Private forest transition in Gunungkidul village: reality, path, & drivers

R L Wicaksono1*, S A Awang2 and P Suryanto2
1Forest Management Study Program, Faculty of Agriculture, Universitas Sebelas Maret, Indonesia
2Faculty of Forestry, Universitas Gadjah Mada, Indonesia

*Corresponding author’s e-mail address: rezkywicaksono@staff.uns.ac.id

Abstract. For the past five decades, the state of private forest in the Gunungkidul district has exhibited an expansion after previously shrinking. This paper aims to provide an in-depth look into the process-dynamics of private forest transitions that occur as well as the pathways and drivers. Using content analysis and semi-structured interview methods this research is conducted in Jepitu Village, District of Gunungkidul. The transition of land use in Gunungkidul can be said as a form of private forest transition. This condition is evidenced by the increase in the area which is identical to the land-use system in the terminology of private forests. The process of private forest transition that took place in Gunungkidul occurred evolutionarily through certain stages. In general, the process of transitioning community forests in Gunungkidul follows three forest transition paths, namely: economic development, forest scarcity, and smallholders, tree-based land-use intensification pathways. Nevertheless, the process of transitioning private forests in Gunungkidul has several distinctive characteristics that require further study through a variety of perspectives.

1. Introduction
Private forest in Java-Madura Island for 18 years (1990-2008) indicatively showed an increase in the coverage area by 36% [1]. This condition contrasts with Indonesia's natural forest cover area which has contracted over the past six decades (1950-2015) by 42.77% with an annual rate of 24.31% [2]. The condition experienced by community forests is termed as Forest Transition (FT), which is an increase in forest cover area from conditions that previously experienced shrinkage in a relatively long period [3 - 5].

Gunungkidul is one of the districts in the Special Region of Yogyakarta (SRY) that experienced the Private Forest Transition (PFT). Compared with 3 (three) other regencies (Bantul, Kulon Progo, and Sleman) Gunungkidul experienced PFT with the highest percentage, which was 60.7% [1]. The transition process begins in a relatively long period. Beginning with a massive and structured process of deforestation in the 1800s, it coincided with the entry of the Netherlands into Java [6]. The process continued for the interests of agriculture and plantations [6], as well as the interests of war [7] to its peak in the period 1940 to 1950 which was marked by Gunungkidul's dry, arid, barren condition and poor [8]. This condition slowly underwent a transition process that began in the early 1970s until today Gunungkidul is no longer known as a barren and arid region but a verdant area with plants and trees [9].

Studies on forest transition have been carried out relatively much like the study of the development of forest transition theories by Barbier et al. [10], a comparison of the mechanisms of forest transition in several Asia Pacific countries [11] and direct and underlying causes the forest transition in India [12].
Nevertheless, studies on the forest transition in Indonesia, particularly at the sub-national level, are still relatively limited. Mather and Needle [3] state that it is essential to identify the causes of the transition as an important turning point in the history of the global environment amid concerns about the trend of forest degradation in developing countries. Specifically, in a smaller scope, the current transition of private forest is expected to be relevant and valuable learning amid the state of forests that are experiencing shrinkage (deforestation). Thus, this paper aims to provide an in-depth look into the process-dynamics of PFT that occur as well as the pathways and drivers. The second part describes the method used. Third, is about results and discussion. The section describes the real conditions of the private forest transition in Gunungkidul explicitly. Moreover, finally, the fourth section is the conclusion.

2. Materials and methods
This study employed several methods to ensure high validity and reliability of data, namely: content analysis and semi-structured interviews. Content analysis is an approach to obtain replicable and valid inferences from texts/documents [13]. This study used several documents as well as scientific literature (such as journals, books, proceedings, thesis/dissertation) and official documents are related particularly from the Ministry of Environment and Forestry (MoEF) at the national and sub-national levels. This approach combined with primary data and information gathered through semi-structured interviews to explore and look into the process-dynamics of PFT that occur as well as the pathways and the drivers. These data are collected using a purposive & snowball sampling technique. Then, the data are analyzed using a qualitative analysis of the interactive model developed by Miles & Huberman [14] [15]. The research conducted in Jepitu Village, Gunungkidul district.

