

Winds of change may be harbingers of drought

Debra MacKenzie

THE RAINS have failed over much of Africa and Asia this week. Meteorologists suggest that distant changes in the temperature of the oceans may be the common cause.

In the Sahel region, south of the Sahara, rain during this summer's wet season has barely reached 70 per cent of the average yearly rainfall since 1950. In Ethiopia, the wet season ceased abruptly in July, killing crops and threatening famine. India has been hit hardest, with a near-total failure of the wet monsoon in the north and west of the country. A third of the population—250 million people—are short of drinking water, while the water level behind hydroelectric dams is so low that electricity supplies have been cut.

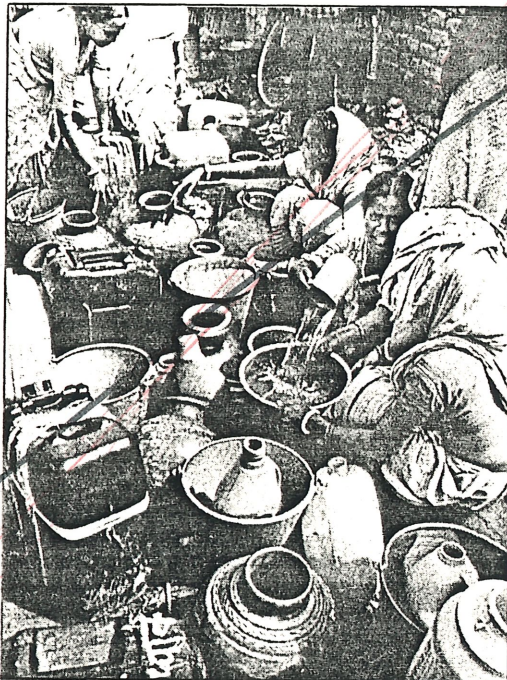
As the western coast and Rajasthan are stricken by drought, however, the southeast of India and Bangladesh have been deluged with rain. Chris Folland of the British meteorological office says that the contrast reflects new theories that "there are practically two separate monsoons". Recent research, he says, has completely changed scientists' ideas of how monsoons work.

India's monsoons stem from the difference in temperature between the Tibetan plateau and the Indian Ocean. When the plateau heats up in summer, creating an area of low pressure, winds blow in from the southwest Indian Ocean. They usually bring rain. In winter, when the plateau cools, the winds reverse, causing the dry season.

Though the temperature gradient makes the winds blow over the whole subcontinent in summer, other factors in the east and west appear to influence whether they produce rainfall. Local regions of low pres-

sure form in the Bay of Bengal, to the southeast, or southwest in the Arabian Sea, and cause rainstorms.

This storm activity has all but ceased in western India, while it continues to excess



Rainwater ends up in the sea, not in these pots

in the east. Folland says that the difference may be due to sea surface temperatures that are unusually high in the Indian Ocean.

Sulochana Gadgil, of the Indian Institute of Science in Bangalore, says that when

ocean temperatures exceed 28°C warm air rises very strongly, forming local storms that drop all their rain on the ocean, leaving only dry air to blow over India. Folland says that this year, temperatures as high as 29°C have been observed throughout the Indian Ocean.

He suggests that these sea surface temperatures may inhibit the pulses of storm activity that normally soak western India. But because the detailed observations of winds and temperatures that would resolve the issue are lacking, he says.

Another suspicion is that this year's droughts have something to do with El Niño, the anomalous pattern of winds and currents that recurs every few years in the Pacific Ocean. Sushil Unninayar, of the World Meteorological Organisation in Geneva, says that an El Niño has been blowing in the Pacific since November of last year.

The main feature of an El Niño is, again, a shift in sea surface temperatures. They rise abnormally in the eastern Pacific, and create odd air movements, says Unninayar. They seem to have a profound effect on the monsoon. Of the past 26 years when El Niños have occurred, 21 have coincided with droughts in India.

To explain the droughts fully, meteorologists need more comprehensive historical records of the climate around the globe than they have now. Unninayar says that the US National Climatological Centre has recently finished developing a standardised package of computers, software and training, that will enable 100 or so developing countries to put their climatological records into a standardised database for research. □

New Zealand prepares for the apocalypse

SHOULD countries in the northern hemisphere one day choose to blow each other to bits with nuclear bombs, New Zealand will be bracing itself for an economic catastrophe. That is, if the government follows the advice of a report it commissioned on the impact on the country of such an apocalypse.

The report, by the New Zealand Planning Council, does not focus on the effects of fallout or of nuclear winter, but on the way that New Zealand's economy would crumble once trade links with devastated countries to the north of the equator became severed.

The council bases its advice on scenarios envisaged by the Scientific Committee on Problems of the Environment, known as SCOPE. The SCOPE report of 1985, compiled by more than 300 scientists from 30 countries, looked at the environmental consequences of a major nuclear exchange.

One of the report's authors, Wren Green, was New Zealand's representative on SCOPE. He says that though New Zealand is unlikely to be a nuclear target, industry would eventually be crippled by the loss of imported machinery and spare parts. Transport would be disabled by the loss of imported lubricating oil and rubber. For a while, the country could survive on indige-

nous supplies of diesel oil and petrol but, ultimately, the country's sole refinery would grind to a halt through lack of spare parts.

Moreover, healthcare would disintegrate. New Zealand depends for almost all its medical supplies on the northern hemisphere. Within six months, says the report, suffering would be immense. Deaths from asthma, diabetes and epilepsy would multiply. Without anaesthetics, dentists would be forced to extract rather than treat infected teeth.

Of more concern to the authors is the loss of export markets because consumer markets in the northern hemisphere would disappear.

It predicts that unemployment would soar to 50 per cent of the population as export markets for dairy and meat products dry up. What would happen, it asks, if farmers who have 65 million sheep can sell produce from only 15 million animals?

New Zealand also fears that if an aggressor chooses to bomb Australian military communication bases, of which there are three, then electromagnetic pulses could arrest computers and electronic control equipment in the country. Banks, telephone, radio and television would be crippled immediately. So too would the

country's electrical grid. This, in turn would disable New Zealand's oil refinery at Marsden Point, a plant for the manufacturer of synthetic petrol, and pumping operations for natural gas.

Though engineers could ultimately repair the damage, perhaps within a few months, the devastation would reduce New Zealand within that time to an economy comparable with that of pre-industrial Europe.

The report also warns of food shortages, mainly of wheat. Cautiously taking into account updated predictions since the SCOPE report of temperature drops in the southern hemisphere of up to 3°C, the report warns of reductions in rainfall that could suppress agricultural output in New Zealand.

The report's authors dismiss fears among the population of disease caused by fallout. It foresees, at worst, an extra 1000 deaths from cancer in the short term, and no incidence of radiation sickness. The authorities would need to monitor dairy products for safety over several months.

The report also states misgivings about New Zealand's unwillingness to stockpile goods that could become unavailable, such as pharmaceuticals, rubber, fertilisers and compressed natural gas. □