



Eroding battlefields: Land degradation in Java reconsidered



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ABSTRACT

Land degradation has been a major political issue in Java for decades. Its causes have generally been framed by narratives focussing on farmers' unsustainable cultivation practices. This paper causally links land degradation with struggles over natural resources in Central Java. It presents a case study that was part of a research project combining remote sensing and political ecology to explore land use/cover change and its drivers in the catchment of the Segara Anakan lagoon. Historically rooted land conflicts have turned the land into a political battlefield, with soil erosion being the direct outcome of the political struggles. Starting from an analysis of environmental changes using satellite images and historical maps, the research explored a history of violent displacements in the frame of a series of brutal insurgencies and counterinsurgencies in the 1950/60s. In these struggles over national political power, entire villages were erased, and peasants' land was appropriated by the state. This political history is 'inscribed' in today's landscape. The contested land comprises some of the most erosion-prone sites in the entire catchment of the lagoon. The landscape of erosion is a landscape of conflict and a symbol of historical violence and injustice. In line with our research in other parts of the catchment, the case study presented here challenges dominant political discourses about the nature of upland degradation in Java. It provides insight into still unresolved and underexplored chapters of Indonesian history and presents a strong plea for combining land use change science and (historical) political ecology.

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Introduction

Since Blaikie and Brookfield's calls to explore the political-economic forces that shape resource use decisions and land use patterns (Blaikie, 1985; Blaikie and Brookfield, 1987), political ecologists have greatly contributed to a better understanding of the nature of land degradation. Linking environmental conditions and changes with political, social and economic structures, power relations, and patterns of resource access and control, they have questioned partly long-standing narratives about the causes of land and other kinds of environmental degradation (see, for example, Batterbury et al., 1997; Brookfield, 1999; Forsyth, 1996; Forsyth and Walker, 2008; Ives and Messerli, 1989; Klein, 2002; Leach and Mearns, 1994; Preston et al., 1997). In many cases, they have challenged neo-Malthusian explanations, focussing on population pressure, and the one-sided blaming of farmers' cultivation practices for environmental degradation as simplistic political narratives or 'environmental orthodoxies' (Forsyth, 2003, Leach and Mearns, 1994).

In Java, one of the global hotspots of erosion and sedimentation, simplistic narratives continue to dominate societal discourses about upland degradation, river water flows and coastal sedimentation. After decades of political interventions aimed at reducing soil erosion in the island's uplands, and more than a quarter century after Blaikie and Brookfield's (1987) 'Land Degradation and Society', population densities and upland farmers' allegedly unsustainable cultivation practices (cf. Sutadipradja and Hardjowitjito, 1984) still dominate related discussions in state authorities and universities. These narratives are linked to neo-Malthusian environmental discourses and political interests. By distracting attention from exploring other causal factors of upland degradation and coastal sedimentation, i.e. by narrowing research agendas, these framings have been self-perpetuating. Also the lack of intersection between scientific communities, such as soil and land use change scientists and political ecologists, has contributed to the persistence of the misleading narratives.

In this context, research building on methods from different disciplines can be particularly fruitful. The case study presented here was part of a larger research endeavour that combined remote sensing, land use/cover mapping and historical cartography with social-scientific inquiry to explore land use and land cover changes (LUCC) and their drivers in the catchment area of the Segara Anakan lagoon, which is situated on Java's south coast. The case

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study establishes clear and direct causal links between struggles over natural resources and land degradation. It challenges established narratives about the drivers of upland degradation and makes a strong case for a historical political ecology (cf. Davis, 2009). Departing from an analysis of LUCC, the research unravelled historically rooted struggles over land that have literally turned it into a political battlefield, with soil erosion being the outcome of the political struggle. Bare, erosion prone slopes are the immediate result of ongoing struggles over land. Documenting the intricate historical roots of the land conflict, the research provides insight into local dynamics of the unresolved and little documented violent history of Indonesia in the 1950/60s. A series of insurgencies and counter-insurgencies related to the Dar'ul Islam rebellion and the anti-communist massacres during these two decades not only produced political forests cleared of people (cf. Peluso and Vandergeest, 2011, Vandergeest and Peluso, 2011), but in the long run created conflicts resulting in erosion-prone slopes cleared of trees. Following a brief review of related literature and an outline of the methodological approach used, the paper reveals the landscape of erosion as a landscape of conflict and a symbol of unresolved historical violence and injustice.

Soil erosion in Java's uplands: fragmented knowledge

Java, partly as a result of natural processes, exhibits some of the highest erosion and sediment yields worldwide (Walling and Webb, 1996) and has for decades been a hotspot of political interventions aimed at reducing soil erosion. The expansion of certain forms of agriculture has undoubtedly contributed to massively increased erosion rates in parts of the island (Dijk et al., 2004, Donner, 1987, Nibbering and Graaff, 1998, Palte, 1989, Purwanto, 1999). One of the most prominent examples is the highly profitable but ecologically destructive potato cultivation on the Dieng Plateau (cf. Lavigne and Gunnell, 2006, Rudiarto and Doppler, 2013). However, in other parts of Java, one-sided blaming of farmers' cultivation practices is not substantiated by empirical evidence. It has rather distracted attention from numerous other drivers of accelerated erosion and sedimentation (cf. Diemont et al., 1991, Schweithelm, 1989), and is partly a political strategy that has for many decades served as justification for the exclusive management of state forest territories by the state forest company and for keeping people out of these forests (cf. Galudra and Sirait, 2006, Lukas, 2013, Peluso, 1992).

The widespread neglect of contested state forest territories and of the roles of socio-political structures and processes, including questions of resource access and control, in soil and LUCC studies has contributed to the persistence of these narratives. In line with the framing of upland degradation as a result of population pressure and unsustainable farming practices, and partly embedded in related political interventions, most research on soil degradation and mitigation strategies in Java has focussed on farmers' agricultural plots (e.g. Dijk et al., 2004, Palte, 1989, Purwanto, 1999), while excluding disputed state forests from analysis (for an exception see Savitri, 2006); and LUCC studies may include demographic dynamics as explanatory variable but exclude land tenure (e.g. Verburg et al., 1999). Outstanding in terms of linking LUCC analysis and societal dynamics is the research conducted by Lavigne and Gunnell (2006), which focussed on Java's montane forests and volcanoes. But the scope of the few LUC(C)² analyses that have been conducted in the catchment area of the Segara Anakan lagoon (Astisiasari, 2008, Prasetyo, 2004), one of Java's hotspots of soil conservation efforts, was confined to remote sensing techniques

without adequate ground truthing and did not include any empirical analysis of the causes of land use and land cover patterns and changes.

Struggles over resources 'inscribed' in physical landscapes – linking land use change science and political ecology

In addition to politically confined research foci, lack of intersection between scientific communities, such as soil and LUC(C) scientists and political ecologists, may contribute to the persistence of environmental narratives (cf. Turner, 2003). Though LUC(C) science and political ecology share much common ground (Turner and Robbins, 2008) and have been fruitfully combined in other parts of the world (e.g. Elliott and Campbell, 2002, McCusker and Ramudzuli, 2007), their problem framings and analytical approaches may differ considerably (Turner and Robbins, 2008). While LUC(C) and soil science may not (sufficiently) incorporate aspects like (historical) socio-political developments (McCusker and Ramudzuli, 2007) or questions of resource access and control, political ecology may sometimes not pay much attention to LUC(C) and other bio-physical environmental conditions and dynamics (Walker, 2005, Zimmerer and Bassett, 2003). Different from LUC(C) science, which usually aims at systematically assessing area-wide LUC(C) and their immediate and (mainly theory-based) distal causes, political ecologists typically select cases "as informed by theory that stresses the role of distal or exogenous processes that usually operate to disadvantage local land managers and are often captured in social conflict and land or resource degradation" (Turner and Robbins, 2008:303).

