Community involvement in peatland management: Social intervention approach and environmental law

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Abstract. Currently, the peat restoration program is the main solution to tackling land fires. The establishment of the National Peatland Restoration Agency (BRG) in 2016 by the President of the Republic of Indonesia shows the government's seriousness in efforts to restore peatlands. This paper aims to determine the effectiveness of social psychology intervention approaches in peatland restoration. This paper shows that community groups who are given social-psychological intervention can perform peat restoration well and in accordance with restoration principles. Not only that, but this group is also able to restore by integrating environmental, social, and economic aspects comprehensively. These three aspects are the main factors for sustainable peatland restoration.

1. Introduction

Peatlands have an important role in maintaining and maintaining the living environment's balance, both as water reservoirs and carbon storage [1]. The area of land fires in Jambi province continued to show an increasing trend from 2011 to 2015, namely 89.00 hectares in 2011, 11.25 hectares in 2012, 199.10 hectares in 2013, 3,470.61 hectares in 2014, and 19,528.00 hectares in years 2015 [2]. 2015 marked the worst year in the history of forest and land fires in Indonesia in the last 18 years. Losses incurred by this land fire include material and non-material aspects.

According to the world bank, the economic loss due to the peatland fires is estimated at US$16 billion, which is Rp 240 trillion. This does not take into account the long-term impact that will be experienced by children who breathe the haze caused by fire [3]. The number of people with Acute Respiratory Tract Infection (ISPA) in Jambi province in 2015 was 104,110 people and is the highest in Indonesia [2]. The high number of peatland fires in Indonesia, particularly in Jambi province, is caused by many factors. To follow up on this land fire problem, restoration was carried out.

This restoration emphasizes restoring the condition of the ecosystem as before. Peat restoration in Jambi province emphasizes environmental, social, and economic aspects in its implementation. Through the integration of these three aspects, the sustainability of the peat ecosystem can be achieved. The main actors in restoration are local communities supported by related agencies/government, non-governmental organizations, and academics. This is done so that the restoration carried out by the community is effective. In implementing the restoration, many methods and approaches can be applied. One approach that has a significant impact on society in restoration efforts is the social-psychological intervention.
One of the approaches that can be taken in peat restoration efforts is the social-psychological intervention. This social psychology intervention has an important role in building individual cognition in the group studied [4]. Based on data from various literature and researchers' experiences, we collect some emerging motivations about why villagers still burn the land even though they have suffered from catastrophic forest fires. Among these factors are: 1) there are no economically viable alternative solutions for them to clear their land without having to use fire; 2) conflicts between groups between HPH holders, HGU holders, and local communities related to land use issues and territorial problems; 3) taking advantage that leads to criminal behavior; 4) the belief that using fire to clear land will result in better quality yields; 5) various problems due to relations between residents and local authorities where for example migrants obey the law more than local residents. We propose several psychological factors related to the motivation for burning that need to be considered in designing this peat restoration intervention, namely, 1) the problem of social dilemmas; 2) perceived fairness; 3) free-riding; 4) psychological distance; 5) optimism bias; 6) conflict between groups [5].

1.1. Peat Ecosystem

Indonesia has the largest peatlands in the world's tropics and the 4th largest in general after Canada, Russia, and the United States. Peat ecosystems are a significant store of carbon globally [6,7]. The carbon stock stored in Indonesia's peat ecosystems reaches 46 gigatonnes or about 8-14% of the total carbon found in global peatlands. Peat ecosystems provide many benefits, including maintaining the stability of forest ecosystems, controlling floods and water supply, tourism potential, local community livelihoods (fisheries, agriculture, and plantations), climate stabilization, biodiversity, as well as for education and writing [8,9].

Peat ecosystems are fragile (fragile); therefore, management actions need to pay attention to their typology and natural character. Mismanagement of peat has degraded around 6.6 million ha of peatland in Sumatra and Kalimantan [10]. The Ministry of Agriculture reports that around 3.7 million ha (35%) of peatland in Indonesia is unproductive degraded peatlands [11]. The pressure on peatlands increases as the use of commercial, industrial, and drainage peatlands for agriculture and forestry [12]. If this is allowed to continue, it will experience drought during the dry season and is very susceptible to burning, either intentionally or not [13]. The fires that occur play a role in reducing the peat surface's relative elevation [14,15].

1.2. Peat Restoration

Under Article 30 of Government Regulation No.71 of 2014 concerning the Protection and Management of Peat Ecosystems, restoration is the restoration of peat ecosystem conditions as before. The restoration could be seen as very effective in overcoming the problem of peatland degradation. This provision refers to Article 54 paragraph (2) of Law No.32 of 2009 concerning the Protection and Management of Environment. Restoration, which is the restoration of the environmental conditions as before, is one of the stages to recover the environment's functions.

