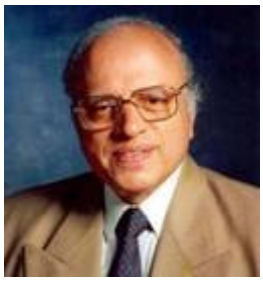
PANDIT GOVIND BALLABH PANT MEMORIAL LECTURE: I

(14 SEP 1991)

Issues on Ecological and Human Problems of the Himalayas



Prof. M.S. Swaminathan, FRS
Director,
Centre for Research on Sustainable Agricultural and Rural Development,
Madras

14 September 1991, GBPIHED, Kosi-Katarmal, Almora, U.P.

About Dr. M.S. Swaminathan

Dr. M.S. Swaminathan born in Tamil Nadu, India, on August 7, 1925 had his early education at Travancore and Madras Universities and earned his Ph. D in Genetics from Cambridge University in 1952, and over 30 Honorary Doctorates have been conferred on him. In addition to being a fellow of the Indian National Science Academy and the Royal Society if London, Dr. Swaminathan is a Fellow of the Science Academies of Sweden, Italy, United States, USSR and China. He is a Founder Fellow of the Third World Academy of Sciences. He is currently President of the International Union for the Conservation of Nature and Natural Resources and of the World Wide Fund for Nature India. He is also the President of the National Academy of Sciences of India.

Dr. Swaminathan played a catalytic role in India's Green Revolution during 1960 and 1982. From April 1982 to January 1988 he served as Director General, International Rice Research Institute (IRRI) Manila, Philippines. Prior to assuming his post with IRRI, Dr. Swaminathan worked at the Indian Agricultural Research Institute, New Delhi, mainly in the field of wheat improvement. After heading the IARI for seven years, he took over as Director General, Indian Council of Agricultural Research and Secretary, Department of Agricultural Research and Education (1972-79); and then Principal Secretary, Ministry of Agriculture and Irrigation (1979-80). He was member Planning Commission in-charge of agriculture and rural development from 1980 to 1982. It were the efforts of Dr. Swaminathan that led the Planning Commission to lay the much needed emphasis on Himalayan Eco-Development in the Sixth Five Year Plan.

He served as a Founder-Trustee and later Chairman, Board of International Council for Research on Agro-Forestry (ICRAF) during 1977-1982. He served as Chairman, U.N. Advisory Committee on Science and Technology for Development during 1981-84, He served as Chairman Advisory Panel on Food Security, Agriculture, Forestry and Environment to the World Commission on Environment and Development (WCED). Among his many distinguished awards are the Romon Magsaysay award for Community Leadership (1971), the first award for serving the cause of women in development (1985). Recipient of Padma Shri (1967), Padma Bhushan (1972) and Padma Vibhushan (1989) awards by the President of India. In 1986, he received the Albert Einstein World Award on Science. On 6th October 1987, he became the first laureate of the World Food Prize. He also received "Tyler Prize 1991" for Environmental Achievement.

On the occasion of his receiving the first World Food Prize at the Smithsonian Institution, Washington, in October, 1987, Mr. Javier Perez de Cuellar, Secretary General of United Nations wrote:

"Dr. Swaminathan is a living legend. His contributions to agricultural science have made an indelible mark on food production in India and else where in the developing world. By any standards, he will go into the annals of history as a world scientist of rare distinction".

Dr. Swaminathan has now established M.S. Swaminathan Research Foundation at Madras for Sustainable Agricultural and Rural Development based on the integration of traditional and frontier technologies.

PANDIT GOVIND BALLABH PANT MEMORIAL LECTURE

M.S. Swaminathan
Director, Centre for Research on Sustainable Agricultural and Rural Development, Madras

The establishment of an Institute linking environment and development has been a very meaningful method of perpetuating the memory of one of the greatest Indians of our time, Govind Ballabh Pant.

