

DRIP IRRIGATION

Gaining ground, slowly

Growing water scarcity underscores the imperative for more efficient irrigation systems

- *Deep in the Rajasthan desert, in Neemkathana, where water is a rare commodity, S.K. Modi's barren 12-hectare plot has been converted into a thriving citrus orchard.*
- *The Jivrajbhai Patel Agroforestry Centre's ber farm in Surendrabag, Saurashtra, was on the verge of extinction when the monsoons failed in 1988. Today, the farm's yield has shot up by 114 per cent.*

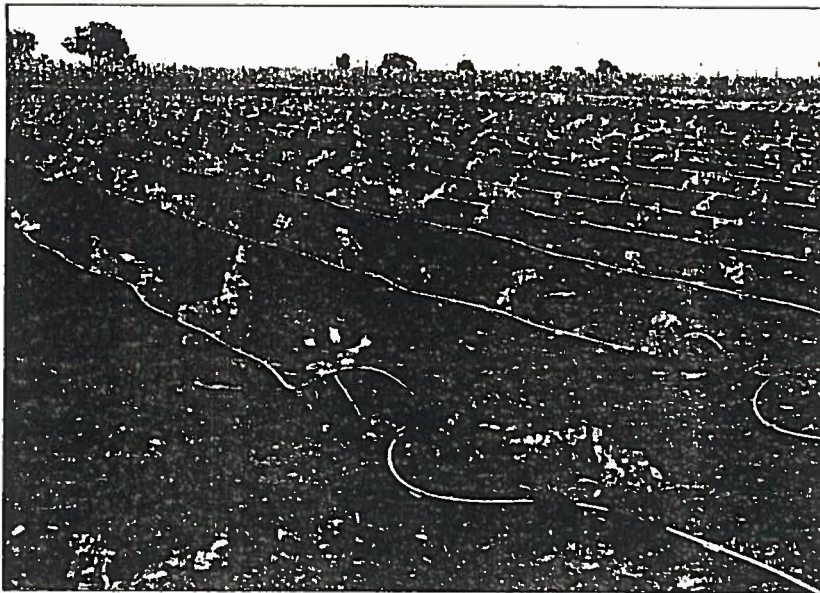
Both these farms have a common feature responsible for their sharp turnaround from wasteland to greenland—the drip irrigation system they have installed. In a country where drought, water-scarcity and failed monsoons are a perennial problem, a system which uses the minimum amount of water for irrigation should have found wide application. But despite its proven track record, the concept failed to take off in India, when introduced in the late seventies. The reason: government indifference, stiff resistance from the farmers and the poor quality of the systems then available. Political support, small central subsidies, and the arrival of new DIS-manufacturing companies, made all the difference in the mid-eighties.

From 2,400 hectares between 1977-87, acreage under DIS rose to 36,500 hectares between 1987-92. Nearly 60 per cent of this acreage is in Maharashtra, followed by Tamil Nadu, Karnataka, AP, Kerala and Gujarat. But the high initial investment and ignorance about its utility at the grassroots level is impeding progress in other states.

Invented by an American scientist in the

mid-thirties, DIS is a popular concept abroad. Nowhere more so than in Israel, where it first struck firm roots in the Arava Valley in the late sixties, and transformed the desert into an oasis of fruits and vegetables. The entire cultivated area in the Promised Land is under DIS today. The US, the Middle East and China are other avid followers.

The basic principle underlying the system is simple: to make every drop of water count. Through emission points on the pipes networked over the field surface or buried, the water drips directly onto each



DIS: the right amount of water, at the right place and the right time

individual plant's root zone. Slowly but steadily, the plant gets the right amount of water, at the right place and at the right time.

The pipes are connected to a pump and filtration system placed near the main water source. DIS can be adapted to poor soil and water quality as well as difficult terrain. As only the roots are watered, weed proliferation is minimised, as is the use of pesticides. If a liquid fertiliser unit is included, the roots directly receive the nutrients

saving the 20 to 30 per cent that normally gets dispersed in air. DIS also preserves soil fertility, which other conventional irrigation methods erode through waterlogging and salination. Labour costs are reduced as DIS is automated.

Besides these structural advantages, DIS also addresses the more basic issue of efficient water management. Even if India's entire water potential, both underground and surface is harnessed, only 50 to 60 per cent of the cultivable land, from the current 37 per cent, can come under irrigation. Secondly, increase in productivity rather than extending the area under cultivation alone can meet the growing needs of the burgeoning population. As it requires

just 40 to 50 per cent of the water used by flood irrigation, DIS is suitable for any part of the country, not just water-scarce areas.

