

Adaptation Strategy and Farmers Land Processing in the Upland Arfak Mountains

(Case Study on the Hatam Tribe of West Papua)

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Abstract:

Research that is subject to Arfak traditional farmers from the Hatam sub-tribe has been carried out in Syoubri, Kwau and Mokwam Villages, Warmare District, Manokwari Regency. documenting local wisdom that is still being practiced; describe and analyze the typology of mixed gardens and find a strategy for developing a traditional Hatam mixed garden model that is socio-culturally acceptable, and can improve their welfare and is environmentally friendly

This research is a descriptive study designed using a naturalistic qualitative approach which is intended to describe or describe systematically, factually and accurately related to the facts, characteristics and relationships between the phenomena studied. Determination of the sample based on a deliberate division of the region (sampling and purposive area), namely based on land typology, ethnicity, and farming methods.

From this research, it can be concluded that the mixed garden of traditional Hatam farmers currently has the SEE (Social-Economic-Ecological) typology, which is characterized by limited types of commodities planted where garden management involves the entire extended family, semi-subsistence oriented on a limited area of land and wisdom is still practiced. local traditional Hatam farmers. Strategies that can be used in developing the ideal mixed garden model for traditional Hatam farmers are: adding the number of plant species that are in accordance with the biophysical characteristics of the land, have high economic value and are known to farmers and can reduce land degradation; establishing economic institutions and marketing networks for local products, utilizing local wisdom of the land zoning system to limit non-agricultural land conversion; build a brand image of Hatam farmers' products as organic products; structuring mixed garden management by utilizing appropriate technology, local wisdom and simple conservation techniques adapted to farmers' conditions, and increasing farmer capacity through counseling, mentoring and training.

1. INTRODUCTION

Several decades ago, gardening or shifting cultivation was considered an environmentally friendly or sustainable farming practice because of the minimal input used or because the rotation cycle was long enough so that the land was still able to recover itself. It's just that with the increase in population, which is in line with the need for needs, boards and sand, which encourages farmers who practice shifting cultivation for food, gardening their land and shortening the period of

their land. With this phenomenon, FAO (1957) finally declared shifting cultivation as an agricultural system that is backward, unsustainable, inefficient, and wasteful of resources.

The practice of shifting cultivation with a mixed garden pattern is widely applied in various parts of the world and is spread across Asia (22%), Africa (37%) and America (41%) covering an area of about 280 million hectares (Heinimann et. al., 2017). It is also projected that the practice of shifting cultivation will still be

applied for the next few decades until 2090. In Indonesia, the practice of shifting cultivation with a mixed garden pattern is still applied by traditional farmers (especially indigenous people) in various areas on the islands of Sumatra, Java, Kalimantan, Sulawesi, Nusa Tenggara, Maluku and Papua. Especially in Papua, from several research reports which show that the management model of mixed gardens for traditional Papuan farmers has generally not changed much. The slash-and-burn technique is still being applied, but the type and choice of plants and the method of planting will certainly vary depending on the knowledge acquired from generation to generation or the application of new innovations resulting from interactions with immigrant farmers, missionaries or field officers.

One of the indigenous Papuans who mostly work as traditional farmers is the Arfak Tribe who live in the Arfak Mountains Region which is administratively located in the districts of Manokwari, South Manokwari and Arfak Mountains. The Arfak Tribe has four sub-tribes, namely the Hatam, Molie and Meyakh Tribes and the Sough Tribes who still apply the shifting cultivation system using the slash-and-burn method (Sumule, 1994; Laksono et al., 2001; Mulyadi, 2007). Arfak's farming system is still traditional as one of the causes of their agricultural welfare, so that the local government is also assisted by Non-Governmental Organizations engaged in environmental conservation.

The existence of the Arfak Tribe with its system to this day is possible because they consider the local agricultural knowledge about ecology, forest and agriculture that has been formed from generation to generation from their ancestors is still in accordance with current conditions. This is in line with the statement by Waren (1991) and Johnson (1992) that an important aspect related to the existence of a local/traditional community in interacting with natural

resources is local knowledge which is characterized by the ability to integrate and harmonize with nature and adapt to the conditions and needs of the community. From the description above, it is necessary to find ways to develop a traditional system of Arfak farmers that can improve their welfare but in harmony with natural resources and local wisdom possessed by traditional Arfak farmers. The development of traditional farming systems, among others, can be done by developing a mixed garden model using the principles of agricultural diversification and integration (Integrated Farming).

