



Sustainable Development and Urban Growth: Precarious Habitat and Water Management in Ho Chi Minh City, Vietnam

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ABSTRACT

Vietnam is still today one of the poorest countries in the world. For some years now, it has nonetheless represented a pole of economic development in South East Asia, thanks to a government policy of liberalisation of production facilities.

Economic expansion results in an annual growth rate of the Gross National Product of more than 8%, and a metropolitan concentration of activities (Ho Chi Minh City (HCMC) accounting for 30% of foreign investment and Hanoi 14%). Within this framework, Vietnamese cities are confronted with extremely serious problems connected with population increase and degradation of natural resources.

Ho Chi Minh City, the metropolis of South Vietnam, has more than 5 million inhabitants. Economic expansion is marked by the establishment of a great many industrial, commercial and service companies. Another aspect of urban reality, the population density is very high (more than 23,000 inhabitants per square kilometre), working-class housing conditions are of very low quality and public networks do not meet the population's needs.

Research is currently being carried out by the Environmental Committee of HCMC and the EPFL (Swiss Federal Institute of Technology) in order to establish the relationship between development of the precarious habitat and pollution of the urban water supply. An initial observation may be made:

Water represents a key element in the development of HCMC. The city is intersected by canals and rivers, used as a dumping ground for all the industrial and domestic waste, a dwelling place for the most destitute families (makeshift housing on piles), traffic routes for waterway transport and market gardening areas. The question of water utilisation arises because the level of contamination recorded, whether in the conveyance circuit, its domestic use or at the drainage stage, exceeds generally accepted hygiene standards, and constitutes a risk for the population's health.

It is essential that measures should be taken, particularly in the precarious habitat areas where the population lives at the limit of absolute poverty. According to

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the survey conducted on the basis of 600 households in two working-class areas, 42% of the active population have unofficial jobs, and the average monthly household income is in the order of 12 US dollars. Under conditions such as these, it is extremely difficult for families to invest in housing and improving the environment.

Innovative forms of dialogue between public authorities, the people's committees which exist in each subdistrict and the population must form the basis of simple solutions aimed at the creation of jobs and the rehabilitation of these areas. © 1997 Elsevier Science Ltd. All rights reserved

INTRODUCTION

Vietnam is still today one of the poorest countries in the world. Thanks to the political and economic changes introduced since the end of the 1980s, however, it has become one of the new poles of production of South East Asia (1992).

Two major events appear to influence its development in the short and long term: the policy of economic redevelopment and opening up to abroad *and* the process of internationalisation of trade in which Vietnam is henceforth engaged.

These two factors have direct repercussions on the population distribution and activities in the area: the tendency towards polarisation in the metropolitan districts is obvious.

The metropolisation process can be extremely positive. It offers an opportunity to open up Vietnam by providing it with a new role on the international scene. Recent development is particularly characterised by an increase in investment, production, employment and income. However, there is also a danger that recent economic changes will create new social and environmental risks, placing a new and permanent question mark over living conditions in the main metropolitan areas.

The metropolis of Ho Chi Minh City (HCMC) occupies a strategic position in the opening up process which is taking shape (Tâm, 1991; Du *et al.*, 1994). It is, therefore, here that the questions connected with urban growth and environmental degradation are most acutely felt. It is also here that we have focused our research in which two things are at stake: it is not only a matter of producing new knowledge concerning fundamental questions concerning development of the precarious habitat, but also of offering urban decision-makers new understanding of the problems and new tools with which to manage the interface between environmental preservation and growth of metropolitan activities.

These are the preoccupations forming the basis of an interdisciplinary research project currently being carried out by the Ecole Polytechnique Fédérale de Lausanne (Swiss Federal Institute of Technology Lausanne), in direct collaboration with several scientific partners in Vietnam, with the aim of identifying the principal relationships between the process of metropolisation, the extension of precarious habitat areas and water pollution (Bassand *et al.*, 1996).

INTERNATIONALISATION OF THE ECONOMY AND METROPOLISATION: A REALITY IN VIETNAM

The knowledge accumulated on metropolitan structures concerns 3 main areas: the sector-based and spatial changes of economic functions; the demographic growth and organisation of human establishments; the segmentation and segregation of society and urban space with the formation and extension of precarious habitat zones. In addition to these 3 dimensions, present in HCMC in specific forms, there is the environmental dimension.