"Unless the right technologies are used, unless the farm is viewed as a factory," says Bavarlal Jain, chairman of the Jalgaon-based Jain Irrigation Systems Ltd., "there is little hope for the Indian farmer or the country." Jain Irrigation has a 55 per cent market share in DIS, and has installed the system over 25,000 hectares of farmland. Other major companies in DIS, apart from

about 30 manufacturers in the small-scale sector, include Voltas, Coromandel, Premier Irrigation, EPC Irrigation and Jyoti Ltd.

Jain's confidence in DIS is supported by increased yields, earlier maturity and better quality crops at the farms. At Sahibrao Patil's ten hectare farm in Rajwad, each banana tree yields 22 kg of fruit, unlike the earlier 14 to 15 kg. Within 30 months, he harvests three crops, instead of two. And, since one crop gets harvested in the

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traditional off season, Patil earns as much as Rs.375 per quintal as against Rs.100 to Rs.110 during the season.

However, DIS doesn't come cheap, being over three times more expensive than flood irrigation. The main price determinants are plant spacing and topography. Randomly distributed, closely spaced crops like rice and wheat cannot use DIS; it is applicable only to systematically planted row crops like vegetables, fruits, flowers and cash crops like sugarcane, cotton, coconut, spices, tea and coffee.

On an average, in closely spaced (5 ft) crops like most vegetables and sugarcane, the cost per hectare is about Rs.60,000. When widely spaced (30 ft) as with mango, oil palm and coconut, the cost is Rs.17,500 per hectare. On an average, the cost of the system gets recovered within six months for vegetables like lady fingers and tomatoes and two years for sugarcane, say farmers.

To ease the initial financial burden, central subsidy schemes have been announced. But the subsidy pattern varies in most states for the different categories of farmers, like small, medium and large. For example, in Maharashtra, a small farmer gets a 50 per cent subsidy up to a limit of Rs.20,000, while in Tamil Nadu it is Rs.1,500 per acre up to a ceiling of Rs.3,375.

The scheme, however, has not really worked well. The small farmer, with less than two acres of land, rarely grows high-value crops. Secondly, all the states have not promoted DIS as assiduously as Maharashtra, Tamil Nadu, and now Gujarat. Of the Rs.15 crore subsidy sanctioned by the centre for DIS in 1991-92, Maharashtra got the largest chunk with Rs.4 crore. Maharashtra's ambitious Rs.200 crore horticultural programme is also synergistic with DIS.

The vast potential of DIS is undeniable. According to the National Committee on

the use of Plastics in Agriculture, 20.9 million hectares of existing farmland can come under DIS. The eighth plan target is 500,000 hectares. Coconuts in Karnataka, pomegranates in Gujarat, fruit orchards in Himachal Pradesh, vegetables in Punjab, citrus fruits and vegetables in Rajasthan, are just some of the opportunities available. "The barren Chambal district of MP can be

mind. Maintenance services need to be prompt as faulty filtration can clog and crack up pipes. To withstand weathering and rodents, the lateral pipes must be made of virgin polymers and not recycled plastic, which small-scale manufacturers tend to use to reduce costs by nearly 30 per cent. A good system, according to the agricultural ministry's guidelines, is supposed to last at least ten years.

The companies, meanwhile, want some assurances too. Investments in the requisite expertise and infrastructure must be justified by the returns. Demand, they say, is small now and will not spurt sharply unless DIS is promoted on a large national scale by the government.

Lack of awareness among the farmers is a genuine problem facing the promoters of DIS. It is as low as 2 per cent in states like Bihar and Orissa. Even in Maharashtra, convincing farmers, even by example, has not been easy. Recalls N. Mahanor, a citrus farmer who, beginning from 1985, has progressively covered 44 hectares of his 80-hectare farm at Palaskheda, Aurangabad, with DIS, "Neighbouring farmers wondered how drops of water could be more effective than a flood!"

Some efforts are being made by IPCL's plasticulture cell and the NCPA to spread the good word. Jain Irrigation has been advertising frequently and sponsoring the *Amchi Mati Amchi Manse* programme on regional TV. But that's not enough.

Together with a standardised, streamlined pattern of subsidies nationwide and concessions on import and excise duties, the general consensus is that the Central and state governments' agricultural departments and their extension machinery should adopt and promote efficient water management as a national priority, just as hybrid seeds and chemical fertilisers were for the green revolution.

But traditional attitudes must first change. Farmers recklessly waste water today because it is available virtually free. Once water is priced at its true cost, the value of DIS will become self-evident.

■ INDIRA KHANNA



At Patil's farm: higher yields

transformed within three years if the government gives it full attention," says A.D. Bahl, Voltas' divisional manager, agro-industrial products and pumps.

Currently a Rs.50 crore industry, it is all set to expand to Rs.100 crore by 1993 with new companies like Finolex, NBT International and Mahyco Seeds entering the field. However, some rough patches still need to be smoothed if the annual 200 to 300 per cent growth rate potential, as estimated by Voltas, is to be realised. Systems must be efficiently designed, keeping the topography, soil and water quality of the farm in