ENVIRONMENTAL MONITORING PROGRAM

Every year in the developing world, malnutrition and infectious diseases kill between 10 and 15 million children, while agricultural pests such as the desert locust destroy thousands of crop acres, ruining livelihoods and threatening regional food security. These outbreaks are climate-sensitive. Their extent and intensity depend largely on environmental conditions such as temperature, rainfall and vegetation. Monitoring changes in these conditions can therefore help decision makers in agriculture and health ministries assess

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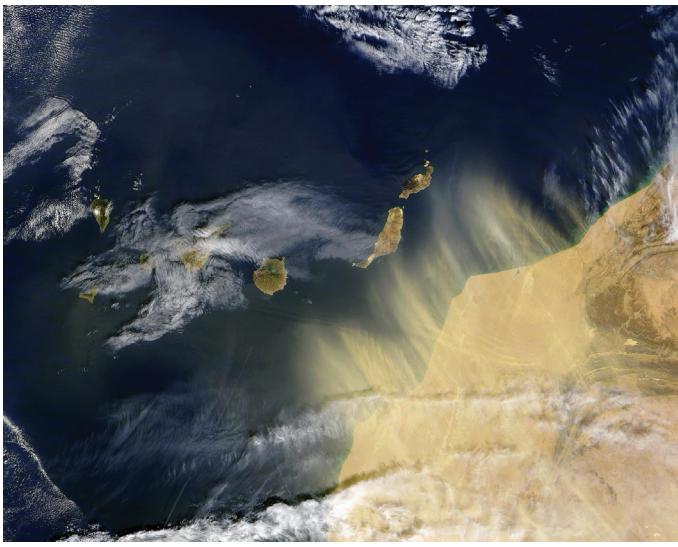
Remote sensing is the science of deriving information about the Earth's surface and atmosphere using images acquired from an overhead perspective–using satellites or airplanes, for example. Monitoring environmental factors using remotely sensed data present certain advantages over ground measurements, especially in regions where ground-measurement data are scarce. The remote observations are generally high-resolution, available in almost real-time, and provide consistent measurements over large regions.

The goal of IRI's Environmental Monitoring Program is to provide its clients and partners with state-of-the-art data to facilitate their work in climate-sensitive sectors such as health and food security. Through exhaustive, rigorous evaluation and interpretation of available satellite products, the program staff ensures its partners have access to the most reliable and relevant information, in a format that best informs their decision making and planning. The IRI also provides classroom facilities and computer resources for remote sensing experts to train partners on innovative uses of products the institute has developed.

We currently focus on satellite-derived estimates of vegetation, rainfall, surface temperature, humidity and atmospheric dust. Ultimately, these products are integrated into early-warning systems for human health, pest management and fire risk. Examples of our work are described on the next page.



Dust storm blows off the North African coast. NASA

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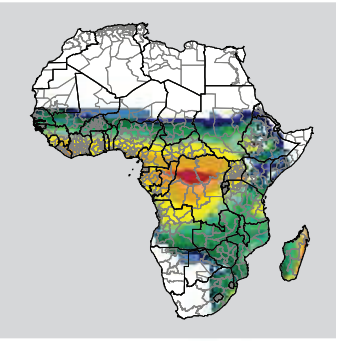
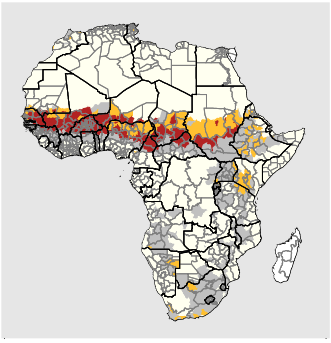
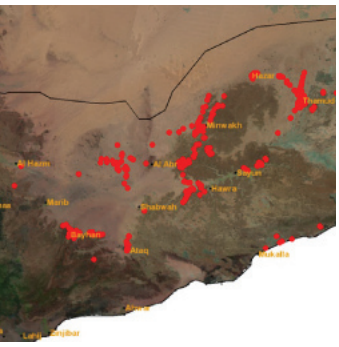
Desert locusts fill the sky in southern Mauritania. G. Diana/FAO



Early Warning for Malaria and Meningitis in Africa

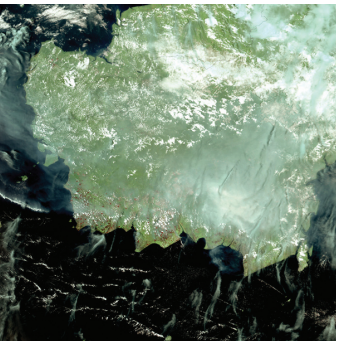
Economic development has played an enormous role in shaping the current global distribution of malaria. Where malaria isn't adequately controlled, however, the time and place of its occurrence is closely linked to climate conditions. Among the various mapping products IRI provides is a model of climate suitability for seasonal malaria transmission (left). Meningitis, another climate-sensitive disease, is prevalent in the Sahel region of Africa (right). Epidemics occur throughout this area in the dry season, typically coinciding with periods of very low humidity and dusty conditions and disappearing with the onset of the rains. We are working with key stakeholders to explore this climate relationship further in order to develop an early-warning system for health workers in Burkina Faso, Mali and Niger.





Desert-Locust Monitoring from North Africa to Southwest Asia

The desert locust *(Schistocerca gregaria, Forskal 1775)* lives in remote desert zones that extend from North Africa to Southwest Asia. These habitats are generally far from populated centers and difficult to access. IRI's mapping and monitoring tools help locust-control workers pinpoint areas where conditions are favorable to breeding, based on rainfall and vegetation data. The tools allow for an early-warning system of sorts, because the insects can be located and controlled before their populations grow to full-scale plagues. The image at left shows locust outbreaks in Yemen in 2007. The Food and Agriculture Organization used IRI maps to issue alerts to ground teams, who treated more than 19,000 hectares.



Fires on Borneo. NASA

Fire Forecasting in Central Kalimantan, Indonesia

Fires in Central Kalimantan's peatlands and forests, which are linked with the ENSO cycle, have become an increasing problem in the region, as well as an significant source of carbon dioxide emissions. In 1997, fires resulted in significant regional smoke and haze problems, causing thousands of hospitalizations and $5-10 billion in economic losses. IRI is collaborating with CARE Indonesia in a larger consortium effort to protect biodiversity and improve the development status of Central Kalimantan. IRI is analyzing links between forest fires and climate variability in order to provide early information about the likelihood of fires, which could help reduce their impacts if linked to appropriate policy actions.

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.