3. Results and discussion

3.1. Reality conditions of private forest transition in Gunungkidul
Gunungkidul is the largest district in DIY, which covers 46.63% (1485.36 km2) of the entire province [16]. Based on the condition of the topography, Gunungkidul Regency divided into three development zones, namely: 1) North Zone (Batur Agung), 2) Central Zone (Ledok Wonosari), and 3) South Zone (Pegunungan Seribu) (Kabupaten Gunungkidul, 2015) [17]. As the largest district in DIY, Gunungkidul has superior potential in the forestry sector. BPS DIY [16] states that the total forest area (State forest and community forest) in Gunungkidul as a whole is 59,006.37 ha (60.82%) with the area of community forest specifically is 44,110.87 ha (56.33%). This condition is different from before, especially in the 1950/60 period. Gunungkidul during that period experienced a famine (paceklik) that was marked by the occurrence of severe mass hunger [18] (nutritional oedema) which resulting in epidemic outbreaks of malnutrition (nutritional edema) [19][20] to cause fatalities [21][22]. Dryness and attack by mice exacerbating the condition [23]. Nibbering [7] poverty, hunger, and bare (treeless) landscapes that are vulnerable to erosion are synonymous with Gunungkidul. Furthermore, Awang et al. [24] described that the condition of the land at that time was in the form of a critical land of rock with grass or bush vegetation and rarely found trees. Unsustainable land use is the cause of this condition. Nibbering [23] described that land use in that period, especially in the South Zone (Gunung Seribu) was identical to the expansion of food / agricultural cultivation from the valley to the hillsides to meet daily and market consumption. Expansion of food crops/agriculture is one of the causes of reduced or even loss of timber plants (trees) other than the use of wood (trees) for charcoal and materials for making terraces [23].

The reforestation program of critical land led by the central government in the 1970s [25][26] was a significant momentum for the development of private forests in Gunungkidul. The program is carried out on critical lands with steep slopes, abandoned land, and area that has water springs. The main objectives of the program are to improve productivity of degraded land, soil & water conservation, provide wood for building materials, household utensils and firewood [25][27]. Although the program began with the TOP-Down approach by the central government, the community and government at the sub-national (district) level responded well. The form of response and support is local policymaking that requires communities to plant teak in schools (Wiyata Jati Rules) & on land owned by couples who will marry (Polokromo Jati Rules), financial / financing incentives, community & institutional empowerment.
[25], and strong intrinsic motivation from the community to reforest Gunungkidul. Intrinsic motivation then becomes hereditary learning and forms an awareness for the community to preserve and develop private forests [28].

Quantitatively, the success of the community forest development program in Gunungkidul assessed from the process of private forest transition that took place from the beginning of the 70s to the present.

The picture above is a visualization of increased vegetation land cover in Gunungkidul for five decades (1970-2010) qualitatively. Although Wardhana et al. [9] stated that the visualization had not directly demonstrated the relation of adding the tree/wood vegetation area significantly, it could be said that during this period there had been a change in the form of land cover from previously rocky to vegetated. Therefore, to interpret and prove the existence of private forest transition, it is necessary to clarify the definition of private forests, including the distribution of land-use systems and their vegetation composition. Awang et al. [29] define private forests as forests that are on private land and are managed to be used to improve the quality of life, as family savings, sources of income while protecting the environment. In general, the system of community forest land use consists of the home garden (pekarangan), dry land/bush (tegalan), and forestland (alas or wono) [30]. Hinrichs et al. [31] explained that the home garden is a land-use around the house planted with food crops, vegetables, fruit trees and timber plants that function to meet the daily needs of farmer households. Furthermore, dry land (tegalan) is an area located far from houses planted with food crops, woody plants, and wood fuel with specific agroforestry patterns. While the forestland (alas /wono) is a form of the use of an area far from home (usually in steep and infertile hilly areas) and is intended specifically for planting wood.

Wardhana et al. [9] detail the visualization of the change (transition) of land use by dividing it into seven types (see table 1). Transition rates in all forms of land use show positive values. This condition shows that in five decades there has been an increase in the number of areas that have undergone a transition from previously rock-landed to other forms of land use. The transition from rocky land-bush/shrub, rocky land-dryland agriculture, rocky land-plantation forest, and rocky land-mixed forest mainly indicates the transition of land to timber vegetation [9]. In line with this, BPKH XI [1] stated that in the period 1990-2008 there was an increase in the potential of timber of community forests in Gunungkidul by 60.7% (from 188,992.37 to 303,708.85 m$^3$).

