

## History, Local Wisdom “Ima Kokiriwo” Coconut Based Agroforestry and Land Use Policy in North Halmahera



Ebedly Lewerissa<sup>1,2\*</sup>, Budiadi<sup>3</sup>, Suryo Hardiwinoto<sup>3</sup>, Subejo<sup>4</sup>

<sup>1</sup> Doctoral Program in Forestry Science, Faculty of Forestry, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia

<sup>2</sup> Forestry Study Program, Universitas Halmahera, Tobelo 97762, Indonesia

<sup>3</sup> Program of Department of Silviculture, Faculty of Forestry, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia

<sup>4</sup> Department of Agricultural Social Economics, Faculty of Agriculture, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia

Corresponding Author Email: [ebedly.lewerissa@mail.ugm.ac.id](mailto:ebedly.lewerissa@mail.ugm.ac.id)

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### ABSTRACT

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*adoptability, Zending, spatial planning, community*

For the people of North Halmahera, coconuts represent a crucial agricultural commodity, yet information related to this topic remains relatively limited. This research aims to explore the history, level of adoptability, and the process of coconut processing, including the role of government policies related to land use. Phenomenological methods and snowball sampling were employed in the research, especially in data collection through interviews, observation, and focus group discussions (FGDs). The data were analyzed using the triangulation method, combined with literature studies, and the level of perception was measured using a Likert scale and quantitative analysis. The results revealed that coconut plantations were first independently cultivated by the Dutch in 1896, while Zending began cultivation between 1902 and 1910. The harvesting and processing of coconuts into copra adhered to the local wisdom principle "Ima Kokiriwo," which signifies working together in groups. The pattern of land use is predominantly (92%) mixed dryland farming, with an annual addition of land area of 3.3 hectares typically occurring in dryland agricultural cover types. The findings of this research support local government policies, particularly those related to the development of coconut cultivation based on traditional wisdom principles. Wise land use and sustainable agroforestry system programs have been effective in increasing land and coconut fruit productivity in North Halmahera, despite post-harvest processing not yet significantly augmenting household income.

## 1. INTRODUCTION

Documentation and tracing of local or regional history is very important and strategic for developing national historical writing [1]. Locality-scale history stores various events that can reveal the identity of past peoples [2]. Communities that retain a sense of their history exhibit similarities or differences in the characters of historical events [3]. The history contained in an area will provide an overview of the characteristics of the environment that was the background of the event, including the problem of coconut plantations. Coconut (*Cocos nucifera* L) is an agricultural commodity that has an important socio-economic role and has a long history in various rural areas in Indonesia [4].

Community-based land management practices have been around for a long time, but have not been well documented in North Halmahera District. This momentum needs to be preserved and monitored to ensure proper implementation on community lands [5]. Coconut is one of the important plantation crops in Indonesia which has historical value and cannot be separated from the development of civilization in the tropics [6]. The coconuts developed by the people of Halmahera have for quite a long time experienced a shift from a monoculture planting pattern to an agroforestry system, for example the model of a mixture of coconut and nutmeg,

coconut with cloves and coconut with various other food crops.

Coconut, as one of the main types of plants for the people of North Halmahera, has long played an important role in the economic and socio-cultural life of the community [7]. The history of the existence and development of coconut in North Halmahera is still a question for most people in North Halmahera Regency who do not know the origin and process of its existence. Supporting the economic life of families in North Halmahera, coconut was adopted as the mother plant for the development of agroforestry systems. Coconut planting and maintenance are carried out individually and also collectively. Coconut harvesting is carried out collectively by a group based on the principle of mutual help or mutual cooperation, which traditionally (local wisdom) is called Ima Kokiriwo. The local wisdom of Ima Kokiriwo is carried out by a group of people to process coconuts into copra. Local knowledge is needed to document certain activities carried out [8]. Local wisdom is also understood as basic values that are regarded as true and serve as a reference for conducting daily community activities [9].

