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Towards Sustainable Cities: Urban Community and Environment in the Third World

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KEY WORDS Urban. Third World City. Sustainable Development. Environmental Problems.

ABSTRACT The role of the city in environmental change and deterioration seems to be ambivalent and in order to explore this ambivalence we have to pose several questions. What is the essence of the city in generating development, on the one hand, and of environmental problems, on the other hand? How have the relations between town and countryside been shaped and how are these relationships connected to sustainability of town and countryside? What exactly do we mean by sustainability? What are the factual environmental problems of Third World urban and metropolitan areas, and what are the practical solutions implemented in these areas? We do not pretend to be able to solve the pressing social issues implied in these questions, but merely hope to supply some thoughts to give food for further reflection.

INTRODUCTION

It is a quite complex task to assess the role of cities with respect to environmental issues in both the broad and normal senses of the latter, *i.e.* either just in relation to physical conditions or also including the socio-cultural conditions of the citizens concerned. Undoubtedly, cities are obvious mechanisms for the accumulation of wealth, generating better living conditions for a growing part of the world population, but no one would deny that cities are also parasitic by nature, creaming off agriculture surpluses and other natural resources from all over the world, often without full compensation for the natural and social damage inflicted. This, as a matter of course, does not mean that rural areas are not sometimes environmentally degraded and that when the urban-rural comparison is made in some cases cities could not be environmentally better off than the countryside. Moreover, urban environmental problems are strongly rooted in high population density, leading to the concentration of waste, pollution, and so on. On the one hand, this concentration could be a disadvantage, but, on the other hand, this may also be quite positive because in the urban context more opportunities are offered to tackle the problems structurally.

The complexity of the relation between city and environment deepens when account is taken of the fact that the urban milieu is fertile soil for environmental awareness, because environmental movements in the world are strongly rooted in the sincere concern of inhabitants of metropolises about a life style which is alienated to a high degree from nature, whatever meaning is attached to the concept. Practically speaking, the city is a breeding ground for technical and managerial inventions, including those in the field of environmental protection; and in the long run, these inventions can change and cut down the nature of pollution, energy use, ecological damage, and so on.

Modern environmental consciousness implying the global dimension of ecological vulnerability is mainly urban and Western in nature; it is a cultural construction referring to the relationship with the natural environment as problematic and in the long run dangerous to human survival. This concept is alien to traditional, non-urban societies whose relationship with nature is not solely determined by its intrinsic, ecological value, but mainly by the religious character of the natural environment which is considered to be the world of spirits and ghosts. An example is presented by Schefold (1994), who found that the inhabitants of the islands of Mentawai (Indonesia) lived in harmony with the environment and that their relation with nature was not based on environmental consciousness. These people followed traditional rules by which their subsistence was guaranteed. However, new contacts with the external world allowed them to acquire air-guns

with which in some regions they decimated birds and small mammals without any consideration of the long term consequences, because this activity was compatible with their religious beliefs.

So, basically the role of the city in environmental change and deterioration seems to be ambivalent and in order to explore this ambivalence we have to pose several questions. What is the essence of the city in generating development, on the one hand, and environmental problems, on the other hand? How have the relations between town and countryside been shaped and how are these relationships connected to sustainability of town and countryside? What exactly do we mean by sustainability? What are the factual environmental problems of Third World urban and metropolitan areas? And, finally, what are the practical solutions implemented in these areas? We do not pretend to be able to solve the pressing social issues implied in these questions, but merely hope to supply some thoughts to give food for further reflection.

URBAN FUNDAMENTALS

The process of urban development and the cities it constitutes can be considered essentially a social process involving increasing interdependence and specialization to be able to realize more complex activities, such as trade, industrial activities, and high level services delivery (Nas, 1990). It is an ongoing process with inherent dynamics of diversification, growth, capital accumulation and spatial expansion. Specialization takes shape in many domains: functional location, technical and labour structure, and institutional development. It involves separation of living, work and recreation; diversification of educational, technical and production levels; and proliferation of institutional settings (Leeds, 1984). The proliferation of these forms of specialization constitutes the hard core of the urban development process which is based on increased demographic concentration and the related realization of accessibility potentials. It leads undeniably to greater diversity in culture and life styles, cosmopolitanism, and innovative behaviour, which generate typical urban forms of relationships, intensification of the pace of life, and a change in the conception of time from natural-based (the seasons) to mechanical-based (the clock). These changes foster new requirements such as higher levels of infrastructure and technical support systems as well as new forms of organization and administration for the sake of the maintenance of cohesion. During this process of urban development the cities diversify into networks of specialized urban centres often covering vast metropolitan regions and the countryside is incorporated completely into the urban system fulfilling a role as supplier of natural resources to feed the citizens and support the urban process. This process has reached unexpected levels of urban concentration already, with expected numbers of 24.4 million, 23.6 million and 21.3 million in Mexico City, Sao Paolo and Tokyo respectively in the year 2000 and makes the question of urban poverty one of the most pressing of our times. What are the consequences for the natural and social environment of this urbanization process, *i.e.* for environment in the broad sense?

