

Abstract No: A-173

STRATEGY TO CONTROL FOREST AND PEATLAND FIRES AFTER CENTRAL KALIMANTAN FIRE IN 2015

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SUMMARY

Forest and tropical peatlands fires provide a wide impact on various aspects of life including health, economy and environment. Massive forest and peatland fires in Central Kalimantan began in 1997 and likely to recur in every dry season, including severe drought occurred in the year 2105 in conjunction with the strong influence of El Nino. Impact on health issues, the economy and the environment especially in Central Kalimantan showed the seriousness of the impact caused by land and forest fires. The positive thing that emerges from forest fires and land in 2015 is the presence of a sizable public awareness related impacts. Fire control measures in 2015 proved to be very difficult and costly, since it is necessary to take control of scarce land and forest fires which emphasizes the prevention aspect. Focus group discussions were conducted with various stakeholders and produce a strategy which includes control of peat hydrology, restoration and community-based firefighting must be done, by also promoting the economic development of local communities. The role of each main stakeholder, allocation of resources, should be a concern. Mentoring and coaching that begins with mapping the problems in each region should be absolutely made.

Keywords: *fire, peat, control, community*

INTRODUCTION

Peat swamp forest and peatland area in Central Kalimantan covering approximately two million hectares, which is scattered in several regencies in the southern part of Borneo Indonesia (Wetland, 2004). However, for the last twenty years, these peatlands have experienced the annual wildfire disaster due to the impact of the high nature destruction particularly on the disturbance of its hydrological function. As the results, the worst air pollution due to haze from fires in the history of Southeast Asia happened during the strongest El Niño in 1997-98, which is the worst recorded incident before 2011, dense haze that caused the air pollution was recorded mostly from forest fires and peatland in Indonesia (Heil *et al.*, 2006). Page *et al.* (2002) estimated that 810 - 2,570Mt carbon was emitted during the high fire incidence in 1997. Furthermore, analysis results by Yulianti *et al.* (2012) using MODIS hotspot data for the 2002-2011 clearly showed the highest hotspot density areas in Indonesia located in Kalimantan and Sumatra Islands. The area with the most fires in south Kalimantan is located at the Mega Rice Project (MRP), Central Kalimantan had a mean 2,223 hotspots/yr and hotspot density, 0.188 hotspots/km²/year. This number remains Indonesia as one of the top carbon emitters, after China and US during latest decade.

In 2015, Indonesia came back into the world's spotlight related to fires and transboundary haze crisis. The fire in the southern MRP, Central Kalimantan mostly occurred in new plantation area, small plot-agriculture, and unclear drained peatland prior to 2015 as mentioned in Atwood *et al.* (2016). During the peak fire season (Late October-Early November), the major trace gases that were mixed in with the dense smoke were carbon dioxide, carbon monoxide, methane, hydrogen cyanide, acetic acid and ammonia (Stockwell *et al.*, 2016). These gases are considered harmful to all living things. Other indicator is the concentration of particulate matter (PM10) in Palangka Raya (Central Kalimantan) showed concentrations >2.500 ug/m³ (Meteorological Station Tjilik Riwut's document) higher than in 2002 and 2006 severe fires (<2,000 ug/m³, Hayasaka *et al.*, 2015). According to the technical guidelines for the Air Pollution Standard Index information, the safe limit for human health PM 10 is <400 ug/m³. If the index threshold is passed, air is in very unhealthy conditions and will increase the sensitivity of patients with asthma and bronhitis diseases. Assuming that condition continues year by year, it will affect not only the climate and biodiversity but also the younger generation in the future. Therefore, the Faculty of Agriculture University of Palangka Raya responds to the problem by conducting a meeting and group discussion with members of the faculty, students, and relevant the Local Government Agencies. This work aims to gather and share information, opinions and solutions to control Central Kalimantan fire after 2015.