Information and data related to the history of coconut-based agroforestry, including the process of harvesting and processing coconuts by the people of Halmahera, are currently unavailable. This condition also occurs in one of the

Indonesian coconut production centers in North Halmahera where the recording and documentation of the history of coconut and its benefits for the community are not yet adequately available. The above statement is explained by Summerhayes [10], that coconuts have existed for a long time in Indonesia but their history is not widely known and documented with only a few archaeologists having recorded their presence. Therefore, this study aims to trace the history of coconut, find out the level of adoptability of coconut in the Halmahera community and the processing of coconut, and find out government policies regarding land use in North Halmahera. Through this research, it is hoped that it will provide information on the history of coconut, coconut land management and coconut processing based on the local wisdom of the community which can then be considered by the government in spatial planning without neglecting the community's needs as a source of income. Coconut management if it develops from a home industry to a medium industry can have an impact on regional income.

## 2. METHODS

This study was conducted from April 2019 to February 2020 in North Halmahera Regency, chosen for its extensive coconut plantations and its status as the largest producer of copra in North Maluku Province (Figure 1). The research subjects were primarily local coconut farmers.

The research employed a phenomenological method [11]. Data collection was conducted in two stages: a literature review and interviews [12], using a purposive sampling method. In-depth interviews were conducted with 72 farmer informants, comprising local residents and key informants (community leaders) who had long resided in North Halmahera Regency. An additional 30 interviews were conducted with key informants who had knowledge and experience related to coconut history and community culture, using the snowball sampling method [13]. Observations and participation were undertaken to understand the daily social life of the community. The Focus Group Discussion (FGD) technique [14] was utilized with selected community groups to gain a collective understanding of the development of coconut commodities and coconut-based agroforestry. A

literature review was conducted by searching through books, scientific articles, and archives to review past studies and obtain secondary data. The collected data was primarily qualitative, consisting of opinions/views and narratives about the history of coconut cultivation and its usage in society.

In order to process the findings of this study into an objective and reliable scientific report, the collected qualitative data was analyzed using the triangulation technique [15]. The process of verifying the validity of the information emphasized the alignment of all data obtained from in-depth interviews, observations, and document studies. To measure the perception level of coconut farmers in North Halmahera towards coconut adoptability, the Likert Summated Ratings Scale was utilized. This self-report technique measures attitudes by asking subjects to indicate their level of agreement or disagreement with each statement [16]. For example, if "Currently, coconuts are considered the main commodity of the Halmahera people" is a statement in an evaluation criterion, and the respondent strongly agrees, they would mark (√) in column number 5. Each column represents a rating value as follows: 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree. Quantitative data analysis was carried out using the relevant formula [17, 18].

$$P = F/n \times 100;$$

Note: P=Percentage Number

F=Frequency

n=many individuals

While the standard categories used by researchers are:

81%-100% Very good category

61%-80% Good category

41%-60% Not good category

21%-40% Not good category

0%-20% very bad category

To obtain credible information, data was classified based on themes, and reduced by linking between themes. Presentation and interpretation were done to explain the historical process and adoption of coconut plants and coconut-based agroforestry. This study used a phenomenological perspective, where the phenomenological approach was used to develop understanding or explain the meaning of an event experienced by a person or group [19].

