

Impact of Agroecosystem Changes on the Livelihood of Cihideung Udik Village Residents, Ciampea District, Bogor Regency

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Abstract. Agricultural land is one of the agroecosystem components that is vulnerable to land conversion. This land conversion causes changes in agroecosystems and drives changes in the livelihoods of local communities. This study aims to identify agroecosystem changes in Cihideung Udik Village, analyze the impact of agroecosystem changes on the community, and identify the livelihoods used by the community to adapt to these agroecosystem changes. This research used a qualitative approach. The results of this study show that, first, changes in the agroecosystem in Cihideung Udik Village occurred unnaturally, the main cause of which was the change from agricultural land to non-agricultural land, especially for housing. Second, agroecosystem changes change agricultural commodities, increase the number of homeless people, cause loss of community livelihoods, and undermine community culture in farming. Third, livelihood changes become the community's adaptation strategy to agroecosystem changes. The form of livelihoods resulting from the adaptation is to survive as farm laborers by planting secondary crops and becoming traders, casual laborers, and working in other areas as commuter migrants.

Keywords: Agroecosystem, Changes, Livelihood

1 Introduction

An agroecosystem is a form of man-made ecosystem that is utilized to produce agricultural products to meet human needs [1]. In agrarian societies, the existence of agricultural land as one component of the agroecosystem is vital to support agricultural productivity. As one of the production capitals of agrarian societies, agricultural land is one component that is vulnerable to change to meet complex human needs. One of the phenomena that caused this change was converting agricultural land into non-agricultural land.

Research explains that among the factors causing conversion are the urge to meet the needs of the increasing number of people and the desire to improve the quality of life [2]. In addition,

land conversion is also caused by the high need for housing [3]. In this case, rice fields are the agricultural land that is most vulnerable to land conversion [4]. Of course, this causes the local community, especially farmers, to feel affected economically, socially, and culturally.

When viewed from an economic perspective, the impact is related to livelihoods. Communities living in places where land conversion occurs must adapt and make changes to their livelihoods, especially those who depend on agricultural activities in rice fields for their livelihoods. Livelihoods are activities carried out by humans in order to obtain a decent standard of living, which usually differs in each region depending on the physical conditions of the area and the ability of the population to manage it [5]. However, it is not uncommon for changes in livelihoods as an adaptation strategy not to go well. Meanwhile, changes in agroecosystems also have a major impact in terms of socio-culture. The socio-cultural conditions of the community are greatly influenced by their life needs which then form habits, customs, and culture [6]. The existence of agroecosystems as one of the fulfillment of human needs certainly affects the socio-cultural aspects of life. So that changes in agroecosystems can also cause changes in socio-cultural aspects.

Cihideung Udik Village is one of the villages experiencing agro-ecosystem changes. This village is located in Ciampea District, Bogor Regency, West Java Province and is approximately 17.1 km from the city center of Bogor. This village consists of 15 community units (RW) and 48 neighborhood units (RT). The area of this village is bordered by Cihideung Ilir Village, Bojongjengkol Village, Cinangneng Village, and Petir Village. The area of the village is 284 hectares, with land conditions divided into dry land and wetlands [7]. Dry land is land that can be used by the surrounding community as settlements and yards, while wetlands are land designated for the agricultural and plantation sectors. The village, which is now headed by Mr. H. Denny, has the main potential for plantation commodities and tourist destinations. Among the plantation commodities are secondary crops, cucumbers, and purple eggplants. Meanwhile, tourist destinations can be seen from the Bendungan Cihud which is a legacy of the pioneers of World Scouts and the Cinangneng Tourism Village which is still located in the Cihideung Udik village area. In addition to plantations and tourist destinations, this village also has agricultural potential. However, along with the increase in population and also supported by the location of the village which is not far from the Dramaga sub-district where the main building of IPB University is located, it has become an easy target for architectural developers. Now, the Cihideung Udik village area is increasingly crowded with residential complexes. The construction and development of this housing complex has resulted in agricultural land in the Cihideung Udik village becoming increasingly narrow. As a result, more and more people in the Cihideung Udik village have switched professions from rice farmers to traders, daily laborers, and other jobs.