### Table 1. The dynamics of land use transition in Gunungkidul during the 1970s - 2012

| Types of Transition                      | 1972-1980 | 1980-1990 | 1990-2000 | 2000-2012 | Average |
|-----------------------------------------|-----------|-----------|-----------|-----------|---------|
| Rocky Land-Bush/Shrub (RL-B/S)          | 1.01%     | 8.16%     | 4.50%     | 3.90%     | 4.39%   |
| Rocky Land-Mixed Forest (RL-MF)         | 0.10%     | 0.10%     | 0%        | 0.20%     | 0.10%   |
| Rocky Land-Plantation Forest (RL-PF)    | 4.80%     | 0%        | 2%        | 4.90%     | 2.93%   |
| Rocky Land-Dryland Paddy Fields (RL-DPF)| 0.90%     | 5.20%     | 6.40%     | 8.90%     | 5.35%   |
| Rocky Land-Dryland Agriculture (RL-DA)  | 2.30%     | 15.20%    | 13.20%    | 14.90%    | 11.40%  |
| Rocky Land-Settlement (RL-S)            | 2.60%     | 1.40%     | 0.50%     | 0.10%     | 1.15%   |
| Rocky Land-Irrigated Paddy Fields (RL-IPF)| 0.30%     | 0%        | 0.50%     | 0.70%     | 0.38%   |

Source: Wardhana et al [9]
Pegunungan Seribu is one of the zones that has experienced the transition of private forests in Gunungkidul. The zone that was once described by Nibbering, [7][23] as arid and treeless is currently a zone with the largest area of community forest (> 50%) in Yogyakarta [32]. Correctly, a portrait of the private forests transition of in the Pegunungan Seribu Zone can be observed in Jepitu Village, Girisobo District. The total area of private forest and dry land in Jepitu Village sequentially is 461.8 ha, and 153.108 ha [33]. The average arable land area of the community forest in this village is 1.53 ha/head of the family [34]. The observation shows that community forest land use in Jepitu is done with an agroforestry system in which the composition of the plant consists of a mixture of food crops (such as corn, cassava, rice, peanuts, vegetables), animal feed (grass), and woody plants (teak), mahogany, Jabon). In dryland areas in the valley, the composition of the plants is a mixture of food crops, fodder, and trees with an agroforestry border tree planting/box system. While in the hills, the form of land use is alas / wono (forested) which is dominated by woody plants with random patterns. In general, the transition of community forests that occur in Jepitu is to shift the function of land in the hills from the majority used for food crops to the majority of woody plants and planting woody plants on dry land. The description, aside from the results of observations, was also reinforced by the statement of the farmers, as well as the head of the farmer group, that “…the hill (formerly) was only (specifically) planted with corn and cassava. There is no wood yet”.

3.2. Drivers and pathways of private forest transition in Gunungkidul

The transition of the Gunungkidul Community Forest occurred evolutionarily. Rahardjo [35] and Soekanto [36] define evolution as a change that requires relatively slow time and is followed by a series of small changes. In the 1950s until now the transition of Gunungkidul people's forest can be divided into 4 phases (see table 2), namely: 1) Critical Period, 2) Intensive Planting, 3) Pre-Industrialization of community timber, and 4) Industrialization of community timber.

| Period                       | Time                  | Main Point                                                                 |
|------------------------------|-----------------------|-----------------------------------------------------------------------------|
| Critical                     | End of the 50's decade until the end of the 60's decade | Food shortages are one of them caused by mismanagement of land by farmers. This activity resulted in increasingly critical land conditions and decreased productivity. The culmination of this event was the outbreak of malnutrition/Honger Oedeem (HO) |
| Intensive Planting           | Beginning of the 70's decade until the end of the 80's decade | Intensive planting of perennials has been carried out through government programs such as reforestation. |
| Pre Industrialization of community timber | The beginning of the 90's decade until the beginning of the 2000s | Beginning with the rise of community timber trading activities. |
| Industrialization of community timber | Early 2000s to now | ● Community timber trade activities are increasing  
● Start of building collective community forest management (community-based) |