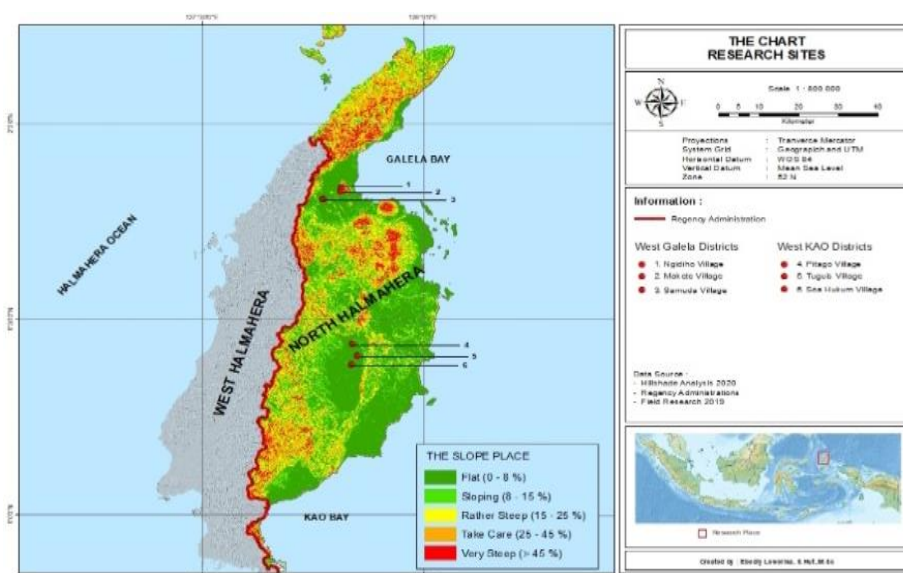


Figure 1. Location of North Halmahera

### 3. RESULTS AND DISCUSSION

#### 3.1 Development of coconut based agroforestry in North Halmahera

In 1870 during the Dutch East Indies occupation, plantations in Indonesia developed very rapidly, especially after the birth of the agrarian law. Through this law, Dutch capital owners (and other Europeans) could lease large tracts of land to open plantations for 75 years for government lands and 5-20 years for people's lands [20]. These large plantations were quite dominant until the pre-independence era and few people had the opportunity to own plantations [21]. A series of empirical facts show that the implementation of coconut cultivation in North Halmahera ranged from 1895-1910 through state power (Sultan of Ternate). The strong role of state power over foreigners (the Dutch) in forcing local people to adopt coconut plantations as well as abandoning shifting cultivation methods which were considered primitive. The history of the adoption of coconut-based agroforestry in Halmahera by local communities can be seen in Figure 2.

The change in the orientation of the Halmahera people is shown through the community's interest in developing smallholder coconut plantation businesses on their own initiative or following market waves that attract small farmers into it. Indications of the phenomenon of the strengthening of the enthusiasm of Halmahera farmers for the coconut commodity have occurred around 1915 and have continued to increase to the present and the coconut commodity is developing in every village in North Halmahera Regency. One of the community leaders in Sangowo Village, Morotai Island, named Yang Seng Tiong (82 years) is a community leader with Chinese blood and lives in Gura Village, Tobelo District. After his citizenship changed to become an Indonesian citizen his name became Theodore Gee Palangi. Theodore was the former Head of Sangowo Village from 1978-1993. Information obtained from Theodore that Sangowo Village was founded in 1890 with the first Huku (village head), namely Semojo. In 1895 the Dutch brought 19,990 coconuts to Morotai Island in the village of Sangowo by ship through the port of Sunda Kelapa.

Sunda Kelapa is a very busy port and the technology used by sailboats at that time was still very simple as a means of propulsion for boats. At this stage sailboats became a mainstay in shipping at the Sunda Kelapa Harbor to get to these areas [22]. Local people in Morotai accept coconut as one of the important commodities to be planted in Sangowo Village. This statement was confirmed by Theodore Gee Palangi on May 7 2019 as a key informant that the process of adoptability of coconuts by the Morotai Village community was quite good as seen from the absence of resistance from the Morotai community at that time. It was further explained that it was probably due to Dutch rule at that time in Morotai, and coconuts were considered a versatile fruit, where almost all of its components could be used for daily life purposes.

Coconuts brought by the Dutch were planted by a family in Gotalamo with a field foreman, namely Nabi Biasim (a landlord of Arab descent), then the rights were taken by Marga Kurung because the planting was done on their land. But before that, there was a transfer of power to handle the coconut plantation from Nabi Biasim (a Morotai resident of Arab descent who was authorized by the Dutch) to Lagonhong (a Morotai resident of Chinese descent who was given power by the Dutch) and then it was handed over again to Van Overshe (Dutch company name). then taken over by Salkret (Dutch company name). After about a year Marga Kurung took over the rights to the plantation but did not last long. Then the Dutch committed violence against Marga Kurung by expelling him using fast troops and taking the rights to the coconut plantation. As time passed, the people of Halmahera adopted coconuts and planted them independently (Results of an interview with Theodore Gee Palangi on 07 May 2019 in Tobelo)

In the beginning, the opening of plantations forced on behalf of state policy through the Sultan of Ternate, has resulted in many residents refusing to plant their land with coconuts and defending their land, causing conflict. Opposition and conflict almost occurred because the local community resisted, but because of the power possessed by the Sultan of Ternate, coconut planting was still permitted (Interview with key informant Hidanga on 10 May 2019).