High on the list, if not at the top, is the systematic alienation of city-dwellers from nature. The awareness of human dependence on nature has been drastically reduced and the perception of nature completely altered. The tide is now turning, because of severe pollution and other urban and industrial environmental incidents city-dwellers have had to change their minds and are also in the process of changing their behaviour. All well and good but the intricate complexities of the urban social and material system generally preclude any easy solutions.

A second consequence is the wealth-generating disposition of the urban system which is one of the pillars of welfare states and in non-welfare states it is also clear that cities – notwithstanding existing poverty and slums – still have to be considered major sources of income production.

A third consequence for the natural environment is the systematic exhaustion of the natural resources and pollution of natural systems inside and outside the urban world caused by the excessive use of energy, fertile agricultural land, and rural products, and the dumping of

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Social Science and Social Reality : A Quest[1]

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KEY WORDS Social Reality. Social Science. Organization of Produciton. Dialectics. Empericism. Realism. Materialism.

ABSTRACT In social history thought processes reflect the changes in organization of production. The quest for reality is an ongoing phenomenon. How social science comprehends this complex social knowledge? In this context rigid cross-cultural theories and mechanistic models need scrutiny. Besides it is also essential to probe into pilosophical and methodological under-pinnings in social sciences. Precisely as social reality is both objective and subjective and therefore any theoretical perspective demands the cognizance of this dialectical process. For concepts and constructs do not occur in vaccum. Accordingly social science not only owns the responsibility of contemplating and projected the intricate social processes but also finding possible means of change.

Human thought has been under a constant flux of change and been in progress along with the changes in the human organization of production and the struggles to replace the absolete forms for a better future society. Accordingly both theoretical issues and politico-ideological struggles have become integral parts of the democratic process. Throughout human civilization all cultures contained an inherent potential for dynamics as per the social laws and customs. Inter and intra drifts eventually become near universal processes and these structural mechanisms depend on economy, polity and historical conditions. Rigid cross-cultural frames of references, tight taxonomic systems and incipient periodic tables only cramp the social reality. The quest for reality *vs.* myth, essence *vs.* existence and matter *vs.* mind has been subjecting the human intellect for critical probings, dates back to the invention of fire, the beginings of human civilization.

What is reality and how social science helps understand the complex social knowledge and how it mystifies and also reproduces according to variations in the historical conditions? These trivial issues necessiate for philosophical probings and methodological underpinnings in the social sciences. Precisely as knowledge is attained and reproduced not only through contemplation but also through activity (labour) and interaction with the people (social relations). Therefore we maintain that people and their ideas in the material production and the experience to praxis is very imperative, not being merely reflective, ultimately enriches the understanding of social reality through the social science. Social reality is both objective and subjective and thus any theoretical analysis requires the cognizance of this process which is an ongoing dialectical mechanism. In other words to be a member in the society is invariably to participate in its dialectic, the production and reproduction processes (This view is in juxtaposition with the individual perfection notion of knowledge inferred on self-evident premises of the seventeenth century classical thinkers like, Galileo, Descrates, Newton, Locke, Darwin, etc.). The apparent dialectical structures maintain balance with the environment and contain the internal dynamics of change. For, time is not an unitary flow the subsumes all epoches, rather is ultimately governed by the movement of history itself. This movment essentially is that of peoples and their control over nature, *i.e.* their environ and themselves.

From this social background the responsibility before the social science is to project conscientization and contemplation not only of the present but also of the possibilities inherent in the present for the future. In other words to provide a demystification of the social world in order to reveal the historically emergent and socio-culturally constituted bases of the present. Conceptualizations and constructions do not take place in a social vaccum as mere descriptions and abstractions but they are part of

1. Revised version of a paper persented in the National Seminar, "Perspectives on Understanding Social Reality", held at Bhopal University, Bhopal, 17-19 March, 1990

for sustainable development is impossible.

