EARLY WARNING AND RESPONSE TO PEATLAND FIRES IN CENTRAL KALIMANTAN

Peatland fires lead to major economic losses, widespread health problems, and risks to biodiversity. They also significantly contribute carbon emissions. IRI, Bogor Agriculture University, CARE Indonesia and other partners have developed tools to forecast fire activity months in advance of the fire season. These early warning tools can help decision-makers manage fire risk and reduce the impact of peatland fires.

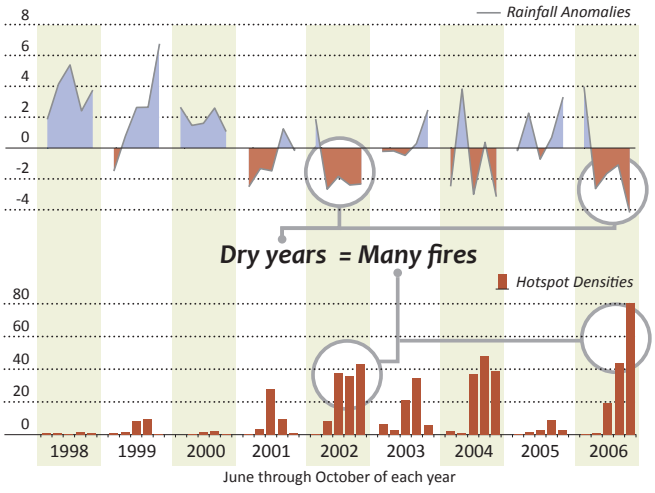
The Problem of Peatland Fire

In Kalimantan, Sumatra and other parts of Indonesia, fire has long been an integral part of agricultural practice and food production, providing fertility to soils while helping to clear land for cultivation. However, uncontrolled spread of fire poses a serious risk to public health, livelihoods, and conservation efforts in Indonesia. In 1997-98, peatland fires resulted in major regional haze, thousands of hospitalizations, and estimated $5-10 billion in economic losses. According to published research (Nature, 2002), these fires accounted for the equivalent of 13-40% of global carbon emissions from fossil fuels during that time. The peatlands of Central Kalimantan province have undergone dramatic ecological and social change over past decades. Millions of hectares have been drained and converted from forest to agricultural land and palm plantations. These lands are at a much greater risk of uncontrolled fire spread, particularly when rainfall is below-normal levels.

The Relationship Between Fire and Climate

IRI partnered with the Center for Climate Risk and Opportunity Management (CCROM at Bogor Agriculture University) and CARE Indonesia to understand the role of climate in determining fire activity. This research revealed that rainfall during the dry season from June-October – when most fires are started – is particularly critical in determining the severity of fire activity. Analysis of rainfall and fire hotspots from 1998-2006 indicates that below-normal rainfall is associated with more severe fire activity, compared to normal years (Fig 1). In addition, due to the strong influence of El Nino-Southern Oscillation (ENSO) on rainfall in Indonesia, researchers effectively integrated ENSO indicators, such as sea surface temperatures (SSTs) in the tropical Pacific, to predict fire activity in advance of the fire season.

Figure 1



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PEATLAND FIRES IN CENTRAL KALIMANTAN

Francesco Fiondella/IRI

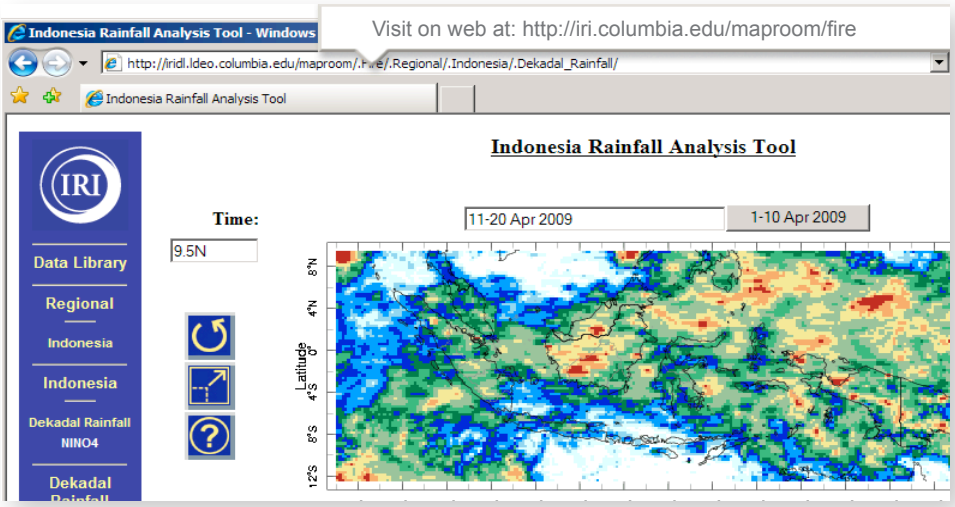
Tools to Forecast Fire Activity in Central Kalimantan

In collaboration with the Central Kalimantan Department of Environment (BLHD), the Indonesian Meteorological Service (BMKG) and the Indonesian Space Agency (LAPAN), IRI has developed an online fire early warning tool based on scientific knowledge of the relationships between fire activity and climate (Fig 2). This tool, available in English and in Indonesian, enables users to view maps of satellite-monitored rainfall data by province, district, or other selected areas, for user-specified time periods. In addition, it allows users to make forecasts of fire activity several months ahead using NINO4, an index of SSTs in the Pacific Ocean. The information in this tool about rainfall and seasonal forecasts of fire activity complements current few-days ahead information about fire risks.

Figure 2

Visitors to the IRI Data Library can get detailed precipitation estimates for Indonesia from 7 Dec 2002 to the present.

They can also animate the data on the map for any number of days, and overlay coast, country, state, province, and district boundaries.



Integration of Fire Risk Information into Decision-Making

The IRI fire early warning tools give decision makers the ability to predict rainfall patterns and forecast elevated fire risk in advance of the fire season. This offers an opportunity to mobilize resources early for fire suppression, as well as to enact policies to encourage the use of alternatives to fire in high-risk years.

IRI is working closely with CCROM and provincial and district-level government stakeholders to ensure that the tools meet decision needs, and to identify policies and institutional arrangements that could help encourage the use of alternatives to fire in high-risk years. IRI and CCROM are sharing knowledge gained through this effort in other parts of Indonesia for use in early warning systems.

ABOUT THE IRI

The IRI works on the development and implementation of strategies to manage climate related risks and opportunities. Building on a multidisciplinary core of expertise, IRI partners with research institutions and local stakeholders to best understand needs, risks and possibilities. The IRI supports sustainable development by bringing the best science to bear on managing climate risks in sectors such as agriculture, food security, water resources, and health. By providing practical advancements that enable better management of climate related risks and opportunities in the present, we are creating solutions that will increase adaptability to long term climate change. IRI is a member of the Earth Institute at Columbia University.