

Southeast Asia Fire Danger Rating System Project - Update

(February 2003)

The Southeast Asia FDRS Project is a 5.5-year regional Canadian International Development Agency initiative. The project is executed by the Canadian Forest Service with partner agencies in Indonesia, Malaysia, Singapore, Brunei and at the ASEAN level. Its purpose is to enhance the capacity of resource management organizations at regional, central and local levels in Southeast Asia to manage vegetation fires and associated haze.

Background

Extreme weather conditions like droughts and floods usually result in environmental disasters costing billions of dollars each year. El Nino-related droughts occur every two to seven years in Southeast Asia with varying intensity. This phenomenon causes the monsoon to be delayed, thus prolonging the dry season and increasing the impact of the drought. For example, the droughts of 1997 and 1998 resulted in heavy air pollution from wildland fires in large areas of Indonesia, Singapore, Malaysia, Brunei, Thailand and the Philippines. These fires burnt an estimated five million hectares during 1997 in Indonesia alone. The sources of these fires were agricultural and land conversion burning. These fires generated large emissions of carbon dioxide, carbon monoxide, nitrogen oxides, ozone, hydrocarbons, particulate matter (smoke) and other pollutants. These emissions contributed to the local and transboundary air pollution issues of human health, transportation, climate change, acidic deposition and smog. Magnitude of the Haze Index (HI), Air Pollution Index (API), and airport visibility indicated that the worst air pollution occurred in the fire-prone regions of Sumatra and Kalimantan, with Singapore and Peninsular Malaysia being affected as a result of smoke transport from fires in Indonesia. Fires continue to be a problem, as evidenced by the haze problems during the 2002 dry-season in Central and West Kalimantan, and the Southern regions of Sumatra. Since natural phenomenon cannot be readily controlled by people, prevention and early detection of fires is the best way to minimize air pollution at the source and the resulting impacts.



The 1997 large-scale smoke event in Indonesia

The purpose of the Southeast Asia FDRS is to provide early warning of critical burning periods when emissions from land and forest fires will be greatest or most damaging. Using this advance information, fire management and regulating agencies can minimize haze problems by implementing land burning restrictions and enhancing forest fire detection in anticipation of serious burning conditions. This kind of early warning system is designed to integrate with national and regional fire management programs through direct decision-aid links

to prevention, detection and suppression activities. The Southeast Asia FDRS Project has been working cooperatively with regional partner agencies to develop a system that quantitatively assesses current and future fire danger on a daily basis. Standard fire danger parameters for the region are then used to develop fire management decision-aids specific to each country through workshops with local fire experts. In this way, all countries in the region communicate using the same fire danger information, and each country is able to adapt the information to their own particular fire management situation.

Operational FDRS Mapping



Indonesia, Malaysia and SE Asia FDRS websites

One result is operational mapping of weather-based fire danger indicators. To date, a regional, web-based FDRS is operating at the Canadian Forest Service research center in Edmonton, Canada. Furthermore, a national FDRS for Indonesia has been successfully implemented at the Indonesian Meteorological and Geophysical Agency in Jakarta, with continuous operation having commenced in August of 2002. Daily fire danger maps are produced by the MGA and disseminated directly to user agencies and to the public through the Internet. A national FDRS for Malaysia was successfully



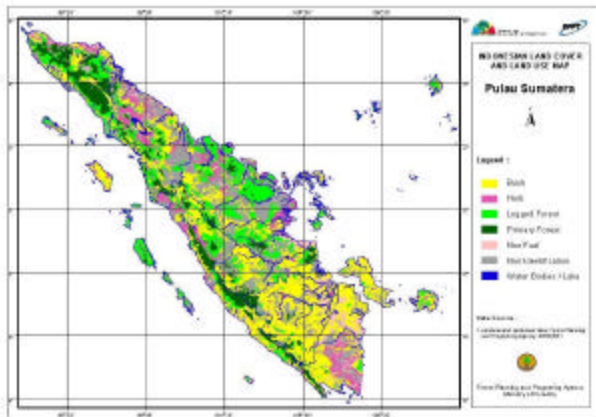
Field data collection for FDRS calibration

implemented at the Malaysian Meteorological Service in January of 2003, in a collaborative effort with the Malaysian Centre for Remote Sensing. Similar systems are currently being developed with local agencies for pilot regions in Sumatra and Kalimantan, as well as in the East Malaysian state of Sabah.

