

**THE TWO CULTURES REVISITED:  
SOME REFLECTIONS ON  
THE ENVIRONMENT-DEVELOPMENT DEBATE  
IN INDIA**

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# I

I am privileged to be delivering this prestigious lecture dedicated to a most remarkable Indian—an outstanding engineer-administrator, a great institution-builder, a most inspiring teacher and an intellectual who demonstrated a profound commitment to the most sensitive and progressive of human values.

I never knew Professor Satish Dhawan personally but he was very much part of my growing up since my father and he were colleagues although belonging to different institutions. Over the years, as I read more and reflected about him and talked with people who had worked with him, I was profoundly impressed by two uncommon traits of his.

First, he was a true builder of men because of his willingness to stand up for his team and take the responsibility for failure, while generously giving away credit to others on occasions of success. This was most evident in the SLV saga and Dr. Abdul Kalam has written about this movingly.

Second, he was one *mentor* who did not become a *tormentor*. The bane of Indian science (and indeed of industry, politics and many other fields in this country) is the unwillingness and reluctance of charismatic trailblazers to call it a day when at the top, to train a new generation of successors and most importantly, to leave the successors free to do their job.

Since this lecture is co-sponsored by ISRO, permit me to recall that I have consciously endeavoured to forge a close partnership between the Ministry of Environment and Forests and ISRO. India will launch its own dedicated satellite for monitoring greenhouse gas and aerosol emissions in 2012 and its own dedicated forestry satellite in 2013 to enable real-time monitoring of both deforestation and afforestation in our country. The Ministry of Environment and Forests is also co-financing the National Institute of Climate and Environment Studies being established by ISRO and working closely with the Space Applications Centre in modeling and monitoring the health of the Himalayan glaciers. One of the very first decisions I took after becoming minister was to ensure that ISRO is an integral part of our climate science and climate change negotiations team because of the tremendous capability it has built up in this area.

## II

Over half a century ago, while giving the Reith Lectures over the BBC, the eminent British physicist-author C.P. Snow spoke of how the breakdown of communication between the “two cultures” of modern society—the cultures of the science and that of the humanities—was becoming a hindrance to understanding and addressing pressing public issues. The Lectures were later published as a book which the Times Literary Supplement in 2008 included in its list of 100 books that have most influenced Western public discourse since World War II.

This afternoon, I wish to speak of a later-day facet of these “two cultures” syndrome—the apparent gap between those espousing the case for faster economic growth and those calling for greater attention to protection of the environment. On the face of it, there should be no gap at all—who can argue against faster economic growth since that alone will generate more jobs and at the same time who can argue against the preservation of our rivers, lakes, mountains and wonderful biodiversity in its myriad forms, since that alone will make for sustainable development. But I am afraid that the two groups are not talking **to** each other—they are talking **at** each other and with every passing day, the gap seems to be widening. It seems so for a number of reasons. For one, our growth aspirations themselves have changed perceptibly and anything less than an 8-9% annual rate of real GDP growth is deemed a “slowdown”. For another, an energetic and exuberant environmental community has emerged with a very large number of well-educated youngsters in its vanguard. And, of course, our track record on environmental management certainly does not inspire much confidence.

## III

When pushed, a growth protagonist will say “there must be a proper balance between environment and GDP growth”. When pushed, an environmentalist will say “there must be balance between GDP growth and environment”. Notice the slight shift in the sequence in the two statements. The first implies that a fetish is being made of the environment but in the final analysis a balance must indeed be struck. The second implies that a fetish is being made of economic growth but in the final analysis a balance must indeed be struck. *Balance*, therefore,

is the key. Both sides will agree on the importance of faster economic growth. Both sides will also agree on the need to reflect and factor in ecological concerns in the fast growth process. So where is the problem? So, why so much discord, instead of dialogue, why so much confrontation, instead of cooperation.