I compliment the Ministry of Environment and Forests, Government of India, on this thoughtful initiative. I also complement the Director and Staff of the Institute on the meaningful work they have carried out so far. Nationally and internationally, there is a growing awareness of the need for ensuring that the ecological security of the Himalayas is intimately intertwined with the livelihood security of the people living in this highest mountain ecosystem of the world, stretching 2400 km in length and 300 km n width. The ecological security of the Himalayas is not only vital for the welfare of the hill people and their children but also for the food security of India. The future of agriculture in the Indogangetic plains, a major food basket region of India and of the world, will be determined by what we do or do not do in the Himalayas today.

I am glad this Institute has chosen for its core activities the themes, land and water resource management, sustainable development of rural ecosystems, conservation of biological diversity and ecological economics and impact analysis. All these themes are inter-related and will have to be studied on a systems basis, if damage to Himalayan ecosystems is to be halted and reversed.

Many of the ecological and human problems of today in the Himalayas owe their origin to segmented thinking and action. Some recent examples are:

- the construction of roads in high altitude without concurrent arrangements for slope stabilization resulted in extensive landslides and to the intensification of deforestation.
- the rapid growth of the apple industry based on the use of wood for packging in Himachal Pradesh and Jammu and Kashmir led to the extensive felling of trees- the linkages between forests and apple packaging were not worked out before incentives were given to the planting of apples, pears and other fruit trees.
- the direct extraction of medicinal plants growing in nature for commercial use led to the rapid depletion of medicinal plants and to the listing of species like *Dioscorea deltoidea* and *D. prazeri* in the Red Data books of the Botanical Survey of India; this is a good example for detailed study by students of ecological economics.
- the neglect of traditional food crops like amaranath, chenopodium and buckwheat has not only weakened the household nutrition security system of the hill people, but also **prevented the Himalayas becoming the home of the health foods**

of the future. These traditional food crops still afford an opportunity for building a dynamic Eco-Food industry.

- the promotion of sheep husbandry without attention to winter forage needs has enhanced seasonal migration among the Bhotiyas and other hill people.
- rapid increase in population in recent decades has resulted in a substantial increase in the area under cultivation as well as in the cattle population. The failure to evolve an integrated nutrient supply system for the hills comprising organic manures, biofertilizers, green manures and mineral fertilizers has led to a situation where large numbers of farm animals are kept solely for providing manure to crops. An important reason for the increasing floods and soil erosion we are now witnessing is the large human and cattle population of the Himalayas and the growing depletion of the forest cover.
- the growth of tourism in the Himalayas has instead of strengthening the livelihood security of the local people has often tended to erode their capacity to earn their daily bread. For example, pilgrims going to Badrinath and Kedarnath in the Garhwal Himalayas in the past used to halt at several location seeking shelter and food and also used ponies, thus giving work and income to the local inhabitants. Now, with the introduction of rapid transport systems and organized Hotels, most of the money spent by pilgrims goes to people from outside the hills. Also, the development activities undertaken in areas which were once rich in oak, rhododendron and other broad leaved species, have resulted in barren slopes and in the replacement of oak and rhododendron with chir pines.
- the construction of dams and barrages across Himalayan river systems has severely threatened the riverine ecosystems. The natural populations of fish fauna especially migratory fishes like "Mahaseer" are under severe threat, due to the closure of breeding areas in the upper reaches of the river systems. Similarly, genetic erosion is increasing in medicinal plants. The Government sponsored Garhwal and Kumaun Mandal Vikas Nigam give contracts for extraction of the medicinal plants.
- the eastern Himalayan region and North-east India comprising of Nagaland, Manipur, Meghalaya, Tripura Mizoram, Arunachal Pradesh and the hills of Assam are important repositories of genetic variability in citrus, cotton, rice and other plants as well in animals like Mithun and Yak. Shifting cultivation and invasion of cleared lands by non-edible weeds like Eupatorium, Mekenia and Lantana have resulted in a considerable damage to natural ecosystems and rendered the region a "hot spot" location with reference to the loss of biological diversity.