2. METHOD

This research is a descriptive research designed using a naturalistic qualitative approach which is intended to describe or describe systematically, factually and accurately related to the facts, characteristics and relationships between the phenomena studied. Determination of the sample is based on a deliberate division of the area (sampling and purposive area), namely based on land typology, ethnicity, and farming methods. In addition to domain analysis, to get the ideal strategy in developing mixed gardens for traditional Hatam farmers, a SWOT analysis is also used.

Location and Time

The information and data needed according to the research domain were collected from 3 villages as research locations, namely: Mokwam, Syoubri, and Kwau villages which are administratively located in the Warmare District, Manokwari Regency, West Papua Province. The research has been carried out from November 2021 to May 2022.

3. DISCUSSION AND RESULTS

General Condition of Research Site

Based on the West Papua Governor's Letter No.138/2158/Setda-PB/2014 and the Minister of Home Affairs

Regulation No. 129 of 2018 concerning the Regional Boundary of Manokwari Regency and Arfak Mountains Regency, West Papua Province, the research location is included in the administrative area of Warmare District, Manokwari Regency, Papua Province. West. The Warmare district with its capital in Kampung Dindey has an area of 674.84 km² which is the widest district of the 9 districts in Manokwari Regency.

The research location is in the Arfak Mountains landscape area, which since 1992 most of the area (68,325 hectares) has been designated as a conservation area in the form of a Nature

Reserve through the Decree of the Minister of Forestry of the Republic of Indonesia Number: 783/Kpts-II/1992 dated 11 August 1992 (Laksono et al., 2001, Mulyadi, 2007, Hastanti and Yeni, 2009). In 2012, the division of Manokwari Regency was enacted so that the Arfak Mountains landscape area is located in three district administrative areas, namely Manokwari, South Manokwari and Arfak Mountains which stretches at coordinates 133°53' to 134°15' East Longitude and 01°0'0" to 01°29' South latitude to the north of the Bird's Head (Vogelkop) region of Papua Island (Aninymous, 2013).

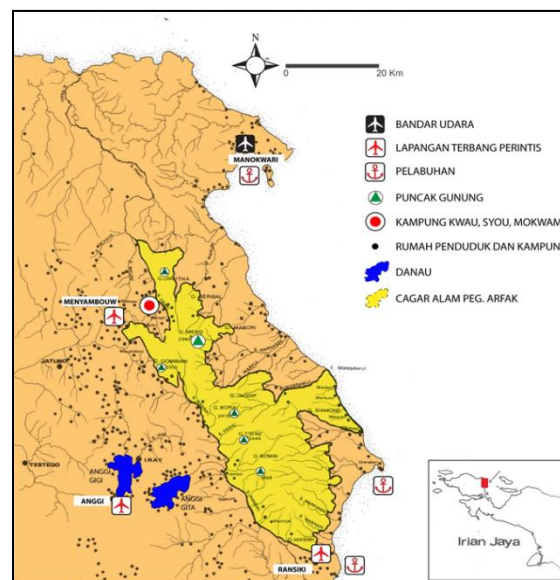


Figure 1. Position of Research Locations in the Arfak Mountains Nature Reserve Area

The expansion of the Manokwari Regency into three regencies covering most of the Arfak Mountains area has an impact on increasing accessibility to and from villages in the Arfak Mountains area. The construction of various infrastructures, especially connecting roads between villages and between districts has been carried out, although most of them are still in the form of labor-intensive roads (sirtu) or pilot roads due to the rough terrain. Nearly 60 percent of the area in Manokwari Regency is an undulating and mountainous area with steep slopes with

unstable soil conditions and easy landslides.