The crisis phase describes environmental conditions and the lives of people who experience adversity. The environmental conditions in Gunungkidul in general, especially in the Pegunungan Seribu Zone, experienced severe degradation. The soil erodes quickly to reach serious conditions [19][20]. Agricultural extensification that does not consider aspects of sustainability is the cause of land degradation in Gunungkidul [7][23][24]. From 1920 to 1954, the harvested area of crops increased by 265% (from 37,500 ha to 137,000 ha) [7]. Specifically, in the Zone of Pegunungan Seribu, agricultural / food crops are not only limited to cultivated in the valley but have expanded to the hills (see figure 2). Woody plants drastically decreased not only because of the expansion of crops but also for charcoal [7][23]. The land degradation that occurred exacerbated by the prolonged dry season and the outbreak...
of rats with proportions that had never been experienced before. This condition destroys food crops/agriculture and consumes existing food stocks. Poor farmers are forced to choose to sell livestock, land, and even their homes. A large number of people migrate out by participating in government-run transmigration programs to seek better livelihoods [37].

Figure 2. Expansion of Agriculture Cultivation in Zone of Pegunungan Seribu, Gunungkidul. Source: (Nibbering, [37]).

The second phase is Intensive planting. This phase was marked by a greening program organized by the government, which became one of the important momentum for the development of private forests in Gunungkidul. This program is generally intended to improve critical environmental conditions. This program is recognized as one of the most successful rehabilitation programs. Even the development can be seen today. Nawir et al. [25] mentioned that the factors driving the success of the program were: 1) damage to the biophysical conditions and the culture of hard work of the community, 2) support from leaders (formal & informal) and proportional local government policy interventions in line with local initiatives, 3) structure institutions that are appropriate and desirable by stakeholder awareness to prioritize group interests over individual interests, 4) the existence of sustainable funds for carrying out activities, 5) recognition and accommodation of local needs and culture, and 6) permanent income from the local community.

The third phase is the Pre Industrialization of community timber. The main point of this phase is the beginning of the proliferation of private forest timber trade activities as an entry point for community timber to fulfill the supply-demand of the timber industry. In this period farmers in Gunungkidul began to be able to feel the benefits of timber planted in the previous phase, especially for their own needs such as home improvement, and furniture [34]. At the same time, the condition of natural forests in Indonesia has decreased in terms of quantity and quality. The Data in Tsujino et al. [2] states that in the 1990-2000 period, Indonesia's natural forest cover area decreased by 11.2% (from 111.1 Mha-98.7 Mha). A similar condition was experienced by The Javanese State Forest Company (Perum Perhutani) where there was a drastic decline in timber log production in seven years (2000-2007) from 1.5 million m$^3$ to 48,000 m$^3$ [38]. These conditions make it difficult for the industry to obtain wood raw materials from natural forests and plantations so that the existence of private forest wood is considered to meet the imbalance in supply-demand of the timber industry. The momentum specifically happened in Jepitu Village, wherein that period even though it was still relatively limited, community forest wood began to be sought by traders. "... even then (timber traders) are not as crowded as they are now, there are only 1-2".

The fourth phase is the industrialization of community timber. The main differentiator of this phase compared to the third phase is the increasing marketing of community forest wood and the existence of collective community forest management units. The sale of timber from community forests in Gunungkidul is dominated by logs, where two-thirds of the logs are traded outside the district (Jepara, Klaten, Bantul & Sleman) while the rest is for local needs [32]. The same thing was expressed by informants (timber traders) in Jepitu that "... in the 2000s until now most people (traders) outside entered. A lot, (from) Jepara, Klaten. Here (Jepitu) they buy logs and take home. The most from Klaten ". In
addition, the rampant industrialization of community timber in Gunungkidul can be seen from the quantity of potential of small-scale wood-based industries including the sawmill industry which numbered 3,464 units and 31 in total, compared to other districts in Yogyakarta [39]. Furthermore, this phase was marked by the existence of collective forest management units. Specifically, in Gunungkidul the establishment of community forest management units was initiated by academics (Faculty of Forestry UGM) and Local NGOs (ARuPa & SHOREA) in 2004 [32][40]. The program was initiated in three villages (Kedung Keris, Dengok, and Giri Sekar), each of which represented three zones in Gunungkidul [32]. In 2006 a local farmer’s cooperative association was formed called Koperasi Wana Manunggal Lestari (KWML) to accommodate all community forest farmers from the three villages. In the same year, KWML obtained the LEI-SCBFM certificate [32][39][40]. The total area of private forest certified under the management of KWML is 815.18 ha consisting of 184.3 ha in Kedung Keris Village, 229.1 ha in Dengok Village, and 401.8 ha in Giri Sekar Village [40]. Furthermore, in 2011, KWML obtained a Timber Legality Verification (VLK) certificate with an area of 594.15 ha [32].