I can go on listing such examples and you will be in a position to add many more. There are also many positive developments which show the way. The Chipko Andolan and Sukhomanjri watershed management show the power of people's cooperation in the sustainable management of forests and watersheds. The destiny of nearly 40% of our population inhabiting the Gangetic plains depends on the management of the Himalayan hydrologic estate. The tectonic events which led to the uplift of the Himalayan mountain ranges provided the geological framework for the evolution of the hydrological systems for the northern part of India. One of the

urgent tasks facing us in the conservation and wise use of this extensive hydrologic estate, spread over an area of about 6,50,000 sq. km.

The Himalayas is rich not only in biological diversity but also in cultural diversity. Inspite of such diversity, there is unity in the major problems facing the people of the Himalayas, namely poverty, population growth and environmental degradation. The solutions to such problems are however location specific. They have to be developed through participatory research with local women and men. The G.B. Pant Institute of Himalayan Environment and Development should spearhead the concept **"Think Himalayan but analyse and act locally".**

My first plea on this occasion is the fostering of **participatory research** designed to promote a new paradigm of development based on the integration of the principles of ecological sustainability, economic efficiency and social equity. The maximum impact of the destruction of land, water and biomass resources falls on women who play the major role in the collection of fuel, fodder and water. A major aim of the participatory research programmes should be the standardization of location specific methods of improving biological productivity and quality of life. There is need for a land and water use strategy for each compact agro-ecological zone with a view to promoting the following three end uses.

(a) Conservation areas

W.A. Rodgers (In Himalaya : Environment, Resources and Development. Editors: N.K. Sah, S.D. Bhatt and R.K. Pande) states "the Himalayas must rank as the region in most need of conservation inputs. I say this not because of the scarcity of national Parks, nor because of the large number of endangered species in the area, but for two other reasons. First, is our ignorance of the biology and ecology of high altitude communities and their component species. Secondly, the increasingly obvious physical deterioration of the Himalayan environment, every year sees more erosion and landslides with greater levels of flooding and siltation damage downstream".

An integrated strategy involving *in situ* and *ex situ* methods of conservation will have to be developed taking into account the incidence of biological diversity at different altitudes and longitudes. Special efforts will have to be made to involve local communities, particularly wome, in the conservation work and to make them feel full partners in the efforts to conserve the biological wealth of the Himalayas.

There are degraded areas where the biological potential of the soil has been diminished due to a variety of human induced causes. Restoring degraded lands will need sustained efforts over many years and even decades. The science of restoration ecology is fast advancing and I am glad this Institute has taken up such work on a priority basis. I would suggest that the scientists of the Institute should help the Ministry of Environment and Forests of the Government

of India to formulate a carefully designed programme of **Employment Guarantee for Himalayan Ecological Security.** Such a programme should consist of three major components_ **work** related to conservation, restoration and sustainable utilization of natural resources; **wage** paid both in cash and kind, ensuring equal wages for women and men; and **welfare** measures such as steps to lower infant mortality and adverse sex ratio and provision of drinking water supply and an effective public distribution system for essential commodities.

There are already initiatives for utilizing the services of ex. service men in eco-restoration work. Experiments have also been carried out to assess the efficiency of aerial seeding techniques. A multi-pronged approach in necessary, utilizing such techniques which can help us to reach the goal of restoring the biological potential of soil speedily and surely. More research is also needed for understanding the soil micro-flora and micro-fauna and of the role of micronutrients. Unlike in Alpine pastures, the prevalence of legumes in the Himalayas is limited. We must standardize methods for the rapid spread of grass-legume pastures. Leguminous shrubs and trees supported by the inoculation of effective **rhizobial** cultures would help improve soil fertility. Earthworm farming also deserves attention.

