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REGULAR RESEARCH ARTICLE

The Agricultural Expansion in Conservation Areas: The Case of Gunung Halimun Salak National Park, West Java

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ABSTRACT

The Indonesian government has expanded the Gunung Halimun Salak National Park (GHSNP) to reduce the impact of global climate change and conserve ecosystem biodiversity. This policy has been resisted by local communities who need access to GHNSP area to support their livelihoods. Qualitative and quantitative approaches have been applied in this study to explain the occurrence of agricultural expansion and its impact on the household economy in the GHSNP area. This study is supported by an analysis of secondary data regarding land cover changes in the GHSNP corridor area. This study found that farmers have been able to take reflexive and rational actions by utilizing power relations and social networks to regain their access in the GHSNP area. It was shown by the formation of concentrated agriculture expansion in areas that were previously stated as the forestry corporation concessions. Agricultural expansion has increased due to the economic needs of the resident, migration, and the resident's need for land. Massive agricultural expansion in the GHSNP corridor has changed land use and corridor landscapes and disrupted conservation goals. This study concludes that agricultural expansion occurred as a response of farmers to government decisions to expand the national park into areas the local communities considered part of their living space. The complexity of changes due to agricultural expansion in conservation areas challenges conservation experts and the forestry profession to develop adaptive management that is more sensitive to change and community needs.

KEYWORDS

agricultural expansion; access; land cover change; livelihood; migration; adaptive management.

1. INTRODUCTION

The story of Gunung Halimun Salak National Park (GHSNP) is integral to the history of forest management in Indonesia, especially in Java. Management of forest resources in Indonesia represented a state monopoly (Peluso, 1992). The legacy doctrine of the 'eminent domain' was the initial framework that drove the continued expansion of large plantations (Jiwan, 2012; Sampat, 2013; Davidson, 2016). Production of agricultural commodities replaced forest functions, causing forest damage, and worsening socio-economic conditions of local residents (Afiff, 2016; Butler, 2011; McCarthy et al., 2011; Rachman, 2011; Siscawati & Rachman, 2014).

Changes that occurred in the Gunung Halimun Salak National Park (GHNSP) were reflected in conflict of interest between local economic and conservation. Many actors have an interest in this region at local, national, and global levels (Galudra, 2008). The local people have lost access to the forest since the government designated Mount Halimun-Salak as a national park (Adalina & Sawitri, 2013; Afiff, 2016; Fridayanti & Dharmawan, 2013; Rahmawati, 2013; Rahmawati & Gentini, 2008; Siscawati & Rachman, 2014). The expansion of the GHSNP management area has also led to spatial

conflicts, land use change, land cover and deforestation (Hakim et al., 2016; Kurniawan et al., 2017; Prasetyo & Setiawan, 2007). Various conflicts have arisen because the parties have difference views regarding conservation and community welfare in the management of conservation areas (Afiff, 2016; Hakim et al., 2016).

The GHSNP area is a field (arena) where power relations determine who can benefit. An arena is a system of relations that form a structure of position and power relations (Hilgers et al., 2014). Bourdieu argues that individuals can only be agents relationally and all relationships imply power (Blokland, 2017). Power relations also work in individual or group struggles to gain access to resources (Myers & Hansen, 2019; Ribot & Peluso, 2003; Peluso & Ribot, 2020). This power relation could be performed by individual actors as well as social actors (Sibeon, 2004). Thus, various social institutions, natural structures determine individual actions to utilize various resources. The players involved in the arena have produced practices/habitus or games by mobilizing their dispositions whether as inhibitors or supporters through institutional or figurational structures (Mouzelis, 2008).

A number of studies have shown that technology and the market economy have driven the expansion of land conversion (Benhin, 2006; Byerlee et al., 2014; Lawrence et al., 2004). At the household level, the decision to expand is influenced by the calculation of the relative advantages to use the forest. From the perspective of political ecology, the social and environmental relations of a household are related to the wider environment, economy, and power (Zeng et al., 2017). Farmers in West Java managed their land with the 'Dudukuhan' system, a traditional tree farming system consisting of; (1) timber system, (2) fruit-banana-perennial crop system, (3) mixed fruit-wood system, and (4) fallow system. Farmers prefer this management approach because of limited land tenure, small size of landholdings, off-farm job opportunities, limited market access, or their limited experience with intensive tree management. The farmer's decision regarding the type of stand to be developed is influenced by the desired tree yield, market opportunities, and land tenure status (Manurung et al., 2008). Geographical specificity as well as variations in occupations conducted by the population generate the area heterogeneous in terms of agricultural practices. Access to natural resources is basically a relationship between humans and nature as materiality (Myer & Hansen, 2018; Ribot, 1998). The ecological setting, the existence of the plantation economy and exposure to the external economy have encouraged agricultural expansion, both concentrated expansion and spotted expansion (Dharmawan et al., 2020).

In contrast to the classical utilitarian approach, natural resource management today requires a more adaptive approach in response to various feedbacks (Berkes & Folke, 1994). It is important to emphasize the 'non-equilibrium' ecological view and the need of a sophisticated, responsive, and adaptive management approach (Scoones, 2015). 'Adaptive' ecosystem management focuses on using current scientific and social information for planning and action. A variety of new information will become an integral part of management to formulate more appropriate decisions in the future (Maser, 1994). The existence and sustainability of the forest will be maintained when the community can use the forest either directly or indirectly (Darusman, 2000). Several studies consider that forest resource management needs to integrate environmental, economic, and cultural ecosystems (Junaedi & Maryani, 2013; Sutwika et al., 2018).

The expansion of the GHSNP area caused problems of encroachment and degradation of natural resources which correlate to the low level of communities' welfare around the national park (JICA, 2007). The national park policy designed by Indonesian Government has influenced various changes in the conservation area and its surroundings. Studies by Lund & Rachman (2018) and Hennemann (2012) have

shown that there was 'flexibility' in the implementation of GHSNP management policies.

