DEVELOPMENT AND ECOCRISIS

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Ecology is often defined as "the study of plants and animals in relation to their environment." (Hagget 1975:116). In this study the organism is man. Eco- thus indicates that the man-nature relationship is in focus, as in human ecology. This means that ecostrategies are strategies used by individuals or groups of individuals for the utilization of nature. It is important to note that man alone can change his ecological behaviour and adopt different strategies at will.

Man, Nature and Development

Environmental problems and resource depletion are not mainly a technical problem but are the outcome of human perspectives and strategies. Three principal 'ecostrategies' ('domination', 'active adaptation' and 'passive adaptation') were elaborated upon and a case study was carried out in Sri Lanka to investigate to what extent this conceptual framework was reflected in this physical and social reality.

Alarming reports about contaminated waterways, polluted air and deterioration of natural resources reach us with increasing frequency. The need for a sustainable man-nature relationship appears as one of the most crucial questions for future development. A recent example of this concern is the report "Our Common Future" by the World Commission on Environment and Development (1987). Although the problems discussed in that report look insurmountable, the authors believe in a "new era" in which the environmental resource base could be sustained and even expanded. The report noted, however, that: "The world must quickly design strategies that will allow nations to move from their present, often destructive, processes

broadly stratified in three layers. The top layer is composed of the minority of 'Affluent Families'. It is a small layer. Its families are well integrated into the Development Process from which they draw many benefits. They are well satisfied with the existing order and naturally do not desire changes in the existing politico-economic system : The bottom layer is the largest. It consists of the Poor: The families that are only marginally integrated into the Development Process. Though they have least to gain from the existing politico-economic system, they are overwhelmed with such a feeling of defeat and failure that they take no interest in the Economic order and the political process as well. This large stratum consisting of the poor are politically silent and inactive. The middle layer, though small, is restless and dynamic. It consists of families that are neither poor nor affluent: Neither so poor as to be politically dormant and inactive, nor so affluent as to be satisfied with the existing order. Middle stratum families are fairly well integrated into the Development Process: But they are not integrated well enough as to satisfy many of their social and economic aspirations. Generally they want a change in the existing order: One that will provide them a better chance of satisfied chance of satisfying their social and economic aspirations. The middle stratum provides the active elements of the Political process: Elements tha struggle for political and economic change. Political dynamism on the one hand and challenges to the existing order and threats to the stability of the State on the other, originate in this middle layer of Political Society.

The Janasaviya Concept aims at integrating the large dormant bottom layer of Political Society into the Development Process, motivating them with hopes of socio-economic improvement and a better future, shaking off their mental state of inactivity and resignation, and activating them into the Political Process.

Enrolling the large bottom layer of Political Society to participate actively in the Political Process will, no doubt, alter the political power balance in society. While the restless middle layer families continue actively campaigning for changes in the existing politico-economic order to remove what they see as being barriers to their socio-economic improvement, the newly activated bottom layer would at least for the next few years - see an interest in actively defending the existing order that is giving them a new break in life.

If the Janasaviya Programme succeeds, it is likely that the influence of the middle layer political activists in the Political Order will be increasingly negated — at least for a few years — by pro-Status-Quo activism that can be expected from the newly activated bottom layer. On the other hand, if Janasaviya Practice lags far behind Janasaviya Thintice lags far behind Janasaviya Thinking and the programme fails to successfully integrate the bottom layer into the Development Mainstream, there can be widespread political unrest — especially after the Janasaviya benefits cease at the end of two years.

* In the longer run, however, the Janasaviya Process, through praxis could result in greater political unrest. Once the large bottom layer of Political Society — presently dormant — is economically and politically activated, if it is found that there are not enough resources to meet their rising aspirations, the political price to pay will indeed be high. This could happen - if at all - in the longer run.

* The Development Strategy for rural communities and small urban communities implied in the Janasaviya Concept is the development of large numbers of small privately-owned enterprises for income and employment generation. With State Institutions transformed to pay a supportive role (rather than a dominant part) in a privatised small-enterprise type economy that could develop out of a successful Janasaviya, the Concept implies an independent privatised small-enterprise oriented development model free of State patronage and State control: A model that will enable increasingly greater numbers of people from rural communities and urban garden communities to enter the mainstream of capitalist production.

of growth and development onto sustainable development paths."