The problem lies when you go beyond “balance” as a general philosophical concept and try and give it some operational meaning. When hard choices need to be made about large projects that are considered central to economic growth, but are detrimental to the environment. Let us all accept the reality that there is undoubtedly a trade-off between growth and environment. In arriving at decisions to untangle the trade-off, three options present themselves—“yes”, “yes but” and “no”. The real problem is that the growth constituency is used to “yes” and can live with “yes but”. It cries foul with “no”. The environment constituency exults with a “no”, grudgingly accepts the “yes but” but cries foul with a “yes”. Therefore, one clear lesson is this--maximize the “yes, but”, where this is possible.

The vast majority of environmental and forestry clearances are in the “yes, but” category but they do not hit the headlines like the “yes” or the “no” decisions do. Of course, as we gain experience, we must refine the “but” in the “yes but” approach. The “but” often takes the form of conditions that must be adhered to before, during the construction, and after the launch of the project. I believe that in laying down these conditions, we must strive for three things: First, the conditions must be objective and measurable, so that it is clear what is to be done and whether it has been complied with. Second, the conditions must be consistent and fair, so that similar projects are given similar conditions to adhere to. Finally, the conditions must not impose *inordinate* financial or time costs on the proponents (which would render them impractical).

This has indeed been our effort in the last fifteen months for the vast majority of the cases that have come before us. For instance, we allowed a power project in Ratnagiri in the face of NGO objections since it was already well advanced in implementation. There is also the urgent need to enhance our ability to monitor compliance with the conditions we lay down – our current capabilities in this regard are completely inadequate. In upgrading these abilities, we will need to be innovative and think smart, going beyond traditional inspection-based systems, a theme I will come back to later.

One of the most interesting innovations introduced over the last decade relates to valuation of ecological cost of projects. This initiative, the entire credit for which must go to the Supreme Court, is the concept popularly known as “CAMPAs” or “NPVs”. CAMPAs, which stands for Compensatory Afforestation Management and Planning Authority, is an innovation ordered by the Supreme Court in 2002, according to which every party, whether government or private, that wishes to divert forest area for non-forestry purposes, has to deposit a certain sum equivalent to the total value of ecological benefits lost per hectare diverted for such purpose. The value of benefits lost is arrived at by taking into account the net present value (NPV) of benefits lost, the stipulated compensatory afforestation amount and the funds accrued under the catchment area treatment plans submitted. This approach has served us well – today we have almost Rs. 11,000 crore available to state governments for reforestation and regeneration of natural forest cover. However there is a need to periodically revisit the prescribed formula to ensure that the value of forest land diverted is based on calculations that reflect the true and accurate cost of such diversion. There is also a case to be made for the introduction of a similar levy for projects that have environmental costs, even when they do not involve diversion of forest land.

“Yes, but” cases aside, there will most certainly be instances, few and far between I should add in the overall scheme of things, when a firm “no” will be required. In such cases that have complex scientific, ecological and social dimensions, my approach has been to make decisions in the most consultative and transparent manner possible. This is what we did in the case of *bt-brinjal* (which I discuss later), and in the case of the Vedanta mining project in Orissa, where I consulted extensively, and shared a most detailed explanation for our decision with the public. I am convinced that the time has come to make trade-offs explicit and make the correct choice, however unpalatable that might be to some. This is exactly what Indira Gandhi did almost three decades back, if you will recall, when she said a decisive “no” to the Silent Valley hydel project in one of India’s most ecologically sensitive regions. Her “no” was not unilateral but it was unequivocal.

## IV

Part of the problem arises from the fact that we do not have a system of “green accounting”. Economists estimate GDP which is gross domestic product as a broad measure of national income and also estimate NDP which is net domestic product which accounts for the use of physical capital. But as yet, we have no generally accepted system to convert *Gross Domestic Product* into *Green Domestic Product* that would reflect the use up of precious depletable natural resources in the process of generating national income. Many years ago, the noted Indian environmentalist Anil Agarwal had advocated the concept of a *Gross Nature Product* to replace the usually estimated *Gross National Product*.

