In this issue

Application of S&T to rural areas

The necessity of harnessing S&T for transforming rural India has long been recognized. Mahatma Gandhi, way back in 1935, realized this and had initiated a movement called 'Science for people'. Since independence, the S&T institutions and manpower have witnessed a phenomenal growth in absolute terms. Not surprisingly, the mainstream S&T institutions, including the national premier institutes, national laboratories and universities have given low or no priority for R&D relevant to rural areas, which account for nearly 700 million people. This could be the result of lopsided funding, criteria for evaluation of S&T personnel and market factors. It is well-known that the S&T needed to solve basic rural problems such as safe drinking water, low cost housing, quality energy, sanitation and all-weather roads is lacking.

The special section presents a set of articles describing the R&D efforts at the Centre for Sustainable Technologies (formerly ASTRA) of the Indian Institute of Science and a few other institutions in India. The articles deal with evolution of S&T policy in India, alternate building and energy technologies, efficient cook-stoves, sustainable water, watershed development, information and communication technologies and community health systems.

A. K. N. Reddy (page 889) presents the evolution of S&T in India and describes the ASTRA (Centre for Application of Science and Technology to Rural Areas) experiment in promoting S&T for advancing rural development. Based on the analysis of barriers and the lessons learnt, he provides direction along which the R&D could be sustainably promoted in institutions of higher learning in India.

Construction or building technologies are highly energy intensive leading to higher costs and environmental degradation. Venkatarama Reddy (page 899) presents the energy-efficient technologies developed at ASTRA and the opportunity for promoting sustainable building technologies. The study has demonstrated the energy efficient and sustainable alternatives to the energy-intensive conventional construction materials such as steel, cement, glass, aluminium, plastics, bricks, etc. Thus the need for alternative building technologies, which are environmentally sustainable, is presented along with examples of technologies developed at ASTRA.

Meeting energy needs of a large developing country such as India is a challenge. Dasappa et al. (page 908) present the development of biomass gasification technologies and the potential to meet energy needs in a non-polluting and sustainable way. They present the technological and field experience pertaining to open top return down draft biomass gasification system coupled with the internal combustion engine.

The R&D work on biomass-based biogas technologies at ASTRA is presented by Chanakya et al. (page 917). They describe the process to ferment biomass feedstock and the digester designs for the plug-flow and solid-state stratified technologies. Adaptation of biogas technology concepts to treat urban solid waste and liquid waste from coffee processing is presented. They also highlight the new uses for biogas, digester slurry and digested feedstock.

Development and dissemination of the fuel efficient domestic biomass cook-stove in Karnataka is presented by Jagadish (page 926). In Karnataka 1.5 million fuel-efficient ASTRA stoves, with a thermal efficiency of 44%, have been disseminated. The analysis highlights the need for more designs, clean combustion and cost-effective dissemination modules.

Ravindranath et al. (page 932) report the performance and impact of a decentralized biomass gasifier-based power generation system in Hosahalli village. The decentralized biomass power system has functioned for nearly 14 years, with over 85% diesel replacement and generating electricity at an average operational and maintenance cost of Rs 3.3 kwh. This system has shown the technical and operational feasibility as well as acceptability by the rural community. Decentralized biomass power systems have the potential to meet all the rural electricity needs in an environmentally sustainable way.

Two articles deal with water. Gosain and Sandhya Rao (page 948) demonstrate the use of GIS-based modelling framework for local level planning, incorporating the sustainability aspects of watershed development. A case study from Karnataka demonstrating the implementation of the technique is presented. Sudhakar Rao and Mamata (page 942) discuss the water quality issues in promoting sustainable water management. They highlight the problem of fluoride contamination of groundwater and present the IISc method using magnesium oxide to treat the fluoride-contaminated water.

Srivastava et al. (page 954) present the dynamics of relationship between the incidence of poverty and degradation of natural resources in different states of India and highlight the need for economic policies and institutional interventions to conserve natural resources and reduce poverty.

Arunachalam (page 960) presents the role of information and communication technologies in poverty alleviation along with the experience of the intervention of M.S. Swaminathan Research Foundation in a cluster of ten villages in Pondicherry.

Antia (page 967) presents alternate approaches to delivery of medical technology for rural health. He highlights the need for community health care system and the synergy between traditional and modern medical systems.

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—N. H. Ravindranath
Palk Bay, Palk Strait and Gulf of Mannar

Current Science (2004, 86, 1351–1352) had carried an article by R. D. Shuiling related to bridging Palk Strait recently. The article dealt with a proposal to elevate the island formations comprising the Adam’s Bridge in the Palk Strait, by a geochemical engineering solution.

Engineers have also proposed a project referred to as ‘Sethusamudram Ship Canal Project’ (SSCP) to secure passage for ships across the Adam’s Bridge by providing a ‘channel-like passage’, that would shorten the circumbalibrary distance between India’s east and west coasts, around Sri Lanka. It is interesting to note that this project dates back to 19th century and is still to see the light of the day. In an interesting article, Harish Rao notes [see http://www.projectmonitor.com/detailnews.asp?newsid=3106]; ‘The project was originally conceived in 1860 by the British Commander A. D. Taylor of the Indian Marines. Thereafter, almost once in every decade a committee or a prominent expert made a recommendation in favour of the construction of the canal. . . . The government’s enthusiasm to set up committees did not wane. Successive committees revised the cost of the project upwards . . . from Sir Ramaswamy Mudaliyar’s initial capital outlay for the integrated Sethusamudram-cum-Tuticorin Port Scheme at Rs 998 lakh for a draft of 26 ft to as much as Rs 685 crore for 30’ draft (and Rs 760 crore for 31’ draft and Rs 1,200 crore for 35’ draft) in the Pallavan Transport Consultancy Services Ltd’s report in 1994’. The latest news (according to The Hindu of 3 September 2004) on the project is that the Government of India decided on 2 September 2004 ‘to set up a Special Purpose Vehicle (SPV) for implementing the Rs 2000 crore Sethusamudram project which involves the commissioning of a navigable channel from the Gulf of Mannar to the Bay of Bengal through the Palk Bay. The project envisages cutting of a ship canal to connect the Gulf of Mannar and the Palk Bay so that most of the ships, depending on draft required, moving between the East and the West coast of India could have continuous navigable sea route around the peninsula within India’s own territorial waters. This will save about 400 nautical miles and up to 36 hours of sailing time for ships between the East and the West coasts.’

In this issue R. B. Cathcart (page 849) foresees a futuristic ‘industrial regional complex consisting of complementary floating and land-fixed facilities’. Such a project may have ‘tremendous environmental impact costs to India and Sri Lanka’. The article addresses issues and concerns that may arise due to activities in the Palk Strait as a result of ‘biogeomorphologic and anthropogeomorphologic event-processes’.

The SSCP project is considered to ‘be a great engineering marvel’, as much as the Industrial Complex envisaged by Cathcart. As many such ideas are floated form time to time, questions concerning ‘the geology of the Palk Strait, disposal of huge quantities of excavated material, stability of a high-cut of several meters in such environments’, etc. are still to be discussed and debated by geo-engineering experts of this region and others.