The effects of such processes, or more broadly of any societal structures and dynamics, on physical landscapes can be seen as 'inscriptions'. Shedding light on the effects of power relations on the environment, Bryant and Bailey (1997:43) noted that the shaping of natural resource uses by powerful actors is often visibly 'inscribed' in the environment, for example, in the form of plantations or dams, while the patterns of resistance of the less powerful "are often more difficult to discern". The forms of such resistance may include 'illegal' exploitation of resources (Bryant and Bailey, 1997), which has been a widespread phenomenon in Indonesia's state forests for decades (Nibbering, 1988, Peluso, 1992); uprooting of plantation trees (see Gerber, 2010); or forest clearance in national parks (Bryant and Bailey, 1997:43). Some of the forest fires in Madagascar resulting from poorer farmers burning out of frustration about richer farmers' tree plantings which establish legal claims over land (Kull, 2002, 2004) can be seen as 'inscriptions' of struggles over resources in the physical landscape. Examples of such 'inscriptions' of resistance are also found in Peluso's (1992) in-depth study of struggles over forest land and trees in Java from colonial times until the 1980s and in Bryant's (1997) political ecology of forestry in Burma. The 'inscriptions' of struggles over resources, or more broadly of societal structures and dynamics, in physical landscapes are forming the intersection of LUC(C) science and political ecology.

Choosing an analysis of LUC(C) as the starting point of the research and then exploring the drivers of the observed changes using political ecology informed social-scientific inquiry contributes to soil and LUC(C) science by providing knowledge on and directing attention to the (often neglected) roles of socio-political structures and processes. At the same time, it integrates bio-physical conditions and dynamics into political ecology. The often limited engagement of political ecology scholarship with actual environmental conditions and dynamics has been critically noted and discussed by a number of authors (Nygren and Rikoon, 2008, Vayda and Walters, 1999, Walker, 2005, Zimmerer and Bassett, 2003). If we see, with Paulson et al. (2004:17) "[p]olitical ecology's

² The abbreviation LUC(C) refers to both land use and land cover (LUC) and land use and land cover change (LUCC).

originality and ambition [to] arise from its efforts to link social and physical sciences to address environmental changes, conflicts, and problems”, the (re-)integration of bio-physical conditions and changes into political ecological inquiry seems highly desirable. One effective approach to this end is to choose bio-physical conditions or changes as the starting point of inquiry and then construct “causal histories of interrelated social and biophysical events” without rigid a priori assumptions (Walters and Vayda, 2009:534, outlining the concept of ‘event ecology’), though keeping in mind core political ecology questions, and applying them where relevant. The case study presented here was part of a research project that followed this approach, with an area-wide analysis of LUCC as the starting point of inquiry. In this way, physical environmental conditions and changes, i.e. LUCC and degradation, could directly be linked to struggles over the access to and control of land.

Research methods

The case study presented here was part of a larger research endeavour covering the entire catchment area of the Segara Anakan lagoon. This shallow coastal lagoon (see Fig. 1) has been heavily impacted by riverine sediment input (Lukas, Submitted for publication, White et al., 1989, Yuwono et al., 2007). Its catchment area has thus become a hotspot of political interventions aimed at tackling upland degradation, though with limited results. Against this backdrop, our research explored the dynamics and drivers of LUCC and land degradation throughout the catchment area. This research combined remote sensing, historical cartography and land use/cover mapping with social-scientific research methods.

In a first step, areas with LUCC were identified, based on visual interpretation of satellite images and the results of land use/cover mapping. For this purpose, a series of satellite images (Landsat MSS, TM, ETM and SPOT) taken between 1976/78 and 2007/2011 was acquired and georeferenced based on recent topographic maps. GPS-facilitated land use/cover mapping was carried out throughout the entire catchment area of the lagoon. False colour

composites generated from the green, red and near infrared bands of the satellite images, the results of the land use/cover mapping (GPS tracks, photographs, and notes), and the topographic maps were overlaid, using ArcGIS. Flickering between images, differences particularly in tone, texture, patterns and shapes were identified and combined with the results of the land use/cover mapping and the intimate knowledge of the area (cf. Campbell and Wynne, 2011, Lillesand et al., 2008). In this way, a total of 297 LUCC areas were identified and delineated throughout the catchment area. These LUCC areas were overlaid onto topographic maps (scale 1:25,000), partitioned into map sheets and used in printed form during the social-scientific case studies conducted thereafter.

These case studies, which were mainly aimed at analysing the dynamics and drivers of LUCC, covered 60 of the 297 LUCC areas identified. In selecting case studies, the aim was to cover different parts of the catchment area, some of the hotspots of LUCC and erosion-prone land, and a wide variety of different cases. To further expand the temporal scale of analysis, historical topographic maps from the early 20th century were acquired for the case study areas, scanned, georeferenced and overlaid with the contemporary topographic maps and the satellite images. The case studies comprised transect walks and semi-structured interviews with representatives of district and sub-district governmental organisations, the state forest corporation, NGOs, and village administrations as well as with community groups, farmers, elderly people, and other village residents. An inductive approach was taken, with interviews mainly comprising broad, open-ended questions, especially during the first part. At the same time, the results of the satellite image processing (the LUCC maps) were, usually during the last part of the interviews, incorporated into the discussion. In this way, the combination of LUCC science and (historical) political ecology, or more broadly of remote sensing and social-scientific inquiry, provided scope not only for directly linking information about physical environmental changes and related social dynamics but also for constant cross-validation and cross-fertilisation. Many of the socio-political drivers and events would not have been uncovered without the area-wide analysis of LUCC, and vice versa, certain physical changes would perhaps not have been revealed

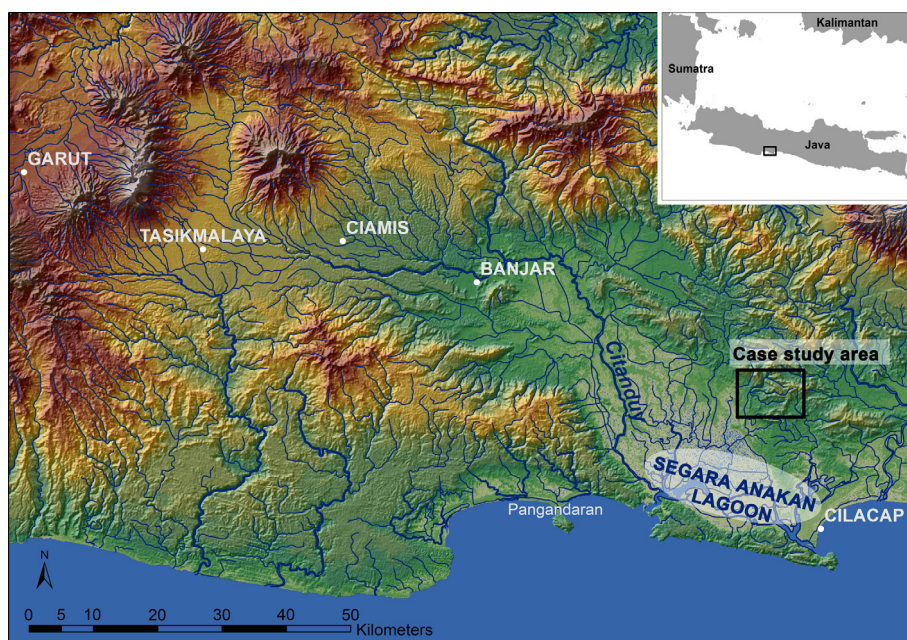


Fig. 1. Following an analysis of land use and land cover change (LUCC) in the entire catchment area of the Segara Anakan lagoon using satellite images, case studies focussing on the drivers of LUCC were carried out in various parts of the catchment area. The area of the case study presented in this paper is located north of the Segara Anakan lagoon.

without the social-scientific inquiry. Without the analysis of satellite images, most of the insightful cases of environmental degradation directly resulting from (historically rooted) struggles over resources would not have been uncovered. Taken together, many of these cases challenge common assumptions about upland degradation in Java.

The following is an in-depth account of one of the case studies with a particularly intricate history. Departing from the analysis of satellite images and land cover mapping, the research that comprised 20 interviews, a number of group discussions, and two extensive transect walks explored the causes of LUCC and degradation, which were of a socio-political nature. Step-by-step, this approach disclosed a history of violent displacements in the frame of a series of insurgencies and counterinsurgencies that were part of struggles over national political power and that have barely been documented to date.

