6

MAN-ENVIRONMENT INTERACTIONS : A FUTURISTIC POINT OF VIEW

I.J.S. JASWAL

Man will undergo certain changes from biological and cultural angles. This change will have a definite correlation with the corresponding varieties in the physical and bio-cultural environment. The man-environment interaction has to be viewed as a projection of ecological adjustment. The interaction of large number of variables has to be quantified to build up the scenario with multifactorial projections. Predictions usually do not find much favour not that prediction is difficult but it is considered meaningless. For lower animals, there may be only one trajectory of davelopment i.e. replication of *status quo*. But in the case of Man, it cannot be just the replication of *status quo*. Microevolutionary forces keep on bringing microchanges. One of the major factors conditioning how future will be different or similar is the attitudes of people with regard to the present and the future.

North East India provides various eco-niches to the population groups inhabiting its hills and valleys. These groups are in different stages of contact with one another and with the outside populace. It is expected that the populations will be able to end the relative isolation by the end of this century. The expected man-environment interactions can be discussed under the following heads :

1. GENETIC LOAD

High infant mortality is the rule for most of the underdeveloped areas. The infants below the age of one are most vulnerable

to fatal diseases and if the resistance is low, even the ordinary ailments prove to be fatal in the complete absence of even elementary health care. Pre-natal wastage also tends to be fairly high as the expectant mothers do not get medical attention and the hard life takes heavy toll of life. The elimination of children below 14 years results in the loss of genetic material, which these individuals fail to pass on to the next generation. Thus the genetic isolate also remains devoid of variety of genes. Apparently, these populations appear to be healthy and sturdy as the low resistance individuals get eliminated. No developing region can allow such a collosal wastage of embroys, infants and children. A concerted effort will have to be made to save these lives and it has to be seen that they remain healthy enough to contribute their genes to the next generation. The efforts are directed towards these ends and it is expected that better health care will provide a large fund of genetic diversity to thrive. We have to be prepared to confront increased genetic load in these groups. A large number of deleterious genes, which got eliminated earlier may be retained in future generations. The populations may confront hitherto unknown genetic anomalies. An increased genetic awareness and eugenic care has to become the part of health education and health care in these groups. Most of these populations have negligible incidence of colour blindness (Jaswal, 1975) and mental abnormalities of genetic origin (Jaswal and Jaswal, 1983), but with change in the genetic environment, some of these anomalies are bound to make their appearance in smaller genetic isolates in appreciable number. A lost of other genetic disorders will also have to be confronted.

2. NUTRITIONAL ENVIRONMENT

The man-plant and man-animal relationship is changing and it is expected to govern the food balances in the context of wider resources and environmental balance. The shifts in food supplies from surplus towards deficit and back again towards surplus will affect the nutritional status of populations. Primitive groups are generally in a position to strike a balance with their environment. They are essentially hunters and foodgatherers. Their necessities are fully met by their niche. In case of want or shortage, they do not hesitate to migrate out of newer pastures. By the passage of time, they are able to adjust to new situations. The settled groups

are prone to various stresses and strains brought about on their nutritional environment by fluctuations in conditions governing man-plant and man-animal associations. Floods, drought, famine, epidemics throw challenges to the maneouvarability of the mankind. Industrial society is further prone to extreme stresses not because of the above-mentioned factors but a host of new self-generated disturbances in the man-biosphere balance. Pollutants, effluents etc., create numerous problems. Migrations and contact situations bring change in the attitudes. A population subjected to food-taboos under the socio-cultural influences gets into disturbed nutritional ecology and may expose itself to hitherto unknown diseases.

Migrants have to make special efforts to adjust themselves to the food habits and available raw material in the host eco-niche. LDH deficient groups cannot take to high milk diet. Similarly people habituated to high animal proteins find it difficult to adapt to vegetarian fare. Predictions indicate extensive mobility and demographic changes, which will automatically subject the human groups to change their nutritional environment. Shifts in calorie consumption will add to these changes.