This study will analyze the agro-ecosystem changes that occurred in Cihideung Udik Village by emphasizing the phenomenon of conversion of agricultural land to non-agricultural land and analyzing the direct and indirect impacts of these agro-ecosystem changes, as well as analyzing the community's adaptation strategies to these changes, especially strategies for community

livelihoods. The objectives of this study are: (1) To identify the agro-ecosystem changes that occurred in Cihideung Udik Village; (2) To analyze the impact of these agro-ecosystem changes on the community; and (3) To identify the livelihoods used by the community to adapt to these agro-ecosystem changes.

2 Results and Discussions

2.1 Agroecosystems Identification

2.1.1 Identification and Overview of the Agroecosystem of Cihideung Udik Village

Cihideung Udik Village is a village with a natural landscape in the form of a plateau. Having a topography in the form of a tropical climate typical of the Bogor area makes agriculture one of the economic activities carried out in Cihideung Udik Village. Not only that, this village has a river called the Cihideung River which also adds to the diversity of the ecosystem in this village. The river which is a source of livelihood in Cihideung Udik Village originates at the foot of Mount Salak and empties into the Cisadane River. As a source of livelihood for Cihideung Udik Village, the Cihideung River is used to irrigate rice fields and meet domestic needs such as bathing, washing, and toilets (MCK).

The sustainability of the irrigation system in Cihideung Udik Village is inseparable from the existence of a dam that regulates the irrigation system in this village. In 1986, Sultan Hamengkubuwono IX inaugurated a dam in Cihideung Udik Village called Bendungan Cihud. This dam regulates the irrigation system of two villages at once, namely Cihideung Udik Village and Cinangneng Village. Regulating the irrigation system of the Cihideung River which is part of a natural ecosystem with high ecological value, this river is a habitat for various species of plants and aquatic animals. The biodiversity found around the river not only provides ecological benefits, but also adds to the natural beauty and attraction for visitors who come to this village. This then makes Bendungan Cihud one of the most popular tourist attractions in Cihideung Udik Village.

Near the location of the Bendungan Cihud, there are many agricultural and livestock lands. The crops that are widely cultivated by local farmers are types of secondary crops such as cucumbers, long beans, cassava, eggplant, chilies, and sweet potatoes. Then the livestock that are cultivated are goats, cows, sheep, and buffalo. This combination of agricultural and livestock activities is the main source of income for the people living around the dam.

2.1.2 Agroecosystem Change Analysis

The most visible agro-ecosystem changes in Cihideung Udik Village are changes in dry land agro-ecosystems. The conversion of agricultural land into non-agricultural land in the form of housing has occurred significantly. Based on the results of observations that have been carried out, it is clear that there has been an expansion of land clearing for the construction of housing complexes.

"It used to be agricultural land, but now around 80 percent of the land in the north of this village has become housing, if you count the total there are 7-8 developers who have built housing complexes here" (UF, Cihideung Udik Village, 6/5/2024).



Fig. 1. Condition of Village Agroecosystem in 2018



Fig. 2. Condition of Village Agroecosystems in 2022

These changes have a significant impact on the agro-ecosystem structure of Cihideung Udik Village. Agricultural land that was originally the center of the community's economy has now changed into a residential area and reduced the area of land that can be used for agricultural activities. This can be clearly seen in **Figures 1** and **2**. In 2018, the northern part of Cihideung Udik Village was still a green expanse where people carried out a number of agricultural activities, but in 2022, the land turned into a housing complex. Significant changes also occurred in the southwest part of the village. The area that was previously a plantation, within 4 years turned into a dense housing area.

The lush green land in the north and southwest of Cihideung Udik Village has now been transformed into a housing complex with modern architecture, complete with tight security. In addition, there are also a number of half-finished shophouses under construction and several shops offering various goods and services along the road entering the northern part of Cihideung Udik Village.

Before the arrival of housing developers, agricultural activities in Cihideung Udik Village were spread across several locations in the village. However, the decreasing area of agricultural land means that agricultural activities are now only carried out in several points in this village, namely from 15 neighbourhoods (RW) in Cihideung Udik Village, now only 3 neighbourhoods (RW) still have agricultural land, namely RW 11 - RW 13, while in other RW there is no more land left to carry out a number of agricultural activities.