Following the various studies above, this study aims to explain the occurrence of agricultural expansion as a response to the government's policy to expand GHSNP. Furthermore, this study will also describe changes in power relations, social, economic, and ecological changes as well as national park management related to agricultural expansion in the GHSNP area.

2. METHODS

This study was conducted in Cipeuteuy village, in the conservation corridor of the Mount Halimun Salak National Park, West Java, which is part of the Mount Halimun-Salak National Park (GHSNP) area. The GHSNP Corridor is a national park area that is conserved to support the biodiversity of the Mount Halimun and Mount Salak ecosystems. GHSNP Corridor is an ecological corridor, which connects two similar wild habitats. This corridor is important for the sustainability of ecological processes because it provides space for animals and the sustainability of their populations (Supriyatna, 2018). The Decree of the Minister of Forestry No. 175/Kpts-II/2003 identified the area of Mount Halimun-Salak National Park as including protected forests, permanent production forests, and limited production forests (GHSNP, 2008). The GHSNP corridor area has become a special concern in conservation because it protects water catchment and conserves endangered animals (Galudra, 2000; Galudra et al., 2008; Yumarni, 2012).

This study used a mixed method strategy (Creswell, 2009). Qualitative data were collected between August - October 2019 and April 2021 to understand the environmental, social and political context of the GHSNP area (Marvasti, 2004). Qualitative data were obtained from twenty-six key informants consisting of TNGHS Center managers, government officials, community leaders, youth activists and farmers. The qualitative data were obtained from 26 key informants consisting of GHSNP managers, government officials, community leaders, youth activists, and farmers. Specifically, the qualitative data were explored to understand more about the dynamics and agricultural expansion processes carried out by smallholders to gain access to the national park area for their livelihood. Additionally, this study has used household surveys to obtain information about social demographic characteristics, economic and occupational changes, and ecological changes as a consequence of agricultural expansion carried out by farmers in the national park area. A household survey was conducted in March 2020 to describe the economic characteristics of farmer households. The survey was conducted with 57 respondents who were selected by systematic random sampling from 380 names of farmers registered at the GHSNP Office. This study also analyzed the diversification of household income sources using the Simpson diversity index = 1−(Σ(n/N)2) with a value between 0-1 (Dharmawan et al., 2020). This study also examines the literature on the historical context of conservation policies related to agricultural expansion in the GHSNP area.

3. RESULTS

3.1 Trajectory of conservation: the policy and history of encroachment

Agricultural expansion in the national park area is considered by the national park management authority as encroachment. This section is based on a literature review on conservation policy to highlight farmer encroachment in the GHSNP. This study also examines the literature of the historical context of conservation policies related to agricultural expansion in the GHSNP area. The researcher also conducted interviews

with key informants from the national park authorities regarding their response to agricultural expansion in the national park area. The historical background is important to understand the power relations between conservation policy makers (the state) and farmers as groups who experience the impact of these policies.

Nature conservation in Indonesia began during the Dutch colonial regime in the 1880s. A well-known conservation regulation is in the 1941 Ordinance on the Protection of Nature (Natuurbeschermings Ordonantie 1941) which recognized the rights of indigenous peoples (Bedner & Arizona, 2019; Galudra, 2008; Peluso, 1992; Peluso & Vandergeest, 2001).

From the Dutch colonial history of forest conservation policy, the issue of encroachment emerged because of the stated objective for conservation areas to primarily provision forest function. In the period from 1906 to 1939, boundaries were established between state forest areas and non-state forests (Galudra, 2000; Peluso & Vandergeest 2001). Meanwhile, the Dutch colonial government established Mount Halimun-Salak as a nature reserve in early 1940.

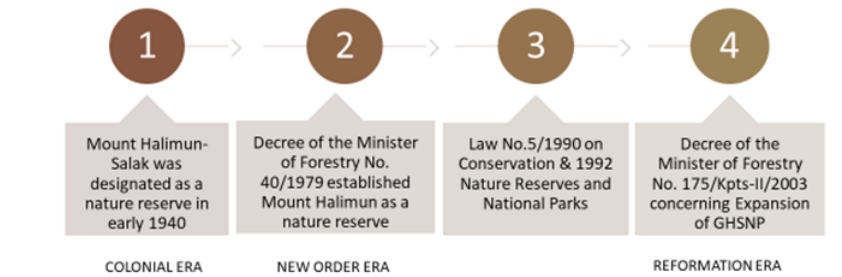


Figure 1. Trajectory of Conservation Policy in GHSNP

Figure 1 shows the main trajectories of the determination of conservation areas and their changes, as well as the origin of the issue of encroachment by farmers around the Mount Halimun-Salak forest in the colonial and post-colonial periods.

3.1.1 Colonial era

The determination of conservation areas by the Dutch Government was documented by the GHSNP authority. The Mount Halimun Nature Reserve had been managed under the authority of the Dutch Government during 1935-1945. The Japanese government, which occupied Indonesia in 1942, did not pay attention to conservation areas. They employed local residents to exploit forests and plantations to meet their war needs (interviewed with local religious leader, and historical notes of Paguyuban Petani Arum Bandung; Hall et al., 2011).

3.1.2 Independence era

In 1945-1961 the Nature Reserve area was managed by the government of the Republic of Indonesia under the West Java Forestry Department (Balai TNGHS, 2016). The period 1961-1978 was an important period because the management of the Nature Reserve was transferred to Perum Perhutani, the State Forestry Corporation (SFC) in West Java, which was granted concession rights by the Government of Indonesia. In this period the people living around the forest worked for Perum Perhutani in managing forest areas. Farmers planted their food crops between tree seedlings, which had not yet grown into mature trees (this cultivation practice is called tumpangsari, see Roshetko et al., 2013). At that time the government established the forest police

(Polhut) to monitor forest areas from disturbances by residents. After independence, the Decree of the Minister of Forestry No. 40/1979, the Indonesian government declared Mount Halimun as a nature reserve covering an area of 40,000 hectares including part of the Perum Perhutani concession area. Subsequently, the Government of Indonesia issued Law no. 5 of 1990 concerning Conservation of Forest Resources and Their Ecosystems and in 1992 the government had converted the Halimun nature reserve into a national park (Galudra, 2000).