There are several theories that explain the causes of forest transitions. Rudel et al. [41] divided the causes of the forest transition into two main path, namely economic development path and forest scarcity path. Economic development path explains the transition of the forest due to the decline in the number of agricultural sector workers who have shifted to other sectors to get a better income, including gaps in rural and urban economic growth which have led to a high flow of urbanization to cities. In addition to having an impact on decreasing land productivity, it also increases in the wages of the remaining agricultural workers and makes agricultural business increasingly unprofitable. This condition makes farmers tend to leave the land far away to become forested land. Then is the forest scarcity path. The path explains that the high rate of deforestation results in a scarcity of forest products, which then triggers an increase in prices. The land owner's response to this condition is to plant his land with tree crops. The government accelerated this condition through a program of reforestation of marginal land to minimize the negative impact of deforestation as well as the response to rising prices of forest commodities.

Lambin & Meyfroidt [42] developed the theory of forest transition into five paths, namely by adding state forest policy pathway, globalization pathway, smallholder, tree-based land-use intensification pathway, also, forest scarcity pathway, economic development pathway previously described. The state forest policy pathway explains that national / government policies play an important role in the transition of forests. The path of forest scarcity partly drove the policy. Nevertheless this path is different from that path because often land use policy changes are triggered by factors outside the forestry sector such as the emergence of ecocentric awareness, alternative tourism-based economy, development of environmentally friendly national image for investment purposes, integration of marginal groups around the forest, including the interests of State control over remote areas. Then is the globalization pathway. This pathway is an extension of the path of economic development but focuses more on the globalization process that affects the occurrence of forest transitions. The process includes the embodiment of international conservation ideologies at the local level, neo-liberal reforms, the growth of tourism trends, and migration (livelihood diversification strategies) in which the integration of the whole process triggers a forest transition [43]. Finally, smallholder, tree-based land-use intensification pathway. Hecht et al. [44] stated that forest transitions, especially in marginal areas dominated by small-scale agriculture, can be associated with the expansion of "anthropogenic forests" in the form of timber gardens, agroforestry, orchards, yards/gardens, planting valuable species for land circulation, as well as secondary succession of grasslands forming a matrix of natural forest fragments. This path is different from the path of forest scarcity and economic growth, which is explained by Rudel et al. [41]. In this pathway, the forest transition is caused more by the motivation of the land management farmers “to decrease their vulnerability to economic or environmental shocks and guarantee their livelihood through ecological and economic diversification”, which efforts are carried out through an agricultural intensification and innovation approach [42].

Generally, the transition of community forests in Gunungkidul can be said to follow the general pattern offered by Lambin & Meyfroidt [42], and Rudel et al. [41] especially economic development, forest scarcity, and smallholders, tree-based land use intensification pathway. However, in the context of Gunungkidul in general, especially in Jepitu Village, the economic pathway begins with a phase of crisis
that triggers circular (temporary) and permanent migration (transmigration programs) which results in a reduced population including workers in the agricultural sector. Although over time the number of workers in the agricultural sector has decreased due to changes in the type of work chosen by today's young generation. The same thing was expressed by the informant that "now if only being a farmer, it is not enough to (finance) everyday life. Not to mention if you only have a little land, there must be a side job (other) ". Furthermore, there is little difference between the process of transitioning the Gunungkidul people's forest to the forest scarcity pathway. A relatively significant difference is in the initial conditions that motivate farmers to plant their land with perennials and that underlies the government's support to initiate reforestation programs. In the context of Gunungkidul specifically Jepitu the initial motivation underlying the community and the government to green the land with woody plants is to improve the quality of degraded land. The government, especially the community at that time did not make the high price of timber as the main motivation for planting timber in the land. In addition to that period, community timber has not been sought by the industry (not yet the massive national timber industry, and the high potential of Indonesia's natural forests), the people themselves still consider the wood to be worthless (not sold). The perspective was proven by the informant's statement that "the cattle used to be sold, for wood there was no price (worthless)". Although at present, the awareness of the Gunungkidul farmers community to cultivate their land with woody plants is increasing, one of them is because the economic benefits of community timber are getting higher as previously explained. Finally, it can be said that the transition of community forests in Gunungkidul follows smallholders, tree-based land use intensification pathways. Specifically, this is evidenced by the term “tebang butuh” which describes the limited use of timber to meet basic needs of the community that are urgent (death, illness, marriage, schooling children to a higher level) and require large amounts of money. In addition, how much the role of the Gunungkidul community forest can be seen from its contribution to farmers' income. Specifically, Oktalina et al. [34] stated that community forests in Desa Jepitu contribute to farmers' income by 40.52% of total income.