A socio-economic study, carried out in HCMC in 1995 amongst the inhabitants of two precarious habitat quarters, provided a vast amount of information concerning the housing conditions and social practices of low-income families.

The link between these different parameters can be formulated by a simple statement: uncontrolled urbanisation, the growth of zones of poverty and precarious habitat and the absence or inadequacy of infrastructures are 3 dimensions of metropolitan maldevelopment which can affect the sustainable management of resources and the living environment of the populations.

Contemporary Vietnam: a special dynamism

Vietnam has recently emerged as one of the most promising countries in South East Asia, and its economic metropolis now lives at the frantic pace of continuous change: rising foreign investments, setting up of new industrial production units, construction of commercial buildings, not forgetting the arrival of masses of rural immigrants.

This context is in line with both the extension of the dynamism which today characterises South East Asia and with a national history in the process of profound transformation.

Even if Asia remains one of the areas of the world which is still little urbanised, with 30% of the population living in cities, it is nonetheless a fact that, at the end of this century, it will provide 32 of the 60 urban areas in the world with more than 5 million inhabitants. Among them, Ho Chi Minh City. But Asia is also, after Africa, a continent devastated by poverty. Vietnam, with its immediate neighbours, Laos and Cambodia, belongs to the group of the poorest countries in the world (with a Gross National Product lower than US\$ 600).

Economic growth has been remarkable in several countries in South East Asia during recent years. The industrial sector now accounts for 40% of the GNP in such countries as Taiwan, South Korea, Singapore and Hong Kong. This expansion serves as an example for those countries in the area which arrived later in international markets, as is the case of Vietnam.

It is impossible to discuss the socio-economic situation of Vietnam without remembering that this country is emerging from one of the longest and most lethal periods of armed conflict in recent history. From 1954 to 1975, Vietnam was split into two separate national entities. At the time of reunification, the southern part had a capital, then called Saigon, with 3.5 million inhabitants.

The war policy at that time was directed at collecting the population in the urban areas. As we know, the consequences were disastrous for the agrarian economy. As from the national reunification in 1975, an inverse logic has been introduced by the authorities in an attempt to relieve demographic pressure on the South Vietnamese metropolis by establishing new economic development zones in rural environments. Today the government acknowledges that this voluntarist policy has been a failure.

These events no doubt form the basis of the reforms decided on in the 1980s. Whilst Eastern European countries, formerly allies, were initiating a process of radical review of their functioning, Vietnam adopted a policy of economic liberalisation and opening up, intended to energise the internal economic mechanisms. Although agriculture remains the prime economic sector, with 46.9% of the GNP, its share is gradually decreasing in favour of industry and services.

New economic policy in Vietnam and globalisation of trade

The first economic reform measures were aimed at the decollectivisation of all sectors by the transformation of agriculture and the restructuring of State enterprises. This liberalisation has been extended to the financial sector, with the promulgation of an investment code in 1987, the recognition of small private companies, the creation of a credit system designed for the domestic market, and the establishment of commercial banks for foreign transactions.

Subsequently, from 1989 onwards, the government started applying a monetary

policy favouring the introduction of financial development tools. The national currency (the dong) was devalued, the gold market was deregulated, saving was encouraged by an increase in interest rates, and the tax system was modernised. Vietnam provided itself with direct access to international financial markets: in June 1991 foreign banks were authorised to operate on Vietnamese territory.

These radical reforms of the economic system have had a decisive impact on the sector-based and spatial reorganisation of the economic system. It was in agriculture that the first positive effects were recorded: from 1986 to 1995 the cultivation of food crops increased by 50%, largely thanks to rice-growing (+65%). Vietnam regained its self-sufficiency in food production and even became the third largest rice-exporter in the world in 1990.

Even if there is much contrast between the development of the various sectors, the overall situation is considered to be generally positive. The production of hydrocarbons, light industry and the farm-produce industry is greatly increasing. There is a reconfiguration of the industrial sector and rapid expansion in the private sector. According to the General Office of Statistics, the industrial growth recorded in 1993 was 13.5% (*Courrier du Vietnam*, 1994). For the fourth consecutive year, Vietnam enjoys an increase of its GNP with more than 8.6% growth for 1994 (6.6% in 1991, 8.6% in 1992 and 8.1% in 1993).