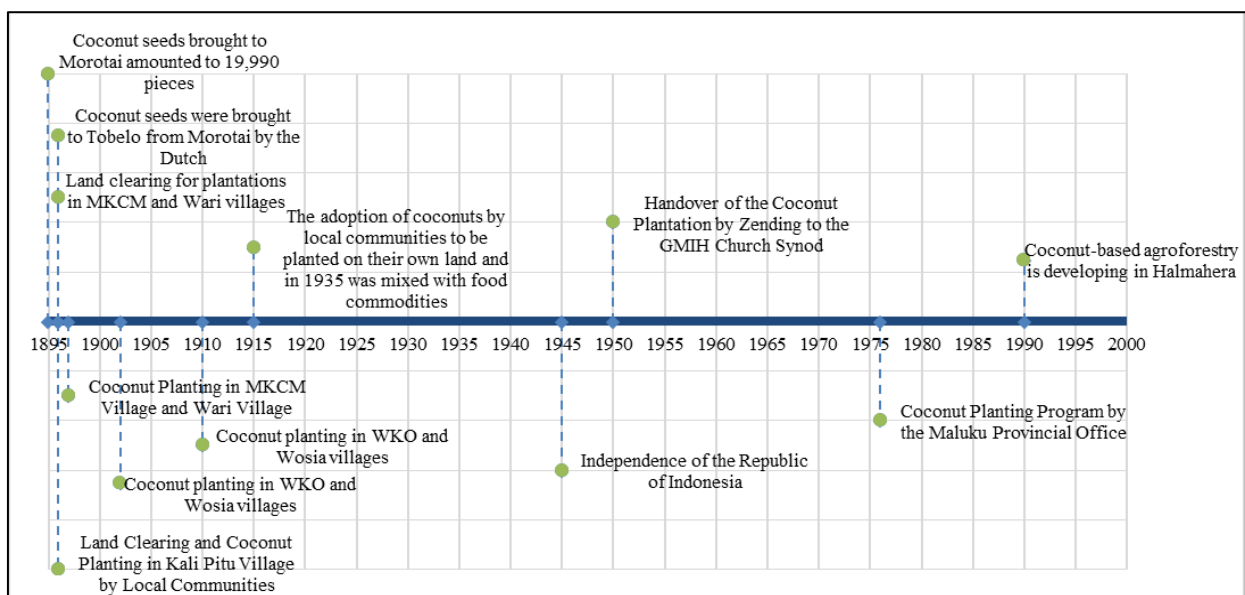


Figure 2. Trends in coconut cultivation in North Halmahera

The coconut plantations in Tobelo are seeds brought from Morotai Island by the Dutch because they match the name of the location where the plantations are located, namely MKCM Village (Morotai Klapper Culture Airlines). The land in Morotai (Daruba Village) is not suitable for planting coconuts, so the Dutch conducted a survey in Tobelo and thought that the soil in Tobelo was classified as alluvial soil which was better for plantation crops than on Morotai Island (Interview with Theodore Gee Palangi on 7 May 2019), this is reinforced by BPS [23], the soil in Tobelo and its surroundings is classified as an alluvial soil type. Planting of coconut seedlings by the local community (Halmahera people) in three locations including Kali Pitu Village, MKCM and Wari in 1896 on the orders of the field manager named Mr. Breyner is a Dutch national. The Tobelo people were employed as field foremen whose job was to oversee the coconut planting process (interview with Lea Tabaga in Upa Village, 10 May 2019). The coconut plantations in Wosia Village and WKO Village (Work Klapper Onderneming) were planted in 1902 by Zending (interview with John Mangimbulude on 15 May 2019) and according to documents from the Evangelical Christian Church in Halmahera, the plantations were handed over by Verenigde Nederlandse Zendingen Corporaties to the Evangelical Christian Church in Halmahera (GMIH) on September 20, 1950.

