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# **Sustainable Development**

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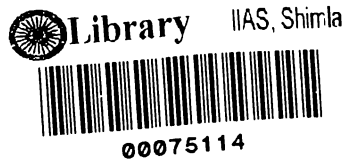
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**MALCOLM S. ADISESHIAH (ed.)**

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## Preface

Development has to be accepted as the end purpose of all planning. As a term it has come into popular parlance with a wide variety of uses. In fact we have come to classify the countries of the world into the developed and developing, overlooking the fact that all countries are in some sense developing, and that there is no country which has reached such a stage that it can afford to remain stagnant. We have further divided the developing countries into the least developed and the developing countries.

It has become rather urgent that there should be some kind of consensus on what we mean by development, because all living – local, national and international – is being increasingly equated with a state of being represented by it. More recently there has been concern whether we, any of us, in either industrialized countries or in countries which are still predominantly agricultural, can afford the kind of development that we have had over the last century. We are beginning to think of the generation to come and the kind of legacy we will be leaving behind for them.

And so to both develop and yet to do so in such a way that we leave the environment which supports us in a state at least as we came into it, is what we have come to call Sustainable Development. For its realization, there are several pay-offs. First, our life-styles – which have increasingly divided into the affluent few who can keep up their affluence at the cost of the environment, and the poor destitute majority who see no future to their environment and so have little interest in it – need modification. Can the wealthy few reduce their demand on the irreplaceable



resources of the environment both to safeguard them for the future and make a part of them available to the deprived part of their fellowmen, women and children? Second, is there need for this issue of development, Sustainable Development, to be looked at globally so that parallel to the partly reduced life-style of the affluent within the country, the well-to-do nations moderate their demand on the world's non-renewable resources and share in the sacrifices imposed on the poor countries in the restraint following the use of lesser fossil fuels.

These and other important short-term and long-term issues face us as families, as nations and as a world community in regard to the doctrine of Sustainable Development. To explore some of these facets, the Economic Affairs Group of the India International Centre arranged a seminar on the subject. It is from the papers of this seminar and the very interesting and revealing discussion on them that this publication has been put together. It covers the question of definition and scope, the operational problems faced by the government administrator of the programme, the resources conundrum, the special problems posed by our major resource, water, and the tragic human problem caused by economic development.

The publication is being issued in the India International Centre Monograph Series. Special thanks are expressed to N.H. Ramachandran, Secretary of the Centre and Seminar, who has helped in bringing out this publication.

Malcolm S. Adiseshiah

Chapter 1

## Sustainable development: What it is and its coverage

MALCOLM S. ADISESHIAH

### **Some introductory thoughts**

Some opening comments on Sustainable Development are in order.

First, this is the fourth of five publications that the Economic Affairs Group has prepared on ecology-related issues. In this series on resources, resources management, resources conservation, etc. this analysis on Sustainable Development follows that of the last one on wasteland development.

Our basic problem is that we economists have equated development with growth. Our Plans have been dominated by rates of growth which are currently being achieved in the Seventh Plan. That is our major concern. This equation of development with growth, which is referred to in all the papers before us derives conceptually from the further concept of the linearity of history, under which development is equated with economic growth, economic growth is equated with the dominance of the market which is in the hands of a well-to-do minority who represent modernity, and modernity is equated with consumerism, so that non-market people, who are the poor and unemployed, are equated with backward people, and non-market economies with backward economies and regions.

In contrast to this unidimensional concept of history and its accompanying growth of GNP, which serves mainly the needs of the wealthy few, as against that of the poor majority, and maintains

the majority of our people in conditions of poverty and the various ailments connected with poverty, this mode of development is also the destroyer of our resources, of our ecology. As against this concept of growth-dominated, market-oriented development, is the concept of Sustainable Development.

[For me, the concept of Sustainable Development is not only development which will conserve our resources and not destroy and damage them, as our present development models are doing. Sustainable Development is equally important because it is development for all and not for a few in society.] Therefore, the practical application of Sustainable Development is, first, that we must choose projects which are not resource-consuming, a major example of such a project before us being the Sardar Sarovar project in the Narmada Valley. Once we begin destroying resources, little can be done about it. So the first thing to do is to see whether we can agree upon going in for projects which are not resource-consuming, which are not resource-damaging and resource-destroying. And, secondly, to build into every project the means of conserving the resources which have to be used, renewing resources which have to be consumed and countering the damage and pollution to environment that emerges as a result of development, whether it is in agriculture or in manufacture. Countries like Sweden in the area of forestry, The Netherlands and France in the area of industry, Britain and the US in the use of the automobile, show how pollution and how damage of resources can be controlled. A brief round-up of the wide scope of the concept of Sustainable Development is attempted here.

### **Application of the doctrine**

Sustainable Development is wide-ranging in its application – reaching out to:

- (a) Land use, including forestry,
- (b) Water,
- (c) Air and pollution control,
- (d) Industry,
- (e) Energy, and
- (f) Human resources.

A brief conspectus on each of these facets of Sustainable Development will be useful. I have in another context reviewed the

damage and destruction to our resources of land, water, air, industry, energy and humans which has resulted from the kind of development planned and executed over our seven Plans. Now the doctrine of Sustainable Development points to the possibilities of turning our development around, not only to repair the damage caused but also to lay the basis for holistic development of the economy. It may be noted that the separate treatment of each resource is for analytical clarity, because in real life, several resources are co-mingled in operation as in a water shed, which combines land use management, water management and forest management – each of which is treated here autonomously.

#### *Land use and forests*

Soil and water conservation techniques and mechanisms which prevent soil loss and ensure uniform water conservation are known and should be applied by our farmers. Here there are two problems, the first being the non-involvement of the farmer in the programme who regards it as an external agent, as a 'Sarkaria programme' against which he needs to be involved in its planning and initiation from the beginning and made to see that his land can provide for his benefit 15 to 20 per cent more of the yield through the soil and water conservation techniques employed. The second is a wider problem involving uncertainty in him, given his status as an unregistered tenant, a share-cropper, a benami cultivator, or a landless but submarginal farmer. Here till the land reform legislation is actualized, the farmer will not be interested in improved land use. The problem of land use in the country also covers the problem of increasing desertification, caused by the delicate technological balance being upset against which technologies have been developed by our Jodhpur Arid Zone Institute to stop its spread. Similarly as a counter to the menacing problem of water-logging and salinity, there is no escape from slowing down our major irrigation plans and projects, and extending the use of medium irrigation as a counter.

This is also related to the growing damage to land and water use caused by our rapid loss of forest and forest cover leading to soil erosion, floods, desertification and loss of flora and fauna. This rapid deforestation can only be halted by slowing, or in some cases abandoning, of large irrigation projects and some heavily

wood-based industries which involve clear felling of trees. Apart from halting deforestation and inundation of forests, land-use policy with regard to forests calls for ecological restoration of degraded and denuded areas, which will both redirect resource use to meet the basic needs of the neediest and develop land-use policy addressed to the varied agro-climatic regions of the country. At bottom, it becomes obvious that only if the vast untapped energies of the people are used in a network of self-help, will the gigantic tasks facing us in the land-use and forestry area be meaningfully tackled.

#### *Water*

The country's water resources depend mainly on the plentiful seasonal rainfall which if used to (a) reduce instant surface run-off, and through use of vegetative cover, (b) further develop the massive reservoir which the soil represents can meet most of our water needs. In other words, the lessening run-off will increase infiltration and percolation and will make for greater recharge of soil moisture, ground water and perennial surface water flows. The water crisis in major parts of the country calls for water conservation on ecological principles – namely that water resources are destroyed by land mismanagement or excessive withdrawals of natural resources which is disruption of the hydrological cycle or excessive water flowing into it, causing pollution. In other words, water conservation calls for ending the destructive and distorted use of water and respecting the hydrological cycle, maintaining a clear difference between essential and non-essential use of water, and meeting as a priority the needs of the poor and the marginalized.

#### *Air*

There is need to establish criteria and standards at least in the country's major cities to start with on the basis of air pollution monitoring. The time has now arrived for licenses to be issued to any thermal plant, factory and industrial unit burning fossil fuels only if its capital budget provides for pollution-containing machinery. The most polluting source in our cities is the old and dilapidated diesel internal combustion trucks and two- and three-wheelers. Their licensing should be strictly controlled and issued only to those fitted with emission-control devices.

Simultaneously, the river water pollution and acid precipitation from our factories which have made the Ganga, Cauvery and our major rivers unusable can be stopped. Similarly pesticides pollution is reaching dangerous levels. FAO/WHO report that one person dies per minute from pesticide poisoning in the Third World. This can be controlled by biological controls using predators, parasites and pathogens, growing use of pest-resistant varieties and replacing DDT, BHC etc. by organic manures.

### *Industry*

Industrial planning in the future must be based on resource and environmental factors, which will also be efficient in resource use, using as far as possible renewable resources. Industrial costs for every unit should include pollution control but such costs cannot in all cases be borne by the industrial units. This can in part be met by the government providing such units with subsidies for industry in installing preventive, restorative and or compensatory machinery. Here there is a particular problem with our small-scale industries, which are bound to further multiply in the future, for they are the employment-generating sources. At present they produce over Rs 60,000 crore goods and employ over 100 lakh persons. Their limited resources do not allow them to invest in environmental regulatory machinery. There is need here for government help not only in subsidies but also on information of less expensive pollution-controlling equipment. This is particularly applicable to the thousands of small tanneries, metal working, machine tools, printing and dyeing, and micro chips manufacturing industries. Further, some degree of joint cooperative funding by the units for the purchase of such equipment should be encouraged.

### *Energy*

In the energy field Sustainable Development involves moving away from the risk-laden nuclear energy path and heavy, almost sole, and increasing reliance on thermal, hydel and crude oil energy towards a low energy future. If even a part of our current heavy investments in the above energy forms is used to develop and supply the highly efficient fuel-saving equipment now available, some 30 to 35 per cent of the country's per capita energy consumption can be reduced. A major contribution to energy use

will be made if the production of the traditional energy sector is increased, in particular wood, charcoal, dung, crop residues, along with a more rapid development of biogas and bio mass, on all of which the majority of our people rely for meeting their energy needs. Similarly the new renewable sources of solar, wind and geothermal energy raise no problems of pollution and are awaiting adequate investment.

### *Human*

Sustainable Development has above all wide-ranging application to the human resources factor. It demands a reduction in fertility rates by increasing the literacy and education of women and girls. It demands drastic reduction in the inefficiency and wastage of our whole school system, expressed in the massive dropout rates and educated unemployment. It demands an urban policy that is based on a dispersed pattern of human settlements, low-cost water supply and housing, and the recycling of all city wastes. It demands optimal use of the medical infrastructure that we have built and will further build, particularly in the rural areas. Above all, it demands a positive, as against the present normative, approach to the major socio-economic problems of unemployment, poverty and inequality, which can never be addressed, unless there is a turn around in society, where all power is concentrated in a thin crust at the top, and where a start can be made by helping and allowing the poor and the dispossessed to organize themselves to fight for their rights.

And so to return to the starting point, the major question posed is whether our growth-centred development plans, including the next Eighth Plan that we are now formulating on a 6 per cent growth rate, can be replaced by plans aiming at Sustainable Development, which addresses itself simultaneously to safeguarding and enriching the environment as well as to meeting some of the basic needs of the neediest in society.