In 2016 the President issued Presidential Regulation No. 1/2016 on the Peat Restoration Agency (BRG). Based on the Presidential Decree, BRG was formed to accelerate area recovery and restore peat hydrological functions due to the forest and land fires in a specific, systematic, targeted integrated and comprehensive manner. This Presidential Decree was issued to follow up on the previous year's peatland fires so that not happen again. The National Peat Restoration Agency (BRG) started its role in peat ecosystem restoration in 2016. In its implementation, BRG is tasked with achieving three restoration targets, namely: 1) restoration of hydrology, vegetation, and the socio-economic carrying capacity of detected peat ecosystems; 2) protection of the peat ecosystem for life support; and 3) restructuring the management (utilization) of the peat ecosystem in a sustainable manner. Based on this task, the object managed by BRG is the Peat Hydrological Order (KHG). The management of the peat ecosystem by BRG aims to achieve multiple benefits, namely, economic, social, and ecological benefits [16].
1.3. Social Psychological Intervention

Social psychological intervention is a process of facilitating the resilience of individuals, families, and communities. This allows people to recover from the impact of a crisis and helps them to adapt and mitigate the same event in the future. With respect for the independence, dignity, and coping mechanisms of individuals and communities, social-psychological support plays a role in promoting the restoration of social cohesion and infrastructure. Through social psychology intervention, people can overcome social crises in their lives [17].

According to community psychology, there are four main approaches to intervention [18], namely raising awareness, capacity building, social action, and policy advocacy. Awareness-raising approaches are often chosen when issues are relatively new to the community or educational—activities such as campaigns, polls, surveys, and other socialization methods. Furthermore, capacity building focuses on establishing or increasing knowledge and/or competence of target interventions and not just raising awareness. The third approach is social action. This approach is used when the main activity is targeted to empower the community as an effort to induce social change from a participatory community process. The final approach is policy advocacy, while its main activity is through legal advocacy, policy research, and class actions.

Article 1 Law No.32 of 2009 concerning Protection and Management of Environment differentiate environmental pollution and environmental alteration. Environmental pollution shall include living creatures, substances, energy, and/or other components naturally or intentionally into the environment because of human activities, which has exceeded the environmental quality standard as set up. Environmental alteration shall be an act of a person/persons who direct or indirect alter physical, chemical, and/or biological conditions that exceed quality standards.

2. Method

This activity method is a method of community empowerment that is carried out with a social intervention approach to community groups in peatland restoration efforts. The empowerment pattern is carried out with a quantitative approach using quantitative data obtained from the observation process and the research instrument in the form of a questionnaire (questionnaire). The research location is in Sungai Bungur Village, Kumpeh Ilir District, Muaro Jambi Regency, Jambi Province. This location was chosen because, based on Presidential Regulation No.1 of 2016 concerning the National Peat Restoration Agency, one of the priority provinces for peat restoration in Jambi province and this village is one of the villages with the highest cases and fire vulnerability in Jambi province. So it is included in the top priority area for peat restoration. In addition, in this location, a “Green village” community group has been formed to play a role in restoring peatlands. In general, they still have limited capacity in restoration efforts. Therefore, it is necessary to provide social interventions so that the restoration efforts carried out can run effectively.

The population of this study was members of community groups at the location of the activity. The sample is in accordance with the definition of a population whose minimum number is set at 50% of the population representing age, gender, and education groups. This research was conducted to obtain data on the effectiveness of the restoration program being undertaken. The effectiveness of this restoration refers to the standards set by BRG. Furthermore, this effect's results can be seen from the correlation with integrating environmental, social, and economic aspects in the peat ecosystem.

The questionnaire used in this study has three parts. Part one provides background on the respondents regarding their age, gender, and latest education. The second part measures the effectiveness of restoration programs that have been implemented by the restoration program. Some of the items for this observation are mainly derived from various studies and reports on previous studies. Meanwhile, other statements are designed according to the actual situation, such as the current condition.

The instrument made using a Likert scale has four alternative answers where the alternative answers are Strongly Aligned, Agree, Disagree, and Strongly Disagree. Data analysis was performed using Miles
and Huberman's version of the steps consisting of data reduction, display data, conclusion drawing/verification.

This study also employs the doctrinal legal method, which aims to “clarify the law on any particular topic by a distinctive mode of analysis to authoritative texts that consist of a primary and secondary source.” One of the assumptions is that “the character of legal scholarship is derived from the law itself”.