In the case of human settlements, sustainable development means first and foremost that the needs of present and future inhabitants should be satisfied, *i.e.* the eradication of poverty and, in the second place, that the existence of cities should not irreversibly harm other natural elements as forests, rivers and soils, *i.e.* exceed their carrying capacity (Wekwete, 1992). So, first we will explore the concepts of urban poverty and carrying capacity.

URBAN POVERTY

The use of the concept of urban poverty must be considered less than fortunate (Nas, 1994). Though poverty in all its manifestations has been elaborately studied, its utility as a concept is very limited, because it refers mainly to relative phenomena, notwithstanding the fact that it can also convey an absolute meaning. Moreover, it also refers to both an objective and a subjective reality, for a rich person can feel poor, and, though perhaps less probable, the other way around can also be the case. Furthermore, poverty has several dimensions, namely a material, social, and a power dimension, referring to material neglect, social deprivation, and powerlessness. The distinction between voluntary and enforced poverty also has to be taken into account, for poverty (and to make things even more complex enforced poverty) is considered a virtue in some religious systems.

There are divergent ideas about the causes of poverty in the absolute sense. These are documented and classified by Eames and Goode in their book *Urban Poverty in a Cross-cultural Context* (1973). When such a study is made, on the one hand, the individual and the societal character and, on the other hand, the inherited and ascribed nature of poverty have to be allowed for. When both these dimensions are set opposite each other, they produce four cells, which from the point of view of the individual encompass: (1) hereditary immorality and inferiority, as well as (2) stupidity and the failure to adjust to societal norms; and from the point of view of the society imply (3) the necessity for hierarchy, competition, and a labour surplus, as well as for (4) natural or quasi-natural disaster in the sense of epidemics and catastrophes (such as earthquakes, volcanic eruptions, and so on), rapid social changes and economic fluctuations, *i.e.* successive economic booms and depressions. This diversity in opinion fuels the suspicion that not everybody is equally negatively inclined towards poverty and that not in all cultures are people naturally convinced that it has to be tackled and removed; for this attitude, too, is mainly a Western affectation. And even in the West there are fluctuations in this respect, because the assistance to the poor is subject to cyclical changes. In the event of economic decline and increasing numbers of unemployed, assistance is increased; in the event of economic prosperity and decreasing unemployment, aid along with the will to fight against the existing poverty tends to languish.

Sociology and anthropology have produced many studies on poverty based on a plethora of diverging views. These can be roughly classified into two approaches, namely those with respect to social inequality in general and those referring to poverty in particular.

The studies about social inequality in general take social stratification as their startingpoint. They describe the social strata and the dimensions on which these are based, the distortions in perspective when looked from above or below, the upward and downward mobility and its consequences for the individual, and the effects of existing social security systems on social inequality in Western societies, which appear to be fairly marginal, *i.e.* in any case, more conservative than progressive in their results. In this approach the poor materialize as the "lowest stratum", and they are poor, if not in absolute sense, then certainly in relative sense. The potential of this stratum is generally supposed to be under-utilised, which could induce tensions and even form a potential danger for the functioning of the system as a whole. A particular variation is international stratification, which postulates a hierarchy of countries with the perverse effect of the existence of low classified, poor countries that expose a tremendous wealth within particular segments of the population, *i.e.* within exactly those segments which support the international stratification system as a whole, in other words the segments

that shore up the system.

A more conflict-directed approach within thinking on social inequality is class theory, which it is true postulates indirect results for the absolute poor, but only imputes a secondary place as a vehicle for social change to these ragged masses in contrast to the labourers or, in another variant, the peasants. This class theory, however, is no longer suitable for our day and age. The nineteenth century ideas involved are hardly applicable in late-twentieth century societies.

The second approach we have distinguished is directed more towards poverty in the narrow sense. During the colonial period, research which was combined with budget studies was already being carried out into the living and housing conditions of the coolies in the Netherlands East Indies. With the help of this type of budget study Bijlmer (1986) has tried to prove that compared with colonial times, the poor in Indonesian cities are worse off nowadays. He has not succeeded, but his study leaves the impression that they are at least as badly off now as in the past.

Between the budget studies of the twenties and thirties and the informal sector studies of the seventies and eighties other approaches were also developed, from which, besides the basic needs approach, the theory of the culture of poverty of Oscar Lewis has found the most fertile soil and has also been the most criticized. Along the main lines can be traced a development which started with the description of the living and housing conditions in the slums in order to involve the authorities for the benefit of the poor, and of course also for the benefit of the rich who could eventually be threatened by the unhygienic conditions of the poor. This was followed by the analysis of the culture of poverty as a pattern of adaptation with passive and apathetic traces congealed over generations. Finally more feeling has now been acquired for the creative side of the poor who, under difficult circumstances and in the face of oppression, have been able to maintain themselves, only being marked off from the rich by their poverty. Of course, these variations in views on poverty only represent changes in the operative caricature of the poor, for in each instance certain aspects are exaggerated.