## Chapter 2

# Sustainable development in operation

K.P. GEETHAKRISHNAN

[Basically, when we talk of sustainable development, the easiest definition is that we, the present generation, have inherited a certain amount of ecology and environmental surrounding in terms of land, water and air; when we leave it to the next generation, we should leave it at least in the same condition, if not in a better condition than what we inherited. This is the sum and substance of sustainable development, putting it in elementary terms.] When we talk in terms of how do we leave this environment at least in the same condition if not in a better condition, we talk in terms of rules and regulations and enforcement, in terms of being able to do something really positive to develop it and stop its degradation.]

[The subject could be divided into four parts. The first part is legislation, rules, regulations, etc.] If we look at it from this angle, what we have may not be a perfect system, may not be a complete system, but by and large we are better endowed than most of the other developing countries. There is, for instance, in India an Air Pollution Act, Water Pollution Act, Environmental Protection Act, Forest Conservation Act, Wild Life Act. When a biosphere reserve is set up, it is found that parts of it do not have any legal protection and so this lacuna must be covered. Or in the case of the Environmental Protection Act, for its enforcement an environmental protection authority is needed, which is removed and distinct from the government so that it can function independently. There are these kind of gaps but the basic point is that in terms of legislations, rules,



acts, etc., we are reasonably well endowed. While we need to examine as to how best they would be made complete and more comprehensive this emphasis would in fact take the second place.

While there is thus some satisfaction that the basic set of rules is adequate, the same measure of satisfaction is absent when it comes to their implementation for several reasons. First, the technical competence itself has not been adequately built up. There is a certain amount of technical competence in Delhi, in the Ministry of Environment and Forest; in other Ministries the technical competence to look into these acts is much less, at the state level, the technical competence is even less and at the sub-state, district level, block or village panchayat it is non-existent. In Delhi we have a Central Pollution Board, in states there are the Pollution Boards. But in terms of technical competence, in terms of trained manpower and machinery to find out whether these rules and regulations are being implemented, what are their violations, there is serious inadequacy. We have the Forest Conservation Act, but ultimately at the lowest level the forest guard's jurisdiction is so large and he is so badly equipped in terms of communication and transport facilities, that he cannot match the poacher.

So, at one level we find that this kind of competence for enforcement, competence for ensuring that the various legal provisions are in fact acted upon, is poor. In the same bracket is our machinery for trying cases. For instance, we want an independent machinery for enforcing various rules and regulations. We have been talking in terms of environmental courts. We have said that today the number of cases coming up are not very many but in the course of the next two or three years there will be many more. On this one of the judges of the Supreme Court suggested, 'Why not organize a training course for some of the judges? We will thus understand better what is the so-called conflict between environment and development.' Maybe we will have to think in terms of separate environmental courts where a public-spirited individual, who has a cause for anxiety, a grievance, can go and seek redressal. Through training then we can have a set of people, both the judges as well as the people who argue before them, who have a reasonable knowledge of what exactly is environment, what is development, what is the conflict between the two, so that final decisions are taken on the basis of a full understanding of both sets

of concerns.

So, the first point highlighted is that we need to have the competence, both in terms of technically trained manpower as well as machinery, to be able to enforce our not inconsiderable environmental legislation.

[The second major lacuna is the perceived conflicts between the environmental requirements on the one hand and the day-to-day economic needs of the people, 'perceived' because very often we do not see it.] Take the case of Madras which has 43 per cent of its people living in slums. Their living conditions are so abysmal because we, as a society, we as a government, have not been able to provide them with the basic amenities. So I forfeit my right to point a finger at them for spoiling the neighbouring roads and lanes as I, as a society, have not been able to fulfil his basic needs.

We have another case where the Supreme Court has ordered the closure of a large number of mines in the Mussoorie Hills, and it has been left to me as the Chairman to enforce it. We have been enforcing it and have stopped the mining activities. But whereas the mining activities have been stopped and reforestation of that area is underway, the problem of the hundreds of people who have lost their jobs as a result of the closure of the mines has not been considered. The problem has been swept under the carpet. Similarly when because certain iron mines have not complied with the rules and regulations and there is the order to close them, there is the human problem of throwing out of employment several thousand people working in them. [When we talk in terms of environmental requirements on the one hand and the perceived conflict with the basic economic needs of the people – I am not talking of economic gains but of the bare earnings of the worker to feed and clothe his family – we have to go back to what our former Prime Minister said: poverty pollutes, which means that we will have to attend to the basic requirements of people. For this, the process of development which benefits these people will have to be accelerated. Basically, somewhere along the line we will have to recognize that the conflict is real, that the problem of the economic needs of the people is real and that it has to be addressed. When that happens, then automatically, they will contribute also to a better environment.]

[The third gap in this set of formulations is awareness. Today we find that awareness is abysmally low, not only among the illiterate

and uneducated, but among all people, including educated and uneducated, urbanites and ruralites. In Delhi, water supply is limited and scarce. So there are some months when on every third day the NDMC is rung up because the water pressure is so low that the water does not go up to the tank and a tanker is needed. But the same person does not mind when there is water available in the tap, using it for his garden. In every one of the houses in Delhi we are guilty of misusing the purified, potable water for our gardens, for washing our cars. This is the same as illiteracy, for it is being uneducated as far as the use of the scarce resources is concerned.

When I talk of awareness I am talking in terms of the entire society. Our awareness that we are spoiling the environment is near zero. The housewife will sweep her house, make it absolutely spotlessly clean, and take all the rubbish and dump it over the wall of the next house. Our kitchens will be absolutely clean in the daytime, but in the middle of the night will be inhabited by many insects which feed on the waste and dirt.

This awareness has got to be built among everyone and by everybody and in different ways. For instance, Karthik Sarabhai's Centre for Environmental Education is talking in terms of water preservation, saying that every drop of water is important. In many petrol pumps you will find a hoarding saying that petrol is very scarce, why are you wasting it by having a bad engine. This awareness promotion perhaps is a job that is better done by individuals, by the NGOs and the organizations in the private sector. This does not exempt the government of its share of responsibility, but experience shows that an outside agency, an NGO, which can be totally committed, which has its roots locally, can do this in a better manner.

The second part of this analysis covers what may be called the impact assessment, in relation to the projects. Taking the public sector Seventh Plan outlay of Rs 1,80,000 crore, roughly 70 per cent of it is investment outlay. As far as the central public sector is concerned, over the last eight years we have got into the act of trying to do some impact assessment, trying to suggest what steps should be taken for ensuring that these are environmentally fully protected and pollution control is totally taken care of. It is a process of education not only for the public sector but for the Ministry of Environment itself. The guidelines that it has issued for the same

sector over the last five years records phenomenal improvements. Every day, it is a process of learning. It is not as if the Ministry of Environment knows what should be done. Very often we are totally stumped. When we criticize a project, the administration of the Ministry concerned comes back to us and asks us, will you please tell us what we should do. We only tell them that it should be environmentally hundred per cent protected, and pollution control should be complete. We are not able to articulate further and tell them what are the specific steps that should be followed to attain these aims. This is the conflict that we have in the Ministry, day in and day out. But the process of education is on. Today the guidelines that we put down for various industries are much better than the guidelines issued about seven, eight years back, and I am convinced that in the next two to three years the guidelines that will be issued will be even more precise than what we have today. This is the process of education.

What does this mean for the Seventh/Eighth Plan outlay? If in the Seventh Plan the public sector outlay is, say, Rs 1,80,000 crore and out of this 70 per cent is investment outlay, if in the Eighth Plan the total outlay is about Rs 2,70,000 crore, and 70 per cent of it, i.e. about Rs 2,00,000 crore, is the investment outlay, then because of the detailed analysis, feasibility and project studies etc. through which each project has to go through this outlay and its projects will be implemented with more or less the full prescription for environmental protection and pollution control. We have also moved the Finance Ministry that an identical procedure should also be followed by financial institutions.

Unlike the public sector outlay for a Rs 1000 crore project which goes through a very hard drill, is examined thoroughly, resulting in the setting of a number of conditions for project implementation, so that something in environmental protection happens, in the private sector, where the funding arrangements are made by financial institutions, the rules only require that at the time of the conversion of the letter of intent into a licence all that is necessary is a piece of paper from the state pollution board clearing the project. The state pollution boards look at only the pollution angle. They have no authority to look at the impact assessment. The net result is that an identical Rs 1000 crore project if put up in the private sector goes through like a shot. None of the stipulations on which we spend

hours and hours at the ministry for putting in the public sector project ever gets attached to the private sector project. This situation cannot be allowed to continue and the Finance Ministry and the all-India financial institutions have been moved to enforce the essential environmental safeguards. It is expected that this regime will apply to the private sector from the financial year commencing 1 April 1989.

Likewise, we are also currently examining the arrangement that should exist at the state government level for impact assessment. Today this does not exist, because when the pollution board examines a project, it examines it purely from the point of view of pollution. In Delhi a committee meets to clear every project having environmental effects, some three or four scientists work at it in detail and produce a safeguard plan. This does not happen, however, at the state level. So, in all probability, within the next year efforts will be made to create such capabilities for impact assessment at the state level as well as at the financial institution level, so that out of the total outlay for the public sector and private sector, the investment outlay part is reasonably well taken care of in terms of environmental protection and pollution control.

The problem that arises is that today we do not have any scientifically established tools for measuring sustainable development. This is a thing that has been bothering a group set up under the Chairmanship of Dr M.S. Swaminathan. Because of this, today people go to extremes. The project advocates, for instance, say that the project should come up and that the environment can be taken care of by planting about two hundred trees. This has been the traditional approach – the planting of casuarine or eucalyptus trees. In a hydro-electric project, when asked what they have done, prompt comes the reply, 'Sir, don't you know that we have planted a hundred thousand eucalyptus hybrid?', and for them that is the end of the matter. On the other hand, the response to this is vague, namely the advise that 'you must protect the environment, you must control the pollution'. We are not able to articulate better and say what exactly is to be done, what is the cost if left undone. The tools of measurement of sustainability should be able to put down in figures, that this is the exact damage in rupees and paise, this is what happens if you take the two together, this is the end result. The World Research Institute has completed such an analysis in

respect of Indonesia, and there, in terms of their own yardstick, they have discovered that if over the last twenty years the growth rate in the agricultural sector has been plus 4 per cent, the degradation in the environment caused by this growth is slightly more than 4 per cent! So if the two are taken together, the net growth rate in agriculture in Indonesia, taking into account the drawal on the environment, is in fact a minus figure. In India Professor Swaminathan is at work on this and hopes to come out with some suggestions which over a period of a year, or a year and a half, could lead to slightly better methods of measurement of the environmental damage, so that whenever a decision is to be taken in economic terms on a project, we are also able to indicate the likely benefits as well as the environmental damage in comparative, quantitative terms.

[So, one point that has to be addressed when we talk in terms of sustainable development being built into the plan is to have a better quality of measurement of sustainable development, or, to be more precise, the degradation that would take place if there is no sustainable development. This can then be combined with the economic indicators with which we are all very familiar, the rupees and paise indicators, and we could then take a total view.]

Two other points arise when we talk in terms of the plan outlay. First, let us take the forest lands. The loss of forest cover over the thirty-year period, 1950 to 1980, is estimated at about 4.3 million hectares; attributable only to diversion for agriculture 2.6, and diversions for various projects and other purposes 1.7. The figures are important.

