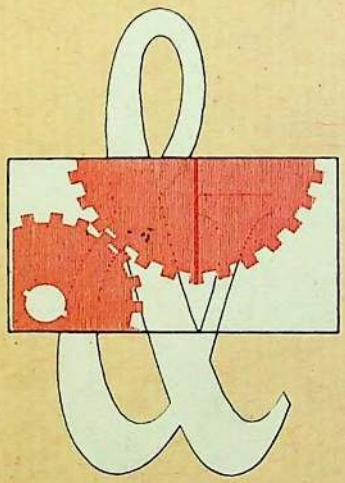
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Plant Trees for Shade, Preserve Water for Life

environment



development

A Sub-Regional Perspective

AN KPA
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Asian Cultural Forum on Development

"Save the environment for the future generations" or *"Plant trees for your children"* is a slogan which is very common to-day in most of the countries of the world. Of late, environment has become an issue of common concern due to severe environmental degradation often arising out of various so-called development programmes. In the relation of environment and development, harmony is the need but conflict is often the outcome. Deforestation and desertification, global warming and destruction of ozone layer, various types of pollution and displacement of human population have continued - due to increasing use of natural resources, to meet the growing demand of human population, industrialization and urbanization. But perhaps a time has come, when we can no longer ignore the environmental and social costs any more in the context of development.

ACFOD's Environment and Sustainable Development Programme is trying to tackle these challenges involving more and more people and groups. The present volume is the outcome of papers presented in a workshop, where the problem of environment and its relation with development have been examined with case studies covering different issues in the context of South Asia. Even though some of the observations and findings are based on the countries of South Asia, perhaps most of the observations are also equally applicable to many other countries of the world.

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ENVIRONMENT

AND

DEVELOPMENT

A Sub-Regional Perspective

Proceedings of a Workshop organised by

ADAB (Bangladesh),

INODEP-ASIA

and ACFOD

Bangkok 1991

ENVIRONMENT AND DEVELOPMENT

- A Sub-Regional Perspective

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Foreword

"Plant Trees for Shade, Preserve Water for Life" are the common messages, well rooted in our Rural Asian Cultural tradition.

Slogan for development in the Sixties accompanied by aid and modernization policies have eroded that tradition drastically. Population growth has undoubtedly created pressure on the earth. But testing of war weapons and transnationalisation of profit motive have cost nature the most.

For last two decades the affected communities and NGOs as support groups in alliance with academics, researchers and journalists have been actively campaigning against this senseless slaughtering of the earth. Success has been significant but not enough. Throughout the world, campaigns and consultations have been built around the forthcoming Earth Summit to be held in Rio in June 1992. But our movement must continue.

The last ACFOD Council meeting mandated that environmental concerns must be integrated in ACFOD program activities and we should be able to join hands with many others. The South Asia workshop was jointly organised by ADAB, INODEP-Asia and ACFOD in that spirit. We are well aware of the fact that people at the base have the experiences and can offer the most in facing the challenges. ACFOD has initiated a program on environmental education based on peoples experiences and cultural traditions.

This publication, though it emphasises South Asia perspectives, we are sure has a message in common with other regions. If this Report helps establish communication with similar efforts in Asia and the World at large, we will consider that our efforts have been worthwhile.

M. Abdus Sabur

Bangkok, February 1992

ENVIRONMENT AND DEVELOPMENT: CONFLICT AND HARMONY

Some Alarming Situations

Deforestation:- 1.8 million hectares of tropical forests each year, 5,000 hectares per day, 208 hectares per hour, 4 hectares per minute -- Affecting 90% of the species in the world and creating environmental problems -- 25 billion tons of top soil lost each year and also contributing to Desertification.

Displacement:- Large scale displacement of indigenous population creating considerable socio-economic problem who are generally not the major beneficiaries of the development programmes.

Global warming/destruction of ozone layer and green house effect:- The water level in the sea may go up with rise in temperature in the polar region and parts of many countries may go under water -- One report suggests that the densely populated countries in South Asia like Bangladesh or many cities like London or Amsterdam or Calcutta may go under water.

Wastes and Refuses:- Common in all cities and towns -- Bangkok producing 5,000 tons every day and Thailand's production of hazardous waste may reach 6 million tons by 2001 -- Serious environmental pollution.

Pollution:- Air, noise and particularly chemical pollution -3rd world countries use 20% of global pesticides but have 50% of world pesticides poisoning and 80-90% of world pesticides related death -- Its use along with chemical fertilizer also makes fertile agricultural fields barren.

Reasons

Increasing use of natural resources -- Various demands and requirements particularly in the developed countries -- In fact, one individual in the developed country can do more harm to environment than 100 individuals in a less developed country due to habit, need and requirements -- Short term development policies in developing countries aimed at generating quick revenue and profits (often due to external debts) resulting more intensive use of natural resources without critically examining the future consequences.

Goal

Protection of atmosphere, land and fresh water resources -- Conservation of biological diversity -- Environmentally sound management of biotechnology and hazardous wastes.

Approach

Change of life-style, particularly in the developed countries -- Boycott all products made from tropical hardwoods -- Critically examine the environmental and social costs of each programme or project -- To increase the use of objects for which recycling is possible.

Introduction

This workshop brought together NGOs from Nepal, Bangladesh and India to explore ways and means to integrate a range of vital environmental concerns with the development process. The NGOs in South-Asia are largely working with the poor and dispossessed who bear the brunt of the effects of environmental degradation. It is clear today that mainstream development processes will have to be critically analyzed and substantially altered if the planet earth is to survive much longer with a sound and healthy environment. NGOs all over South-Asia have for sometime been actively concerned with environmental and social justice issues. A periodic sharing of insights and action strategies between these NGOs will go a long way to strengthen the grass-root activities meant to combat these problems. It is in this spirit that the workshop in Bangladesh was organized jointly by ADAB, Dhaka, INODEP-Asia, and ACFOD from October 9-13, 1990.

The socio-economic environment of the post-second world war period was characterized by the incredible economic recovery of Europe and Japan, and the newly independent countries had inherited an economy shattered by colonial exploitation which had already depleted the natural resources, destroyed the village and cottage industries and disrupted the local habitat/environment relationship. Basically there were two/three models in front of them to follow. The western capitalistic model with its emphasis on heavy capital investment with free-market operation and aided by science and technology. The Soviet model of command economy with heavy emphasis on industrialization, ruthlessly generating surplus from the Agricultural sector. The Chinese model where at least during the initial stages a conscious attempt was made to develop a development strategy considering its own specific socio-economic environment. China's industrialization was characterized by the combination of light and heavy industries, though there was centralization, much emphasis was given to regional planning using local resources for local needs, and development of communes.

To Gandhi the basis of economic development was "village" republics and village self-sufficiency. For him production and consumption should be as local as possible using local resources. The kernel of Gandhian planning was: "the first concern of every village will be to grow its own food crops and cloth". In decentralized "village republics" organized under the concept of village self-sufficiency, Gandhi perceived the solution of India's employment and poverty. Gandhi's perception and prescription of India's problem is vindicated by later day problems faced by Indian economy and polity. But after Gandhi's disappearance from the scene there was a sudden reversal of priorities. For Nehru "the test of real strength is how much steel you produce, how much power you produce and use". In the model formulated by Prof. P C Mahalanobis, the basic tenets are: "primary thrust on a concentration of resources in sectors such as steel, power and the like..." In this way they aimed at solving India's problems of unemployment and poverty.

What are the characteristics of the last 40 years of "Development" strategy? There is enough official data (partly true) to point out the impressive growth of the economy viz: Increase in Gross National Product (GNP) or per capita income, increase in growth in output of oil, coal, electricity, steel, cement, fertilizers and one of the better transportation and telecommunication networks in the third world. In industrial and technological power, India ranks among the first ten nations. But in what way do these impressive abstractions mitigate the problems of poverty and unemployment, which is the lot of millions of the poor?

In all South-Asian countries, the rural development strategy has contributed in destroying the village Agro-ecosystem and plundered its natural resources at the dictates of the urban market. The villages have traditionally been integrated entities with integrated lands, agricultural fields, forests, groves, water reserves and so on. The highly intense capital/resource strategy has destroyed this integrated system. The common property/natural resource base has been systematically destroyed, this has pauperized the vast section of the rural population. Similarly, the urban development is only serving the upper strata of the society. The urban system is increasingly becoming unmanageable with pollution, housing problem, inadequate transportation, water scarcity and increasing tensions

among different sections of the population. The urban system is crumbling in spite of the high cost of investments. The increasing exploitation and destruction of the rural agro system force the local inhabitants to migrate to cities in search of livelihood which again creates pressures on the already crumbling urban system. The Agriculture integrated village eco-system earlier provided fuel, food, fodder, soil enrichment, building materials etc., for the local inhabitants which have been progressively destroyed by the perverse resources utilization strategy which primarily benefits the industry. To planners "underdevelopment" was essentially a consequence of insufficient technological progress and the key to progress was western industrialization.

The technocratic development (heavy capitalization/low labour intensity) has totalised the market, penetrated and destroyed old subsistence economies and their survival mechanism and increasingly marginalised the poor.

Regenerating village agro-ecosystem becomes all the more important given the low potential of employment generating capacity of industrialization with its heavy environmental costs.

Massive investment in the manufacturing sectors is not able to generate employment in agriculture sector. In all South-Asian countries, though there is increase in employment. there is no corresponding increase/(absorption) in employment in the Agricultural sector. Adverse terms of trade between urban and rural sector in the long run disrupts the village eco-systems.

Amritanand Das sums up the development strategy of South Asia as follows: "the desirability of replacing labour intensity by capital intensity, local markets by world markets and rural habitats by urban ones". Only a drastic reversal of priorities could rescue us from this predicament. The workshop was an effort to examine some of the above mentioned issues.

The workshop was held in Bangladesh where one of the worst floods of this century took place. Basically, the floods are a result of perverse development followed in the region. Recent floods coming the wake of 1985 cyclone and 1987 floods have severely

damaged the Bangladesh economy. A joint Bangladesh U.N study had predicted and cautioned the Government for necessary precautions for similar catastrophe in 1989. The recent floods affected 85% of Bangladesh (area) and affected 45 million people – damaging and destroying 2.5 million tons of grain and 172,000 head of cattle and 2 million hectares of crops.

Lack of ecological concerns and deforestation in the Himalayas are the major reasons for this calamity. Deforestation in the Himalayas (farming on marginal lands, fuel wood, commercial cultivation) increases the soil erosion and the water carries top soil into rivers, raising the river bed and contribute significantly to the recurrence of floods.

Given the low lying topography of Bangladesh, most of the rainfall and snow of the Himalayas drains into the Bay of Bengal through it. The Ganges from the North and Brahmaputra from the South also drains a large portion of water from the Himalayas into the Bay of Bengal. The problem could only be solved at the regional level by restoring the eco-system of the entire Himalayas, which needs the combined effort from Nepal, Bangladesh, Bhutan, and India.

The participants at the workshop felt the need of NGOs in this region to network and coordinate their efforts. The problem of Himalayan drainage system can only be solved if the NGOs express solidarity and pressurize their governments to act in a concerted manner leaving aside all ulterior motives. As part of the follow up of this workshop it was proposed to identify activists in this region and bring them together to facilitate joint action and reflection.

Most of the participants benefited immensely from the experience of the friends from Bangladesh in the areas of social forestry and organic farming. The roadside tree planting programme and its benefits to the rural poor was a particularly significant programme which Nepal and India could emulate.

The Nepali participants brought in a wealth of detail and analysis which clarified the peculiarities of the Himalayan ecosystem. With

the democratization of the political process in Nepal, we can now look forward to this knowledge being widely disseminated among the large number of activists and NGOs in that country.

This workshop would not have materialized were it not for the unstinted cooperation and goodwill of a number of people from Bangladesh. Ruby Quadir and Nayeem Wahra (from ADAB), Ataur Rahman, Dr. Atiq Rahman and Quasi Faruque Ahmad are only some of the names. Ruby Quadir needs a special word of thanks for her unlimited energy and enthusiasm without which this workshop might not have succeeded. I would also like to thank the Director and staff of ADAB for their support and cooperation. From far away Bangkok Abdus Sabur (ACFOD) played a key role in getting the workshop off the ground. And lastly, I must thank my own colleague Mahesh Lobo for all the logistical support that he gave.

Seminal ideas for this workshop came from a paper written by Babu P (of ICRA, Bangalore). Dr. Atiq Rahman's visit to Bangalore for discussions and his sharp insights were also of immense help. Dr. Badal Sengupta (from EZE, Bonn) was a source of great inspiration from the very beginning and his support was crucial in several ways.

Finally I must thank Dr. D R Nagaraj for putting these papers into shape and helping to bring out this publication. In this he was ably assisted by Dr. Chandra Shekhara Sastri, Promod John and Edwin. Once again I thank all of them.

- Siddhartha

25th November 1991, Bangalore.

A Brief On The Workshop

A. Atiq Rahaman[*]

There is a growing global concern that the three regions in the world of today which are facing major and severe environmental degradation and consequent devastation are:

(a) The African drought prone areas
(b) The Himalayan Gangetic region and
(c) The Amazonia.

The first two have often been described as drifting into a "situation of super crisis and collapse."

The costs of the on-going relief action in Africa, and the attempts to avert future recurrences, are enormous. And these are merely the material costs; those relating to the large-scale human misery are unquantifiable and unthinkable. Terrible as this African tragedy undoubtedly is, if the many supporters of the Theory of Himalayan Environmental Degradation (as discussed in the book "Himalayan Dilemma") are proven correct over the next several decades, then the new world-scale super-crises, in which the Himalayan region will have become enmeshed, will be much more severe. This evaluation is based simply upon consideration of the much larger numbers of people who will be involved, since the densely populated plains of the Ganges, Brahmaputra, Indus, upper Jinsha Jiang (Yangtze), and other major rivers are tied to the mountains by a welter of physical and human processes, both actual and perceived.

3. Geologically, the Himalayas are the youngest mountains, the Brahmaputra-Gangetic Delta continues to be in a state of formation. In a geological time-scale the dynamic natural processes are continuing, but human

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* *A. Atiq Rahman, Director, Bangladesh Center for Advanced Studies, Dhaka, Bangladesh.*

interventions have often modified the natural systems, sometimes irreversibly.

4. Severe deforestation, soil erosion and land degradation, intense and recurrent flooding characterize the intensity of the problems. Once deforestation has taken place the soil on the hill-slope is exposed to the impact of the rainfall. The impact of global climatic change is likely to further destabilize the climate and evapotransportation behavior in this region which is dominated by the monsoon climate. This will complicate the problems and intensify the degradation further. The causal relationships and inter-linkages of events and phenomena are well appreciated but the science and evidence is far from being resolved. These are often shrouded in truths, semi-truths and myths. Despite all the uncertainties there is no doubt that the vast multitude of the population of the Himalayan Drainage system covering the whole or parts of Bangladesh, Bhutan, China, India and Nepal are faced with grave environmental consequences. The poor are the most affected now. They are also more likely to be affected in the future as they are certain to continue to depend on the land and the water, the resources most affected by environmental degradation.

It is true that there are no quick fixes or simple solutions of the problems of the Himalayan Drainage Ecosystem but peoples' action, properly directed and coordinated, can make a difference even within the present limits of the uncertainty in the science as the problems are really severe and demand urgent action.

5. The roots of these problems are socio-economic and political though their manifestation may be environmental. And solution in this region to succeed must need to involve the indigenous subsistence farmers who always face the highest risks of any ill-considered or even inevitable human action. There is an urgent need to develop a set of cogent and consistent polices

and programs that are sensitively attuned to and are supportive of these people who are the prime actors at the interface of man-nature relationship on which the region's future depends.

There is probably no unique solution. Multiple solutions will have to be sought and the focus must be the poor of the region.

6. In the countries in the Himalayan Region, particularly, in Bangladesh, India and Nepal the Non Government Organizations (NGOs) have been active in the field of development and more recently on environmental issues, particularly in the delivery of services for reaching the poor who constitute the vast majority of the population.

Against this background, some of the NGOs of the countries in the "Himalayan-Gangetic Region", (also known as the "Himalayan Drainage Ecosystem"), decided to get together and hold a workshop in Dhaka, (Savar), Bangladesh, from 9-13 October 1990 to discuss the environment-development questions of the region. It hopes to arrive at joint programme to contribute to the efforts of sustainable development of this environmentally stressed region.

It enabled NGO workers from several countries in the region to exchange their experiences, discuss people's perceptions and peoples' participation issues in order to develop a coherent and implementable action plan to contribute to the environmentally sound development of the Himalayan drainage ecosystem. They will discuss specific themes and will also undertake field trips to obtain first-hand experience on what is possible, what can be done and what must be done right now.

Environment: A Casualty Of Economic-centered Development
A Case Study Of Bangladesh

Qazi Faruque Ahmed[*]

Some thoughts on issues related to environment and economic growth.

Human history has been a history of human-being's interacting with nature and transforming it to meet their needs. Indeed this is what has set homo sapiens apart from other animals and has produced civilization and culture. But when the predominant form of interaction with environment is prompted by satiating the greed of a few and denying the needs of many then such interaction turn into rapacious aggression in which the environment and people, poor people in particular, are the victims. In today's world such aggression has reached unprecedented levels as can be evidenced from the Bhopal tragedy, Chernobyl disaster, Rhina poisoning, acid rain in Europe and North America, ozone hole in Arctic and greenhouse effect etc. Less dramatic, but no less insidious, is the relentless deforestation, encroaching desert and poisoning of rivers and seas. The dreadful famine in Ethiopia, which has claimed over a million lives is the direct result of massive deforestation; Ethiopia's forests, which covered 40% of the country in 1900 now extends across only 3% of it (Adam 1986). This fact is rarely mentioned by the media, even more rarely mentioned is the fact that deforestation occurred largely due to commercial peanut farming for export to Europe.

In spite of such hard evidence, the countries of the third world, following Western nations, worship the god of economic growth – manifesting itself in holy GNP and GDP. Any talk of environ-

* *Qazi Faruque Ahmed, PROSHIKA, Bangladesh*

mental degradation and its effects on the poor are either brushed aside or explained away by the State's policy makers as 'necessary cost for prosperity', 'benefits to the majority justifies cost to the minority' and 'benefits of economic growth will trickle down to the poor'. Behind this rhetoric, of course, hides the need to legitimize, and even sanctify, the unbridled greed of a few at the cost of many.

Robert Chambers (1987) brings out this bias very clearly when he writes, 'Until recently the debates on environment and development have been dominated by values which reflect the 'first' biases of normal professionalism. These start with things rather than people, the rich rather than poor, men rather than women and number rather than qualities. These bear the imprint of the interests that are urban, industrial and central in location rather than rural, agricultural and peripheral. Poor rural children, women and men have been treated as residual not primary, as terminal problems not starting points'.

These biases of the values of the economic growth model not only place the poor last but also blame them for environmental degradation. The poor are blamed for breeding fast and, therefore, they cause major deforestation and land degradation. But it is important to realize that demographic increase in a particular area is as frequently the result of squeezing a politically weak people out of good land into more marginal land or into smaller area than before, as it is the result of population explosion (Gill 1985). The evictions of the poor and tribals often result from the expansion of commercial agriculture, commercial forestry or construction of big hydroelectric projects, driving the poor up hills, towards desert or into forests, where tree felling for agricultural plots is highly detrimental environmentally (Blaike 1985; Roche 1986).

Although the economic growth biases are clothed in scientific jargon, they are often no more than myths. Let us consider the assumption that wealth created by industrialization and commercialization of agriculture will trickle down through society to bring prosperity to all. Many studies have shown that benefits have not trickled down, as assumed, but on the contrary trickled up and stuck in the upper echelon of the society as if by an invisible magnet.