From this overview we may conclude that it is probably less desirable to utilize the concept of urban poor, because as poverty is mainly relative, it cannot possibly be eliminated. The approaches of Ward and the Brundtland Report are strongly rooted in the basic needs approach. In our opinion, this focus on the satisfaction of basic physical and social needs is an adequate starting point, which includes the delivery of social services such as education, health care and housing, and also the supply of employment opportunities which forms the hard core of any road towards sustainable development.

CARRYING CAPACITY

Sustainable development is only possible if the carrying capacity of the environment is not overtaken. The concept of carrying capacity is defined by White and Whitney as "the maximum population that can be supported indefinitely in a given habitat without permanently impairing the productivity of the ecosystem upon which that population is dependent" (White and Whitney, 1992 : 9). To be sustainable, settlements should not exceed the carrying capacity of their support regions or hinterlands. White and Whitney distinguish two major stages of development to which the hinterlands have been subjected since urbanization began.

The first stage is called the pre-modern, quasi-sustainable settlement phase (White and Whitney, 1992: 9-11). In most countries this stage preceded the industrial revolution. Having only limited political and technological means to control their hinterlands, the cities in this stage extracted food and raw materials from their hinterlands generally without destroying the environment. The size of these hinterlands depended on the natural conditions of the direct environment. Indispensable was the power of a city to extract agricultural surplus from the peasants to feed the urban inhabitants. By paying taxes the rural population was forced to produce for the city. For this reason White and Whitney call this stage quasi-sustainable. In this pre-modern stage nobody needed to think about carrying capacity, because limited technology

and abundant resource ensured that it was simply never exceeded.

This changed with the rise of capitalism and industrialization. New knowledge and technology enabled cities to increase the carrying capacities of their environments and to use the environment of other cities. This way certain cities grew very fast and gained great wealth and power. These cities were based on the utilization of the environmental capacities of neighbouring cities. Other cities could not keep up with them and lagged behind. They lost their hinterlands to neighbouring cities. This change is described by White and Whitney as the second stage, the so called unsustainable phase of the colonial/industrial revolution. This stage is called unsustainable because of the unequal growth of cities.

White and Whitney formulate this evolutionary model of cities to show the need for change in future urban development. Their aim is a third phase in which cities grow on a sustainable basis. To achieve such a type of sustainable urban development, recompensation has to be arranged in the case of environmental degradation. If a city exceeds the carrying capacity of another city, this should be compensated. Moreover, in the case of environmental damage caused to the other cities, these costs should also be reimbursed.

This model of the relation between cities and sustainability formulated by White and Whitney is interesting because of its diachronic character. It is an evolutionary model simplifying urban development in order to show the need for sustainable urban development in the future.

URBAN METABOLISM

Human settlements can also be analyzed synchronically when they are considered as organisms which produce, consume and dispose. Guirardet (1990) shows that the metabolism of modern cities is destructive for life on earth. Cities transform environmental resources such as food stuffs, forest products, fossil fuels and mineral resources into waste products. This is a linear process in which input and output are not related. One of its radical consequences is the fast growing amount of waste, of both a chemical and a household nature. To change this development the loop has to be closed. This entails that every output should also become an input: a situation in accordance to the common cyclical processes in nature.

This theory of metabolism deals with a human settlement as a single entity whose existence is not dependent on other cities and their hinterlands. However, is it possible to examine a city witout taking into consideration its impact on other cities and the rest of the world? This question also arises when reading White and Whitney. They analyse human settlements in direct relation to their own hinterlands without taking into account the complex relationships between the networks of cities and regions in the world. To feed its population, a city rarely extracts food only from its own hinterland. The same applies to other goods like energy and fuel. To comprehend the sustainable development of cities it is necessary to cover all the regions and cities influencing it and to consider the world as one interactive system of complex interlocking urban and rural networks.

It is our belief that these theories are probably too narrow for this era of globalization. All the cities on the globe are connected to each other which makes it almost impossible to analyze one city on its own. A tremendous number of flows of energy, raw materials, food, building materials and even wastes from one city to another, from one nation to another, mark the present globalization process. The more or less explicit aim of Guirardet and of White and Whitney – to assure that every output in a city can also become an input – is therefore unrealistic. Having said this, we still support the general idea of fostering urban sustainability.