In 1902-1910, the process of clearing forests and planting coconut seedlings was carried out by Utrech Zendingen Verenigeeng (UZV), a Dutch national missionary at two locations in Tobelo, namely Wosia-WKO Village (former erfacht perponding number 17) with an area of 157 Ha and

Wari Village (former erfacht number 16) with an area of 105 Ha (Interview with John Mangimbulude 20 May 2019 with year of birth 2 May 1938). The erfacht right according to Ploeger and Boujough [24] is a limited ownership right that gives the lessee the right to hold and use land owned by another person (lessor). According to Gunanegara [25], erfacht rights are usufructuary rights or material rights to enjoy the use of land belonging to other parties.

Zending's arrival in Halmahera is in the context of carrying out the mission of the Protestant Christian religion as well as planting coconuts as a source of income. Basically, people receive coconuts because they are related to social and economic services for local communities and education (Interview with Ir. Hein Namotemo on 15 May 2019, former Regent of North Halmahera Regency). The explanation of the Halmahera community leaders was also emphasized by Melamba et al. [26], that apart from that the methods carried out by Zending were through health services, educational services, skills training, and other services. The noble missions that always go hand in hand with Zending are the spread of religion, gardening, education and health (GMIH document 1987). In this regard, to supply religious services, coconut planting was carried out in several locations on the outskirts of Tobelo. Planting coconut by Zending must obtain approval or permission from the Sultan of Ternate with a note that when it is no longer used it will be returned to the community (Interview with Ir. Hein Namotemo, 15 May 2019).

The local community's response to the presence of coconut plants in North Halmahera can be seen in Table 1.

**Table 1.** Response or adoptability of local communities related to knowledge about coconut

Indicator Aspect	STS (%)	TS (%)	N (%)	S (%)	SS (%)
In the Age of the Ancestors, the receipt of coconuts was seen as an important commodity	0	0	0	0	100
Acceptance of coconut as an important commodity is a hereditary tradition until today	0	0	0	0	100
The function and role of coconut is very much for people's lives	0	0	0	20	80
Currently receiving coconuts is considered the main commodity of the people of Halmahera	0	0	0	10	90
Age, influences the process of accepting coconut as the main family commodity	0	0	0	63.4	36.6
Land size is one of the obstacles to accepting coconut as a family commodity	0	0	13.3	86.7	0
Zending/foreigners as pioneers for coconut adoption in Halmahera	0	16.7	0	83.3	0
In the context of spreading religion, education and culture to North Maluku-North Halmahera, Zending planted coconuts to support community services	0	0	0	0	100
There was no resistance between the local community and Zending or foreign parties when they cleared land for coconut plantations	0	63.3	10	6.7	20
There was resistance between the community and the Zending/foreign parties, but it did not come to war	0	0	13.3	10	76.7
Maintenance of coconuts is done easily so that the ancestors planted coconuts on their own land	0	0	0	83.4	16.6
Coconut seeds were available after Zending, so the ancestors wanted to plant coconuts	0	0	0	100	0
<b>Average</b>	<b>0</b>	<b>6.7</b>	<b>3.1</b>	<b>38.6</b>	<b>51.6</b>

Note: SST (Totally disagree), TS (Don't agree), N (Neutral), S (Agree), SS (Strongly agree).  
Source: Results of 2020 Research Data Processing.

GMIH's coconut plantations in the villages of Wosia and Wari are registered as national private plantations. Proceeds from these two plantations have long been used to finance church services in the religious sector and services in social fields such as education, health and others (GMIH Document, 1987). In development, from the seventies to the eighties began to experience threats, including the development of Tobelo City, increased church services, and social development of society. The XXI GMIH Synod Council Session in 1983 decided to utilize the GMIH plantation area in Wosia and Wari as a center for church service activities. The management of coconut plantations is carried out in a coconut

monoculture. The manager of the GMIH coconut land cut down coconut trees that were no longer productive and then rep Based on in-depth interviews and FGDs with community leaders and owners of coconut-based agroforestry land, it is known that after the forest was cut down or cleared for agricultural purposes, the community began to be interested in planting coconuts as a continuation of their adoption in the previous era. The community began to change the planting pattern from monoculture coconut to polyculture (coconut with tree species or other agricultural crops) with an orientation to obtain greater coconut production and land productivity. Transfer of coconut monoculture to coconut



polyculture with other plants as a form of land use to increase people's income. Utilization of the land as agroforestry management. The goal of agroforestry is to use land effectively and increase people's income. The main goals of agroforestry are to increase productivity and efficiency in the use of land and forest resources, improve the quality of natural resources, especially soil and water, improve people's welfare and increase their participation in protecting natural resources [27].