METHODS

This forum was held on 20th November 2015 at the hall of the Faculty of Agriculture, University of Palangka Raya. The number of participants was 150 peoples from the Local Government Agencies, professional associations, faculty members and students. The data used are primary data from the Focus Group Discussion (FGD) and interviews (Q and A session). FGD were held to discuss sustainable peat management recommendations that primarily address the repeated incidence of forest fires and peatland in Central Kalimantan. FGD focus on three topics are water management and sustainable use of peatlands, restoration of peat swamp forests and its socio-economic value, and a strategic of carbon emission reduction and fire prevention in Central Kalimantan. Information of FGD relied on information from various stakeholders. Furthermore, the interview (Q and A session) was conducted to explore more detailed information from the key resources, namely Prof. Mitsuru Osaki from Hokkaido University and Chairman of the Association of Japanese Peat, Dr. Adijaya as an expert in Central Kalimantan's peat hydrology and Dr. Yanaritha as an expert in social forestry (community-based knowledge).

RESULTS AND DISCUSSION

Water management and sustainable use of peatlands

There is expected the pilot villages "zero burning" with sustainable management between University of Palangka Raya and University partners. Respondents in this forum recommended rewetting of peatlands and setting the level of the water as a way to restore natural conditions. Rewetting can be done by (i) establishing canal blocking a WWF initiative in Sebangau National Park, (ii) constructing deep well for fire extinction such practiced by CIMTROP and community forests "Jumpun Pabelum", and (iii) digging *Beje* (small ponds) near to the river or canal such as found in Desa Taruna with new construction that can avoid fast drying up during the dry season. Cultivated and drained areas are advised for groundwater levels to be monitored on a regular basis. One of the technologies tested in Central Kalimantan is SESAMEs system. This method is one of the results of long-term cooperation between Hokkaido University and the University of Palangka Raya.

Restoration of peat swamp forests and its socio-economic value

Restoration should involve a unified villages as integrated target for example Tumbang Nusa, Taruna, and Sakakajang in Jabiren regency. So far, an agroforestry system is a great option for peatland near Palangka Raya. To facilitate the restoration activities, there should be an established local tree nursery managed by the University of Palangka Raya in cooperation with Forestry UPTs such as the Central Management of Kahayan Watershed (BPDAS). In addition to increasing the economic value of peatland, it would require the empowerment of local communities on a small scale. Actually, communities in Central Kalimantan of mainly Dayak do understand the natural conditions and its management but only lack in financial support. The future program of pilot village is planned to be related to the potential of the village, to reduce culture shock in the community. Alternative cultivation of food crops that are resistant to high water level management (flooded) is one of the choices for peatlands. Sago palm is one of the suitable plant for this condition. Starch and residual biomass from sago can be used as a food, cattle fodder and a source of energy (bioethanol), which provides economic value to local communities.

Strategic of carbon emission reduction and fire prevention

Fires are a main source of greenhouse gas emissions (GHGs) in Central Kalimantan. Those incidents are man-made and it is possible to predict when and where the occurrences. Recently, a monitoring system has been developed involving NASA satellite data, NOAA and unmanned aircraft (drone). A study developed by researchers Palangka Raya University Faculty of Agriculture, use the integrated early warning technology of satellite-based monitoring with Information Communication Technology (ICT), which involve lower cost in the form of web applications and smartphones (link www.kaltengpeatlandfire.org). On the other hand, there is necessity to propose cooperation between researchers from the University of the Regional Disaster Management Agency both provincial and district level to apply research results to reduce the number of fires in peatlands. The decline in fire occurrences will reduce emissions carbon dioxide. Rewetting and restoration method that described above is also a solution for reducing emissions from decomposition and fires. Moreover, vegetation planting on the sides of blocking canal should also be done to reduce methane emissions from the reduction process. Hokkaido University and the University of Palangka Raya also have emission measurement tower and chamber for regular monitoring of GHGs from peatland area.

CONCLUSION

Severe fires in 2015 occurred due to the accumulation impact of the lack of sustainable management of

peatland in Central Kalimantan during the last decades. This stakeholder's forum have recommended the pilot village in the former Mega Rice Project (MRP), which encourages zero fire use by promoting water management and restoration based on a combination of local knowledge and recent technology in Central Kalimantan. The method can be implemented to reduce the fire with proper early warning system, adaptive plants for high ground water level, empowerment of local communities, and hydrology management.

ACKNOWLEDGEMENTS

This was conducted as a part of 2015 Dies Natalis of Faculty of Agriculture, University of Palangka Raya. We thanked Indonesia Ministry of Research, Technology and Higher Education" for partially support on project works with the title *–Development of Integrated Fire Early Warning Systems for Sustainable Palm Oil Agro-ecosistem in Peatlands*".

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