The entrance to the nearest Arfak Mountains area is approximately 45 km southeast of Manokwari City. The land road is the main access that connects Manokwari City with the study sites, namely Syoubri, Mokwam and Kwau villages. The journey from the capital Manokwari to Kampung Syoubri and Mokwam is about 62 km which can be reached in 1.5 - 2 hours, while the distance from Syoubri village to Kampung Kwau is about 2.4 km and to Kampung Mokwam is

about 1.4 km using two-wheeled vehicles, or four-wheel type 4 axle.

The majority of the Hatam people living in the villages of Mokwam, Syoubri and Kwau have built more modern houses and abandoned their traditional house models. The traditional house of the Arfak rural community known as the Thousand Feet House or with the speech Mod Aki Aksa Igkojei or Iyam (Hatam) (Lekitoo, et al., 2015), Ibeiya (Moile language) (Hematang, 2014), Mod Meyakh (language Meyakh) (Lekitoo et al., 2015) or Tu misen (Sough language) (Yeni 2010). It is unfortunate that the existence of the Thousand Foot Houses in Kwau, Mokwam and Syoubri Villages is now increasingly rare and even almost lost its authenticity. The architecture of the houses in the study area now has several variations in the form and types of materials used, such as plank houses, wall houses, and bark houses with rattan ties, like the traditional type of millipede house.

The Arfak Mountains area is the residence of the Arfak Tribe, which is the original tribe with four sub-tribes, namely the Meyakh, Hatam, Sough and Moile sub-tribes who have lived in the area for hundreds of years. The Arfak tribe spreads from the Arfak Mountains Regency, Manokwari, South Manokwari, Bintuni Bay, Wondama Bay even to Tambrau and Maybrat (Hujairin, et al., 2017; Lekitoo, et al., 2015). Mokwan Village has the largest population, followed by Kwau and Syoubri Village, which are expansion villages from Mokwam Village. However, the population density of Syoubri Village is denser than the two villages due to its smaller area, which is only 3.65 km².

The position of the Arfak Mountains landscape area in the Vogelkop (Papua bird's head) bordering the Pacific Ocean near the equator and adjacent to the Australian continent greatly affects the nature of the regional climate. Likewise, the weather patterns in the area are closely related to the Australian-Asian monsoon circulation and the movement of the

Intertropical Convergence Zone with the seasons (Nieuwolt, 1977 in Bartstra, 1998). Meanwhile, the local pattern of wind circulation is influenced by the presence of mountainous landscapes which causes large differences in the distribution of seasonal rainfall.

Based on the Schimdt-Ferguson or Mohr climate classification system, the research area includes climate type A (very wet) without dry months (< 60 mm) and the average number of wet months (> 100 mm) multiplied by 100 is zero percent (BPTP West Papua, 2005). With such rainfall conditions, the difference between the dry and rainy seasons becomes unclear. This of course greatly affects farming activities, because on the one hand the availability of sufficient water ensures the continuity of farming activities, but on the other hand this can increase crop failure due to high pest attacks and potential for floods, landslides and land degradation as a result of high erosion.

The results of the calculation based on the Mock formula show that the coldest air temperature in the study area is around 13.1 – 17.6 °C which occurs in August, while the warmest air temperature in the study location is around 22.8 – 25.2 °C. The average monthly normal air temperature is around 18.6 – 21.1 °C. Information about the temperature in the study area is very important, especially if you are going to design or develop agricultural systems in the area.

The Bandung Geological Research and Development Center (1992) divided the morphology of the Manokwari Regency area based on its physiographical arrangement into three (3) units, namely structural mountains or very steep hills, low hills (wavy) and plains. The mountain structure unit is the largest area unit covering about 80 percent of the area formed by volcanic rocks, clastic sedimentary rocks, carbonates, breakthrough rocks, metamorphic rocks.

Characteristics of Hatam Traditional Farmers

Characteristics of farmers is a general description of the state of farmer personification that will affect his success in farming. These characteristics of farmers are used as a benchmark for farmers' performance in carrying out their farming activities, which include aspects of age, education, number of dependents, farming experience, working time, land ownership and area, technology/input used, and cropping patterns. The farmers in this study are farmers from the Hatam sub-ethnic who live in Syoubri, Mokwam and Kwau villages who cultivate shifting cultivation.