The results of the study revealed that most of the local people in Halmahera really understand the adoptability of coconut in their daily life (Table 1). Approximately 90% of respondents to the six villages in North Halmahera answered strongly agree, indicating a high level of knowledge about the importance of accepting coconut as the main commodity to fulfill the family's economy. The same thing was conveyed by Fawzi et al. [28] that stable coconut income allows farmers to improve their welfare. The response or adoptability of the local people of North Halmahera regarding knowledge about coconut reaches 76.58% and is categorized as good, because the number 76.58% lies at 61% -80%, this means that coconut farmers in North Halmahera are aware of the existence of coconuts in their respective villages has an important role in improving the family economy and serves as one of the ecosystems in maintaining ecological balance.

### 3.2 Local wisdom and coconut fruit processing

The people of North Halmahera have local wisdom that has been passed down by their ancestors and has been continuously practiced across generations. Local wisdom is still carried out today because of its traditional nature, so it must be carried out in accordance with the traditions that exist in the Halmahera community. Local wisdom has an important role because it is built from social values that are upheld in the social structure of the community itself and has a function as a guide, controller, and signs for behavior in various dimensions of life both when dealing with others and with nature [29].

The form of local wisdom practiced by the Halmahera people related to coconut management has integrated into the socio-cultural life of the community widely known as the Ima Kokiriwo culture. In principle, Ima Kokiriwo is working together in a group for the management of coconut plantations and their processing. Ima Kokiriwo is a habit of life that has bound the lives of indigenous peoples. Substantially local wisdom is a norm that is practiced in a community that is trusted and becomes a reference in their daily life [30]. The principles of Ima Kokiriwo are considered as local wisdom because they come from an ancestral heritage that has been passed down from generation to generation. The application of Ima Kokiriwo's local wisdom values and principles can be interpreted as a synergistic combination between the economic and social interests of community members which is a combination of homosocio-economic principles [31].

Ima Kokiriwo is a way for the community to harvest coconuts with members of the working group and their closest relatives. The value of Ima Kokiriwo that is still maintained is Belaka (splitting the coconut into two parts) for Hiwu (prying the coconut flesh), then the coconut meat is in Nofu (coconut meat is placed neatly on a smoking area with hot coals using a shell and coconut belt) as shown in Figure 3 (a, b, and c). The

prohibition against Ima Kokiriwo's activities is not being able to skip or be negligent during activities with one of the members. Sanctions that are applied if there is a violation of the rules that have been mutually agreed upon are warnings and expulsion from members of the Ima Kokiriwo group. Figure 3 shows that the work system carried out by the Ima Kokiriwo group and still surviving in the Ima Kokiriwo group is splitting, gouging and smoking activities while cleaning and harvesting are rented out to farmers to harvest the coconuts. The activities of collecting fruit, packing and selling copra are carried out by the farmers who own the land to reduce expenses.



**Figure 3.** Local wisdom activities “Ima Kokiriwo” Halmahera coconut farmers: a) Belaka, b) Hiwu, c) Nofu

### 3.3 Land use policy

The policy on changes in land cover in North Halmahera Regency in 2012 - 2019 can be seen in Figures 4 and 5. Changes in land use are strongly influenced, among others, by commodities, information, capital and people, market distance, growth in the consumer class, especially in developing countries [32].

