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Energy security - not by hydel alone

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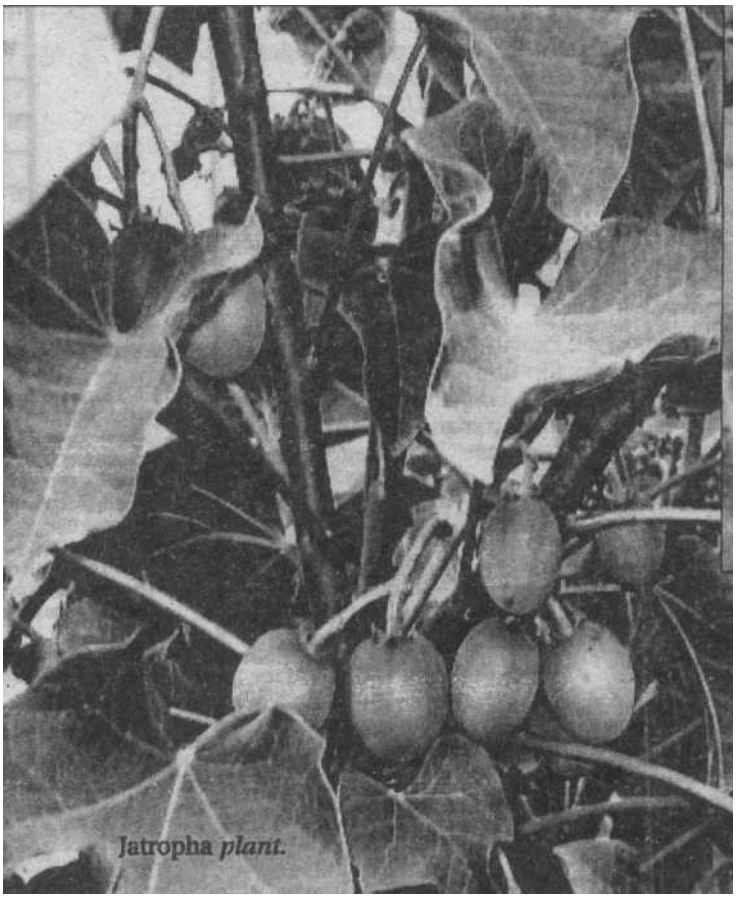
GOING through the box item in Chapter V of the North-East Vision 2020 summing up the constraints on the growth of industries in hill areas, one notices a note of near despair caused by intractable problems of transport and power. All-weather roads are costly to build and maintain and transport by motor vehicles is about the costliest mode of moving products, men and materials. Connecting remote villages with the grid power is also expensive and pro-'blernau'c as nature and wildlife very often snap these lines. Together, these two constraints compound the problem of delivery of every development service in remote hill areas, be it health, education, irrigation or any attempt to manufacture or add value to local resources. So far, the approach to resolve these basic constraints has been to subsidise the road construction or power supply under some special programme for hill areas, which has yielded little success as nearly half the villages in the hill states of the North-east still remain largely unserviced. Even when provided, the villagers continue to face power cuts because every North-eastern state is deficit in power, has bad roads and fuel shortage. It has also been seen that road construction and maintenance create only small seasonal employment and high maintenance costs impose a huge burden. Unless economic activities pick up in the villages, the roads tend to be unviable.

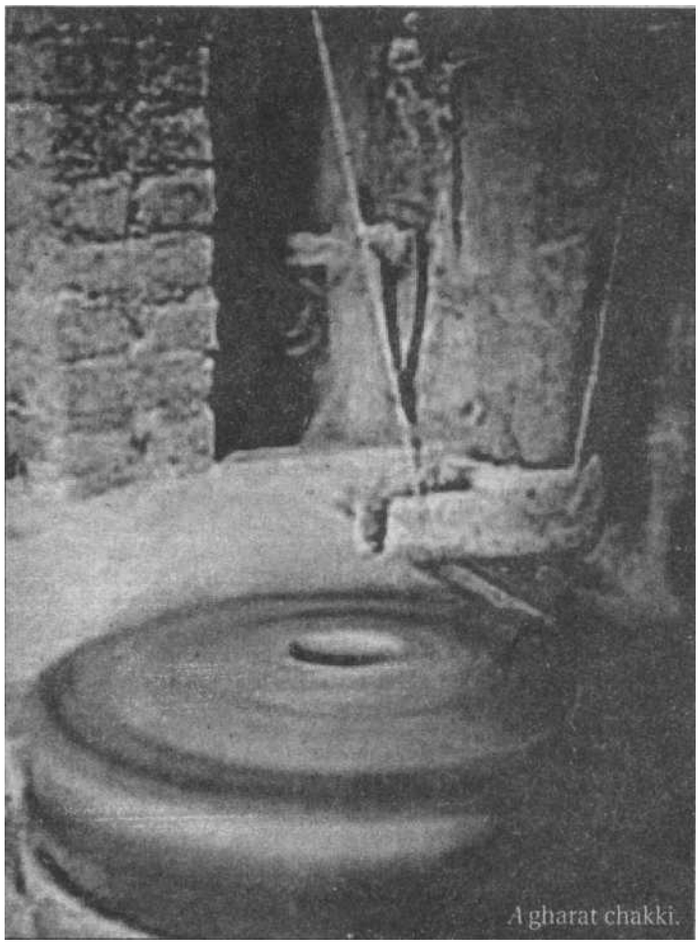
The only way to get out of this logjam is to take a bold initiative in harnessing locally available water and bio resources for development of cheaper and reliable power and fuel and to apply proven technologies to local resources, such as bamboo, medicinal plants, agri-horticultural produce for 'Value addition" activities for the generation of gainful employment in the villages. The main plank of such a programme could be micro-hydel projects and production of bio-diesel at the village level or a cluster of villages.