A landscape of displacement, repression, rebellion, and erosion

Starting point of the research: LUCC and erosion

Based on the satellite images and land cover mapping, a hilly area north of the village of Binangun (see Fig. 2, LUCC area A), Sub-district Kawunganten, District Cilacap was identified as one of the most erosion-prone sites within the catchment of the Segara Anakan lagoon. This site is situated only 15 km north of the lagoon,

within the catchment of the Cikonde River, a tributary of the Cimeneng River, which drains into the lagoon. The widely treeless, partly very steep slopes of this site were mainly cultivated with annual crops, like cassava and maize. Without much tree cover and without field terraces (Fig. 3), large parts of this hill area were heavily affected by soil erosion, which was clearly indicated by the exposed roots of annual crops and thick layers of recently deposited sediments in the adjacent streams. Deforestation in the hills surrounding Binangun was linked by a number of respondents to the increased frequency of flooding observed during recent years.

The indication of deforestation during the past decade detected in the satellite images, together with a short field visit indicating that villagers cultivated annual crops on steep slopes without any means of soil conservation, could have led to the misleading conclusion that it simply is, as suggested by established discourses, upland farmers' unsustainable farming practices that are the root cause of soil erosion. However, combining analysis of satellite images with inductive, open-ended social-scientific inquiry provided a contrasting, much more complex and more insightful counter-narrative.

Since it constituted some of the most-erosion prone land within a major regional hotspot of LUCC, I selected the site for a case study, which I conducted in 2011. Based on the case study results, the erosion-prone hill site is not simply to be seen as an example of upland farmers' unsustainable cultivation practices, but as a battlefield of historically rooted conflicts over land, with soil erosion being a result of these conflicts.

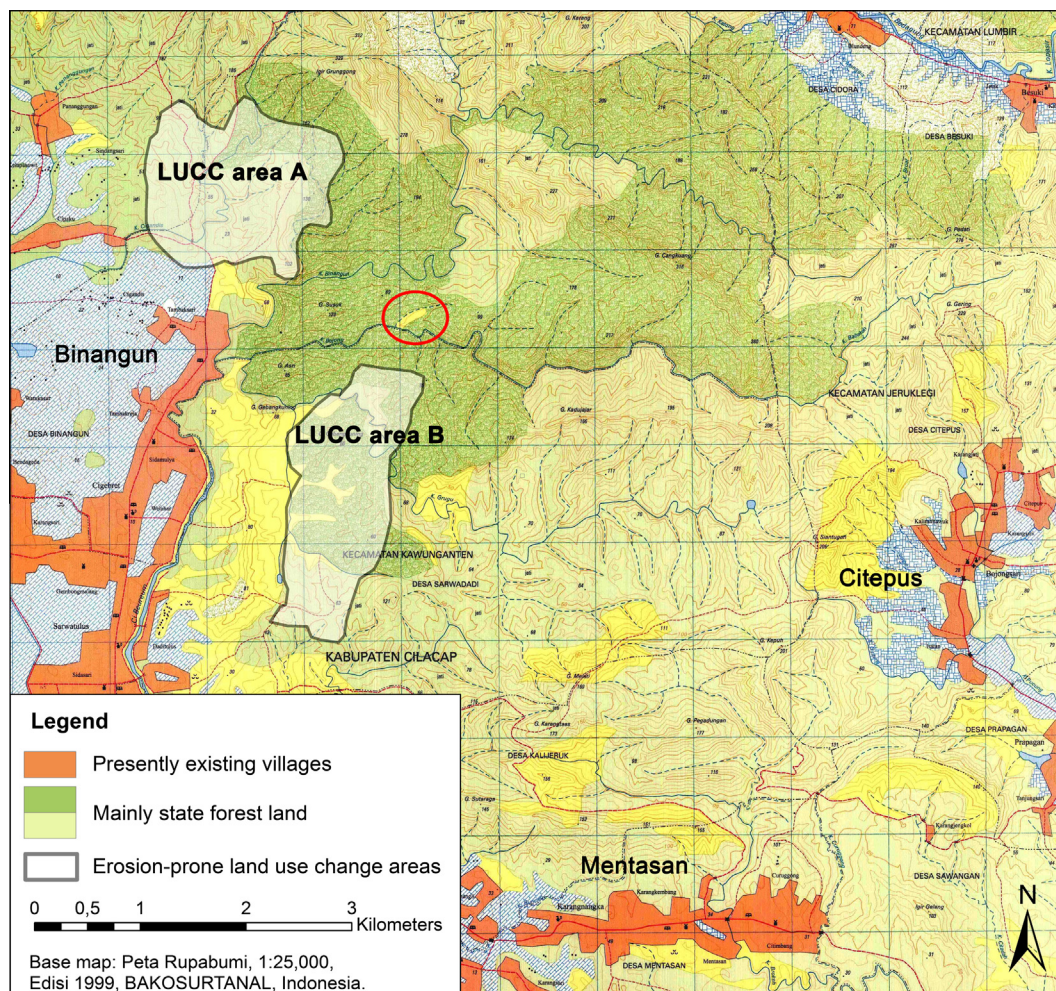


Fig. 2. Based on satellite image analysis and land cover mapping, a hilly area north of the village of Binangun was identified as one of the most erosion-prone sites within the catchment area of the Segara Anakan lagoon (LUCC area A). A second erosion prone land use change area east of Binangun (LUCC area B) shares a similar history.



Fig. 3. Cassava cultivation on partly very steep slopes without field terraces results in high levels of erosion. The photo was taken in LUCC area A. Though farmers have planted a few trees in some parts of the area, they hesitate to invest in additional soil conservation measures as long as the land remains disputed.

Departing from a brief retrospective glance at land use and village patterns around Binangun in late colonial times, the following sections shed light on partly violent displacements of people in the 1950/60s and related contemporary struggles over land, which are the immediate cause for soil erosion.

Looking back: disappeared villages and expanded state forest territories

Recounting memories from their childhood and narratives of their parents, elderly people of Binangun described the 1920s and 1930s as a time when the population was small and land abundant, with individual farmers owning between 2 and 20 ha of land. The valley floors were used for wet rice cultivation, and the hill slopes comprised coffee gardens and mixed forests with fruit and timber trees. In addition to the present village of Binangun, which is situated in a wide valley floor (see Fig. 2), there were numerous smaller villages within the hill land east and northeast of Binangun. Contemporary topographical maps depict this entire area as state forest land without any sign of presently or formerly existing villages (see Fig. 2). Prompted by my respondents' accounts, I found precise evidence of the formerly existing villages in a historical map, representing the situation around 1925/26 (see Fig. 4). These villages have since disappeared, and the entire area has become state forest territory (see Fig. 2).

A first piece of village land became state forest as early as 1924, when the Dutch administration purchased an area of comprising the upper reaches of the mountains east of Groenggang, a sub-village of Bringkeng, for conservation purposes. This purchase was part of broader forest conservation efforts in Java (see Galudra and Sirait, 2006, Kerbert, 1916, Zwart, 1928). Legal evidence of this purchase, which did not affect residential areas, exists, and the tenure status of the purchased land is not disputed today. This area is located northeast of the erosion-prone hill site. It is presently partly planted with teak.

Brutal times and first violent displacement

Present conflicts and soil erosion are rooted in the political dynamics of the 1950s and 1960s. In the early 1950s, the mountainous areas east of Binangun became a base of the Dar'ul Islam, an Islamist movement aiming at the new independent Republic of Indonesia becoming an Islamic rather than a secular state. The formation, ideology, strategies and organisational dynamics of

the Dar'ul Islam have been explored in-depth by Horikoshi (1975), Jackson (1980), van Dijk (1981), and Dengel (1986). However, none of their maps and lists of locations include the region of the sub-districts Kawunganten and Jeruklegi that my case study shows to be another former base of Dar'ul Islam rebels. Also comparatively little knowledge exists about the local violent dynamics in rural and particularly forest areas that Dar'ul Islam rebels used as hideouts and about the resulting spatial patterns of migrations of rural populations. Peluso (1992) provided some insight into the relations between villagers, Dar'ul Islam rebels and the Indonesian National Army (TNI), with the former being caught in the violent encounters between the latter two. She also shed light on forest destructions by TNI forces aimed at destroying the rebels' hideouts.