4. Conclusion
The transition of land use in Gunungkidul can be said as a form of private forest transition. This condition evidenced by the increase in the area which is identical to the land-use system in the terminology of private forests. The process of private forest transition that took place in Gunungkidul occurred evolutionarily through certain stages. The process is based on the interaction of various aspects that form interrelated patterns of private forest transition. In general, the process of transitioning community forests in Gunungkidul follows three forest transition paths, namely: economic development, forest scarcity, and smallholders, tree-based land-use intensification pathway. Nevertheless, the process of transitioning private forests in Gunungkidul has several distinctive characteristics. These characteristics require further study through a variety of perspectives, so that the essence of the transition to the Gunungkidul people's forest can be an essential lesson for the success of ecosystem recovery from the condition that is extraordinarily damaged.

References
[1] BPKH XI. (2009). Potensi Kayu dan Karbon: Hutan Rakyat di Pulau Jawa Tahun 1990-2008. Yogyakarta.
[2] Tsujino, R., Yumoto, T., Kitamura, S., Djamaluddin, I., & Darnaedi, D. (2016). History of forest loss and degradation in Indonesia. Land Use Policy, 57, 335–347. https://doi.org/10.1016/j.landusepol.2016.05.034
[3] A. S. Mather and C. L. Needle. (1998). The forest transition: a theoretical basis. Area, 30(2), 117–124.
[4] Mather, A. S. (1992). The Forest Transition. Area, 24(4), 367–379.
[5] Mather, A. S., Fairbairn, J., & C.L. Needle. (1999). The course and drivers of the forest transition: The case of France. Journal of Rural Studies, 15(1), 65–90.
[6] Whitten, T., Soeriaatmadja, R. E. & Affif, S. A. (1996). The ecology of Java and Bali (volume II). Periplus Editions, (HK) Ltd.
[7] Nibbering, J. W. (1991). *Hoeing in the Hills: Stress and Resilience in an upland farming system in Java*. The Australian National University.

[8] Sunkar, A. (2008). *Sustainability In Karst Resources Management: The Case Of The Gunung Sewu In Java*. The University of Auckland.

[9] Wardhana, W., Sartohadi, J., Rahayu, L., & Kurniawan, A. (2012). Analisis Transisi Lahan di Kabupaten Gunung Kidul dengan Citra Penginderaan Jauh Multi Temporal. *Jurnal Ilmu Kehutanan*, 1(2), 89–101. [https://doi.org/10.1111/gcb.13051](https://doi.org/10.1111/gcb.13051)

[10] Barbier, E. B., Burgess, J. C., & Grainger, A. (2010). The forest transition: Towards a more comprehensive theoretical framework. *Land Use Policy*, 27(2), 98–107. [https://doi.org/10.1016/j.landusepol.2009.02.001](https://doi.org/10.1016/j.landusepol.2009.02.001)

[11] Liu, J., Liang, M., Li, L., Long, H., & De Jong, W. (2017). Comparative study of the forest transition pathways of nine Asia-Pacific countries. *Forest Policy and Economics*, 76, 25–34. [https://doi.org/10.1016/j.forpol.2016.03.007](https://doi.org/10.1016/j.forpol.2016.03.007)

[12] Singh, M. P., Bhojvaid, P. P., de Jong, W., Ashraf, J., & Reddy, S. R. (2017). Forest transition and socio-economic development in India and their implications for forest transition theory. *Forest Policy and Economics*, 76, 65–71. [https://doi.org/10.1016/j.forpol.2015.10.013](https://doi.org/10.1016/j.forpol.2015.10.013)

[13] Krippendorff, K. (2004). Content Analysis. An Introduction to Its Methodology. *SAGE Publications*.

