Formerly productive rice fields in Banda Aceh still lie strewn with tsunami debris and are now permanently flooded. NSW DPI

Washing the salt from Aceh's wounds

Australian researchers are making good progress in assisting Acehenese farmers revive their tsunami-swamped agriculture. Dr Peter Slavich recently returned from the region with his team.

The tsunami that followed the earthquake on 26 December 2004 off the west coast of Sumatra affected more than 2700 kilometres of coast around the Indian Ocean. Farming communities lost family members, housing, transport, tools, saleable crops and livestock, and much of their prime agricultural land and water supplies became tainted by saltwater.

The worst affected rural regions were the floodplains of the west coast of Sumatra and the Indonesian province of Aceh. Key agricultural areas up to five and a half kilometres from the coast were inundated with seawater. Irrigation and drainage channels were damaged, and debris from uprooted vegetation and destroyed buildings was left across farmers' fields. The tsunami's surge also transported marine sediments from the sea floor across the floodplain, and washed coastal dunes far inland over fields of rice, peanuts, soybeans, maize and various other vegetable crops. Seawater then lay on the land for between several hours and several weeks, and some low areas are now regularly flooded by high tides.

To assist Indonesian agricultural research and extension services to rehabilitate tsunami-affected soils and restore cropping in east Aceh and Nias, the NSW Department of Primary Industries has been working with the Indonesian Soil Research Institute in Bogor and provincial extension agencies (BPTPs) in Banda Aceh and Medan. The Australian Centre for International Agricultural Research (ACIAR) has provided two years' funding for the initiative.

The project is engaging farmers on the north coast of Sumatra where a greater number of people survived. Many communities here started to grow crops again only a few months after the tsunami. On the west coast of Sumatra around 80 per cent of the population was killed by the wave. Very little farming has re-started, and road access is still limited. The knowledge that is being generated by working with farmers on the north coast will be used in the west as farming becomes possible again.

Soil scientist Dr Peter Slavich from NSW DPI's Wollongbar Agricultural Research Institute is leading the effort. Other researchers involved are hydrologist Dr Malem McLeod, agronomist Dr Natalie Moore and laboratory technician Craig Hunt.

So far the team has assessed the impacts of soil salinity on crop performance in east Aceh. Indonesian researchers and extension staff have been trained to use an electromagnetic (EM) induction instrument to rapidly assess soil salinity. This EM technology has been widely used in Australia for salinity assessments.

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Unsurprisingly, the early results indicate that the most saline soils appear to be those where tsunami water lay for longest. These areas are also experiencing greater crop-yield losses. Sandier soils have been more affected than some of the heavier and regularly puddled rice soils. Unfortunately this has salinised the water in shallow wells too.

'Our observations of rice crops in October indicated that water and nutrient management are critical at the moment,' Slavich said. 'Some rice crops had failed completely due to exposure to high water salinity early in their growth. Many also failed to fully fill grain so that farmers were only producing around 50 per cent of their pre-tsunami yields.'

The project is also assisting to restore technical capacity of the regional soil and plant analysis laboratory in Banda Aceh. There is a need to train staff in laboratory procedures after the unfortunate loss of their senior analyst. The laboratory will be used to monitor changes in salinity and soil nutrient levels.

Waterlogging of crops is likely to result in poor yields in the present wet season (October–March). The surface drainage is poor due to tsunami deposits across fields and in drains. Most land is normally rotated between rice and other crops. Because the soils are usually puddled for rice, they are generally poorly structured. This slows internal drainage and reduces soil aeration. Waterlogging also reduces the capacity of plants to tolerate salinity.

A number of rehabilitation trials will be run to demonstrate and test technologies to try to improve the local yields. The first trial has been established using salt-tolerant varieties of peanut and a number of nutritional treatments. Similar rice trials will soon be planted.

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