Environmental problems exist in both industrialized countries and the Third World, albeit in different forms. In industrialized countries, for example, toxic discharges in air, water and soil; over-consumption and short-term speculations at the expense of non-material values and forethought are common. In the Third World, on the other hand, it is above all a question of a senstitive balance between population pressure and natural resources, bearing in mind such risks as soil erosion, desertification and declining ground water supplies. The declaration of the UN Stockholm Conference (1972:83) on the Human Environment states: "In the developing countries most of the environmental problems are caused by under-development." International dependency, for example, via transnational companies and export of natural resources is also an important aspect of under-development and the environmental problems.

So far, these perspectives of the natural resource base have to a large extent been neglected in the discussions of different development theories and strategies. A broad survey of development research and thinking indicated that: "Due to this neglect of the natural base of human societies, only widespread fear of global ecological crisis could bring social scientists, and others dealing with development problems, to analyze development as a process involving both society and the environment" (Hettne, 1982:91).

The point of departure for this research project could be formulated as follows: The views and practices concerning the man-nature relationship underlying the industrial-growth-society are not compatible with the demands of a sustainable relationship with nature.

The problems concerning man's relationship with nature are not solely technological. Emergency measures such as better purificaton methods of waste water or industrial smoke, alternative energy techniques, more stringent laws; all may prove effective and may suffice as short-term solutions, but in the long run, they are inadequate. A more profound and realistic approach requires a broad perspective on environmental problems involving value judgements and goal orientations. The environmental crises, both in the 'developed, and in the 'developing' countries, is to a large extent, due to an inadequate understanding and orientation of man's utilization and dependence of natural resources.

Through the research programme "Irrigated Agriculture and Eco-development: Analyses of Social and Ecological Factors Related to Traditional Irrigated Agriculture in the Dry Zone of Sri Lanka" at the Department of Water in Environment and Society, Linkoping University, I gained access to the research situation I was looking for. I also received the necessary support to tackle my evasive research-questions through cooperation with researchers from other disciplines and with Sri Lankan colleagues.

Agricultural practices in Sri Lanka and especially those of the green revolution are of significant importance. Yapa (1979) identified the follwoing three main problems of the "ecopolitical economy" of the green revolution: material bias, landlord bias and environmental problems. The present study highlights the first and third of these aspects, including the underlying strategy for man's relation with nature and its linkages to a natural science perspective. The latter aspects could be tackled thanks to the collaboration with an interdisciplinary research team.

Water availability and supply of nutrients were successively selected as focal points for the investigation. These inputs are generally recognized as being scarce in the studied areas. The farmers' views of the supply, use and need of water and nutrients in agriculture, were analysed and compared with their practices and with the conceptual framework of man-nature relations elaborated upon in the theoretical part of the present study.

Knowledge and information in such a time-tested system is an important research area. To some extent information concerning this system could be traced in the current physical arrangements, practices, tools, social organization and the views, perceptions and knowledge among the present farmers. With the ongoing ecocrises it is necessary to gain all the inspiration and information possible concerning the potentiality of a sustainable man-nature relation. Or as Chambers (1983:92) argues: "In most countries of the third world, rural people's knowledge is an enormous and underutilised national resource."

Knowledge about man-nature relationship in Third World countries is of interest not only in that context. Commoner (1972:xxiv), among others, pointed out that it is a false idea that the modern Western World should be less dependent on nature then other groups of people. "The truth is tragically different. We have become, not less dependent on the balance of nature, but more dependent on it". This indicated the potential of a reverse flow of information from the 'developing' countries to the 'developed' ones. The results should hopefully also be valuable for the region studied. This means that even if the case study is carried out in a developing country, it is not primarily conducted with the common perspective for such a study, i.e. trying, from an industrial-growth perspective, to formulate recommendations for the process of further development of the Third World country. Instead, this case study was primarily carried out with the assumption that it is fruitful to try to explore some aspects of the views and practices among Third World farmers as a source of insight and inspiration, not the least for the necessary process of further de-

velopment of the industrialized world.