'Green revolution' experiences from India, Bangladesh and elsewhere show that besides resulting in loss of sustainability and environmental degradation due to use of only chemical fertilizers and insecticides, the green revolution contributes to social polarization as well. Where the green revolution had been successful, landlessness occurred at an accelerating pace. Evidence from the forestry sector also show similar dismal consequences. Jack Westboy, the FAO forestry expert who first advocated forest industry as a creator of wealth for all, has recanted, observing how rural people actually became worse off as a result (Dargavel et al 1985: 14-15).

From the preceding argument it may appear that economic growth is denounced, technological progress is renounced and going back to the past is being advocated. Such foolish implication is not intended. For society's well-being economic growth is needed, but that growth should take into account sustainability and equity as well, and not only private profits for a few. What is questioned is not the technology itself but the choice and direction of its use. In fact, further development and progress of technology is required to do away with the harmful effects of the present day technology.

Now let us examine how narrowly based economic growth policies in agriculture, industry and forestry have contributed to environmental degradation in Bangladesh. The word 'environment' should be looked upon as constituting two interrelated dimensions – physical environment and social environment. Most often the quality and nature of human relationship in the social environment determines the form of its interaction with the physical environment. On the other hand, any effect on physical environment is easily transmitted to social environment. Powerlessness, unequal access to productive resources, and marginalization of the vast majority and privileges of a few characterize social environment in Bangladesh. These factors in the society adversely affect physical environment – land, water, forest etc. and this, in turn, aggravates the already precarious livelihood of the poor, women and the tribal minority. In this article an attempt will be made to see the effects of economic and development polices on environment, both in its physical and social aspect. Attempts will also be made to analyze how degradation of the social environment contribute to degradation in the physical environment and vice versa. Although the effects

on social environment have been relatively well documented by researchers, the same cannot be said about degradation of the physical environment. This is probably because, until recently, the concern of the environmentalist was narrowly based and expressed itself in merely advocating for protection of wild, endangered species. As hard statistical data are difficult to come by, the author has used impressionistic and empirical observations which he was able to gather because of his extensive travel in the countryside of Bangladesh in the last fifteen years as a development worker in a non-governmental organization.

Agriculture development policy and its effects on physical and human environment :

In understanding these effects it will be desirable to take into account the agrarian relations and certain other social and ecological circumstances of Bangladesh. With an area of 144,000 sq. km, Bangladesh is the largest delta in the world. Three mighty rivers – the Padma, Bhramaputra and Meghna, originating from the Himalayas and the hills of Assam run down its plains and fall into the Bay of Bengal. These rivers have made Bangladesh one of the most fertile countries of the world by depositing rich alluvial soil, provided an extensive water transport system and endowed enormous potential for freshwater fishery and irrigation. Every year during the monsoon, the rivers spill over their banks and flood large areas. If the water level is one meter or so then the flood is considered normal and desirable as certain varieties of aman paddy grow exuberantly under that condition. What is considered to be flood is when the water rises 3-4 meters, comes on rather early and recedes later than usual. This kind of flood happens ever 5-6 years and wreaks havoc on life, property and crops. The hilly areas of north-east, south-east and the highland areas of the central regions are immune from these floods. These are also the areas where reserve forests are located. Of course, the Sunderbans, the largest mangrove forest in the world lying in the south western region, is the exception. Bangladesh is often called a big village as almost 80% of its population live in its 86,000 villages. Physically the villages appear as a cluster of houses made of bamboo and straw (well-to-do villagers use tin and timber), surrounded by a variety of trees and separated from other villages by a large expanse

of crop field. In flood prone areas, villages are situated on land raised by digging ponds or canals.

The peasantry in the village is quite well differentiated based on ownership of mostly, land and also other productive assets. This differentiation has concentrated power, privileges and authority in a small minority while making a vast majority powerless and marginalised. 10% of rural households own 51% of agricultural land while 56% are effectively landless. This skewed land ownership pattern expresses itself economically as low wages, rack renting, usurious interest and land mortgaging; socially, as dependence and obsequious clientalism and culturally, as fatalism and resignation.

The agricultural development policies of the last three decades remained oblivious to these realities and sought to increase production by introducing HYV technologies. In this package were included subsidized and imported inputs like fertilizer, insecticide, mechanized irrigation equipment and hybrid seeds. For the acceptance of this technology provision was made for large-scale credit delivery.

Formation of farmers cooperatives is believed to provide the institutional framework for proper and optimal utilization of the inputs. From the point of view of off-take of inputs this strategy has succeeded substantially. Fertilizer consumption has gone up from 0.3 million tons in 1970 to almost 1.3 million tons in 1984-85, an increase of over 400%. The total irrigated area has been increased from 2 million acres in 1972 to 6 million acres in 1984. Credit in agriculture has increased dramatically in recent years. Total outstanding loan to private agriculture rose from TK 1.0 billion in 1977 to TK 22.9 billion in 1985, and new loans rose from TK 1.5 billion to 11.3 billion over the same period (Just Faaland 1986). The question to be asked at this point is if all the inputs have reached more or less equally to all segments of peasantry. All the micro and macro studies, some commissioned by government itself, have shown that the distribution pattern of the inputs has been almost a mirror image of skewed land ownership and social power distribution pattern of rural Bangladesh. A committee, appointed by the government in 1975, reported on the cooperatives:

(i) since membership was restricted, benefits of subsidized inputs reached only the richer land owner;

(ii) by and large, cooperative management was monopolized by rich farmers;

(iii) the cooperatives rendered no assistance to the poor and landless. They in effect, sharpened the disparity between the poor and rich farmers, and even when suited for a 'green revolution' these could not ensure equitable distribution of the social product. (GOBD, 19750, 6, 10)

Similarly, in the assessment of the Planning Commission, "these cooperatives have turned into closed clubs of the Kulaks", and elsewhere, "the entire structure of the IRDP cooperatives seems to have become dominated by rural elite in conspiracy with the urban elite" GOBD, 19774, 11, 4). The following passage from the Hartman and Boyce study (1978) brings home vividly the above macro observations:

Project aid reached our village in the form of a deep tube-well, one of 3,000 installed in north-western Bangladesh in an IDA project. The tube-well designed to produce enough water to irrigate 60 acres of land, is a valuable asset on paper. The tube-well will be used by a farmers cooperative formed especially for the purpose. But in reality, the tube-well in our village was considered the private property of one man, Nafis, the biggest landlord of the area. The irrigation group of which Nafis was supposedly the manager, was in fact no more than a few signatures he had collected on a scrap of paper. Though each tube-well had cost the donors and the government more than $12,000, Nafis paid less than $300 for his, mostly in bribes to local officials. The tube-well sits in the middle of a thirty acre tract of Nafis' best land. Since it will yield enough to irrigate twice the area, Nafis says that he will rent out to the smaller farmers adjacent to his land. But the hourly rate he intends to charge is so high that few of his neighbors are interested.

An evaluation done by Sida (1977) comes to a similar conclusion after examining 270 tube-wells;

> It is not surprising that the tube-wells have been situated on the land of the well-to-do farmers who are the chairmen and managers of the irrigation groups. It would have been more surprising if the tube-wells had not been located on their land, with the existing rural power structure, maintained largely because of the unequal distribution of land.

Thus the conclusion is inevitable that social environment has been further worsened by strengthening the already strong and weakening the already weak and vulnerable.

The degradation of physical environment is also substantial. In spite of the use of different insecticides and their applications in incrementally higher doses, massive pest attacks are quite frequent. In 1985 a savage hespa pest attack came on the boro-irri paddy and it spread quickly in almost all areas of Bangladesh. Massive spraying of all kinds of pesticide was of no avail. Scientific opinion at that time was that the natural enemies of the pest were killed off by the insecticides but not the pest itself which developed resistance because of prolonged use of insecticides. Insecticides are known to kill pollinating insects, earthworms and bacteria which are helpful to the soil and the plant. Needless to say such a process is seriously disturbing the ecological balance. Insecticides are also blamed by fishermen as causing lower availability of fish every year in the open water bodies. This complaint has some merit since the insecticides applied in the paddy field get washed into open water bodies due to normal flooding and insecticides do severely affect hatching of fish eggs.

Chemical fertilizer application has its own dangers. To obtain the same level of output, farmers are required to use higher doses of fertilizers. Fertilizers release iron from the soil which gradually forms a hard crust which makes deep tillage more difficult by bullock driven plough. This is, however, not as bad as the alleged effect chemical fertilizer has on soil in reducing availability of zinc and sulphur. Deficiencies of these two minerals cause the plants to dry up and wilt and yield is severely damaged. A symptom of this problem began to appear in the early 80s and has become quite widespread, so much so that thousands of tons of zinc and sulphur-based fertilizers are now regularly imported. It is a bit

ironic that, while one lot of fertilizers made the zinc and sulphur, already present in the soil, to turn into a form which the plants cannot take; then another set of fertilizers are needed to replenish the damage done by the first.

Another serious land degradation problem is occurring due to a fast decreasing level of organic components in the soil. This is happening largely because:

(a) farmers are not rotating crops as prudently as before;
(b) farmers have almost forgot the practice of putting green manure and compost into their fields;
(c) under the influence of massive propaganda farmers are led to think that chemical fertilizers are the only fertilizers the plants need.

Land degradation is also occurring in other development programs as a consequence of improper planning, negligent administration and bias towards the powerful. In the rural infrastructure building programs, thousands of miles of mud road and embankments have been made. Mostly poor peasants lands get acquired for construction of these roads and embankments and, naturally, the top soil of this land is dug up to provide the earth required to raise the roads and embankments above flood water level. These roads and embankments also prevent normal flood water coming in, which is very much necessary for aman paddy. On the other hand, when a high flood occurs, these roads prevent flood water from receding fast enough, thereby exacerbating the damages of the flood.

Brick manufacturing on paddy lands, near to urban centers for urban construction work is another process for land degradation and deforestation. One can see hundreds of temporary brick-fields coughing up an enormous amount of smoke from the middle of paddy fields. The brick-fields are rented from the farmers and burnt bricks made from the topsoil of the land. After the manufacturing season, the land is returned to the farmers, but by that time the fertility of the land is almost completely destroyed.

The process of deforestation in Bangladesh

In 1947, the forest covered about 26% of the country and now it covers only 15%. The country's forests are located in the south eastern district of Chittagong hill tracts, north eastern district of Mymensingh, south western district of Khulna and in central districts of Dhaka and Tangail. If one makes a journey into these forest areas one can see signs of massive deforestation. Thousands of acres of reserve forest land lie barren without a tree. The only sign that these lands were once part of a forest can be seen from the stumps of the trees that stick out of the ground in a rather ugly way. Why is this deforestation occurring and why at such an accelerating pace? Who is responsible: poor villagers, tribal forest dwellers? A more common and off the cuff explanation given for deforestation is demographic pressures. Such explanation is bound to be partial, verging on 'victim blaming' if it is not viewed in relation to the state's forest policies.

Official forest policies of Bangladesh are the legacy of its colonial past and remain virtually unchanged to this day. Bangladesh has kept the state reservation system which was created during the colonial period. In the name of Scientific management and conservation this policy 'reserved' the forests for urban, commercial and colonial appropriation with the exclusion of traditional and communal rights of forest dwellers to fuel, fodder and other subsistence needs. The management principles developed for Britain's privately owned and largely uninhabited forests created major difficulties when used in the context of inhabited and communally managed forests.

The condition of forest dwellers and rural poor living on the fringes of the forest became more precarious when forest policies' bias towards urban, commercial and industrial interest became more entrenched. There are examples in Bangladesh when forested valleys are flooded and local people evicted to create more hydroelectric power for urban industry or large tracts of forests denuded to serve paper, rayon and brick factories.

In the competition between subsistence users and urban industrial interest, the latter is given more than a helping hand. The obser-

vations made by Kulkarni (1983), Shiva and Bandopadhya (1986), in the context of deforestation in India, largely hold true for Bangladesh as well. In India, industry has been helped most and subsistence users least. The costly task of afforesting degraded land, which ought to have been that of the industrial sector, was dealt to villagers with immediate bio-mass needs, while industry was not only given access to standing productive forests, but in many cases given enormous subsidies as well.

The urban and industrial bias of forest policies allows for only cash-based benefits of the forest to be considered. As a result, the predominant incentive is to cut down trees without any thought for preserving or enhancing them. The dramatic loss of forest cover over the last thirty years shows that the 'sustainable yield' calculations, which guided cutting rates were not only over optimistic, but failed to take into account over-cutting by contractors, and hardship caused to local people (Gadgil et al 1983).

In order to establish its superior claims to forest resources over communal or tribal ownership, a forest department was created by the state. As expected, in the context of urban and commercial bias it soon began to see itself as policing the forest to keep the villagers away. Introduction of fines and permits which almost inevitably accompany state reservation, turned foresters into policemen and villagers into notional thieves (Gill, 1986). This attitude turned villagers' responsible behavior for conservation into negative hostility and a cat and mouses game ensued between the foresters and villagers.

However, all the policing and the wielding of sanctions and controls over the villagers did not make the forest department an efficient custodian. The locus of its power was far removed and it depended upon low paid guards, who often succumb to the temptation of living off of the very resources that they are supposed to be protecting. Subjugation of forests to the commercial needs has been so complete that there is no injustice seen in keeping the villagers and forest dwellers out while letting the contractors in.

Thus, while poor villagers and tribal people are not the main beneficiaries of pillage of forest resources, they are the main victims

of consequent degradation of environment. Their livelihood, health and family are put in jeopardy by flood damage, silted dams, decreases in ground water supplies, reduced rural income and higher migration.

What can NGO's do about environmental degradation?

NGOs' role regarding environmental action is, so far, very limited, although, much has to be done with lot of urgency as forces creating environmental problems are relentless. There is a great need for developing public awareness to environmental problems — its causes and consequences. Awareness also has to be developed among policy makers who, so far, have not incorporated environmental concerns in big development projects. The awareness-building process has to be based on accurate and independent information on environmental problems and this information system has to be generated through intensive and painstaking research, monitoring and documentation. Where possible, NGOs should either carry out the research and documentation themselves, as most often, they work with victims of environmental problems, or work in collaboration with concerned citizens groups and individuals. But research alone is not enough. Information generated through research has to be clear cut and specific to be of any use. NGOs have to feed these clean, concise and accurate information into mass media as well as into their own public education system to develop a bulwark of public awareness against relentless onslaught on environment. NGOs also have to undertake an advocacy role along with other citizens groups and concerned individuals to sensitize policy makers to the need of a sound environmental policy and incorporation of environmental concern into development planning, so that short-term gains of a few is not given precedence over long-term interest of many, sustainability and equity is not sacrificed to mindless commitment to economic growth and well-being of future generations is not bartered away to urban and commercial interest of today.

Along with the research, information, consciousness raising and advocacy work NGOs need to develop concrete programs for regeneration of already degraded resources and prevent future degradation. Specifically, it would mean organizing massive tree

plantation programs in the homesteads, road sides, embankments and denuded forest land. From the point of view of sustainability, equity and ecology the programme will be better served if the rural poor are involved in planning, implementing and gaining ownership of the resource created. The NGOs work in homestead tree plantation is quite substantial. They provide needed motivational input, arrange for necessary skill training and set up plant nurseries so that rural poor can undertake planned tree plantation around their homestead. Under PROSHIKA's programme alone every year groups of rural poor men and women plant over hundred thousand saplings of timber and fruit trees around their homestead. NGOs have also initiated programs for the rural poor to plant trees on the road sides and embankment slopes. Spread of their programs is limited by the inability of the organization of rural poor to obtain long-term lease of the roadside and embankment slopes. Where the landless groups have obtained long-term lease of roadside and embankment from the sub-district government officials, tree plantation on these unutilized resources has been found to be beneficial both economically and ecologically. One can easily surmise the waste, both in human and material terms, when one realizes that thousands of miles of rural roads and embankment remain virtually unutilized while millions of rural poor, inspite of their keen interest and creative ability, remain idle. In this context, one is also painfully reminded of same, if not more, waste in forest land, thousands of acres of reserve forest land remain denuded year after year. If these land were made available to organized poor forest dwellers on a long-term lease then it should be quite possible for NGOs to provide resources-training, extension and credit to them for developing agro-forestry. NGOs should try to lobby relevant government ministries for making appropriate policy decisions in this regard.

Use of fertilizers and insecticides not only damage soil and ecology but also economy of the poor peasants — they cost more and more every year. To prevent this, NGOs need to initiate programs of organic agriculture where poor peasants learn to make and use compost from locally available organic materials, put green manures in their fields, rotate crop wisely and use biological pest control methods. A lot of knowledge similar to organic agricultural practices exists among farmers from traditional agricultural system. These

need to be revived and those practices which have scientific credence can be widely disseminated. Farmers are also constantly innovating. These need to be documented and widely shared if found to be effective. At present organic agriculture is promoted by only a handful of NGOs. For a greater impact more NGOs need to take up this programme.

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Women, Nature And Environment

Asmat A. Ahmad & Tahera Yasmin Huq[*]

Bangladesh again hits the newspaper headlines 'Bangladesh is at highest risk for environmental crisis' (Daily Bangladesh Observer September 29, 1990 P:4). In the same news it has been noted that the environmental risks are being recognized; however the government has not taken effective remedial action. Awareness building through the celebration of environmental week turns out to be only a gimmick unless steps for remedial action are taken seriously. Bangladesh faces serious problems like economic crisis, poverty, growing landlessness, flood, drought etc. The environmental problem is not an insignificant problem among these. The issue of environment is not only deforestation but it covers a wide range of topics like forestry, water, pollution, urban slum etc.

Whenever the environmental problems have been addressed the focus has been largely on deforestation. Very little attention has been paid to the other issues. Recently in a news item published in the weekly journal 'Friday', it has been noted that the rivers Buriganga in Dhaka, Sitalakhya in Narayanganj, Karnaphuli in Chittagong and Surma in Sylhet are so heavily polluted that it is dangerous to use their water. The contribution of industry to Bangladesh Gross Domestic Product is only 12% yet its contribution to the pollution problem is as high as 50%. Dumping of toxic wastes in Bangladesh has also been an alarming issue in recent times. (UBINIG 1989).

Environmental problems affect everyone equally, it cannot be gender based or sex biased. Polluted air affect men and women, contaminated water can cause diarrhea to both the sexes. The topic "Women and Environment" can create confusion unless it is

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clarified. In this paper we will point out that there are certain activities in which women are more closely related to nature and environment then the men. This paper will highlight what these activities are and how they affect women.

NATURE, ENVIRONMENT AND WOMEN

A woman's closeness with nature is often linked up with her reproductive function. In analyzing the subordination of women, feminists often posit the dichotomy of 'Nature Vs. Culture' and assume that women are confined to the natural world because of their natural procreative functions (Ortear 1974).

O'Brien (1980, 1981) asserts that a woman by virtue of her reproductive function is closer to nature and because of her ontological oneness with Nature, a woman has not developed a second nature historically. Her arguments run like this: men experience alienation with the loss of their seed during coitus, therefore, they lack a sense of natural continuity such as motherhood confers and experience individual uncertainty about paternity. Men attempt to compensate for the separation from natural genetic continuity through the artificially created realms of civics, politics and philosophy.