3.1.3 The reformation era

The management of national parks in Indonesia was further strengthened by Law no. 41 of 1999. The government then issued the Decree of the Minister of Forestry No. 175/Kpts-II/2003, which expanded the GHSNP area to 113,357 hectares by connecting the forests of Mount Halimun and Mount Salak. The GHSNP expansion includes forests as well as villages, tea plantations, agriculture and shrubs that previously existed (GHSNPMP-JICA 2009; Rosleine et al., 2014). According to the GHNSP report, forest conservation was not a concern for local communities because they used the forest to support their livelihoods (GHNSP, 2008). This situation is related to the context of the issuance of a national park expansion policy that includes the Perum Perhutani concession area, which had previously been used by residents. Indeed, based on the decision, the government considers community agricultural activities in the expansion area of the national park as encroachment.

The GHSNP agency acknowledged that many people used land in the GHSNP area, both for agriculture and illegal mining. Unfortunately, it is difficult to collect specific data on this matter, especially to match the land measurement data in the field with farmers' claims (interview with Mrs. Pr, GHSNP officer on August 27, 2019). In 2016, data collection on smallholders in the corridor area was carried out, especially on land previously managed by Perum Perhutani. This activity was conducted to evaluate the possibility of developing a conservation partnership program. GHSNP encourages community commitment to support conservation efforts (interview with Mr. Wy, GHSNP officer, on August 27, 2019). However, there was an 'agreement' that the community may manage the land in the area, but if the state needs the land, then the community must return the land to the state. Currently, national park officials have begun to develop good relations with the community in order to create better cooperation.

3.2 Land used and land cover change

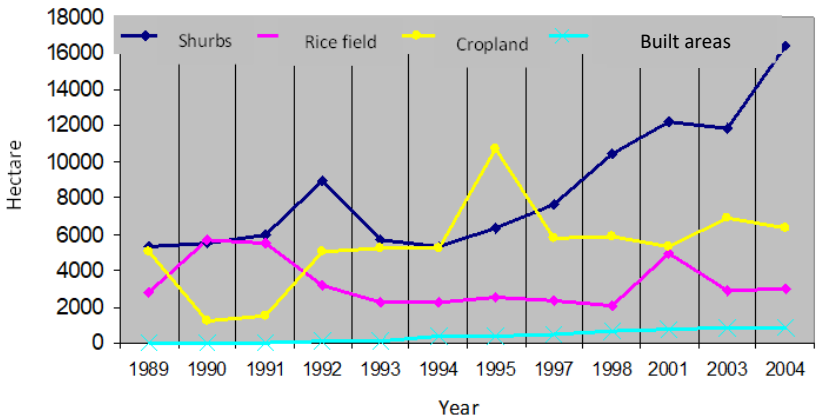


Figure 2. Development of shrubs, rice field, cropland and built areas from time to time in GHSNP, 1989 – 2004 (Prasetyo & Setiawan, 2007)

Figure 2 shows the changes in land use in GHSNP in 1989-2004. The area of natural forest in the Mount Halimun Salak National Park has gradually decreased at the same time that there was an increase in shrubs, rice fields, cropland, and land with buildings (Prasetyo & Setiawan, 2007).

As a conservation area, the GHSNP was simultaneously used for non-conservation purposes, including agriculture, settlements, and mining (Kurniawan et al., 2017; Rakhmawati, 2017; Hakim et al., 2016). Deforestation occurs precisely in the corridor area between Mount Halimun and Mount Salak which was considered essential for the conservation of the area's biodiversity (Rosleine et al., 2014). Natural forest land cover in the GHSNP corridor is increasingly being eroded by human activities, especially by agricultural production. Figure 3 shows that the forest cover has eroded which threatens the integrity of the forest corridor between Mount Salak and Mount Halimun.

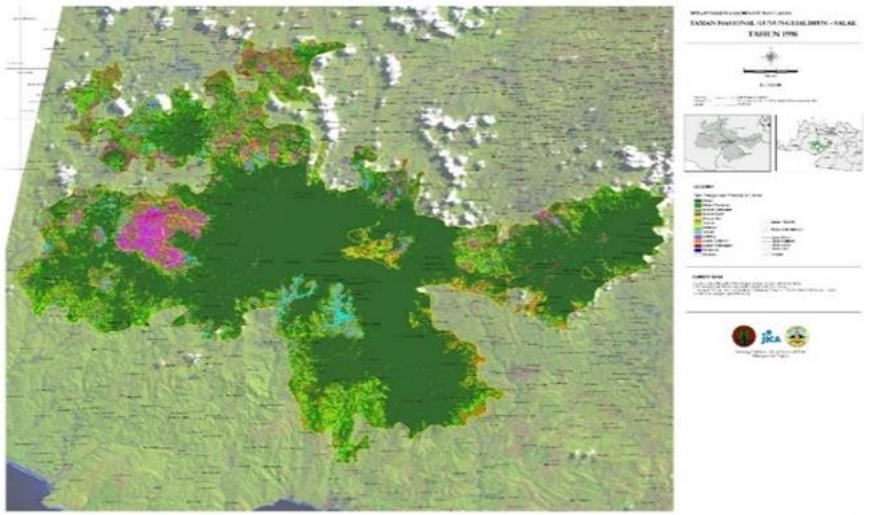


Figure 3. Land Cover in GHNSP Area, Year 2004 (Prasetyo & Setiawan, 2007)

