Peatland Community Attitudes towards Conservation and Restoration Programs in Pelalawan, Riau, Indonesia

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Abstract. One of the priority areas for restoration and conservation of peatland after the 2015 fires in Riau is Pelalawan District. The community attitude around peatland will affect the success of conservation and restoration activities carried out by the government together with the Peatland Restoration Agency (BRG). This research aims to determine the community attitude around peatland toward conservation and restoration programs using a descriptive method with a qualitative approach. The total number of respondents is 45 communities spread over two sub-districts in Pelalawan, Riau. The location determination was carried out by purposive sampling where two sub-districts were selected, the Bunut sub-district representing the mainland peatland area and the Pelalawan sub-district representing the coastal peatland area. The main results of this research indicate that conservation and restoration of peatland such as the establishment of Fire Concerned Community (MPA), the existence of re-vegetation, canal blocking as form of re-wetting, and re-vitalization of livelihoods in Pelalawan, Riau obtain a positive response from the community along with it, community participation programs organized by the government. This research shows to the public that local peatland communities have awareness and understanding of the importance of protecting peatland area ecosystem.

1. Introduction

Peatland is a unique and sensitive ecosystem, has complex hydrological systems and bears important economic service functions [1]. For instances, Sumatra and Borneo are part of the Sundaland biodiversity hotspot [2], controlling temperature, humidity, hydrology, and producing carbon for the world [3]. It supports the flora-fauna diversity and human community livelihoods [4]. Peatland areas are able to contribute to the economic functions for surrounding communities (wood and non-timber products) in a sustainable manner. This condition is used by the surrounding community to earn a living in order to improve household economic conditions [5].

Globally, peatlands are threatened with a decline in peat stocks by 0.02% annually [6] because of degradation due to exploitation and fires. In 2015, 40% of hotspots throughout Indonesia located on peatland [7]. Riau Province has the largest peatland and forest fire, accounting for 1,928.26 ha, due to this, the government formed the Peatland Restoration Agency (BRG) which plays a role in the peatlands conservation and restoration in Indonesia [8]. The agency has a 3R program namely re-vegetation, re-wetting, and re-vitalization. In Riau province, one of the worst hotspots was in Pelalawan District. The 3R program is needed to protect the ecosystem so that it remains balanced and the community can use
it as a livelihood. Because it is one of the hotspots and there is degradation due to fires, this location was chosen to be the research location.

As a result of peatland degradation and exploitation which is very detrimental to the country, especially for peatland communities each year, the Indonesian government forms the BRG. BRG strives for conservation and restoration of degraded land conditions. The effort is in the form of carrying out activities for restoring degraded peatland, developing peatland utilization, empowering farmer groups and communities around peatland. In recent years, BRG has implemented the program and in implementing the program BRG needs the support and synergy of the local government and community. However, in Pelalawan District, precisely in Bunut and Kerumutan sub-districts, no research has been conducted on the local community attitudes to the programs that have been carried out by the government in peatland area. Therefore, this research aims to determine the community’s attitudes towards conservation and restoration of peatland in Palalawan, Riau.

2. Method

2.1. Location Decision Method
This research conducted in Pelalawan, Riau. This area has become one of the priorities in peatland restoration due to fire in 2015 [8]. The existence of high land exploitation makes the Pelalawan District area at risk of experiencing forest fires in the dry season [9].

2.2. Sampling Method
The sampling method used in this research is purposive sampling. Purposive sampling method is a sampling method with certain considerations. The sample is a part of number and characteristics possessed by a population [10]. This research activity is an action research conducted in the Krumutan sub-district as a representation of coastal Malay community and Bunut sub-district as representation of mainland Malay community. The number of respondents in this research were 45 people who lived and worked on peatland area.

2.3. Data Analysis Method
The analysis methods used in this research is descriptive method to describe and determine the community attitudes towards conservation and restoration of peatland in Palalawan, Riau. Descriptive method is a method in a status research of community, an object, a condition, a thinking process, or a group of recent event. The aim is to make a description or portrayal systematically, factually, and accurately [11].

3. Results and discussion

Attitude is a predisposition to do or not to do a certain behavior, an attitude is more on an individualized awareness process. Attitude is also interpreted as a tendency to consistently provide pleasant or unpleasant responses to an object, this tendency is the result of learning, not innate or hereditary. Attitudes can be positive or negative. In a positive attitude the tendency of action is to approach, like, expect certain objects, while in a negative attitude there is a tendency to stay away from, avoid, hate and dislike certain objects [12]. The attitude of the community around peatland will affect the success of conservation and restoration activities carry out by the government together with several institutions, such as the BRG which was established by the government to assist peatland communities in protecting and conserving peatland ecosystems, especially from the danger of fires that are very easy to occur in peatland. Following are the results of research on community attitudes towards conservation and restoration that have been carried out in Bunut and Kerumutan sub-districts, Pelalawan, Riau.