Calibration of the FDRS to local conditions has been completed based on satellite fire detection and ground-based measurements of visibility. Actions based on these indicators are being developed with national and provincial/state fire managers.

Fuel Mapping

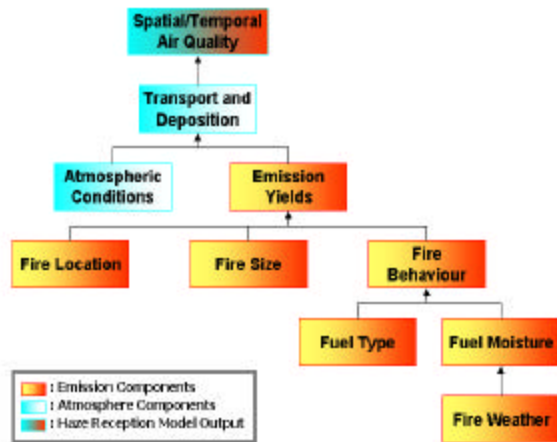
A second result is to add a level of sophistication to the system by adding fuel information. Some work has been completed, which allows fire managers to interpret the fire weather for different fuel types. Fuels are mapped using satellite imagery, existing land cover data and existing soil maps. Other studies are underway, being conducted by local partners.



Fuel map for Sumatra

FDRS-Haze Forecasting

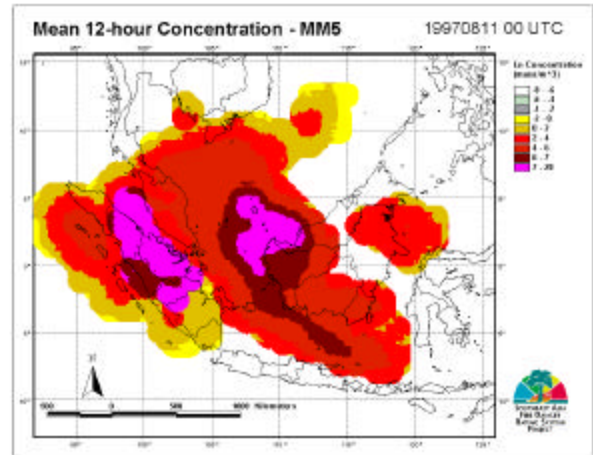
A third result is the coupling of fire danger rating to emissions and atmospheric transport models to manage smoke pollution. The models under development are designed to determine which receptor regions are most at risk of haze, and subsequently, which source regions are most critical in terms of fire prevention and preparedness. We are currently conducting a retrospective simulation of the 1997 and 1998 haze disaster in Indonesia, to assess the ability of existing smoke dispersion and emissions models in predicting



Structure of integrated FDRS-Haze model

haze episodes at downstream locations. This simulation relies on historical fire danger observations and data derived from remote sensing including fire detection, fuel maps and burned area maps.

In conclusion, the SE Asia FDRS project provides an early or advance warning information system to improve fire and smoke management at multiple scales.



Forecasting results for the 1997 haze event

Upcoming Activities

- Fuel moisture and ignition studies of grasslands and peat in Sumatra will be completed with results used to further calibrate the FDRS for SE Asia conditions.
- Ongoing FDRS application activities at Siak and Pontianak in Indonesia, West Malaysia and in Sabah, East Malaysia.
- Newly completed project communications strategy will be implemented to effectively disseminate a variety of FDRS information to scientists, fire managers and the public.
- Fire management and training officers from the region will translate SE Asia FDRS training module to local languages and commence training implementation. A training program for FDRS and fire behavior is being planned for the ASEAN CSU.
- Three Canadian technical and training missions are planned for the region in early 2003.

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