Geographically, the RW 11 - RW 13 area is adjacent to the dam and based on the type of agricultural land, this area is classified as a wetland. This is what makes the agricultural lands in this area survive. Its location near the dam makes this area fertile because it gets stable irrigation. However, local farmers admit that now they can no longer plant rice because the condition of their land is getting narrower. Before the construction of a modern housing complex, farmers still had land to plant rice. However, since the large-scale land conversion, the remaining land available is no longer possible to plant rice. This makes rice a commodity that is starting to be alienated from agricultural activities in this village.

The decreasing amount of land every year makes farmers utilize the remaining available land by carrying out agricultural activities in the yard. A yard is an area of land directly adjacent to a building [1]. A yard, which is an area of land directly adjacent to a building, is a practical choice to continue carrying out agricultural activities even on a smaller scale. The yard agroecosystem is widely used by local farmers for planting eggplant, sweet potatoes, cucumbers, long beans, and cassava.

2.1.3 Causes of Agroecosystem Change

One of the main causes of agro-ecosystem changes in Cihideung Udik Village is the conversion of agricultural land into non-agricultural land, especially for the construction of housing complexes. The construction of modern housing and infrastructure such as shops and shophouses also changes the amount and pattern of land use, this causes the loss of a number of fertile green areas that were previously used for agricultural activities.

According to informants, the location of Cihideung Udik Village which is close to the IPB Dramaga campus makes this village one of the strategic targets for developers to build a number of housing complexes in this village. The availability of fairly large land with the potential to be developed into a residential area is the main attraction for developers. As a location for an education center, IPB Dramaga attracts many people from various regions, both from the Dramaga area and from outside the Dramaga area. The high mobility of people to IPB Dramaga has increased the demand for housing and urban facilities significantly. This encourages developers to look for target areas for the development of residential areas in order to meet the housing needs of the growing population. Along with that, local economic development and people's purchasing power also contribute to the increasing demand for property, especially in areas close to centers of economic growth such as campuses.

This is in line with Chromicco's research on the impact of the existence of the Bogor Agricultural Institute (IPB) Dramaga campus on changes in land use in the surrounding area [8]. The research explains that the dominant change with the presence of the IPB campus is the change in residential land from what was originally a non-built space such as gardens, bushes, and rice fields, to a built-up area with a residential function. This finding is in line with information provided by informants who said that the residents of the houses in the modern complex in Cihideung Udik Village were dominated by IPB educators.

Changes in the agro-ecosystem landscape in Cihideung Udik Village are also inseparable from the existence of *Biong*. *Biong* in local terms is understood as a person who acts as a broker or intermediary between housing developers and land owners in Cihideung Udik Village. *Biong* has a role in coordinating and facilitating transactions between housing developers and landowners which often involve the sale or rental of agricultural land for housing development purposes. *Biong's* presence accelerates the land conversion process by facilitating land transactions and attracting landowners to sell or rent their land.

The *Biong* in Cihideung Udik Village, they are experts in persuading the landowners. According to informants, many of the *Biong* are native residents of Cihideung Udik Village. This allows them to easily access information related to the ins and outs of Cihideung Udik Village and potential areas. The majority of agricultural land in Cihideung Udik Village is inherited from the previous generation. The *Biong's* skill in manipulating prices has led some people to decide to let go of their parents' inherited land.

The developers' efforts to gain access to land in Cihideung Udik Village are not only through the use of *Biong* action. Informants admit that a number of cunning tactics often occur in this village. The government through the Regulation of the Minister of Agriculture Number 41 of 2009 concerning Technical Criteria for Agricultural Designation Areas issued a number of requirements for the development of food agriculture areas, namely that the development land is not agricultural land that has been cultivated, and is prioritized on land that has potential, abandoned land or idle land [9]. In order to outsmart this regulation, informants explained that several developers took action by manipulating the flow of the dam to make a wetland into dry land that is no longer productive for agricultural activities so that they obtain a permit to convert agricultural land legally.

2.2 Impact of Agroecosystem Changes on Local Community Livelihoods

2.2.1 Direct Impact

Agricultural Production Changes. The conversion of agricultural land to non-agricultural land in Cihideung Udik Village certainly reduces the area of agricultural land or rice fields. Land on the edge of the village main road is more massively converted into private buildings for local residents or sold to residential developers via *biong*. Farmers who are far from the main village road access feel saved because they can still work on their own land. According to informants, farmers who used to own converted rice fields are now farm laborers and daily laborers in factories or markets. In addition, some have chosen to migrate daily to Jakarta as employees. The decreasing number of farmers and the narrowing agricultural land area are the root causes of the decline in agricultural production. The main commodities of agricultural production in Cihideung Udik Village are secondary crops and horticulture.

