountains who live and settle in the Arfak Mountains nature reserve area feel that, forests, mountains, tree rivers and animals and other plants in the area have always provided life, comfort, tranquility and safety to them since the existence of their ancestors until the current generation [10].

Based on folklore told by previous generations (ancestors of the Arfak people) from time immemorial until now about the life of flora and fauna in the Arfak mountain area, there are several rules that must not be violated which also constitute norms that must be recognized communally. The restrictions or prohibitions that apply to their lives are made by the people living in the area so that they cannot disturb or destroy the animals and trees in the forest area. It has become a public belief that violation of this prohibition will be the initial cause of natural disasters which will affect the social, cultural and life aspects of local communities [9].

Some events that occur naturally (disasters) are believed to be the impact of violations of rules or norm limits. For example, when someone goes hunting in the forest and finds an animal behaving strangely, this is a sign that something outside the normal situation has happened. The activity of felling or cutting prohibited trees is one of the causes of disasters such as thunder, lightning, rain, wind and floods.

A person who is known or feels that he has committed an act that violates a rule that causes a disaster must immediately admit his or her actions to a traditional leader (elder), tribal chief, or owner of the tradition that was violated. After that, ritual activities are carried out which aim to stop nature's anger or anger towards them. The ritual can be carried out by taking or cutting the hair and putting it in a white stone plate and then conveying the mistake by the oldest person and offering it to nature. When the white plate breaks, it indicates that nature has blessed it and the weather at that time will be bright again and the sun will shine again.

With natural events like those mentioned above, the oldest people in the village always give warnings, sanctions and warnings to people who commit violations not to repeat the same thing against the flora and fauna that live in the surrounding natural environment, disasters The nature that has happened has become a bitter sweet experience in the lives of the Arfak people. With such prohibitions, they can be told and passed down from

ancestors to children and continued to subsequent generations until now, so that the people of Arfak are always afraid and careful when carrying out activities in the surrounding natural environment.

With the persistence of natural disasters that occurred, the Arfak people always adhered to the prohibitions that were told and passed down to their children and grandchildren to adhere to these prohibitions so that a concept emerged that was determined to be carried out and implemented to this day, namely the concept of "Igya ser hanjop" (Guarding the boundary) and "Igya hon hanjop" (Standing and returning to the boundary).

- The concept of igya ser hanjop

The Hatam tribe, as the oldest and dominant tribe in the large Arfak tribal group, has a tradition of managing natural resources and the environment whose existence is still recognized today, namely Igya Ser Hanjop. This concept was also put forward as local wisdom of the Arfak tribe [7]. The system of protecting resource assets that is carried out traditionally and has come to be known as a form of traditional conservation actually begins with the concept of defending property rights from other people who are detrimental in nature. Igya ser hanjop itself is actually a form of active action by individuals and communally in maintaining ownership rights to areas/areas/regions by making signs and symbols that restrict other people from accessing them.

Creating boundaries or signs of someone's land ownership can be done in various ways, the essence of which is to prohibit other people from entering an area that does not belong to them without permission from the area owner (prohibition sign). Prohibition signs can be made in the form of boards with words prohibiting entering or utilizing resources in an area, or by making mingkuen and kuak. Stated that mingkuen and kuak are prohibitory signs used by the Hatam people to restrict other people from entering an area that does not belong to them. It was also explained that the prohibition signs made could have different meanings. The consequences of this violation could be a fine of money, Timor cloth, or the violator could become ill and could result in death [9].

If observed more closely, the existence of igya ser hanjop in the lives of the Hatam tribe (Arfak tribe in general) is a moral message to utilize resources according to their intended use and at the same time maintain environmental functions to provide sustainable benefits. In its implementation, igya ser hanjop does not merely limit the access of other people who have no rights, but more than that the restrictions also aim to protect the basic rights of customary land owners in a communal and sustainable manner.