Development of exports and the extent of foreign investment are no doubt the most obvious indications of Vietnam's entrance into the era of globalisation. Between 1988 and 1993, accumulated foreign investments have been multiplied by 30. There is rapid development in the number and size, but also the sector-based distribution of investments. Although during the first years, capital was primarily concentrated in the petroleum and hotel sectors, since 1991 there has been extensive diversification. Seventy percent of investment is concentrated in the industrial sector, in the most varied domains (telecommunications, information, chemical products, mining, textiles, fine leather goods), branches of foreign banks are also gradually being established (35 at the moment, compared with 25 in 1993). The success of this new economic policy is being achieved at the expense of regional imbalance and growth, which is becoming more and more concentrated: Hanoi retains 14% of foreign capital investment and the metropolitan area of HCMC, 30%.

In HCMC, this investment is directed firstly at the industrial sector (60% of US\$ 2.2 billion), made primarily by Asian countries (*The People's Committee of Ho Chi Minh City*, 1995). Taiwan is at the top of the list of foreign entrepreneurs with Hong Kong and very far ahead of South Korea. The decision in 1994 to lift the embargo against Vietnam by the United States should allow North American companies to get a foothold in this buoyant market. Currently, the industrial production of HCMC represents 31.6% of total national production and approximately 80% of regional production. In the South Vietnamese metropolis, the annual Gross National Product per capita is US\$ 840, that is to say almost 4 times higher than the national average.

Socially, the development is proving painful. According to De Vienne (1994) the restructuring of the production system has resulted in a loss of employment estimated at 30% in the transport sector and 20% in the building and civil engineering sector; 70% of companies in HCMC were closed or working part-time in the first half of 1989. And this despite the fact that the government took certain temporary protective measures in favour of domestic firms. Everything is happening as if order within the economic system had been achieved at the expense of increasing social disorder.

Today the obvious urban reality is that of the coexistence of two developing economic circuits: an upper circuit connected to world economy, and a lower circuit, consisting of innumerable unofficial activities, greatly increasing since opening up

to the private economy. HCMC definitely seems to be taking the route already followed by other Asian metropolises, whose economic miracles are celebrated without examining too closely their social dimension.

PRECARIOUS HABITAT, LIVING CONDITIONS AND ENVIRONMENTAL PROBLEMS

Within the context of the opening up and globalisation of the economy, it is in HCMC that the economic changes disrupting Vietnam are the most aggravated, as are their consequences on the demographic, social and environmental levels.

Whilst the urban population still remains the minority (21.9% of the national population in 1992), demographic forecasts predict that this same urban population will account for 27.1% of the national total in the year 2000, and 46.7% in 2020 (Hainsworth, 1993). In 1996, the population of HCMC was over 5 million inhabitants.

The current inflow of migrants is estimated at approximately 100,000 per year, or 25,000 families who attempt to settle, at all costs, in one of the districts of HCMC. Even if these estimations are cautious, the growth of the metropolitan population is foreseeable: the youthfulness of the population (44% of the population was younger than 15 in 1989) and the high proportion of population groups of an age still capable of having children (46.5% of the population belongs to the 16–40 age group) will continue to sustain current trends for a long time to come (Tâm, 1991).

The metropolis suffers “the weight of history” and the effects of its “modernity”: living conditions have seriously deteriorated. Four-fifths of the inhabitants of the metropolitan area live in the 300 km² of “the HCMC inner-city area”. If the average density of the rural districts is approximately 2000 inhabitants per km², it is 23,200 inhabitants per km² in the urban districts, and can even reach 80,000 inhabitants in certain particularly overpopulated zones. This has repercussions on both technical networks and housing quality: 13% of the road network is considered to be in good condition, the conveyance of drinking water is adulterated by numerous deteriorations, leading to a loss of 27% in the quantity of water supplied; 30% of urban districts lack drainage for used water; a large part of household refuse and industrial waste is thrown into streams, rivers and waterways, with no other form of treatment. Furthermore, there is considerable proliferation of the precarious habitat in HCMC, particularly in areas liable to flooding, near or on the many canals crossing the urban area, which have become real open sewers, and this while self-building, for the moment, is the only solution available to poor families to their housing problem.