The segregation and integration between the sexes is associated with environmental and ecological circumstances. From the anthropological perspective, Sanday (1981) posits that any belief in the danger of menstrual blood and sexual intercourse reflects the general danger experienced by people in reality. In an environment where there may be a shortage of energy vital to human survival, then the belief in the danger of menstrual blood and sexual intercourse is fostered (Sanday 1981, 106 - 110). People attempt to control dangerous forces and regulate their environment by enforcing such beliefs during the time of scarcity. Furthermore Sanday suggests that the danger of menstrual blood attributed to the female body reflects the actual danger experienced by men in hunting and warfare. Thus the balance between the sexes is established. With her environmental and ecological arguments Sanday (1981) also points out that women willingly observe such taboos to establish the balance between the sexes. They are not only

related to nature and environment due to their reproductive roles, they also perform other activities for which they act upon nature and environment more closely than men. Women are primarily the gatherers of food, fuel-wood, fodder and water for the family. These activities are severely affected by environmental degradation.

The loss of forest is accelerating world-wide but the figures tell us nothing of the daily pressure which deforestation and the degradation of forest lands place on women. Collecting and transporting fuel-wood has always been arduous. The scarcity of firewood means more hours spent collecting fuel. In an FAO report it has been pointed out that in Bangladesh the fire-wood shortage is so severe that rural women and children spend an average of 3-5 hours a day gathering and transporting fuel. Women must walk long distances perhaps 10 to 12 kilo-meters and leave before dawn just to collect fire-wood for cooking.

In most societies women keep domestic animals like cows, goats, poultry and other family stock that play an important role in family nutrition, providing additional protein-rich food such as meat and milk and agricultural drought labour as well. Women are primarily responsible for finding fodder for these animals. Better fodder means stronger draught animals and better cultivated land. Cow dung is also an important alternative source of fuel. With the environmental degradation both fodder and water become difficult to obtain, forcing women to spend more time foraging for these basic necessities in addition to other household routine work.

Contaminated water adds to the burdens on a women's household duties. She has to look for a pure water supply which may involve walking further distances. Otherwise she has to purify the water through boiling to make it germ-free, she has to collect more fuel for this extra water boiling.

Migration from rural to urban areas has been growing fast which creates the urban slum problem. These slums which are dark, dingy and damp with no proper ventilation are poorly constructed. In these slum areas women have to perform their domestic chores in a very difficult way. There are no cooking facilities, or proper latrine system for hygienic disposal for human waste. These areas

also lack essential services like provision of drinking water. These problems are more acute for the migrant women in the urban slum than in the rural areas. women live in bad dwellings, on the road-side with an open drainage system and public health is severely affected. Water supply is not adequate, and women have to fetch water from a long distance at a certain time.

BANGLADESH – OBSERVATIONS FROM THE FIELD:

One could at this point quote figures and number and make a thoroughly boring presentation on women in Bangladesh. It has become quite typical now-a-days to strength one's arguments with statistics which is not such a bad thing – except that it depicts women as a nameless mass. Since the last decade due to the global emphasis on women and now environment these two are somehow incorporated into every paper, seminar and discussion. They have become our tickets to attend courses and workshops in exotic places. 'Conscious' planners never fail to create a women and environment component into their programs. One can only hope that the inclusion of such components indicates critical awareness of facts relating to the conditions, status and need of women and the environment.

The effect of environment on women and efforts to remedy the situation are quite different from what one reads in reports and what actually takes place in reality. Lets take the case of the 'Unnata Chula' (improved stove), as an example. Unnata Chula is an earthenware stove which is famous for its efficient use of firewood. Over the recent years specially after the 1988 floods many organizations designed and distributed unnata chula to their target group members. This activity fell easily within the scope of our favorite catch words: Women and environment. Use of unnata chula would be a boon to the rural women for it would reduce the time spent foraging for fire-wood and thereby leave them with more time to concentrate on other activities. Environmentally it would also be beneficial for less fire-wood would be needed and would thus be a big step towards curbing the process of deforestation. In practice however this is what happened. The unnata chulas remained unused. Apparently these chulas require "Khori" (fire-wood) which has to be bought in weight from bazaars and

the price of which is beyond the means of any landless or marginal landless families. All they can afford are twigs, leaves, animal-dung, jute stalk etc. Thus the great new invention to benefit women and environment failed to reached the poor women because the innovators did not analyze the real underlying issue.

Women do not cut trees for fire wood – they only collect bio-mass. These are cut by commercial traders for brick-fields, and saw mills, trees are cut by contractors who build beautiful wide tarmac roads, trees are cut by corrupt officials who are supposed to protect the environment. In fact the situation now is worse than before because due to constant felling of trees, women and children spend longer hours collecting bio-mass.

Unnata chula is just one example of how concepts do not relate to the practical world; yet quite a few of us are advocators of this chula. If one looks deeply enough one can find many such example of impractical ideas. One wonders why that happens – is it lack of desire to understand or is it lack of commitment to implement any sustainable programme?

We say – leave it to the women. Let the women at the grass-roots speak. Let them identify their needs and let them plan accordingly.

The women who many of us consider to be ignorant and illiterate, have inherent good sense. While working with women's groups in the field the importance of health and sanitation programme was highlighted. After listening to the virtues of healthy living the women asked just one question. "Where is the clean water?" These women have to either walk a distance to collect uncontaminated water or they had to pay their rich neighbor for every pitcherful of water they drew from the tube-well. They did not always have enough cash to do that and had to resort to drinking contaminated water. Unfortunately for the women, programme planners seldom look into the basic problem i.e. access to safe drinking water and the point to note here is that sinking of tube-wells is not always enough. We have seen the governments programme where the tube-wells have been placed in bazaars where social norms bar women from entering. Children in these cases become the major carriers of water; The state functionaries are also well-known for placing tube-

wells in the court-yards of people they meet first in the villages i.e. the elite. This only provides the elite with an another leverage to control and oppress the poor.

Standing at the beginning of a new decade we can see genuine interests to protect this earth and her people. It is up to us — the people — to translate this interest into commitment for sustainable growth. To achieve this we say it again — listen to the people, listen to the women. Listen to the women carefully and we may yet save this planet.

CONCLUSION

In the context of environment and women we would like to stress that the policy making should be a bottom up approach based on the felt needs of the people for whom such projects would be designed. After careful consideration, such projects should have a long term vision. Stop-gap measures often fail to meet the needs of the people and in the long run they fail to reach the goal as we have seen in the case of improved oven 'Unnata Chula'.

The environment issue should not be seen as a separate package or as a component, just like women issues are seen in the development project. Most of the environmental issues can be incorporated in the ongoing health, education and income generating programs. For example in the health programme, we stress on Oral rehydration saline (ORS) during diarrhea, yet we fail to emphasize the environmental issue that the source of drinking water should be uncontaminated. Awareness building about our environment can be incorporated in the functional educational curriculum, Social afforestation can be taken as one of the income generating project. In these sectors the related organizations both the government and the non-government need to develop a closer linkage for an effective and sustainable programme. A holistic approach would be more successful than taking the environmental project in piecemeal fashion.

The current emphasis is on environment and a special focus is on women. We recognize that women have special needs but these should be incorporated in the overall programme and this should

not turn out to be a alienated programme. Women's activities are related to household as a unit. Programs like social afforestation and pure drinking water will certainly ease women's work but these will also be beneficial for all the members in the household for example every one will drink germ-free water. The special focus on gender seems to be stressed by the donor agencies and we the national non-government agencies often stress on these same issues hoping to further our interest by lobbying for more funds. We want to conclude with only one final sentence that the programs will be more fruitful if we listen to the people for whom these programs will be designed.

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Child And Environment

In The Context Of The Himalayan Sub-region, specially Bangladesh

Helen Rahman[*]

Introduction

Most of the time nature and we, the human species live so much in harmony, the interdependence was so natural we hardly had to notice it existed. At least it used to be like that.

I use the word interdependence. But how loyal have we been to this term. Nature with its bounty of resources, enormous, sometimes ruthless power has little defense against our insatiable needs. We have ignored our part of the obligation to nature but more than fully exercised our rights to its resources.

Now everywhere we are beginning to talk about saving the environment for OUR sake because it is beginning to hurt.

Our relationship with our children is somewhat similar. We enjoy them, we say we love them we also claim we care for them. Truly most of us here believe we are prepared to do anything for them. Our emotion is irrationally intense. But what about the great-grand children my child. How protective and intense is my emotion. How many of us even consciously personalized the thought about the life they are going to have, about the world, the society they are going to be a part of, the earth and the environment they are going to inhabit, the air they are going to breathe, ladies and gentlemen our protective emotions do not stretch that far.

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Because the naked truth is children we have is to satisfy OUR needs to carry on OUR ideology, sometimes we see them as a continuation of ourselves, sometimes as basic as family inheritance, some for security etc.

But hardly are children there for their sake. That's fine if there is no better reason for having a child but what about their rights and our obligation to those rights. Once they are here on this planet who decides and implements them. The children or we.

All along we have treated and still want to treat our environment and our children as our property because we feel we own them. We fulfill our responsibility to them the way we perceive them.

Some of us are worried how can children help us in such a global crisis as environment. We take their comments and views as immature and childish. If we only have the patience to decipher their childishness we may be amazed by the clarity of their vision. When we don't, sometime our children in their unfocused anger speak up in the language and culture of violence and illusion of drugs. We are forced to hear that. When nature speaks up for their rights we call it disaster — natural disaster. We have no choice but to hear that.

But ladies and gentlemen the irony is what we have done to nature and consequently to our environment in its revenge it is hurting the most defenseless and vulnerable group of human species. Our children. And on the other hand what we are giving our children their habits, ideology, needs and greed will hurt and continue to destroy the environment. The cycle continues and expands.

There are clear moral reasons why this present global awareness about the environment should focus on children other than the most obvious reason that preserving the environment means preserving the species. Along with other species the human child deserves conservation.

(a) It is their planet, the environment of which we are degrading today. So it is more of their problem than

ours – but we are causing it and they cannot stop us.

(b) Children are the ones affected first and in a more acute form of the environment hazards and pollution.

Child's View of Environment

A child's interaction with his immediate environment is through his need for food, sunlight, water, air, soil and physical security. In Bangladesh we cannot provide any of these (probably with the exception of sunlight) in sufficient amount for every child – not even fresh air, and clean uncontaminated water.

Even in his prenatal stage he is not getting enough nourishment from his impoverished mother. The placenta cannot fully protect him from air pollution, cadmium, and lead poisoning. In the post natal phase the child's vulnerable young body system is not equipped to cope with the pollution or the poverty.

But how much of this pollution and poverty is his creation – but certainly he will have his contribution to it all for the next generation if he survives today.

Himalayan Region

My understanding of any commonality among the poor children of Dhaka, Kathmandu and Bangalore is through the eyes of the street children in these countries. I am not an expert on scientific findings or analysis.

History, culture and practice, poverty and ecology connect these areas.

Although in all cases the street children live in a subculture of their own – one sees the reflection of those country-wide social and moral structure in a microcosm, through them. There are similarities within the causes, anger, hopelessness, strength, sense of life and living within their national context. The difference is one of degree and culture.

Countries like India, Nepal and particularly Bangladesh which depend so much on agriculture and cultivable soil and on nature which controls a successful or an unsuccessful outcome, are the worst victims of desertification, deforestation and most of the poverty associated environmental degradation.

In fact when we are talking about environmental crisis simultaneously we have to think about the effect of such crisis on the population within a context and vice versa. Then it is unavoidable that we put the greatest emphasis on the well-being of our younger generation of today and of the future.

What any environmental crisis is going to do to our children and what the children are doing to the environment. Is it going to be mutual annihilation or is it going to be mutual support and continuity?

Today our planet has 1.7 billion children under 15, they make up 32% of the world's total population. 0.84 billion of these children live in Asia. In Bangladesh 48.6 million children are under 16 years of age which is over 44% of the nation's total population.

Bangladesh has one of the highest urban growth rates in Asia, about 8% annually. At this rate more than 40 million people will be living in urban areas by the year 2000. Of which over 17 million will be children, assuming children will still constitute today's 44% of the nation's total population. Most of them will be living in over crowded slums – or on the street with almost no access to clean water or sanitary facilities. Diseases, death and scavenging will be a way of life for these children.

The future prospects seem daunting in terms of overpopulation, environmental degradation, ecological imbalance and life for the vast majority coming down to the level of struggle for survival.

In the Himalayan Sub-region, particularly in Bangladesh, it is clear that overpopulation related environmental stress and its associated natural disasters are of main concern. The industrialized and technologically more advanced countries are beginning to see the potential of transferring their technology oriented development projects

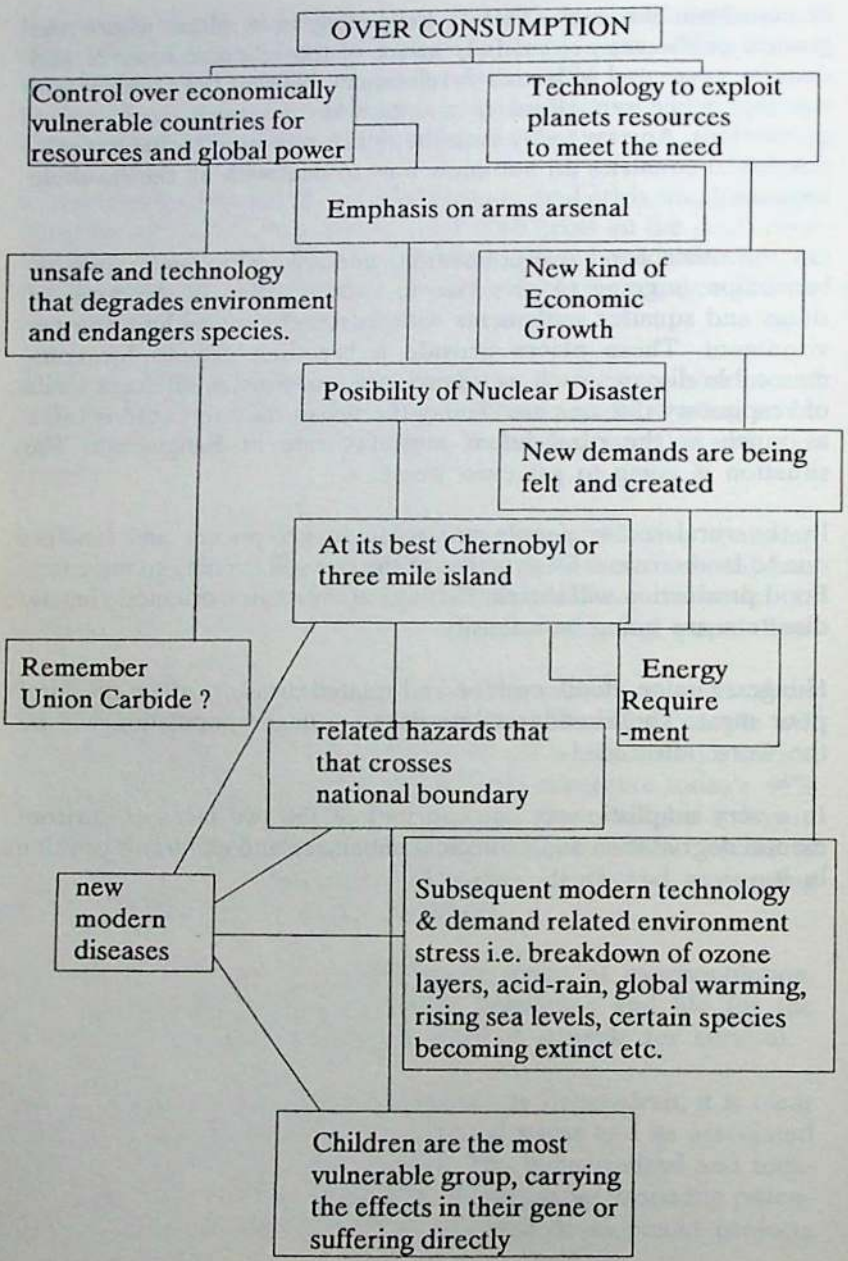
in countries like ours. This is happening in a place where the general public are not yet fully aware of the inherent hazards and dangers associated with such development. Neither the Government nor the public can afford to maintain the necessary basic safety precautions. Anyway today even the richer and more technologically developed countries do not know how to deal with all the resulting hazards.

On the other hand overpopulation, unemployment and rapid urbanization is going to give rise to overcrowding in the form of slums and squatter settlements with extremely unhealthy living environment. These places provide a breeding ground for communicable diseases such as tuberculosis, meningitis, different kinds of respiratory diseases etc. Today the urban mortality rate is twice as much as the rural infant mortality rate in Bangladesh. The situation is going to get even worse.

In the rural sector people are going to get poorer and landless due to land erosion. Destruction of the top soil is going to increases. Food production will shrink. Ecological imbalance oriented climatic disasters are going to intensify.

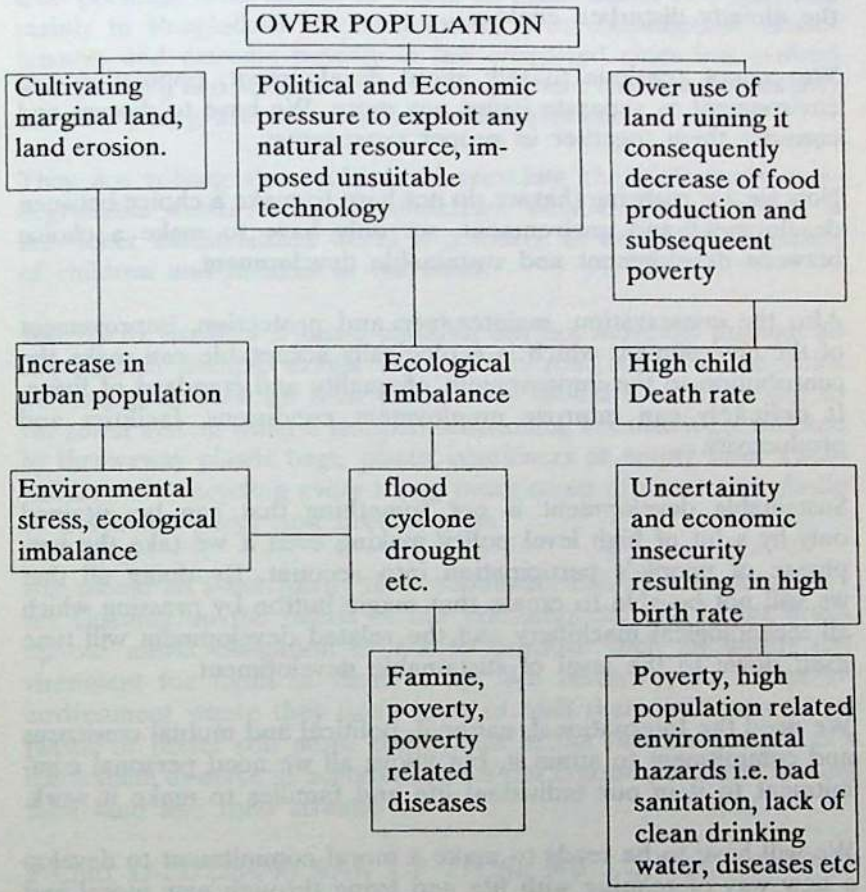
Hunger, famine, flood, cyclone and related disasters affect the rural poor most. The already malnourished younger population will be the worst affected.

In a very simplistic way one can look at the two faces of environmental degradation and ecological imbalance and children's position in it.


OVER CONSUMPTION
Control over economically vulnerable countries for resources and global power
Technology to exploit planets resources to meet the need
Emphasis on arms arsenal
unsafe and technology that degrades environment and endangers species.
New kind of Economic Growth
Posibility of Nuclear Disaster
New demands are being felt and created
At its best Chernobyl or three mile island
Remember Union Carbide ?
Energy Require -ment
related hazards that that crosses national boundary
new modern diseases
Subsequent modern technology & demand related environment stress i.e. breakdown of ozone layers, acid-rain, global warming, rising sea levels, certain species becoming extinct etc.
Children are the most vulnerable group, carrying the effects in their gene or suffering directly

Children infused with today's values and needs continuing and accelerating the cycle of mutual destruction, children and Environment.