3. WATER QUALITY

A major hazard is expected to be in the form of poor quality of water. With projected expansion of industry and growth of urban centres in the tribal hinterland, the quality of drinking water is expected to deteriorate with the attendant problem of water-borne diseases. In north-east India, the tribal hinterland had always faced the acute hardship to procure potable water. Topographic compulsions were not the only factors in choosing the village sites. Head-hunting and perpetual inter-village, inter-clan, inter-tribe feuds forced the settlers to select the hill tops as habitational sites. Womenfolk had to undertake arduous journey to walk down the slopes to collect water from the streams. Water remained very precious liquid over the centuries till public health facilities helped to mitigate this suffering, that also in very few villages. Some tribes decreed to save at least a patch of forest, so that they could continue to get constant supply of water from the forest brooks when the vast forestland burnt around for the 'swidden' cultivators. Khasi and Jaintia tribes call these sacred

groves as 'Law Lyngdoh'. In the flood plains, potable water remained a distant dream despite the flooded rivulets all around.

The growth of urban centres, military cantonments, hydro-electric projects and timber-based industry has caused havoc with the forest based eco-system of these populations. Services of a futurist are not required to predict that this landscape will shortly become a favourite place for industrialisation. With the wanton destruction of forest, the top soil has already been eroded and the water retention is very poor. The springs have started drying up. The urbanisation and industrialisation is bound to pollute the streams with pollutants and effluents. The quality of water will be further degraded unless urgent precautions are taken and the mushroom growth of urban centres is replaced by proper planning of resources and settlements. Will the human civilization, which took birth in the river valleys, breathe its last near the dry taps?

4. CLIMATE

A particular pattern of climate results from the complex interactions between the atmosphere, oceans, land masses, glaciers, vegetation and to an increasing extent, man. Deforestation has already led to changes in the climate and is expected to bring about a new man-disease interaction. Floods are expected to increase with the corresponding changes in the valleys. The climatologists expect global cooling, which will affect the crop pattern and the cultivation methods. The pastoralists will be under greater stress because of climatic changes and the consequent socio-economic shifts.

Population explosion took place with the advent of agriculture. Sedentary groups have better viability than the nomads. These groups have access to the services of the specialists and tend to maintain *status quo* in terms of man-habitat relationship from generation to generation. The increasing population tends to degrade the ecological system causing unprecedented changes in the climate. Archaeologists are of the opinion that one of the major factors in the downfall of world civilizations like Indus Valley had been the devastations caused by floods, which in turn, were brought about by severe climatic fluctuations and depleted forests. Though man has developed techniques to face these climatic shifts but a sudden accident in the Nuclear plants or the

sustained degradation by the industry may lead to climatic changes, which could adversely affect the man-plant and man-animal balance.

The high yielding varieties of crops and multiple cropping pattern have affected the potency of the soil. Artificial inputs may not be able to restore the vitality. These new crops give rise to new pests in turn to new pesticides etc. This man-plant equation gets disturbed by slight change in the climate, which has far reaching repercussions on the social and economic life of the dependent groups. The habitations require to get a quick change in case of desertification and consequent climatic changes.

5. ENERGY

The traditional energy sources are expected to be replaced by modern sources. Nuclear, hydro, solar and geo-thermal energy is likely to play a significant role in future. The demand for oil and natural gas is likely to increase manifold but the cost is likely to be prohibitive. Comparative isolation of the hill communities is coming to a faster end. New growth centres are emerging in the remote areas. Industrialists have already penetrated these virgin areas to exploit raw materials. As the population density is very low in these areas, influx of human groups from neighbouring high density areas is expected. The changed conditions will deplete the forest resources to dangerous levels unless the energy consumption pattern is changed. Alternate sources of energy will have to be tapped.

