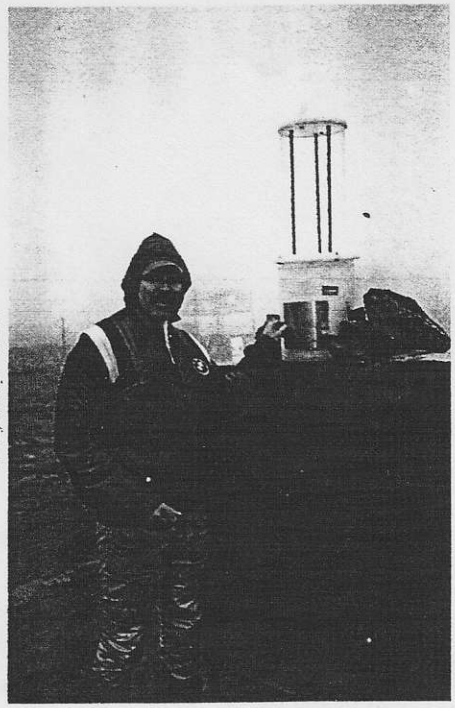
RAJESWARY

Magazine Source
UNDP

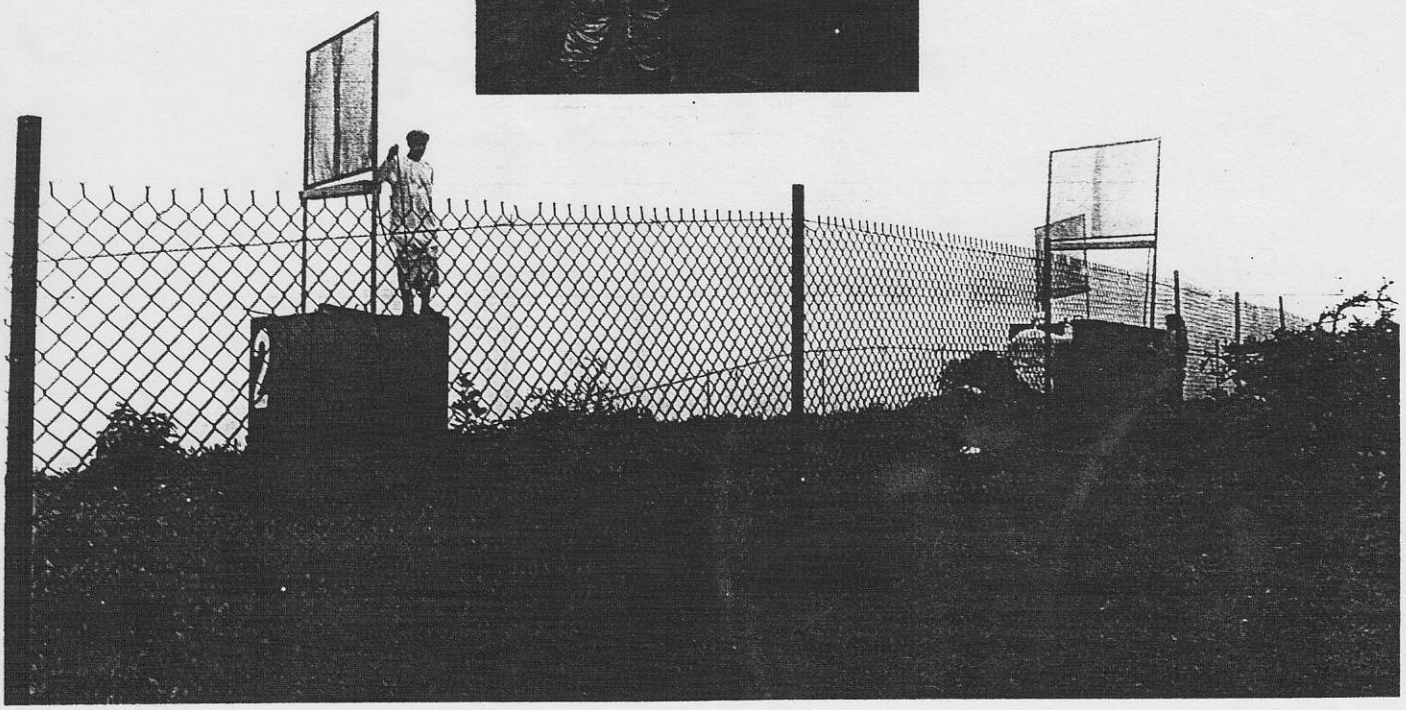
Tapping Fog For Water

By I. Rajeswary



I. Rajeswary / UNDP

Dr. Robert Schemenauer stands by an instrument that collects fog moisture for chemical analysis.



