



Seventeenth

T. A. PAI MEMORIAL LECTURE

**Working with Nature
Working with People
Working with Knowledge**

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WORKING WITH NATURE, WORKING WITH PEOPLE, WORKING WITH KNOWLEDGE

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I deem it a great privilege to be here today to pay tribute to the memory of an illustrious son of India, late Shri T. A. Pai. T. A. Pai was a great banker, an able administrator, a courageous politician. The remarkable banking system he helped build was based on widespread participation of people. He was also a man with a firm faith in democratic values. I believe that a further strengthening of the democratic, participatory systems T. A. Pai stood for is vital to good stewardship of India's environment. I do not equate taking care of environment with rejecting development, giving up industrialisation. On the contrary, I believe that efficiency of resource use is a key to sustaining success in industrial development and such efficiency can be achieved only on the basis of sound environmental management. Working with nature, working with people, working with knowledge are then themes that would have greatly appealed to Shri T. A. Pai. I am therefore delighted at this opportunity to explore them further with this distinguished audience.

Bedthi Project

My own roots in our country with its long traditions of learning lie in the hill tracts of Western Ghats. In the fourth

canto of his epic poem Raghuvamsa, Kalidasa describes the conquest of the four corners of the land by king Raghu. Kalidasa was a lover of nature and of beauty, and one of the most charming passages in the poem is his description of the hills of the Western Ghats as a lovely maiden. Her feet lie near river Narmada to the North, her head at Agastyamalai in the South. She is clad in a pretty green sari of the rain forest, her breasts smeared with fragrant sandal.

Today the green mantle of this maiden lies in tatters, the sandal paste has all but vanished. As one flies over these hills one does see remnants of the original great forest, but extensive tracts lie barren. The hills are now bedecked with numerous lakes where rivers have been impounded to create reservoirs. It would, of course, be right if many of the remnants of the forest were protecting the catchments of these reservoirs. But, in fact, exactly the opposite is true. It is in the catchments of the reservoirs that deforestation has progressed the furthest, hastening erosion of soil, silting up the waterbodies, reducing their life and usefulness.

I had the occasion to understand why when twenty years ago I was asked to serve on a committee to assess the environmental impacts of a proposed hydroelectric project in the picturesque Bedthi Valley just north of Jog falls, a valley of pepper vines and green pigeons; reminiscent of an image from Raghuvamsa:

Marichodbhrantaharita

Malayadrerupatyakah || IV - 46 ||

Our committee met one morning in Bangalore, was briefed by the officials of the Power Corporation, and then drove in a

convoy to the project site five hundred kilometers to the north. There we were taken next morning to the dam site for an hour and a half, and returned to the Inspection Bungalow. It was then that I discovered to my consternation that we were expected to complete a report certifying that the project had no adverse environmental impacts within the space of next two hours. I protested that surely our task had barely begun and that a much more in depth collection of facts followed by a careful analysis was required. But I was the youngest member of a committee full of seasoned bureaucrats, and I was overruled.

Public Appraisal

I was very much perturbed. As a scientist my duty was to be true to the facts on ground and conclude what they dictated and not drift with currents of political expediency. It so happened that for several years I had been engaged in ecological field research in the hill country in and around Bedthi Valley and had many friends amongst farmers engaged in training pepper vines on their betelnut trees. Many of these orchards with their flocks of green pigeons were slated to be submerged by the dam and the farmers were naturally concerned. I talked to them and proposed that we conduct an open, public environmental impact assessment of the Bedthi project and see what conclusions emerge. The farmers agreed to assist in such a project to be carried out through the college in Sirsi where most of their children studied. I was at a great advantage in this exercise because as a member of the EIA committee I was in possession of the Detailed Project Report. There is no genuine justification, such as on grounds of national security, for keeping these reports as official secrets, but that remains the practice after fifty years

of democracy, ensuring that there is little transparency, little accountability in governance.