We say that over the period 1950 to 1980 the total loss of forestry cover, thanks to agriculture, was 2.6 million hectares, thanks to non-agriculture and other purposes, is about 1.7 million hectares, totalling up to 4.3 hectares. Ever since the Forest Conservation Act came into force in 1980 the total amount of forest land which has been formally authorized for diversion for various developmental purposes is about 1,20,000 hectares, hardly about one-eighth of a million hectares. On the other hand, we all know that the 75 million hectares of forest land which was notified does not fully exist on the ground. Maybe what exists on the ground is in a reasonably good condition, is with over 40 per cent cover, is around 45 million hectares. We know that about 30 million hectares does not have

good forest cover. Satellite imagery itself has established that in the last twenty years we have lost close to 1.3 million hectares per annum. Whereas on the one hand we claim to have lost over a period of thirty years through development and agriculture only 4.3 million hectares, here we are losing 1.3 million hectares per annum. What we have lost in the last eight years by diversion to projects officially is only 1,20,000 hectares. On the other hand, what we have lost even during this period, according to satellite imagery, is 1.3 million hectares a year. This means that the process of development as defined by the plan activities does not support the inference that this by itself is what is leading to the environmental damage. Normally we tend to connect environmental damage with the process of development and the process of development with the public sector outlay. This is the normal logical relationship established. But if we look at the public sector outlay and at the projects being implemented on the one hand and the net forest lands lost to projects on the other, then it may be that in the Eighth Plan period we will be able to totally control this kind of loss. But that does not mean that we have taken care of the process of deforestation because the process of degradation of the environment takes place not so much because of the planned active investment that we undertake within the public sector outlay, but because (a) of the failures in that, and (b) of the areas to which we do not address ourselves.

This brings one to the third part of this analysis. Environmental degradation takes place more in the areas where we have failed and in the areas which we have not addressed at all. First, there is the problem of the population of both human beings and cattle. It is definitely on the cards that before the end of the century, that is in another eleven years, we are going to have an extra 200 million people including about 60 to 80 million below the poverty line. It may be that an identical number will be living in the forest areas, in the degraded forest areas, or on the fringes of the forests. These people will make inroads into the forests, they will cultivate in the worst and most hostile conditions, getting about one-tenth of a ton per hectare which is crucial for their survival. It is not as if he is in a monetized economy, where he can buy foodgrains even if offered at 25 paise a kg. He is not in a position to buy. He will say to himself, as the government cannot take care of my requirements, I will have

to fend for myself. He will thus cultivate land under the most hostile, inhospitable conditions.

We have been having family planning programmes for the last forty years. But still, today we are talking in terms of an extra 200 million people that will be there on the ground in the next eleven years. The estimates of livestock and cattle vary, 90 or 100 or 110 million might be the addition in the eleven years, and most of it will be livestock of a fairly inferior variety which does not yield much but which again is a basic protection for the poor person. For him, having his two goats or one sheep or three cattle is precisely what indicates his status in his society, gives him support for his survival to make both ends meet and keep body and soul together. This to him is more important, while for the environmentalist the grazing in the forest will be stopped if cattle is eliminated.

If our planning could have succeeded and we did not have these 200 million people and the 110 million cattle, it may be that our efforts at salvaging the environment would have been that much easier. But today the facts are otherwise.

Let us take land. There is one estimate of the Agriculture Ministry which says out of the total of 330 million hectares, the reporting area may be about 300 million hectares, of which 177 million hectares is degraded. In fact, the 'seriously degraded and affected by wind and soil erosion' area is estimated as 100 million hectares. For purposes of this analysis, 125 million hectares may be taken as degraded land. Even at 125 million hectares, it constitutes nearly 40 per cent of the reporting area. Degraded land does not mean it is lying waste, with nobody touching it. Most of it is in fact under the use of somebody or other. Degraded land relates to the fact that optimum biomass generation is not taking place, because the soil has been impoverished; maybe it is the ravines in the Chambal area, maybe it is land with excess of salt that has come to the surface, maybe it is the hill areas where thanks to the cutting of the trees the soil has been eroded with every monsoon. Whatever be the category, the claim is that about 120 million hectares is degraded in this country. If we want sustainable development we cannot allow this to happen. We are producing this year about 170 million tonnes of foodgrains. Last year maybe we produced 135 million tonnes. This was produced out of about 140 million hectares of land. There are agriculturists who claim that good crop land is capable of



producing two and a half tonnes per hectare, and so we will meet our requirement of 225 million tonnes at the turn of the century with just 100 million hectares, which means that we can surrender 30 to 40 million hectares. But in actual practice what is going to happen in the next eleven years is, with the addition of 200 million people, a large proportion of whom are on the fringes of poverty and for whom food security is important, they will not think in terms of two tonnes per hectare but will be thinking in terms of one quarter of a ton per hectare to ensure food security. This means that the demand for land for agriculture, instead of contracting by forty million hectares, could in fact increase by ten or fifteen million hectares if we do not take certain steps now. The poor farmers to get this 10 or 15 million hectares will hack away at the remaining forest, they will degrade further the other lands. If we do not attend to this problem, the chances are that in the next twelve years another ten to fifteen million hectares of land will get degraded, and this land will have to come mostly from forest land and hill slopes.

The cost of reclaiming such degraded land varies from Rs 10,000 to 15,000 per hectare. Taking the figure of Rs 10,000 per hectare, to recover all the 125 million hectares over a period of two years, the resources needed are about Rs 1,25,000 crore. This means, that for this purpose alone we would need to be given two-thirds of the total Seventh Plan public sector outlay but spread over a ten-year period. The Wasteland Development Board is allocated Rs 500 crore this year and Rs 720 crore next year for wastelands out of which Rs 70 crore is available, the rest being for rural development. From the employment programmes the Board gets Rs 300 crore for tree planting. Under social forestry, which comes with various tags, from bilateral and multilateral source, another Rs 300 crore are available – all adding upto the figure of about Rs 700 crore. But the kind of money that is required to correct the degradation of the wastelands is about Rs 1,20,000 crore. The kind of money that we are talking about is really very large.

In the case of water, the Ganga and Jamuna are supposed to be perennial rivers. But between Delhi and Agra in the summer months, what little flows in the Jamuna is the untreated or treated sewage of Delhi. The Ganges goes dry in Kanpur in the summer months because of the abstraction of water upstream of Kanpur. But at least the Ganges still has the capacity to regenerate ten,

fifteen kilometres down below, which Jamuna does not have. The Sabarmati river is again nothing but sillage most of the time of the year. This is so for every river. To restore these rivers to their earlier status two things should be noted: one, the quantity of water, which requires the catchment area treatment, the greening of all the upper catchments so that the soil retains the rain water, and the alternating cycles of floods and droughts are reduced and more water flows. Second, and more importantly, it should be ensured that effluents are not let into the rivers. Effluents are both the urban sewage as well as the industrial effluents. We often keep highlighting the industrial effluent problems. Possibly that is also manageable, as it can be controlled under law. As regards urban sewage, the problem is almost unmanageable. Delhi alone requires about Rs 1000 crore for treating its sewage.

In our system of plan priorities we have not given adequate attention to this issue in the last forty years. Urban sewage has been treated as the least important sector. An estimate was prepared in 1972 that for about 145 class one cities about Rs 1200 crore would be needed for effective sewage treatment. To update this figure, it will not be enough to merely update it for inflation. In Madras city, for example, when the Veeranam scheme was sanctioned back in the sixties, the cost was Rs 23 crore, and it could have been finished within about Rs 30 or 40 crore. For the same scheme, today we are talking in terms of Rs 1000 crore, a fifty times escalation. Hence in all probability the allocation for treatment of all the sewage, both industrial and urban, which now go into the rivers, may involve of Rs 20,000 to 30,000 crore. There are no precise estimates but the basic point is that we have to think in terms of very much larger outlays.

This issue is urgent, because it is this polluted water which recharges the wells, the tanks and other water sources all along the river course, in all the villages. We try to provide more effective and protected drinking water supply in all the villages by putting tubewells, cleaning the well water and supplying it, whereas the starting point of the whole exercise is the polluted river water which percolates to these wells and tanks, where filtration makes it only slightly better in quality and more potable. So one of the pre-requisites for providing safe drinking water, at least in the villages along the river Ganges, is to take up cleaning up of rivers on

the lines of the Ganga Action Plan.

The same applies to air. It may be, in terms of air, the cement projects that spew the cement dust, the thermal projects which put out the particulates as well as sulphur dioxide, carbon dioxide and monoxide, are controllable. But look at the automobiles. Both Delhi and Calcutta already figure in the top fifty most polluted cities. Delhi alone has about 1.2 million vehicles, 2-wheelers, 3-wheelers, 4-wheelers. As far as the lead is concerned, the refineries have been told and we have been promised that the methods of production are being changed and by the year 1992 hopefully it will come down to 0.15 grams per litre, which is regarded as an acceptable level. We can push for a further reduction but this in itself will represent only a marginal improvement. In Delhi, today, 80 per cent of the pollution is carbon monoxide, carbon dioxide and the unburnt hydrocarbons, which could be prevented by fitting catalytic convertors in each one of the vehicles, which is costly but effective. Enforcement could be through fining each one of us who owns a car or a truck or a bus, if the engine is not properly tuned and is wasting fuel in addition to causing pollution. We have been talking about it for a long time. But, on the whole, implementation is very poor.

If it is decided that the 2-wheelers and 3-wheelers which pollute the maximum should pollute less, that can be achieved by stipulating that all such vehicles should shift from two-stroke engines to four stroke engines. It will be prohibitively expensive, in a country where we have just been having the 2-wheeler expansion, a phenomenal expansion, on the basis of the 2-stroke engine. If we now suggest that we shift to the 4-stroke engine a large part of the investment already made will be wasted. But this is the kind of thing for which money should be provided, because we are not far behind Mexico as far as air pollution is concerned. Even as it is, studies show that even a child in Calcutta inhales smoke equivalent to twenty cigarettes a day. The child does not have to be a smoker, there is that amount of smoke in the air.

The order of requirement of funds seems large, but in terms of the total plan outlay it is meagre. The Seventh Plan outlay is Rs 1,80,000 crore, and the 1989-90 outlay, for both Centre and the states, may be about Rs 40,000-45,000 crore. Within this, 60 per cent will go for the energy sector, communication, and other infrastructure, 15 to 17 per cent may go for the social overheads,

and environmental protection will get about 2 per cent. So, out of Rs 45,000 crore, Rs 300 crore may accrue from social forestry, another Rs 300 crore from employment programmes and about Rs 200 crore, for all other programmes, including the Ganga Action Plan, etc., and including all the amounts of the state pollution boards. Totally it would be about Rs 900 crore.

Further, for the Rs 45,000 crore outlay there are so many competing claims from the various departments and ministries that, ultimately, if there is any increase for the environment it would be to increase the Rs 900 crore to Rs 1200 crore or Rs 1300 crore. As noted earlier, even if we decide that in the major activities that we take up as part of the plan outlay, namely the public sector and the private sector investment, there is adequate provision for environmental safeguards, the process of degradation of the environment will be on in the areas that we do not attend to or in the areas where we fail. Take land use, for which there is no outlay, with the result we do not normally look at it; the land use pattern is so defective, it is so uncontrolled that ultimately it degrades. The same land use would perhaps have been better controlled if it had been a kind of a plan scheme with Rs 200 crore outlay, and brought under the monitoring scheme.