URBAN FORM

The sustainability issue of the city can be approached in a fundamental way of focusing on the lay-out of the city and posing the question of whether certain types of lay-out are environmentally speaking more adequate than others, especially with regard to transport energy use.

Several urban patterns can be distinguished:

the compact city, the suburban landscape, the lineal city, the grid-iron pattern and the more or less self-contained garden city. Judging the differences in energy use for traffic between these types appears to be very complex.

Separation of the various urban functions, such as living, working, shopping, and recreation, clearly leads to increased traffic and energy consumption. So, the compact city most probably performs better than the suburban landscape in these respects. However, when other environmental aspects are taken into account, such as air and water pollution, urban segregation of living and industrial working places could be profitable for the citizens, while this also could facilitate the collection and removal of industrial waste. Grid-iron urban forms also seem to easily absorb and disgorge traffic, especially when supplemented by diagonal thoroughfares. Self-contained garden cities also compare favourably to the suburban landscape, but self-containment probably should be considered an unrealistic principle in the present era of globalization.

The compact city could also be compared to the lineal city. This leads, for example, to the discussion of the Randstad Holland, the ring of cities in the western part of the Netherlands, which includes Amsterdam, Leiden, The Hague, Rotterdam and Utrecht, encircling the so called green heart. What is more favourable for energy-use reduction: to fill up the green heart in line with the compact city concept or to follow the lineal city concept by strengthening the ring with high accessible centres along a city ribbon? The first alternative saves the eastern part of Holland from encroaching urbanization and the latter rescues the green heart. This discussion about the Dutch situation shows that the issue of city form is much broader than isolated cities and should be considered in the context of national urban strategies.

So, the problem is that these urban forms cannot be evaluated exclusively on energy use alone but other elements also have to be taken into consideration such as green conservation, pollution, and so on. Different mixtures of public and private transport also carry weight and may prevent easy conclusions from being drawn.

Another problem engendered by this fundamental approach is that existing city forms are not easily altered. Even as a discussion on basic urban lay-out makes sense for future developments of existing cities and for newly planned ones. While admitting this, there should be no secret that the expectations about the results of empirical research on such a complex multidimensional phenomenon should not be too high.

URBAN GREENERY

The importance of green areas in cities – also with regard to clean air – scarcely rates a mention in urban and environmental research. We want to stress the need for these urban green areas which, in our opinion, should become a major field of resarch (Veenma, 1994). In order to foster sustainable development in cities, it is necessary to rescue and extend green areas within city borders including the wide range – from birds to cattle – of animal life supported by these areas. Sustainable development demands a life style from the present generation which will not restrict the possibility for future generations to live in the same way, but this can only be realized when the present generation is able to meet its own needs. Green areas can help to reach this goal, both in Western and in non-Western cities.

In Western countries to a large extent the supply of the basic needs has been realized. The problems generally take the form of overconsumption with huge consequences for the environment. Enormous amounts of waste, emissions of noxious materials, and depletion of fossil fuels are some of the environmental problems common to Western countries. These problems can only be solved by a change in attitude towards the environment. We hypothesize that green areas in the cities might be important for citizens to understand and experience the coherence of nature and to explain that human beings form an integral part of nature. City-dwellers do not experience the direct consequence of their activities for the environment, because they live in an area of concrete instead of green. Green areas such as parks, forests and agricultural gardens in which people can walk,

listen to birds or rest after work, might probably contribute to a different attitude towards nature in general.

Green areas cannot be considered to be pure nature, and that is why the concepts of green area and nature are not interchangeable. Generally a park is laid out artifically and maintained by men. In fact, there are only a few places in cities where plants and trees grow without human interference, such as ruins and other deserted sites, which can serve as a depot for rare seeds and plants.

In the first half of the twentieth century Ebenezer Howard formulated a theory on nature in cities, which he called Garden Cities (Howard, 1985). The rapid growth of English cities and the miserable circumstances of the poor induced Howard to found the Garden City Movement. He thought that the best urban environment in which to live should guarantee contact with nature and he tried to fuse the advantages of city and country life in his brainchild of Garden City. Howard not only wanted to change the outlook of cities by incorporating parks, gardens and green boulevards, but also hoped to change the unequal distribution of wealth and power. In the English cities of his time landlords owned large parts of the city. In Howards's Garden Cities the land would be communal property and slum-dwellers would be able to live in nice houses in a healthy environment. Several garden cities were built inside and outside England with beautiful parks and gardens, but they never realized Howard's original idea of reducing the unequal distribution of wealth and power.