In any case, I had the DPR, with all the maps and with voluntary help of the college students we set out to conduct a careful environmental impact assessment. Imagine my surprise then when we saw on ground ongoing forest clearance in an area which the maps showed to lie outside the submersion zone. Moreover this tract had some of the tallest, finest trees. It turned out that some unscrupulous officials had seized on the opportunity of the project to liquidate parts of the best forest to line their own pockets. To briefly summarise the further developments; we completed our public environmental impact assessment; calculated the appropriate benefit-cost ratios, discovered that the actual ratio fell below the required norm of 1.5, presented these and other findings in an open seminar in which several officials of the state government participated; had our findings independently verified by the Administrative Staff College at Hyderabad, after which the Karnataka State Government dropped the project.

Distorted Development

But deeply etched on my mind was the officially sponsored stripping of the green mantle of these lovely hills. That brought me the understanding that development programmes were not necessarily attempts to enhance the quality of the life for the people, as they should be, but often attempts to create opportunities for gains, perhaps unlawful gains for those in power. That is why development projects often go against nature, as they did in such uncalled for forest destruction; they often go against people, as the economically unjustified submersion of

farmers' lands in the Bedthi project would have done, they often go against knowledge, as happened in this case when a scientist like me was forced to endorse a clearance without due examination of facts.

It is such distorted pursuit of development, not true development to enhance the quality of people's lives, not true development to protect nature while gently moulding it to support human aspirations, not true development to nurture knowledge of how best to persuade nature to help man, that has created many false contradictions in our country. Pitting environment against development, suppression of public access to information are two of such contradictions. For pursuit of distorted development inevitably leads to waste of resources, to inefficiencies in resource use. In a resource poor country like India such resource waste is inimical to development; it forces us to remain backwards. Unfortunately India remains a country with extremely low levels of resource use efficiencies. We spend more chemical fertilizer per unit of agricultural production, we spend much more energy per unit of economic production than most other countries. Japan, amongst the more efficient of economies, in fact produces five times as much gross national product as we do per every unit of energy consumed.

Efficient Resource Use

The history of Japanese economy and of environmental movement indeed holds significant lessons for India. In Japan too the initiatives for environmental protection did not come from the government or the industry. They came from the public. The public pressure built up in Japan in late 1960's as a result of the Minamata disaster, a tragedy in which many disabled children

were born to mothers who were victims of heavy metal pollution. The resultant outcry forced the government to enact and enforce strict pollution control legislation that had many fallouts. One such fallout was the control of automobile exhaust levels. Controlling the exhaust forced the manufacturers to develop technologies that greatly increased the efficiency of fuel use by the engines. This placed the Japanese automobile industry in a position of advantage when the sharp rise in petroleum prices in early 1970's led to worldwide increase in demand for fuel efficient cars. Hirofumi Uzawa, a distinguished Japanese economist, traces the subsequent rapid growth in Japanese economy to this trigger. So in Japan the public pressure for a cleaner environment served as the catalyst for economic growth.

Medicinal Herbs

I contend that the flip side is also true. In India the failure of public pressure for environmental protection to lead to effective action is responsible for our slow rate of economic growth, a slow rate forced by our penchant for wasteful resource use. Permit me to illustrate this waste with another example, that of our medicinal plant resources. Our country has an ancient and rich tradition of herbal medicine. In fact, it was medicinal plants that along with spices first attracted the Europeans to India. A classic text that profoundly influenced the beginnings of modern science of botany was composed in India between 1678-93; it was called "Hortus Indicus Malabaricus", and was the result of the enterprise of the Dutch administrator of Kochi Van Rheede. However it was probably largely composed by a group of four native Ayurvedic physicians, three belonging to Saraswat, and one to the Ezhava Community. Ayurvedic, Siddha, Yunani

and other local traditions of use of herbal medicines continue to this day in India, around 10% of our 15000 species of flowering plants are used in the Ayurvedic Pharmacopoeias, as many 6000 species may be used in various local traditions. Indian Pharmaceutical Industry, including that grounded in traditional systems, is one of our strongest sectors.

Yet, our management of medicinal plant resources is highly inefficient. A classic case is that of Sarpagandhi, *Rauwolfia Serpentina*, a herb in the forest understory of our Western Ghats. Medical uses of this plant are traditional to us; taking clue from these has been developed a drug for treatment of high blood pressure by a European pharmaceutical company. As a result none of the added value comes to India, we are merely suppliers of raw material. But with the development of this drug, this once abundant plant was rapidly overexploited till its harvest was banned leading to the development of a synthetic substitute, so that we no longer earn even as exporters of raw material.

