

Security Council, a Nuclear Weapons State with a nuclear reach that extends to the continental United States, China is clearly a case apart. I am surprised the organizers of the Lund Workshop did not realize that China is so out-of-line on every parameter with the other cases considered as to suggest a mistake in its inclusion as a case; a mistake compounded by the absence of a contribution from a mainland Chinese.

Since only some of the contributions deal with the agricultural or medical components of the S&T systems in the CPE countries considered, the title of this compilation should have been 'Industrial Science and Technology at Stake...'. But shed a tear for this:

'In the late 1960s and the 1970s, Hungarian agriculture, due to its innovative development, was among the leading European countries in the productivity indexes of its 42 products. The paradigm of technological development in Hungarian agriculture, with its innovative entrepreneurial values and system approach, at that time was basically different from that of the industry. It was limited, but entrepreneurship in the management of agricultural cooperatives and state farms was allowed, while the industrial management was deprived of it. The scarcity of resources, the industrial management blocking investment in agricultural sector, and the crisis of the whole economy stopped and even retarded the innovative development of agriculture in the second part of the 1980s. The loss of its Eastern market, and the excessively inappropriate governmental agricultural policy at the beginning of the 1990s, finally knocked out this once prospering sector of economy. After 1992, one third or half of the agricultural organizations were forced to use horses and manual power instead of machines...'

At Rs 550, this paperback is at the margin of the reach of individual S&T policy-wallahs but worth the buy if your calling requires you to counter in real-time smart-alec free-marketeers peddling the 'Washington Consensus', and/or smarter-alec economists of Marxist-Leninist persuasion.

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Sustainable Agriculture – Towards an Evergreen Revolution. M. S. Swaminathan. Konark Publishers Pvt. Ltd, A-149, Main Vikas Marg, Delhi 110 092, India. 1999. 219 pp. Price: Rs 250.

M. S. Swaminathan has a number of articles and addresses to his credit. This book includes among others 'Our Agricultural Future', the Sardar Patel Memorial Lecture which he delivered in 1973. I have admired this lecture from the time I read it in October 1973. I believe this lecture should be the reading material for all those who wish to graduate in agriculture in India. The lecture was written when there was enthusiasm of 'Green Revolution', and yet he decided to talk about the Assets and Liabilities in agriculture in India. We talk today of soil and water degradation, but he cautioned about it 25 years ago. He wrote about 'Ecological Seasons' and I quote something which should have been practiced. 'In Assam, the period between September and May is free from floods, since the major floods have either taken place in May-June or more commonly in August. There is tremendous potential in this area for exploiting groundwater and for arranging for lift irrigation. An assured *rabi* crop can be raised if arrangements can be made to supply water.' I wonder if the State Government and planners took note of this prognosis, though all politicians and bureaucrats talk of improving the economy of North-east.

Writing about fruit crops, the address goes to identify: 'The concept of population explosion in fields has also permeated horticulture. Growingly, emphasis is being placed in orchards on the selection of dwarfing root stocks. Some experts believe that fruit orchards of the future may be "Lilliputian" in nature, facilitating high management efficiency.' And yet even today we have mostly low population orchards with low productivity. The horticulturists or plant scientists could have brought a remarkable change if his advice was taken by the masters of horticulture.

The lecture also emphasized the importance of biological control of pests, economy through recycling and reducing post-harvest losses, which Swaminathan saw as the emerging needs of Indian agriculture. Unfortunately, even today

the biological control of pests remains a laboratory exercise, and we cannot claim that we have it operating even in half a million hectare area out of approximately 200 million gross cropped area. Will the private sector be able to make biological control and IPM as common acceptable practices? A thrust has been given to the post-harvest technology, but we hardly have well-researched and quantified data on losses of the various vegetables and fruits in different regions of the country. We do know that in one region or other tomatoes are wasted because of over production. There is hardly any good science in relation to pre-harvest and post-harvest technology in different fruits and vegetables. Is it because the basic sciences have remained outside the realm of agriculture? Swaminathan has been a promoter of basic sciences in agriculture, but others did not follow the path charted out by him.