Economists all over the world have been at work for quite some time on developing a robust system of green national accounting but we are not there as yet. Ideally, if we can report both *Gross Domestic Product* and *Green Domestic Product*, we will get a better picture of the trade-offs involved in the process of economic growth. Alternatively, as some economist have argued, we need alternative indicators to measure true welfare improvement, as Green GDP is not be the best indicator of sustainability or future increases in consumption or welfare – indicators such as “Genuine Savings/Investment”, and “Genuine Wealth Per Capita” are being developed as alternatives. We don’t need precise numbers. Even a broad-brush estimate will be a huge step forward to give *practical* meaning to the concept of “sustainable development” which all of us swear by in theory.

This term “sustainable development, incidentally, was first defined by the Indian economist Nitin Desai, in the Report of the World Commission on Environment and Development, called *Our Common Future*, widely known as the Brundtland Report after the-then Norwegian Prime Minister who was the chairperson of the Commission. The definition, beautifully clear yet intangible at the same time, runs thus---“sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

In the last few months, I have tried to set the ball rolling so that by 2015 at least we can have a system of green national accounting. We will not be starting on a clean slate of course. One of the world’s leading authorities in this field is Professor Sir Partha Dasgupta at Cambridge University, and he has published

extensively. In one of his seminal pieces published along with others including the Nobel Laureate Kenneth Arrow, he has calculated that the “genuine” domestic investment rate in India is around 2.3 percentage points lower than the normally reckoned domestic investment rate for the period 1970-2001 after taking into account environmental costs and both calculated as a proportion of GDP. He goes on to show that as against the estimated growth rate of India’s per capita GDP of 2.96% per year during this period, the growth rate of per capita genuine wealth after taking into account environmental costs works out to 0.31% per year. Such analyses help put a number to the environmental cost of our growth process, making our trade-offs more explicit, and hence must be mainstreamed.

Building on Professor Dasgupta’s work, the World Bank has institutionalised a metric called “Adjusted Net Savings”. This measures the “true” rate of savings in an economy after taking into account investments in human capital, depletion of natural resources and damage caused by pollution. This is considered an indicator of the true wealth generation of the economy, and hence of its sustainable development potential. Adjusted net savings helps make the growth-environment trade-off more explicit, since countries that choose to prioritise growth today at the cost of the environment will have depressed rates of adjusted net savings. Just as an example - according to the World Bank data, India’s Gross National Savings as a percent of GDP was around 34.3% in 2008, but its Adjusted Net Saving in the same year was 24.2%, the difference arising due to the depletion of natural resources and pollution related damages, in addition to conventionally measured depreciation of the nation’s capital assets.

Another extremely interesting and valuable exercise of quantifying the economic benefits from ecosystems of various types and costs associated with their loss is being coordinated by Pavan Sukhdev. This is a global study called *The Economics of Ecosystems and Biodiversity (TEEB)* supported by the United Nations Environment Program, the German government, the European Commission and other institutions. Already two volumes have been released. A TEEB study for India is to be launched with the support of the Ministry of Environment and Forests. This will demonstrate why prosperity and poverty reduction depends on maintaining the flow of benefits from ecosystems and why biodiversity conservation and protection is not a luxury but, in fact, is essential for achieving developmental objectives. Earlier, work done by Professor Kanchan Chopra of the Institute of Economic Growth, Delhi, helped in establishing the concept of NPV that I discussed earlier.

## V

Let me suggest another way of handling this new “two cultures” phenomenon. And this is to look at environment not as some sort of elitist or upper middle-class clean air or tiger protection issue *per se* but more as a public health issue. Even as India scales new heights of economic growth, it cannot afford to do so at the cost of the health of its population, its greatest asset. Recent reports show that people in different parts of India are raising serious concerns about a series of health issues due to air, water and industrial pollution. Climate change is expected to exacerbate these already serious public health problems. From unprecedented industrial and vehicular growth to the dumping of chemical waste and municipal sewage in rivers, the build up to a public health catastrophe is already underway. India faces the prospect of a significant increase in cancers and respiratory illnesses. Most of urban India faces some form of toxic health threat due to the environment.