[14] Miles, M. , & Huberman, A. M. (1984). *Qualitative Data Analysis: A Sourcebook of New Methods*. Newbury Park, CA: SAGE publications.

[15] Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook* (2nd ed.). Newbury Park, CA: SAGE publications.

[16] Badan Pusat Statistik Provinsi D.I. Yogyakarta. (2017). *Provinsi Daerah Istimewa Yogyakarta dalam Angka 2017*. [https://doi.org/10.1159/000159850](https://doi.org/10.1159/000159850)

[17] Gunungkidul, K. (2015). Kondisi Umum Kabupaten Gunungkidul. Retrieved July 16, 2019, from [https://gunungkidulkab.go.id/D-74db63a914e6fb0f445120c6f4a4e6a-NR-100-0.html](https://gunungkidulkab.go.id/D-74db63a914e6fb0f445120c6f4a4e6a-NR-100-0.html)

[18] Selosoemardjan. (1962). *Social changes in Jogjakarta*. Ithaca, New York: Cornell University Press.

[19] Bailey, K. V. (1961). Rural nutritional studies in Indonesia: 1. Background to nutritional problems in the cassava areas; 2. Clinical studies of hunger oedema in the cassava areas; 3. Epidemiology of hunger oedema in the cassava areas; 4. Oedema in lactating women in the cassa. *Tropical and Geographical Medicine*, 13, 216–233; 234–254; 289–302; 303–315.

[20] Timmer, M. (1961). *Child mortality and population pressure in the D.I. Jogjakarta, Java, Indonesia*. Vrije Universiteit Amsterdam.

[21] Budi S.J, S. (2005). *Ingat(!)an: Hikmat Indonesia Masa Kini, Hikmah Masa Lalu Rakyat*. Yogyakarta: Kanisius.

[22] Darmaningtyas. (2002). *Pulung Gantung Menyingkap Tragedi Bunuh Diri di Gunungkidul*. Yogyakarta: Salwa Press.

[23] Nibbering, J. W. (1993). *Rats and Droughts: Stability in a Changing Upland Farming System in Java*. *Asian Geographer*, 12(1–2), 19–32. [https://doi.org/10.1080/10225706.1993.968398](https://doi.org/10.1080/10225706.1993.968398)

[24] Awang, San A., Santosa, H., & Widayanti, W.T., Nugroho, Y., K. S. (2001). *Gurat Hutan Rakyat di Kapur Selatan*. Yogyakarta: Debut Press.

[25] Nawir, A. A., Murniati, & Rumboko, L. (2008). *Rehabilitasi hutan di Indonesia*. Center for International Forestry Research (CIFOR). Retrieved from [http://www.cifor.org/publications/pdf_files/books/BNawir0801Ina.pdf](http://www.cifor.org/publications/pdf_files/books/BNawir0801Ina.pdf)

[26] Nawiyanto. (2014). Gerakan Lingkungan Di Jawa Masa Kolonial. *Paramita: Historical Studies Journal*, 24(1), 51–72. [https://doi.org/10.15294/paramita.v24i1.2862](https://doi.org/10.15294/paramita.v24i1.2862)

[27] Suprapto, E. (2010). *Hutan Rakyat: Aspek Produksi, Ekologi, dan Kelembagaan*. Jakarta, Indonesia.

[28] Yumi, Y., Sumardjo, S., S. Gani, D., & Ginting Sugihen, B. (2016). MODEL PENGEMBANGAN PEMBELAJARAN PETANI DALAM PENGELOLAAN HUTAN RAKYAT LESTARI: Kasus Di Kabupaten Gunung Kidul, Provinsi Daerah Istimewa Yogyakarta dan Kabupaten Wonogiri, Provinsi Jawa Tengah. *Jurnal Penelitian Sosial Dan Ekonomi*.
Kehutanan, 8(3), 196–210. https://doi.org/10.20886/jsek.2011.8.3.196-210

[29] Awang, San Afri, Andayani, W., Himmah, B., Widayanti, W. T., & Affianto, A. (2002). Hutan Rakyat: Sosial Ekonomi dan Pemasaran. Yogyakarta, Indonesia: BPFE.