According to the informant as one of the village government staff, approximately 80% of the rice fields in the village have been converted into housing and settlements. Population density in urban areas influences the increase in population in areas close to the city center [10]. This is in accordance with the geographical condition of Cihideung Udik Village, which is located in Bogor Regency and adjacent to the IPB campus. Informants also said that many of those who inhabited the residential areas resulting from the land conversion were lecturers and IPB academicians.

Currently, the areas in Cihideung Udik Village that are still dominantly farmland are located in RW 11-13, which are located some distance from the village road. Informants who work as farmers complain that currently most farmers can no longer grow rice because of the large number of bird pests caused by the reduction of farmland suitable for rice, so that bird pests will be concentrated on one farmland when planted with rice. This has caused farmers in Cihideung Udik Village to prefer planting secondary crops and horticulture commodities.

Agrarian Structure Changes. Land is the main resource in supporting agricultural production, the conversion of land means that farmers need to adapt again. Farmers are the profession most affected by land conversion, their access to resources in the form of land has been controlled by housing developers. Research conducted in a location adjacent to Cihideung Udik, namely Cihideung Ilir, stated that the conversion of land into buildings, especially residential, caused obstruction of waterways, thus disrupting farmers' activities in planting rice [10]. This was also felt by farmers in Cihideung Udik.

As a result of massive land conversion, landless farmers are increasing and some of them are still engaged in agriculture but as laborers. Farm laborers' access to land resources is certainly not the same as farmers who work their own land. Farm laborers in Cihideung Udik are partly casual daily laborers who are certainly not as lucky as farmers who still own land. However, it does not rule out the possibility that current landowning farmers will also sell their land because they are tempted by fantastic land prices. There are internal and external factors that cause farmers to sell their land [10]. Internal factors include age, urgent economic needs, and the desire to change their fate. Meanwhile, external factors include population growth, irrigation problems, pressures from residential developers, high land price offers, government policies, and location factors such as land conditions close to residential areas.

Land tenure in Cihideung Udik Village is diverse and there are also landlords who are native residents or even residents from outside. Land owned by landlords is more prone to conversion and this has been proven. There are also large tracts of land owned by people from Jakarta, which also shows the inequality of land tenure, but the motives for local people selling their land are not yet known. Based on the author's observations, land that is still relatively large and productive is located far from the main road access and behind houses or residential areas.

2.2.2 Indirect Impact

Economic Change. The economy is a fundamental part of people's lives [11]. Economic change is the changing production and consumption behavior of society [12]. This change is closely related to changes in the financial structure in the form of structural transformation which results in a series of changes that are interconnected with each other. Economic changes can be caused by various things, including social changes.

In Cihideung Udik village, economic changes were largely caused by changes in agroecosystem conditions. According to informants who were interviewed, initially, Cihideung Udik village was a village with the potential for large and fertile land, capable of planting various crops ranging from rice to secondary crops. However, with the good condition of the land and its location not far from the densely populated Dramaga sub-district, Cihideung Udik is one of the main targets for residential development.

The rapid residential development has resulted in several agricultural lands having to be converted into residential land. Many farmers choose to sell their land to housing developers. These farmers then lost their livelihoods. The loss of livelihoods forces village communities to adapt and switch livelihoods. Many farmers remain in the agricultural sector by becoming farm laborers who work on other people's land. In contrast, many others switch their livelihoods to non-agricultural sectors such as daily laborers and traders.

Socio-Cultural Change. Social changes are closely related to the economic changes that have been discussed. According to Samud, the economy is important in social change in society [11]. This quote implies that the changes that occur in the economic aspect also influence the changes that occur in the social aspect.

Social change is based on three ideas, namely the existence of differences where a situation is different from the situation after the change occurs, then it occurs at a different time where the change does not occur at the same time but occurs at a different time with a different period. The third idea is the idea that explains that social change must occur within the same social system [11].