3.1. Community attitudes towards Peatland Conservation
Indonesia's peatland has a very important value because it provides forest products such as timber and non-timber, store and supply water, store carbon, and a habitat for biodiversity with many rare species of
flora and fauna found only in this ecosystem. Peatland ecosystems should be protected in order to be maintained until the next generation. Legal aspects regarding peatland conservation are regulated in Presidential Decree No. 32 of 1990 concerning protected areas. There are several approaches that can be taken in the context of peatland conservation: (i) tackling forest and peatland fires, (ii) replanting with high carbon-fastening plants (trees), (iii) adjusting ground water level, (iv) utilizing abandoned shrubland, (v) strengthening legislation and monitoring peatland usage and management, and (vi) providing incentives in peat conservation [13]. Peatland communities together with the government in Bunut and Kerumutan, Pelalawan, Riau can carry out conservation by doing a number of these methods. The following chart shows the involvement of the government in providing financial support and extension programs in Bunut and Kerumutan, Pelalawan, Riau.

Peatland conservation effort in the form of extension services and government support has been felt by the peatland in Pelalawan Riau. According to questionnaire data analysis in Bunut and Kerumutan, Pelalawan, Riau, extension services are held 2 or 3 times a year. If the local community has felt the impact of these conservation activities, then the community will automatically be more active in conservation activities. [14]. The existence of an extension program received a response from the community as much as 60% following the extension activities, while the rest have never followed a government extension program as shown in Figure 1(a). This is due to the lack of information obtained by the community, especially those who live far from the district or in the forest, long distances make some communities reluctant to come, then because there are some communities who are not members of farmer groups so do not know about the existence of agricultural extension activities, and the busyness of the communities who go to the land from morning to evening. Based on the result of interviews, extension programs that they often get about how to manage peatland and technology usage. On the other hand, the community also needs counseling on processing agricultural products to increase added value by modifying products and packaging and marketing of the processed products.

Based on the result of interviews, extension programs that they often get about how to manage peatland and use of technology. In addition to extension services, physical support from the government is needed, this is in accordance with research on peatlands that the success of conservation depends on sufficient knowledge about peatlands [15] but based on the Figure1(b) only 29% of respondents have received such support. Although government support has not been maximized, the community continues to carry out agricultural activities on peatland even with minimal funds.

3.2. Community Attitudes towards Peatland Restoration

Peatland is one of the marginal types of land chosen mainly by large plantations, because it is relatively sparsely populated so the possibility of land use conflicts is relatively small. Due to excessive land use, the land needed is also getting wider. This can trigger fires on peatlands. In 2015, Bunut and Kerumutan
have experienced peatland fires that seriously disrupted community's daily lives. Fire in peatland does not only occur on the surface or on the ground, but in peat soils that produce thick smoke and take a long time to extinguish it. This prompted the government to form the BRG to implement the 3R program or an extension of re-wetting, re-vegetation, and re-vitalization of livelihoods [16]. This restoration activity will not proceed without the support of the community in peatland area. This following is the community attitude towards restoration that has been carried out in Bunut and Kerumutan, Pelalawan, Riau.

3.2.1. Fire Ban
Fire ban is an appeal or warning to the community around peatland to avoid the use of fire around peatland and in the peatland management [17]. This is because, peatland is very sensitive to fire. Before the fire ban, communities often use fire in clearing peatland by burning the land. This is one of the causes of fire that easily spreads to other peatland. One way to prevent fires from supporting restoration activities is through a fire ban. The following is the community's response to the fire ban.

![Figure 2. Community opinion on the fire ban.](image)

To prevent fires in support of the restoration project is the presence of fire ban. Based on the research result, as many as 96% of respondents agreed to a fire ban in the peatland area. Due to the rules of fire ban are the beginning of prevention, then the community can also be careful in using fire when they are on peatland area. This is in accordance with research on fires in Kampar district that the community understands about fires and their consequences [18]. If fire is reduced or even prevented, it will be very beneficial for peatland farmers and the community's economic activities will not be disrupted. There are 4% of respondents who disagree with the fire ban because it is considered harmful to them. Fire will accelerate the process of clearing peatland, the costs incurred are more efficient than using machines, and can save energy.