F-Child1, D-285/90, WP 5.1, Date 04-10-90



Children are the most acutely affected ones, thus maintaining the cycle of mutual destruction, children and environment.

F-Child2 D-285/90 WP 5.1, Date : 04-10-90

The Scenario is that we will have to create employment and healthy living conditions and increase food production.

So on one hand we cannot afford to reject development nor can we handle the modern technological package development safely without causing new kinds of environmental hazards or disturbing the already disturbed ecology.

We cannot continue to talk about development, population and environment as separate issues any more. We have to discuss and consider them together in proper perspective.

Now we are realizing that we do not have to make a choice between development and environment, we only have to make a choice between development and sustainable development.

Also the conservation, maintenance and protection, improvement of the environment which is ecologically acceptable can make the contribution to the improvement of quality and standard of living. It definitely can improve employment conditions, facilities and productivity.

Sustainable development is not something that can be attained only by a lot of high level policy making even if we take the new phrase of people's participation into account. By doing all that we will not be able to create that magic button by pressing which all technological machinery and the related development will tune itself down to the level of sustainable development.

We need the International, national, political and mutual consensus and commitment to attain it, but above all we need personal commitment to it in our individual life and families to make it work.

We will have to be ready to make a moral commitment to develop a new way of relating with life and living through new moral and value criteria. Our children and future generations will inherit those along with a planet with future to live on. Our home, children's school, religious places, streets offices, factories everything can be our policy making, decision taking, training and learning ground.

Hopefully we wouldn't have to send our children to Kaitta to take that training.

Children a positive force in maintaining the environment

One personal observation: in India, to some extent in Nepal and mainly in Bangladesh is consumption, over consumption, homelessness and extreme poverty in the congested cities has evolved a very strong and stable street economy where children particularly the very young are the most important element.

They are solving the problem of recycling the biologically non-degradable wastes of the consumerism. What is a big problem in the richer industrialized world is a source of living for thousands of children and families in the cities.

Just try to visualize if those children did not scavenge through all the rubbish dumps, drains and on the road sides in the cities carrying their sack on their elbow what would have happened to the sewer system when it stopped functioning because it got blocked by throwaway plastic bags, plastic containers or empty cans. Those children are recycling every thing, every scrap of metal and plastic or polythene paper and broken glass.

But please let's not justify their subhuman existence because they are cleaning up the debris of our consumption. WE better brush up our moral obligation of not to produce such an untidy environment for them to clean it up. We better try to create an environment where they don't have to wish that there were more plastic or better still more empty cans in the rubbish dump. Let's teach them to make us accountable for our consumption and ruining their land and their streets.

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Tribal Communities And Deforestation The Madhupur Garh Case

Philipin Gain * *& Alo D'Rozario* **

Introduction:

Deforestation as one of the major environmental problems affects large numbers of Bangladeshis including the tribal communities. Over the past 20 years, the forest cover in Bangladesh has declined from about 15 percent of the total area to 5 percent. The annual estimated rate of deforestation is 8,000 hectare (GOB 1987).

Deforestation is partly caused by population increase, greater demand for forest products (especially in urban and commercial sectors), and conversion to agricultural land. Deforestation and conversion of forest lands to other uses has been the highest in the plain land sal forests from Dinajpur to Mymensingh, Tangail and Dhaka districts.

According to the provisions of the Forest Act of 1927, amended in 1989, the Government may constitute a reserved forest with any forest land or government acquired property. This means that the government may curtail community's right to collect leaves, branches, fuel-wood, and other forest products from the forest. This results in the community legally losing all customary usufruct rights to the forest and increases tension between the villagers and the local forest officials.

Through this paper an attempt has been made to show the situation of 18,000 tribals, mainly Garos, in the third largest forest of the

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country, Madhupur Garh, long famed for its towering fragrant of Sal trees (Sorea Robusta). The tribals in the Madhupur forest, believed to be living there for centuries, are vulnerable to the greed and pressure of the mainstream of population and foreign fund-sponsored projects for "afforestation" and commercial gains.

The allegations of harassment and assault on the tribals and the non-tribals as well are frequently made to draw attention of the policy makers at the top levels.

The most recent harassments caused through false cases and eviction threats posed to the Garo tribals are due to amended forest act, government-sponsored rubber cultivation, agro-forestry and woodlot projects. All these projects are known to be funded by Asian Development Bank (ADB). Rubber cultivation is claimed to be economically profitable by the government. The agro-forestry and woodlot projects, objectives of which are to produce timber and fuel-wood are also, said to be good for the people in the Madhupur Forest.

But the government's claim about the rubber cultivation, agro-forestry and woodlot has been rejected by the residents in the Madhupur forest. It is now a widely accepted fact that the ADB-funded projects have posed serious threats to the natural habitat of the tribals and that of the non-tribals as well.

Background of the Garos (the main tribe) in the Madhupur forest:

The Garo tribals, properly called *Mandi*, in the Madhupur forest area who number nearly 18,000 are called motherland Garos, in their language "*Abima*." The other two types of Garos are "*Acchik*" Mandi or Hill Garos (living in Meghalaya in India) and the "*Apal*" or plains Garos (living in Mymensingh District in Bangladesh). The total number of Garos in Bangladesh are 100,000 and in both India and Bangladesh, they number 500,000.

The landholding system of the Matrilineal Garos is unique. Only the women of the tribe can possess land and other wealth in any form. The men are allowed to use or administer the wealth of the woman's clan (motherhood). The "*Acchik*" Garos' land right

have been protected in India and are updated in Meghalaya. Even holdings alienated from the tribals are being returned to the tribals.

The condition of the "Abima" or Motherland Garos, who have lived in the Madhupur forest for centuries is becoming ever worse. Under the British *Zamindari* system, the Madhupur Tract and its people came under the *Rajah* (King) of Natore, who dedicated the area to the god Gabinda under the title of *debottor* (gift for god). The Mandis (Garos) could cultivate the high land under lease and could register the low land in their own names.

In 1878, the Garos of Madhupur forest recorded their lowlands and some of the highlands. Since then they have paid an annual tax to the Revenue Department as the successor of the *Zamindar* and the British Raj. A Forest Settlement Officer wanted to repeal the act (the Indian Tenancy Act of 1878) under which the Garos got their lands registered. Since then continued efforts are on to dispossess the Mandis of their land rights. In fact, they have lost much of their lands registered with Revenue Department and occupied under "prescription" (land right based on the length of occupation). It is not only the land that they have lost, they have lost many of their values and cultural ethos because of their mixing with the majority community and the resulting constant pressure.

From 1962 the government began to rehabilitate non-tribals on Madhupur forest land, much of which was in the tribals' possession. During the 1964 riots the Garos experienced their first exodus to India. On return they found their land occupied by the "Refugees" who came from India.

In 1962, Monem Khan, the then Governor of East Pakistan (now Bangladesh), declared publicly a plan for a 40 square mile National Park in the Madhupur forest. The government did not help the people understand the plan and no legal notice was served. Tribals fought a legal fight and survived that time, but the Forest Department and the Revenue Department continued efforts to dispossess the tribals of their land. The Forest Department gradually took over control.

Since the 1962 declaration for making Madhupur Forest a national park, eviction notices have been served to the Garos several times. But the government had never promised the minimum compensation to the Garos who by forest law and ILO convention claim land rights.

In 1968 and again in 1969 the Garos in Chunia village were served with eviction notices. But there was nothing about compensation and rehabilitation mentioned in the eviction notices. In 1974 the police attacked with guns the same village to evict the villagers. The women came in the frontline to resist them and they drove the police off.

Similar eviction attempts were made in 1978, 79 and in 1980. Every time an eviction attempt is made, hundreds of Garo families fall victims. They have to respond to the eviction notices, run to the courts and confront the law enforcing agencies.

The latest eviction notices were served by the Forest Department to 20 Garo families in Mohishmara village in the Madhupur forest. A Range Officer associated with the notification said that they served notices to the illegal inhabitants on the forest land. The notification reminds the Garos, who trace their history back to 1860, of the amended forest law of 1927 which might cause them maximum imprisonment of 5 years and a fine of Tk. 50,000. The notices served on 19 February, 1990 asked the Garos to leave forest land in seven days.

But the Garos ignored the notification. "We have received several similar threats in the past. The objective of such attempts to evict us is to grab our land for the vested interests certain quarters", claimed the Garos in Mohishmara. The Garos whose forefathers and who were born here are mentioned to have lived in the area for 5 to 10 years in the eviction notices. This is considered to be a trick of the Forest Department to identify the peasants in the forest as illegal settlers.

The Garos and a few other tribes are harassed in another way also. Every year several false cases are brought against the tribals who get a raw deal in the courts and other government offices

because of their simplicity of being tribals. A few cases are also brought against the forest Department for illegal actions against the tribals. A few persons and groups help the Garos handle violation cases themselves.

Rubber Plantation:

Outstanding threat to the tribals : The rubber cultivation, that started on 15,000 acres of Madhupur forest land is an outstanding threat to the natural habitation of the tribals. The rubber cultivation is known to be sponsored by the government and funded by the Asian Development Bank (ADB). It started in 1986 and the President H.M.Ershad, while inaugurating rubber cultivation in Madhupur, announced that it would be expanded in many more thousand acres gradually.

The first phase of rubber cultivation which has become a colossal failure in the Chittagong Hill Tracts and Sylhet district), took several acres of registered and prescribed (land right based on the length of occupation) land of the tribals. The tribals who live in the forest from time immemorial have title deeds on a few acres of their traditional "homeland."

The first phase of the rubber cultivation was completed by the end of 1989, as announced by the government and the second phase was due to be started in early 1990. A feasibility study was completed by the end of 1988, funded by the ADB (TA No 908 BAN). In the mean-time various quarters realized that serious violation of human rights took place due to rubber cultivation, and that it caused loss of natural forest and bio-diversity.

The rubber plantation is marked as an afforestation effort at the government level and it is propagated that it would be economically profitable. But the examples set by Chittagong and Sylhet rubber plantation programme furnish a disappointing picture.

An example of how the habitat of the tribals is disturbed can be noted. Purna Sangma, a Garo Woman, who held a valid title deed to 3.5 acres of registered land, but was dispossessed in 1985, brought a civil suit in court to recover her land and won. Her land, however,

has been covered with young rubber trees. Since the judgment in her favor in January 1989, the rubber plantation authorities have not yet arranged for compensation.

Several other attempts were further made to dispossess the tribals of their lands including cultivated land. The tribals confronted the rubber plantation authorities and uprooted the rubber trees forcibly planted on their cultivated land.

As a result, many false cases were filed against them and a few tribals were arrested and put into detention for several days. The tribals, however, were resolved to resist rubber cultivation on their ancestral land and succeeded in stopping original plan of rubber cultivation on 45,000 acres of land. In the face of their strong resistance, the areas for rubber cultivation is known to have been reduced to one-third.

The Minister of Agriculture, on 3 April, 1989 had assured the Garos that there would be no rubber cultivation on registered or prescribed lands.

Parish Chandra Mree, a Garo chief, commented on this latest outrage against the tribals: "we are children of the forest, we were born here, we were brought up here. We want to die here. We are so accustomed to forest life that we cannot survive if we get evicted from the forest."

The experts opine: "Instead of focusing on deforested lands rubber plantation projects have destroyed large areas of natural forest through clear felling. This destruction has resulted in significant loss of natural habitats, including the rich Sal (Sorea Robusta) forest in the Madhupur Tract with associated wildlife. The rubber trees have destroyed the ecological balance as they do not attract wildlife."

Dying forest, dying people:

The Madhupur forest in Mymensingh and Tangail districts, the third largest forest in the country and largest surviving forest of the plains, is 150 km North of Dhaka. This (forest) tract lies between

24.1' and 25.2' North latitude and 89.50' to 91.1' East longitude. Madhupur Garh has traditionally been known as 'Sal' forest since the principal tree species of this forest is Sal (Sorea Robusta). About 75 to 80 percent of the forest cover areas used to be occupied by Sal and the rest with patches of mixed forest. According to the Forest Department sources, the total notified areas in this forest is 53,880.55 acres.

But in the past 20 years the forest has been at least half destroyed. There are many areas totally stripped of natural forest and rubber plants are growing there. A few parts are falling completely barren to be grabbed by people with vested interest.

There is a long history of resistance by the Garos in this forest. Since the partition of India in 1947 their land claims have come under increasing jeopardy. Bengali settlement has been allowed, beginning in 1962, often with false title deeds. Their number has rapidly grown and the tribals are now outnumbered four times.

The Garos have witnessed their original environment and forest being rapidly destroyed allegedly by the Forest Department and the settlers. They have fallen the worst victims of the situation.

When the management of the forest came to the Forest Department from the *Zamindar* (Feudal Lord) after 1951, Swideen (Jhum) cultivation was prohibited on forest land on the ground that it harmed the forest, Since the take-over, no revenue has been collected from the Garos for using the forest land as their rights to such land were not recognized by the government. The forest Department always alleges that the Garos are destroying forest and therefore, they should be removed from the forest land. The Garos, on the other hand, are seen to be the best protectors of the forest. They have deep reverence for the forest as their culture is closely associated with the forest.

The Garos' version in response to the Forest Department's allegation is, "The Forest Department is trying to evict us, because the employees of the Forest Department consider us to be an obstacle to their illegal means of earning money, by receiving bribe from the illegal loggers for helping them take away the timber.

We live in the forest, so their illegal activities do not escape our notice. Thus they think that it would be a great advantage to them if they could remove us because then there will be none to see what they do in the forest." It is not only the Garos but other sources, e.g. recent press coverage and local leaders, who strongly support the allegations the Garos make.

To prevent the assault on the forests, the government amended the Forest Act of 1927 in September, 1989. Stern measures have been provided against the violators of forest lands: 5 year imprisonment and Tk. 50,000 (US $ 1600) fine are the maximum penalties. The newly amended forest law, however, has not been able to stop felling trees because it is generally accepted that laws can easily be defied by the people connected with the power structure. Around 200 cases have been filed under the amended forest act up to now. But the accused and those arrested are of the poor class. The real culprits who destroy the forest easily escape legal actions.

The government in its efforts for afforestation, has started agroforestry and woodlot in the Madhupur Garh. But it is a pity that the people living therein do not realize what they mean and how to participate in making the afforestation programs successful. They do not believe that any afforestation effort under the existing pattern of the Forest Department will be successful. They do not trust the Forest Department. They are often heard to say: "we have seen how the Forest Department staff have destroyed the forest. Now they talk about reforestation. It is unbelievable".

The Government Promises: never materialized :

The tribals always have appealed to the government high-ups to help them with a peaceful habitation, The government policy responds to their appeal since the government at the highest levels has been strongly supportive of the rights of tribal minorities. But its inability to control social discipline at the local levels has been increasing steadily.

How the government promises and statements are defied at the local levels can be exemplified. In 1976, the President, Zia-ur-

Rahman announced, "The forest will be protected and the aboriginal living there will not be evicted." At his suggestion the tribals formed a Tribal Welfare Association (TWA) in 1977. The TWA submitted 15 demands and the main one was to protect their lands. In 1981 the Tribal leaders met the President and the President assured them that the plan to evict the Garos in Madhupur forest has been dropped. But in reality, the threat to the habitation of the Garos in Madhupur forest has increased, and the subsequent governments have failed to stop attack on the Garo land and harassment to their women. In early 1989 a Garo school going girl was gang raped; in November 1989, five Garo women were beaten by the forest guards and security personnel as they wanted to resist their attempts to destroy their pineapple gardens and to convert them to nursery beds. The victims have not yet received positive response from the courts.

After the appointment of a Christian advisor to the President in 1990 a delegation of Tribal Welfare Association, met with the President Ershad and the advisor and appraised them of their land problems and demanded security of their land. Shortly therefore, the President appointed a "Permanent Committee" of Ministers to look into the Garo problems. On June 22, 1990, the minister of forest and environment, the minister of land, advisor to the president on NGO affairs and senior officials of the Forest Department held a meeting with the tribals in the Madhupur Forest and a 9-member committee was formed with tribal representative and Forest Department officials and the UNO of Madhupur Upazila. The committee was assigned to identify the problems of the Garos of Madhupur Forest and suggest solutions. The Forest Minister gave an assurance that the Garos of the Madhupur Forest would not be evicted from their lands and declared that the notices served would be cancelled. He ordered a tripartite land survey to determine land ownership. A committee formed for this purpose was supposed to investigate the land situation and injustices done to the tribals and submit the report within 15 days. Three months have passed, but there has been little progress.

Human rights and environmental concern:

The human rights activists, anthropologists and environmental activists are aware of the events taking place. They all agree that the wide settlement of human population, past method of exploitation, illegal logging, failure of the new plantation method, alienation of the forest-dwellers, foreign funds and so forth have contributed to the rapid depletion of the forest and cultural disaster of the Garos who are considered to be the children of the forest and whose life, culture and religion depend on the forest.

The relationship between the Garos and the Forest Department and settlers from 1962 is antagonistic. The illegal outside loggers take advantage of this. The Garos and others are not willing to cooperate with the Forest Department in the protection of forest and new plantations due to their sense of alienation grown from their loss of rights to use forest lands.

Madhupur forest — a complex posture:

Madhupur Garh which needs extensive care and serious attention, has now become a complex posture. The forest is considered to be at least 'half-dead.' But in official documents it remains intact.

To infuse life to this "half-dead" forest, new plantations with foreign funds have been started. But the exotic and single species plantations, i.e. rubber, eucalyptus and other fast growing and commercially valuable trees have raised eyebrows of the specialists.

Everybody is concerned about the survival of the Madhupur forest. Those who live in the forest area expect that the government will live up to its promises, laws will be enforced impartially and harassment of the poor and innocent people will cease.

Recommendations:

In order to return to the green old age and preserve the tribal rights measures should be taken without delay. Some suggested recommendations are:

a.To improve the conditions of the Madhupur forest the Garos have to be allowed to use the forest lands presently occupied by them and the lands taken through unfair means should be returned to them.

b.To make reforestation programs a success, people's participation has to be ensured and their sense of alienation has to go.

c.To diminish the antagonistic relationship between the Garos and the Forest Department, initiatives have to be taken from the lower levels and therefore, all acts of repression, e.g. filing false cases, collecting forced tolls, use of force to recover lands for rubber cultivation agro-forestry and so on have to be stopped outright.

d.The Garos have to be consulted by any outside funders before giving funds for forestry programs. Foreign funds given for rubber cultivation and agro-forestry, without much consideration are believed to have aggravated the situation.

e.The distressed Garos and others have to be given legal support by the government functionaries, so that people can begin to trust the Forest Department and other government setups.

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N.B. Most of the information was collected through monitoring the events and field trips.

Dhaka, 22 September, 1990.

Dilemma Of Development And Environment
The Danger of Eco-fundamentalism

Dipak Gyawali[*]

INTRODUCTION

We all love trees; we all oppose deforestation; however, we should advocate trees in the Himalayas for the right reasons and not the wrong ones. Trees are needed by the hill-man for his subsistence and survival – and this is the right reason why we should have trees. That floods in Bangladesh will be prevented by afforesting Nepali hills is scientifically unsound, and justifying tree-planting on such grounds is the wrong reason. Following an action plan for the wrong reason – howsoever right and altruistic the objective may be – is eco-fundamentalism. At the very best it will lead to future embarrassment: at its worst, it could result in socio-ecological and developmental grief.