Hatam people and Arfak people generally utilize resources from generation to generation with limited portions according to needs. For example, hunting activities are carried out by individuals or small groups for subsistence needs (household needs). If the hunting activity has yielded results (for example, one pig or deer), then they will return to the village and consume them together. Hunting is not carried out with monetary incentives so you have to get as many results as possible, but only to meet the need for animal protein. Likewise with other extractivist activities such as taking medicinal materials, vegetables, fiber, dyes, even for construction which is also limited to meeting needs in small quantities [11].

Without realizing it, the concept of igya ser hanjop owned by the Hatam people and also the Arfak people has contributed quite significantly in managing the sustainable use of resources in the Arfak Mountains. When

talking about igya ser hanjop, there are various components in it, namely: resources utilized, knowledge in managing resources and the environment, and indirectly educating the younger generation to actively protect the area and utilize it as necessary in order to guarantee availability in the future. These components are actually the spirit of modern conservation that we know in general

- The concept of igya hon hanjop

Igya hon hanjop is an expression in the Hatam language which can be translated as "return to guarding the boundaries". If we trace the true meaning of igya hon hanjop, it cannot be separated from the concept of igya ser hanjop itself. These two terms are closely related to each other, so they cannot be separated, or cannot stand alone in their implementation. It would be a mistake if we implemented igya ser hanjop without also implementing igya hon hanjop. The term "guarding boundaries" is a fundamental message in the practice of managing biological resources and the environment among the Hatam tribe (Arfak tribe in general).

The concept of igya hon hanjop requires everyone to be aware of their limits and maintain their own boundaries. In a broader sense, it is a moral message that requires us to respect and respect other people's property, and act according to applicable rules and norms. Apart from having horizontal implications (between humans), the concept of igya hon hanjop actually also has the meaning of a vertical relationship (human relationship with the Creator). Igya hon hanjop represents honesty about the prevailing values of life, as well as a teaching to increase gratitude for what each person has, so that it must be maintained and utilized properly for all of life now and in the future.

The prohibition signs made by the Hatam people (Arfak tribe) such as mingkuen and kuak can be viewed from two sides based on their interpretation. For customary/land owners who have a prohibition sign on it, it is a warning/prohibition for outsiders who do not have rights to the area from entering or utilizing the resources within it. This sign is also an acknowledgment of ownership of an area. Meanwhile, on the other hand, the prohibition sign also warns other people (not the area owner) not to violate people's boundaries, and to return to guarding their own property. The moral message of respecting other people's rights, protecting and sustainably managing natural resources is a package of local wisdom inherent in igya ser hanjop and igya hon hanjop. This moral message should be the basis for every environmental management program or conservation activity in the Arfak Mountains area.

3.4 Threats to Socio-Cultural Aspects and Environmental Knowledge

The development of technology and communication in the Arfak Mountains and surrounding areas requires the people of Arfak in general to be directly involved in every change that occurs. The impact of these changes unknowingly occurred in the midst of the lives of the Arfak tribe. The Arfak tribe received various innovations in the agricultural sector which had an impact on their traditional agricultural system. The use of fertilizers, herbicides, insecticides, and the introduction of potential plant species are the results of innovations received by the Arfak tribe from outside their community [12]. Regarding innovation, that the innovation received also had an impact on social change in the Arfak tribe community [13].

Easier and more affordable transportation access brings the Arfak people who live in the interior closer to urban areas which they think are more lively, interesting and a place where they can easily get various needs. Every change that occurs in one aspect is basically followed by changes in other aspects. This is what happened in the life of the Arfak tribe (including the Hatam tribe). Modernization accompanied by various direct and indirect demands presents its own problems for the people of the Arfak Mountains.

- Change in mindset in utilizing biological natural resources

In the past, the Arfak tribe cultivated land for agriculture to meet household needs (subsistence), but things were different when this research was carried out. Money is a target that must be achieved when carrying out cultivation activities on agricultural land, or when carrying out hunting activities and other extractivist activities. Although this does not apply to all Arfak people, this phenomenon has become an integral part of the life of the Arfak tribe today.