Precarious habitat for the poorest families

The state of deterioration of housing conditions in HCMC is borne out as much in terms of amenities and maintenance as in development of the property available. Two-thirds of the houses are covered in sheet metal (UNCHS, 1989) and 50% of housing in the city centre urgently requires renovation (Parenteau and Van Trinh, 1991). Even if street alignment is respected along main roads, the housing blocks are tightly packed together and badly linked to public services. Much of the housing is insalubrious and disposes of only a minimal surface of not more than 6 m² per person.

Although the authorities have long considered the housing sector as a priority, by the inclusion of this right in the Vietnamese constitution, reality tends to prove that the State's share of the property available has never represented more than 30% of all urban housing, the investment carried out by the authorities not exceeding 2% of the public budget (Nhuan and Mathey, 1990). The predominant model is therefore

individual accommodation, either of rural inspiration or following the commercial logic of the Chinese community (Goldblum, 1987), which has spread over the whole urban area in an informal fashion. The legacy of urban designs from the colonial period prevails, on the other hand, in the main street layout and in the architecture of public establishments built during this period.

Self-building remains, for the present, the only solution available to low-income families. This practice is implicitly accepted by the State, but clashes with statutory deficiencies: no construction code specifies standards to be respected; inspection of new buildings and their conformity with planning permission is carried out at the discretion of the local planning office. Moreover, regulation of the occupation of land and property is only just beginning. This uncertainty can have undeniable consequences for the occupants, on the one hand, because the ground remains the property of the State, and its development is carried out in the form of user's rights, and, on the other hand, because the ownership of real estate is required at the time of expropriation and indemnification procedures. Examination of the first results of the survey carried out in HCMC¹ will show that these restrictions can have very serious consequences for the poorest families. As from 1991, an order legalised private ownership and thus authorised the sale, renting and mortgaging of real estate, which does not solve all the problems created by the dissociation of land from building ownership and illegal transactions resulting from it.

Precarious habitat is a crucial question. The Land & Housing Department, according to its latest estimations, advances the figure of 67,000 slums in HCMC,² which would accommodate about 300,000 people (6% of the metropolitan population).

But urbanisation goes beyond these most dramatic cases. Generally speaking, all the precarious habitat districts suffer the same evils: flagrant lack of infrastructures and urban services (road maintenance, sewers, drinking water supply, refuse collection), emptying of dirty water and rubbish into the streams and rivers which are not treated in any way, pollution of ground water, and the filling of backwaters with rubbish by the population, which refuses to pay private refuse collectors. There is a lack of essential services like schools and health centres, and only those households living legally in HCMC³ have direct access to urban services (water and electricity, for example).

For families living in urban districts illegally, the only conceivable alternatives for survival are unofficial, and inevitably more expensive: purchase of water and electricity from third parties, connection to private meters. Although their presence is known and registered, these households are nonetheless considered "illegal" since they have no official residence permit.⁴ This dubious occupancy status does not encourage residents to make a serious investment in the improvement of their accommodation or construction of new dwellings. They make do with what buildings already exist, which leads to excessive subdivision of plots of land and overdensification, gradually transforming these urban districts into a maze of tiny and almost impassable streets.

The question of habitat for the poorest families is thus one facing all urban services in HCMC. State investment is henceforth restricted to the infrastructures and development of certain sites. At the same time, promotion and construction companies are encouraged, and attempts are being made to diversify sources of finance and investment. Therefore, regional cooperative banks specialising in housing finance were created in 1989 (Cartoux, 1995).

The opening of the property sector to the market economy can have positive results in terms of production of housing intended for social groups with relatively low purchasing power. On the other hand, there is however little chance that it will provide a solution to the problems of precarious habitat districts. The majority of families have such low income that they have no access to housing put on sale by

public authorities, even if an allowance is obtained in the case of eviction. Eradication of the slums does not only involve technical solutions aimed at improving the urban environment, it raises far more complex questions concerning the destruction of hovels, the rehousing of poor families living in them, access to training and employment, all aspects of social development which are too often likely to be neglected in urban planning, and which are still far from being resolved in HCMC.