Elder residents whom I interviewed in Binangun and other villages nearby described the Dar'ul Islam encounter in their area as a traumatic period. The rebels were based in the forest areas between Binangun, Mentasan and Citepus (see Fig. 2). They asked villagers for food and tried to recruit them. Those who refused were shot. My respondents described in detail how the rebels plundered and burnt houses, 'slaughtered' people and cut their bodies into pieces. Also some of the village board members of Bringkeng were killed. The first residents, feeling highly insecure, started leaving the area as early as 1951, secretly at night leaving behind all their belongings and cattle. Their dwellings provided additional bases for the Dar'ul Islam rebels. Later, refugee camps were set up in Sarwadadi, Cilacap and other places, and villagers were, partly by force, evacuated by state authorities and the TNI. The TNI fought against the Dar'ul Islam rebels. Since the rebels had recruited villagers and partly lived side by side with them, it was difficult for TNI forces to distinguish between rebels and ordinary people. Therefore villagers were consequently evacuated. By the mid-1950s, all residents who had not been killed or recruited by the rebels had left the area.

People sent into the swamp forest

The TNI, together with state authorities, including the district administration and village heads, decided then to move the displaced residents permanently to a safe place. They designed a land swap. Accordingly, parts of the village of Binangun as well as the entire villages of Grugu, Bringkeng and Babakan (see Fig. 4) were to be moved into an area just north of the Segara Anakan lagoon. This area had been state forest territory before. It was to be given to the people in exchange for their previous village land, which was beleaguered by Dar'ul Islam rebels and which was to become part of the state forest territory.

What at first glance appears as a humanitarian act, turned out to be a bad deal for the residents of the evacuated villages. The new land they were to receive was supposed to be the same size as their former village land. However, the quality of the land and its suitability for agriculture was very different. A number of respondents described the land provided as unfertile swamp land with high levels of salinity. Parts of the land were still covered with swamp forest. This land was difficult to reclaim and was flooded waist-deep for several months every year. The peasants did not receive any support in reclaiming the land, but, as one respondent noted, "[...] were just sent to this swamp area."

The displaced had no choice but to accept what was offered. Some of them reportedly did not even know about the agreement. Others were made to sign agreements. Since the swamp land was very difficult to reclaim and to cultivate, and given that the displaced people were in a desperate situation, forced to live from hand to mouth after having lost everything, many of them had no choice but to sell the piece of swamp land received in return for minimal payments or even only for some food. Out of hundreds

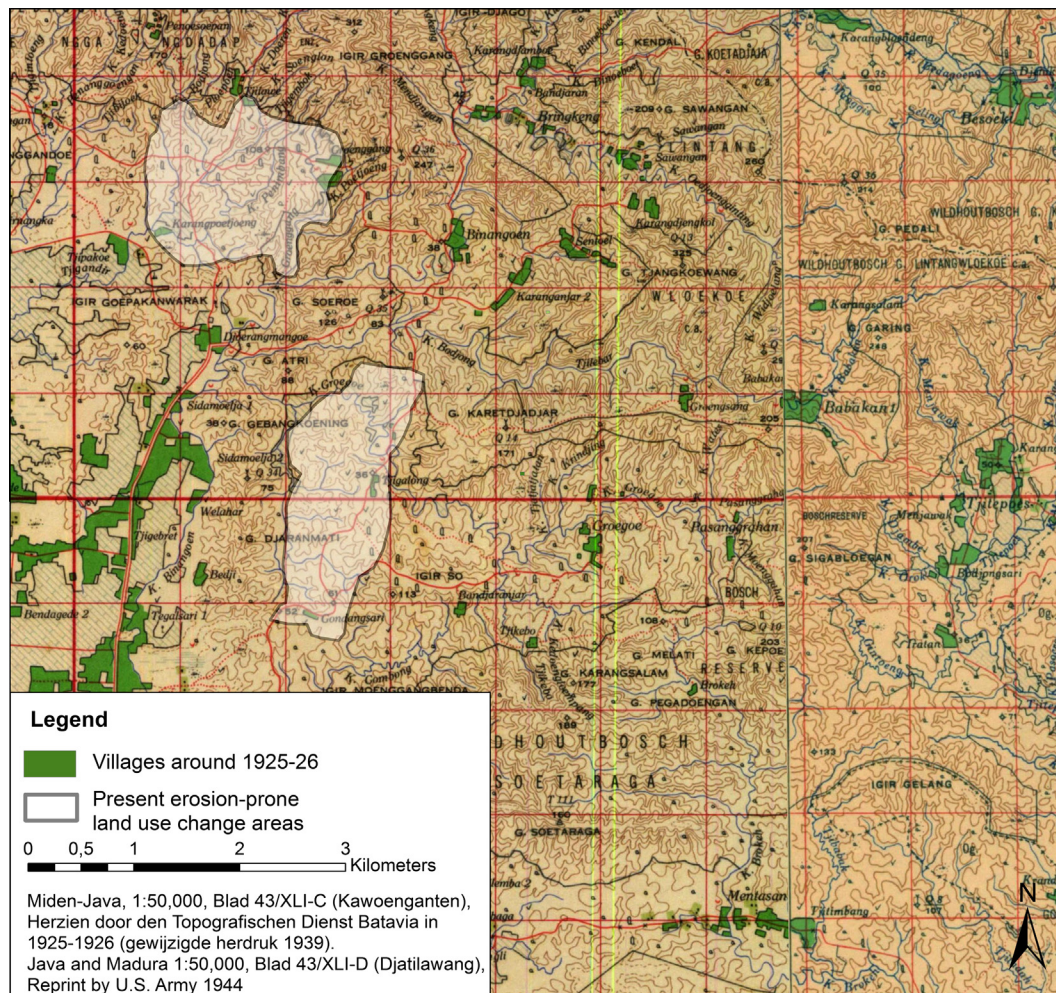


Fig. 4. Until the 1950s, numerous smaller villages and sub-villages were located in the hill land east and northeast of Binangun, as evidenced by historical maps produced in the 1920s.

of residents of the former village of Bringkeng, only the village head, the village secretary, two traditional healers, and an additional ten residents actually moved to what was to be set up as the new village 'Bringkeng Baru' ('New Bringkeng') in the swamp land. The large majority of the displaced, however, either had no other option than to cheaply sell off their part of the swamp land immediately or did not even receive any land. The latter was due to the fact that (1) some of the land reportedly had already been cultivated by other farmers since the Japanese occupation 1942–45, and (2) the total area provided in the swamp land was, contrary to the initial agreement, smaller than the previous village land. Some of the displaced people were told by their village head that they could not get any land, since the area was too small.

First return of the displaced

Consequently, those who ended empty-handed moved back home as soon as the security situation allowed. In 1961, just before the national leader of the Dar'ul Islam, Kartosuwirjo, was captured, the Dar'ul Islam rebels between Binangun, Mentasan and Citepus were brought under control. The last 15 rebels surrendered, and a military and police base remained at the former villages of Grugu and Bringkeng only until 1962. Many of the displaced villagers, including the village secretary of Bringkeng, moved back home, started rebuilding their houses, which had all been destroyed, and cultivated their former land.

However, legally they were not allowed to return, since according to the land swap agreement their land had become state forest territory. In other words, peasants were faced with the choice of either being landless or illegally returning back home. These circumstances made some of them become politically engaged and join the Barisan Tani Indonesia (BTI), the Peasants Front of Indonesia, which was associated with the Communist Party of Indonesia (PKI), and which called for land reform (cf. [Peluso et al., 2008](#)). Reflecting on the initiation and consequences of the land swap agreement, a village representative of Bringkeng Baru noted: "Some people didn't get any new land. They thus returned to Old Bringkeng, and the land swap issue turned from a security problem [referring to the Dar'ul Islam] into a political problem [referring to the status of illegality and the PKI]."

Second violent displacement: "Your land or your life"

The profound change in the political landscape of Indonesia in 1965 brought about a second violent displacement of those who had returned to their former villages. The killing of six army generals in Jakarta on 30th September 1965, which military heads claimed to be an attempted coup by the PKI against the state, served as a starting point and justification for the formation of an authoritarian, militarised state and an anti-communist purge, which became one of the largest massacres of the 20th century, with an estimated half a million killings ([Cribb, 1990, 2001](#)).

All those who had returned to their former villages were labelled PKI members in 1965. They were forced to leave, and their houses were burnt down. People were faced with the choice of losing “their land or their lives”, as one village representative succinctly stated. Many people were killed or put into prison and tortured.