[30] Awang, S.A., Wiyono, E. B., & Sadiyo, S. (2007). Unit Manajemen Hutan Rakyat: Proses Konstruksi Pengetahuan Lokal. Yogyakarta, Indonesia: Banyumili Art Network.

[31] Hinrichs, A., Muhtaman, D. R., Irianto, N., Hinrichs, A., Muhtaman, D. R., & Irianto, N. (2008). Forest Certification on Community Land in Indonesia. Jakarta, Indonesia: Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).

[32] Bakhtiar, I., Santoso, H., Sudarwan, Novianto, E., Sanyoto, R., & Zaki, A. (2014). Weaving the dreams from the teak logs: Lessons from the community forest enterprise of Wana Manunggal Lestari Gunungkidul-Yogyakarta. Yogyakarta, Indonesia.

[33] Desa Jepitu. (2014). Monografi Desa Jepitu. Yogyakarta, Indonesia.

[34] Oktalina, S. N., Awang, S. A., Suryanto, P., & Hartono, S. (2015). Strategi Petani Hutan Rakyat Dan Kontribusinya Terhadap Penghidupan Di Kabupaten Gunungkidul. Jurnal Kawistara, 5(3), 298–309. https://doi.org/10.22146/kawistara.10058

[35] Rahardjo. (1999). Pengantar Sosiologi Pedesaan dan Pertanian. Yogyakarta, Indonesia: UGM Press.

[36] Soekanto, S. (1992). Sosiologi Suatu Pengantar (IV). Jakarta, Indonesia: Rajawali Press.

[37] Nibbering, J. W. (1999). Tree planting on deforested farmlands, Sewu Hills, Java, Indonesia: Impact of economic and institutional changes. Agroforestry Systems, 46(1), 65–82. https://doi.org/10.1023/A:1006202911928

[38] Fujiwara, Takahiro, Awang, S. A., Widayanti, W. T., Septiana, R. M., Hyakumura, K., & Sato, N. (2017). Socioeconomic Conditions Affecting Smallholder Timber Management in Gunungkidul District, Yogyakarta Special Region, Indonesia. Small-Scale Forestry, 17(1), 41–56. https://doi.org/10.1007/s11842-017-9374-1

[39] Listyanto, T., & Yuwono, T. (2017). Analisis Daya Saing Industri Kecil dan Menengah Berbasis Bahan Baku Hutan Rakyat dalam Menghadapi Era Sertifikasi: Studi Kasus di Yogyakarta dan Jepara. In A. Maryudi & A. A. Nawir (Eds.), HUTAN RAKYAT DI SIMPANG JALAN (I, pp. 151–187). Yogyakarta, Indonesia: UGM Press.

[40] Fujiwara, T., Awang, S. A., Widayanti, W. T., Septiana, R. M., Hyakumura, K., & Sato, N. (2015). Effects of national community-based forest certification on forest management and timber marketing: a case study of Gunung Kidul, Yogyakarta, Indonesia. International Forestry Review, 17(4), 448–460. https://doi.org/10.1505/146554815817476422

[41] Rudel, T. K., Coomes, O. T., Moran, E., Achard, F., Angelsen, A., Xu, J., & Lambin, E. (2005). Forest transitions: Towards a global understanding of land use change. Global Environmental Change, 15(1), 23–31. https://doi.org/10.1016/j.gloenvcha.2004.11.001

[42] Lambin, E. F., & Meyfroidt, P. (2010). Land use transitions: Socio-ecological feedback versus socio-economic change. Land Use Policy, 27(2), 108–118. https://doi.org/10.1016/j.landusepol.2009.09.003

[43] Kull, C. A., Ibrahim, C. K., & Meredith, T. C. (2007). Tropical forest transitions and globalization: Neo-liberalism, migration, tourism, and international conservation agendas. Society and Natural Resources, 20(8), 723–737. https://doi.org/10.1080/08941920701329702

[44] Hecht, S. B., Kandel, S., Gomes, I., Cuellar, N., & Rosa, H. (2006). Globalization, forest resurgence, and environmental politics in El Salvador. World Development, 34(2), 308–323. https://doi.org/10.1016/j.worlddev.2005.09.005