

# **PANDIT GOVIND BALLABH PANT MEMORIAL LECTURE: VI**

## **Some Issues Related to Sustainable Development of the Himalayan Region**



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## **About Prof. S.K. Joshi**

Prof. S.K. Joshi was born on June 6, 1935. he studied at the Allahabad University and did his Ph.D. in Physics from there in 1962. His broad areas of research specialization are Condensed matter Physics and Collision Processes.

He was elected Fellow of the Indian National Science Academy in 1974 (He was Secretary of Academy during 1983- 86 and Foreign Secretary during 1989-92). He was the President of the INSA from 1993 till 1995. He is a Fellow of the Indian Academy of Sciences since 1974 and was Vice President from 1989 till 1991. He is a Fellow of the National Academy of Sciences. Dr. Joshi was the President of Indian Physics Association during 1989-90. He was elected President if the Materials Research Society of India in 1995. He is the President of the Indian Science Congress Association for the year 1996-97. Dr. Joshi is a Fellow of the Third World Academy of Sciences, and Foreign Member of the Russian Academy of Sciences.

He won Watumull Memorial Prize for 1965, Shanti Swaroop prize for Physical Sciences for 1972, CSIR Silver Jubilee award 1973, and Meghnad Saha Award for Research in Theoretical Sciences in 1974. He also won the K.S. Krishnan Memorial Lectureship of INSA for 1987, FICCI Award in Physical Sciences for 1990. Dr. Mahendra Lal Sircar Prize by IACS Calcutta for 1989 and Goyal Prize in Physics by Goyal Foundation in 1993. He was awarded Padma Shri in 1991. D.Sc. (honoris causa) Kumaun University in 1994, Kanpur University in 1995 and Banaras Hindu University in 1996.

Dr. Joshi's major research contributions span over a wide variety of topics in solids state theory. His early researches were concerned mainly with study of phonons in metals and insulators. Dr. Joshi did research work in area of electronic states in disordered systems and theory of electrons correlation in narrow band solids. He has also worked on surface states and surface segregation. The current research interests of Dr. Joshi lie in the study of strongly correlated electron systems like high temperature superconductors and heavy fermion systems.

Dr. Joshi has supervised the Ph.D. thesis of 19 scholars and he has published more than 175 research papers.

# **Pandit Govind Ballabh Pant Memorial Lecture**

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I deem it an honour to be asked to deliver the Pandit Govind Ballabh Pant memorial Lecture. Pandit Pant, a great son of India, who belonged to this region, made momentous contributions to the freedom struggle of India. Pandit Pant was an enlightened, visionary and inspiring leader. When I was a student in Almora, Pandit Pant was the Chief Minister of Uttar Pradesh. He was a colossus and a legendary figure for us. His achievements inspired us to do better. His personality contained best traits of the Indian tradition. All his life he was in close contact with people and had great concern for their well-being. For me it is a special privilege to deliver a lecture named after Pandit Pant at an Institute, which carries his name, at a town, which provided the initial impetus in my carrier.

I would like to dwell on a few issues connected with the development of the Himalayan region. I myself belong the Kumaun Himalayas. Himalayas have imperceptibly influenced my thinking and my mental make up. I always felt humble but enervated before the majestic Himalaya. I am personally very sensitive to changes happening in the Himalayan region. The Himalayan ecosystem is very fragile and is intimately linked with the climate and economy of the Indo- Genetic plain and the subcontinent. Large-scale perturbations in the Himalayas could influence water retention capability of Himalayan mountains. This would lead to flooding of plains during monsoons.

The Indian Himalayan region extends over 2800 km from north-west to north-east, covers 12 states and union territories. It has a total area of approximately 591,000 sq. km. (about 18% of India) inhabited by 51 million people (6% of India).

## **Science, Technology and Development**

Development of the Himalayan region should be based on understanding of the needs of the people, their culture and social structure. This institute with its dedicated staff should carefully examine what role science and technology can play in the economic development and environmental protection of the Himalayan region. We should explore how science and technology can be harnessed to alleviate the poverty of the people and to generate new and better products and services.

One can think of appropriate small-scale industries which may utilize the work force of a single family. These small units normally would not have access to the results of research. In some cases, we would need to establish relationship between the small units and larger companies, which assemble the final products. These small units could mainly live as suppliers to larger companies, which need not always, be located in the Himalayan region.

Standards and quality are key to the commercialization. It is only the high quality products which can fetch good price in the market. Quality should be the major concern of all the production units. Communication infrastructure is very weak in the hills and needs to be improved. We have an opportunity here to leap frog and acquire advanced telecommunication capabilities. Roads would have to be built to connect all the small-scale production units.

Himalayas are rich in natural plant resources, herbs and medicinal plants. These could be utilized for an industry to make herbal products. There is an increasing demand worldwide for them. Use of these, natural plants should not adversely affect the biological diversity of this region. We should link conservation with sustainable use of the plant material. This Institute can play an important role in gathering data about different aspects of biodiversity in the Himalayas, documenting the bioresources of this region, establishing gene banks and preserving germplasm of the native Himalayan plants.

The information available on different aspects of biodiversity in the Himalaya is grossly inadequate. I am very happy that this Institute has initiated a programme on documenting tree resources, wild edibles and plants of the region. We should identify, classify and map the habitats of plants and develop propagation protocols for species which are commonly used by society. It is also necessary that people should be made aware of conservation of biodiversity. The conservation of our plant resources should be made a part of our education. School teachers and children can play an important role in biodiversity conservation and can help carry the message effectively to the rural people.