If environmental control is seen, managed and sold as a public health enhancing intervention, then I would argue that much of this cacophony over “environment versus development” would subside. That is why recently I have taken the initiative to bring the Ministry of Environment and Forests into a partnership with the Indian Council for Medical Research and the Public Health Foundation of India. Central to the objective of this initiative is the growth of environmental public health as an academic and practical discipline and creating a new cadre of trained professionals. Environmental public health as a formal discipline should ideally integrate streams of knowledge from diverse disciplines, integrating learnings and perspectives from life sciences, especially human biology, immunology and ecology; quantitative sciences such as epidemiology, biostatistics and demography; social sciences such as environmental health economics and policies; environmental toxicology; waste management; and occupational health.

One of the more visible and even successful environmental conservation efforts in India has been Project Tiger, launched under the leadership of Indira Gandhi in April 1973. True, there are just about 1400-1600 tigers left in the wild in our country today, although this accounts for around half of the world’s tigers in the wild. There is an argument raging now on why these project tiger reserves should be protected with such ferocity, especially when they come in the way of using our coal reserves, for instance, for generating electricity needed by a burgeoning



population. Again, if the terms of the debate are posed thus—protection of tigers alone versus opening of new coal mines—I think we are headed nowhere. But when we highlight the fact that the 39 Project Tiger reserves account for some 5% of our forest areas and are home not only to tigers and other forms of biodiversity but are also places from where many of our rivers originate, critical to our livelihoods, then I believe there is a greater chance of bridging the “two cultures” gap.

## VI

Having said this, I want to return to the very formulation of this modern-day “two cultures”. Is the debate really environment *versus* development or is it one of adhering to rules, regulations and laws versus taking the rules, regulations and laws for granted? I think the latter is a more accurate representation and a better way to formulate the choice. When an alumina refinery starts construction to expand its capacity from one million tons per year to six million tons per year without bothering to seek any environmental clearance as mandated by law, it is not a “environment versus development” question, but simply one of whether laws enacted by Parliament will be respected or not. When closure notices are issued to distilleries or paper mills or sugar factories illegally discharging toxic wastes into India’s most holy river, it is not a question of “environment versus development” but again one of whether standards mandated by law are to be enforced effectively or not. When a power plant wants to draw water from a protected area or when a coal mine wants to undertake mining in the buffer zone of a tiger sanctuary, both in contravention of existing laws, it is not a “environment versus development” question but simply one of whether laws will be adhered to or not.

India is fortunate to have strong, progressive legislation to safeguard its ecology. The Wildlife (Protection) Act of 1972, the Water Act of 1974, the Forest (Conservation) Act of 1980, the Air Act of 1981, the Environment (Protection) Act of 1986 and the most recent Forest Rights Act of 2006 have all been passed by Parliament after much discussion. The question before the country is very, very simple: are these laws to be enforced or are they to just adorn the statute books, honoured more in their breach than in their observance. This is the more intellectually honest way of formulating Lord Snow’s dialectic in the Indian context today.

I have to say that for too long a time, we have taken these laws and the discipline they enforce for granted. Industry has assumed that somehow these laws can be “managed” and governments too have not insisted that the laws be implemented both in letter and spirit. We have now reached a crucial juncture when *fait accompli* will not do any longer. Gopal Gandhi put it to me recently in his own inimitable way—the thrill of circumvention must be replaced by the joy of compliance.

Of course, I would be the first to accept the need to relook at the ways in which regulations are enforced. Our traditional approach has been to automatically assume that tough regulations mean an army of regulators. There is a legitimate fear that this could end up being another source of what economists call “rent seeking” or what ordinary human beings would call “harassment” or “corruption”. Of course with RTI, accountability of public agencies has increased manifold. But this may well not be enough. That is why I have been saying that we need to think of market-friendly instruments for enforcing regulations.

If you go back to the seventies and see how the US dealt with the acid rain problem, you will find that while the US Environmental Protection Agency (EPA) set the standards, what ensured cost-effective success was an emissions trading system. Recently, I invited four leading economists from MIT and Harvard to design the outline of a market-based system for us so as to enforce air quality standards more effectively. The team has prepared a concept paper which is available on our website ([www.moef.nic.in](http://www.moef.nic.in)) and we are going to start with pilot programmes in Tamil Nadu and Gujarat. On-line monitoring is clearly a pre-requisite for such an innovation to bear fruit.