The pursuit of development, in particular economic development based on the growth paradigm – which emphasizes an increase in the throughput of goods and services in a national economy – has brought non-industrialized societies like those of South Asia to a quandary. On the one hand, one cannot fuel development so conceptualized without an increase in the consumption of matter and energy resources, some of them non-renewable and with toxic waste products; on the other hand, mass aspirations for products of modernity and the "good life" have been fired to such an extent, and cultural changes that imply high resource use have occurred so fast, that no mass-based politician can hope to even reach first base if he or she advocated a zero-growth, purely environmentalist agenda.

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This dilemma stares all development practitioners in the face; and, among this breed, those who dwell in the realm of epistemology – the development philosophers – feel it literally breathing down their necks. One cannot advocate "business as usual" or "more of the same" approaches whether Marxian or free market when the limits to unbridled growth is there for all to see: one also cannot advocate an other-worldly monasticism for the masses and deny them the fruits of technology that has whetted their appetite. Is there a way out of this linear "black box" and into a freedom space helped by a liberal dosage of lateral thinking?

Himalayan Waters And The Development Dilemma

Development has come to Nepal with messianic fervor since it opened itself to the outside world in 1951. Although a new religion such as this one – and religion it is because it concerns itself with a way of life – should have believers and heretics, proponents of the resource intensive mode of development abound and healthy skeptics are rarely seen. Development is measured in terms of the number of projects and the amount of funds disbursed. Rarely is it seen in terms of the quality of life and the well-being from overall economic processes.

For example, road building is an essential rite of this new religion. In the very unstable topographic and geological conditions of the Himalayas, this exercise costs a lot of effort, not only to build but more to maintain. On top of this, the energy cost of moving bulk goods by this method is very high compared with modern alternatives. These are rope-ways and large helicopter ferry services. The former, when compared with the entire gamut of upstream-downstream costs of building the road as well as investment in vehicles and fuel, look more efficient, while the latter can compare favorable in certain sectors such as the Pokhara-Mustang or Surkhet-Jumla corridors across the high Himalayas.

However, such lateral thinking is almost anathema to classical practitioners of development. The pinning of faith in the canon of resource-intensive economy prevents the creative exploration of other possibilities which would lead to more efficient development.

Hydro-power in Nepal is a classic case in point. In recent years, Nepalese have been fascinated with the possibility of generating electricity from the 6000-odd streams and rivers of Nepal. The international oil crisis in the early 1970's elevated this fascination to the level of an obsession which has regularly over the years distorted development resource allocation.

The idea that Nepal will be developed like Singapore or Japan if it can only export its electricity to India is the "hydro-dollar" fallacy that plagues much societal thinking in Nepal. It assumes that buyers don't bargain a seller to death or that the sellers are invited with red carpets to occupy a share of the market. Such simplistic development models completely ignore the complexity of industrial productions and the marketing of its goods. In the case of Nepal, if the heavy investments required for hydro-development and its long gestation periods are not handled with the professional expertise required, Nepal can face the risk of total bankruptcy before it completes the transition from point A now to point B then. On the other hand, if the state assumes the role of a facilitator that promotes its industries rather than that of a delivery agent in the traditional South Asian concept of "mai-baap" lord protector, the inherent genius of a people can find a creative outlet that leads to efficient solutions which exploit comparative advantages in the local economy.

For a sensible alternative state, we should not use the word "resource" very loosely and equate it with physical entities such as forest and water. A "resource" is created only with the right inter-meshing of physical entities with a social climate that includes features from religion and world-view to political and economic structures. It is actually the latter "software" rather than the former "hardware" that makes a physical entity a "resource".

That "Nepal is rich in water resources" is a myth that results from believing in the resource-intensive definition of development. It is caused by an inordinate belief in averages: the internal distribution of water within Nepal is such that where there are people and cultivable land, there is little water and where there is abundant water, little of it can be used because of the paucity of population and land.

To convert such a physical entity into an economic resource useful to society, a re-molding not just of nature and its river valleys through civil engineering but also of the society receiving of the technology is a must.

Technical difficulties stem from the fact that the hydro-geology of water in the Himalayas is poorly known, and the little that comes to light is not favorable to large structures favored by the current state of hydro-technical constructions. The knowledge of the river flows, especially the extreme flood and drought conditions, is poor and not conducive to reducing the risks in design. The degree of uncertainty places the recipient society under severe risk conditions which it may not be able to bear, especially if it is a small, under-developed country.

Besides water flow, there is the important question of what all this is resting on. The Himalayas are young and still rising about a millimeter a year because the South Asian continental plate is pushing the Chinese portion of the Eurasian land-mass by about a centimeter a year. Because of this instability, the Himalayas are also eroding at an approximate rate of one millimeter a year. As a result, the Himalayan rivers are not rivers in the traditional sense but "drainage corridors" along which flow both water and matter, the latter being about 10% silt and the rest as boulders and pebbles. This "bed load" movement is a formidable geological force which cannot be stopped by forest cover. Indeed, it is this natural phenomenon that created the land-mass of what is now Bangladesh over the geological years past.

One consequence of this massive matter flow is that Himalayan rivers that debouch into the Tarai plains as "inland deltas" with fans that rise as the river deposits more matter than can be carried away by the water they have. The Kosi fan is the best example. The rate of water flow in the Kosi since geological times is much higher than what it and the Ganga can carry to the sea. As a result, the rivers bed of the Kosi is much higher than the surrounding land by ten to fifteen feet. This fact encourages bank over-spilling, and the Kosi has indeed moved westward by 100 kms in the last 250 years. In the years to come, a violent shift to the east is a distinct possibility. Standard diking technology is no match against

the geological forces at work; and afforestating the hills till all of Nepal was one big canopy of trees would not reverse the situation either.

RETURN TO SOCIETY

This brings us back to society. Floods are a natural phenomenon, a way in which nature behaves. They can be modulated to a certain extent and at a certain cost. Often, the most telling cost is the financial one of the cost of dams and dikes. There is also a more subtle environmental cost which results in the change in the ecological succession pattern beneficial to some species but harmful to others.

The socio-environmental question is: are there limits to this re-molding of nature? Does a human society have the right to change nature to any extent so that it derives immediate benefits but the costs are passed onto other species or to other generations of humans? Alternatively, does a particular human society have no right whatsoever to re-mold its surroundings but is it obliged to keep it in its primeval pristine state? Where does one draw the line?

If the lifestyle of California is to be taken as the standard to be aspired for, with all the ramifications of pressure on resources such as energy, water, minerals, and other physical endowments, then there are several critical questions that need answering. If flush toilets and private swimming pools are to be accepted as desirable goals, water consumption levels can exceed 500 liters per capita per day. Today, South Asians consume an average of 30 to 60 liters per capita. What pressures this nearly tenfold increase in resource consumption will exert on our freshwater systems when extrapolated for a billion people should lead us to pause for thought. Similarly, the outlines of a future if the nearly two hundred million South Asian families own a car can be reflected upon. In terms of order of magnitude, even accounting for technological breakthroughs that improve efficiency of engine design, the physics of the phenomenon points to a level of petroleum consumption at least double that of USA today.

Seen in isolation, one could simply claim that this was progress and development. Seen, however, in the context that a billion in the Sinic world, half a billion each in the Babylonic world and in Meso-America, as well as several hundred million in Sub-Saharan Africa and in the Byzantine world would have achieved similar levels of affluence, one must realize that such a level of petroleum consumption cannot be sustained – not merely in terms of the availability of the resource in question but in terms of the capacity to produce, the limits to, and diminishing returns of, technology, and the formidable problem of the air and water's incapacity to absorb more wastes. Such a level of competition for resources must be examined in a fashion more sympathetic to interdisciplinary inquiry, not merely in technical or economic terms, but also in terms of international security and the risk perceptions of various blocks. The recent events in Kuwait are an inkling of the "non-technical" shape of things that can go wrong if the Californian life-style is extrapolated indefinitely.

DEVELOPMENT AND CREATIVITY

If development is understood as an imitation of the Californian life-style, then we are trapped into a resource intensive mode of existence which may not have a very long future. There are strong apologists among those advocating this path who maintain an inexplicable faith in technology and its ability to produce "substitutes" when certain resources gets scarce.

Strangely, this faith is not shared by technologists, especially those conversant with the limitations imposed by the Second Law of thermodynamics. They see a diminishing return of technology where more and more research and other efforts go to produce breakthroughs which provide less and less increase in well-being. The classic example has been described thus: the humble radio, invented in an attic, brought the whole world to one's kitchen. The next improvement – B/W TV – only marginally added to the information content of the radio by providing a visual dimension to what was already available. The color TV, which needed a laboratory empire and not just a garage to invent, has added even less to the overall increase in well-being by providing a color dimension to the information content.

The burst of creativity which invented the first press or the first mechanical engine or the first aeroplane has arisen from situations where individual and private initiatives have been encouraged and given free play. They have rarely occurred within the cloistered walls of a formal university or a government department. In view of this, if development is not to be narrowly equated with increases in inappropriate measures such as GNP etc. which measure only the level of marketization, broad-based development must be seen as something that arises when a society's creativity – from its economic and industrial decisions to those in areas of education and culture – is in full swing. For this to occur, enlightened statecraft which shares this goal with its creative citizens must play the role of a facilitator. In turn, this implies the importance of the role of institutions in the development process.

Institutional development does not mean the strengthening of government departments, as has been the practice with aid agencies till recently. That exercise is "organizational development", which may or may not succeed depending upon whether the institutional clime is appropriate or not. Institutions have been the ignored aspects of the development intervention exercises. First of all, the effort has shied away from admitting that any change in social outlook or behavioral pattern is a function of its power structure and hence its politics. Development efforts that have failed to realize that their contributions have, more often than not, been hijacked by a powerful sector which becomes more powerful in the process. Second, institutions are an expression of the unwritten rules of a society that maintains a certain political balance in which there are winners and losers. Often, the poor are the losers. Making them winners, or at least giving them a fair chance, means changing the rules of the game. This must be done before intervention exercises.

In the example on Nepal's macro-energy alternatives cited above, one cannot just begin to draw designs of rope-ways and find the funds to call for tenders and contracts because studies have found rope-ways economically and otherwise efficient. It has also been well studied that the functioning rope-ways of Nepal were "strangled" by the truck owning interest of the country. In order to prevent truck owning interests from sabotaging new efforts, in-

stitutional changes must be made – such as increase in fuel taxes for trucks but reduction in electricity prices for ropeways, the chances of truck owners investing in ropeway companies etc. – which in effect change the rules of the game.

An important point that needs to be made is that sustainable development need not mean stagnation. Development has to be expressed in terms of creativity both individual and social, not merely an increase in resource consumption. The creation of a good mass transit system for our congested cities would need more creativity at the social level than merely importing more cars. Linking hydro-power development to integrated packages that take advantage of complementarities such as hydro-power-ropeways-market for Jumla apples is a creative effort; but this cannot be done as part of a bureaucratic exercise. It must have the business incentive; and it must be done by intermediary institutions that lie between the nation-state and the family as the two extremes of social units.

INTERMEDIATE INSTITUTIONS AS ALTERNATIVES

The question of right institutional choices to carry forth development intervention exercises is also linked to the problems of the environment. Indeed, the environment has been defined as the totality of inter-linkages between the living and non-living biophysical world, the human-built surroundings and the symbolic or socio-cultural spheres. The environmental paradigm does not allow for compartmentalization and particular solutions because each sector affects and is affected by other sectors in a non-linear fashion.

In this context, the choice of institutions becomes even more important. Traditional compartmentalized bureaucracies are designed on the pyramidal Cartesian framework of analysis and breakdown into components. The environmental paradigm, on the other hand, strives to synthesize and generate wisdom that leads to wise choice. It looks for the linkages between units rather than at the units themselves with the belief that the whole is greater than the sum of the parts.

If the problems of energy, resource scarcity, lack of development and the adverse environmental impacts of development are to be

tackled, the trick is to design institutional mechanisms which can cope with complexity and inter-linkages. This calls for the use of institutional tools which foster the growth of intermediary institutions such as formal NGO's or informal guthis. It calls for a dilution of the role and responsibility of the apex institution called the state. It calls for the creation of an open society which allows individual and group creativity free play, where not ukase from the center down but shared experiences between democratically interlinked networks help determine decisions.

The development of Himalayan water and energy resources is a case in point. Any intervention stops being just the sectorial problem of energy or flood control. Water and energy are not subjects but the focal point of the intersection of many disciplines. Power market, agriculture, fisheries, watershed management, transport and navigation, refrigeration and containerization, resettlement – all these issues come to bear on water resources development. So far, there has been an impasse in the development process because of wrong institutional choices. The state mechanism in Nepal, India and Bangladesh were entrusted with the whole gamut of functions from survey and design to operations to marketing to adjudication. A more sensible choice would have been if the state confined itself to adjudication between contending claimants and interests and left intermediary institutions free to explore creative possibilities. The problem of inter-linkages would then have been automatically been taken care of by the in-built homeostasis of the market and a dispassionate adjudicator. Even non-quantifiable items such as lifestyle changes would not find themselves left out.

CONCLUSION

Swami Vivekananda, a leading philosopher of South Asian renaissance, once exhorted: "in the deep valley of despair, even the hand that comes out of the darkness to help you must be your own." A way out of the dilemma between development and environmental protection can come not as a gift of wisdom from development agencies, lending banks and the state dependent on them but from a confident society that can tinker with institutional tools. Facilitating the work of intermediary institutions assures a better homeostasis mechanism which opens the potential for un-

locking the creativity of individuals working singly or in groups. The built-in feedback in democratic networks assures better environmental sensitivity than in pyramidal hierarchies where wisdom is deemed to flow from top to the bottom. Such institutional choices offer a hope of development and a break from stagnation of the past.

On The Dangers To The Himalayas

Sailendra Nath Ghosh[*]

Any mountain system has decisive impact on its foothills and the plains below in terms of climate, water regimen, soil characteristics, produce-mix, and social mores. Mountain systems are also among the most fragile, once the denudation of its forests and the consequential soil erosion begins. A young mountain system is even more fragile. Being young, its rocks are uncompacted and composed of solubles like limestones-hence easily erodable. Moreover, it incorporates faulted regions and earthquake zones. The Himalayas, being the youngest and the tallest mountain system in the world. presents unique advantages to the foothills and the vast plains below but, in the event of its misuse by man, also suffers from much larger vulnerabilities, posing grave threats to the populations from the foothills to the deltaic regions of its rivers.

The great height of the Himalayas has prevented the piercing cold winter wind from the north from blowing into India. Its height has also caused massive snow accumulations and glaciations. In the Himalayas, there are fourteen principal glaciers ranging from 14 km to 72 km and as many as fifteen thousand glaciers ranging from one to five kilometers. On the western flank, its reduced height prevents to a lesser extent the arid winds from West Asia.

In summer, the Himalayas intercepts the moisture-bearing clouds originating in the Indian Ocean and moving from the south-west and south-east towards the north, to cause heavy rainfall in both east and north-east India. Thereafter, as the clouds move westward along the Himalayan barrier, the monsoon loses its intensity but yet gives copious rainfall to the central Himalayas and the plains in Bihar, UP etc. As the moisture depleted wind takes the reverse direction in September-October, it collects moisture on its path

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(from the surface waters on land and the Bay of Bengal) and precipitates in the south-eastern region of peninsular India. At times, the cold Mediterranean wind entering India through the Himalayas' opening in the north-west, collects moisture on the path in the same manner and reinforce this trend of precipitation in south-east India.

Thus, by intercepting the south-westerly monsoon, the Himalayas moderates the heat and desiccation which north India would have otherwise experienced during July-September. It again is the cause for the winter rain from the north-westerlies creating a seasonal climate which is somewhat like that of the Mediterranean in Europe.

The superabundant rainfall in east India, the copious rainfall in the region facing the Central Himalayas plus the snow melts and the glaciations have given rise to the mighty river systems of the Indus, the Ganga and the Brahmaputra, running the lengths of 2800, 2225, and 2900 kilometers respectively. Innumerable streams have united to form these river systems. Rarely in the world do we find such mighty networks of tributaries feeding the great river systems. The Indus basin and the Ganga-Brahmaputra mega-basins are really the creations of the Himalayas. The alluvial depositions that built up these basins' high fertility came from the Himalayas.

For an understanding of what the Himalayas has given us, we may begin with the obvious example of the Ganga, whose water is known to be endowed with unique properties. The capacity of the Ganga's water for generating phytoplanktons and zooplanktons is said to be the highest among the rivers in the world. Until a few decades back, the Ganga was also among the world's richest repositories of fish. Till the middle of this century, water from Hardwar or its upstream or from Prayag could be kept bottled for a year or more in germ-free condition. Many men of science such as F C Harrison of McGill University (Canada) and the famed French physician D Herelle, pointed to the pathogen-killing properties of Ganges water and the British physician C E Nelson testified to its property of remaining fresh even on long sea voyages from Calcutta to London. How these properties arose and how they can be maintained are questions connected with the Himalayas and its upkeep.

A large number of the Ganga's tributaries originate in the extensively glaciated slopes of the Himalayas as well as the trans-Himalaya, fed by one of the world's wettest tropical zones. The intensity of the downpours and the high gradient of the Himalayan ranges lend great velocity to the downflows. The huge volumes of water gushing through each of the steep-sloping mountain streams clash furiously at their confluences, create clouds of sprays, getting ionized (electrically charged) in the process. Till recently, the thick forests on the hills used to protect the purity and transparency of the Ganga water, which was one of the finest assets of mankind.

Climatically, 'the Himalayas, in its different altitudes, presents an extremely wide variation from the tropical to the alpine and even arctic, as well as a very close juxtaposition of different types of climates. Biotically, however, India in its different longitudes and latitudes (even beyond the Tropic of Cancer) has remained tropical from south India up to the Siwaliks in the north, on account of the free movement of biota in the whole of the subcontinent south of the Himalayan enclosure.

Vegetationally, in the differing altitudes of the Himalayan ranges, there are rain-forests, evergreens and semi-evergreens, wet temperate forests and dry temperate forest moistures. If on India's mainland, too, tropical wet evergreen and tropical wet semi-evergreen are found along with tropical moist deciduous forests and the dry tropical forests, it is in no small measure due to the influence of the Himalayas. Infinite varieties of medicinal plants exist in the Himalayan ranges and sub-Himalayan tracts.

In respect of the faunal varieties, too the Himalayan ranges are among the richest areas of the world. Some species of animals are found only in this region. The sub-Himalayan tracts, are also quite rich in faunal diversity. The tropics' capacity for speciation, coupled with the moisture ensured by the colossal presence of the Himalayas, has been responsible for this massive gene pool on Indian soil.

If the Himalayas has been a great boon to India, it could also be a source of great disasters if its ecosystem continues to be tampered with. It is therefore imperative that we know the nature

of the Himalayas' vulnerabilities. As stated earlier, it is the world's youngest mountain system, and is composed of rocks which are most erodable. Since it is the tallest as well, the downflows from precipitation and the snow-melts from great heights erode the rocks even more. The great river systems of north India are thus highly prone to siltation and require continual desilting. However, India's planners have remained completely oblivious to this urgent need.

Secondly, if the vegetation of the Himalayas is destroyed, the highly leached soils of the eastern Himalayas and the characteristically loose soils of the central Himalayas, which are held together by forest cover will come hurtling down to choke the rivers, reservoirs and lakes. Destruction of forests – more so the mountain forests – means the destruction of both faunal and floral varieties. Once this process starts in the tropics, the losses are far greater than in the temperate countries. Moreover, this process is virtually irreversible.

Thirdly, the Himalayan rivers are in a continuing process of eroding their banks, depositing the clay, silt, sand and gravel on river beds and changing the river courses. Embankment of these rivers is not only futile but positively dangerous. By constricting the flows and pushing the water backwards, it causes floods in the upper reaches.