One respondent, a father of six young children, was imprisoned on nearby Nusa Kambangan Island for ten years, where he “had to study suffering”. Together with tens of thousands of other prisoners, he was forced to work. Apart from being forced to clear entire slopes of extremely deep-rooted, sharp *alang-alang* grass (*Imperata cylindrica*) by hand and from working in quarries, his labour contributed to the building of the roads between Jeruklegi, Wangon and Lumbar, of a tennis court for the staff of a military camp, and of a military chief’s private house. He was also engaged as a household servant for another military chief. His wife had no choice but to get divorced and re-married to a military officer. After ten years he was released from prison. In his release report it reads that he could not be convicted with certainty of having been a PKI member. He still had to report to police and military offices regularly for two years, and his registration card contains an entry labelling him as political opponent, denied of many rights and freedoms. He lives in poverty today and depends on food and money from his neighbours and children. This is only one of many tragic life histories that shall illustrate the repression and violence and the deeply engrained historical injustices that must be considered in trying to understand contemporary land conflicts and resulting soil erosion.

Village land transformed into state forest land, an era of repression

The displacements of 1965 were consistent and permanent. The villages between Binangun, Mentasan and Citepus vanished from the face of the earth (Fig. 5). Almost the entire area immediately started to be managed by P.N. Perhutani, the state forest corporation. The area was delineated, partitioned into forest divisions and incorporated into the forest administrative system of Perhutani. It was immediately planted with teak.

Only one small piece of land in the midst of the new state forest territory remained in the hands of its former owner. I had identified it in the satellite images, since its land cover differed, and even topographical maps correctly delineate it as private land (see Fig. 2, red circle). This land belonged to a forest guard in the 1950s and 1960s, who, due to his personal connections, was free to choose not to give up his land.

The other peasants had to give way to the expansion of the state forest territory. During the New Order regime that General Suharto started to establish in 1965 and that remained in power until 1998, the displaced had no chance to claim the land they lost, no chance to secure justice. Relations between the villagers and the state and its forest corporation were marked by repression, anxiety and hatred, as the following statements made during a discussion with peasants and a village representative aptly summarise:

“During the entire New Order regime the people were afraid to take any trees from Perhutani land not to mention to claim any land ownership.”

“During the New Order Regime you should be in line with the state bureaucracy, and if you were not, there were three choices: You were declared an obstacle to development, a member of the Dar’ul Islam, or a PKI member. The last option was the most common one.”

“I was afraid to complain. They would have labelled me as communist and killed me.”

“Perhutani is like a child of the government. Whenever there were problems between Perhutani and the people, the government intervened. People just had to develop hatred against Perhutani over time.”

Peasants’ access to the long-standing as well as the new state forest territories was strictly limited. As common all over Java, they were allowed to cultivate annual crops between newly planted trees for the first few years after planting (a system known as *tumpangsari*, see Peluso, 1992), but for the related permits peasants of Binangun had to make informal payment into the private pockets of the forest guards and forest labour foremen (*mantri* and *mandor*). Despite the state forest corporation’s policing efforts, villagers continued to exploit resources from state forests, and in line with the tenure status of the land, they did so carelessly, which resulted in forest degradation in many parts of Java (Nibbering, 1988, Peluso, 1992).

Summing up: Insurgencies and counterinsurgencies and the territorialisation of productive forest resources by the state

The case presented here provides a concrete and particularly insightful piece of empirical evidence of the links that Vandergeest and Peluso sketched between political insurgencies, counterinsurgencies and the consolidation of postcolonial states and political forests in Southeast Asia (Peluso and Vandergeest, 2011, Vandergeest and Peluso, 2011). In this case, as described above and further discussed below, a series of partly brutal insurgencies and counterinsurgencies provided an opportunity for, served to justify or was part of the expansion of state forest territory at the expense of village land.

The first displacements were, in the beginning, related to the Dar’ul Islam insurgency. People, who feared for their lives, fled on their own initiative. Later, these displacements culminated in state-led evacuations as part of and to support an effective counterinsurgency of the TNI against the Dar’ul Islam rebels.

These first displacements in the 1950s would have been only temporary had state authorities not designed a land swap. The Dar’ul Islam insurgency and the need for an effective counterinsurgency required, or perhaps rather provided a good opportunity for, the land swap. Clearly disentangling the different motivations that led to the initiation of the land swap during this chaotic time is rather challenging in retrospect. However, based on a number of considerations and statements from my respondents, it appears that the land swap might not have been primarily driven by humanitarian concerns, but to a substantial extent by the interest of the state and its forest administration to depopulate a politically fragile area, to territorialise economically productive forest land in the hills and to provide in exchange a piece of what must have been regarded as economically unproductive swamp (forest) land. These considerations and statements shall briefly be summarised in the following.

Asked about the government’s main motivation for the land swap, a village representative explained that “the area had become a base of the Dar’ul Islam. They plundered and burnt houses and slaughtered people, who were afraid and fled. The government and Perhutani used the situation to resettle people. The government wanted the area to become Perhutani land.” Asked why the then-village head of Bringkeng had signed a land swap agreement which was obviously disadvantageous for the villagers, a current village representative explained that “all state authorities, including the district and sub-district heads, formed a strong alliance that was hated by the people. And the village head was pressured under the condition of not having any village land in the 1950s. New land, wherever, was urgently needed. So he might not have had any other choice.” Since the land provided in the swamp area was

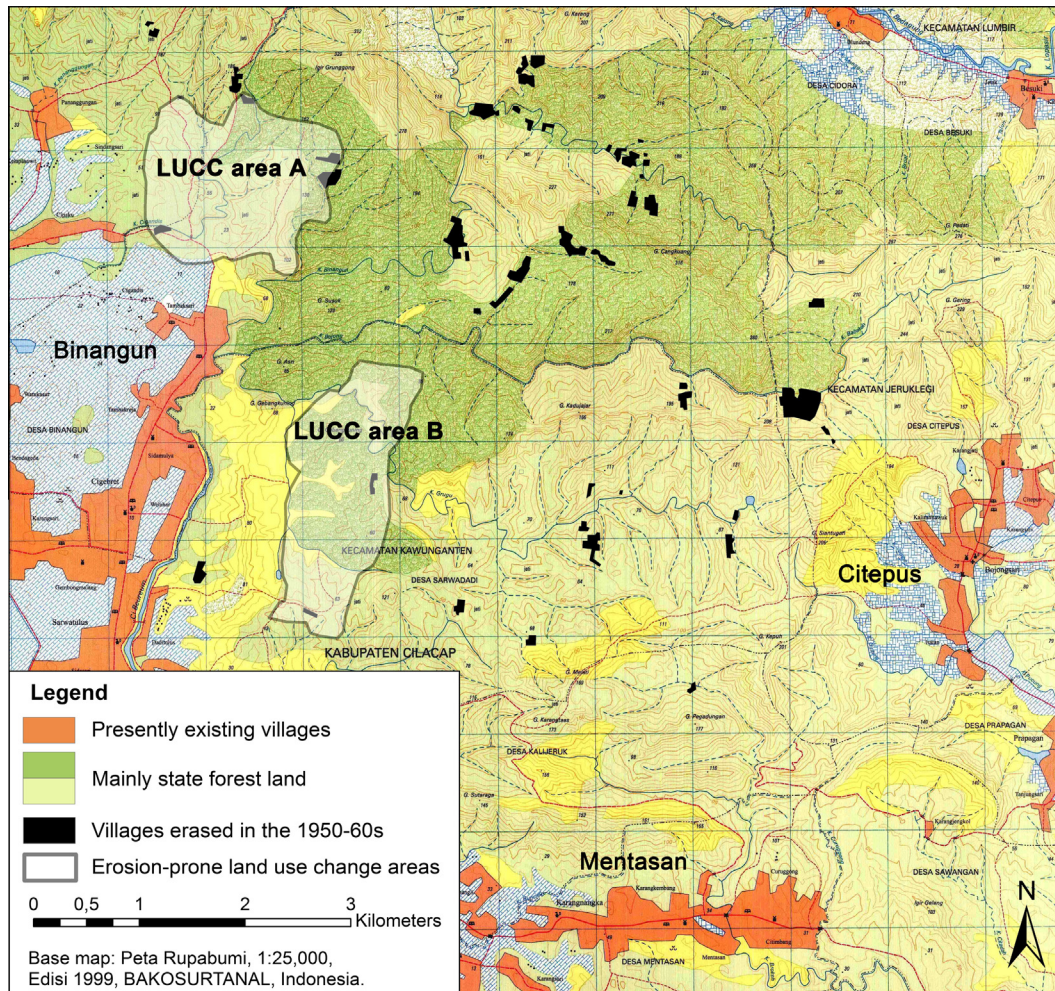


Fig. 5. The villages located in the hill land east and northeast of Binangun vanished from the face of the earth in the 1950–1960s, and the land became part of the state forest territory. This map of the disappeared villages is based on an overlay of a contemporary topographical map (Fig. 2) with a historical map representing the situation in the 1920s (Fig. 4).

smaller than the original village land, in 1963 the village head asked for additional land to fulfil the agreement. However, as the same respondent explained: “There was no chance for that. Government structures were extremely hierarchical, and the Bupati [head of the district] was still part of the royal family at that time. It was a feudalistic society. He was far above the people. His face was not allowed to be seen by the people and the village heads. It was completely covered with cloth.” Given the different land sizes and land qualities and the way of implementation, the land swap was obviously not fair on paper and even more unfair in practice, but was pushed by repressive state authorities.