The relatively low level of human resource education in the Arfak Region, especially in the study area, is one of the challenges in agricultural development activities. From the report on the results of the 2016 Tourism Thematic Community Service Program in Kwau Village, it shows that only about 9 percent of its citizens have received high school and undergraduate education. Meanwhile, conditions in Syoubri and Mokwam villages were slightly better, with around 20 percent of whom had high school and undergraduate education. The level of education and knowledge of farmers is low, causing apathy and difficulty/slowness in adopting an innovation, including innovation in agriculture. This is in accordance with the statements of Sumule (1987), Mulyadi (2007, 2016), Sagrim et al (2016) and Nofianti (2019), that Arfak farmers have low farming motivation due to low knowledge and skills.

The more dependents the heads of traditional Hatam farming families are, the more expenses they will have, so it is possible that they are unable to develop a managed farming business and the income they receive tends to be used up only for living expenses. In addition to the family's living expenses, in general, Hatam farmers still have to be burdened with other expenses such as helping to pay the dowry

of relatives, mourning assistance or paying fines due to customary violations. This is what contributes to why most of the Hatam farmers live less prosperously, the income from farming is minimal while the family has many dependents.

Experience in farming is one of the factors that influence farmer productivity. The length of time a farmer runs his farm will give an idea of his knowledge and skills in running his farm and his mindset. Because according to Sutarto (2008) there is a positive relationship between the amount of farming experience a farmer has with his ability to deal with problems in the farming. In addition, farming experience will help farmers make decisions in conducting and developing their farming.

In carrying out gardening activities, all members of the nuclear family of Hatam farmers are actively involved, even when the opening of a new garden involves relatives. However, there is a clear division of labor between women and men. This is also in accordance with the results of research conducted by Sumule (1994) and Mulyadi (2007, 2016). Orang Hatam men play a very important role in making family decisions, including determining the location and timing of opening new gardens and planting time. Determining garden boundaries (garden borders) and felling trees are carried out by men because they require more manpower. Most of the gardening or farming activities are carried out by women from the Arfak Tribe, including the Hatam sub-tribe. The cleaning of the garden from branches and branches of trees, shrubs and bushes is carried out by women and assisted by children. Likewise, planting, simple maintenance, harvesting and selling garden products to the city are mostly carried out by women.

The Arfak Tribe community adheres to a Ambilineal kinship system that has an impact and gives a pattern in the system of land ownership and use. The distribution of inheritance is generally left to the eldest son, who will then arrange the

distribution to his siblings in equal proportions between sons and daughters, including the distribution of land owned by his parents. With this inheritance system and polygynous marriage, several people/relatives can own the land of the Arfak Orang in one stretch of land or stretch of land.

Characteristics of Mixed Gardens

Basically, traditional farming systems or shifting cultivation systems in various regions in Indonesia, even in various countries, have the same characteristics, which include forest cutting - cleaning - planting - abandoning - harvesting activities. Then move to a new location when production in the first field has decreased and then rest for several years, depending on the biophysical conditions of the land. The fly-and-burn technique carried out by traditional Hatam farmers is knowledge gained from repeated experience by previous generations which is believed to keep the garden fertile and producing well. The use of farming tools is still simple and the types of plants grown are mainly to meet the basic needs themselves. However, there are variations depending on the location and culture of the people.

From several studies that have been carried out in the Arfak Mountains area (Laksono et al. 2001; Makabori, 2005; Mulyadi, 2007; Mulyadi et al, 2009; Hastanti et al, 2009; Salosa et al, 2014; Lekitoo et al, 2015; Sagrim et al, 2016; Sagrim et al; 2017; Hujairin et al, 2017; and Yaku et al, 2019), it has been identified that the Arfak community has applied simple and/or complex agroforestry patterns, namely using home gardens, mixed gardens (mixed gardens) and annual gardens (Arifin et al., 2009).

The Hatam farmer's cycle by zones provides enough for them to get the job done without any significant obstacles. When a new garden is about to be opened, another garden is available as a food stock warehouse which ensures the availability

of food for the family. This stage of the process is carried out well after the land that has been planted for a certain time does not require much time to clear the plants or keep them from being disturbed by animals.