Degradation of natural forests is a major problem. This is mainly due to two factors – market demands for timber and other forest produce and the pressure imposed by dependence of many tribes on forest and forest lands for their livelihood. The demand of wood is so much that clandestine selling of wood has become a profitable business for some unscrupulous people. Overgrazing by cattle causes difficulties in the regeneration of degraded forest areas. The livestock density in Himalayas is higher than in plains. In the Eastern Himalayan region, the practice of shifting agriculture leads to ecological problems. This practice of shifting agriculture is a way of living adapted to native surroundings. For example, the Padam tribesmen of Arunachal Pradesh bring the newly married bride home at the time of harvesting of shifting agriculture. The strategies adopted for weaning away the communities surviving on shifting agriculture through packages like Integrated Jhumia Development Project and Permanent Land Based Occupation have not succeeded because these have not given due importance to socio-cultural traditions and psychological dimensions associated with them. A successful strategy would have to take a holistic view of traditional ways of resource management, its social dimensions, community organizations and institutions, scientific and sustainable use of natural resources based on latest scientific knowledge and demands of the economic development.

## Education and Training

One of the important areas needed for any development is the sector of human resources. In the Himalayan region literacy as a whole is less than 30%. I don't think we have been able to fulfill the constitutional obligation of ensuring primary education for all children upto the age of 14. There must be many of brilliance and genius in the very large mass of people, who did not have an opportunity of education. Pandit Jawaharlal Nehru said in 1962 in his address to the Ceylon Association for Advancement of Science:

*“You may put up a factory or a plant, and the factory may work and produce dividends too, but if you are going to do something which will affect the nation – large masses of people – you have to affect these masses of the people in their thinking. Therefore, wherever these revolutions have taken place, industrial or scientific, there has been mass education. You cannot have an illiterate country having an Industrial Revolution, or a scientific one. Apart from mass education comprising everybody, we must have scientific education comprising, not everybody, but large numbers, and technical education. That becomes essential. And you find that happening in all these countries before the various changes come about. One of the most interesting examples is that of Japan, where you see a society completely changed according to plan, and changed not suddenly but within a relatively brief period of time; and the Japanese when they decided to change in the last century, about the eighties, one of the first things they introduced was mass education and training of people.”*

Education, particularly of girls, is a prerequisite to the success of any developmental programme. Education of women will also curb the growth of population. Increased education will also ensure better reception and absorption of S&T inputs. We have to invest more on education but the very design of education should change. Instead of pedantic transmission of facts and knowledge, to be learnt by rote, we need a system that encourages curiosity, innovation, use of hands in conjunction with mind, thinking related to environment and nature around. The educational system is the key instrument which prepares people for successful implementation of any programme. We should not copy the educational system of other developed countries. In the Himalayan region there is a need to educate a cadre of development engineers.

This new breed of engineers should also be familiar with broad socio-technological knowledge. They should know for example how to identify a developmental problem at a local level, how to mobilize the forces necessary for its solution, how to address infrastructural problems, how to mobilize very small scale industries and provide them the tools they need and how to make available to these small units the experts' advice and information relevant to them. We should also train group of specialists who know the markets and how to reach them and who understand the competitive pressures in the new global environment of commerce and trade.

In the Himalayan region, in rural areas, women carry the major burden of the household work. Their life is full of drudgery hard work, tiresome tedium and often a tragic neglect towards their health. Therefore, education and training of women is of utmost importance.

In order that our developmental programmes succeed we should promote alliance between educational institutions, research laboratories, government departments and non-governmental organizations. Such alliances can be effective in dissemination of knowledge and technology relevant to the various programmes and projects.

### **Agriculture and Horticulture**

The food insecurity in the Himalayan region is due to rising population, declining crop yields, very small land holdings which continue to get fragmented and change in food habits. There are meagre irrigation facilities in this region. The inputs of high yielding variety seeds, fertilizers and seeds also are inadequate.

This region holds promise of health foods of future which could be based on crops like amaranth, chenopodium, buckwheat etc. One should to improve marketing facilities for seasonal crops such as tomatoes, beans, chillies, capsicum etc.

More and more land is now being used for horticulture. In Himachal Pradesh apple orchards have generated wealth for the people. Himachal Pradesh apple orchards have generated wealth for the people. Himachal provides apples to the whole country. Low-grade apples are also used for juices, jams and jellies. Many other fruits, vegetables, flowers, vegetable seeds, tubers etc have a great potential in this region. One could also grow the high value nuts like walnuts, hazelnut and peanut. Environmental costs of horticulture are now being realized. The need for packing material is leading to deforestation.

Tea plantations in Assam and West Bengal meet the domestic demand for tea and also provide tea for export. All these tea gardens are owned by a few big houses and wealth generated is not shared by local people. There is potential for high quality tea plantation in Himachal Pradesh, Uttar Pradesh and other regions. In order that many more people benefit from smaller tea plantations, one will have to think of some cooperative arrangements for tea processing and marketing.

Application of biotechnology like tissue culture for propagation of trees and plants would prove of value. New methods of packaging fruits need to be studied.

G. B. Pant Institute has already taken initiatives on many issues mentioned above. It is a challenge and an opportunity for us to work for the development of Himalayan region so that the quality of life of its people improves. I am very happy that the Institute has selected major programmes related to conservation of biodiversity, land and water resource management, sustainable development of the Himalayan eco-systems,

ecological economics and environmental impact analysis, environmental physiology and biotechnology, and institutional networking and human investment, Your research and scientific studies should be aimed at finding innovative solutions to problems of the people. The role of the scientists to disseminate knowledge about environment and its preservation to the public is equally important and crucial. It is important that people should know the implications of environmental degradation. Your progress on these and many other fronts will depend on your ability to transfer knowledge into action. The best tribute that we can pay to Pandit Pant is to ensure through innovative measure preservation of the pristine environment of the Himalayan region and to bring prosperity to the people of this region.