Fourthly, the Himalayas being in the zone where a major continental block is moving under another (plate tectonics), it is exposed to threats of natural disasters. Here, any act of human indiscretion, such as impounding a vast mass of water at one place in a man-made reservoir, can trigger disasters of unprecedented proportions.

Professor Savitri Burman, formerly of the Department of Geography, University of Delhi, who made many trips to the Himalayas and covered all the districts in the region over the last 40 years, has recorded her findings in a paper 'Resource Use and Himalayan Environment' which she presented at a seminar in 1986. Her quotation from Sir Edmund Hillary's statement published in 1982-83 is revealing:

> "When I first visited Mount Everest in 1951, what a beautiful place it was! We climbed through dense pine forest up the long steep hill to Namche Bazaar. The whole region was dense with greenery. Below the village, giant conifers soared, forming the snow and ice peaks that line the other side of the valley. We climbed to Thyangboche Monastery at 13,000 feet; it was clothed in forest and surrounded by a ring of superb mountains. We reached Pangboche village with its ancient monastery and its tall, gnarled juniper trees. Most of the junipers from here on were ample supplies of firewood"
>
> "About 25 years later I repeated this very same journey. The forest was woefully thinned by the axes and saws of the Nepalese who have been cutting timber for buildings. The trees below Namche Bazaar had been scarred by the heavy knives of Nepalese porters taking branches and bark for fuel and gummy hardwood for torches and lighting fires. The forests around Thyangboche had lost many of their mighty trees and the Pangboche area was also bare. Up to the Khumbu glacier valley there was hardly a juniper to be seen."

Savitri Burman's own findings reveal that

> 'There are definite indications of permanent and near permanent changes in climate in several parts of the Himalayas, tending towards desertic conditions: retreating glaciers, dried up springs, erratic precipitation, rising temperatures and higher temperature ranges. The observations and perceptions of a large number of persons, in both urban and rural areas, in practically all districts of the Himalayas in 1983-85 and since, points to a definite trend towards warmer summers, less snowfall, and more storms – dust storms in some places, thunderstorms in others, and hailstorms in yet some other places. In general, the rainfall pattern is becoming erratic...."

Is this nature's whim? No. It is in regions where 'development activity' based on nature-conquering concepts is going on that these grim changes are taking place. Dalhousie has avoided this path. It has shown no appreciable change in rainfall pattern.

Savitri Burman also found that the onslaught of modern growth over the years has led to increasing subsidence, rapid loss of water by run-off and heavy siltation and eutrophication of lakes in the region in addition to frequent floods in both the lower reaches and flat areas of the region and in the adjoining Indo-Gangetic plain. There is also evidence of migration of people from several pockets where soils do not yield enough for sustenance. Practically all slopes, especially in the western sectors of the high Himalayas, are now bare. These are the areas which once supported mighty glaciers with ice thousands of feet thick.

Erosion in the mountains takes many forms and is often classified into gravity flows like creep and rolling of materials down slopes, washing off loose materials, scouring effect and transportation of debris by running water in the form of sheet wash, rill and gully erosion and mud flows.... It is estimated that if the rate of water flow is doubled, the scouring capacity is increased four times, (soil) carrying capacity 32 times, and the size of the particles carried 64 times.... A study based on the satellite imagery of the UP Himalaya reveals that about 64.3% of the total land (or 78% of 'snow/ice free' land) suffers from some degree of erosion. An estimated 10% or 3,139 kms seem to be in the grip of severe erosion.

Landslides have escalated by leaps and bounds since the road-building process started. In Mussoorie, removal of limestone by mining the base has led to severe destabilisation of the hill station: the Mall has been sinking, buildings are developing cracks and support walls are collapsing.... In Simla, subsidence and slumping became noticeable in the late 1960s and early 1970s. In Sikkim, miles and miles of roads keep slumping. As the mining debris now covers large areas of hill slopes below the limestone belt, and has little water infiltration capacity, there is a large reduction in the effective catchment area in the Mussoorie hills leading to a faster run-off.

The diversion of water sources and drying up of springs have also had quite a number of unfavorable effects... villages in Doon valley have lost as much as 25% of their agricultural land because of the loss of irrigation sources, as well as grazing land. Reduction in water supply has affected the production of the famous basmati

rice. The fast run-offs and heavy loads of deposition are leading to changes in river courses and blocking water systems including canals.

With urbanization, industrialization, increased traffic and reduction of vegetative cover, pollution is rising. Air pollution is particularly noticeable in most valley regions where there is heavy traffic. Pollutants like carbon monoxide, sulphur dioxide, lead compounds and organic gases get trapped in the narrow valley where temperature inversions are very common.

The Bharbari and Terai belt, situated between the hilly region and the plains, was till recently covered with dense forests. Studies have revealed that now, barring a few areas in the Eastern Himalayas (such as Bhutan and Arunachal Pradesh), it is devoid of tree cover. Trees have been removed for practicing 'intensive agriculture' and turning the area into India's food basket! The Country's political leaders and opinion makers do not realize that forests are the foster mother of agriculture in perpetuity. To improve agriculture by removing forests is absurd even in the plains. It is madness to think of this in the hills.

Chipko leader Sunderlal Bahuguna has shown how forest destruction in the Himalayas has resulted in the drying up of water resources and desertification. He says, 'The flow of rivers has become so irregular that in Nepal the ratio of maximum to minimum flows may be 40:1 to 60:1 in the large rivers originating in the high mountains, and from 1000:1 to 30,000:1 in rivers originating below 2000 m. The ratio of maximum to minimum flow of the Ganges at Hardwar, where it comes down from the hills to the plains is 70:1.'

All these adverse impacts are traceable to two basic causes

(i) industrial and commercial activity has led to a spurt in population in the hill region;

(ii) the culture of 'cash generation', divorced from considerations of people's needs for healthful living has taken over.

Population growth in the hills has not been due only to the natural growth of the local population. During the 50 years between 1901 and 1951, population growth in the Himalayan region was 63.78%. But during the 30 years between 1951 and 1981, the population was up by 81.05%. The building of roads and dams, tourism and transportation activities created demands for other services. When new roads open up access to previously inaccessible forests, a whole series of devastation takes place. Population increases while land becomes increasingly degraded and unable to support even the pre-existing population. The locals try and compensate for this by increasing livestock farming, which degrades the soil even further. This becomes a vicious circle.

The 'cash culture' comes as yet another vicious circle. To cultivate potato, a cash crop, people felled trees, and potato harvesting led to an increased loosening of the soil. Since potato cultivation came to the Himalayas in a big way, *andhi* (wind laden with dust raised by soils loosened by potato harvesting) has become common even in the higher regions of the Himalayas. Another cash crop, maize, has been causing gully erosions. Plantations requiring heavy use of pesticides and chemical fertilizers are polluting the water streams. Cash culture has thus meant the ruination of life's bases on the one hand and wearing of diamond rings on the other. These kinds of cash crop cultivators know that their pattern of agriculture is not sustainable. They are therefore simultaneously investing in restaurants and hotels, oblivious of the needs of the common people.

Encouragement of cash crops cultivation has thus led to destruction of forests, ruination of the soil, pollution of water stream, dust-loading of air, and malnutrition of local people. A study by Savitri Burman in the watershed of Kali river revealed the following facts about the local people's malnutrition when the craze for exotic crops took over. The people of the western Ramganga watershed are now eating more of sugar, jaggery, tubers and roots (nearly 50% in excess) and taking 50% less in pulses, 78% less in oils and fats, 43% less in milk and 90% less in green leafy vegetables and fruits. Costly fruits which have been introduced in the region and are dispatched to city markets are beyond them, and they have neglected their local varieties of fruits. The search for edible wild fruits has also stopped.

It needs to be noted that in earlier times the hill people used to get sufficient amounts of carbohydrates, proteins, fats, vitamins etc. from their traditional foods. In 1981, R K Gupta gave a long list of trees which yielded fruits, fodder, fuel-wood, and timber, and also conserved soil. In the Himalayan regions, numerous varieties of millets under different local names such as madua jhagora, chua, kuri and buckwheat used to be the staple food-grains. People used to grow horse-gram and many other types of pulses as well as oil-seeds. The wild nuts, too, gave them nourishment. In today's imitative culture, rice, wheat, maize, and sugar have replaced these.

The solution lies in reversing the 'cash culture' in favor of 'people's need' culture and changing the concept of development. When we talk of 'people's need', precedence must be given to local people's consumption needs. At present, in the name of national need, the elite's needs get overriding priority. 'Development' is destruction if it does not improve the production base while increasing production. To do this, economics must be tempered with ecology, which is Nature's economy, and always in accord with *people's* economy.

Let us see how this would take shape if we apply this concept to the Himalayan region. The first step would be to restore the love of traditional foods and concentrate on cultivation primarily for local people's consumption for healthful living. Secondly, efforts must be made to understand the wisdom behind local people's traditional practices, in agriculture, transportation and so on. Thirdly, tree farming for perennial food (fruit), fodder, fuel and fiber must fill larger spaces. To that extent the role of agriculture for seasonal crops will gradually shrink.

Fourthly, for water harvesting, every micro-watershed has to be taken as the basic unit. Efforts must be made to revive, by utmost possible afforestation, the springs that have dried up. Forests are the common regulator of soil, water and air, and the base camp of oxygen-dependent life forms' journey on this planet. Afforestation is thus the single programme which serves the whole gamut of needs of both people and other living species.

Fifthly, since the scope for mini-hydel and micro-hydel generation is great in the Himalayas, every effort must be made to tap all possible sources for such generation.

Sixthly, since forest cover in the Himalayas has been so denuded that its restoration needs maximum abstention from fuel-wood use, the use of bio-gas plants, solar cookers and water heaters must be encouraged among the populations of the Himalayan region and the sub-Himalayan tracts. The local people could perhaps even take up their manufacture, installation and servicing. Despite the fact that bio-gas plants are not very suitable for high altitudes, their use is spreading among the hill people though solar devices have greater scope.

Seventhly, full employment in villages has to be generated through afforestation, soil regeneration, growing of *traditional* fruit crops and food-grains, solar cooker and water heater manufacture, bee-keeping etc. The vast scope of employment through fruit processing industries (drying of fruits, pickling, jam-making) remains to be appreciated by the planners. If this line of approach is taken, it will contain the trend towards urbanization. The Himalayan region can be the home of the world's largest herbal medicine preparation units.

While emphasizing these positive tasks, we need to reiterate that the destructive schemes of big dam building and clear felling of trees must be resisted. Felling of only those individual trees which are over-maturing should be permitted after scrutiny by the people. Further, road building should be discouraged. It is presumed that enough roads have been built to meet defense needs. In any case, if roads continue to be built in the hill-forest regions, the extent of havoc to our basic resources would be more than what an invading army could inflict.

Since many people, in the name of harnessing the large volume of water and vast hydel potential, advocate big dams even in the Himalayan region where the tectonic subduction process is in progress, a few points need to be made.

The *primary* question is not of water and energy alone or even of cooperation between neighboring countries. It is one of integrity of all resources in a given ecosystem. If there can be such measures as would tap the water and derive energy without destroying the forests, without disturbing the residence time of water in the various pathways of the hydrological cycle, and with no soil loss, no triggering of earthquake, no deprivation of fertilizing silt to, and no burden of more salt and pollutants on the downstream reaches, it would be very welcome.

But anybody who knows anything about the inter-relations of these resources and their pathways would say that the losses would be far more than the short-lived gains. Opposition to big dams does not arise only, or even mainly, from tribal interests. There are also many other issues in big dam construction which concern the non-tribals. But when it is urged that 'movements for protection of tribal culture is condemning the tribals to less then equal treatment', it evokes a pitiful feeling that our elite does not understand how mankind's hope of survival lies in the conservation ethics of tribals. One can certainly say that instead of talking too much in terms of bringing the tribals (including the tribals of the Himalayas) to the mainstream, it is necessary for the mainstream to imbibe the tribals' communitarian and conservation-oriented values.

On the question of tree-felling, too, there are hurt feelings that commercial exploitation of forests, 'even if scientifically and equitably undertaken, is considered wicked'. But what is scientific exploitation? The whole of silvilcultural practice as it developed in India and some western countries is unscientific and oriented to commerce, rather than maintaining the resource base and meeting the variegated needs of people. The argument is raised that 'not to allow commercial exploitation is to exclude a valuable partner in organizing, funding and executing an enormous and urgent exercise'.

The question is, what kind of forest does the fund-giver seek? Would it be such as would protect the soil, maintain the water regimen and meet people's needs? Enlisting people's participation would lead to far greater afforestation than scores of commercial

fund-givers are capable of. One single dedicated soul, Vishveshwar Dutt Saklani of Pujargaon, Tehri Garhwal, raised a dense forest of more than one million trees in an open area; and these were mixes of trees that gave fruit, fodder and fuel-wood to the local population and conserved the soil. There are many others who have planted several lakhs of saplings individually. They are the people's heroes. People's movements for afforestation can unleash such initiatives and work wonders.

Afforestation in the Himalayas or anywhere else can gather momentum only when the forest department is debarred from exercising the owner's functions. It should be transformed into a consultancy wing. Forests would ultimately need to be handed over to the care of the people. But until there is a strong ecological movement countering the pull of commercialism, mere handing over of the forests to village panchayats will not be the proper solution.

On Energy Sources And Energy Conservation

D.K. Subramanian[*]

Initially man used energy sources that were available nearby. Hence wood became an old energy source used for water heating, cooking and smithy applications. Discovery of coal and oil led to their becoming important fuels. This was followed by electricity. Electricity is essentially a secondary source, because we derive it from primary sources that are naturally available. Solar energy can be used to meet many end use requirements.

Since most of the energy we get is from the sun, the sources are either directly or indirectly derived from sun. Such sources are known as renewable energy sources. Examples are direct solar energy, hydel sources, wind, etc. Some forms of energy sources are due to slow energy accumulation to generate fuels over a very long period of time. These sources, once used, get depleted and cannot be easily regenerated and hence are known as depletable or non-renewable resources. Examples are coal, oil, etc. Bio-mass is an indirect form obtained from sun. If our use of bio-mass/year is equal to regeneration, it becomes a renewable source, else it is depletable. Present usage of bio-mass, mainly in the form of firewood, leads to depletion and hence it can be construed as a depletable one.

There are also indirect forms of energy obtained from various activities that are going on, (wrongly called wastes). For example, we can get bio-gas from animal, human and factory wastes. We can get lignin from paper factory wastes. We can also use agricultural residues like straws. husks, shells etc. for energy purposes. Rice husk, rice straws, stalks from ragi, coconut shells, groundnut

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shells, coconut leaves, etc. are some examples. Since we are producing food every year to feed our population, since the production will be increasing every year and since the residues form a sizable part of the plant, it is appropriate to consider them as a source of renewable energy.

Some energy sources like coal, oil, electricity are priced and available in the market and hence are known as commercial energy sources. Some others like agro-wastes, firewood, cow dung etc. are privately obtained through various means (like gathering, got from one's own fields etc.). These are known as non-commercial energy sources. In our countries with dominant rural economics, noncommercial energy sources play a dominant role. An underestimation reveals that the percentage of noncommercial sources is more than 50% for a country and the percentage for villages is nearer about 90%.

Even though noncommercial energy plays a vital role, our entire planning, design and implementation activities revolve around commercial sources. We have electricity utilities, coal agencies, oil corporations etc. and also distribution centers; planning and budgeting focuses only on these resources. Recently, noncommercial energy has come to the attention of the planners — but in a very small way only. There is no integrated approach to plan the utilization of noncommercial resources.

Any energy plan should take into account various factors like

(i) Preferred form of energy converters
(ii) major end use of energy like cooking
(iii)Preferred use of renewable energy
(iv) avoidance of (or minimization of) use of depletable sources
(v) Maximization of efficiency of energy use.

Since renewable energy sources are very important from the point of view of sustained development, let us look at some of these sources.

Hydel Energy

In hilly terrains, wherever water falls down a height, there is a potential for hydro energy. This has been tapped in the early days to run water wheels, to run grinders and later on to run turbines to produce electric power. Since large water drops and dense forests go together, many hydroelectric projects are constructed in such places far away from consumption centers. Because of abundance of rainfall, the western Ghats has a number of rivers with good potential for electrical power. Starting with Shivanasamudram in 1900, many of them have been tapped. For example Sharavathy, Moyar, Pykara, Idukki, Kali, Koyana etc., are some of the power stations in the western Ghats region.

Power consumption is almost evenly balanced throughout the year – as more than 70 per cent of electrical energy is consumed by industries; but water availability in many of these rivers is restricted to the duration of monsoons – about three months say. So in order to generate energy evenly, water is stored in reservoirs. This results in the submergence of large areas – of prime forests. The philosophy in the design of such projects seems to be to use every cc of water and every Centimeter of head. The consequences to forest areas are not considered in the design. These days, one sees design of dams with carry over capacities. Such designs ignore the following factors:

(1) forests provide certain life structures. They have a value beyond the commercial value :

(ii) Even the commercial value is replaced by a nominal value :

(iii) The bio-mass in that area can produce firewood which is also energy. Hence the total energy should be the net energy (energy from water – energy from annual growth of firewood in the area under submergence). When this was considered, it was found that in the Bedthi project, (Karnataka, India) the existing design yielded less energy from water than can be got from firewood.

(iv) Effect of silting is not considered.

(v) Resettlement costs are not taken into account properly.

(vi) Need for a minimum, contiguous forest area for biological diversity, for better ecology, and for water and soil conservation is not taken into account.

From the above, it can be seen and shown that for minimum damage to ecology and social structure, it is desirable to go in for some peaking plants with minimum storage and a large number of micro/mini hydro electric plants. With new technologies, micro hydel plants operate at higher efficiency with minimum maintenance. Because of the higher costs of construction of dams and their support structures, and the need and cost for long distance transmission lines, micro hydel plants are becoming economical.

Microhydel plants can also provide electricity to the neighborhood, thereby providing a much needed dispersal in electricity usage.

Bio-gas

Bio-gas can be obtained from cattle waste, sewerage, organic wastes (like leaves, fruit and vegetable wastes) water hyacinth, industrial wastes (like cotton willow dust, spent wash in distilleries etc.) : The potential for bio-gas is great – about 240 billion units (thermal) per year – nearly three times the electric energy produced/year. Also bio-gas units give us two important advantages

(i) we get more manure (three times nitrogen is got as compared to open composting):

(ii) the surroundings are clean, so health and hygiene improves. In the case of industrial wastes, bio-degradation takes places.

Bio-gas, a by product from these digestion plants, can be used for cooking, lighting, lifting water, running tractors etc. It will be a substitute for firewood, diesel and kerosene. Hence these plants are being popularized in our country. The following problems exist in bio-gas usage.

(i) At present, many tested designs – like KVIC, UAS, etc., are being popularized. The existing designs still have many problems – flooding, economics, non-generation of gas in winter. Hence many new designs are being investigated.

The Adike Belagarara Sangha, Sagar is popularizing a model. This model uses less cement : By using simple feed-back concepts, it is possible to get gas in winter. Digging of a trench around the plant has reduced flooding of the plant in monsoon. Pressure of gas is increased by keeping the outlet point for sludge at a higher position than usual.

ASTRA, IISc has come up with an optimized design of KVIC model and this has been experimented for over one year. Incorporation of a solar water heater on the top and charging dung with hot water obtained from the water heater has increased yield by more than 50 per cent.

