

## Lost Himalayan river found in Rajasthan

New Delhi

A COMBINATION of modern technology and clues from ancient Hindu scriptures has led to the discovery of a lost Himalayan river below the desert sands of Rajasthan in India.

Dr Bimal Ghose, a geomorphologist at the Central Arid Zone Research Institute in Jodhpur, has traced the buried channels of the Saraswati River and says the discovery of the subterranean river may provide a solution for bringing the once lush and green Thar Desert back to life.

Using maps supplied by Ghose, government agencies have already sunk 36 tube-wells along the buried course of the Saraswati in the district of Jaisalmer in the heart of the Thar Desert.

Surprisingly, each of the wells is producing between 2,000 and 40,000 litres of water per hour. There is so much water flowing below the desert, Ghose says, "that if all the tube-wells are operated simultaneously, this part of the desert can be flooded".

Ghose launched his hunt for the Saraswati more than a decade ago after seeing references to the river in two ancient Hindu manuscripts, the Rig Veda and the Mahabharata (3000 BC).

Along with the Indus and the Ganges Rivers, the scriptures made references to two other north Indian rivers originating in the Himalayas, the Saraswati and the Apaya. The Saraswati has now been traced, while the search for the lost Apaya continues.

In mapping the buried course of the Saraswati, Ghose cross-checked the clues from the scriptures with ground truths, aerial photographs and land imageries. Ghose says it is now established that the Saraswati, rising from the Shiwalik Himalayas, once flowed through the Haryana and Rajasthan states into the now-dry district of Gujarat. The Thar Desert appears to have been formed by the Saraswati River changing its course westward and eventually becoming subterranean about 1,000 years ago, which alters the previous conception as to how the desert came into existence.

Although the Saraswati River is dead, Ghose says, its buried channels conduct the water formed by the melting snow of the Himalayas. These buried channels, being perennial, are dependable sources of ground water that could be used to solve permanently the drinking water problem in the desert. Ghose is now trying to delineate the buried deltas of the Saraswati for investigation of the existence of crude oil.

K.S. Jayaraman

## Human Frontiers Program seeks international help

Tokyo

JAPAN'S Human Frontiers Program is back in the news again. After being advertised as a major international effort in basic bioscience research, into which Japan might pour ¥1 million million (\$8,000 million) over twenty years, the programme has spent almost two years searching for an identity. Last week more than 30 scientists and science-related government officials from the seven Western summit nations (Japan, France, West Germany, Italy, the United Kingdom and the United States) gathered in Tokyo to try to give the programme some shape. But it is still not at all clear what financial backing will be available.

The programme emerged from the Ministry of International Trade and



Takeshita — commitment to programme?

Industry (MITI) early last year, partly in response to Western criticism that Japan makes too small a contribution to the world pool of basic scientific research (see *Nature* 320, 296; 1986). Its budget, although not exceptionally large by US standards (the US National Institutes of Health spend \$5,000 million a year), would have marked a major advance in support for basic research in Japan.

From the outset, the programme has been driven by ministry officials and has lacked clear scientific goals. Just before the Venice summit where the programme was discussed, former Prime Minister Yasuhiro Nakasone criticized its vagueness.

Scientists in MITI's feasibility study committee made various suggestions before the summit, for example that it should involve research on AIDS (acquired immune deficiency syndrome) and sequencing of the human genome, but no final decision has been made.

A decision on the budget is also lacking. Less than \$2 million has been assigned for a feasibility study which began in December last year and will continue until April next year.

Prospects for 1988-89 are little better; MITI and the Science and Technology Agency (which joined the programme late

last year) have requested a combined total of only about ¥500 million (\$4 million) for a 'pilot' programme in fiscal 1988.

None of this seems to have diluted the effusive enthusiasm of the delegates at last week's meeting. Dr Benno Hess, vice-president of the Max Planck Society, sees the programme as a unique opportunity to form a trilateral research programme between Europe, the United States and Japan. And David Noble, administrative secretary of Britain's Medical Research Council, said it was a "well organized meeting".

In MITI's "tentative" proposal it is suggested that the programme will consist of research grants, fellowships, workshops and the "promotion of research and development of related technologies" (such as DNA sequence analysers and non-invasive body scanners).

A board of trustees from the summit nations will determine the size of budgets, a secretariat will provide administration, and a governing council of 20 distinguished scientists drawn from all participating nations will determine research areas, allocate funds and select outstanding scientists to review applications for grants and fellowships. The proposal also repeatedly emphasizes that the programme should support "young" scientists — a new idea in Japan where the government provides only a few hundred post-doctoral fellowships.

The "tentative" conclusion of the meeting was that emphasis should go to research which cannot be carried out by a single nation. But it was recognized that it might be difficult to organize an international team consisting solely of young researchers — senior scientists might be necessary as organizers.

Research subjects and partners were thought to be best chosen at the international workshops of the programme.

But all discussion will prove superfluous if Japan's Ministry of Finance does not put substantial funds into the programme — and it will now be at least 1989 before it becomes clear where the ministry stands. MITI officials insist that Nakasone's retirement will not take the steam out of the programme. But Nakasone has long been a strong supporter of research in the biosciences and has pushed for the 'internationalization' of Japan. In contrast, his successor, Prime Minister Noboru Takeshita, seems more concerned with domestic politics than with international research in bioscience. And unless the programme gets strong political backing inside and outside Japan it will never achieve the levels of funds first considered.

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