[So, if we are to attend to reclaiming the degraded land, water and air, what we need is a kind of a super fund, similar to what they had in America when they suddenly discovered that hazardous substances and wastes were so large and so dispersed in the country, that they needed a super fund of two billion dollars to control them. They realized that individuals could not tackle it, it had to be a state programme. There is a case for a super fund because the requirement for reclaiming the damage done to the land, to the water and to the air is so very large, that there is no means of focusing attention on it within the framework of the plan. We need to have a separate super fund, very much larger than the kind of allocations that are possible for such efforts within the framework of the plan. This is one requirement.]

[The second requirement is the planning structure – the model of the planning, whether it be the Harrod Domar model or the Mahalanobis two-sector models, in the end it is a rupee and paise model. It benefits a certain section of the society, the poorest of the poor continued to be there, with the gap between them and the

non-poor widening. Hence [the entire structure of planning will have to be looked into to see whether the planning as done today can give us sustainable development.] But in reality it seems that poverty is sustainable. That is, there can be sustainable development at the lower levels of consumption to which the majority of the population are accustomed. But sustainable development in a five-star culture is impossible. The water supply requirement of an average individual in the village may be only about five gallons a day. We can have sustainable development with good water supply for the entire 800 million people at that level. In Delhi the per capita requirement is about 40 gallons a day. In the five-star hotels, it goes up to 120 gallons a day. There is no way we can have sustainable development for the 800 million people on this basis.

So when we talk in terms of sustainable development, that is possible at lower levels of consumption, where consumption is defined as what about 40 per cent of the people of this country at the bottom end of the scale have. It may be that if we start with that as a starting figure, and our entire planning process is aimed at taking that up by 10 per cent or 20 per cent, rather than talking in terms of the urban housing, urban water supply, urban power requirement, urban automobile requirement, etc., we can have a sustainable plan. Even in a country like The Netherlands, they have decided that the total fossil fuel consumption will have to go down, by placing more emphasis on buses and on public transport and not on individual cabs. There is to be a ban on further acquisition of cars, and fuel consumption is to be metered and taxed heavily. We will have to think on similar terms. We can have sustainable development if we address ourselves to the consumption standards of the average people, and reorient the plan as a long-term process. Of the next year's outlay, nearly 75 per cent is only a throw forward expenditure from the current year on ongoing projects and their completion. But if the process for sustainable development is started, at least in the Ninth Plan, the plan structure could be reoriented to make it more suited for promoting sustainable development. This is the second point, namely, the plan strategy and the emphasis will have to change if we are to aim at speedy sustainable development.

The last set of points that we have is this. The immediate problem of degradation that is obvious to the eye is the land and air degradation that we see around us. But globally, there is more concern about a hole that is seen in the ozone layer. We are talking in terms of global warming, we are talking in terms of the tropical rain forests. All these concerns are valid. Degradation is not something that is limited to the boundaries of the state, or of the country, it is universal. It is useless for an Indian to say that after all the hole in the ozone layer was caused by the CFC consumption in America and the developed West and that it is their headache, because the sufferers include our people in India. So in all these cases where we are talking about the emphasis at the global level, we have to recognize that we have also a major part to play in making common cause with them. Though we may feel that we are not contributing to the damage, the damage is going to affect us equally. The two points need to be borne in mind in this debate. First, let us recognize the fact that the CFC consumption in India is not even one-fourth of a per cent of what it is in America. The total fossil fuel consumption in this country is not even one per cent of what it is in America. But we will make common cause with them and see that the CFC installed capacity is not allowed to grow, even reach full capacity; if the industrialized countries help us with the alternative technology when it is developed, and if the costs are shared.

The second point is that out of the 800 million people, barring maybe half a million, people in our country understand neither ozone nor the hole of it. Our 800 million people see their degraded land, and the fact that the forests have been cut. They see that the rivers are totally polluted, they find the water courses are drying up. They find the air is not fit to breathe. Their perception is this. So to talk to them and to carry conviction with them, we need to attend to their problems first. This means that we can make common cause with developed countries as far as the protection of tropical rain-forest is concerned, provided that they also realize that 25 million hectares of forest land in India is under severe biotic pressure, that they should help to attend to this problem in turn.

Chapter 3

## Sustainable development: Governing of resources and resources of governing

R.K. PACHAURI

Approaches to the optimal exploitation of natural resources do not find a prominent place in classical economics theory. Attention was first focused on this area over 50 years ago in a pioneering article by the well-known economist Harold Hotelling. For several decades after that economists lost sight of the significance of Hotelling's work till the first oil price shock of 1973–74 brought the realization that several of the world's natural resources were depletable and, therefore, merit careful analysis in determining optimal rates for their extraction and use. Undoubtedly, there have been periods in history when concern with the depletion of forest resources has featured in national plans and activities, but forest resources have always been seen renewable in nature, as indeed they are, and the availability of substitute fuels such as coal and petroleum have in the past enabled large areas to be afforested after earlier forests were completely depleted and burned away.

In the early seventies the work of the Club of Rome received considerable publicity, and several intellectuals saw in its doomsday forecasts a valid reason for slowing down the engines of growth in the Western world which were fed essentially on low-cost energy and mineral resources. Happily, the concerns generated by the Club of Rome and the extreme conclusions that they appeared to dictate were short-lived, largely because the models that they put

forward did not take into account the effects of price increases that scarcity in global resources would result in, bringing about a reduction in demand. But the impact of these studies has not been lost on several groups including environmental activists in Western countries, and their concerns are finding place increasingly in development strategies and growth plans.

The economic scene in India today is full of depressing examples of over-use and, in some cases, abuse of our endowment of natural resources. Some of these have been written about from time to time but except for frequent seminars and discussions the planning process has not really come to grips with mechanisms by which the high social cost associated with depletion is taken into account. Consequently, the growth of the Indian economy during the forty years since independence has taken place at a very heavy cost in terms of loss of the wealth that nature had bestowed on us in the form of fertile soils, forest cover, mineral resources and clean air and water. Conceivably, the steady rate of economic growth in recent decades could perhaps even be negative if one accounts for the full value of the erosion of our natural resource wealth over time. The Government appeared to have been seized of this problem two years ago and very useful attempts were made to even inform Members of Parliament of the consequences of our present system of resource use and abuse. But, alas, these appear to have been given up despite the serious drought afflicting the country, which is at least in part the result of depletion of green cover and top soil in several areas.

Nowhere is the devastation of natural resources more in evidence than in the Himalayan region. For instance, it is estimated that the rate of erosion in the rivers of this region is currently at the rate of over one millimetre per year, which represents a five-fold increase over the situation at the turn of the century. They are carrying, as a result, sediments at the rate of 16.5 hectare-metre per 100 sq km of catchment area annually. Altogether, it is estimated that the erosion of soil in the Ganga basin alone is of the order of 6 billion tonnes per annum, and perhaps the total for all the rivers of the country may be around 15 billion tonnes per annum. If a market value was to be assigned to this quantity, we are possibly losing top soil worth around Rs 10,000 crore to the sea annually.

The major reason for this heavy rate of erosion is the widespread



deforestation that has taken place in the Himalayas. The National Forest Policy of 1952 set a target for afforestation to cover one-third of the land area of the country, with 60 per cent of the hilly tracts under healthy forest cover and 20 per cent in the plains. As against this target satellite imagery reveals that the area under good forests currently is only around 11 per cent, and in hill areas in particular only one-third of the total surface is under forests as against the 60 per cent laid down in the National Forest Policy. If one views these figures against increases in the population of people and livestock, then the process of deforestation appears even more serious, with the per capita productive area under forests down to 0.05 hectare against 0.2 hectare in 1951. The growing demand for fuelwood and the effects of increased cattle- and goat-grazing can only lead to greater deforestation, not to mention the demands for timber imposed by the paper and pulp, construction and furniture industries.

Foresters are now belatedly seized of this problem, but point to the encroachment of people and grazing animals on forest areas. Goats, in particular, are regarded as a menace to planting of trees, since they are known to devour a large variety of saplings before they can grow. Foresters see no sense in a forest policy devoid of a firm grazing and livestock policy. Others criticize the emphasis of forest departments on planting tree species which do not produce fodder. As a result of this and fodder lands not being protected, animals graze in forest areas leading to widespread damage. Forestry, like agriculture, requires to be moved closer to the needs of the people, by their fullest involvement in tree plantation and protection programmes. There must also be major emphasis in these activities on education and extension support. As yet, however, our plans and programmes do not show evidence of a balanced and stable approach that would ultimately ensure growth of forest wealth in the teeth of growing pressure from man and animal.

Questions on governing of resources are confined not only to resources found on the surface of the earth but those below as well. Much of our coking coal resources have been burned away in applications such as steam traction in the railways. In 1984–85, around 43 per cent of our natural gas produced offshore had to be flared. Our waterways have been polluted by industrial effluents in

several locations to a degree that aquatic life has perished completely, depriving local populations of very healthy fish yields.

Even more serious is the problem of water management for irrigation, and the heavy investments that have gone into large surface irrigation projects. Not only have many large projects suffered from heavy cost and time overruns, but in several cases good lands have been submerged under storage and canals. Also the loss of water itself in some of these irrigation systems may be as high as 50 per cent in the form of evaporation and seepage. In some areas the problem of seepage combines with a lack of drainage facilities to result in excessive water-logging on productive agricultural land, rendering it useless for cultivation. Ground water in several regions has been overexploited through a proliferation of pumpsets and short-sighted power tariffs heavily subsidizing agricultural use of electricity. A narrow sectoral approach looking for quick short-term results often obscures wider and long-term implications which would require very rigorous and detailed modelling of ecosystems. A national ethic in favour of conservation of resources needs to be articulated at the highest level of government, but its translation into action must permeate through to every community. Then only would materials be recycled, waste be minimized and resources of water and energy be conserved.

These calamitous developments have been written about extensively in the printed media and excessive dramatization of the issues involved would only add to the futility of widespread wailing that 'everything is wrong', which one hears *ad nauseam* these days. But even more harmful would be a postponement of the realization that there is something seriously wrong with our process of planning, and perhaps in the resources of governing itself, if after forty years of independence our annual growth of national income is exceeded by the annual loss of natural wealth.

Parliamentary democracy, as it has evolved upto this day and the pressures it generates, ensures that the entire system of government and the bureaucracy in particular works superbly in mitigating short-term disasters, be they droughts, floods, fires or famine. The quiet confidence that the nation displays today in the face of the worst drought in a century bears testimony to the strength of the government apparatus in tackling the short-term aspects of this challenge. But at the same time the government and

the process of planning has developed a hopeless inadequacy in recognizing and integrating into its processes those developments that must ensure the sustenance of our base of natural resources. Government does not appear to have developed its own resources to effectively govern these resources. It has been said that India is no longer dealing with disaster events but disaster processes. The challenge of development today is not one of providing protection to an infant industry as it existed in the early fifties but of protecting and restoring our ecological resource base. Regulation of industry needs to concern itself with the utilization of those resources which impose a high social cost on the country. In 1986 the Government enacted a comprehensive piece of legislation in the form of the Environment (Protection) Act 1986, but it took on too many of the enforcement and legal functions that rightly should be performed at the local level, with inputs, wherever possible, from non-government groups and institutions.

Over the years the Government has acted like a banyan tree, inhibiting in effect the development of institutions and think tanks that would have the permanency and dynamism to articulate resource use issues and feed them into government plans. Often it has set up organizations and boards inhouse to guide the formulation of long-term policies in the fields of mineral development, energy, water and environment. But these are often manned by tired pessimists at the top and unmotivated bureaucrats at other levels sullenly biding their time for what are regarded as plum positions elsewhere.