Solar energy has become quite popular in tropics. The smaller solar cookers in the rural areas are very popular. Even the commercial solar panels are in the vogue wherever this source could be harnessed. Hydro-electricity, though exploitable, may not come to the expected levels. Environment consciousness may not allow the large areas to be submerged under water. It is likely to act as a supportive source to other energy sources. The extension of communication network will increase the demand of petro products, the cost of which will be prohibitive in the coming years. Biogas has potentialities to become very popular in these regions. The future generations are expected to exercise restraint in the matter of forest devastation. In the hills, wind energy has potentialities of harvestation.

North-East India will undergo a sea change as far as the population pattern is concerned and it will force its inhabitants to change the energy consumption patterns. Economics of energy will be another compelling reason for adoption of alternate sources of energy.

6. FOREST

All the tribes in North-East India are forest communities. It was once remarked that their culture is so dependent on bamboos that it can be called the Bamboo Cultural Zone. The houses are built out of bamboos. The bamboo shoots are ingredients of a popular dish. Even local gods and deities are carved out of bamboo. The economy and social life of a shifting cultivator cannot be imagined without the forests. In earlier times, the low density population allowed subsistence of these groups entirely on forests, but the change brought about in recent times has forced these shifting cultivators to think in terms of abandoning their 'way of life'. Wanton destruction of forests by the contractors for the timber needs of the growing population elsewhere has denuded the hills. This has caused extensive soil erosion and in certain parts of western Himalayas, the conditions of desertification have already set in.

This situation has deprived the forest communities their sustenance and the general habitat has been degraded. Not only these hills, but the valleys suffer under the curse of annual devastating floods causing severe damage to men and material. The grave problems caused by deforestation have also been discussed under the heads of Water Quality, Climate and Energy. It is expected that the changing conditions will force the forest dwellers to protect their environs, 'CHIPKO' movement led by Sh. Sunder Lal Bahuguna in the Garhwal Himalayas and the general uproar caused by the public and environmentalists to force the abandonment of Silent Valley Project are some of the good pointers in this direction. Vigorous search for alternatives to timber, change to terrace cultivation from shifting agriculture and a sustained compaign to plant more trees may partially undo the damage. Twenty-first century will be heralded with growing concern towards forests, especially so in the hills.

7. SOCIAL ECOLOGY

The interaction between the social processes with the physical environment is the subject-matter of social ecology. Different environments stimulate differential social responses. Some of these responses may be technological, cultural or even religious. The response tends to take the path of greatest efficiency in the utilization of the environment. Environment is the active and integrated part of the social system. Chicago School of Park, Burgess and their followers have studied Chicago and other cities as composed of components in competition with each other. Retail business, wholesale houses, manufacturing firms, rate of delinquency etc. are treated as genetically determined species.

Most of these components of social ecological systems are interdependent and can be predicted with reasonable accuracy provided the correlations could be worked out well. In North-East India, the new era which was ushered in the late 19th century brought changes in almost every walk of life. The introduction of christianity in the hills improved the literacy and extended the health care in the remote areas. Trans-tribal solidarity emerged on the lines of denominations. Inter-tribal marriages took place and 'sub-nationalisms' took birth. Consequent insurgent movements and political activities changed the relationship between various components of the social environment.

Post-independence economy, sealing of international borders, introduction of electoral politics have shaped the society of 1980's, which is far too different from the old days. Emergence of middle class, formation and consolidation of tribal elite and the new culture of 'tribal developmental' funds and activity will have far reaching implications in the coming years. Religious fundamentalism and parochialism is expected to be diluted by the better communication system and termination of comparative isolation and seclusion of the small groups.

References

1. Jaswal, I.J.S., 1975, Anomalous Colour Vision Among Three Tribes of Arunachal Pradesh, *Anthropologist*, 22 : 60-64.
2. Jaswal, I.J.S. and S. Jaswal, 1983, Mental Retardation and Tribal Society, *J.N.E.I. C.S.S.R.*, 7 : 26-83.