This theory has also been applied in Third World cities. In the colonial period the European wards of Lausaka and Nairobi were shaped according to the garden city concept with parks, trees and open spaces.

Notwithstanding this role of the greenery concept, in Third World cities the problems are concentrated on the provision of basic needs. If the present generation cannot provide themselves with their basis needs, they cannot be expected to take care of the needs of future generations. If we want sustainable development in these cities, we have to take care of the basic needs of the present generation.

Green areas can support this aim. They do not need to be in the form of parks or recreation areas, but can also take the form of productive farming land. In many non-Western countries city-dwellers cultivate all sorts of crops on fallow land. These crops help them to fulfil their daily nutritional needs.

Nowadays theories related to the garden city, such as these fostered by the Green City Movement, also emphasize the importance of urban nature. They stress that these areas are important for the mitigation of urban environmental problems. They have a positive effect on the temperature, which is normally higher in cities than in the countryside. Green areas reduce excessive temperature rise by means of evaporation *via* the vegetation. Through this evaporation they also contribute to the increase in air humidity. Very importantly, the quality of the air is improved by the production of oxygen. Green areas have a positive effect on air circulation and help to fight dust. Besides improving air quality, green areas contribute to the balance of hydrological systems. They induce these systems based on the infiltration of rain into ground to retain surface water (Deelstra, 1990).

Green areas are also important as a habitat for animals of which several have survived the urban growth and have adjusted themselves to city environment. The coot, a European waterbird, lives in the centre of cities and builds its nest from tin cans. In Australia, possums live side by side with humans, mainly in the roofs of houses and the bandicoot disturbs urban night life when it collects food in the garbage tins. Several species prefer urban to rural environment because of the possibilities to find hiding places and to collect food.

Realistically, we should be aware that urban greenery cannot really solve urban environmental problems and that in fact it can be easily used to disguise them. Yet, the urban greenery movement cannot be reproached for this form of camouflage.

AIR POLLUTION

We have seen that the fundamental approach to urban form in relation to energy use, however important, leads to serious constraints in the

applicability of results and that urban greenery can be considered a neglected subject both in research and policy. By contrast pollution – both of the air and the water– has been a rich area for research and governmental intervention. The main strategies involved in air pollution are limitation of cars, restriction of car use, reduction of emission, restriction of the need for transport, and time management of transport use.

The limitation of cars can be achieved by implementing measures, such as restricting of the possibility to buy cars by the introduction of a limited number of marketable certificates allowing car ownership; the permitting of not more than one car per household; high taxes on car ownership and car sales; and high petrol prices.

The reduction of car use can be achieved by the limitation of parking lots, the restriction of parking possibilities by the introduction of parking licences or high parking fees, and the restriction of car use according to time, pollution levels, area, and number of persons carried (for example car use restriction of odd or even days, during rush hours eventually bound to the number of persons, during periods with high air pollution levels, and in certain car free zones). The other way around stimulation of public transport can be realized by low tariffs, good public transport services, and free bus lanes.

Lower emission levels can be achieved by the implementation of emission standards and the organization of an adequate control system, the improvement of existing fuels and the stimulation of the use of cleaner fuels such as gas.

The reduction of the need for transport can be attained by city planning as discussed above. The promotion of living near the workplace seems to be especially useful.

The practice of holiday spreading and the introduction of continuous timetables for schools to reduce trips are forms by which traffic peaks during the day and the holiday season can be reduced.

This list of possibilities for reducing air pollution by motor transport should not give the impression that the problems are solved. Some governments have been successful in reducing pollution, for example Singapore employs a system of limited car ownership and Mexico City has taken measures to force the use of gas for buses and other heavy transport vehicles, while others have implemented partial solutions. Nevertheless, the situation remains alarming in many cities because often the political will for successful air pollution reduction seems to be lacking, notwithstanding the fact that the beneficial examples of adequate control measures abound. This lack of political will might be explained by the vested interests of the people who are the source of pollution and those who suffer from it. In the case of air pollution generally the whole population is effected evenly, but the rich do account for the bulk of motorized transport. This combination of interests is different in the case of water pollution, of which the impact to a large extent can be avoided by the rich, but not by the poor who have to pay more dearly.

WATER POLLUTION

In Third World cities water pollution is one of the main causes of all kinds of infectious diseases. There are several sources for water pollution: inadequate sewage systems, industrial disposal and domestic waste. Rivers which run through cities simultaneously function as the main source of water supply and as the place in which to discharge industrial and domestic waste.