To what extent the villages traditionally have been an example of an independent, locally adapted system is difficult to say. It is clear that during long periods in ancient times, many of the villages in various ways were tied to extensive social structures. Subsequently after the 13th century, during the Kandyan kingdom and especialy in the early British period, the villages were probably quite isolated, lacking means of communication and with only little trade with such things as pots and metal. (Hettige, 1948:53, Farmer, 1976). It is even more difficult to ascertain the standard of living, but examples of famines and malaria epidemics indicate some of the problems. Some of the basic features discussed above have probably been in existence for up to 2,000 years. For at least during some periods, the villagers have been solely dependent on an ecostrategy adapted to local conditions.

A Deteriorating System

The system briefly discussed above is disintegrating today (or more accurately changing). As pointed out by Ellen (1982:22), "the stable and apparently conservationist strategies of many small-scale societies are largely an illusion." The farming system described above is currently changing for the following reasons.

(i) As a response to population pressure (incl. "village expansion schemes") the houses of the villages were dispersed along the roads. This dispersion diminishes social coherence and interpersonal contact and blurs the differences between chena and homegarden cultivation. Even if the villagers try to keep up the traditional pattern of cultivation, the size of their gardens has increased and the highlands now occupied are on average drier compared to their previous gardens, which were close to the tank bunds where the water table was high.

(ii) Market penetration and other aspects of external influences (e.g., the evolution of new paddy rice land privately leased or freeheld instead of the old "share" system) make it difficult to maintain cooperation within the village. Cooperation is more and more replaced by wage labour, which was traditionally avoided. This, in turn, makes it difficult to, for example, maintain the village irrigation structures.

(iii) Population pressure and the cultivation of cash crops, speed up the chena cycle and the same plot could be cleared and used again after only two or three years of non-use.

The 'traditional' system illustrated above can hardly 'carry' the present and future populations of the area with a reasonable welfare. The shortening regeneration periods in chena cultivation is, for instance, a threat to a sustained productivity of chena lands.

During the first part of my investigation the interviews were not solely focused on nutrients and water as inputs in agriculture. The whole range of modern and traditional inputs (such as pesticides/herbicides and draftpower) were discussed as aspects of the farmers ecostrategies. Even if most of the people wanted to use more of the modern inputs due to the potential for increased yields, they were also worried about the impact on long term soil fertility and the quality of the foods produced. Out of the 10 persons selected for the semi-structured interviews, only three, fairly young females did not express anxiety about the health and environmental effects of the industrialized inputs; this is probably a consequence of the interview situation. The ideas concerning negative health effects probably were influenced by the fact that drinking pesticides and herbicides is a common method to commit suicide in Sri Lanka.

Many villagers claimed that the industralized inputs had negative side-effects, and that: "The various kinds of paddy rice have adapted themselves to chemicals (6:3,xi)." They also said that "When pesticides and herbicides, *tel,* and chemical fertilizers are applied the earth gradualy becomes infertile, *nisaru venava* (c:5,18)." In an investigation among farmers in Talgodapitiya in Kurunegala District by S. Hennayake (pers. comm. 1984) the perception of pesticides and herbicides making the paddy rice poisonous was also found. Similarl, they believed that the land will get used to the agro-chemicals, including. the chemical fertilizers. These findings were surprising (a more positive attitude toward the industrialized inputs had been expected, with the exception of the problem of getting money to buy them), and were followed up during the latter part of the investigation which was focused on nutrients.

A part of this scepticism concerning the industrialized inputs was the perception that the different inputs were dependent on each other. "The new varieties need the chemical fertilizers" (4/3-85,15). The perception was often expressed in terms of the soil and the paddy rice becoming adapted to, *huruwenawa,* or used to *heda gehenawa,* the chemical fertilizers. This adaption was often expressed in terms of a soil degradation. "There will be a decrease in the fertility for some time after the chemical fertilizers have been used" (21/3-85,9.3).

The reasons for a decline in precipitation given by the villagers was: (i) deforestation; (ii) less respect for the Gods and rites; and (iii) bad behaviour among people in the village and the country.

Deforestation

The most frequently given reason was the clearing of forests: "There is no rain because the jungle has been cleared. If there is jungle even a passing rain cloud tends to stay" (a:13,iv1). Some people said that increased chena cultivation was not a major reason for these problems, since no large trees were felled for this. It was the large trees which blocked the rain clouds.