In several locations, especially in the Hubim/Sebim area, it is not uncommon to find people buying and selling Akwai bark (*Drymis* spp), and even openly offering it if they need it. This is an unprecedented situation where information about the benefits of akwai has not spread beyond the region. What people do selling akwai is driven more by the desire to get large amounts of money without thinking about the impacts that occur. Of course, it was not a mistake made by Arfak people when selling akwai, because that is how clever they are in responding to the changes that occur.

Investigations into hunting activities carried out in the Watariri, Mirowi and Wamcei areas revealed that there were still hunting activities for protected species such as deer (*Rusa timorensis*) and birds of paradise (*Paradisaea minor*). Deer hunting is done not only for personal needs, but also for commercial purposes to earn some money. As a result of exploration at the Ransiki traditional market, deer meat sellers were still found selling a number of game products. Apart from that, several respondents interviewed admitted that they still catch birds of paradise when there are orders, even though the intensity is very low because the last sale made was one year ago, which was sold in preserved form (already dried as an accessory). The two facts revealed through this research indicate that money is the main stimulus that changes mindsets in utilizing biological resources in this area.

- Loss of cultural symbols that represent local knowledge and wisdom

In the previous explanation, another part of this dissertation explained the use of prohibition signs as a tool for managing biological natural resources in the Arfak Mountains area. The results of the research when the research was carried out, it turned out that almost all respondents understood Igya Ser hanjop or hanjop in Sougb language as boundaries of ownership that must be understood and respected by everyone. It is believed that for every violation that occurs there will be compensation received such as a fine or illness, misfortune and even death.

Even though they generally understand the practice of restricting access by making prohibition signs, when the research was conducted there were no longer any prohibition signs (mingkuen or kuak) installed as a form or

symbol of ownership boundaries. Another fact was revealed that the majority of respondents said that the prohibition signs were made by their parents, and now they are using them again.

Mingkuen (a type of bamboo that grows in the Arfak Mountains) is not only used as a prohibition sign, but has quite high cultural value. Mingkuen search results are also used in traditional rituals, especially when problems occur or there are violations of community social values, so mingkuen is one of the intermediary media for solving them. Even though it has an important meaning, the results of the exploration show that no one uses this mingkuen in traditional rituals anymore. information or stories about mingkuen can only be obtained at the adult to elderly level, while young people don't know about it.

- A low family-based education system and the unavailability of socio-cultural learning support instruments that are appropriate and easy to use

The family environment is the initial milestone in the formation of a person's character and intelligence. It is from this environment that a person first gets nutrition, education and character formation. According to Makhmudah (2018), the age of 0-6 years is the age where a child will imitate the figure of his parents, so the role of parents greatly influences the child's growth and development. Apart from that, it is also said that parents must always provide motivation that leads to children's development, apart from environmental factors which also play a role. Education in the family environment is also stated in our country's legal system, namely in Law number 20 of 2003. In this law it is explained that informal education is a pathway to family and environmental education that takes the form of independent learning activities.

In the traditional knowledge system of the Arfak tribe (including the Hatam people), there is no official institution whose existence is recognized communally (customarily) as an educational institution for the younger generation. The inheritance of knowledge is generally carried out between generations indirectly, of course accompanied by various shortcomings. A boy will know how to hunt well when he is directly involved in hunting activities with his parents or other people who are older and experienced in hunting. Likewise in terms of land processing (gardening). A girl is the same way, she will be skilled at processing food ingredients into ready-to-eat food if she is directly involved in the process carried out by her parents beforehand. A study conducted [2] suggests that women from the Arfak tribe have a significant role in the children's education system, which can be done during gardening activities or going to the market. The higher a mother's activity, the more time she allocates for children's education in the family. The high level of activity of women from the Arfak tribe in taking care of the household, gardening, and even buying and selling activities in the market often requires children to be involved in all their activities [2]. This condition also indirectly provides informal knowledge and education for a child. The weakness of an education system like this is that when parents no longer hunt or farm, they no longer receive knowledge regarding hunting techniques and farming.