The very nature of long-run resource problems requires a wide involvement of people and professions which cannot come about in the pressure-prone, short-term orientation of government organizations. Besides, capabilities of analysis are built up over a reasonable length of time with freedom to induct specialist services and individuals from outside as and when the need arises. The recent history of other nations which have developed a healthy awareness in protecting their ecological and natural resource wealth shows that the initiative in this field has invariably come from strong groups outside the government. In their absence, the governments of both capitalist and socialist countries have followed an over-exploitative myopic policy in the use of natural resources.

The position today is grim but not hopeless. Those who have

spearheaded the Chipko Movement and opposition to the Silent Valley Project have delivered a message which is powerful but not complete. These need to be translated into development plans harmonized with nature to restore the ecological balance where it has been disturbed, and to quicken the pace of development where economic stagnation exists. The answer lies neither in a zero level exploitation of natural resources, nor in a total disregard for their protection. For while industrial plants and major projects are seen as enemies of ecological restoration, a much more fearsome enemy is grinding poverty and deprivation. These the government can remove at a much quicker pace than before, perhaps by doing less itself, and truly decentralizing the planning process. For only then could the intellect of local groups and institutions grow to ensure the protection and sustainable use of local resources.

#### Chapter 4

## Sustainable development: Technology and environment in water development

Y.K. ALAGH

The important issue that I would like to emphasize is that studies of the type being discussed have to impact on irrigation design and capacities. The agricultural scientist and economist, land use and regional planner, economic statistician and geologist, are not added to the team. The work has to impact on the day to day work for the design of capacities and regulation of the systems. This has been done in our country already on some projects. We need to replicate the selected advances faster.

### **Surface water projects**

Critiques of surface water projects argue that they are expensive, they do not lead to benefits in relation to costs, they lead to waterlogging and rehabilitation costs.

As regards the first argument, sometimes the total expenditure on the major and medium irrigation in a five-year plan is divided by the additional potential to be created in the plan to derive figures of investment per hectare of surface irrigation. In other cases, expenditure figures on new surface irrigation projects, which will be giving benefits in future are compared with investments in ground water in the past ignoring the effects of rising price on the latter. It needs to be recalled that in many cases inter-basin transfer of water attempts to transfer water from water surplus regions to strongly

deficit regions. There is no evidence to suggest that schemes which involve the transfer of such water are more expensive than those which provide for ground water lifting, say at a depth of 20 metres or more in average soil conditions on dry land conditions, leaving aside more difficult conditions like hard pan or hard rock areas, where obviously capital costs of ground water would be higher. In such areas costs of around Rs 40,000 per hectare are by now common. Sometimes even experienced agricultural economists work out the running costs of ground water projects without adequately costing the opportunity energy costs of pumping.

There is no question that the environmental costs of irrigation have to be estimated carefully and provided for in full in development projects. However, benefits of investment planning have also to be fully taken into account. To begin with, note that inter-basin transfer of river water is a great equalizer not only of water on the surface but also of underground water. The standard groundwater aquifer model works out first the groundwater balance in the past and calibrates it with observational data. Such models are used to simulate the land and water regimes in the command given soil conditions like rugosity, hydrogeological conditions and evapotranspiration rates, natural vegetation over the crop regime and the quantity of surface water flow, the number of years and the pace in which the groundwater table rises, can be worked out. Thus, a model of the Mahi Narmada Doab, an aquifer in which at present the water table is between 60 feet to about 300 feet, the model works out the number of years in which under alternative irrigation delivery regimes, the groundwater table will rise to say a level of around 10 feet below the surface. It may be noted that at initial phases of an irrigation project, surplus water is available and its seepage through the soil to the aquifer is a sure-shot manner of augmenting the natural resource of ground water. In the new irrigating projects being planned, such models are used to plan canal systems. Groundwater levels in a basin are monitored. Since the surface water is regulated the farmer is encouraged to invest in tubewells to realize his profitable cropping pattern. If he does not do so, state tubewells are installed when the water reaches close to the surface. The canal system is designed to convey this water abstracted from tubewells. The system is failsafe. I had argued that in projects in which this is being done, not a single hectare of land

would be waterlogged. Bittu Sahgal criticized me in an article in the *Sunday Mail* for making this tall claim. My only reply is to append in Annexure A, the groundwater levels in October 1988 in 78 points in the Mahi Narmada Doab. Thus, groundwater is being monitored with 78 piezometers 6 to 7 years before the surface water is to become available. The irrigation system has been designed in a manner such that the former would be encouraged to withdraw groundwater, since only limited quantities of surface water would be available. If this strategy does not work and the monitored groundwater levels show alarming levels, state tubewells would be installed and water would be pumped back into the canal system, which has been designed to accommodate it. Not a single hectare of land would, therefore, be allowed to be waterlogged and critics have to prove the contrary. The Planning Commission has approved the project with the pre-condition that studies for drainage and groundwater balances already completed for the Mahi Narmada Doab must now be completed for regions like the Bahl, Saurashtra, Kutch and Sami Harij, so that the irrigation strategy takes the soil and water balance into account.

In Indira Gandhi Nahar Project in the Phase II area, groundwater levels are 20 metres to over 100 metres below the surface. A groundwater aquifer model would tell us the number of years in which, given the conveyance of surface water, the groundwater table would rise. It may be noted that since the conveyed water would be sweet, quality of the ground water would also improve through blending. The simple point is that conveyance of surface water would in fact augment the availability of water for good and hence the need to plan from the beginning for conjunctive use. The purpose of groundwater aquifer models, of course, is to build up computer compatible regimes which precludes waterlogging. Measurement and control systems are installed from the beginning and provision made at the design stage in such a manner that if the farmer does not use the ground water even when the energy cost of pumping it falls as the water table rises, the Project authority would pump out the water and convey it in the distribution system which is designed from the beginning to provide for this eventuality.

As regards the benefits of irrigation it has been argued that the benefits of Sardar Sarovar Project are over-estimated because the expected yield is high, i.e. around 4 tonnes of wheat and paddy and

more than 2.5 tonnes of jowar and bajra or around 1.5 tonnes of pulses, groundnut and cotton, and over 2 tonnes of tobacco. As against this, current yields are lower. The Sardar Sarovar Project would give controlled and assured irrigation. Thus, its outcomes should not be compared with the average obtaining at present or even the average obtaining under irrigated conditions presently, since in large parts of the state, irrigated areas did not get assured water supply. Detailed tabulation of crop cutting experiments have shown that in most cases average yield with 4 plus waterings was more than double the average of all irrigated crops showing that 4 assured irrigations were not made available on an average in irrigated areas in the state. Thus, it was clear that when assured irrigation will be given to the farmers, the yield levels achieved will be those approximating to those planned for the Sardar Sarovar system towards the end of the century. In fact, such yield targets would be exceeded on account of technological progress. The benefit-cost ratio would be highly favourable, making the Sardar Sarovar Project a worthwhile investment. When these facts were conveyed to the critics they argued that these relate to a small experimental area. Again, this is incorrect since Annexure B, which contains these estimates, is from crop-cutting experiments (appropriately retabulated): the source of production statistics in India. The argument of course is not that expenditure on irrigation development is by itself a magic wand. The issue really is that poverty and low productivity levels in dryland areas themselves have tremendous social costs. The acute scarcity of water in these areas adds to the social and economic problems of the inhabitants. Well-planned transfer of surface water can be a great boon in providing drinking water, removing water-borne diseases, raising the agricultural productivity of the region and can in fact lead to highly beneficial ecological outcomes. More than half of the morbidity in India is estimated from water-borne diseases. In the Saurashtra Districts of Gujarat to be benefited from Sardar Sarovar, upto 20 per cent of the morbidity is from scabies, a disease arising from stagnant water. The trade-off is not between a favourable eco-system and development. As Mrs Indira Gandhi argued in her Stockholm lectures, poverty and ecological degradation normally reinforce each other. The design of development has to augment the sustaining capability of the environment and to provide for a more



active interaction between man, technology and the available land and eco-resources.

The argument that surface water development is at the expense of groundwater development is not particularly clear. In areas where both are the possibilities, the two are complementary. In others, where they do not compete, they are in their own right each important priorities. To argue that the two are competitive is to suggest, for example, that for a student textbooks compete with stationery. The requirements of both have to be met, possibly at the expense of other inessential expenditures. However, it has to be emphasized that water should be transferred or conveyed only after socially profitable use possibilities for it have exhausted. Thus only 'surplus' water is to be conveyed.

Development of ground water and watershed development are very important priorities for the national economy. Watershed development in particular is a concept on which emphasis has been recent. A number of experiments are presently underway. There are the centrally sponsored schemes. In a few states, externally aided watershed projects are in operation including World Bank, EEC financed and bilaterally financed projects. ICAR is also emphasizing agricultural development on selected watersheds. Finally, some very exciting work is being done by NGOs like the Society for the Promotion of Wasteland Development and other groups. An interesting feature of the work of some of the voluntary groups is that the cost estimates of features like contour bunding, check dams, land levelling and digging of percolation tanks and soil conservation work is lower than that in official projects. Also, voluntary agencies have interesting proposals of integrating rural development schemes like NREP, RLEGP and IRDP with watershed development schemes.<sup>1</sup> Finally, groups like the SPWD and Pani Panchayat of Shri Salunkea, lay considerable emphasis on contribution from the farmers and beneficiaries and this is of great importance. Detailed studies are now showing the importance of the involvement of different institutional groups, the farming communities, landless labourers and government agencies, for any serious attack on land use planning problems.<sup>2</sup> We should now quickly take stock of the existing experiments underway and design the more ambitious schemes we have in mind for the Seventh Plan.

### **Groundwater issues**

Delivery of ground water to the Indian farmer is another important area of priority. By now the hydrogeological survey of ground water potential in the country is nearing completion. Accelerated programmes of tubewell construction and extraction have been identified in selected districts in the country and funds provided in the Special Action Plan. More generally, it needs to be appreciated that a number of studies are now showing the working of groundwater markets in the country. The farmer has shown that he is willing to pay for reliable supplies of water, and groundwater development policies which take into account the existing markets for such water and increase the supplies of water, ensuring its availability at reasonable prices to the farmer, should be a major objective of policies. In those areas where markets have not developed, the state may have to play a stronger promotional role, particularly through cooperative agencies but in other areas, it should strongly support and provide initiative in making available this scarce resource in a larger measure. Policies which provide finance on a larger scale, resource development information and specialized advice to field-level agencies, need to be devised and encouraged.

Assessment of groundwater resource in the sub-surface reservoir entails assessment of both static and dynamic components of the available water in storage. The assessment of static storage is, however, not normally required from the consideration of resource use. What is more often needed is the dynamic or replenishable component of the resource, the assessment of which over any space and time frame is best done by Water Balance Techniques.