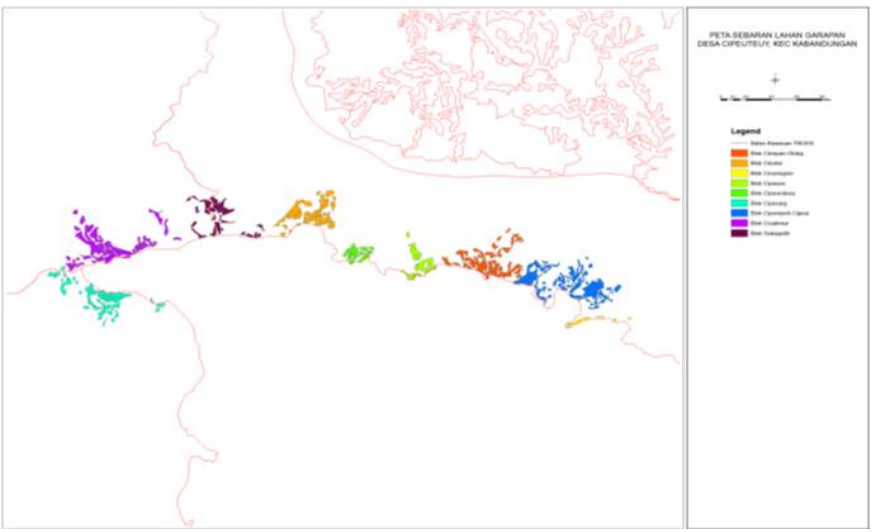


Figure 4. Agricultural Expansion in GHNSP Area (Balai TNGHS, 2016)

Figure 4 shows the agricultural expansion in Cipeuteuy Village. According to GHNSP agency, there are 380 farmers from Cipeuteuy village who have been involved in agricultural expansion in the GHSNP area. They are residents of almost all kampongs in Cipeuteuy Village. Some are migrants from outside the village, having moved to Cipeuteuy because they got marriage, live with relatives or looking for work in the local economy. Farmers have cultivated arable land with an area that varies from the narrowest area of only 400 square meters to the widest reaches 26,000 square meters. More than half of survey respondents in this study have grown food crops in the GHSNP area. The characteristics of farmers participating in agricultural expansion will be explained in the next section.

3.3 Socio-demographic characteristics

This section is based on the household survey and interviews with key informants. Several key informants confirmed that the community in Cipeuteuy village experienced negative impacts of the forest land, including areas previously used by smallholders or plantations, being transferred to the Halimun-Salak area. Some rural families have become landless peasants and been forced to become plantation workers. The income earned by workers from plantation is not sufficient to meet all their daily needs. For a long time, people of productive age generally migrated to find work in cities and even abroad to become foreign workers. This condition changed during the reformation period in Indonesia. Local residents took advantage of the situation to develop agricultural land in the GHSNP area. Many of those who had worked in the city returned to the village to start farming or develop other economic activities in the village.

Table 1. Socio-demographic Characteristics (n=57)

Characteristics	Percentage
Household Head: Male	97.0 %
Age group (30-60 year)	76.0 %
Basic education (Grade 6)	91.0 %
Developing an agricultural plot after year 1998 (Reformation era)	83.5 %
Developing an agricultural plot on their own	55.3%
Continuing the family farm in the GHSNP area	29.0 %
Taking over management of another farmer's agricultural plot	10.6%
Developing an agricultural plot through investors' support	07.6%

Source: Primary data (2020)

Table 1 shows the social demographic characteristics of survey respondents. The survey consisting of 57 farmers who cultivate land in the GHSNP corridor area. Almost all (97.0%) of the respondents were male. Women participate in agricultural activities, some even clearing their own land although this is limited. The respondents are in the productive age group (76%.0), but they only have primary school education (91.0%). Most of them (83.5%) cleared land in the national park area after 1998. This fact is most likely influenced by the unstable political situation during the reformation period which prompted the community to occupy state land, including in the national park area which was previously a Perum Perhutani concession area. Only a small number of farmers continue to cultivate family-owned land (29.0%) or take over arable land from other farmers (10.6%). Among the respondents, only 0.7% admitted to developing agricultural land using investors' capital.

3.4 Economy and occupation changes

The key informants in this study explained that between the colonial period of the Dutch East Indies until the New Order era, people in the GHSNP area generally worked in plantations. When the plantation operations discontinued, only some of them were able

to continue working as casual laborers. Additionally, only a limited portion of the community were able to secure land tenure to develop rice fields or vegetable gardens. Residents, who could not afford to purchase land, occupied land in the forest area for conversion to agriculture. Some of them have occupied abandoned land even though they have no expertise in farming. They only occupy the land to gain benefit by transferring the land to someone else for compensation.

Agriculture is an important economic opportunity for the resident, either as owners of agricultural land and businesses, as farm laborers or in the agricultural support sector. Most household members involved in some part of the agriculture sector. The slight change has been shown by household members who work in the service and trading sector. An overview of local occupations is presented in Table 2.

Table 2. Occupation Changes

Characteristics (n=57)	Percentage
Previously working in sectors other than agriculture	79%
Currently having a job off the farm	29%
Having grandparents and parents who have worked in agriculture	69%
Having household members work in agriculture	59%

Source: Primary data (2020)

As shown in Table 2, the farmer household survey shows that 79% of respondents previously worked in sectors other than agriculture, and respondents who currently have jobs outside agriculture (29%). The grandparents and parents of most respondents worked in agriculture (69%). This shows that most of the respondents came from families with an agricultural history, then left the agricultural sector and are now returning to the agricultural sector. Agricultural characteristics are quite dominant because more than half of the respondents have household members who are involved in agricultural activities (59%).