Informal education really depends on the quality of parents and the surrounding environment. To achieve good child growth and development, the quality of parental knowledge and the environment must also be good. The existence of informal education instruments such as learning media that are easy to apply is very important to help the informal education process itself. The educational instrument in question is of course more about the

application of cultural values and local wisdom, because this is what cannot be obtained in formal or non-formal education.

3.5 Overcoming Socio-Cultural and Environmental Knowledge Problems

Issues related to socio-cultural and environmental knowledge in the Arfak tribe (including the Hatam people) cannot be handled by the tribal group or community itself, but must be a collaboration of various parties including universities. Socio-cultural and environmental issues are very complex problems that must be approached holistically. In this dissertation there are three things that could be used as alternatives to solve problems related to socio-cultural and environmental knowledge among the Hatam people in the Arfak Mountains.

- Incorporating local content based on local knowledge and wisdom of the Arfak tribe in the formal and non-formal education system in the Arfak Mountains area.

Culture and the values contained in it constitute the identity of an ethnicity wherever that ethnicity is located. The Hatam people (including the Arfak tribe in general) have cultural values and local wisdom which are actually an identity that has been passed down from generation to generation. Existing cultural values really depend for their existence on the system of inheritance of traditional knowledge that occurs. With an indirect inheritance system, it is feared that the socio-cultural values of the Arfak tribe will one day disappear.

Formal and non-formal education as an education system that is controlled and regulated by law should be a tool for maintaining the existence of socio-cultural values and traditional environmental knowledge in the young generation of the Arfak tribe. The existence of local content opens up space for educational practitioners to include more cultural values and local knowledge as material in structured and measurable learning in schools. The application of local loads must always be controlled and evaluated periodically, so that the target for implementing local loads can be as expected.

- Providing educational instruments with local content based on local culture and knowledge of the Arfak tribe.

Educational instruments are an important part of an education system, including local content. As far as observations have been made, there are not enough educational instruments available that can be used as learning media related to socio-cultural aspects and environmental knowledge among the community and the world of education. Local knowledge rooted in the cultural values of the Arfak tribe must be immediately well documented and used as basic material in preparing educational instruments based on local knowledge of the Arfak tribe. Learning from the Arfak tribe to manage biological natural resources and the environment must be an aspect of formal, non-formal and informal learning systems.

- Providing informal education facilities (Arfak tribal traditional schools) in every Arfak tribal village.

For a child undergoing formal education, learning at school currently only takes up a small portion of the time available each day. Most of the time will be spent at home with parents, friends, relatives and others. In contrast

to children who attend formal school, quite a few children from the Arfak tribe currently do not go to school and spend all their available time playing with friends and interacting with their environment. The existence of informal educational facilities/vehicles is very important to increase the knowledge of the younger generation, especially regarding the cultural values of the Arfak tribe. Losing culture and related elements in it is a loss of identity for each member of a particular ethnicity, so that every form of effort to save these values is also an effort to restore their true identity.

Informal education facilities can be in the form of field schools whose content is adapted to developing conditions and situations. Referring to the results of the research conducted, it is important to build a field school that teaches the cultural values of the Arfak tribe in recognizing and managing biological resources and the environment. The existence of this field school will really help women and especially parents in educating their children, although it can also be used by adults to increase awareness of their socio-cultural values. The existence of field schools must be controlled periodically by an institution that is formed (a collaboration between stakeholders and nearby universities). Apart from improving the quality of informal education, the existence of this field school can also be an added value, especially for the local tourism sector in the Arfak Mountains area.

4. Conclusion

The Hatam people are an ethnic group that has very good knowledge about the environment and its ecosystem, and implements a system of resource protection and management through *igya ser hanjop* and *igya hon hanjop*. This traditional management concept, which has been practiced for generations, has even now been used by policy makers as a symbol of implementing conservation in the Arfak Mountains. The implementation of *igya ser hanjop* and *igya hon hanjop* must be implemented simultaneously as an environmental management package in the Arfak Mountains with full involvement of the Hatam tribe community and the Arfak tribe in general.

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