In Shanghai for example 3.4 million cubic metres of waste is released into Suzhou Creek and the Huangpu River and less than five percent of the waste water is treated (Hardoy and Satterthwaite, 1989). The impact of discharges is worst in cases of shortage of water, found in many Third World cities. When there are ample water resources, waste and sewerage can be partially broken down by bacteria for example in the rivers. This water is marginally less dangerous to drink.

In Jakarta, the water problem is rooted in an overabundance of ground water extraction for households, industries, hotels and other commercial activities. This causes low pressure in the lower layers of ground water, which are then filled up by sea water penetrating from the coastal area, inducing saline intrusion. This

brackish water has penetrated a large part of the city underground water reservior. As piped water is often not available, especially in the poor neighbourhoods of northern Jakarta and ground water has salted up, the poor have to buy water from mobile water traders at relatively high costs (Hadiwinoto and Leitmann, 1994).

To prevent water pollution cities need adequate water resources, a waste collection system, and an adequate sewage system so that the city-dwellers as well as the industries can be supplied with the clean water they require.

WASTE IN THE WARD

Recycling is one of the means of obtain sustainable development. It is interesting to see that many Third World cities possess extensive recycling systems which involve a large number of people in selecting valuable materials, such as metals, bottles, paper and plastics. These systems also provide income for the groups of scavengers who engage in this work.

In Bandung, Indonesia, for example we know that several thousands of scavengers are involved in recycling. The waste is collected from concrete boxes in front of the houses where part of it is burnt and where the municipal collectors already start by taking out the most valuable parts. This waste is transported in handcarts to one of the smaller entrepot. As in the city where it is loaded on to big lorries for transport to the city dump. At the entrepot during the unloading of the handcarts and the loading of the lorries scavengers busy themselves with a second picking-over for valuable material. This is repeated for the third time at the city dump were two lines of collectors can be distinguished: on top of the lorry the men and behind the lorry the women and children. At the dump the materials are treated: the bottles are cleaned, the paper and cardboard are packed, the metals flattened with a hammer, and so on. The scavengers transport and sell their goods to middlemen who sell these in big quantities to other companies. The whole system functions as an integrated hierarchy with the scavengers who depend on the middlemen by patron-client relations and have to take the risk of overproduction when the factories are fully supplied at the bottom. Although the system is income-generating for a substantial number of people, it has severe disadvantages such as unhygienic working conditions and a lot of uncollected household waste spread over the city. Recycling is also taking place in other ways, for example, there are cigarette-butt collectors who roam the streets and wet-scavengers who wade the rivers in search of metals (Versnel, 1986).

Social research on the life of scavengers and the knowledge that they perform important functions in the recycling process has led to attempts to organize these persons so as to increase their income and to improve their living and working conditions. In some places co-operatives have been established to form new income-generating activities such as composting. In Mexico City a co-operative has been established which has developed a integrated ward waste treatment system. It comprizes treatment of liquid and solid waste and has separate treatment routes for inorganic and organic materials as well as for soapy and non-soapy waters. The output delivered by the system is in the form of inorganic products reworked in informal workshops for commercialization, organic fertiliser, treated water for fish farming and water for irrigation. Several techniques are used such as a biological chamber for aerobic decomposition, a sedimentation tank for anaerobic purification, and biological filtering (Pezzoli, 1991).

URBAN ENVIRONMENTAL MANAGEMENT

To prevent urban environmental disasters it will be necessary to manage the urban environment in a well-planned, balanced way. In many Third World cities environmental management is not an issue on the agenda of their authorities. Water and air pollution are just two examples of urban environmental problems. Other problems are acid rain, industrial pollution, high levels of noise, increasing use of electricity, increased use of motor vehicles, high population density and perhaps urbanization itself.

In most Third World countries city planning is controlled by the national authorities. Their main goal is economic growth to create job opportunities, generate income, provide for the

basic needs and to improve the quality of life of the citizens. The compatibility of economic growth and environmental protection has always been a problem all over the world. In Third World countries this problem is felt even more sharply because of limited economic development. This is clearly revealed in the following example.

To establish economic growth a country needs investments in all kinds of sectors, but especially in industry. For industrial companies it is much cheaper to start a new factory in a country with little or no environmental regulations. A country is most attractive when it does not expect industries to comply with specific rules, such as a reduction of the emission of carbon dioxide, or when the firm to pay for its own pollution. So, the need for rapid economic growth in a country is difficult to combine with the protection of environment. In the long run the two aims have to be balanced, because economic growth without taking the natural resources that are used and destroyed into account will end in stagnation. The solution for the future has to be the integration of both economic and environmental development plans.