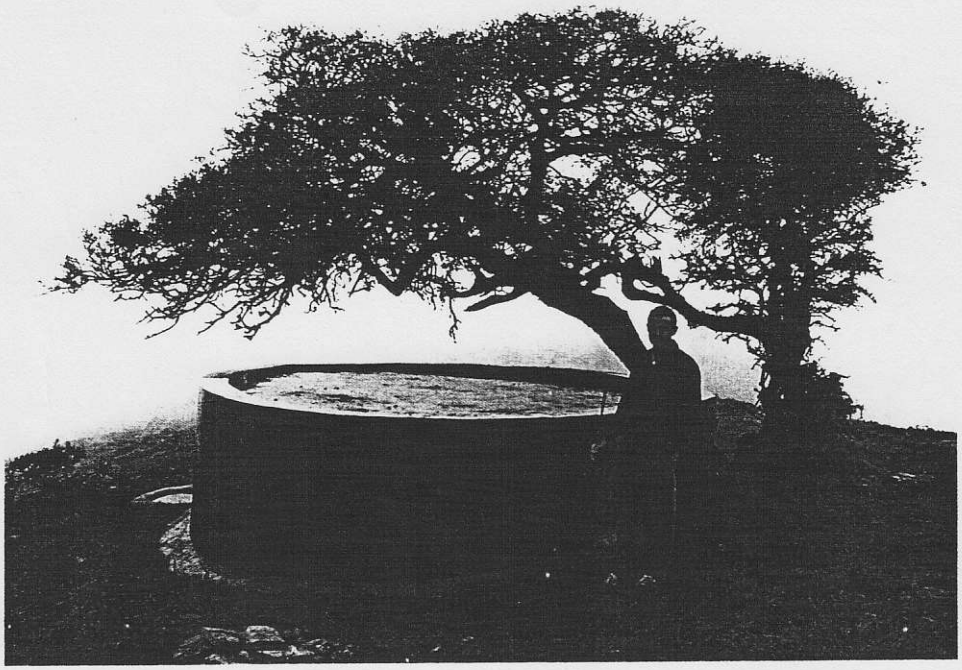
Dr. Robert Whitcombe

Fog moisture collecting screens and 2,700-litre storage tanks at Qaftawt.

Dhofar, Oman—As research scientists Robert Schemenauer and Maria del Pilar Cereceda pull their nylon anoraks tightly around them atop the limestone hills of Dhofar, a group of men from the United Arab Emirates in their cotton, ankle-length *dishdashas* relish a picnic in the fog. To the visitors from the Gulf, the fog that hangs for three months each year over these 900 metre-high hills is a refuge from the scorching sun that beats down on the plains of the Arabian Peninsula. For the scientists, the fog offers an important source of water for agriculture, forestry, aquifer recharge and drinking in a land where water is scarce.

Nearby are metal tanks topped by huge vertical screens with polypropylene meshes designed to catch tiny droplets of fog and drizzle. The scientists are experimenting with meshes of different types to determine which one traps the most water. "Small fog droplets hit the screen, coalesce and run down the mesh into the tank," explains Dr. Schemenauer of the Canadian Atmospheric Environment Service. How much is collected depends on the density of the fog, how long it hangs over the hills, and windspeed.

After a month-long trial in Dhofar, three different fog collectors net the same amount of water. "The next step is for our team to determine which of the three is least expensive and most easy to construct and maintain," says Professor Cereceda of the Pontifical Catholic University of Chile. She is supervising Gonzalo Frigerio, a student from the Geography Department of the same university. Mr. Frigerio is also training Omani geographer



Dr. Robert Whitcombe

Fog moisture intercepted by a wild olive tree completely filled this tank.

Mohamed al-Maashani to take measurements from the instruments that are being used. Wearing a pair of battered knee-high Wellington boots, Professor Cereceda squelches through mud to a spot where eight plastic hoses drain into plastic pails. The hoses are connected to a pole topped with a rotating plastic mesh to determine which wind direction yields the most water.

Dr. Schemenauer and Professor Cereceda are no strangers to fog moisture collection, having experimented with it extensively in Chile and recently in Peru. Their efforts led to the establishment, in 1987, of a Chilean pilot project sited on a ridge called El Tofo, 780 metres above sea-level. The project was designed to assess all the conditions associated with the formation of high elevation fog or *camanchaca*, as it is known in Chile. They also investigated the feasibility of collecting water on a large scale and piping it to the nearby fishing village of Chungungo on Chile's arid coast.

Over a two-year period from 1987-1989, the 50 fog collectors in Chile yielded 10,000 litres of water per day. When a pipeline currently under construction is completed, each villager from Chungungo will obtain 29 litres a day—twice the amount of water they presently purchase from a mobile water tanker.