The metropolis seen from the precarious habitat districts

The diffusion of the precarious habitat and the extension of pockets of poverty cannot be considered residual consequences, but must be seen as an integral part of this process of metropolitan concentration and socio-spatial discrimination. The two districts where the field survey was carried out are going to be subjected to the pressures of metropolitan development: dredging of canals and reorganisation of their banks, evacuation of housing built on piles, new road construction, new urbanisation in the south of HCMC. The large-scale urban operations are decided upon at the central level and tend to focus the growth of the metropolis even more around certain key sectors (technological park, luxury housing estates, routes for motorised transport, etc.). At no time were the population and the people's committees in the districts concerned consulted; the individual puts up with the development rather than chooses it.

Knowing the changes which are going to be made in HCMC and their repercussions on habitat and environment, this first diagnosis attempts to convey the perception the inhabitants have of this reality, to examine the nature of the problems and the possible connections between informal management of the environment (particularly water), its impact on natural resources, and the leads which might be envisaged to find solutions for sustainable development. Some results can be outlined.

Socio-economic profile: at the limits of poverty. The population expresses, by its integration in urban life, the precariousness of its conditions of existence. More than 40% of people included in the census exercise an unofficial activity, small business, transport (rickshaws) or services, and thus have no security of employment. This is also reflected by the very low incomes. The average monthly family income is around 12 US dollars, which makes it difficult to meet essential needs. Therefore 75% of the family budget is devoted to food, with another 5–10% being devoted to the payment of water and electricity. The balance does not suffice to cover unforeseen expenses, whether they are for health or education. This explains why 40–50% of respondents admitted getting into debt.

The 2 zones studied became rapidly urbanised from the end of the 1960s. A large number of the dwellings were built by the occupants themselves: 41% in subdistrict 10, and 56% in district 15. The status of site occupation often remains precarious: only 37–45% of occupants, depending on district, are recognised owners of their accommodation, the others are still waiting to regularise this situation (only owners can hope for any compensation in the case of expropriation). Moreover, in these 2 zones, 20% of the inhabitants still have no residence status, and thus no claim to the use of any urban services and facilities.

Living space is limited to 35 m² per dwelling, and construction materials remain unsatisfactory in many cases: 50% of houses in subdistrict 15 are built of wood and makeshift materials, 23% in subdistrict 10. This high proportion in subdistrict 15 is directly linked to the location of these dwellings on the canal. More serious still, between 60 and 70% of the roofs let the rain in, between 39 and 46% of the houses are liable to flooding when water lies in the area.

Each family consists on average of 5.8 individuals, from 18 to 30% of heads of household have secondary school level education and the level of illiteracy varies between 7 and 16%. Poverty and informal economy combine when it is known that

more than half the children do not follow the ordinary schooling cycle, either because the residence status does not allow them access to this public service, or because they work on the streets during the day. This explains the existence of evening classes. There are, however, from 27 to 37% of school-aged children who receive no schooling whatsoever.

The effect of schooling remains ambiguous on socio-economic integration in the urban environment. It no doubt has an effect on family behaviour⁵ and commitment to the community, but still has little influence on income level: 42% of the active population are engaged in the unofficial sector (services to third parties, rickshaw business, occasional employment, small business). The monthly income per person remains low, on average between 120,000–137,000 dong (or 11–13 US dollars), and 40% of respondents declare an individual income lower than 100,000 dong, in other words well short of the declared limit of absolute poverty in HCMC.

This extremely low income level explains why the greatest part of expenditure is devoted to the purchase of food (74%), it also explains why almost 50% of households maintain that they have to occasionally or regularly borrow money from relatives or money-lenders.

These precarious conditions weigh very heavily on the actions which can be taken in an attempt to improve the current situation. In the majority of cases, all those individuals capable of working exercise an activity, and the deterioration of the habitat reflects their residential uncertainty and their inability to invest more in housing. The public actions which could be taken are more concerned with the task of increasing awareness of the importance of preserving the natural environment, and community participation in the rehabilitation of the damaged zones of habitat. It remains difficult, on the other hand, to demand more financially from families already living at the limits of destitution or in absolute poverty.