An Employment Guarantee Programme for Himalayan Ecological Security should cover the entire Himalayan range in our country both in terms of altitude and longitude. A back-up consortium of Government Departments, and technical institutions/universities should be formed to provide the necessary technical guidance and oversight to the programme. One of the aims of the UN conference on Environment and Development scheduled to be held at Rio in Brazil in June, 1992, is the preparation by an **Agenda – 21.** This Agenda for action will cover the time span 1993-2000 and 2000- 2010. We need a similar agenda for restoring the degraded ecosystems of the Himalayas. Such restoration programmes can also find high priority in the agenda for mutual cooperation among the SARC countries covering the Himalayan region, namely Bhutan, India, Nepal and Pakistan, Bangladesh, will be equally interested owing to the downstream flood problems arising from upstream deforestation.

(c) *Sustainable intensification*

There are many areas in the Himalaya where the productivity of crops , farm animals, fishes and forest trees can be increased continuously without detriment to the long term productivity of land. This will however call for effective steps in the areas of soil health care and water management. In addition, appropriate public policy measures, particularly a reform of property rights in forests (see for example, E. Somanathan, Economic and Political Weekly, January 26, 1991), will be needed for harmonizing the needs of society and sustainability.

Sustainable intensification of biological productivity will need excellent scientific support. The management of land and water, energy, crops and farm animals and post-harvest products will all need support from basic, applied and adaptive research.

In addition, there will be need for **anticipatory research** in areas such as the following:

(a) Renewable energy sources.
(b) Trends in consumer preferences including an emphasis on the health foods of the future.
(c) New methods of packaging and producer oriented marketing.
(d) Application of biotechnology including the establishment of bio-refineries and tissue culture propagation of plus trees and of species under threat of extinction.
(e) Computer simulation models of potential changes in precipitation, temperature and ultraviolet B radiation arising from changes in CO_2 levels in the atmosphere and damage to the ozone layer. Anticipatory research on the potential impact of climate change should be accompanied by research on avoidance and adaptation mechanism.

The integrated package of measures in the areas of conservation, restoration and sustainable intensification which I have described so far can help to harmonize the competing requirements of conservation, commerce and consumption. There is no escape from the fact that we have to produce more food, fuel wood, fodder and all other requirements from less land in the years ahead. Similarly, in a predominantly agricultural and rural economy, agriculture should not only produce more food but also more jobs and income. This is where again this Institute should become the intellectual powerhouse of the Himalayan eco-development programmes, by looking at the different problems in a holistic manner.

This is the best tribute we can pay to the memory of the late Shri Govind Ballabh Pant, who often pleaded for a marriage between science and society. The scientists of this Institute should forge a new social contract with the people always keeping in mind that the ultimate objective of all scientific efforts is the promotion of a better quality of life for all.

While doing good science is the primary task of the staff of the Institute, spreading useful knowledge and imparting new skills are equally urgent tasks. Here we should mobilize the tools of modern information sciences and technology. The power of the information age is such that C.A. B. International will soon offer a complete library of references to all of the significant publications in Forestry over the past 50 years in two CD-ROM (Compact Disc Read only Memory) discs. Thus, the GB Pant Institute should become a repository not only of gene pools but also of the pool of knowledge required to convert natural endowments into economic wealth based on sound ecological and social ground rules.

You live in surroundings most conductive to linking science and spirituality and achieving both professional and spiritual fulfillment in life. No wonder in our mythology as well as in the verses of great poets like Kalidasa, Himalaya is the abode of Gods. The beautiful trees are the earthly manifestations of the heavenly blessing. I shall therefore close with a poem by Joyce Kilmore.

" I think I shall never see
A poem as lovely as a tree
A tree whose hungry mouth is prest
Against the earth's sweet flowing breast

A tree that looks at God all day
And lifts her leafy arms to pray.
A tree that may in summer bear
A nest of robins in her hair
Upon whose bosom snow has lain
Who infinitely lives with rain
Poems are made by fools like me
But only God can make a tree"

Jai Hind