In Cihideung Udik village, the process of change occurred around 2018 and after, when residential development occurred rapidly. Residential development has resulted in increasingly limited agricultural land, which is the main factor in the changes that have occurred in Cihideung Udik village. Before residential development occurred, the social and cultural life of the Cihideung Udik community was closely related to the rice fields where they farmed. Farming is their main livelihood and all family members are usually directly involved in the farming process.

An informant stated that before agricultural land was reduced, children and teenagers in the Cihideung Udik village community generally had basic knowledge about farming methods, especially for those whose families were involved in the lowland rice and secondary crop farming sectors. However, along with residential development which swallowed up agricultural land in Cihideung Udik village, knowledge of farming culture was increasingly eroded. In fact, according to informants, most of the children and teenagers in the Cihideung Udik village community no longer know farming methods and are less interested in the agricultural sector.

2.3 Livelihood as Community Adaptation to Agroecosystem Change

Adaptation strategies are certain actions chosen by a person or group of people in making decisions whose degree of success can be predicted [13]. Adaptation strategies can occur in various situations and dynamic life conditions. Adaptation strategies are closely related to change, including changes in agroecosystems. Changes in agroecosystems require communities to carry out adaptation strategies in order to survive. One example of an adaptation strategy in dealing with agroecosystems change is through changes in livelihood.

Livelihood is the core work of an individual or community [14]. In Cihideung Udik Village, changes in livelihoods are caused by changes in the agroecosystem. The agroecosystem conditions of Cihideung Udik Village were initially in the form of agricultural land and plantations, with residents earning livelihoods related to the agricultural sector. However, this agroecosystem has now experienced many changes. Based on a survey conducted by the author, the agroecosystem condition of Cihideung Udik Village is more dominant with residential land and shops. According to the informant's information, as much as 80% of agricultural land has been converted into housing and residential areas. The remaining agricultural land, namely 20%, is only found in 11th until 13th RW.

Due to changes in the agroecosystem, the people of Cihideung Udik Village have made changes to their livelihoods as a form of adaptation strategy. These changes in livelihoods are divided into two, namely changes in livelihoods that are still related to the agricultural sector and those that are not related. People who experience changes in their livelihoods but remain in the agricultural sector, generally work as farm laborers. This may be due to people's limited ability and skills in working or having an emotional attachment to the world of agriculture, so they choose to continue working in the agricultural sector. Usually, these people will become agricultural laborers in other areas because there is increasingly little agricultural land in Cihideung Udik Village. Meanwhile, people who have changed livelihoods that are not related to the agricultural sector generally work as traders, casual laborers, and as employees by migrating daily to Jakarta. This change of livelihood was carried out by the community as a strategy for adapting.

3 Conclusion

Cihideung Udik Village is a village with a highland landscape and a tropical climate, so many of its residents have agricultural land. This causes the agroecosystem in Cihideung Udik Village to be agricultural. Agricultural land in Cihideung Udik Village has irrigation sources in the form of the Cihideung River and Bendungan Cihud. However, in the last four years, the agroecosystem in the form of dry agricultural land in Cihideung Udik Village has experienced changes. One of the main causes of this change is the conversion of agricultural land to non-agricultural land, especially for the construction of housing complexes. The village's location close to the IPB Dramaga campus makes this village a target for a strategy to convert agricultural land into a housing complex. Changes in the agroecosystem due to conversion cause direct and indirect impacts on society. Direct impacts on society include changes in agricultural production from rice farming to secondary crops and horticulture, changes in access to land resources from farmers to housing developers, changes in farmers' behavior not to plant rice because irrigation channels are blocked, and the increase in homeless farmers. Meanwhile, the indirect impact of changes in agroecosystems on society is economic changes marked by shifts in livelihoods as well as socio-cultural changes marked by knowledge of farming culture being increasingly eroded among some children and teenagers, and even a decline in interest in the agricultural sector. The community in Cihideung Udik Village has certain adaptation strategies to minimize the impact of agroecosystem changes. This adaptation strategy is carried out through changes in livelihoods. These changes in livelihoods are divided into two, namely changes in livelihoods related to the agricultural sector and those that are not related. The livelihoods that are still related to the agricultural sector are agricultural laborers, while those that are not related are traders, casual laborers, and workers in other areas with commuter migration.