Plant after plant species has thus been decimated leading to the banning of use of some 52 species in any exported formulations a couple of years ago. When this ban came into force the pharmaceutical industry asked a good friend of mine, Dr. Almeida, a reputed botanist from Mumbai to look into the issue. He came to the conclusion that the ban was based on mere guesswork, without any secure information. Ultimately the Government of India has been forced to largely abandon the ban.

Closer home, in collaboration with a Voluntary Organisation, Foundation for Revitalization of Local Health Traditions, I looked into medicinal plant use in Karnataka on behalf of the State Planning Board. As many as 300 species of plants are used by commercial concerns within Karnataka, but

there is some partial information about the stocks of just 10 of these species with the State Forest Department. There is no information with any government agency for the other 290 species. We also talked to private concerns such as Dabur in Delhi and Indian Herbs in Bangalore. None of these industries have any good information on the stocks either. The rich and diverse medicinal plant resources of the country thus continue to be used and eroded without anybody at all being the wiser as to what is happening.

People's Biodiversity Registers

Who is it then that known of what is going on? Of course the tribals and villagers who collect the plants know the current status and recent history of the populations, albeit only for their own localities. A reliable understanding of the fate of India's medicinal plant resources could emerge if this information with local communities is recorded and synthesized. Along with a large number of collaborators from colleges, universities, NGOs and forest departments, I have been involved in an exercise to test whether such an effort is feasible. The programme involves preparation of documents termed "People's Biodiversity Registers" that record the local community's understanding of the landscape and the living resources it supports, uses of these living resources, ongoing changes in the living resources and forces driving these changes, their perceptions of priorities for management of the landscape and conservation of living resources and their prescriptions for how best to manage the local living resources. In the pilot phase 50 such PBRs were completed for village clusters from many different parts of India, Himachal Pradesh and Rajasthan, Bihar and Assam, Orissa and

Andaman Islands, Tamilnadu, Maharashtra and Karnataka. Their preparation involved an active collaboration between local people, highly knowledgeable about the local environment and living resources including medicinal plants, but often with little formal education and teachers, students and others with a formal training. The experience has been overwhelmingly positive, it suggests that it is possible to organize a detailed understanding of the country's environmental resources and their dynamics by working with people who are in intimate contact with their natural world.

Community Stewardship

This exercise has had some most encouraging consequences. In village Nanj on the bank of Sutlej in Himachal Pradesh the process of documentation triggered a public discussion centred around the blackboard in the village square that had been put up during the Literacy Campaign. One of the issues that figured was the exploitation of a tree called Kambal (*Rhus Wallichii*) that was a significant source of fuelwood as well as leaf loppings used as mulch in cultivation. People noted that Kambal was greatly overexploited and its harvest should be moderated. They then decided that its use as a fuel should be discontinued, and while lopping for mulch the leading shoot should not be damaged. This common agreement has been implemented, and over the last two years Kambal tree stock has begun to recover. Furthermore, farmers have begun to experiment with alternatives such as crop residues to replace it as a mulch material. Some farmers have in fact implemented such a process of replacement further reducing the lopping pressure on this tree.

Village Nanj demonstrates the potential of people working together, developing an understanding of the working of nature and becoming good stewards of nature based on such an understanding. Another of our PBRs has been prepared for Dhani Panchayat in Orissa. In this village cluster local people responded to ongoing deforestation some fifteen years ago by setting up on their own a Village Forest Committee. This committee has organized regulated harvests of forest biomass with flexible regulations administered by people themselves on basis of community level consensus. Several thousand of such self-initiated committees are now functioning in the state of Orissa. They provide excellent models of how the local forest, including medicinal plant resources could be managed prudently to yield sustainable harvests.