Although the concept of safe yield has been widely used in groundwater resource evaluation, there has always been widespread dissatisfaction with it. Most suggestions for improvement have encouraged consideration of the yield concept in a socio-economic sense. From an optimization viewpoint, ground water has value only by virtue of its use, and the optimal yield must be determined by the selection of the optimal groundwater management scheme from a set of possible alternative schemes. The optimal scheme is the one that best meets a set of economic and/or social objectives associated with the uses to which the water is to be put. In some cases and at some points in time, consideration of the present and future costs and benefits may lead to optimal

yields that involve mining of ground water. In other situations, optimal yields may reflect the need for complete conservation. Most of the optimal groundwater development lies somewhere between the two extremes of complete depletion to complete conservation. Although the management of ground water from exploration of the environment in which it occurs and moves to the assessment of quality and quantity in space and time for scientific development is a complex job and also concerned with the evaluation of the environmental, hydrologic and economic impacts associated with the development and allocation of ground water to competing water uses or demands, the advent of high-speed digital computers with almost limitless storage capability has paved the way for successful adoption and application of this versatile tool in the field of groundwater resource management.

The deleterious effects of isolated development of surface and ground water have necessitated their combined development in a manner such that the resource use is optimized. The difference between combined or supplemental use and conjunctive use is required to be appreciated in proper perspective. Conjunctive use does not mean independently optimized development of surface water resources and groundwater resources to serve the same general objectives in a basin. Rather, it means the complementary use of the many natural sub-resources of both systems to allow more cost-effective development than could be obtained even with the optimum plans for independent development. With this definition, many of the so-called 'conjunctive use projects' planned and implemented in our country are, in fact, not truly conjunctive use projects. They are joint or supplemental use projects.

The planning problems of conjunctive use are formulated as an optimization model of the water resources system. The decision or control variables of the model are the groundwater and surface water allocations. The optimal decision maximizes the objectives of development while satisfying the hydraulic response equations of the surface and groundwater systems, and any constraints limiting the head variation and the surface water availability.

Given the large groundwater exploitation programmes initiated currently, for example, the 6 lakh shallow tubewell programme per annum and the priority proposed for the sector in the Eighth Plan, it is quite clear that we will have exploited the easily available

potential in the nineties. The Planning Commission is now urging that the stage has reached to give high priority to *groundwater management systems*, rather than only emphasizing targets of pumpsets installation. A programme of six studies has been initiated in different aquifers to assess the detailed nature of prototype groundwater management problems and to provide pilot solutions. These studies include a coastal aquifer, subject to salinity ingress, a multi-level aquifer with saline and fresh water inputs, both through surface and ground recharge and so on. Mathematical modelling of such systems is generally based on foreign models. Indian agro-climatic and farmers' behaviour have yet to be patterned, hypothesized and tested.

### **Conclusion**

The critics of well-planned large surface water projects are all off the mark: Available data shows that when the farmer is given 4 plus waterings in a crop season, his yield is more than twice that of the average irrigated yield and two and a half times to thrice the average yield of irrigated and unirrigated farms. Also, cropping intensity goes up. Investments in properly planned new irrigation projects or modernization projects which give regulated and assured irrigation are some of the most profitable social investments which can be made. Second, there is now operating proof in the field of aquifer models which ensure the use of water conjunctively and rule out waterlogging. These examples have to become the standard practice. There is no evidence to suggest that for dry areas, groundwater supply is cheaper than surface water plans. In fact, both have to be planned together and complement each other. Badly planned projects of any kind, surface, groundwater or watersheds, can be economically wasteful and environmentally damaging. We have discussed concrete instances of each, but we have also seen field examples where with modern planning techniques, the use of systems models, computer-based data information systems and development of solutions to Indian problems, our land and water management problems are being solved creatively. This has to become the average practice in the Eighth Plan. On the groundwater side the emphasis has to shift from 'utilization targets in hectares of potential' to groundwater management of aquifers. The systems studies of the Central Ground

Water Board with the National Institute of Hydrology will go a long way in operationalizing these concepts. Groundwater markers have to be used more effectively in policy-making, since they are flourishing in different parts of India. The farmers' behaviour and interest, particularly of the small farmer, has to be at the centre of the effort to bring modern water and land management technology to him, since widespread agricultural growth is a great equalizer.

**Notes**

1. See for example the papers circulated at a Seminar on Wasteland Development through Watershed Development, organized by the Gokul Prakalp Pratishthan at Kuve at Ratnagiri from 26 October to 31 October 1987.
2. See the recent work of MV Nadkarni, 'Political Economy of Forest Use and Management in the context of Integration of a Forest Region into the Larger Economy'.

Annexure A

A STATEMENT SHOWING SUBSOIL WATER DATA OF  
PIEZOMETERS OF NARMADA MAHI DOAB OF NARMADA COMMAND AREA, GUJARAT

Village	Taluka	District	Water depth below ground level										Remarks
			1984		1985		1986		1987		1988		
			May	October	May	October	May	October	May	October	May		
1	2	3	4	5	6	7	8	9	10	11	12	13	
Tandalja	Sankheda	Baroda	4.30	3.18	5.22	5.00	7.31	5.09	9.51	-	9.76		
Desan	Sankheda	Baroda	13.03	12.13	12.86	13.39	14.28	13.43	15.58	-	15.38		
Jojwa	Sankheda	Baroda	6.58	5.09	6.96	5.03	7.20	5.68	-	-	7.27		
Lavad	Sankheda	Baroda	4.70	2.72	4.62	4.46	6.03	4.64	7.40	-	7.40		
Malu	Sankheda	Baroda	4.35	3.31	5.48	5.67	8.25	8.31	-	-	-		
Ambapura	Sankheda	Baroda	12.90	11.12	12.65	13.59	14.10	-	16.40	-	18.90		
Antoli	Sankheda	Baroda	6.75	4.82	6.33	5.75	6.62	6.67	-	-	7.61		
Padvan	Sankheda	Baroda	12.89	12.07	12.49	12.60	13.16	12.88	10.71	-	3.63	Filled up	
Bodeli	Sankheda	Baroda	3.04	1.85	2.92	2.73	4.07	2.72	-	-	-		
Limada	Vaghodia	Baroda	7.80	4.81	8.96	7.13	9.96	8.23	-	-	-		
Rameshwarpura	Vaghodia	Baroda	6.60	4.80	6.71	6.11	7.51	7.83	-	-	-		
Poicha	Savali	Baroda	33.92	32.50	34.12	34.30	35.20	34.91	-	-	-		
Anjesar	Savali	Baroda	25.30	24.81	25.73	25.16	27.59	26.02	30.65	-	31.65		
Kotambee	Vaghodia	Baroda	6.73	2.70	8.24	5.15	9.41	7.11	-	-	-		
Panchdevla	Vaghodia	Baroda	5.42	4.02	6.03	4.64	7.06	7.17	10.20	-	-		
Sarnej	Vaghodia	Baroda	6.63	2.72	6.20	5.78	6.72	6.11	-	-	-		
Zardaka	Kalol	Panchmahal	11.67	9.93	10.98	10.62	12.24	11.11	-	-	-		
Garadhiya	Savali	Baroda	4.27	2.77	5.00	3.30	5.22	4.89	-	-	-		
Samalaya	Savali	Baroda	6.72	5.41	8.00	5.67	7.70	6.81	-	-	-		

contd

1	2	3	4	5	6	7	8	9	10	11	12	13
Charanpura	Savali	Baroda	4.23	3.12	5.29	4.74	6.25	5.58	-	-	-	
Amrapura	Savali	Baroda	21.70			Abandoned			-	-	-	
Savali	Savali	Baroda	9.44	9.25	10.58	10.71	11.68	12.51	14.72	-	-	
Saradia	Sankheda	Baroda	-	-	18.62	18.86	19.83	18.93	-	-	31.05	
(Handed)												
Tilakwada	Tilakwada	Baroda	-	-	26.31	25.17	26.24	25.34	-	-	-	
Raika	Baroda	Baroda	33.88	33.10	34.20	34.19	36.27	35.28	-	-	-	
Harni	Baroda	Baroda	3.22	2.79	3.40	3.10	3.43	3.38	5.16	-	-	
Kelanpur	Baroda	Baroda	8.42	5.79	9.90	7.03	10.36	8.61	-	-	-	
Mavli	Dabhoi	Baroda	10.88	99.24	11.27	11.40	12.53	11.96	-	-	-	
Anguthan	Dabhoi	Baroda	10.19	9.62	11.52	10.54	13.37	11.31	-	-	18.40	
Hansapura	Dabhoi	Baroda	4.39	3.11	4.16	3.42	4.33	3.93	-	5.2	6.23	
Dabhoi	Dabhoi	Baroda				Abandoned			-	-	-	
Shirola	Dabhoi	Baroda	30.94	30.90	31.39	31.51	32.00	32.82	-	-	35.85	
Chandod	Dabhoi	Baroda	35.35	33.53	35.76	34.13	35.50	34.23	35.80	35.17	35.17	
Malpur	Sinor	Baroda	34.31	33.77	34.16	34.39	35.14	34.78	36.50	-	-	
Barkal	Sinor	Baroda	22.43	19.08	22.07	19.17	22.17	19.51	-	-	-	
Surasamal	Sinor	Baroda	31.82	29.89	31.74	30.53	32.03	32.93	32.7	-	-	
Timbarva	Sinor	Baroda	35.82	35.20	36.00	36.09	39.95	35.84	-	-	39.00	
Karvan	Dabhoi	Baroda	21.49	21.68	22.15	22.50	23.70	22.66	-	-	24.00	
Samsabad	Baroda	Baroda	21.11	21.07	21.63	22.06	23.60	22.45	26.86	-	-	
Patarveni	Baroda	Baroda				Abandoned			-	-	-	
Itola	Baroda	Baroda	15.40	15.31	15.69	15.81	16.23	15.79	-	-	-	
Alamgir	Baroda	Baroda	12.33	12.13	12.70	12.85	13.80	14.63	-	-	-	
Ankodia	Baroda	Baroda	26.36	24.47	25.49	25.98	26.71	26.37	28.90	-	30.80	
Jaspur	Padra	Baroda	28.04	27.50	28.41	28.80	30.87	29.12	-	-	-	
Dabka	Padra	Baroda	16.32	16.12	16.38	16.60	16.90	16.90	-	-	22.50	
Kamakuvva	Padra	Baroda	25.62	25.78	26.01	25.93	26.90	27.14	-	-	-	
Kotana	Padra	Baroda				Abandoned			-	-	-	