Those who returned home to their land in the early 1960s were considered illegal. This status triggered political resistance and made some of the allegedly illegal peasants to link with networks associated with the PKI. This insurgency of peasants against the territorialisation of their land by the state and its forest administration was brutally struck down in the frame of the anti-communist military-led counterinsurgency of 1965/66. The portrayal of the killing of six army generals in Jakarta as a violent act of the PKI against the state and the labelling and criminalisation of all those who had returned to their land as PKI members served as justification for a counterinsurgency, for the violent displacement of the returnees, hence clearing the way for territorialising their land.

This territorialisation (cf. Peluso and Vandergeest, 2001, Vandergeest and Peluso, 1995), which was inextricably linked with

a series of two insurgencies and counterinsurgencies, involved violent displacements; the delineation of former village land and its partition into forest divisions, rendering village borders irrelevant; the incorporation of the land into the administrative system of the state forest corporation; and restriction of peoples’ access to the land and its resources, which was enforced by armed forest police. The immediate planting of teak in the new state forest territory underlines the state’s interest in the area’s productive resources. Teak was (and still is) economically the far most important species for the state forest corporation. The Department of Forestry aimed at doubling teak exports, which had already increased 2.5-fold between 1965 and 1968 (Direktorat Djenderal Kehutanan, 1969), “for the development of [the] national economy and [the] prosperity of the people” (Department of Forestry, 1966). The swamp forest, given to the villagers in exchange, was not suitable for growing teak.

Also ideas and aims within the forest administration about watershed conservation supported the land swap. One respondent, who had been working for the state forest administration in the 1950s, explained that the new land provided to the peasants was well suitable for farming, whereas their former hill land was most suitable for forest. He subsequently highlighted the hydrological functions of forest cover on the hill land.

To sum up, the land between Binangun, Mentasan and Citepus had in the 1950s and 1960s become a battlefield of violent struggles over political power. All three of the major political forces that

fought for national political power within the newly independent Republic of Indonesia, namely the Dar'ul Islam, communist groups (PKI) and the Military (TNI), and the violent confrontations between these forces, profoundly reshaped the landscape in this region, disrupted social life, brutally erased entire villages and many people, and provided scope for and was inextricably linked with the territorialisation of village land as state forest. The previous land use mosaic of scattered villages, agricultural land and mixed forests was transformed into production forests, comprising one-age-cohort teak and pine plantations, managed by the state forest corporation. These forest plantations and occasional clear cuts dominated the scene until the mid-1990s, as can be seen from the satellite images analysed. While the hill land was transformed into a state forest plantation, the 'relocation' of the villages initiated the gradual transformation of substantial mangrove and swamp forest areas in the northern part of the Segara Anakan lagoon region into rice fields and settlements (Fig. 6-1 and 6-2).

Political forests turned into erosion-prone battlefields

While the villages in the hill land vanished from the face of the earth, they continued to exist on historical maps and in the memories of the displaced and their descendants. The fall of the Suharto regime in 1997/98 provided the historical chance for the displaced as well as for large parts of the entire population to (re-)gain access to the state forests, or the 'political forests' which [Peluso and Vandergeest \(2001:762\)](#) defined as "lands states declare as forests". About half of the state forests in the area around Binangun were cut down within a few years. Almost every family from the villages surrounding the state forest, as well as outsiders from the nearby regions and towns participated and benefited. Illegal logging became a big business, involving loggers, porters, truck businesses and traders. The forests around Binangun had been ready for harvest, and Perhutani had already built roads and bridges within the forests to prepare the harvest and transport of timber. This provided perfect conditions for the illegal loggers. About ten trucks loaded with timber passed through Binangun every day. Even truckloads of security personal that arrived in the beginning were not able to, were afraid to or got paid to not interfere. The house of a Perhutani officer who aimed at enforcing state forest law and order was attacked. 'Illegal' logging went on until most trees were cut down. Around the mid-2000s, some areas were reforested by Perhutani, while other areas remained occupied by peasants, who not only harvested trees, but claimed land ownership for historical reasons.

Second return of the displaced

The hill area north of the village of Binangun that I had identified in the satellite images and based on land cover mapping as a major erosion prone site (see Fig. 2, LUCC area A), is one of the state forest areas claimed by peasants. The same applies to a larger area east of Binangun (see Fig. 2, LUCC area B). Until the early 1950s, the hill site north of Binangun (LUCC area A) had been part of the former village of Bringkeng. The hill site east of Binangun (LUCC area B) had been part of the former village of Grugu. Those who were displaced from Bringkeng and Grugu in the 1950/60s or their descendants and other villagers claim ownership over this land. Their claims are based on the fact that (1) the swamp land received in the 1950/60s was smaller than their original village land, and (2) most residents of the former villages did not sign and even did not get to know about the land swap agreement. In the case of Bringkeng, the villagers were to receive only 434.8 ha of swamp land in exchange for their 614.8 ha of fertile hill land. Therefore the peasants claim ownership over an area of 180 ha. In the case of Grugu, the peasants claim an area of about 200 ha.

The land areas claimed almost perfectly match spatially with the areas that I had identified as erosion-prone land based on the satellite images and land cover mapping. The conflict between peasants and the state forest corporation has literally turned this land into an erosion-prone battlefield. The land was cleared of its forest and has been cultivated by hundreds of peasants since then. In line with the disputed land ownership status, limiting the peasants' planning horizon, they have mainly grown annual crops. Growing these crops on steep slopes without field terraces and tree cover has resulted in high levels of erosion. This landscape of erosion is an 'inscription' of the ongoing, historically rooted struggle over land.

A group of farmers took the lead in fighting for land rights. They set up a first dwelling at the foot of the hill, which serves as a temporary residence and base camp of a farmers' committee, which they established as representation of the peasants cultivating and claiming land.

"It's like war with Perhutani"

At the time of field research in 2011, the conflict between the peasants and the state forest corporation over the land had been ongoing for a decade. This conflict has involved various formal and informal processes, and modes of indirect and direct confrontation. Reflecting on the course of the conflict and the current situation, one respondent noted: "It's like war with Perhutani."

Perhutani, with support from the police, tried to move the peasants off the land, "but hundreds of people were brave enough to stay" (a village representative). The peasants approached the head of Perhutani's forest district office. Since their hand-drawn maps were not accepted as evidence, they managed to organise a precise cadastral map of the former villages of Bringkeng and Grugu dated 1937 from the Military Topographic Service. The claimed land as depicted in this cadastral map almost perfectly overlays with the state forest land currently cultivated by peasants as depicted in the satellite image.

Perhutani reportedly regards the land swap of the 1950s as accurate, referring to a second purchase of 170 ha of village land by the Dutch administration in 1934. However, evidence of this alleged second purchase does obviously not exist. On the contrary, the cadastral map of 1937 depicts the corresponding area as village land, and according to elderly people, maps and border markers of Bringkeng did not change between 1925 and the 1950s. The villagers engaged two lawyers and staged two demonstrations in the district town of Cilacap.

