

Recent Peat Fires Tendency in Mega Rice Project Area, Central Kalimantan, Indonesia

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The Mega Rice Project (MRP) in Central Kalimantan, Indonesia, was started in 1996 with the aim of converting one million hectares of tropical rain forest on peatland into paddy field and promoting of transmigration. This project just left significant negative effect in this area. Water tables in the MRP area considerably declined due to channels and irrigation system developed by the project. Thus, peat soil in the MRP area now could dry easily and become good fuel during dry season. This situation was ironically proved by severe peat fires occurred under abnormal drought induced by El-Niño event in 1997, 2002, 2004 and 2006.

In order to grasp peat fire activities in MRP area, SiPongi-NOAA hotspots data from 1997 – 2007 were analyzed. The hotspots were mapped using 9,240 grids of 1 km² size to find the severe fire areas in MRP. Monthly and daily precipitation data from Tjilik Riwut Climatology Station located at Palangkaraya Airport, and monthly Sea Surface Temperature (SST) data from NOAA-National Weather Service were analyzed to assess the relationship between abnormal drought enhanced by El-Niño and peat fires occurrences. Air pollution data between 2001 and 2007 measured at Palangkaraya city by Central Kalimantan Regional Environmental Impact Management Agency was used to understand relationship between peat fire activities and air pollution level. Ground water level data was measured by Takahashi et. al. (2007) in a peat swamp forest on the right bank of River Sebangau near Palangkaraya.

The results showed that El-Niño event could bring very severe and abnormal drought lasted for few months and could make severe peat fires as a result. Severity and abnormality of drought under El-Niño event were found to have strong relationship to positive values of SST anomalies. Large number of hotspots or fires was detected in MRP area mainly in dry season of El-Niño year. Number of hotspots was 8,401 in 1997; 5,734 in 2006, 4,961 in 2002 and 3,591 in 2004. Relatively large number of fires also observed even in non-El-Niño year with positive SST anomalies. Actually, 2,959 hotspots were found in 2001; 3,410 in 2003; and 1,583 in 2005. This indicates that there is a strong relationship between fires occurrences and positive values of SST anomalies.

Results for ground water level showed that fires were observed to be started at ground water level around 20 cm below ground surface. Number of fires was related to the decrease of ground water level. In El-Niño year, ground water level decreased monotonously related to severity of drought and fires become more active as a result. This monotonous decrease was made by long dry season due to El-Niño event. In 2002, deepest ground water level of 117 cm was observed and hundred of fires started when ground water level become below -80 cm. This may indicate that ground water level could be considered as one of good indicator of severe fire occurrence.

Distribution map of hotspot clearly showed that severe fire areas in MRP were main channel and central part of Block A, along Trans Kalimantan Highway Road in Tumbang-Nusa Village area, and central-southern part of Block C area that mainly paddy field and abandoned land. Fires in these areas may support the judgment that fires was thought to be mainly human-caused fires due to intentional and careless use of fires in land clearing, slash and burn, cigarettes and cooking purposes during fishing.

Air quality in 2002, 2004 and 2006 was found in dangerous level for human when PM₁₀ concentration increased to more than 300 ppm under severe peat fire occurrences. Relationship was found between number of hotspots or fires and concentration of PM₁₀ as formulated with $[PM_{10}] = 0.1821 \text{ Hotspots} + 6.9764$, $R^2 = 66.6\%$.

Finally, peat fires in MRP area should be suppressed by reducing intentional and careless fires and educating local inhabitants because fires were mainly human-caused fires.