The development of the agricultural sector in this village has encouraged farmers to expand their agricultural land. The expansion of agricultural land has also been conducted by residents who live permanently on the edge of the GHSNP area, even by women working independently. Women are actively involved in village level jobs when their husbands work as laborers in the cities. Some of these women have been forced to develop and manage agricultural land because their husbands do not return to the village or do not provide adequate income for the household.

Many of the residents stated that the economic condition of the village enhanced since the expansion of agricultural businesses in surrounding the GHSNP area. Currently, national park officials treat local residents better than was common in the past when the area was managed as a Nature Conservation (Pelestarian Alam). This altered situation has encourage farmers who have the capital tend to expand their agricultural areas.

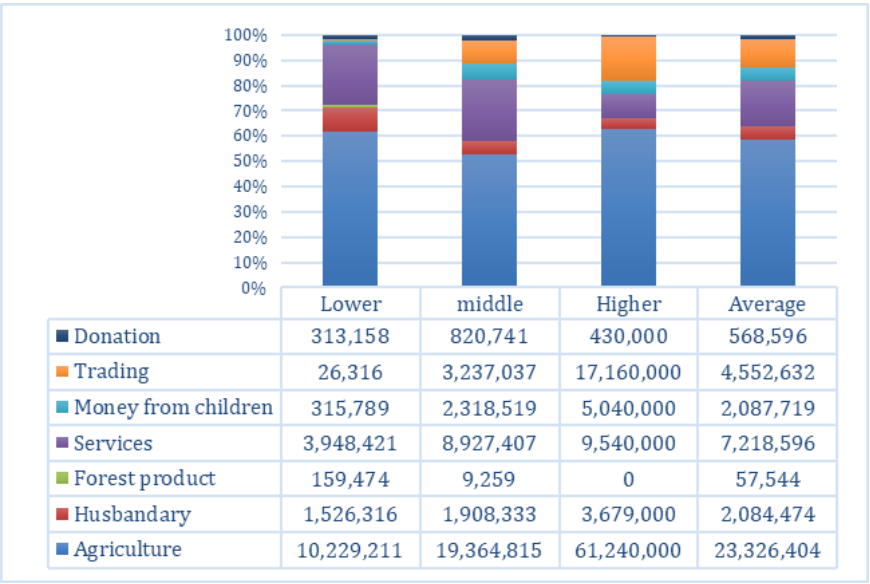
> *"...our minds are at peace when we have our own land. Even though the price of vegetables is cheap, if you have a lot of land, the harvest will be a lot too. I have five blocks of land; two downstream and the others upstream. My husband and I save money from our agricultural activities, enabling us to purchase more land. According to national park officials, the land here cannot be traded. I have taken over my relative's land by giving compensation for the costs he has incurred on the land. I hope that in the future my land can also be passed on to my children"* (Mrs. Els, farmer).

During the Reformation period, large-scale logging occurred and many residents occupied the logged-over land for agriculture. Farmers who are successful in

developing agricultural production tend to use the money to take over arable land from other farmers.

> *"I used to work in Jakarta as a construction worker. When there was a lot of logging, I returned to my homeland to find employment with the logging companies. After that, the residents were busy developing the logged areas for agriculture production. All farmers here are registered by the National Park officers, they are allowed to cultivate the land, as long as they do not increase the area of arable land. At first, I only worked one field, now I have two tree gardens also. For fifteen years I depended on middlemen to sell my farm products, now I do so independently. Hopefully this land will become mine in the future"* (Mr. Isp, farmer)

Agriculture, both subsistence and market-oriented, has become the main feature of Cipeuteuy village. Figure 5 shows that agriculture is the largest source of income among farming households, across all classes. Farmers who have the lowest income are farm labor households that do not have large arable land. Meanwhile, the highest income are middlemen who run many businesses. However, the income sources of farmer households are relatively diverse, with the Livelihood Diversity Index value of 0.4.



	Lower	middle	Higher	Average
Donation	313,158	820,741	430,000	568,596
Trading	26,316	3,237,037	17,160,000	4,552,632
Money from children	315,789	2,318,519	5,040,000	2,087,719
Services	3,948,421	8,927,407	9,540,000	7,218,596
Forest product	159,474	9,259	0	57,544
Husbandary	1,526,316	1,908,333	3,679,000	2,084,474
Agriculture	10,229,211	19,364,815	61,240,000	23,326,404

Figure 5. Source of Household Income per year (n=57)

Table 3. Simpson Diversity Index by Income Group

Income (Rp)	Lower (<25.650.000)	Middle (25.650.000 – 54.400.000)	Higher (>54.400.000)
Simpson Diversity Index	0.407817	0.450746	0.457746

Source: Primary data (2020)

Table 3 shows that the income sources of respondents are relatively diverse (the Simpson Diversity Index is above 0.4 on a scale of 0-1). Livelihood Diversity Index scores were higher in the higher income group, although the difference is not significant. Index values seem to be quite different between low- and middle-income respondents. Meanwhile, the index value of middle-income respondents is almost close to the index

value of high-income respondents. The income of middle- and high-class farmers includes non-agricultural sources of income, both trade and services.

3.5 Ecological changes

One of the informants explained that the national park expansion policy established strict regulations prohibiting residents from harvesting and utilizing forest products. Residents who previously depended heavily on forest products changed their lifestyles significantly, even though respondents still depend on forests for agriculture, such as for irrigation (91%), prevention of floods and landslides (89%), maintaining regular rainfall (84%), and crop pollination (95%). National Park authorities and conservationists view that forest sustainability is affected by people harvesting forest products and continuing agricultural expansion. Poor farmers do not have the money to open large fields. They farm with inappropriate technology that risks causing disasters such as landslides. On the other hand, farmers are practicing intensive agriculture and use chemical products. All of these conditions harm the quality of the environment in the future.