Based on the results of image classification in 2012 (Figure 5 and Table 2). Identified land covers are Settlements, Plantations, Dryland Agriculture and Mixed Dryland Agriculture. The land cover is according to the Regulation of the Director General of Planning P.1 / VII-IPSDH/2015 concerning Guidelines for Monitoring Land Cover that:

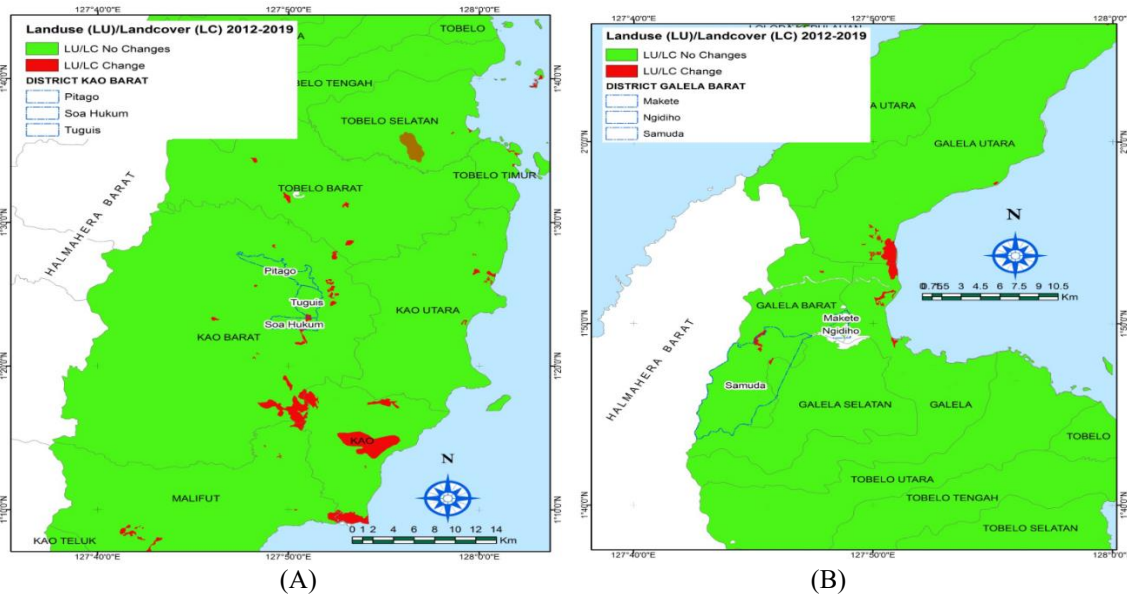
- (a) Settlements: Residential areas, both urban, rural, industrial and others, which show a dense flow pattern.
- (b) Plantation: The entire plantation area that has been planted.
- (c) Dryland Farming: All agricultural activities on dry land such as dry fields, mixed gardens and fields
- (d) Mixed Dryland Agriculture: All types of dryland farming alternating with shrubs and logged-over forest. Often appears in areas of shifting cultivation and rotational cropping of karst land. This class also includes a mixed garden class.

Classification of changes in land cover in 2012-2019 and their area can be seen in Table 2.