1	2	3	4	5	6	7	8	9	10	11	12	13
Bamangam	Karjan	Baroda	27.87	27.68	28.13	28.42	29.72	26.78	30.46	-	-	
Liliapur (Moti Karal)	Karjan	Baroda	14.05	13.20	15.77	13.55	16.06	13.71	16.5	-	-	
Urad	Karjan	Baroda	26.48	26.42	26.23	26.19	27.02	26.82	-	-	29.68	
Karjan	Karjan	Baroda	27.32	27.43	27.96	27.77	29.04	29.93	-	-	-	
Sarod	Jambusar	Bharuch	12.40	12.03	12.49	12.66	12.93	12.76	-	-	-	
Kavi	Jambusar	Bharuch	6.48	6.37	7.24	7.22	8.31	8.27	-	-	-	
Piludra	Jambusar	Bharuch	19.49	18.26	18.46	17.23	18.79	18.55	-	-	-	
Jambusar	Jambusar	Bharuch	7.10	6.00	7.39	6.60	7.99	7.84	-	-	-	
Matar	Amod	Bharuch	19.21	19.71	19.50	19.42	20.73	20.07	21.70	-	23.50	
Jafarpur	Jambusar	Bharuch	11.20	10.88	11.32	11.24	11.64	11.48	12.40	-	12.70	
Karela	Bharuch	Bharuch	15.50	15.55	15.03	16.00	16.05	16.36	-	19.00	23.35	
Vagra	Vagra	Bharuch	8.65	7.48	8.79	8.16	9.37	9.17	10.50	10.56	12.35	
Bherasan	Vagra	Bharuch	7.95	6.95	7.96	7.58	9.18	7.83	-	-	10.30	
Ochhan	Amod	Bharuch	5.40	4.50	5.83	5.40	6.40	5.57	-	-	8.70	
Bhadbhut	Bharuch	Bharuch	8.50	7.22	8.10	7.43	8.20	7.72	-	-	-	
Besan	Bharuch	Bharuch	10.50	9.60	10.41	9.91	10.67	10.12	-	-	-	
Tralsa	Bharuch	Bharuch	14.00	12.95	14.48	13.57	15.07	13.84	-	16.65	-	
Nahipur	Bharuch	Bharuch	9.60	8.32	10.40	8.55	9.98	8.73	-	11.40	15.20	
Nand	Bharuch	Bharuch	23.80	21.22	23.18	21.29	23.34	21.63	-	22.40	24.35	
Shuklatirth	Bharuch	Bharuch	9.20	6.52	9.29	8.14	9.75	8.21	-	9.50	10.90	
Bharuch	Bharuch	Bharuch	7.05	6.55	7.15	7.20	8.08	8.23	-	-	-	
Kishnad	Bharuch	Bharuch	23.03	23.00	22.46	22.75	23.57	23.10	-	-	-	
Sambha	Jambusar	Bharuch	6.48	2.68	4.44	3.48	4.46	3.96	-	-	-	
Devla	Jambusar	Bharuch										
Mangrol	Amod	Bharuch	3.40	2.82	3.73	3.81	4.18	4.22	-	-	-	
Nahier	Amod	Bharuch	9.82	9.03	9.58	9.69	10.14	9.87	10.70	-	11.80	
Gandhar	Vagra	Bharuch	5.50	5.30	5.93	5.49	6.51	5.81	-	-	6.82	
Kadodara	Vagra	Bharuch	3.55	2.71	3.91	3.67	3.83	3.40	-	-	5.07	

contd



1	2	3	4	5	6	7	8	9	10	11	12	13
Luwara	Vagra	Bharuch	8.40	5.75	6.13	5.65	5.88	5.89	6.95	6.63	7.83	
Atali	Vagra	Bharuch	5.65	4.90	6.00	5.65	6.00	5.88	-	-	-	
Chandpura	Jambusar	Bharuch	3.95	3.90	4.78	4.60	5.01	5.68	-	-	-	

*Annexure B*

Crop	5 years' average 1969/70 – 1973/74
Paddy HYV/6+Irr.	2845
Paddy Av/6+Irr.	2189
Wheat HYV/6+Irr.	2489
Wheat Av/6+Irr.	2379
Bajra HYV/3-5 Irr.	1861
Bajra Av/3-5 Irr.	1843
Tobacco HYV/6+Irr.	1994
Tobacco Av/6+Irr.	2337
Cotton HYV/6+Irr.	1312
Cotton Av/6+Irr.	1308
Groundnut Av/6+Irr.	1456

HYV High Yielding Varieties.

Av All Varieties.

Irr. Irrigation.

Source Crop Cutting Experiments – Retabulations.

## Chapter 5

# Sustainable development: The problem of project displaced persons

P.G. MENON

Even the good intentions of the Government to promote 'development' are resulting in consequences perceived as unjust and intolerable by millions of the very people who are supposed to benefit. This paper focuses on the serious and under-rated danger posed by the growing disaffection of the PDPs (Project Displaced Persons), i.e. those whose lands are acquired for the factories, mines and dams that current models of economic development postulate. This issue of PDPs is getting increasingly confrontational and politicized, and confused. Impartial study is required. In order to provide a starting point, this paper briefly gives the background, and the current perceptions, beliefs and attitudes of the various important opposed role-players; it then lists a suggested agenda for discussion.

### **The background**

- (a) There are already 10 million PDPs, and there will be another 5 million if just half the proposals awaiting the EIA clearance of the Ministry of Environment are approved. These are claimed to be conservative estimates from reliable sources. So they merit study.
- (b) PDPs create increasing pressure on the cities. There are 2.3 million migrants in Delhi, and increasing by 4,00,000 per annum. 70 per cent of Delhi's unemployed come from the neighbouring

states. They are more the consequence of single-criterion development than of the Baby Boom.

(c) Varieties of injustice continue to be suffered: people are not informed in time that they will be ousted; they are not given a proper hearing; 'public interest' is defined by the potential beneficiary; PDPs are rarely compensated fairly, or in time; many receive nothing, being officially landless since traditional common lands were alienated in the last century through laws initiated by the British. Some continue to believe that they have property rights; only 30 per cent of the PDPs have yet been rehabilitated, and even they are generally worse off than before; many PDPs have fallen from self-employment into bonded labour; the psychological and social costs of being uprooted are heavy.

(d) Their feeling of injustice leads to alienation from a system in which the costs of development are 'charged' disproportionately to them while the benefits go disproportionately to others, many of whom were better off to begin with. The 'trickle-down' effect' did not, as was expected, accompany the process of development.

(e) The PDPs have suffered economically, socially, culturally. These costs were not calculated, and hence not known to management, etc. Classical economics omits these costs ('negative externalities') as being irrelevant. So the NGOs are right in querying Government statistics claiming great improvements.

(f) The PDPs and potential PDPs are being helped to organize themselves against 'developers'. They are becoming increasingly violent. A collective and continuing sense of being wronged is more conducive to revolt than apparently poor economic conditions per se. Executives located in rural areas are increasingly at risk. Managements therefore need to understand the PDPs' point of view.

### **The perceptions of the PDPs**

Even the Union and State Governments are often perceived by large sections of the masses not as genuine representatives of the people and custodians of Common Property Resources (CPR), but as callous step-parents or exploitative zamindars. Consider the following:

(a) Some State Governments have argued in court that, traditionally, tribals never had property rights. Emperor Ashoka

held the same opinion, even after his post-Kalinga remorse. 50 million of the world's 3,000 million tribals live in India, generally in backward areas. Government offers to industry incentives to 'develop' such areas, and industry creates PDPs because they rarely have systems for training up the 'sons of the soil'.

Adivasi means 'original inhabitants' yet they continue to be generally governed, even after Independence, by the Forest Laws enacted by the British to wrest control of the Common Lands in India. Our Government continues this thrust to further 'enclose the commons'. These have declined from about 80 per cent of the total land a century ago to about 10 per cent now. There is increasing opposition, and several State Governments are planning to arm their Forest Guards. This is 'armament for development'!

(b) The 44th Amendment to the Constitution was meant to deprive the erstwhile Maharajas of their privy purses, by abolishing the fundamental right to property. In the name of progress, it now swells the number of oustees, of bonded labour and of those below the poverty line. Is this progress towards perdition?

(c) The Land Acquisition Act, as amended in 1984, permits the public sector itself to do the acquiring, in the public interest, and the private sector to do so through the Government. Hence they can avoid paying the market price. Those whose lands are thus 'forcibly' bought regard this as no better than officially supported robbery.

(d) The law/process for land-acquisition flouts two basic principles of natural justice: one, prior to the acquisition, there is no discussion with those who will be adversely affected. This flouts the principle: The other party has a right to be heard. ('Audi Alterum Partem'). Two, it is the acquirer who unilaterally defines what 'public interest' is. This flouts another principle: 'No one shall be a judge in his own cause' ('Nemo iudex in causa sua').

In practice, operational decisions regarding which land to acquire, how much, and when, are de facto taken by comparatively junior officers. 'Quis custodes ipsos custodiet?' (Who will guard the guardians?). One answer to this question is: Once industry has become enlightened regarding its long-term self-interest, it will be prepared to consider the locals as potential partners. We trainers can then offer them much that is specific.

(e) There is need for national-level legislation to regulate

displacement etc. The Maharashtra Project Affected Persons' Rehabilitation Act, 1986 still awaits the President's assent. It merits our deep study.

### **The manager's/administrator's viewpoint**

Since the mid-sixties, I have taught Time Management techniques that reduced the typical time-span for land acquisition from 2 years to 6 months, and also reduced the effort. Yet I was not aware till recently of the magnitude of the PDP problem. Most managements still are not. Hence even in the case of decent organizations, social justice is not included in the tasks currently laid down for those operationally responsible for project management, whether of a factory, mine or dam. The main pressure on the personnel is to complete the project quickly, because of the increasing emphasis on the costs of each day's delay. This is claimed to be Rs 2 crore (to the economy), in the case of a 200 mw power plant. A conscientious manager will err on the side of acquiring more, not less, land and of acquiring it sooner than later, especially if his organization will pay less than the market price.

His focus then shifts to other internal priorities. Even the public sector, for economic reasons, has dropped the social concept of 'Greenfields Development'. A 1987 Parliamentary Group on Cost-Effectiveness suggested 'freezing' the social responsibilities of the public sector. Hence PDPs get ignored unless they make trouble; and so they do. But confrontation is self-aggravating. For project personnel may see themselves as helpless victims of the system, but never as gleeful oppressors. If social justice is the 'mission' of an NGO, it should seek training in assertiveness management and in negotiation skills, so that it can learn how to attack issues without attacking the current opponent and potential partner.

As for managements, only top management can institutionalize rehabilitation as an important organizational goal. (Some have already institutionalized social audit, which is more difficult, and present it in their annual reports). Managements would benefit greatly by attending the kind of programme described under Item 7. They would get the information they need to re-examine traditional beliefs, such as:

- The facts are exaggerated.
- The situation is not serious enough to bother about.

- History proves that displacement and sacrifice are unavoidable for economic development.
- The business of business is business; besides, rehabilitation is Government's responsibility.

The typical manager committed to his profession develops a mind-set that makes him sceptical about a win-win scenario being feasible. Hence he does not try to develop one, although many rural people would welcome an opportunity to change their way of life for something they consider better. Hence they should be treated not as the 'child' in TA (Transactional Analysis), nor as adversaries, but as 'customers' in the marketing sense of 'The customer is always right'.

The trade unions, as part of their social responsibilities, are increasingly promoting TU Rural Cooperatives, etc. But they have yet to consider how gainful vocational training can be imparted as an intrinsic part of planned rehabilitation. The TUs could also help ensure that the social impact is impartially studied before a project is approved, and that 'public interest' is not unilaterally determined by the interested parties in camera, along with what form and quantum of compensation would be fair.

The elected representatives could play a major role in working out action-plans to harmonize the interests of all concerned.

### **What next**

A 'round table' structured somewhat like a committee meeting with an agenda is being held in Delhi. Its coverage:

- (a) To produce something akin to a 'White Paper' which impartially delineates the dimensions of the problem.
- (b) To quantify sector-wise. How many people have been, and will be, evicted industry-wise, region-wise, etc.? How many flee because of industrial pollution of their water, etc.?
- (c) To consider the extent to which such displacement is manageable by planning in terms of development alternatives that are humanistic and ecologically supportive, such as the 'Technology Nursery' model of the Association of Scientific Workers of India.
- (d) To evolve an acceptable methodology for assessing the social impact of any new project. (Is the BIS methodology for evolving national standards appropriate?)

(e) To determine a more generally acceptable system for defining 'public interest'; and to determine what amount of human displacement and use of non-renewable resources could genuinely be in the long-term national interest.

(f) To re-cost various common property resources.