4. DISCUSSION

This study demonstrates the changing landscape of the GHSNP corridor resulting from the development of agricultural expansion. From a conservation point of view, land cover changes in the GHSNP corridor are destructive because conservation experts consider agricultural expansion as interfering with the preservation of the biodiversity of the Mount Halimun and Mount Salak ecosystems. Land cover in the corridor have drastically changed, especially since the deforestation in the Perum Perhutani concession area in 1998.

In 1990 there was logging in the area which according to the map of the Forestry Planning Agency (BAPLAN) was recognized as limited production forest. Landsat data of July 28, 1997, had showed that there was additional logging of 43 hectares. In 1999 there was logging of 19.5 hectares and lager area of 49.6 hectares of forest in 2001. Subsequently, the logged land was rejuvenated as shrubs, which were then partially converted by farmers into agricultural land (Prasetyo and Setiawan, 2007). Thus that is currently a GHSNP corridor, the loss of forest cover in the area was caused by Perum Perhutani's activites in harvesting timber. To overcome the deteriorating forest condition in the area, the government issued Decree no. SK No. 175 of 2003 mandated the preservation of biodiversity of the Halimun and Salak mountain ecosystems. However, this conservation policy has many challenges due to the continued expansion of agriculture by residents in the corridor area.

Changes in the ecological landscape due to agricultural expansion in the GHSNP area eventually lead to other changes, namely socio-agrarian, socio-economic and socio-ecological changes. This study has identified the various changes, their driving factors, key actors, and estimates of how long they will last. These changes are described in the following paragraphs and the various components of these changes are summarized in Table 4.

4.1 Socio-agrarian power relations changes

This section refers to the results of a study on encroachment related to state domination in setting conservation policies in the Mount Halimun-Salak area. Peluso (1992; 1993) argues that the current change in agrarian relations is related to the practice of state policies in the colonial period. Changes in power relations between the state (the Ministry of Forestry) and farmers are the triggers of the landscape changes in the GHSNP area. The main actor in policy change is the state through the Ministry of

Forestry which issued the Decree of the Ministry of Forestry No. 40/1979 concerning the designation of the Mount Halimun Nature Reserve, which included the Perum Perhutani concession area that was previously a source of farmers' livelihood. This legal aspect empowers the state to issue conservation policies that excludes farmers from forest areas.

These power relations tend to be permanent because regulatory changes usually take a long time for negotiation as there are various interests at the national level. Conservationists have viewed agricultural expansion as more than just a threat to the environment and conservation goals. The government, supported by conservationists, has even strengthened conservation efforts by issuing other provisions. In 1992 government changed the status of nature reserves to national parks based on Law no.5/1990 concerning conservation. While, the Ministerial Decree no. 175/kpts-II/2003 was enacted concerning the expansion of the GHSNP area. The expansion of the GHSNP area included several villages around the forest area, as well as agricultural areas managed by local farmers (JICA, 2007). Farmers rejected the decision and they continued the agricultural activities they had been doing before the setting of the new GHSNP boundaries.

Political reform in the 1998 replaced authoritarian regimes with a democratic government, which accelerated the process of agricultural expansion in this region. Referring to Bourdieu's argument, this situation describes a dynamic relationship between structure (object) and actor (subject) (Mouzelis, 2008). As political power shifted, local views on historical injustice gained momentum, leading to commitments to co-management between forest authorities and local communities. However, dimensions of recognition and participation by local people were difficult to address. Local people and their institutions had long been denied recognition of their particular experience, identities, and values about forests, excluding them from any decisions made over management (de Royer et al., 2018).

The presence of cultivators in conservation areas is considered illegal by the authority. In the pre-reform period, the resident lived with a habitus under state repression, so they did not dare to fight openly. The political change in 1998 encouraged farmers to show their resistance. Farmers resisted the state by controlling forest areas for agriculture or other functions (Lukas and Peluso, 2011; Hall et al., 2011; Lund and Rachman, 2016). The reflective ability of farmers has changed the existing power relations. Farmers aware about the importance of regaining their right to livelihoods in the area which were inherited from their ancestors. Farmer's reflective ability has brought change for the better for them. In Tyrol, Austria, people used their reflective abilities and rationality to face crisis, such as diversifying the agriculture systems and enhancing socio-ecological resilience (Stotten, 2020). Maresca's study in Africa also shows the ability of farmers to legitimize their identity through their institutions and agents to transform their social struggles (Wacquant, 1987).

Table 4. Four Dynamics of Changes in the Ecological Landscape of the Gunung Halimun Salak National Park (GHSNP) and Socio-Agrarian, Socio-economic and Socio-ecological Consequences, Cipeutuey Village, 2020-2021

Driving factor	**Main Actor**	**Implications** on socio-agrarian and socio-ecological changes	Possible **duration** (time) of change
Changes in legal basis (Area Management)	State/Minister of Forestry:Kepmenhut no 40/1979.	CHANGES IN AGRARIAN POWER RELATIONS Agrarian Power Relations Domination of State Community exclusion	Permanent or long term; depends on regulations

Driving factor	Main Actor	Implications on socio-agrarian and socio-ecological changes	Possible duration (time) of change
Economic needs pressure	Local residents and Free rider (immigrant residents, who have no claim based on agrarian history in the area)	CHANGES IN ECONOMIC ACTIVITIES AND WORK The emergence of land encroachment, land transactions, job opportunities	Temporary; depends on law enforcement
Return-migration *In-migration*	Village youth who returned to the village New residents who came from outside the village	CHANGES IN SOCIAL ASPECTS The existence of the next generation of farmers and agriculture sector workers in the region Increasing number of people engaged in commercial agriculture in the region	Temporary; depends on law enforcement
The meaning of land for residents	Village farmers in general	Farmers hope that land in the area will become private property with inheritance rights	
Land use behavior	Farmers	ECOLOGICAL CHANGES Utilization of non-organic products for agriculture Creating a garden on sloping land without terraces	Temporary; depends on law enforcement, supervision and extension program

4.2 Changes in the economy and employment

There are several types of forest plants in the area which was previously managed by Perum Perhutani as production and protected forest, such as rasamala (Altingia excelsa), pine (Pinus merkusii), damar (Agathis sp.), and puspa (Schima wallichii). There are also 12 types of bamboo trees, including those originally from West Java, namely cangkore bamboo (Dinochloa scandens) and tamiang bamboo (Schyzostachyum sp.) (Sambas et al., 2018). There are 100 forest species that are commonly used by people for traditional medicine, traditional ceremonies, building materials, and other necessities (JICA, 2007). The practice of shifting cultivation in Indonesia has been carried out for generations as indicated in Gunung Salak valley, West Java. Their swidden cultivation practices are deeply rooted and mostly subsistence-oriented (Rahman, 2017a).