The research entitled "Analysis of the Impact of Agroecosystem Changes on the Livelihoods of Residents of Cihideung Udik Village, Ciampea District, Bogor Regency" has theoretical and practical implications. The theoretical implication of this research is that it can enrich the literature regarding the impact of agroecosystem changes on livelihoods in Indonesia, especially in Cihideung Udik Village. Apart from that, in this research there is an explanation regarding the conditions of the agroecosystem in Cihideung Udik Village so that it can enrich knowledge regarding rural agroecosystems in Indonesia, especially in Cihideung Udik Village. As for the practical implications of this research, through this research it is hoped that it will be able to reduce the massive practice of converting agricultural land to residential areas because it can cause various negative impacts, both in environmental aspects, agricultural production, access to resources, economics and social culture.

References

- [1] Budi S, Djazauli A, Prihatiningrum AE: Agroekosistem. UMG Press. (2018)
- [2] Baruna S, Zalmita N.: Dampak alih fungsi lahan pertanian terhadap mata pencaharian petani di Desa Miruk Kecamatan Krueng Bona Jaya Kabupaten Aceh Besar. *Jurnal Pendidikan Geosfer*. pp. 212-213 (2022)
- [3] Alinda E, Tampubolon D, Sari L.: Alih fungsi lahan dari sawah menjadi perumahan diampung Gumuruh Desa Nagrak Kecamatan Cangkuang Kabupaten Bandung. *Journal Unibba*. pp. 55-67 (2022)
- [4] Pratiwi MK, Nuddin A, Rahim I.: Perubahan mata pencaharian petani sebagai dampak alih fungsi lahan pertanian (kajian penelitian di Kecamatan Bacukiki Kota Parepare). *Jurnal Galung Tropika*. pp. 35-44 (2024)
- [5] Septiana S.: Sistem sosial budaya pantai: mata pencaharian nelayan dan pengolah ikan di Kelurahan Panggung Kecamatan Tegal Timur Kota Tegal. *Sabda*. pp. 83-92 (2018)
- [6] Suryana NK, Assegaf SU, Ariani A.: Ketahanan pangan rumah tangga petani pada agroekosistem lahan kering (kajian sosiologis di Kota Tarakan). *Jurnal Ilmu-ilmu Pertanian*. pp. 27-38. (2014)
- [7] Sundari D, Virianita R.: Partisipasi masyarakat dan keberhasilan pengembangan “Kampoeng Wisata Cinangneng” Desa Cihideung Udik, Kecamatan Ciampea, Kabupaten Bogor. *Jurnal Sains Komunikasi dan Pengembangan Masyarakat*. pp. 695-712 (2020)
- [8] Chromicco Handrico.: Dampak keberadaan kampus Institut Pertanian Bogor (IPB) Dramaga terhadap perubahan pemanfaatan lahan di wilayah sekitarnya. *Jurnal Online Mahasiswa (JOM) Bidang Perencanaan Wilayah dan Kota*. pp. 44-53 (2016)
- [9] Republik Indonesia. Peraturan Menteri Pertanian Republik Indonesia Nomor 41 Tahun 2009 Tentang Kriteria Teknis Kawasan Peruntukan Pertanian (2009)
- [10] Hidayati HN, Kinseng RA.: Konversi lahan pertanian dan sikap petani di Desa Chidieung Ilir Kabupaten Bogor. *Jurnal Sosiologi Pedesaan*. pp. 222-230 (2013)
- [11] Yusuf M, Agustang A.: Dinamika perubahan sosial ekonomi pada masyarakat Kindang Kabupaten Bulukumba. *Jurnal Sosialisasi*. pp. 31-37 (2020)
- [12] Fahlia, Irawan E, Tasmin R.: Analisis dampak perubahan perilaku sosial ekonomi masyarakat Desa Mapin Rea pasca bencana gempa bumi. *Jurnal Ekonomi dan Bisnis Indonesia*. pp. 51-55 (2019)
- [13] Helmi A, Satria A.: Strategi adaptasi nelayan terhadap perubahan ekologis. *Markara Human Behavior Studies in Asia*. pp. 68-78 (2012)

[14] Rohman, K.: Analisis perubahan mata pencaharian dan kesejahteraan Masyarakat Mayong setelah adanya industri besar dalam perspektif maqasid syari'ah (studi kasus masyarakat Desa Segonbugel Kecamatan Mayong Kabupaten Jepara). Institut Agama Islam Negeri Kudus (2020)