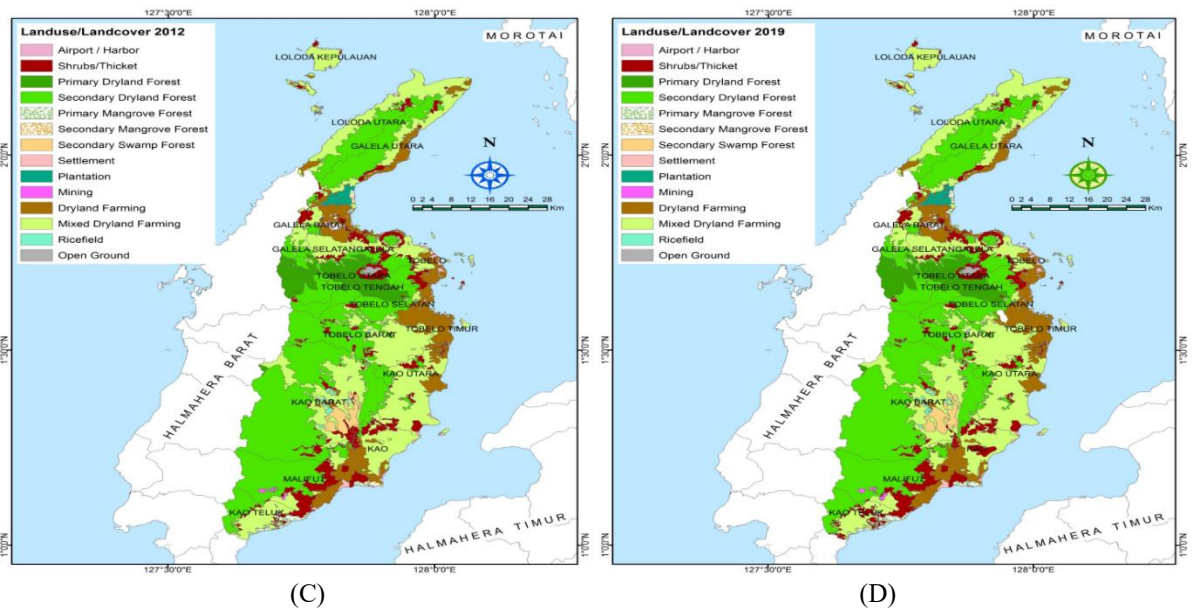
Dryland agriculture increased by 23.07 Ha (1.84%) while settlements, plantations and mixed dryland agriculture decreased. These changes were made into settlements, plantations or abandoned and turned into dry land agriculture mixed with shrubs. The cause of the change in land use is due to local government policies regarding land use by planting regional superior species such as coconut and nutmeg plants. Other causes such as the increasing population, causing the need for land to increase. According to As-Syakur et al. [33] along with the increasing number and income of the population, the business of converting land into residential land will increase. This condition results in less and less good land for settlements such as paddy fields or vacant land.

**Table 2.** Land cover classification and changes in 2012 - 2019

Land Cover	Years 2012	2019	Change	
	Area (Ha)	Area (Ha)	Area (Ha)	Percentage (%)
Residential	2.884.55	2.838.62	-45.93	3.66
Plantation	2.096.60	2.023.95	-72.65	5.79
Dry Land Agriculture	33.036.02	33.059.09	23.07	1.84
Mixed Dryland Agriculture	104.156.95	102.997.63	-1.159.32	92.39
<b>Total</b>	<b>142.174.12</b>	<b>140.919.29</b>	<b>-1.254.83</b>	<b>100.00</b>



**Figure 4.** Changes in land cover in West Kao (A) and West Galela (B) Districts  
Source: Satellite Image Data, 2020



**Figure 5.** Land Cover Change Map for 2012 (C) & 2019 (D) by District  
Source: Satellite Image Data, 2020

Changes in land use are the main driver of changes in spatial patterns and the overall provision of ecosystem services [34]. North Halmahera Regency Government Policy as outlined in the 2012-2032 RTRW where one of the clauses states in part three (spatial planning strategy) in article 4 section 4 that the strategy for developing and realizing superior cultivation activities in North Halmahera Regency is a policy that allows

land cover changes to occur in each District, namely in West Kao District and West Galela District. The community grows superior types of crops such as nutmeg on dry agricultural lands. Changes in land use/cover are the most direct manifestation of the impacts of human activities on the earth's surface systems and are critical in the process of global environmental change [34].

Local governments need to intensively carry out coordination with related agencies, to re-evaluate the entire planning infrastructure. The Regency Spatial Plan takes into account the condition of the Watershed (DAS), sectoral plans according to the needs of the community and the ecological conditions of each land unit. Regional spatial planning is the responsibility of competent parties and synergies that are implemented at the site level. This is confirmed by Fitriani et al. [35] that it is hoped that there will be good synergy between implementers in the implementation of regional spatial planning policies. If there is synergy between sectors, it will develop spatial planning according to sectoral goals.

#### 4. CONCLUSIONS

The history of coconut-based land management dates back to Zending's presence in North Halmahera. The management is developed with effective land use in the form of agroforestry. Land use in the form of coconut-based agroforestry must continue to be developed by prioritizing local wisdom owned by the people of North Halmahera, namely Ima Kokiriwo. It is necessary to carry out further research related to government policies with land use by the community. This research has limitations regarding the involvement of parties in managing coconut agroforestry land based on spatial planning by taking into account the culture of the people in North Halmahera Regency.

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