Residents progressively encroach on the national park area when they have no other land to be cultivated and nothing could be the source of their income. Political changes in 1998 created a situation that encouraged residents to carry out agricultural activities in the GHSNP more extensively. Therefore, the scope of expansion was quite prodigious, disconnecting the corridors of the national park. Farmers carried out extensive agriculture by preparing new land (including by converting forest land) using the traditional swidden (slash-and-burn) method. Production is mainly subsistence-oriented and dominated by food crops, such as upland rice, maize, and vegetables. Crop cultivation is rotated between fields to maintain soil productivity; this practice is very

dependent on the availability of land (Rahman, 2017a). In some cases, farmers in this area have farming systems similar to the indigenous Baduy people. They developed a landscape system from shifting cultivation (huma) to monoculture annual gardens (kebon) and mixed crop gardens (kebon campur or dukuh), triggered when other annuals or perennials were cultivated after rice harvest (Iskandar and Budiwati, 2017). They practice farming systems that are common in Java. The trees they plant are a conscious investment for which other options are given up. Farmers generally limit planting to the number of trees that can be maintained and integrate tree planting with their plant and animal production activities (Roshetko, 2008).

Agricultural expansion has increased farmers' income and the opportunity to occupy land. Moreover, trade and service activities emerged as well as the transfer of arable land. These changes are supported by better access to infrastructure and markets. In the case of agricultural expansion, the perpetrators are not only residents. They belong to a group called free riders, which refers to migrants from outside the village who occupy land in the national park after the state set new boundaries for GHSNP. The expansion is concentrated in the areas that were previously cultivated by farmers when they were working in the Perum Perhutani concession area. While its pattern is similar to that identified by Dharmawan et al. (2020) as a concentrated expansion.

4.3 Social Changes related to migration and cultural values of land

This section refers to the explanation of the study results point 3.3 regarding the demographic profile of smallholder households, particularly the migration patterns and the importance of the value and meaning of land for farmer households.

Return migration is a triggering factor for changes in demographic characteristics related to agricultural expansion in GHSNP. The potential for agriculture development in this area has encouraged return migration. It is common practice for villagers, especially the young ones, to undertake temporary migration. Migration to cities is the choice of residents due to several supporting factors; 1) they can work in the urban informal sector because flexible time commitments allow them to return to and go to their home villages, 2) work in the city is an opportunity to diversify family income, 3) the transportation system in Java is cheap and diverse, 4) the existence of social networks of earlier experienced migrants, friends or family with whom they live (Hugo, 1997). Studies in Central and East Java also show the habit of temporary migration, especially among the young population. They carry out small-scale tree planting activities in their village in a limited area but provide benefits that are commensurate with the investment of time and resources they have (Roshetko et al., 2008). Population growth due to return migration needs the attention of national park managers because they carry out agricultural activities in conservation areas. Changes in population due to agricultural activities in the GHSNP area are temporary because they depend on national park regulations regarding agricultural activities by residents in conservation areas.

In-migration is the arrival of newcomers from outside the village. They come for various reasons to live with relatives or because they are married to residents. Social preference for living and bringing up their children in the village where there are perceived to be fewer negative, non-traditional influences (Hugo, 1997). The newcomers work in agriculture as laborers or open arable land for subsistence or commercial production, or in trade and services. They may also follow a temporary migration pattern like other villagers to diversify family income. This change is temporary depending on the national park management regulations. The presence of newcomers certainly increases the number of people involved in agricultural activities

in this area. This expansion needs to be managed so that agricultural activities increase family food security or income without interfering with the conservation goals of the GHSNP.

The Cultural value of land. Most farmers hope that the land they manage will one day become their private property and be passed on to their children. 'Negoro panjang punjung, gemah ripah loh jinawi' is a traditional axiom meaning the distribution of land and prosperity in the country. Customary Law teaches the principle of harmony and interdependence between humans and the land. Humans get benefits from lands, such as agriculture, mining, and forestry while lands also get benefits from humans because human keep them fertile so they can provide plants and ecological needs of forests (Suparjo, 2011). On the other hand, based on values of equity in gender, locally called 'sanak', the parents treat their sons and daughters equally as children and tend to allocate their land based on the customary law. Both women and men, including widows/widowers, have control over their land, not only over their inherited/granted/purchased land but also over other lands that are used in sharecropping, rented, and mortgaged. This phenomenon has been recognized by the community and by the external authority at the village level (Mugniesyah & Kosuke, 2007). People keep the cultural values that land is an important asset for family heritage. Farmers hope that they will get a property right for their occupied land, and then they could be passed on to their children.

4.4 Ecological changes due to human behavior

Ecological changes in the GHSNP area occur due to agricultural activities, both commercial and subsistence farming. Poor farmers do subsistence farming because they do not have enough capital. They cultivate narrow land on slopes that are at risk of landslides. Meanwhile, farmers who have a lot of capital, or who can work with middlemen maximize agricultural productivity by expanding their agricultural land and using chemical fertilizers. They also used long plastic sheet to mulch the soil beds for plant nurseries. This technic may have negative impacts on soil fertility and health because farmers burn the plastic post-harvest. In the long term, chemical pollution will reduce groundwater quality and even cause disease in the human body. Unfortunately, agricultural extension services provide knowledge and agricultural techniques that promote chemical inputs.

