Pioneering Rural Technology in India

"Appropriate technology" stirs mixed reactions, connoting to some a resort to the Stone Age way of doing things. Many people in developing countries are suspicious of Westerners' attempts to steer them toward appropriate technology, seeing in such efforts a conspiracy to deny them the promises of high-stepping Western technologies and divert them from the "new international economic order."

It is significant then when a scientist such as Amulya K. N. Reddy, of the Indian Institute of Science in Bangalore, shifts from a prestigious career as an electrochemist to devote all his energies to promoting rural technologies. Reddy is regarded by Western promoters of appropriate technology as an unusually eloquent spokesman for the movement. Charles Weiss, science and technology adviser of the World Bank, says that too often educational and research institutions in developing countries regard such technology as not worthy of their attention—hence Reddy is "a very important figure" as "one of the first prestigious figures in academic science from a first-class [Third World] institution to declare the importance of village technology."

Reddy, who got his doctorate at the Imperial College in London and taught at the University of Pennsylvania in the 1960's, pursued electrochemistry for several years at the Institute until around 1974, when, he says, "I began to feel increasingly the irrelevance of what I was doing." Unaware at the time of the work of British economist E. F. Schumacher, the progenitor of the concept that "small is beautiful," Reddy "groped [his] way to the concept of appropriate technology" in the course of writing a critique of the science and technology plan of the Indian government. His ideas were favorably received by colleagues and he was able to get enough support from the Institute to found project ASTRA—Application of Science and Technology to Rural Areas.

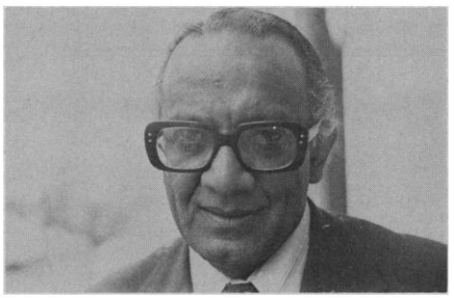
So far, ASTRA has focused its research on rural energy systems, housing technology, water projects, and the processing of agricultural wastes and residues. Close to realization is a design for a rural energy system in the village of Pura. The first phase is a community biogas plant to operate on cattle wastes. There are already thousands of biogas plants in India, but almost all are demonstration projects supplying only a tiny fraction of community energy needs.

Scientists and engineers from ASTRA describe how, by categorizing the energy resources and uses of energy in Pura, they identified the most pressing need—medium-temperature heat for cooking. Conventional wisdom, by contrast, stresses rural electrification, which is of no use for village cooking. ASTRA scientists calculated that of the locally available energy resources—firewood, crop wastes, and animal wastes—the animal wastes were the most abundant and readily usable for a community biogas plant. The gas not used for cooking would be used for water pumping, electricity generation, and cement mixing, and revenues from electricity and cement could make up the costs of the plant in 4½ years, according to the estimates.

In Reddy's view, planning for appropriate rural technology requires shedding the value system implicit in Western technology. "The value systems of science in developing countries are such that all foci of interests, all criteria and fashions are based on what the scientific establishment in the advanced countries believes in. Everyone is looking westward. More than money, equipment, or infrastructure, it is that value system which is the real obstacle to scientists looking at their own problems," he says.

The technology produced within that value system fails the basic criteria of appropriate technology—that it must address the area of greatest need, must promote self-reliance on the part of those for whom it is designed, and must be environmentally sound.

Appropriate technology is just as challenging for scientists and engineers and is in no sense "primitive." Indeed, appropriate technology is "advanced high technology if judged by the extent of modern scientific and engineering thinking that goes into it," Reddy contends. For example,



Amulya Reddy

Photo by C. Holden

calculating the heat transfer of a cooking stove might be compared to calculating that of a reentering rocket. In assessing the usefulness of a cooking stove, however, a variety of different factors, including social ones, must be taken into account. A solar stove will not be efficient if villagers do no cooking between 10 a.m. and 6 p.m.; a smokeless indoor stove will not be desirable if smoke is relied on to keep down the termite population in thatched roofs.

In the belief that self-reliance must begin at home, Reddy offered some do's and don't's for well-intentioned Westerners during a visit to Princeton last month. Westerners should try to strengthen the technical capability of developing countries by performing basic research and technology assessment, he says, but they must not undermine groups such as ASTRA by collaborating with them. "The cultural hangover of colonialism is such that if there is an institutional collaboration, any credit for achievement will always go to the Western institution," he says. This saps the confidence of the locals and "the growth of confidence that you can tackle your own problems is the crux of development."

Reddy warns against trying to develop gadgets and devices for Indian villages while sitting in a lab in Cambridge, Massachusetts. They will never work, because one has to understand the whole social ecology as well as the physical circumstances of a village to know what people need and will use. Besides, the locals have to be involved every step of the way. "This is considered the obvious thing to do for the urban architect," notes Reddy, but somehow with poor people the idea of investigating their habits and preferences and doing test marketing falls by the wayside. "Then they don't like what we have done and we say they are stupid."—CONSTANCE HOLDEN

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