In the early 2000s, Perhutani and representatives from the sub-district administration offered an agreement, allowing peasants to cultivate the disputed land for 25 years, followed by a re-evaluation. At the same time, the agreement declared the disputed land as state forest land, hence reinforcing the ownership status quo. Many peasants were not aware of the latter and assumed they were granted ownership rights. The agreement also laid the foundation for the establishment of community forestry (PHBM: *Pengelolaan Hutan Bersama Masyarakat*). In the frame of PHPM schemes, which have been initiated throughout Java since the early 2000s, Perhutani continues to control the selection, planting and management of trees, while local residents have temporarily limited cultivation rights (*tumpangsari*), are responsible for safeguarding the trees and receive a share of the revenue. PHBM, as [Singer \(2009:133\)](#) aptly summarised, "can either be viewed as a break with the past as local populations can benefit directly from the income from the forest, or perceived as yet another way of buying local people out of their legitimate rights to the forest." Based on the latter viewpoint, [Maryudi \(2012\)](#) explored PHBM as a strategy of the state to regain control over the forests.

In the case of the land dispute investigated here, tricking peasants into a PHBM scheme, hence granting them limited access and

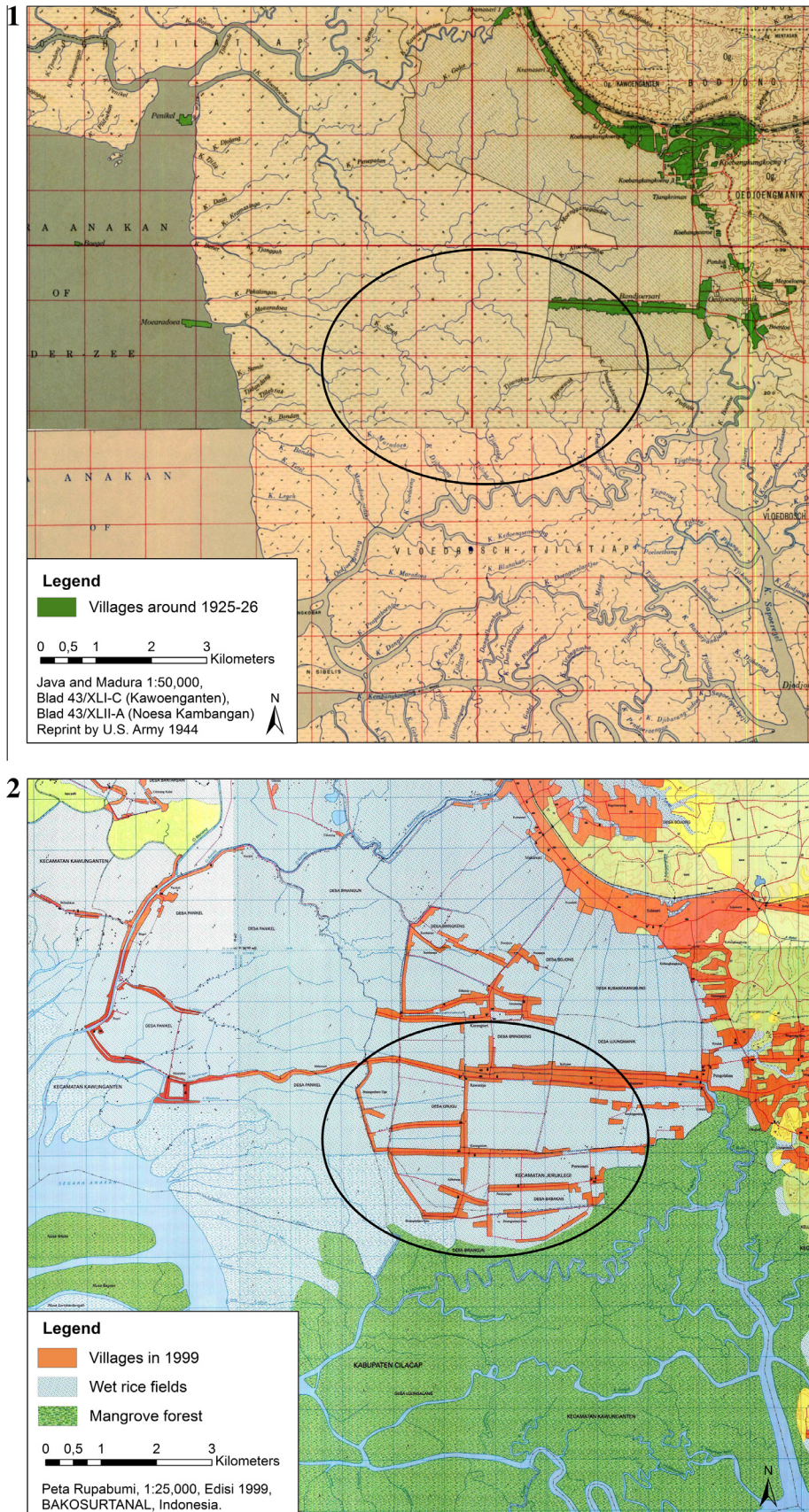


Fig. 6. (6-1 and 6-2) The historical topographical map of the north-eastern section of the Segara Anakan lagoon depicts expansive mangrove and swamp forest areas. The 'relocation' of the villages Grugu, Bringkeng and Babakan and parts of the village of Binangun initiated the transformation of large parts of this mangrove and swamp forest into rice fields and settlements. Though most residents from the 'disappeared' villages reportedly did not receive any new land, the new villages of Bringkeng, Grugu and Babakan, and the sub-villages Binangunbaru 1–3 have grown over time. Thus, the former mangrove and swamp forests have been replaced by villages and wet rice fields.

control over the land, undoubtedly appears as a strategy to regain control over the disputed land and to maintain the land ownership status quo. The peasants did not know for years what PPHM was until Perhutani started planting trees on the disputed land in 2008/2009. Upset about seeing Perhutani planting trees on 'their' land and regarding the tree planting as a strategy of Perhutani to re-territorialise 'their' land, the peasants pulled out the newly planted seedlings. This led Perhutani to engage the police, which resulted in tense encounters on the conflict land, involving a knife threat.

This open confrontation generated political attention up to the national level. The case was discussed in the national parliament in 2009, and the Ministry of Forestry recommended a survey of the historical village land. The survey was supposed to be carried out by a team formed by Perhutani. The peasants fear that they have to bear the costs, and at the time of the research in 2011, they were disappointed that nothing had happened yet. One respondent shared his concern that the process might intentionally be delayed until the last eye witnesses have died.

Tensions and confrontations on the ground between Perhutani and peasants have been going on in the meantime. Peasants are upset about Perhutani staff walking around on 'their' land and setting border markers. At the end of a discussion, a group of peasants confided in me that they had been afraid of talking to me in the beginning, because sometimes spies arrived and interrogated them without letting them know that they worked on behalf of Perhutani. One respondent added: "We are in trauma."

Erosion-prone battlefields

Having shed light on the history of two violent displacements, the territorialisation of former village land by the state and its forest corporation, and the dynamics of the resulting contemporary land conflicts, we return to the starting point of the case study: the issue of soil erosion in the catchment area of the Segara Anakan lagoon. Together with the research we have conducted in other parts of the watershed, the case presented here illustratively shows that blaming upland farmers' unsustainable farming practices for being the single-most important cause of soil erosion and lagoon sedimentation is a misleading, far too simplistic political narrative.

During the past years, the disputed, partly very steep land has been cultivated by peasants mainly with annual crops, which, due to the lack of field terraces or tree cover, has resulted in high levels of erosion. However, these cultivation practices are not peasants' preferred way of farming, but a result of the smouldering land conflict. Without having been asked and without knowing that LUCC and soil erosion were my points of departure for this research, a group of peasants explained that they would usually plant tree crops on such land, intercropped with annuals only during the first years, but that they had to postpone such investments until the tenure status of the land is clarified.

The representatives of the farmers' committee are aware of the relation between upland degradation and flooding and sedimentation. In fact, the committee comprises one person responsible for soil conservation. The farmers already have plans for investments into land terracing and irrigation. This will, as they explained, not only limit erosion, but reduce nutrient washout and increase yields. To some extent, the committee's commitment to soil conservation might be a political strategy to counter political discourses about farmers' allegedly unsustainable farming practices that commonly serve as arguments to keep them out of the 'state forest land'. As aptly formulated by [Peluso et al. \(2008\)](#), "[t]he landscapes of occupation must appear sustainably managed". In fact, some farmers have already planted some trees in the steeper portions of the slope ([Fig. 3](#)) and have converted a small area at the foot of the hill slope into terraced rice fields. Terraced rice fields and (mainly mixed) forests dominate large parts of the privately

owned land in the lagoon's catchment area, and there has been a general trend of shifting from annual to tree crops in many parts of Java over the past years.