Some of the problems are :

(i) a good design using simple materials with minimum trouble shooting is needed.
(ii) Research is yet to be done to get maximum carbon from wastes so that yield is quite high. At present only some forms of cellulose are decomposed; other carbon components are not changed and thereby they go with the sludge.
(iii) Existing designs are good for cow-dung and sewerage. Lot of work is still to be taken up for digestion of other wastes like water hyacinths, vegetable and agro-wastes and industrial wastes.
(iv) Even though bio-gas plants are put up in many places, there is no follow up activity – both to understand its social effects and to provide maintenance. There is a claim that putting up a large number of bio-gas plants will deprive poor people who do not own cattle from collecting cow-dung available in village common grazing areas. Similarly, many people do not use gas for cooking due to religious convictions. These social aspects need a study.

A brief survey of bio-gas plants in Karnataka undertaken several years back showed that repair and maintenance of bio-gas plants is a serious problem. Many plants were lying unrepaired for want of skilled persons. Skill generation and training of local artisans for maintenance will have to be taken up along-side popularization of these plants.

(v) Community bio-gas plants have many social problems and many of them are failing due to non-availability of dung, non-cooperation etc. One of the main reasons of failure is the fact that the gas is used for cooking. People have firewood for cooking at zero or marginal costs. Hence there is no strong motivation to cooperate. (Benefits, if any, – like ease of cooking, reduced cooking time, no smoke etc., – go to womenfolk). Instead if other end uses like lighting, lifting water are chosen, there may be greater chances of success. Also, it is not necessary to have a plant for the entire village. One can experiment with a plant for a group of houses in the same social level. Another problem is that of operation and maintenance. Hence, it is desirable to study the many large plants already put up and ascertain reasons for failure as well as social implications.

Instead of trying traditional uses, one can think of other uses also. For example, Gowlis in U.K. Dist., have large cattle population, and have enough dung. If their cattle are stall fed, the dung is put through a bio-gas plant, the sludge is used for fodder production, the gas is used for pumping water and for chilling milk and for producing milk products, then their life style will improve, they won't graze forest areas and the neighborhood will improve ecologically, they may not migrate from place to place also.

Other Renewable forms – solar and wind

These sources – solar and wind – are mainly used as a substitute for firewood and electricity and to that extent, they reduce the degradation of forests. Estimates of wind potential in Karnataka is around 40 billion units. Wind is a good candidate for pumping water. The major problem with wind mills seems to be their costs. At the present market situations, wind energy seems to be expensive.

Solar energy has been used from very early days – both directly and indirectly. Here we consider the direct use. Simple devices in urban areas to provide hot water for industries, hotels, canteens etc., can reduce consumption of electricity, firewood, kerosene and furnace oil. The hot water system installed in the silk filatures factory at Kanakapura, Bangalore District will replace the boiler.

Similarly, there is a strong potential to use solar hot water systems in hotels, canteens, dairy, textile industries, etc. all such uses will indirectly benefit the environment.

Agrowastes are also being used as a fuel. They have many competing uses – as fodder, to fertilize soil and as fuel. The present day use of agrowastes as fuel (energy equivalent of 200 billion units/year) is very inefficient. It is desirable to develop technologically simple, easy to use, less expensive, high efficiency and easy to maintain conversion devices. Large scale units might divert agrowastes from a waste to a marketable commodity with a price. This, according to some, will deprive poor people of their fuel. In-depth analysis of such problems and linkages is necessary, because such a statement is not true of all agrowastes. It has been found that many agrowastes like rice husk, arecanut husk and shell, sugarcane bagasse, etc., are not used by poor people. Hence, it is desirable to find out efficient methods of using such non-competitive agrowastes.

Similarly, industrial wastes especially from paper industries contain a large amount of lignin. It is possible to use them as a fuel thereby saving firewood and reducing pollution of water sources.

Bio-mass

Bio-mass is a generic name to include various types of plant mass that grow on earth-both land and sea. Table 1 illustrates the various sources of bio-mass. Some of the sources like forestry are grown naturally; some like social forestry, agricultural crops are cultivated by man; some like agrowastes are by-products of our activities; some others like weeds grow on their own. These weeds, once considered a problem, are now grown and cultivated by man. The annual growths of bio-mass are very large.

One of the basic problems connected with bio-mass is the selection of proper uses. There are many uses for bio-mass. Table 2 lists various uses of bio-mass; the important being food for men, fodder for animals, fertilizer, fibers and fuel. The main uses of agrowastes in India are :

(a) fodder for animal,
(b) nutrient to the soil:

(c) fuel and
(d) industrial products like particle boards, papers etc.

Another smaller use is as building materials – specially for roofs. The majority uses agrowastes have been as fodder and fuel. Hence it is imperative that emphasis on one use should not reduce the availability of the raw material for another use. In a poor country like India with a vast cattle population, fodder is an important problem. Today, some of the agrowastes have been diverted for production of paper and boards and poor people are deprived of their fodder.

This does not mean there is no agro-waste available for energy production. There is still a large quantity of bio-mass – non edible and edible – available for energy generation.

In India we use most of our bio-mass – natural and wastes. But the bio-mass is used for energy in an inefficient manner. Efficiencies of combustion are in the range of 10-15%. So by improving these efficiencies, we can either reduce consumption of bio-mass (and thereby increase the bio-mass going for fodder or soil nutrition) or use the remaining part of bio-mass for new activities.

Table 3 shows the various possibilities of use for the bio-mass fuels. The diffused nature of availability of bio-mass in various parts of our country makes it possible to build localized energy centers which will supply energy to many local small industries. Table 3 contains many decentralized uses like jaggery making, bricks manufacture, village hotels, etc.

The advantages of using bio-mass for energy are given in Table 4. The problems are also listed. The technologies are commercially available, financially viable and environmentally sound. The energy centers will be spatially distributed.

Because of the many advantages, many countries not only find ways and means of using these wastes, but also go ahead for intensive cultivation of some of the plants, weeds and algae – as a viable alternative to conventional energy generation methods.

The problems are not serious or insurmountable. They can be solved and a balanced land use pattern can be achieved.

Potential of Bio-mass

The calculated potential of bio-mass is very revealing. For agro-wastes, we know the residue factors and crops production. With these, we can calculate the availability of agro-wastes every year. Table 5 gives the residue factors for some important crops.

The available potential of bio-mass is ten times the current annual energy use. This shows that bio-mass is a prime renewable resource candidate for energy production. Economically and technologically also, bio-mass is very competitive. Developing countries get 50% or more of their energy from bio-mass. Even developed countries are increasing their dependence on bio-mass. Other advantages are improvement to our environment, renewable nature of this fuel and increased production with increased population.

Table 6 shows the energy calculations from fossils fuels and bio-mass and Table 7 gives the annual world production of bio-mass. Karnataka's agro-waste potential is given in Table 8. The total energy available is 46 billion units/year. This is nearly five times the current electrical energy production in the state and nearly double the total energy consumed in 1979. The total commercial and noncommercial energy consumption in the state of Karnataka is equal to 27 billion units. The agro-waste used for energy was only 2.536 million tons of coal equivalent. Table 8 gives the maximum potential available – nearly 111.589 billion units (thermal) based on 1979 production figures.

Table 9 gives a partial picture of use of bio-mass for energy in some countries. We can see that gasohol, energy plantations, bio-gas, and hydrocarbons from plants have become important alternatives for energy generation.

Energy conversion from bio-mass

There are many different ways and routes of using bio-mass for energy. The oldest and simplest is the direct use – burning in

stoves or furnaces. Many agro-wastes have been used at very low efficiencies because of their nature and characteristics as well as devices used for combustion.

To improve the efficiency and the quality of fuel, other indirect methods were invented – like densification, pyrolysis, fermentation, anaerobic digestion etc. Similarly improved – high efficient – devices like stoves, ASTRA OLE, boilers for hot water have been developed. The Astra Ole can reduce and has reduced consumption of bio-mass by half.

Various energy conversion routes are given in Table 10. Wood chips and other processed bio-mass can be fed into a wood gas generator which produces wood-gas. The quality of fuel has been increased considerably in many cases so that it can become a substitute for oil or coal or coke. Similarly, we can produce electricity through various routes and the electricity can be used for lighting, water lifting, running motors in rice mills etc.

Table 1 Sources of Bio-mass

1. Field crops	(grains, sugar, roots, oil, hydro-carbons, Euphorbia lathyrus)
2. Forest crops	(leucaena, copaiba, chinese tallow, poplar, casuarina, prosopis juliflora, acaccia, auricultiformis, jalitrees)
3. Forest residues	(twigs, leaves etc.)
4. Forest weeds	(Eupthetorium, lantana)
5. Grass lands	(Napier grass)
6. Agro-wastes	(crop residues, grain residues /husks)
7. Domestic wastes	(food, rubbish, sewage)
8. Animal wastes	
9. Industrial residues	(forest based, food processing and agro-industries)
10. Aquatic plants	(algae, weeds like water hyacinth, hydrialla; Uni cellular – Chlorella, Navicula; multicellular algae – kelp etc.)
11. Garden wastes	(coconut, areca)

Table 2 Bio-mass uses

Pharmaceutical
Fragrance
food
Fillers
feed
Fiber, paper, boards
film
timber
chemicals
fertilizer
fuel

Table 3 Energy Needs where agro-wastes can be used

Domestic
- cooking, hot water

Agriculture
- water lifting
- transport

Small industries
- jaggery making;
- paddy drying;
- bricks and tiles making;
- lime burning
- black smithy
- sericulture activities
- tobacco curing
- crafts — toy making
- milk/sweets making
- coffee/tea processing
- textiles
- rayon
- soap
- paper making
- vanaspati
- timber curing

Commercial
- hotels
- shops

Table 4 Advantages and problems in Bio-mass for Energy

Advantages	Problems
1. Stores energy	1. Land water use competition
2. Renewable	2. Supply uncertain and seasonal
3. Versatile conversion and products; some with high energy content	3. Soil requirements
4. Technology known	4. Existing practices
5. Low capital input	5. Transportation
6. Available to many strata of the society	6. Bulky storage
7. Large potential	7. Low efficiencies
8. Employment generation	
9. Reasonably priced	
10. Ecologically safe	
11. Availability in many places (diffused)	
12. Does not increase atmospheric CO_2	
13. Potential may increase with population	
14. Potential reduction of weeds like Euphetorium	

Table 5 Residues yields per ton of crop at Harvest (left above the ground)

Crop	Residue factor
Beans and peas	0.66
Cotton	1.2
Maize	0.6
Groundnuts	1.15
Potatoes	0.12
Rice	1.15
Sunflower	5.15
Wheat	1.83

Table 6 Fossil Fuel Reserves and resources, biomass production in the world (1979)

1. Proven Reserves	Tonnes Coal Equivalent
Coal	50×10^{10}
Oil	20×10^{10}
Gas	10×10^{10}
	80×10^{10}t = 2.5×10^{22} J
2. Estimated Resources	
Coal	85×10^{11}
Oil	5×10^{11}
Gas	3×10^{11}
Unconv. oil & Gas	20×10^{11}
	80×10^{11}t = 30×10^{22} J
3. Fossil fuels used till 1976	2×10^{11}t Carbon = 6×10^{21}J
4. World's Annual energy use	3×10^{20}J
5. Annual Photosynthesis	
a) net primary production	8×10^{10}t = 3×10^{21}J
b) cultivated land only	0.4×10^{10}t = 1.5×10^{20}J
6. Stored Biomass	
a) total (90% in trees)	8×10^{11}t = 20×10^{21}J
b) cultivated land only (standing mass)	0.6×10^{11}t
7. Atm. CO_2	7×10^{11}t carbon
8.. CO_2 in ocean surface layers	6×10^{11}t
9. Soil organic matter	10 to 30×10^{11}t
10. Ocean Organic matter	17×10^{11}t

Table 7 Annual Biomass Production (tonnes)

Net primary production (Organic matter)	2×10^{11}
Forest production (dry matter)	9×10^{10}
Cereals	1.5×10^{9}
Roots	5.7×10^{8}
Sugar	1×10^{9}

Table 8 Total energy potential from agro-wastes for Karnataka (Year 1979)

Crop	Area (million ha)	Total energy content (million units)
Rice	1.146	15050
Jowar	1.98	8141
Ragi	1.03	9800
Bajra	0.663	1370
Maize	0.184	6000
Wheat	0 .344	1520
Small millets	0 .402	350
Pulses	1.375	2750
Oilseeds	1.45	5688
Fibres	1.08	10050
Sugarcane	0.158	40000
Coconut	0.156	7800
Others	-	3070
Total		1,11,589

Table 9 Some Bio-mass uses for energy in other countries

Kenya	75%	}
India	60%	} of their total energy
China	33%	} requirement from Bio-mass
Brazil	25%	}
Sweden	9%	}
Brazil	alcohol from sugarcane 10-14 billion litres/ Yr.	
Zimbabwe	ethanol from sugarcane — 40m litres	
USA	Gasohol from maize 1 m. barrels/day silviculture plantations of pines, willows, o aks, maples, sycamores etc. Euphorbia Lathyrus in Arizona 1.5tons/yr./ha	
France	methane generation, use of charcoal, carburol	
Sweden	Fast growing willows	
Mexico	Parthenium argentatum	
Australia	Botryococus braunii (alga) (produces a hydro carbon liquid)	

Table 10 Energy Conversion

Thermo chemical
- Direct combustion — stoves, furnaces
- Densification
- Fluidised bed combustion
- Pyrolysis
- Liquefaction
- Gasification (Wood-gas)

Biological
- Fermentation (ethanol)
- Anaerobic Digestion (bio-methanation)

II. Energy Conservation

So far we looked at the resources; since energy consumption is met by these resources by various routes and devices, it is possible to improve efficiency of conversion routes and devices thereby reducing requirements for energy. This means that we can meet the needs for development – industries or irrigation or institutions – with lesser quanta of resources. This aspect of energy conservation does not directly affect the ecology of Western Ghats, but it has an indirect effect. Energy – particularly electrical energy – planners always claim that "Energy aids in development – bread for starving millions" – and on that basis, they seek funds for additional projects – like Silent Valley, Bedthi and Gangavalli etc.

This strategy of building more and more projects to meet growing demands on energy is not the only solution. Is this true ? If we look, particularly, at electrical energy, we come to know that the amount of used energy is very much less than 10 percent. Out of 100 percent energy available in coal, say, the following energy reductions occur:

	Percent	Percent
Transporting of coal	10 remainder	= 90
Power station efficiency	30	= 27
Transmission and distribution losses	30	= 18.9

Device efficiencies vary from 5 percent - 60 percent. Only electrical motors have a high efficiency. If we assume an average efficiency of 25 percent, then the usable amount is given by .25 x 18.9 = 4.725. Hence about 95 percent of energy goes as waste to atmosphere.

The above does not include wastage of energy in the process, in the management etc. (common examples to illustrate the point are a stove burning without any cooking done on it, an over designed large furnace being used to heat small items in a foundry etc.) Through energy audit and process redesign, it is possible to reduce these wastages also.

Hence it can clearly be seen that new generating plants are not the only solutions to produce additional energy. Energy conservation is the answer. This is illustrated by a few examples below: (By energy conservation we mean that for a given process and for a given production, energy used is reduced).

(i) Irrigation pump sets are one of the important consumers of energy. The total load in this category is 16490 Mw, number of consumers is 4.233 million and consumption is 3420 units/consumer. Inspite of this being a major load, no efforts are being done to improve energy efficiency. Farmers use normally very high capacity pumps. Studies reveal that most farmers buy pumps with capacities 10 hp or more. They operate these pumps at less than half its rated capacity. This reduces efficiency. Secondly, quality control in motors and pumps is not very good. Slight changes in the dimensions of air gap and in the casting of pumps reduce efficiency further. Thirdly, low power factors and low load densities increase losses. Studies reveal that efficiencies vary from 15 - 40 percent and power factors from 0.3 -.8. There is a high probability to improve this situation and save energy.

An interesting example of management — which should be encouraged — is community pump sets. A few persons buy a pump together. This reduces the total pump capacity. If 5 persons join together and buy one set of 15 hp, the capacity reduction will be 35 hp, (from a capacity of 5 x 10 = 50 hp to a capacity of 15 hp). This reduces capital costs on pumps, distribution lines, substations etc. Secondly, hours of operation increases, thereby improving load factor and increasing the revenue of the electricity boards. Thirdly, due to better capacity utilization, efficiency also increases. A spin off from this can be a piped water supply for drinking water to the village. Since the cost of pump has come down to the group, they can siphon off part of the savings in capital cost to the cost of piping.

(ii) the energy conversion devices using firewood are crying for our attention. To cite a few examples.

(i) chulas used for cooking have low efficiencies of conversion — about 10 to 15 percent — resulting in wastage of 85 - 90 percent of usable energy,

(ii) water heating devices also have poor efficiencies,

(iii) devices used to boil water in agro-processing, in sericulture in hotels and canteens, and in small industries have low efficiencies of the order of 20 percent.

(iv) Tobacco curing barns use firewood, because air vents are not properly designed, efficiencies are poor.

(v) Tile and brick making kilns consume large quantity of firewood. In almost all processes that employ firewood, energy efficiency was not a factor in the design and also they employ traditional and old methods. These lead to the following studies and solutions:

(i) The major problem of chulas is being studied at various centers. Many designs of smokeless and partially smoky chulas have been developed. The ASTRA Ole designed scientifically to minimize heat losses has three chambers whose openings are to be so determined as to fit closely vessels used and a chimney. A grate is provided with an air inlet to allow proper flow of air so as to maintain a steady flame and to transfer heat to the vessels in the neighboring chambers. In the fuel box, one can put firewood logs, twigs, agro-wastes like stalks etc., and fire them. The chula is mainly made of bricks, mud and rice husk. This chula has been popularized in four parts of Karnataka – Aneka Taluk, a dry area; Ungra village in Kunigal Taluk, a semi-arid area; Sirsi taluk, high rainfall, hilly, forested area ; Kumta Taluk, coastal area. More than 200 numbers have been constructed and their performance is being continuously monitored. In addition to the fact that the efficiencies are in the range of 25 - 35 percent, the chula has other advantages – it cooks food faster, the flame is steady so one need not go on blowing the firewood and no smoke with suspended particles are reaching the eyes of women who are cooking.

As this chula can be made locally, it is only necessary to provide an intensive training to local people to build it in

houses. Chulas really provide a major impact on environment. Hence popularization of chulas is a major activity. This has three states – training, construction, monitoring.

Many organizations – technical institutions, voluntary groups, industries – have been coming with many designs of chulas. Many of them do not have a good efficiency and this has brought a bad name to smokeless chulas – as these are called. Hence a test house to help in testing and certification is essential – at least to inform governments and organizations of the different types of stoves available, their properties, their efficiencies, their uses and suitable places/types of usage.

(ii) Allied to the problem of household chulas is the problem of design of stoves for hotels, canteens, balawadis, schools, and hostels. Since they consume wood from forests as already stated, heat transfer in these stoves should be studied and based on it, proper, high efficiency stoves should be brought out. Some private persons, sometime back produced cooking devices in which cooking is done by steam. This reduced time of cooking and alternate fuels like electricity, firewood, coal, kerosene can be used easily in them. Even though claims were made about their better efficiencies, no detailed studies were made. These cooking devices are to be found in many hostels and hotels which use gas/firewood/electricity. It is worthwhile studying this option versus the large traditional chulas used in many hostels, canteens etc., from the point of view of efficiency.

(iii) Another allied problem is water heating. A sizable part of firewood and agro-wastes are used in preparation of hot water for bathing. "Devices" used are very inefficient. Many developments are taking place in this area in improving existing devices -

(a) trying to use flue gas from the chula,

b) designing a device based on smokeless chula model

(c) designing a boiler – an individual person in Sagar Taluk in Shimoga District has built a boiler that works on arecanut shells. There is a great need to develop and popularize such devices in various areas.