Adequate urban environmental management not only requires the integration of economic and environmental planning, but also of sector plans for transportation, infrastructure, land use and public health. Generally, planning in Third World countries deals only with a few elements of the urban system, and the development of one sector can mean the stagnation of another. For example, land use is closely linked to environmental management. Ineffective land use control may lead to the development of squatter settlements, the use of sensitive soils and valuable land such as farmlands, forests and grasslands for the urban development, but also bring water shortages and inadequate drainage systems in its train. These developments generally have a heavy impact on the urban environment.

In most Third World countries the national government decides upon all political, economic and environmental issues in the cities. Most often this government does not have a general overview on the local problems. The people who work for the national government at the local level often feel more responsibility towards the national governmental issues and are not as concerned about local problems as are the local authorities. Thus, for adequate environmental management it could be important to decentralize power, so that the authorities who are responsible for decision-making and project implementation also feel concerned about the impacts of these plans (LaNier et al., 1989).

So, decentralization under certain conditions could be one of the ways to tackle the problem. Admittedly, research on the origin and development of the urban municipalities in Indonesia has shown that it cannot be expected that central governments are willing to dispose of power without any financial advantage in return (Nas, 1990). This means that decentralization, though it certainly creates some possibilities in the field of environmental protection, should be greeted with moderate enthusiasm.

Decentralization, moreover, should never mean that the national authorities can forget about environmental issues. It is very important that they discuss these issues with other countries and decide upon general rules because environmental problems do spill over national boundaries. Yet, the local governments should have the authority to adapt the general rules to their specific situation and needs. The cities should also be able to draw up their own budget and to have the resources to raise funds and collect taxes at their disposal. Without these resources a city cannot function on its own. The national government in its turn, however, should be allowed to counteract local governments when they, probably under the influence of local conservative interest groups, are not prepared to deal adequately with local and national environmental issues.

Effective environmental decision-making at the local level requires local participation and public support. Through participation people can decide upon environment issues which affect their direct environmental. This process presupposes some degree of awareness of the problems and solutions. People have to know what kind of impact their activities have on the environment. Improvement of environmental awareness can be achieved by education, for example school courses on ecology and monitoring of

pollution by neighbourhood groups (Bartone et al., 1994).

Participation is also needed to encourage willingness to pay for environmental improvements. Adequate water supply, sewage and drainage systems and solid waste management in a neighbourhood require funding. Because the city does not have unlimited financial means, the city-dwellers have to support these systems themselves. When people know why these changes have to be implemented, they will be more willing to finance them. Edelman (pers. comment) particularly emphasizes that systems should be arranged in such a way that they can be maintained by the local government. Therefore, he believes, a system needs to be just adequate and not optimal. An adequate systems is satisfactory because it can be maintained by the locals who are willing to pay for it.

CONCLUSION

In this article we have pointed out the ambiguous character of the city which, on the one hand, is alien and damaging to nature, but, on the other hand, forms the basis for the increase of wealth, the environmental protection movement, and the technical innovations necessary to solve contemporary and future environmental problems. The concepts of carrying capacity and sustainability may be helpful for the definition of an approach to urban development, although the two above-mentioned theories on urban evolution and urban metabolism are considered rather simplistic. They do not adequately represent the complexities of the current interaction in our globalizing world. Several environmental issues are explored within this framework of sustainability and it clearly emerges that many problems could be reduced or even solved but for the lack of the political will to do so. Systems for waste treatment at the neighbourhood level have been developed. The exploration of urban forms in relation to environment does not lead to any clear conclusions and has a low level of applicability particularly in existing cities. More attention should be paid to the role of urban greenery in Third World cities.

Generally speaking, the solution to urban environmental problems in the broad sense is very complex because choices have to be made between the consequences in the short and in the long run, between the protection of the ecosystem and the standard of living of the inhabitants, as well as between economic growth and equity. So, urban environmental discussions often tend to run in circles around the contradiction between the relative importance of poverty and of nature, and the fact that development through poverty reduction increases natural environmental problems. The positions taken within this discussion are generally strictly bound to the interests represented, so that differences are strongly related to various interest and strategic groups. Urban environmental management has to cut this Gordian knot not like Alexander with a stroke but more cautiously most probably by a step by step application of environmental plans.

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