

Madagascan monsoon

During geological fieldwork in northern Madagascar, Roger Key witnessed the devastating effect of a major change in rainfall patterns. He asks, how can geologists help?

Torrential rain poured from the sky above Madagascar in the first four months of 2007. The deluge produced 50 percent more rainfall than the average for the last 20 years, according to the Madagascar's Meteorological Bureau. In March, 68 centimetres of rain fell – more than three times the expected amount – although the number of rainy days was below the monthly average. This led to extensive floods that swept away or badly damaged most bridges and caused numerous landslides, isolating rural communities.

Villages in northern Madagascar are mostly situated in fertile valleys separated by mountain ridges and surrounded by dense rain forest. The few roads and tracks follow the valleys. Villagers commonly use footpaths across the ridges to travel from one village to the next. Towns are concentrated along a single north-south trunk road from the capital Antananarivo in the north. The majority of northern Madagascar's two million or so inhabitants live along this road.

Madagascar's rural population is self-sufficient in food with every village surrounded by rice paddies. Traditionally, villagers harvest rice in the two months after the rains. Excess rice is sold as the main and, in many cases, the only cash crop, either in the nearest towns or to travelling traders. The March rains destroyed the rural road network with catastrophic consequences for trade. Excess rice piled up in the villages, preventing villagers from earning money. The few traders who made it through bartered prices down, leaving villagers out of pocket.

The Madagascan government faces the expensive task of upgrading the country's road network to cope with the new rainfall patterns. Road bridges across major rivers need

strengthening to withstand severe floods. Local communities are busy either repairing or replacing smaller bridges. There is understandable uncertainty about whether the rains were a one-off or whether they will be repeated in the years to come. The Madagascan government has to decide what climate model to use as it tries to prepare long-term development plans for the country.

Can geoscientists help? Yes, in several ways. Firstly, we can study existing geological and topographical maps, satellite images and aerial photographs to locate exposures of rocks such as granite, which are capable of supporting new bridges. Secondly, we can identify areas threatened by landslides so that construction companies can either take account of the landslide risk or find alternative routes for roads and other infrastructure. We can also help find quarry sites to provide the raw materials both for better bridge foundations as well as to improve road surfaces.

The British Geological Survey's geological mapping and mineral exploration team is working in northern Madagascar. We are part of a World Bank funded project on behalf of the government of Madagascar. The project will last until mid 2008 and aims to understand better Madagascar's role in the formation of the Gondwana Supercontinent at the end of Precambrian times. New geological maps and geoscientific databases of north-central Madagascar will assist the government in their short-and-long term planning, and will enable exploration companies to focus their fieldwork. ■

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Madagascan villagers repairing flood-damaged bridges.