India frequently faces droughts and unfavourable weather, but being a large country we have good weather in some region or the other every year. With the exception of one or two instances, the whole country has never experienced bad weather. Hence, there is the importance of 'Good Weather Code', as stated in the first chapter. Could we take full advantage of a good weather in a given year? In 1973, when this lecture was written, the means of communication and transport were limited, but today this kind of code could become a vehicle of change and prosperity of the country in the next millennium.

Now, many agriculture scientists would like agriculture to be taught from the primary school level. However, Swaminathan says: 'During the early years of childhood, before the child begins to receive formal education, and in primary school, the major emphasis should be on living in nature and with nature, learning about nature through direct observation, and using the materials provided in nature to develop scientific skills, aptitude and habits of thought'.

The first chapter also counts floristic diversity and animal wealth as important assets. It was this vision of Swaminathan which led to the establishment of such institutions as National Bureau of Plant Genetic Resources, National Bureau of Animal Genetic Resources and National Bureau of Fish Resources. While the collections of plant resources have been

made, the identification and utilization of important traits in each case remains an important task to be accomplished.

The chapters on 'Agricultural Progress – Key to Third World Prosperity', 'Genetic Conservation, Seeds and Property Rights' highlight the contemporary issues of the Third World. The progress through improvement of rice and wheat is now acknowledged around the world. But progress in growth is slowing down and becoming a cause for unsustainable agriculture. Efforts to reverse or arrest this trend are extremely important not only for India, but Asia as a whole. Swaminathan mentions his interaction with an old Chinese farmer. 'I asked Mr Lu "What are the most important farm problems today, and in what areas do you feel we should focus the research in future". The farmer's immediate reply was "The care of the soil and the health of the plant".' This in a sense sums up the problem of sustainable agriculture in India and Asia.

Some of the chapters are extremely informative to the common reader. Seed and Intellectual Property Rights (TRIPS) have attracted considerable debate in developing countries, particularly in view of the role of multinational companies. A few chapters included in the book make

the following important points: 'We live in an interdependent world, where plants, microbes and animals have brought the world together. The quotation of Martin Luther King is very appropriate when he says "All life is inter-related We are caught in an inescapable network of mutuality Before you finish eating breakfast in the morning, you have depended on more than half the world".' Such examples have brought home the point that the development of agriculture has been made possible by the cooperation of all. To carry this point further, Swaminathan very appropriately gives the pedigree of the rice variety IR66 that involved 72 genotypes which included 20 land race which came from different continents of the world. If some multinational corporation makes use of IR66 and develops a new variety, would such an MNC be entitled to a patent? These and many other contemporary questions have been discussed. In fact, through such efforts a legislation called the Plant Variety and Farmers Rights has been drafted, but no government had the time to enact such a law. We wake up, make noise and protest when someone patents Jamun or Karela.

Finally, the chapter on 'Towards an Evergreen Revolution' has several sug-

gestions which the government should adopt. Would the acceptance of these suggestions solve the problem? The success of 'Green Revolution' was based on the efforts of the enthusiastic and dedicated scientific community, sensitive bureaucracy and the vision of Indian political leadership. But now, it is difficult to say that we have a dedicated scientific community. Bureaucracy thinks that the targets fixed in kharif and rabi workshop is their only concern. When the production is high (with good weather) it is due to the efforts of the ICAR and bureaucracy, but if production declines it is due to bad weather. Political leadership is happy only with the statistics. Swaminathan is a sensitive and knowledgeable scientist, and one would look forward to his vision of an Indian farmer in the next millennium. This is a book which should be read by all those interested in Indian agriculture. There is a minor error in Figure 4.1. The range of yield should be 1 to 4 and not 100 to 400 metric tonnes per hectare.

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