3.2.2. Establishment of Fire Prevention Team
The Fire Prevention Team is a team formed through the village government in Bunut and Kerumutan, Pelalawan, Riau, whose members are community representatives so they are referred to as the Fire Aware Community (MPA). The aim of establishing MPA is to increase monitoring of forest fire prevention on peatland area. Figure 3. Shows the MPA representative named Mr. Mulyadi and Mr. Zainal. They are members of MPA group in Bunut. Their task is to monitor peatland to ensure that fires do not occur, helping to remind communities not to use fires such as smoking near peatland because it is vulnerable in Bunut, especially Merbau village. Until now they are still active as MPA members in Bunut District.

Based on Figure 4. It can be seen that youth in Kerumutan are enthusiastic in participating in MPA mentoring activities. In accordance with previous research that one form of community participation in peatland fires is by establishing MPA [19] The MPA mentoring activity was carried out to train the community, especially youth, to respond in the event of a fire disaster in Kerumutan.
This assistance was carried out with active MPA members in Kerumutan. The activeness of the community shown in Figure 3 and Figure 4, as well as the results of the questionnaire in each district shows the positive community attitude who fully supports the formation of a fire prevention team, because with the fire prevention team will assist the community in delivering information about peatland if it occurs fire, then MPA can also work together to overcome fires that occur in peatland so that fires can be dealt quickly. In addition, MPA can also conduct counseling to increase community awareness so as not to burn so that environmental sustainability is maintained.

3.2.3. Canal Blocking.
Peatland re-wetting is needed to restore moisture [16]. Re-wetting land can be done either by building walls of the channel (canal blocking) that serves as a water barrier so that water can be stored in the canals/ rivers. The target of proper peatland re-wetting is not to raise the water level as high as possible, but to raise the ground water level in such a way as to increase peat moisture (especially in the dry season) so that it is not easily oxidized and / or burned.

After the fire in 2015 in Bunut, canals began to be built by government together with the community. The canal blocking is not only to keep the peatland water content wet but it is also used by the community to catch fish in the canal to be sold or consumed by their own families using a tool called a “bubu” shaped beam of wire as shown in Figure 5 The formation of the canal blocking was accepted by the community, but the community in Bunut had experienced a failure of channel formation during the design by the government. Kerumutan has a river that is also used by the community to catch fish because of fish catches abundance, besides being palm oil/rubber farmer, some communities in Kerumutan work as fishermen to increase income. Previous research has also shown that channel blocking is beneficial for community's lives for generations [20]. The types of fish available are Tuakang, Pelumpung, Toman, Silincah, Batung, Jalai, Pantau and various other fish species. The river in Kerumutan functions as a water barrier to keep the canals filled with water. Existing rivers and canals also function as a source of water to extinguish fires in case of fire. Because Kerumutan is located in a
coastal area, canal blocking functions as a barrier to the entry of seawater into peatlands so that plants can grow well.

![River in Kerumutan, Pelalawan, Riau.](image)

**Figure 6.** River in Kerumutan, Pelalawan, Riau.

3.2.4. Peatland Revegetation.

Peatland can be planted again (re-vegetation) with plants that do not interfere with the water cycle in peat ecosystems and/or carbon-binding plants such as rubber and palm oil [21]. Re-vegetation process serves to maintain the sustainability of the peat ecosystem and also strengthen the canal blocking, and protect peatland from being eroded by canal water flow. Some types of plants native to the peat ecosystem are jelutung, ramin, swamp, aloes, and meranti. In addition, some plants such as coffee, pineapple and coconut are also peat-friendly and have economic value for the local community.

![Revegetation of Peatland.](image)

**Figure 7.** Revegetation of Peatland.

Based on Figure 7, it can be seen that the new peatlands through re-vegetation process in Bunut District. The land is planted with various types of horticultural crops including cassava, coffee, bananas, and others. In accordance with previous research that it is very important to develop horticultural crop trials with wet agroforestry schemes. [15] Horticultural crop planting was chosen to provide increased plant diversity. If the price of palm oil or rubber falls, community can take advantage the horticultural crops to be processed and sold at a higher price.

4. Conclusion

Conservation and restoration of peatlands such as the formation of the Fire Concerned Community (MPA), the existence of canal blocking, re-vegetation, and re-vitalization of community livelihood in Pelalawan Riau received support and positive responses in the form of community activity in participating in various activities held by the local government. It illustrates to wide community that local peatland communities have awareness and understanding of the importance of protecting the ecosystem of peatland areas.

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