(iv) Tobacco curing consumes a large quantity of firewood. Even though this activity is going on for many years, the design of air vents is not properly done. I was given to understand that installing a gas jacket with a reduction in size of air vents will reduce consumption by 30 percent. Again detailed studies on efficiencies of existing barns, and on the design of boilers and air vents are necessary to reduce firewood consumption.

(v) Firewood is used in traditional activities like brick kilns and tile factories. By redesigns and by proper reuse of heat (either from the kiln or from other sources) it is possible to reduce consumption of firewood. Unless concerted action based on proper and detailed studies is taken, these traditional industries will consume more "power".

As regards bricks, it has been shown that it is possible to produce compressed mud blocks (with surki) which have the same strength as burnt bricks. This method saves energy from fuels, provides employment to local people and saves transportation expenses. A compressing machine, named ASTRAM, has been developed and used in various places. It is desirable to use this in construction programs extensively. Studies on similar extrusion technologies for tile making are under progress.

(vi) Sericulture industry uses hot water for cooking and reeling. It may be desirable to introduce efficient devices in them. @SUBHEAD = V Rural Electrification – Dynamics and Implications

When we looked at the rural energy scene, we found that the requirements of lighting is met by kerosene and the illumination level of this is very low leading to an optimal energy scene of lighting through electric bulbs. Let us see the scenario of rural electrification. Despite many years of electrification activities, the process is yet to reach a large number of villages. Even where it has reached, the number of households having electricity is low – about 25%.

Uttara Kannada District in Karnataka has a number of hydroelectric projects and the new atomic power plant is also located in Kaiga in that district. If we see the rate of rural electrification, it is only

42% in 1982. The progress is also slow; the number of villages electrified in 1971-72 was 20 and the number in 81-82 was 44 – just about twice. It may take 10-20 years to electrify other villages and hamlets. Even if a village is electrified, the electricity does not reach all households because of high capital costs. The present cost of a connection is more than Rs. 1000/- and this is not affordable by many rural households. Hence even though the cost of electrical energy/month is less than the cost of kerosene, people are not moving towards electricity.

In order to reduce the cost of electrification and cost of installation, we have proposed a new pattern of circuitry. This will reduce cost of electrification by about 50% and cost of installation by 80-90%.

The important characteristics of this are :

(i) Run a separate lighting line. Optimize the route of this line with the help of optimization techniques.
(ii) Supply power for fixed hours in the evening in order to avoid metering and meter charges. Fixed charged can be collected from households.
(iii) Each household is restricted to 2-3 bulbs only.
(iv) Every tap from the mainline runs though 5-6 houses thereby reducing the line length from tap point to the houses and also reducing the cost/installation.
(v) Each house is provided with a simple main switch and cutout.
(vi) Voltages can be reduced to 18V/36V if bulbs are manufactured for that purpose. Inexpensive inverters or transformers can be installed for this purpose. Currently bulbs for automobiles are available at 12V. The idea is to reduce shocks and increase safety.
(vii) Since rural electrification is going to take a long time, it is desirable to go in for decentralized systems using biogas/wood-gas generation system, dual fuel engines and an electrical generator. The cost is around Rs. 1.8 - 2.00/unit of electricity generated. This compares favorably with grid electricity – after removal of subsidies.

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Report Of The Workshop

Presentations

Making his presentation on "Natural Resources and the Environment", **A. Atiq Rahman** said there was a looming environmental crisis in the Himalayan-Gangetic region, but also many myths and poor information, In the environmental arena, there existed overly simplistic "funder-driven" ideas, including the one that answers to development problems lay in merely "giving money to the poor" The government-to-government relationship was not too good in the sub-region and information and data difficult to access. During the 1988 floods, for example, Bangladesh experts realized that there was a severe dearth of information required to study floods. It was important to begin serious study of the environment, resources, people and development. In Bangladesh, the most cost-effective way to promote afforestation was through NGOs as they could get people involved in a way that the government could not. Firstly, however, it was important for NGOs to build their expertise on environmental issues.

Saleemul Huq, speaking on "Natural Resources and the Environment", said a comprehensive regional study of the Himalayan-Gangetic ecosystem had never been carried out. Certainly, some natural phenomena were beyond human control as they depended upon geological, atmospheric and climatic conditions. However, there were certain issues on which study could begin. There must be increased communication between the countries of the region at the popular level as well as between governments, the scientific community and NGOs.

Iqbal Ali presented a Bangladesh case-study of "the NGO experience on the environment". He said that people's participation was the key, but how it could be ensured was the question. Were people aware of their own immediate and regional environment? It was clear that unless environmental concern was incorporated by NGOs in their day-to-day activity, the type of development appropriate to the region could not occur. Having studied a sampling of Bangladeshi NGOs, he could say that no organization had

mechanisms or procedures to take account of environmental concerns in their activities. He suggested structures which would enable NGOs to be more environment-sensitive.

In his presentation on the "Impact of Energy on Environment and Development", **D.K. Subramanium** described the work of the Indian Institute of Science in the application of science and technology in rural areas (ASTRA). Describing the failure of many fuel-efficient chula fabricators, he said "There are more bogus improved chulas than regular ones'. In rural India, cooking stove normally worked with 5 to 10 percent efficiency. His institute, in Bangalore, had designed a new chula called Astra Ole, made of mud and husk with which efficiency was raised to between 30 and 45 percent. There was minimum of 50 percent saving in fuel, he said.

Dipak Gyawali said it was not enough just to want trees. "We should want trees for the right reasons." He said the demand made for building huge reservoirs in the Himalayas to hold back monsoon floods would be unrealistic for the sheer cost of the engineering works. The process of siltation, flooding and other aspects of Himalayan rivers were not yet well enough understood to start making utopian plans. In taking floods, there was a need to meld the hard science and the social sciences. Deforestation, it was true, was having a tremendous impact at the local level and that was reason enough to start re-foresting the Himalayan hills.

Philip Gain and **Alo D'Rozario** presented a paper on "Tribal Communities and Deforestation", focusing on the central Bangladesh area known as Madhupur Garh, where dense Sal forest had been almost completely destroyed, to be replaced by rubber plantations, eucalyptus and acacia. Plantation owners, big international banks, timber merchants and vested interests in Dhaka were responsible for the destruction of the forest. Decisions about Madhupur Garh were made by people as far away as Manila and Washington DC. Those who were affected, tragically, were the indigenous Garo people and others who lived in Madhupur Garh. The question was not only one of environmental concern but human rights. While Madhupur Garh's forests were already "half-dead", in official documents they remained intact. In future, the Garos must be allowed

to use the forest lands which have been taken from them through unfair means. People's participation was clearly the key to properly manage woodlands such as those of Madhupur Garh.

Sailendra Nath Ghosh said in discussing the principles of sound development, it was important first to define what "development" was, It meant the universal accessibility to health-giving food, hygienic surroundings, proper clothing, shelter, un-polluted air, etc. The focus must be on self-reliance, the optimum realization of each locale's potential, harmony between plant, animals and society, protection of plant and animal species, protection of the inanimate environment, and the nurture of broad-minded men and women. Above all, "there was no enjoyment without a price". The principles that were important to know were : "everything is connected to everything else", nature does not tolerate uncontrolled growth of any species; the natural cycles such as the nutrient cycle and the hydrological cycle must not be disturbed, stability lies in diversity. Growth beyond a certain limit becomes a disease. Many of India's problems including those relating to the environment, could be dealt with through the setting up of a "5-tier federalism". Fighting against commercial forces, he pointed out, was much more difficult than fighting a government.

Qazi Faruque Ahmed, in his paper "Environment, A Casualty of Economic-Centered Development", said traditional wisdom claimed that India was to blame for drought in Bangladesh and Nepal for the floods. This could not be entirely true, as there were substantial environmental problems within Bangladesh as well. Actually, Bangladesh did not have an environmental problem as such, but a problem of poverty. Physical ecology and social ecology together made up the "environment" but most environmental studies limited themselves to studying the former. Bangladesh's environmental problems were related to agriculture and deforestation. There had been increasing poverty in the farming sector while the government had usurped forests by nationalizing them on behalf of the elites. With the backing of multinational and bilateral donors, mono-culture plantations were being pushed. The environmental problems of Bangladesh had a direct impact on the poor, women and the tribals. The popular mobilization at the grass-roots must also be carried over to the macro level. There must be collective action by NGOs

so that the Government could no longer push them towards the periphery of its concerns.

Sisir Sanyal, speaking on "Gandhian Philosophy and Ecology", said the solution to environmental and other societal problems was to concentrate maximum power at the village level and minimum power at the highest levels of the state. On the whole, environmental problems were man-made rather than due to the vagaries of nature. And the few who were responsible for ruining the environment did so in the name of the maximum number of people. Everything was done in the name of the people: from the green revolution to the creation of drought. It was worth recalling that the Indian Constitution gave no power to the villages. The status quo in South Asia would continue until there was a massive mobilization of the people. All other solutions would remain patchworks. "We need a revolution, not relief," he said.

Mohammed Ataur Rahman, speaking on "Cultural Aspects of the Environment", said that the environmental underpinnings of South Asian civilization were established thousands of years ago during the times of Balmiki, Kalidasa and the Sakyamuni Buddha. Respect for the environment was ingrained in the religion and cultural beliefs of south Asia. Even though air and water had tremendous ability to purify themselves, the modern human race was capable of irreversibly polluting these natural resources. Planners and engineers should be wary of pushing programs which could destroy traditions and lifestyles in the rural country-side. Folklore and rural traditions were changing due to external influence, cultures were increasingly being subverted. Sacred trees such as the banyan were being chopped down and sold in the marketplace. Even forms of worship were changing due to shifts in middle class desires. However, while some traditions were susceptible to corruption, others could provide fighting tools on behalf of the environment.

Helen Rahman, speaking on "The Child and the Environment", said that while everybody loved children, the emotional links did not really ensure that the rights of minors were ensured. Often, children seemed to exist merely to cater to the emotional needs of adults. The process of misguided development in South Asia were hurting children disproportionately. The moral reason for

safeguarding our environment was that natural resources of the planet were a kind of a trust fund that should be saved for indefinite use by future generations. If the present generation dipped into that trust fund, our children and their children would suffer. The environmental needs of the child were simple: food, sunlight, air, soil, uncontaminated water and other physical basic needs. In Bangladesh, which had 48.6 million children under the age of 16, those needs were far from being fulfilled. Children were also the victims of rampant urbanization, or natural disaster, over-consumption, exploitation and ecological imbalance. The principle of sustainable development was therefore a matter of primary concern for child welfare. Worldwide, and in South Asia, there was need for national, international and, above all, personal commitment towards new moral values which espoused non-wasteful living.

Asmat A. Ahmed and **Tahera Yasmin Huq**, speaking on "Women, Nature and the Environment", Said that on the whole environmental problems were not gender-based – polluted air affected men and women, and contaminated water could harm the health of both the sexes. However, there were certain activities in which women were more closely related to nature and environment. The impact of degraded environment, therefore, hit women disproportionately. The environment issue should not be seen as a separate package or as a component, as "women's issues" were seen by many development programs. Most environmental issues could actually be incorporated into ongoing health, education and income generating programs. Awareness-building about environmental issues could be incorporated in functional education curricula. Women's special needs regarding the environment should not be alienated from the overall environmental programs, which should have a holistic and not piecemeal focus.

WORKSHOP PROCEDURES

Following the presentations on October 9 and 11, the workshop participants divided into three groups so that there would be more opportunity for interaction among the participants. The groups delved deeper into the sub-region's environmental and development problems and prospects as informed by the experience of individual participants. October 11 and 12 were devoted to discussion within

the working groups. During this time, a field trip was also undertaken which included study of the Bangladeshi country-side and river system. On the last day, 13 October, the rapporteurs of the three groups made their presentations. Based on their reports and on further comments and suggestions from the floor, an "understanding" was reached among the participants about the environmental problem in the Himalayan-Gangetic region, their social and ecological ramifications, and the way ahead. The understanding is set out below.

UNDERSTANDING OF MANIKGANJ

This workshop of non-governmental organisations (NGOs) and environmental activists of Bangladesh, India and Nepal, held at Koitta from October 9 to 13, 1990, expresses grave concern at the increasing ecological destruction in the Himalayan-Gangetic sub-region and, as its inevitable consequence, the steadily deteriorating living conditions of the entire population. The suffering of the poorer people, women, children and tribals has been disproportionately more.

There has been in the sub-region increasing incidence of floods, drought, quicker run-off of rain water, accelerated soil erosion, water-logging, depletion of ground-water. siltation of rivers, sand-bar formation, drying up of lakes and rivers in lean season, sand depositions during cyclonic storms and flash floods, and salt water intrusions in the deltaic regions. These are the results of increasing destruction of forests everywhere, from high alpine woodlands to mangroves of the coastal regions, apart from the tectonic forces active in the Himalayas. Barring the last factor, all are caused by human kind in the name of "Development".

The use of fertilizers and pesticides has led to the ruination of the soils, destruction of aquatic resources and the erosion of production basis of produces such as pulses and milk. In the name of endowing the soil with artificial fertility, nature's fertilizing agents have been destroyed. Agriculture has become a high-cost operation which has led to increased indebtedness of the poorer farmers and accelerating landlessness. The pull of commercialization has deeply affected agricultural patterns, replacing subsistence crops with crops for industrial use. The induction of flush irrigation

systems has led to water-logging, soil salinization and lowered ground-water levels. The induction of poisonous chemicals sprayed on the land have exposed peasants to new diseases. Even the unborn have been affected by the pesticide residues and toxic substances present in the womb and in mother's milk.

Forests are the natural regulators of the soil, water and air. Forests of the sub-region have traditionally been the reservoirs of fruit, fodder, fuel-wood, medicinal plants and material for house construction. Given the importance of forest cover, the manner of functioning of the forest departments in Bangladesh, India and Nepal is a reason for special concern. In fact, these departments have proved to be inherently incapable of managing forests.

Today, the area under forest cover in the sub-region is much less than the required essential minimum. There has been a drastic reduction in the diversity of plant and wildlife species in the surviving woodlands. At the same time the nexus between agriculture and forestry has been disrupted. Inheriting the colonial form of silviculture, forest departments have engaged in clear-felling and replacing traditional tree species which are valuable for people's livelihood with timber of commercial value.

The existing policies which debar people's traditional access to their forests has led to breakdown of mechanisms which had in the past ensured both the interest of people and the protection of forests. Transfer of custodianship to the forest departments in all three countries has led to widespread illegal felling, often with the connivance of forest officials. Ironically, in all three countries, the blame for forests destruction is placed at the door-step of the poorer people. Forests have also been destroyed because governments have pushed big dams and large industry and township projects in pristine wooded areas. Unimaginative road-building programs have opened up the deep forests for settlement.

Forest destruction leads to loss of the soil's water-holding capacity, drying up of surface water, and blocking of the recharge of groundwater. This has imposed a crushing burden on villagers, particularly women who have to trek longer distances to fetch water and fuel-wood. Deforestation has also cut at the very root

of life and culture of the tribals of South Asia, whose communitarian spirit and conservation ethic have been assaulted by the steady destruction of their woodlands. The right of the people to a safe and sustainable environment has been wrested from them by existing forest policies of the sub-region.

DOMINANT DEVELOPMENT PARADIGM

Much of the environmental maladies of the sub-region have flowed from the "dominant development paradigm" which, in the name of increasing the Gross National Product, has been undermining the common people's access to resources for healthful living. The prominent features of the dominant mode of development can be summed up as follows:

* This mode survives on the basis of a "destructive circularity" which might begin with the setting up of new industries and building of dams, which leads to deforestation, which in turn leads to erosion and siltation. This is followed by floods and ends in human misery marked by social, political and cultural fallout. The term that aptly describes this whole process is "ecocide".
* The patriarchal tendency gains the upper hand in this mode of development, giving birth to newer forms of gender-violence against women. Although "modern Development" has played a positive role in terms of fighting pre-modern superstitions, it has given rise to many forms of equally dangerous dogmas and irrationality.
* The dominant mode of development is marked by the emergence of new patterns of colonization, occurring not only at various international levels of economic expansionism and control but also within the structures of the nation-states of the sub-region. Within the nation-state, colonization is deeply felt by various social, ethnic, cultural and gender groups.
* Cities, as the focus of "development", register malignant growth while the villages decay. This anomaly results in the rise of unemployment, mushrooming slums, eruptions of vice and violence of all types – social, economic, political and environmental.

* This mode of development survives on the basis of centralization of all types of power at the apex of the system, and the usurpation of people's power. There is increasing reliance on militarization and growing insecurity among the people. Together with the centralization of power, there is lack of popular participation in programmed development. Hasty and immature decision-making is fueled by an inordinate reliance on foreign funding and participation. The existing top-down approach to development provides preferential protection to the interests of a country's elites.
* The predominance of economic forces marks this paradigm of development. Among its negative results is the disappearance of spiritual values.
* The consumption pattern of the elites sets an example for the other classes, including the poor.

ACTION PLAN

To counteract the environmentally destructive legacy of the dominant mode of development, the workshop proposes three categories of action to be taken by the NGOs of the sub-region.

1. ALTERNATIVE PROGRAMS:

Many NGO groups have already set in motion programs on the environment and related alternatives, mostly at the field level and involving the participation of people at the grass-roots. These programs can be taken up by more groups active at the grass-roots level in the sub-region. Such programs should include the following:

1. Promotion of the type of development which is energy-efficient, non-pollutant, not amenable to centralization, "women-friendly", and is low-cost and appropriate to the local setting.

2. Afforestation with multiple species on high mountains, wastelands, roadsides and embankments. Access of the people to the forests should be the guiding light of these activities. Local communities must be given,

if not ownership, then the guarantee of long-term use of forest lands and produce.

3.Programs to stop chemicalisation and resort to organic natural farming.

4.Promotion of inter-cropping and crop rotation to maintain the symbiotic relationship between crops,

5.Regeneration of lakes, desiltation of rivers and excavation of agricultural tanks; promotion of open water fisheries; measures to stop the depletion of groundwater; and the rejuvenation of mangroves.

II. TRAINING:

1.Re-examining existing training programs and methodologies, giving central thrust to ecological concerns. Organizing sub-regional workshops for trainers.

2.Promoting understanding of inter-regional issues through training of grass-roots workers by organizing exposure programs.

3.Strong communication links between the NGOs of Bangladesh, India and Nepal in order to clear misconceptions regarding environmental issues and to support one another's activities.

III. RESEARCH AND DOCUMENTATION :

1.Case studies of the effect of technologies on environment and development.

2.Environmental policy review at the regional level.

3.Advocacy and its role in sub-regional environmental activity.

4.Role of local and indigenous technologies.

5.The relationship between belief systems of different areas and groups and the environment.

6.Critique of the patterns of activity by multi-nationals, as well as multilateral and bilateral funding agencies.

7. An action study programme on women and the environment.

8.Promoting the role of information exchange through media and NGOs to provide better knowledge and understanding regional environment and development issues.

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IMAGES OF ASIA

Selections from 'Asian Action'

The present anthology is situated in a context which is radically different from both the Orientalist and Nationalist projects of reading Asia. In a vital contrast to both these modes, 'Asian Action', a news letter of the Asian Cultural Forum on Development, has been basically concerned with activists' reading of Asia. It is the reading of those who are concerned with the basic task of social transformation. An enterprise of both action and reflection, ACFOD is itself an active partner in the process of social change aimed at building "means of communication among individuals and groups in different countries to promote informed participation of peoples in overcoming obstacles in the way of integral development."

-- Edited by D R Nagaraj, a noted Indian writer.

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