3. Results and discussion

3.1. The effectiveness of the Social Psychology Intervention approach

Based on the research conducted, it was found that the community's capacity in restoring peat had increased. In addition, the ecological, social, and economic conditions in one peat restoration unit have also increased, as shown in the following Table 1.

| No | Indicator | Community Condition / Response Before | After | Restoration aspect |
|----|-----------|--------------------------------------|-------|--------------------|
| 1  | Peatland clearing | Communities tend to burn peatlands to open agricultural / plantation land. | Communities can manage agricultural land/plantations on peatlands without burning. | Environmental, economic, and social. |
| 2  | Peatland water level | The community did not take any action and considered the peatlands' water level to be part of a natural cycle. | The community monitors the water level of peatlands with a simple, accurate system and provides a mitigation response to any changes in the peatlands’ water level. | Environment |
| 3  | The presence of drainage | Communities widen drainage channels to speed up the water flow. | The community makes canal blocking in order to reduce the rate of water depletion in the peatlands so that the peatlands remain wet and do not burn easily. | Environment |
| 4  | Open peat surface | The community grows crops that are profitable for them. | The community grows crops that are economically beneficial and beneficial to the peat ecosystem with vegetation cover. | Economy |
| 5  | Collaboration and integration between communities in restoration actions | Restoration is carried out based on the knowledge of each individual and limited to the criteria they know. | Restoration is carried out based on ecological, social, and economic principles to provide a comprehensive and sustainable positive impact. | Social |
People tend to be marginalized by the arrival of investors. The community becomes more independent and gets justice in restoration efforts.

Based on the research results, it was found that community groups who were given social intervention experienced increased knowledge capacity and restoration action. The psychological mechanism in this dilemma is the tension between choosing a decision or behavior that will provide more benefits for oneself or others / social environment. This condition sometimes also refers to a pro-self versus pro-social situation. In this case, most people know that clearing land using fire will be very expensive for the environmental services that must be paid when igniting forest fires [19]. After the social psychology intervention was carried out, the community group realized that environmental services are very meaningful, and the consequences are too expensive if they are destroyed. Therefore, the community who initially cleared land by burning the land after being given psychosocial intervention preferred to use and clear peatlands without burning (clearing land without burning).

Initially, the community thought that the water level in peatlands was a normal, natural cycle. However, since being given psychosocial intervention, the community has realized that peatlands' water level is a natural indicator related to the level of vulnerability and potential of peatland fires. So, after being given intervention, the community understands the actions they must take to maintain this peatland's water level.

In the third indicator, the community initially flocked to open and expand drainage with the aim of reducing standing water on peat so that it could be planted with agricultural and plantation crops. The community's psychosocial intervention was introduced to the pattern of peatland management for agriculture without destroying the original ecosystem's condition. So that after being given intervention, the community tends to make canal blocking to maintain the wetness of the peatlands and apply a paludi cultural farming pattern that is in accordance with the peat ecosystem.

In the indicator of the existence of open peatlands, the community also experienced an increase in capacity. The condition in the original location, the community planted plants that only benefited them and did not pay attention to the plants they cultivated with the peat ecosystem's suitability. This creates ecological disturbances that increase the vulnerability of peatlands to fire. After being given social intervention, the community has the collective power to manage agriculture on peatlands by considering the suitability of the cultivated plants with the peat ecosystem. Thus, the community will benefit from the plant cultivation carried out, and the ecosystem will also benefit from the vegetation cover of the cultivated plants. Through this, the peat ecosystem can support social communities in the peatland area, and harmonious interactions occur.

The indicators of collaboration and integration between communities in restoration actions show an increasing trend. This increasing positive trend refers to the restoration action being undertaken. If the community carried out restoration actions only with the limited knowledge they knew, it was sometimes not according to ecology principles. Then after being given this intervention, all restoration actions were based on ecological principles. In fact, it is not only the principles of ecology but also the social and economic principles of society. Thus, the restoration carried out has a positive impact on the environment, social, and economy. The existence of peatlands strengthens the carrying capacity of social and economic life, and the community's existence provides a strengthening of the environment's carrying capacity.

The last indicator related to access to justice also shows capacity building. For decades, local communities living in peat areas have only become objects that continue to experience social and economic pressure due to the influx of investors who have ambitions to convert peatlands into production lands. The psychosocial intervention process results, especially in the aspect of access to justice, indicate that local communities are currently more concerned about their existence. This is a
very good fact because the local people are in contact with the peat area. Therefore, their existence must be considered and empowered socially and economically.

By law, clearing peatlands by burning could be an environmental alteration because the peatlands’ carrying capacity has reduced unnaturally. Under Article 53 of Law No.32 of 2009 concerning Protection and Management of the Environment, everyone who burns peatlands shall mitigate environmental damage. Burning land itself could be classified as environmental pollution provided that the measured pollution level exceeds the required quality standards. Land fires that occur naturally due to improper land clearing shall not be classified as environmental pollution but environmental alteration.

The role of the local community is very important. Therefore, it is very significant to increase the role of local government. By increasing the local government's role, the local government may work together with local community leaders and local religious leaders to impose the most proper sanctions on the alteration of peatlands by using the most appropriate local wisdom approach in the form of regional regulations.

4. Conclusion
This study concludes that overall the environmental, social, and economic components in the post-psychosocial intervention restoration program have increased positively with the concept of ecological, social, and economic restoration for a sustainable peat ecosystem.

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