Beware the lure of seaweed

The Lambongan seaweed plots are carved from coral debris at the water line. Strings with small sprigs of seaweed attached are tied across the plots and after four to six weeks are ready to harvest. 'Weeds' such as sea lettuce must be removed. When harvested, the seaweed is laid out on tarpaulins to dry. The dried seaweed, about a sixth of the fresh weight, fetches $1 to $2 per kilogram. In a good year there are eight harvests.

Dr Hugh Kirkman from CSIRO's Division of Marine Research has returned from a visit to Indonesia with a cautionary tale for Australians considering farming seaweed.

Kirkman's warning stems from observations of a successful seaweed (*Euchema denticulatum*) enterprise on the tidal coral reefs of the tiny island of Lambongan. The seaweed is grown for Japan where it is processed into carrogeenan, an agar-like product used as a gelling and thickening agent in cosmetics, and as a suspension medium in canned and processed foods. It also is used to produce agar, the culture base and gelatin substitute.

Indonesia, along with China, the Philippines, Taiwan, Argentina, Chile Ireland and Canada, has a strong seaweed industry. In China, seaweed harvesting is the basis of an industry worth more than $300 million a year, but cheap labour is at its core.

'Manual labour is used in every step of the seaweed-production process on Lambongan Island and the returns merely supplement a largely subsistence lifestyle,' Kirkman says. 'There is potential for some processes to be mechanised, but returns comparable to the commercial farming of vegetables such as carrots, cabbages, and lettuce would be necessary to make similar farms pay in Australia.'

Kirkman also warns of possible environmental problems. 'If enterprises such as these were intended for Australia, the damage done to natural habitats would need to be markedly reduced,' he says. 'About seven species of seagrass used to grow on the reeftops of Lambongan, some in the pools and others as small beds in more exposed areas. Now, all the seagrass has gone and the associated juvenile and adult fish, crustacea and filter feeders also have been depleted.'

Kirkman says aesthetic issues must also be considered by prospective farmers. In Washington State US, where nori seaweed (*Porphyra* species) was grown on rafts near to beach areas, people living along the surrounding coast were politically active enough to have the farms closed because, they said, the farms spoiled the view.

Contact: Dr Hugh Kirkman, CSIRO Marine Laboratories, (09) 246 8288, fax (09) 246 8233, email: hugh.kirkman@per.ml.csiro.au.

Hong Kong job in the air

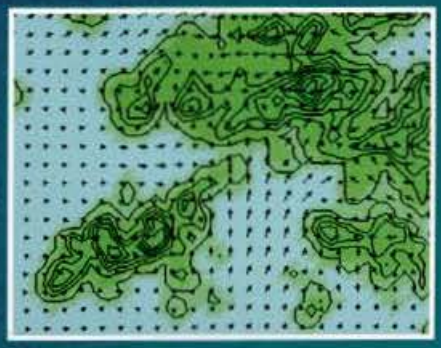
CSIRO's Division of Atmospheric Research is part of an international team selected to establish a sophisticated air-modelling system for the Territory of Hong Kong. The 18-month project involves developing an inventory of emissions affecting air quality, and meteorological and air-pollution models of the region. These will help the Hong Kong Government assess the impact on air quality of proposed changes to vehicle fuel types and urban planning.

Dominant sources of air pollution in Hong Kong are motor-vehicles, coal-fired power stations and construction. Under adverse weather conditions, particulates and gaseous pollutants can be excessive.

The meteorological model used by the division will predict large and small-scale meteorology for a number of continuous periods between one and three days, a typical time for a pollution event. The large-scale part of the model will look at typical weather systems over the region which are known to contribute to pollution events in Hong Kong. The smaller-scale part of the model will estimate local winds and temperatures at hourly intervals across a three-dimensional grid of the Territory.

'Our models must simulate Hong Kong's main pollution problems including fine particles, nitrogen dioxide, ozone and toxics,' says the division's Dr Bill Physick.

As well as model development, the 18-month project involves data gathering to validate model behaviour, and production of a range of databases and graphical interface software. Also involved in the project are Victoria's Environment Protection Authority, Environmental Resources Management in Hong Kong, Scientific Applications International Corporation from the United States and China's Zhongshan University.



The project will model weather patterns contributing to air pollution in Hong Kong.

Contact: Paul Holper, CSIRO Atmospheric Research, (03) 9239 4661, fax (03) 9239 4444, email: paul.holper@dar.csiro.au.