Water usage. Owing to its location, HCMC is subjected to numerous climatic and geographic hazards: the metropolis really lives "with its feet in the water"; it suffers the effects of the tides and also faces a season of tropical rain, causing flooding of large parts of the urbanised territory. The question, in this context, lies less in the quantity of water distributed than in its quality, its spatial and social allocation, its selling price and the treatment of sewage.

In accordance with international standards, a daily consumption of 100 l of water is judged satisfactory (DCTPW and WSC, 1995). This standard is complied with in the 2 districts studied, and exceeded for the metropolis as a whole. On the other hand, it immediately becomes apparent that the quantity of water used and the price paid depend to a great extent on the method of supply.

The current situation reveals the dysfunctions in the management of this sector. The Public Water Company subsidises the drinking water it distributes at lower than cost price. This policy favours persons and companies officially connected to the public network. Only families possessing a family record book are allowed access to this service. The others must fix up a connection at the main distribution

Table 1. Monthly water consumption per person (according to method of supply and price per m³)

	No. of m ³ consumed	Selling price per m ³ (in Vietnamese dong)
Official meter	5.2	1000 (up to 6m ³)–1500 (from 6m ³ upwards)
Informal connection to a meter	1.9	1800–3300
Purchase by the bucket	5.7	4300–11800
Well	1.9	1000–2000

source (generally by means of a plastic tube). For these people, as for those who buy water from retailers, the price paid exceeds the amount of the budget normally allocated to this service.⁶

The ecotoxicological evaluation carried out on the drinking water conveyance network reveals bacteriological contamination by the detection of coliforms in large quantity.⁷ This result leads one to suppose that the network is not watertight. There is therefore not only a loss of liquid, but pollution as from the first segments of the supply circuit, which is further increased by the unofficial connections.

A drinking water distribution policy which better meets the expectations of the population should focus on the implementation of some simple principles: regularisation of the land and property situation of members of the population without residence permits; fixing of a selling price for water including costs of installation, and network repair and maintenance; large-scale installation of house connections and meter sales, to which could be added a system of micro-credits allowing poor families to pay for this technical installation gradually (for example, monthly reimbursement with the water bill). In this way, one could expect an improvement in water quality, a decrease in loss from the conveyance network, greater social equity in expenditure on drinking water supply, and probably improved profitability for the Public Water Company of HCMC.

Evacuation of used water. As far as the evacuation and treatment of dirty water are concerned, problems arise relating to both their technical and socio-economic dimension.

Certain constraints which must be taken into account are predetermined by topographical features: a large number of urbanised zones are situated at a very low altitude and along the canals; the pluviometry is high (in the order of 1900 mm per year) and concentrated during the few months of the rainy season (approximately 95% between May and November, with the peak in September); the hydrographic system of HCMC is subjected to the influence of the daily double-tide rhythm, with considerable seasonal variations.

Technically speaking, the drainage systems (sewers, arroyos and canals), as they are for the whole metropolitan area and particularly in precarious habitat districts, no longer satisfy present needs. The sewer network has developed in a fragmentary fashion, without being coordinated at the level of the entire metropolitan territory. Today it is overloaded, as its development has not kept up with the rate of urban growth, and it is dilapidated, since no restructuring or cleaning work has been carried out for the last 20 years. As for the canals, their reorganisation is clearly essential as they are widely used as sewers for all types of rubbish, both household and industrial, and are becoming favoured sites for the construction of precarious housing. The current is obstructed and slowed down, sludge accumulates in the bed of the canals, and the water is totally polluted.

Large-scale work should be carried out: construction of new sewers, repair of existing networks, excavation of canals and reinforcement of the banks, demolition of housing built on piles. These hydrological measures must be accompanied by others aimed at curbing the volume of urban refuse: design of a new evacuation system for industrial waste and household rubbish, emptying human excrement from canals, treatment of refuse and used water (nothing having so far been carried out in this domain).