Others did admit that chena cultivation (which mainly occurs in young forests) was partly responsible for deforestation, and some said that there had been a three fold increase in the areas for chena cultivation during the last 15-25 years (e:5,iii&11,v&b:3iii). There seemed to be a vicious circle: less rain-less paddy rice-need for more dryland cultivation-deforestation-less rain...! According to Madduma Bandara (1987:6) the forest covered 70% of the total land area in Sri Lanka in the year 1900. By 1953 the forest coverage had diminished to approximately 50% and in 1982 it had come down to 25%.

With regard to the clearing of high forests it could be noted that the 1935 Land Settlement report from the single village stated: "Small isolated patches of high forest occur in the north and south -east."

It was also reported that at a locaton a few km away there "is a large tract of high forest." Nowadays almost no high forest is seen in the area. According to Tennakoon (1986:144) 70% of villagers considered forest destruction as a cause for drought, followed by excessive use of water (29.2%) and acts of God (24.·%). Colonists in this same region placed deforestation third on their list of causes (16.9%), preceded by acts of God (20.5%) and "don't know" (38.8%; ibid).

The difference between the villagers and the colonists in the same region, supports the perception that the apprehensions of the villagers concerning deforestation was genuine, and not mainly a result of external information concerning such things as environmental protection. Very few persons mentioned or referred to external information when they argued that deforestation was a reason for decreased precipitation. However, it is difficult to know to what extent the origin of these ideas was modern and external and to what extent they stemmed from older beliefs which now to a large extent fit into modren ideas.

Reasons given for an increase in the area under chena cultivation were population increase and the increased demands of individuals: "Due to higher demands and desires the jungle gets cleared" (b:21,3). Even if there are laws against jungle clearing, chena cultivation is a necessary part of this farming system and according to Leach (1971:61): "Formal government opposition to chena cultivation... of all sorts goes back almost to the beginning of British administration." The villagers are well aware of these restrictions, but there is great pressure on the resources, and, as Leach already wrote with regard to the 1950's, "practice is very far removed from the legal theory" (1971:62).

The lack of large trees is pointed out as crucial for the decreased precipitaion: "If the wind dashes against that tree, it rises directly, and there it stops the rain clouds in the sky, and then it will start to rain." (e:5,ix). Some people blamed the extensive colonization schemes for a large part of the deforestation in the region. A few persons pointed out the role of the forest companies in the past.

Scientifically it is well known that on a large scale, the forest cover influences precipitation. In the Amazons, 74% of precipition is transpired from the forest but the informtion concerning the linkage between the vegetation and the atmosphere is the weakest part in the attempts to build global climate models including precipitation (T. Rosswall, pers. comm. 1986). To what extent the forest cover influences the local spatial distribution of rainfall in the way that the farmers claim is not known.

Gods and Rites

Gods and religious rites was the second main explanation for a decrease in precipitation. "Because we do not pay attention to the Gods, they pay no attention to us." (a.10,iv1). Almost all of the villagers participated in the ordinary cermonial rites, but one villager said that: "even if the ceremonies are performed, they are not done with any faith in them." (19/3-85,14).

Bad Behaviour

Bad behaviour among the villagers was the third reason given for the percived decrease in rain, without explicity linking this to religious rites and Gods. The country in general was mentioned as being involved; "It could be the government, it could be the people" (22/3-85;13.3). When asked what was the main type of bad behaviour, the villagers gave examples of general social misbehaviour such as "crimes, murders, threats" (d:18,iv1); or "the fact that children do not even look after their parents" (b:3/211,iv1). The parallels between human behaviour and environment could be traced back in various ways. A villager could, for example, quote his old schoolbook, *subashithaya:* "Like paddy rice fields and gardens grow in proper rain and wind, would people be protected by a proper king and intellignet ministers. Like the forest is destroyed by the gusty winds, everything will be destroyed by kings and ministers of bad behaviour."

These links between the behaviour of people (not the least rulers) and phenomena in nature (e.g. favourable weather conditions for agriculture) constitute a common and ancient element in Asian philosophy. Nakamura (1985:150) referred to examples from China and said the Buddhist and Indian ethical systems teach that good human behaviour causes favourable natural conditions, and vice versa. The general linkage between bad human behaviour and not performing rites as a reason for decreases in precipitation is a common feature in similar contexts elsewhere (cf. Knutsson, 1968:92).