Since the rural household de, mand does not usually exceed five KW, small hydel power turbines requiring a 20-ft or six-foot head of water—the height of the reservoir in relation to the turbine — could be installed at a cost of about Rs 30,000 to provide five KW—enough to meet the energy need of a household and free it from dependence on grid power. Technology for making cheaper turbines is available in the country and Nagaland has been successfully implementing this scheme in a number of its villages. The only snag is that since the turbines are manufactured elsewhere, repairs or replacements involve time and expense. Another, possibly better option, is water mills — *pani chakkis* or *gharats* — which are simple devices with fitted wooden or steel blades placed below a stream or small waterfall in a structure under a shed that rotate with the fast falling water and generate power ranging from five to 10 KW. These water mills are a common sight in the entire Himalayan region from Kashmir to Arunanchal and Sikkim is dotted with water mills and used by villagers for crushing wheat and providing domestic lighting. The Himalayan Environment Studies Conservation Organisation has done excellent work in upgrading the *gharats* under the leadership of Dr Anil Joshi by introducing steel blades, ball bearings for faster movements, easier maintenance and higher generation of electricity. Though the initial cost is a little high — Rs 2 lakh for a 10 *KW-gharat*—maintenance is troublefree and involves minimal cost because the village artisan can be quickly trained for the job. A 10 MW-*gharat* could meet basic power needs of a village of 10-15 households regularly. Already over 1,100 upgraded *gharats* are functioning in Jammu and Kashmir and, interestingly, the Assam Rifles and Army formations in the North-east have already installed Hesco's upgraded *gharats* in some villages of Manipur, Arunanchal Pradesh and Nagaland — a fact still to receive adequate publicity. Seeing the operation of this scientific but efficient machine, one feels emboldened to think that the *gharat* could be the appropriate technology for supplying electricity to remote areas of the North-east and is worth a try on a large scale.

The next problem is diesel supply for running pumps, small gensets and vehicles in remote areas. Production of bio-diesel from fruits of *jatropha curcas*, *neem* or *mahua* is the answer for hill areas, especially *jatropha*. It is a versatile plant that can be grown in dry, degraded land, with little labour and without any irrigation in the North-east situation and, most significantly, could bear fruit even within a year or two with good organic



Jatropha *plant.*



A gharat chakki.

mixing and cultural practices as against the usiial three-four years growth period. Under the guidance of Dr Shankar Mukherjee, an eminent agricultural scientist, growers in the villages of How-, rah in West Bengal have reaped the *jatropha* advantage in such a short period which is being used as feed stock by Air Bridge Greens at its 30 KL bio-diesel plant at Domjur in Howrah. The enthusiasm of Tapas Porel, the young owner of this enterprise for bio-diesel, is infectious. It is possible to produce it at Rs 26 a litre and even with taxes could be cheaper than petrol or diesel. It would ere-

ate jobs at the village level for processing and allied activities for transporting it to the plant, productively use dry and degraded land unfit for seasonal crops, enrich soil, clear the air by carbon sequestration and thereby clean and green the countryside. Bio-diesel produced at this plant from *jatropha, neem* and *mahua* is as good as petrol or diesel and it is a delight to see that the refining plant was designed, fabricated and installed by a local engineer and only one component, the catalyst, had to be imported from Japan. The byproducts of *jatropha* bio-diesel, like glycerine, command a good demand and oilcakes are good bio-fertilisers. It seems that there is huge scope for planting *jatropha* on land affected by ever reducing jhum cycles to give villagers a permanent bio-asset and a base for rural industrialisation, energy security, non-farm employment. To achieve this, a village cluster approach is suggested for setting up a viable plant backed up by extensive plantation. Together, the *gharat* and the bio-diesel have the potential to bring about a "very different sustainable green revolution" in the North-eastern hills, opening up huge opportunities for much value addition and industrial activities, as in rural China This is the sustainable way to energy security and not by high dams and hydel projects.

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