Seen within the context of the 2 zones studied for research purposes, the problems of drainage and refuse evacuation assume a more concrete aspect, in the face of which it does, however, seem possible to react, whilst remaining aware that the complexity of the problems can only be confronted via a global conception. In the two districts, demographic pressure leads to overloading of the evacuation networks. Slightly sloping, these two zones are gradually filled in with refuse by the

inhabitants in order to raise the ground level, eliminate the pockets of stagnant water and avoid the systematic flooding of buildings. The small streams are gradually filled to create new zones for conversion into housing areas. Lacking any overall concept, these activities, intended to solve a problem, can prevent the circulation of surface water and cause new forms of flooding.

VIETNAMESE METROPOLIS AND ENVIRONMENT: LESSONS FOR SUSTAINABLE DEVELOPMENT

A report such as this remains incomplete since it is primarily concerned with water management and focuses its attention on two particular areas of precarious habitat. Links must be created with other dimensions of sustainable development: protection of the air in the face of an impressive increase in road traffic, protection of ground and green spaces in the face of invasive pressure for land ownership and increasing soil contamination; iterative dialogue between local and metropolitan levels of intervention in order to guarantee coherence of the measures recommended.

The environmental and social risks seem evident. It is sometimes difficult, however, to convince the decision-makers of this, caught up as they are in the spiral of short-term action, subjected to multiple national and international pressures, often lacking tools to assess the problems, and with few financial and human resources at their disposal to solve these difficulties.

Let us briefly resume what is currently at stake:

- HCMC is today experiencing fantastic demographic and economic growth, which is reflected by a deterioration of existing natural resources (in particular water and soil, in addition to ever-increasing air contamination) and is likely to eventually destroy the development of human activities;
- the topographic and climatological features of HCMC make water management especially complex and mean that this natural resource is a basic element of sustainable development, through the supply of drinking water to all levels of the population, and the evacuation and treatment of the used water which crosses the metropolis and flows into surrounding areas;
- HCMC suffers from a severe deficit in urban infrastructures (road maintenance, drainage, water and electricity, school, sanitary and social facilities) which makes itself felt both in the general state of health of the residents and the social sphere (the poorest members of the population experiencing greater difficulty in attaining access to such services);
- the absence of a legal residence status, affecting a large proportion of the poorer population groups, has negative repercussions on the distribution of basic urban services offered to all city dwellers, on the recovery of costs in favour of the public collectivity, and on the commitment of the families concerned to the community; it is clearly urgent that the land and property occupation of low-income families be legalised in order to fight against this pernicious form of social discrimination and improve their integration in the metropolitan development process;
- the very high population density, notorious in the precarious habitat districts, causes a deterioration in living conditions and is reflected by heavy contamination of the urban environment; a policy of development of new human settlements and rehabilitation of existing districts is essential to counteract this trend;
- the lack of coordination on the metropolitan scale and consultation between City authorities and local officials in the districts and subdistricts is reflected in urban development choices liable to endanger ecological balance and the stability of the social fabric;

- an intersectorial perception of the problems, emphasizing environmental preservation, is in the process of emerging but must be further reinforced to avoid the introduction of measures which are solely repressive (fight against industrial pollution, as is currently the case) instead of incentive measures (favouring less toxic fuels, for example, which are still not available now).

Ho Chi Minh City finds itself at a crossroads. After decades of war and economic stagnation, its economic dynamism today represents the driving force of a new era, a hope for one of the poorest countries in the world.

World economic changes and reforms introduced by the Vietnamese authorities since 1985 have turned this country into a pole of development in South East Asia. The rapid expansion of the Vietnamese metropolis bears witness to this: boom in the construction industry, development of new industrial zones, creation of new companies, reorganisation of public institutions. These indications must not, however, lead us to forget the other side of the coin: overpopulation, increase in private traffic, spreading of precarious habitat districts, illegal employment, increased pollution, inadequacy of infrastructures.

Water plays a major role in this development. It is a natural resource essential for social reproduction and the preservation of its generic qualities is a prime objective. But water also provides a first-rate impetus to economic and social activities: transport network, living area for the poorer population groups, evacuation channels for a large proportion of household refuse. This multidimensional function cannot operate without creating certain antagonisms. And it is only through establishing the priority of problems, by identifying their causes and effects, that it will be possible to make operational choices aimed at sustainable development (Brandon and Ramankutty, 1993).