Sustainable Development

India is a civilization intimately tied to the earth. A very significant proportion of our people, perhaps as many as one half to two-third, depends on natural resources, waters from the rivers and ponds, fuelwood from scrub and forests, fish from streams and seas, reeds, bamboo, cane and medicinal herbs collected from the wild, to sustain them. Degradation of the environment depresses their quality of life. At the same time our wasteful patterns of resource use hurt the commercial agriculture and industry by increasing the costs of their products. Such inefficiency has become a serious handicap in these times of globalisation. It is therefore clear that India can continue to ignore the degradation of its environment only to its own peril.

We must then begin to steer our development onto an environmentally sustainable path. Such a path calls for working

with nature, working with people, working with knowledge in all spheres of activities. The experiences in many different sectors point in this direction. Large scale felling of natural forests to replace them by Eucalyptus plantations in the heavy rainfall tracts of Western Ghats rampant in 1960's involved working against nature. It equally involved working against people who depended on the natural forests to sustain them in many different ways. It also involved working against knowledge for such plantations were taken up without adequate prior experiments. When the Western Ghats Eucalyptus plantation programme were launched it was claimed that they would reach productivities of 15-30 tonnes per ha per year, replacing natural forests with productivities of 10-12 tonnes per ha per year. In reality these plantations have fallen prey to diseases and their productivities have barely reached 2-3 tonnes per ha per year. So they have been abandoned and the forest department is accepting natural regeneration, taking to establishing partnerships with people in form of Joint Forest Planning and Management Schemes. The programmes are then reverting to working with nature, to working with people. Their quality would undoubtedly be greatly enhanced if they included systems of careful ecological monitoring, of working with knowledge as well.

World over industries too are turning to working with nature, for instance, by ensuring recycling of the bulk of effluents and thereby eliminating pollution burdens. Scandinavians are proud of their zero emission paper factories which leave the streams clean and teeming with fish. People of Scandinavia love to fish and are happy with this transformation of the industry. The industry has developed new knowledge while developing

zero emission technologies and are now profiting not only by selling paper, but by marketing these technologies as well. The industrial sector too thus prospers by working with nature, working with people, working with knowledge.

At another level, working with people and working with knowledge is crucial to working with nature. For much of the violence to nature occurs through wasteful resource use. Behind much of such wasteful resource use lie vested interests in misappropriation. Consider losses of electric power. In India such losses amount to a whopping 25-30%, far above the norms of 12-13% prevalent even in developing countries of Southeast Asia. But the magnitude of transmission losses is not clear because the exact quantum of electricity used by irrigation pump sets is not recorded. Developing a good transparent information system on use of electricity and pinpointing where the losses are occurring would greatly help check misuses, including thefts. Indeed it is widely suspected that many air conditioners in Delhi are so wired as to by-pass the meters. The most appropriate way to bring such misappropriation of country's resources by the rich and the powerful under check is to create a publicly accessible system of information on use of electricity.

Entering the New Millennium

Indeed a participatory, publicly accessible system of monitoring the use of our natural as well as man-made resources is the key to checking corrupt practices, to preventing resource wastages. Vested interests in power have always resisted such exposure. Indeed the two-thousand year old Chinese manual of advice to the rulers, Tao-te-ching states:

*The ancients who practiced the way
did not enlighten people with it,
They used it, rather to stupefy them,
The people are hard to rule
when they have too much knowledge,
Therefore ruling a state through knowledge
is to rock the state,
Ruling a state through ignorance brings
stability to the state.*

But we are no longer in an era when a small elite could keep a vast populace in poverty and run a stable state by keeping them in ignorance. Our colonial administrative machinery rooted in a command and control mentality is trying to do just that and getting us into serious difficulties in this modern information age. It is high time we replaced this anachronistic system by one dedicated to informing the citizenry and sharing with it powers to make decisions. Such a system of working with knowledge and working with people would enable us to steer our development on to a path of working with nature. The key to a strong, prosperous, stable nation lies in thus learning to work with nature, work with people, work with knowledge.