In Oman, fog moisture collection experiments were initiated in 1985 by the country's Planning Committee for Development and Environment in the Southern Region with support from the Ministry of Agriculture and Fisheries. Four years later, the work intensified with help from the United Nations Development Programme (UNDP) and the World Meteorological Organization (WMO). Assistance was also sought from the Canadian Atmospheric Environment Service and the Pontifical Catholic University of Chile.

Oman's annual rainfall is variable but it is always greater on the mountains of Dhofar because of the monsoon, or *khareef*. Between June and September, warm, moist monsoon winds from the south-west circulate over the Indian Ocean and Arabian Sea, and are subsequently cooled by the coastal currents off Dhofar. As the moving air mass is chilled, banks of fog and low clouds form and move over the Dhofar mountains.

Robert Whitcombe, a British ecologist with the Planning Committee, is responsible for most of the early work done in Dhofar. Last year, the Planning Committee, through UNDP and WMO, obtained the services of Chilean geographer Juan Barros, who has done work on the *camanchaca*, to conduct a wide range of experiments in Oman.

One of the early experiments was to determine which altitude yielded the most water. Between July and September 1989 a square-metre screen erected at an altitude of 480 metres yielded six litres of fog water a day. In another spot, at 920 metres above sea-level, a screen of the same

size netted 80 litres of water a day.

Earlier this year, the Planning Committee engaged a hydrologist, engineers and an economist from a Danish consulting firm to investigate the feasibility of supplying fog water on a long-term basis to rural settlements on the Dhofar hills and for using the water for afforestation and aquifer recharge.

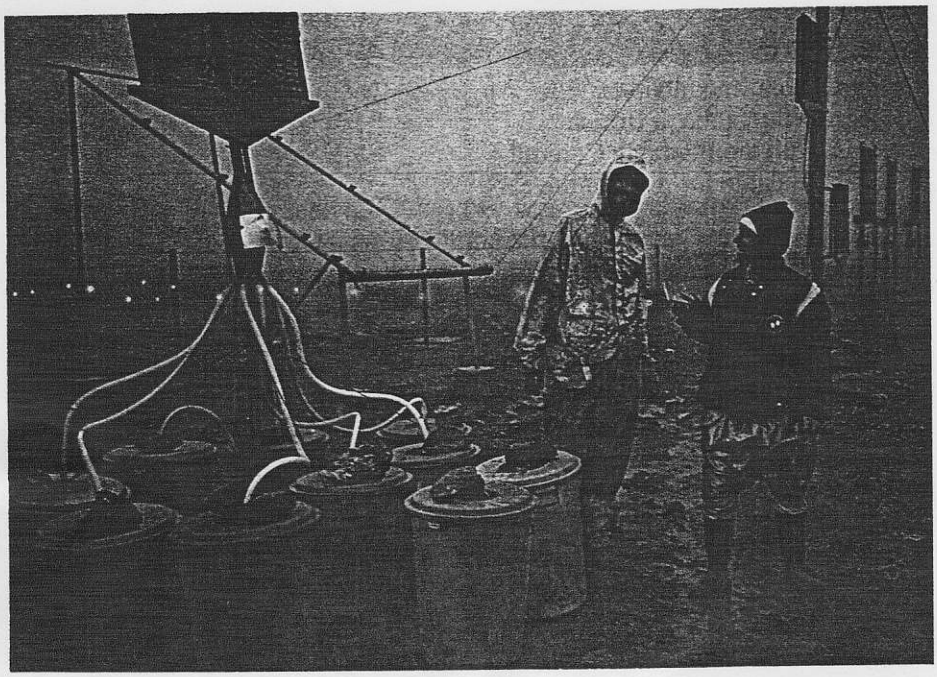
Dr. Whitcombe says that if fog water is used to irrigate young trees for a year or two until they mature, these trees will be able to intercept fog, irrigate themselves and possibly provide surplus water that will recharge the natural underground aquifers. Over the monsoon season last year, an isolated tree intercepted 60,000 litres of water.

There is no easy access to water in the rural areas of southern Oman. Currently, most domestic water comes from government boreholes drilled near rural settlements. "But the villagers have to collect water in their pick-up trucks or pay someone else to carry it for them," says Dr. Whitcombe.

He concedes that fog water collection is seasonal and is only practical where fog is dense. "We also have to consider costs — such as construction of the screens, installation, maintenance and storage, and compare them with the costs of the existing boreholes system," he notes.

It is hoped that fog water stored during the monsoon season will help provide villagers with a steady water supply throughout the year. In an arid region where average rainfall is only ten inches, every drop counts and the fog may constitute a valuable supplementary source of water that would make a dramatic improvement in the lives of the people. ■

Professor Maria del Pilar Cereceda and her assistant investigate which screen position will yield most fog water.



I. Rajeswary / UNDP