(g) To determine what criteria to apply when determining what kinds/amounts of compensation would be fair and appropriate for different circumstances.

(h) To learn from certain case-experiences, so that managers, etc. can contribute to the national-level legislation (and incentives) that is required.

(i) Since oustees' compensation provides opportunities for escape from undesired traditional occupations, to devise training systems relevant to the projects, and acceptable to the project-affected persons.

This kind of approach would enable all concerned to support the Government's advocacy of human rights; of social justice; of more self-determination at the grassroots level, of disarmament and development, and of the existence of a moral basis that cannot be ignored when dealing with and between human beings.



## Chapter 6

# Synthesis of the discussion on sustainable development

G.A. TADAS

There was a general feeling that the damage caused to environment has been irreparable. Man through centuries has been exploiting nature callously for his selfish purposes. The process of environmental degradation accelerated especially with the advent of industrialization, as a mechanism for speeding up economic development. The last few decades have in fact seen unprecedented deterioration in the environment. It was added that the capitalist mode of production, built on the foundation of profit maximization principle and consumers' supremacy in deciding type of produce, has produced a system of production which is highly centralized and pollutant in nature. The concentration of industries and the resultant urbanization have brought with them problems relating to sanitation, housing, congestion, transportation, health care, drinking water pollution, etc. to mention a few. The effects of pollution on environment were especially highlighted. The depletion of ozone layer and the resultant greenhouse effect received much attention. Concern over changes in atmosphere and its effects as a result of depletion of ozone layer was voiced. Apart from industries, inadequate sanitation facilities in the urban centres, the amount of pollution caused by vehicles, especially two-wheelers was brought to the notice.

In addition to industries, developmental projects like irrigation,

thermal power generation, etc. were also said to be responsible for deteriorating environment. There were, however, views that such projects would have to continue considering their importance from the point of view of development and energy needs.

What could be done, it was added, is to check degradation due to such projects. It was pointed out that pollution due to thermal power plants could be checked through the mechanism of electrostatic precipitators, properly scrubbing exhaust fumes, etc. The deforestation effects and displacement of people due to such projects were pointed out. The proposals of setting up thermal power stations in hilly and forest tracks of Western Ghats and other scenic ranges in the country received much criticism.

The population pressure was pointed out as one of the main reasons for deforestation and the resultant environmental degradation. Conversion of forest land into agricultural and habitation land was highlighted in this regard. With irrigation land use pattern has undergone undesirable changes. In states like Maharashtra, the whole track of land is used for sugarcane cultivation after irrigation facilities were extended. The forest cover has been declining year after year. There was a suggestion that fossil fuel be replaced by efficient alternative sources of energy. It was viewed that the use of chuhla would increase efficiency significantly. In addition, the possibility of kerosene replacing fossil fuel was discussed. Since kerosene has to be imported and in view of large-scale foreign exchange requirements involved, this proposal was felt to be unfeasible. Use of dry leaves and other forest wastes for generation of biogas was also thought to be an alternative. However, it was pointed out that government policy allows generation of biogas only from animal waste and not from forest waste. Felling of trees, merciless exploitation of forest resources, and improper land utilization pattern were all attributed to the selfish motives of man ignoring his duties towards maintaining nature intact. The political and group interests have not allowed effective implementation of policies to check deforestation, concentration of industries, etc. It was felt that there has been lack of awareness about the need to maintain healthy environment and that human activities have been led by misconceived motivations.

Poverty was pointed out as one of the major factors adding to

environmental degradation. The abject poverty motivates people to resort to any means of livelihood and nature has often been the victim of such means. It was felt that poverty is one of the greatest pollutants. Inadequate provision of basic needs to the poor was pointed out as the main factor bringing compulsions on them to resort to a way of life often detrimental to the environment around. Population explosion was considered as a major factor intensifying the problem of poverty. A close nexus between population growth and poverty was brought to the notice, and it was felt that poor people would generally prefer to have more children as they are considered as assets for them. The need to break this vicious circle was strongly felt, and called for effective policies and programmes to check population growth. There were views that the infrastructure available in regard to population growth control like family planning has not been effectively utilized.

The environmental degradation continues unabated despite government policies to prevent it. It was brought to notice that existing guidelines, rules and regulations are clear. As per the rules no forest land would be given for industrial development and for agriculture. No projects, whether public or private sector, would be undertaken without the formal approval of the Ministry of Environment. Guidelines also exist in case of rehabilitation of project displaced persons. However, it was pointed out that there has been poor implementation of rules and regulations. Group and political interests frustrate the effective implementation of government policies. In addition, absence of competent machinery to implement and coordinate policies was highlighted. However, inadequacies in regard to effective pricing of wood and forest-based produce, and subsidies and other incentives to encourage afforestation were brought to the notice. Low wood prices discourage private individuals to grow commercial plants. Referring to the prevalence of undesired land utilization pattern, a need for national land use policy was felt. In this regard, recent developments like division of land into different agro-climatic zones was, however, brought to the notice. More than policies, proper awareness among the people was felt necessary. Enforcement of laws would be difficult in the absence of such an awareness. Need for a national manpower development policy was also stressed.

The role of non-governmental organizations and private

individuals was felt important in bringing about awareness among people about the need to maintain healthy environment. The services of private bodies, though costlier, would be more effective, and would be an efficient substitute for government machinery. The plantation programmes should be allowed to be handled by these non-governmental bodies. It was, however, pointed out that government policies surprisingly do not allow private agencies to plant trees. The role of industrial plantation was stressed.

Considering the importance of forests in maintaining environmental stability, the continuing deforestation was seen as an unhealthy finding. There was a call for afforestation on a large scale. The role played by social forestry in the past was appreciated and schemes to encourage it further were called for. Concern was expressed over the decay of community forests, which once occupied a prominent place in the country. The notion that forests were considered as a life support system by our ancestors is also withering away, it was added. A check on deforestation was considered essential, in addition to afforestation measures. The need to have sound data base on different aspects of environment was stressed. This would avoid ambiguities about the magnitude of deforestation, land degradation, pollution, and would also help increase awareness about the environment. It was opined that environmental issues (resource use, capital use, effects of pollution, etc.) should get reflected in National Accounts Statistics. It was pointed out that there should be prudent use of forest resources, and that industries based on forest wood could economize its use on a large scale. An example of match box industry was quoted wherein it was brought to light that through a slight modification in the manufacture of matchsticks and match box, enormous quantity of wood could be saved. Such improvements in manufacturing would not only reduce the cost of production but they would also prevent deforestation. It was urged that such projects should be encouraged by the government. The support received from World Wildlife Fund in regard to such projects was brought to the notice. There was a general feeling that projects causing damage to the environment should not be approved by the government. It was brought to the notice that Ministry of Environment is taking care of this and that every project would have to undergo rigorous guidelines set by it. But, it was observed that confrontation between the Ministry of

Environment and other bodies should be avoided while assessing the environmental effects of a project. There should be a coordinated strategy.

It was pointed out that there is a need to have a forest coverage of 100 million hectares. As against this, the coverage is only around 46 per cent at present. In view of resource crunch with the government, it was felt that large-scale initiation should have to come from industrialists, private bodies etc. This points to the need to have afforestation on commercial basis to some extent. Formulation of proper schemes to encourage and coordinate the activities of industries, commercial and other non-governmental organizations was stressed. The role of financial institutions in lending support to the private organizations in afforestation programmes was felt crucial. It was brought to the notice that Ministry of Environment has set up an expert group to coordinate different actors in the afforestation programme – industrialists, non-governmental organizations and financial institutions.

The merciless use of land for agricultural purposes was criticized and the concern over the damage caused to the land through such actions of man was expressed. It was brought to the notice that nearly 125 million hectares of land is degraded, and reclamation of such land on an urgent basis was felt essential. There was a view that 25 million hectares of degraded forest land should be allowed a natural regeneration. Mining activities in hilly tracts should be abandoned. Prevention of soil erosion, waterlogging was considered very crucial to check land degradation. The irrigation projects would be designed in such a way that problems of waterlogging and salinity could be overcome and the damage to the land avoided. There was a discussion on ways/techniques to restore degraded land. It was brought to the notice that different suggestions have come forth in this regard and that experiments are still on. It was, however, observed that there exists a considerable gap between the outcomes of such experiments and their application to land reclamation.

With the available technology it was felt that waste and barren land could effectively be converted into useful land. Any land reclamation programme has huge financial implications. Though the Eighth Five-Year Plan is providing for a massive coverage of land for reclamation, it was felt that additional efforts needed to be

made in this regard. The idea of Super Fund was appreciated, but there were views that the proposed Rs 3000 crore under the Fund would be insufficient considering the large-scale land reclamation needed. It was, however, brought to the notice that Super Fund is not a substitute for existing funds or allocation within the Plan framework. The purpose of the Fund is to restore degraded land, cleaning up of rivers, and purification of air. The idea of Super Fund is appreciated internationally, and support in terms of financial assistance is coming forth. The need to have sound technical personnel to handle the Fund was stressed.

Looking at the pace at which environmental degradation is taking place, it was observed that the existing framework of policies and programmes would be ineffective in restoring or even halting it. There was a feeling that the present obsession with growth-oriented strategy has side-tracked issues relating to environment, equitable distribution of wealth, desirable mode of production and type of products. It is not the level of growth, but what constitutes growth which is very important. There were views that growth-oriented strategy be dethroned and that it should be derived from the objectives of poverty alleviation, employment creation, minimum needs provision, equitable distribution of wealth, etc. The tendency to equate growth with development was criticized, and it was viewed that development should be interpreted to mean as 'manned development with social justice'. The notion that higher growth at the aggregate level, based on industrialization in a few urban centres, would also percolate down to the masses (and the remote areas) has hardly been a reality. The 'trickle-down' theory has not worked, it was added. Instead, such a strategy has often led to growing disparities and imbalance.

While the obsession with growth-oriented strategy was deplored, there was a view that growth is also equally important for increasing national wealth. Unless there is significant growth, and an increase in wealth, policies aimed at equitable distribution of income, provision of basic needs, etc. would be ineffective. It was, however, felt that growth should not be equated with development, though it is one of the pre-requisites for development. The recent attempts to incorporate issues relating to poverty alleviation, employment generation, provision of basic needs, equitable distribution of income, etc. having a direct bearing on the welfare of

the poor people, on a priority basis within the framework of Plan were brought to light. It was felt that planned development should take into account all the interlinkages involved in the process of development. The improvement in the welfare of the masses and maintaining a healthy environment must receive priority.

There was a feeling that development is not without some cost. There will be depletion of resources, and some damage to the environment. There appears to be a trade-off between development and environment. However, it was also felt that there is enormous scope for economizing on the use of resources, and reducing the potential damage to the environment due to developmental projects. Need for a radical restructuring of planning, incorporating some of the Gandhian elements, was stressed. The choice of techniques of production was considered very important, and it was felt that there should be energy saving, less capital intensive and less input using modes of production. Development must be accompanied by safeguards to environment.

The importance of education was highlighted. With proper education, awareness about how to utilize resources, causing little damage to environment, would increase, it was felt. The need for increasing investment on such services as education and health was stressed. The present magnitude of resource flows to the development of education and health was considered meagre. The emphasis still appears to have been on industrialization and other developmental projects. Even the issues of environment have not received as much weightage as they should have, considering the increasing pace of environmental degradation. It was felt that no development can be sustainable unless at least the existing resources are preserved intact and environment unaffected.



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