This study demonstrates that agricultural expansion in national park has not maintained the conservation goals as stipulated in the regulations. The national park authority has to seek conservation strategies that more appropriate to the socio-ecological dynamic in the area. There is a need to develop a more creative approach to integrate the socio-economic and environmental changes in the conservation program. National park forest ecosystems are not a static natural resource to be preserved under strict control. The non-equilibrium ecological view requires a conservation management approach that is more adaptive to changes in the surroundings, particularly human behavior aspects.

We agree with Roshetko (2008) regarding the need for a paradigm shift in the forestry sector that recognizes the importance of smallholder systems' contribution to achieving the goal of sustainable forest management. Based on this research, land access is fundamental for farmers around the forest. The state needs to give farmers access to land after their land is included in the national park area. Land tenure issues require policies that involve local, regional and national negotiations and participation, as well as the private sector and community organizations. Facilitating smallholder tree farming is a viable strategy to protect remaining forest resources and to enhance livelihood security by farm diversification, despite challenging local land use conditions

(Rahman et al., 2017b; Manurung et al., 2008).

Participation and negotiation with smallholders about the selected agroforestry strategy is important because crops that are economically viable and needed by the global market may not necessarily generate sufficient income for farmers. A study by Peluso & Purwanto (2018) found that teak forests only provide a small income for families, so the wives of farmers have to become migrant workers abroad. In Yogyakarta smallholder teak systems generate 40% of overall household income - 25% from agricultural production, 12% from teak, and 3% from other timber (Roshetko et al., 2013). There is a need to develop a more holistic and sustainable strategy to support and strengthen the development of smallholder agricultural systems and institutions. Furthermore, it is necessary to support a marketing system that emphasizes fair benefits for farmers.

National park policy makers need to shift management orientation from rigid technical traditions to 'adaptive' ecosystem management focusing on using current scientific and social information to inventory, plan, act and accumulate new information as an integral part of management that will improve decisions in the future (Maser, 1994). Thus the management of the national park area is expected to be acceptable to local residents and accommodate local knowledge and needs in its conservation strategy. Conservation areas are developed with residents by identifying and accounting for economic benefits that do not conflict with conservation objectives. Social characteristics, economic demographics and the culture of local populations are factors that need to be taken into account. Thus, it is necessary to involve actors who become more inclusive and prioritize the local population and their vulnerabilities.

5. CONCLUSIONS

Many studies have assessed that conservation policies since the colonial period, the new order through the reform order, eliminated local people's access to forests as a source of livelihood. Democratic reform encouraged residents to control land in conservation areas for their own needs, often agriculture. The policy of national park expansion affected many farmers, resulting in significant land cover change. Conclusions from the results and analysis of this study are below.

First, agricultural expansion has changed the landscape of the national park corridors. Legally, the government designated conservation in the corridor area to preserve the biodiversity of flora and fauna that connects the ecosystems of the GHNSP. In addition to overcoming deforestation, conservation in this area also represents the state's commitment to participate in reducing the impact of climate change through forest restoration. Unfortunately the conservation program has been inhibited by land conversion from forest to agricultural land.

Second, agricultural expansion by farmers occurred because they lost jobs or livelihood due to government policies restricting forestry company concessions in new conservation areas. Agricultural activities carried out by farmers in the context of power relations between the state and farmers encourage them to reclaim their right to livelihood and perceived traditional rights to the land. Farming activities in conservation areas are considered illegal. In this case, national park classified farmers as encroachers. National park officers dealt with the farmers based on several conditions, such as compassion for poor farmers who do not own land, on the basis of farmers' identity as residents, and social status in the community. Farmers have an attachment to land as an ancestral heritage that make them try to acquire and maintain it as an inherited asset.

Third, this agricultural expansion involves farmers who previously worked in forestry companies and migrants from outside the villages. Some farmers who

previously worked in logging and tree planting in forestry companies already have their own farming areas. In addition to planting timber trees, they often intercrop with food crops until the trees are large and shade reduces crop production, usually 2 to 3 years. The farmers developed farmland in the GHSNP area on the border of the villages. This process resulted in the concentration of agriculture expansion in the area of former forestry company concessions, specifically following the boundary between the national park and the village.

Fourth, the agricultural expansion strengthens the economic characteristics of rural agriculture. Socio-demographic characteristics of this region support the development of agriculture. Agriculture became the primary source of income for many farming households that involved the household members. Farmer households hope that the cultivated land in the area could become their property and then can be passed on to their descendants. Agriculture facilitated return migration and in-migration from outside. Most of migrant involved in family farming or other economic activities in the area, including 'land buying and selling' activities. Specifically, poor farmers have only been involved in agriculture as laborers and are now looking to secure agricultural land to meet their household needs. On the other hand, some farmers have capital to increase their agriculture production for commercial purposes and capital accumulation. They have been able to expand arable land, pay farm laborers and seek additional production capital.

Fifth, agricultural expansion has encouraged commercial farming that use non-organic, chemical based agricultural practices, that may have negative ecological impacts, including land degradation and environmental pollution. Similarly, agriculture conducted on steep land with inappropriate techniques risks causing erosion and landslides.

Sixth, the agricultural expansion that occurred in the national park area has challenged the management of the national park to find an appropriate conservation strategy that integrate an active role of smallholders in addition to paying attention to other actors who have been benefiting from the area. This study identified complex problems that are very useful in ascertaining key issues to be considered by forestry science and the forestry profession. Forestry science and the forestry profession need to think about forest management that is adaptive and responsive to rapid changes, especially local needs. The socio-demographic, economic and cultural characteristics need to be deliberated. We argue that those characteristics should be integrated with appropriate conservation programs to ensure success and sustainability.

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