However, as long as the land conflict is not settled, the peasants will not further invest into field terraces, irrigation schemes and trees, at least not on a large scale. They demonstrate their claim over the land by cultivating it with annual crops. The state forest corporation on its part demonstrated its claim over the land by planting trees. Countering this territorialisation strategy, the peasants pulled the seedlings out. In other words, the bare, erosion-prone hill slopes have to be seen as battlefields of historically rooted conflicts over land, with erosion being a direct outcome of these conflicts. Without a satisfactory and just resolution of these conflicts, taking into account the history of violent and unfair displacements, the land will likely continue to be prone to erosion.

Power dynamics and conflicts at the grassroots level and the formation of a 'land mafia'

The story about the erosion-prone conflict land does not end here. It would be too superficial without shedding light on problematic strategies, power dynamics and conflicts at the grassroots level, which have started to impede the political and legal processes that could potentially lead to a resolution of the land conflict and hence to reduced soil erosion. Asked whether he was optimistic that the peasants would finally receive land rights, an insider noted that they had "made a big mistake". Details of these dynamics were rather difficult to grasp, since they had created lines of conflict within the village. The information presented in the following was confirmed by and cross-checked with a number of respondents and hence likely provides a correct albeit not complete picture.

The partition of the claimed and occupied state forest land between peasants is an intricate task. Since the land is occupied illegally, its partition among peasants is an informal process at the grassroots level. Many of those who were displaced in the 1950/60s have passed away, and documents of historical individual land tenure barely exist. It is hence difficult to determine who had owned which part of the previous village land. So who should receive how much land? According to a village representative of Bringkeng, a village forum had compiled a list of residents who had lived in the original village before 1951, and it was planned that both the former land owners and former landless were to 'receive' a piece of land.

However, in practice, representatives of the farmers' committee, which was set up as a representation and action group of those who claimed land and which itself consisted of farmers, started selling cultivation rights. Starting from around 2006, everybody who wanted to cultivate and claim part of the disputed land had to pay for their informal right to cultivate. One villager noted that (parts of) the farmers' committee had turned into a 'land mafia' ('mafia tanah'). This 'land mafia' forced peasants to pay by threatening them to pull out their crops and noting that they would otherwise lose their cultivation right. Afraid of losing their cultivation right, reportedly almost all, i.e. hundreds of peasants, paid IDR 19–25 million (approximately € 1.500–2.000) each for 'their' plot. Informal cultivation rights for comparatively large areas up to 10 ha were reportedly also bought by outsiders from neighbouring regions, who had no relation to the original village of Bringkeng. Some of those who purchased informal cultivation rights assumed they were buying the land, while others were aware that they only bought the 'right to claim the land' hoping to become the formal owners of the land after the resolution of the conflict with Perhutani. The informal cultivation rights have even been resold, often at higher prices. In addition to informally selling cultivation rights for land that formally still belongs to the state, representatives of the farmers' committee collected money for travel costs and legal processes from the other peasants. The informal sale of

cultivation rights by the farmers' committee resembles to some extent the former practices of the forest guards and forest labour foremen, who collected informal payments from the villagers who wanted to receive temporary cultivation rights in the frame of tumpangsari.

Some village residents who critically observed the formation and practices of the 'land mafia' encouraged those who were required to pay to report the case to the village head. However, most buyers were afraid and did not admit their payment. The village board tried to get more information, and the head of the PHBM community forestry farmers' group reported the issue to the Perhutani forest district administration. At the time of the case study, the issue was under examination, and both the farmers' committee members and the peasants who allegedly paid had not confessed.

The informal sale of cultivation rights for disputed state forest land has contributed to, or is perhaps even used for, the discrediting of those who fight for land rights by a group of village representatives of Binangun who are cautious about or even in opposition to the peasants' land claim, who, in other words, tend to be on the side of Perhutani. One of them is the head of the PHPM community forestry farmers' group. He had worked for Perhutani as a forest guard previously and had obviously been installed by Perhutani to represent and enforce the state forest corporation's interests within the community. The persistence of such 'fragments' of the former repressive power apparatus in community forestry schemes has been explored in Lukas (2013). Also a representative of the village board of Binangun opposed the peasants' land claim. He expressed his positive views on Perhutani's PHBM policy and noted that in his opinion, "the land is actually not conflict land, because it had already been swapped in the 1950s".

Summary and outlook

One of the most erosion-prone hillsides within the catchment area of the Segara Anakan lagoon can be understood as an 'inscription' of historically rooted conflicts over land, with erosion being the direct outcome of these conflicts. The conflicts are rooted in a series of insurgencies and counterinsurgencies in the 1950/60s, which were inextricably linked to the struggles of the three major political forces, namely the Dar'ul Islam, Communist groups and the Military, over national political power within the newly independent Republic of Indonesia. Displacements of people in the wake of the brutal Dar'ul Islam insurgency and the state military's counterinsurgency in the 1950s provided an opportunity for the expansion of state forest territory at the expense of village land. A state-initiated land swap provided infertile swamp land to some of the displaced peasants in exchange for their fertile hill land and left the majority of them landless. Those who returned were violently evicted from the land in the mid-1960s within the scope of the 'anti-communist' massacres that were part of the formation of Suharto's repressive military regime. Their land was henceforth managed by the state forest corporation and converted into teak and pine plantations. The fall of the Suharto regime in the late 1990s provided scope for a new insurgency. The displaced returned and began to fight for their land, to fight for justice. Ongoing struggles and confrontations between the peasants and the state forest corporation have since then transformed the land into an erosion-prone battlefield. In other words, soil erosion is to be seen as a material flux running off the battlefields of political conflicts over resources. This landscape of erosion is a landscape of conflict and a symbol of unresolved historical violence and injustice. A fair resolution of the land conflict, establishing historical justice as far as this is still possible at this late stage, is obviously the most important prerequisite for a more sustainable, soil conserving management of the land.

However, over the course of the conflict, a group of peasants who took a lead in fighting for land titles established itself as a new dominator, exerting power over the other peasants and requiring them to buy 'informal cultivation rights' or 'rights to claim' the state forest land. With the formation of this 'land mafia' and with outsiders buying 'cultivation rights', the struggle over the land being a struggle for historical justice for the displaced has been diluted. Though these dynamics at the grassroots level deserve critical attention and need to be addressed, they should not distract from the need for a fair resolution of the historically rooted land conflict between those who were violently displaced including their descendants and the state with its forest corporation, which appropriated their land. The further course of the land conflict is the main factor determining future land use and potential levels of erosion.

Conclusion

In line with our research in other parts of the catchment area, the case of the disappeared villages presented in this article shows that the blaming of upland farmers' unsustainable farming practices for being the single most important cause of soil erosion and lagoon sedimentation is a one-sided, misleading political narrative. Instead, some of the most erosion-prone land areas have to be regarded as battlefields of historically rooted conflicts between peasants and the state and its forest corporation or between peasants and plantation companies over land. In these conflicts, the simplistic narratives about peasants' unsustainable farming practices have served as justification for keeping them away from the state forest territories.

The case of the disappeared villages presented here is a powerful example of the importance of taking into account social-political histories and their shaping of contemporary struggles and dynamics in trying to understand present land use patterns and the causes of soil erosion. Research linking LUC(C) science and (historical) political ecology can be particularly fruitful in this context. An area-wide LUCC analysis served as the basis for the identification of political ecology case studies. Hence, observed physical environmental changes served as the starting point of the political ecology research, and not political networks or theoretical considerations that may have an inbuilt preference for cases where exogenous forces and political struggles disadvantage local land users. Political ecology contributes to LUCC and soil degradation science by analysing (historical) social-political dynamics and struggles that are major causes of LUCC and soil erosion. Ignoring these dynamics and struggles in analysing the causes of soil erosion in Java does not just provide a superficial understanding of the situation but necessarily results in misleading conclusions.

The case study presented here clearly establishes direct causal links between political struggles over the access to and control of land and soil erosion. Historically rooted land conflicts have transformed the land into an erosion-prone battlefield, with soil erosion being the outcome. Unresolved socio-political pasts, marked by violence, problematic power relations, injustice, repression and upheaval, and a history of conflicts over resources, all of which are core issues of political ecology research, are inextricably and causally linked with environmental degradation.

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