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Madhav Gadgil, M.Sc. (Bombay 1965), Ph.D. (Harvard 1969) has been an IBM Fellow and a Lecturer in Biology at Harvard University, a Visiting Professor at Stanford and a Distinguished Lecturer at the University of California, Berkeley. Since 1973 he has worked at the Indian Institute of Science, Bangalore where he is now a Professor at the Centre for Ecological Sciences established through his initiative in 1983. His research interests include population biology, conservation biology, human ecology and ecological history. He has published over 170 research papers (two of them recognized as Citation Classics) and four books, "This Fissured Land", "Ecology and Equity", "Diversity : The cornerstone of life" and "Nurturing Biodiversity: An Indian Agenda". He writes regularly for popular media in English and Indian languages, and has been working with people's science movements and environmental NGOs. He is active in a network of educational Institutions working towards monitoring the biodiversity of Western Ghats initiated with the help of a Pew Foundation award, and in a countrywide effort of voluntary agencies to prepare "Peoples's Biodiversity Registers". He has been a member of the Science Advisory Council to the Prime Minister of India (1986-90) and a Vice President of the Scientific Advisory Body to the Convention on Biological Diversity (1995). He currently chairs the Scientific and Technical Advisory Panel of Global Environment Facility. He received the National Environmental Fellowship in recognition of his field research on the people-environment relationship on the hill chain of Western Ghats, where he has

been involved in the establishment of India's first biosphere reserve. He is a Fellow of the Indian National Science Academy, Third World Academy of Sciences, a Foreign Associate of the U.S. National Academy of Sciences and an honorary member of the British Ecological Society. A recipient of Shanti Swarup Bhatnagar, Vikram Sarabhai and Iswarchandra Vidyasagar awards, he was conferred the Rajyotsava award by the Government of Karnataka and Padmashri by the President of India.

T. A. PAI – A Life Sketch

(17-1-1922 to 29-5-1981)

Born on January 17, 1922, Tonse Ananth Pai graduated in Commerce from Sydenham College of Commerce and Economics, Bombay. He joined the Syndicate Bank as Deputy Manager at the early age of 21 in 1943. A year later, he rose to the position of General Manager of the Bank and held that assignment till 1961. In January 1962, T. A. Pai became the Managing Director of the Bank and retained the position till 1964. Under his stewardship the Syndicate Bank achieved one of the fastest rates of growth for any Bank in India and earned a name for pioneering schemes, innovation in mobilising small savings, financing, agriculture and helping the small man.

In 1965, T. A. Pai was appointed as the Chairman of Food Corporation of India, which he served in an honorary capacity with dedication and distinction. He, however, rejoined the Syndicate Bank as its Managing Director in 1966 and rose to become Chairman in December, 1967.

On March 2, 1970, T. A. Pai was appointed Chairman of the Life Insurance Corporation of India. Under his guidance the LIC made remarkable headway. The Corporation started making larger investments in socially desirable schemes such as housing, urban and rural water supply and rural electrification.

In appreciation of his services he was awarded Padma Bhushan in 1972. In 1973 he was awarded the degree of D.Litt. by the Karnataka University. He was also awarded D.Litt. by the Andhra University in 1975. He relinquished the post of Chairman LIC in March, 1972 and in the next month he was elected to Rajya Sabha from Mysore State. He was appointed Minister of Railways in July 1972 and was entrusted with the responsibility of the newly formed Ministry of Heavy Industry on February 5, 1973. The additional charge of Ministry of Steel and Mines was given to him on July 23, 1973.

T. A. Pai took over the Ministry of Industry and Civil Supplies in the month of October, 1974 and was entrusted with the overall responsibility for industrial development in India. He was known for his enlightened pragmatism in all policy matters. He played a key role in revising the Industrial Licensing Policy and reorienting it to promote full utilisation of installed capacity and encouraging fresh investments in socially desirable sectors of industry.

T. A. Pai founded Manipal Institute of Management in 1980, to set new standards in Management Education, Research and Consultancy relevant to Indian conditions. Renamed as T.A. Pai Management Institute (TAPMI) to perpetuate his memory, the organisation has become a premier institute renowned for its Two Year Post-graduate Programme in Management.

The T.A. Pai Institute of Rural Development, another organisation established in his name, is doing pioneering work in education and extension work to accelerate the process of Rural Development in the Districts of Dakshina Kannada and Udupi.