A large number of community development initiatives should be taken in the slum areas — they would have the advantage of bringing about rapid improvement in the population's living conditions, and could even create employment. Two objectives, modest but realistic, can be pursued: maintenance and improvement of drainage networks; and collection of household refuse. Both these measures are directed at cleaning up the environment in precarious habitat districts and restore their basic function to the water networks. Repair work must be carried out on the pipes, and certain simple jobs can be carried out by all the families concerned. For more technically sophisticated activities, this could provide an opportunity to support small civil engineering companies, created for and specialising in this purpose (construction, installation and repair of piping and manholes, for example). This sharing of responsibility between inhabitants and small companies can also be developed to deal with all activities involved in the servicing of public networks and maintenance of public places. Two other possibilities should be followed up, in accordance with the same model of joint responsibility between population and private sector: the setting up of small companies in these districts to collect, recycle and evacuate household refuse, in collaboration with the public services responsible for this activity, and with the financial support and supervision of the inhabitants; the removal of public toilets located on the canals in favour of public sanitary amenities for the use of local inhabitants and managed privately.

In order to take such steps, the inhabitants' groups must be able to rely on the confidence and technical and financial assistance of local authorities, so that they can be advised on the nature of jobs to be undertaken, learn from specialised technicians the standards to be respected in the carrying out of the work, and have access to the basic financial support necessary to launch such operations.

At the moment, HCMC authorities delegate a part of their administrative competences to people's committees installed in each district and subdistrict. The lack of financial and technical resources restricts investment and the developments carried out in the poor districts, despite participation of the inhabitants. But over and

above these difficulties, it is the whole question of coordination between public services and population which arises. Going from an extremely hierarchic management model, evolving towards a partnership between inhabitants of the poor districts and metropolitan government means the reinforcement of community structures and organisations, which would represent a turning point in the way the planning and development of HCMC is envisaged.

The questions raised and the solutions outlined are not specific to Ho Chi Minh City. They are world-wide and concern all the large urban agglomerations of South East Asia, and the urbanised areas of the Third World as a whole (Sivaramakrishnan and Green, 1986; Stren *et al.*, 1992; Hardoy *et al.*, 1992; Bolay, 1994). They are combined in different ways, depending on the location of each city, the geophysical constraints present and the human, financial and technical resources available. This is the reason why such studies have now become essential to provide guidance for the development of these Third World areas and their populations.

How can economic development and a fairer redistribution of income amongst the populations of the Third World be guaranteed, without destroying the natural resources essential for re-establishment of ecological balance, in both an urban environment and the surrounding rural zones? Such are the major stakes of the research to be carried out (Cohen, 1991).

As was expressed by J. D. Forster (1990), environmental deterioration in Third World cities is not the inevitable consequence of demographic and industrial growth, it is above all a sign of failure in the distribution of infrastructures which must accompany this growth. The solution to this problem for the future of the cities can therefore only be found through collaboration between public authorities and civic organisations, a step towards what Ignacy Sachs has advocated for more than 20 years: sustainable development focused as much on respect for ecology as for that of the human being, in the continuity of his social and economic activities (Sachs, 1993, 1994).

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NOTES

1. A survey by questionnaire has been carried out amongst a sample of approx. 600 people in 2 working-class districts of HCMC, concerning the socio-economic conditions of the population, their habitat and water usage (the results appear in the publication Bassand *et al.*, 1996).
The two population samples are localised in sub-district 10 of district 8 and sub-district 15 of district Binh Thanh. Overall, the 2 sites are relatively heterogeneous precarious habitat areas, where wooden buildings on piles, buildings made of various other materials and permanent structures exist alongside each other. They are representative of the living conditions of low-income sectors of the population of HCMC.
2. There are 2 distinct types of precarious habitat area: those situated along and on the canals (approximately 25,000 families) in dwellings built on piles; and the habitat on the last unoccupied and non-serviced spaces in the urban environment: the swamp areas and the old cemeteries.
3. Only 30% in the precarious habitat areas, according to the Land and Housing Department.
4. The "family record book" is a real residence permit in HCMC territory and gives the right to live in town, whilst specifying the house occupied.
5. The number of children is lower in families with a higher level of education, for example.
6. 50% of the family budget is generally considered the upper limit, according to Asian Development Bank.
7. See Chapter 3, Part II of Bassand *et al.* (1996).