According to Koentjaraningrat (1987), technology is a material component of culture, including technical ways of producing, using, and maintaining all equipment and supplies. Arfak's traditional society knows at least eight kinds of traditional technology, namely: means of production, weapons, weapons, fire tools, food, clothing, shelter/houses, and means of transportation (Lekitoo et al., 2015).

The system of the Arfak people who live around the Arfak Mountains area is cultivation where their agriculture is not intensively involved in the cultivation process. Each garden is cultivated for 2-3 years or if the yield of the garden has decreased, the farmers of Arfak will move to open a new garden. Old gardens are left (fallow) for 3-10 years (Mulyadi, 2007). Old gardens can be reprocessed by observing the growth of trees: *Alnov* (*Dodonea viscosa*), *Bikiwom* (*Homolanthus populneus*), and *Weimu* trees reaching 2-4 meters high, or moss has a lot of sticking to the trees.

The traditional Hatam farmer's cropping pattern is a mixed garden which in one stretch of land consists of several types of seasonal crops, namely tubers, beans and vegetables. Pumpkin, cucumber, spinach and corn seeds are usually planted early when the soil is still warm so the plants can grow well. After about 3 weeks later, sweet potatoes, betel or taro, cassava, green beans and koro benguk (*Bijoba*) beans are planted in. Each of these seasonal crops is planted sequentially according to the age of the plant.

There are several types of seasonal crops that are planted in the Hatam farmers' fields or gardens, some of which they have known for a long time and some are introduction plants brought or

introduced by outsiders (missionaries, PPL or local agricultural services). Most of the produce from farming or gardening is to meet the needs of daily life, only a small portion is sold to the market in the district or district capital.

The types of vegetables grown by Hatam farmers are quite diverse, both from local vegetables that have been planted for a long time and introductions that have recently been planted by Hatam farmers. Sweet potatoes are the staple food of Hatam farmers, so they always plant either

in the garden or in the yard as a backup if the results are not satisfactory in the garden. The existence of rice assistance (Raskin) from the government caused a shift in staple food patterns from sweet potatoes and bananas to rice. This also affects the interest of Hatam farmers to plant sweet potatoes, even if they are still planted, they are reduced or the sweet potatoes produced are sold to buy rice. For corn commodities that have been cultivated for a long time but sweet corn has not been cultivated for a long time.

Table 1. Types of Commodities that are Dominantly Cultivated by Hatam Traditional Farmers in the Study Location.

Num.	Commodity Group	Jenis Komoditas
1.	Food	Corn, sweet potato, taro, kihe, cassava and taro
2.	Vegetables	Potatoes, carrots, onions, cabbage, beans, Chinese cabbage, mustard greens, watercress, leeks, celery, tomatoes, chayote, pumpkin, spinach, gedi leaves, chilies, tomatoes and cucumbers.
3.	Fruits	Avocado, banana, dutch eggplant, pineapple and passion fruit.
4.	Palawija	Peanuts, bean curd (Bijob) and Mung beans

The lack of net income received from the sale of agricultural products makes it difficult for people to meet all their basic needs. The survey results show that the average monthly income of the community/farmers in Syoubri Village is Rp. 790,000; Kwau Village Rp. 1,175,000; and Kampung Mokwam Rp. 810,000. This income is lower than the Regional Minimum Wage standard in West Papua Province which exceeds two million rupiah.

The lack of explanation from related parties regarding the function of the shelter and assistance in the marketing process caused this to happen. Conditions are slightly better for farmers in Kwau village because in the village an agricultural meeting hall has been built so that PPL or service officers are still occasionally visited by providing assistance with lawn mowers and training on organic and other technical fertilizers. However, regular visits are also very rare

so that farmer group activities only run if there is a program or assistance from the local government. According to the village secretary who is also the head of the Gapoktan of Kampung Kwau (Semuel Mandacan), the head of Mokwan Village (Yosep Tibiai) and one of the community leaders in Syoubri Village (Zeth Wonggor) that they really need not only counseling but also assistance that guides them from every stage. cultivation to product marketing.

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