I am also deeply conscious of the need to improve the system of environmental governance itself so as to enhance its credibility and integrity. This will go a long way in bridging the gap between the new “two cultures”. Parliament has already passed the National Green Tribunal Act, 2010 and this specialized network of courts will come into being soon. We are now finalizing the establishment of a National Environmental Protection Authority (NEPA) that will be a permanent professional body to appraise projects and monitor compliance. Right now these appraisals are done by *ad hoc* expert committees which have been plagued by a number of conflict-of-interest issues. NEPA will bring greater focus, objectivity and professionalism in our environmental appraisal and monitoring process.

## VII

There is no doubt in my mind that India desperately needs to sustain a high growth trajectory for at least two-three decades. This is absolutely essential for meeting our pressing social objectives and also our key strategic objectives. At the same time, the “growth first at all costs and environment later” approach is clearly unacceptable. India needs to press into its development all that modern science and technology has to offer. At the same time, the notion that we can impose technological fixes without caring for their larger ecological consequences and without addressing larger social concerns is clearly untenable anywhere, but even more so in an open, argumentative society like ours.

And increasingly these concerns are of the poor and the traditionally disadvantaged sections of society. This is giving a whole new dimension to the environment *versus* development debate. In fact, it is, in some ways, making the debate as formulated largely exaggerated. Sunita Narain puts it well when she says that India’s environmental movement is about managing contradictions and complexities –and to this I would add also conflicts. This environmentalism of the poor, as she calls it or livelihood environmentalism as I would term it as opposed to lifestyle environmentalism of the privileged sections, manifested itself on the national scene first in the mid-1970s with the birth and growth of the Chipko movement in the hills of Uttarakhand. The women were asserting the rights of local communities over the use of local resources.

Such assertions are visible in different parts of the country today. We misread such assertions as the conflict between environment and development when they actually are about establishing a fundamental right to livelihood security and a fundamental right to determine the nature of what we call development that impacts their daily lives in a profoundly disturbing manner. Such assertions are also, I may add, a product of our boisterous democracy which the growth-fundamentalists are uncomfortable with and the empowerment it has engendered. Sustainable development, we need to remind ourselves every now and then, is as much of politics and involvement of local communities as it is of innovation and new technology. In a powerful new book to be released next month, the distinguished Indian economist Bina Agarwal highlights the centrality of the presence and participation of women in institutions of local green governance so essential for achieving the goals of sustainable development.

## VIII

I am now coming to the end of this lecture. Let me end as I started—by remembering Professor Satish Dhawan. His academic credentials were impeccable. He was steeped in modernity. Yet, he was never oblivious of the larger social context in which he operated. It is this spirit that we need to recapture—this spirit of public engagement cutting across disciplinary boundaries but with discipline and in a spirit of humility. This engagement is essential if we are to bridge the two cultures. I had spoken earlier of the breakdown of communications between the two sides. I saw this most vividly during the course of the public consultations I had on *bt-brinjal*. Incidentally, the gap was at its vociferous peak in the two cities which pride themselves as representing the scientific and technological face of a new India—namely, Bangalore and Hyderabad. Here particularly, and in other cities too, I found the scientific community unable to communicate in a language and in an idiom that is comprehensible to a larger public.

Democracy means the need to explain, the need to justify, the need to convince, the need to get people on board, the need to compromise. Speaking at the JNCASR and recalling the memory of the man after whom the Centre is named, I would urge the scientific community and the larger community of growth-fetishists that they have a special role to play in this regard. They need to engage the larger public in a more collegial and in a less condescending manner. I can do no better than quote from Indira Gandhi's famous speech at the UN Conference on the Human Environment delivered on June 13th, 1972. The most famous one-liner from that speech that is still in wide use is "*poverty is the worst polluter*", no matter that what she actually said was a more nuanced "*are not poverty and need the greatest polluters?*" In that very seminal speech, she had also said—and this is really the essence of the message I wish to convey today—that "*the inherent conflict is not between conservation and development*" but "*between environment and the reckless exploitation of man and earth in the name of efficiency*".

**Thank you.**