

NOTE

This paper has been printed as submitted by the author(s) without any formal editing.

Opinions expressed in this paper are those of the author(s) and do not necessarily reflect those of the United Nations Secretariat, the United Nations Centre for Regional Development nor the University of Sao Paulo.

Designations employed and presentation of material in this paper do not imply the expression of any opinion whatsoever on the part of the United Nations Secretariat, the United Nations Centre for Regional Development, nor the University of Sao Paulo, concerning the legal status of any country or territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Urban Growth in Transition, Environmental Change and Natural Hazard Management in Latin America and the Caribbean

1. Introduction

As increasing attention is paid to integrating sustainable economic development and market based approaches into regional development, particular attention must be paid to the vulnerability of urban populations, particularly the poor, to natural hazards. Vulnerability includes the relationship between naturally occurring events and the impacts of human modification of ecosystems through development. Environmental change, whatever aspect considered, includes the changes urban expansion wreaks on natural ecosystems. And sustainable development includes access to resources which help satisfy basic human needs. Whatever benefits urbanization has brought to the region in the past 30 years, they include private sector actions which have brought about the degradation of natural resources, and public sector policies which have paid little attention to natural resource management. The consequences include increased vulnerability of social and economic infrastructure to landslides, flood, earthquakes and droughts. Degradation of natural resources has also affected the availability of food, fuel and building materials, particularly for low income families from city environments and their surroundings. The urban environments and the associated ecosystems with their goods and services that once attracted the original inhabitants have been altered in no small way. And future urban growth means even greater demands.

Modification of existing patterns of urban development can lessen vulnerability to disasters and provide increased availability of food, fuel building materials, and safe building sites. Conversely, if present trends are followed, expected growth and the ensuing environmental change pose grave risk of continued resource degradation and vulnerability to disasters. Left unabated, the impacts of natural events will continue to take an increasing toll of lives and property, particularly among those who are least able to afford the losses. The lower income families who will push out the physical limits of existing urban areas will be cash poor, but will nonetheless demand satisfaction of basic human needs. Not only where but how they succeed in satisfying those needs will have much to do with how vulnerable they will be to natural disasters and to what extent they will contribute to the vulnerability of others.

It may be premature to draw up a definitive list of major themes which will dominate development policy and programs until the end of the century. But three items that will surely be included are disasters, sustainable development and environmental change. The first two of these hold common ground when the focus of development is reduced to disaster relief and reconstruction. This situation now exists in some parts of the world. Development is reduced to this situation when significant portions of the population are (1) forced to live in areas highly prone to hazards with little or no means to mitigate the impact of the associated events

through prevention or preparedness measures; (2) unable to satisfy their need for food, fuel and building materials given the resources, both natural and economic, they control; or (3) victimized by their own or others' modification of their environments to the extent that heretofore benign events now constitute hazards, and the occurrence of the events brings unwanted and uncontrollable results. To a greater or lesser degree the urban poor in the region suffer all three of these conditions.

With all the needs and all the competing claims for regional development assistance, none seems as important as the manner in which environmental policy will be administered in urban areas. These policies can bring reduced disaster vulnerability to new and to existing inhabitants. These inhabitants can, in turn, contribute to a more sustainable use of natural resources, particularly those goods and services that are so directly linked to the basic needs of those with little purchasing power in the formal economy.

Safe building sites are one of the most demanded, costly and least available of the basic needs of the poor. Yet the issue of land use and disaster vulnerability is one of the most visible issues of environmental policy as urban areas evolve. Food is another obvious issue related to environmental policy, both at a global and local level. Regional interdependency on basic food stuffs and local production affected by land-use change and resource degradation, compounded by the impact of natural events, makes this basic need, particularly in the form of water, so important. Fuel crises have come and gone for some sectors, but for the urban poor the dependency on locally obtainable cheap fuels is at the same time a contributor to environmental change and to greater disaster vulnerability because of that change. Building materials are little discussed and less studied, yet their use prompts significant environmental change in urban areas, and often their extraction contributes to increase disaster vulnerability.

Part 2 of this paper briefly describes the evolution of low income settlement development both inside of, and parallel to, decentralization processes involving safe building sites, food, fuel and building materials. Because of their number, their demand for these goods and services from the environment, and the lack of consideration of environmental management issues in settlement planning, low-income families will continue to be the most vulnerable portion of the population to natural disasters. This will be a particularly critical issue for those low-income families who will be part of the additional urban population seeking housing during the coming decade.

Part 3 states that food, fuel, buildings materials and safe building sites occur naturally as resources in environments of both the public and private domains. It is in this form that they are most valuable to the low income families. These goods and services also appear as value-added resources, but in that form they become

increasingly less accessible to the poor. The pressure put on ecosystems for these resources in whatever form they are present establishes the importance of an integrated approach to privatization and local government actions.

Part 4 explains that for the last three decades low income families in the region have repeatedly demonstrated that turning a piece of land to a higher and better use – land development – is the most sustainable economic foothold they gain in an urban area. To sustain the land development process, those families must have access to affordable building materials and safe building sites as well as food and fuel. Such an approach must use environmental management units of large areal extent such as watersheds. They will maximize settlement development strengths, and influence in the most positive way the possible regional growth and environmental change that is bound to take place.

2. The Supply of Settlement Opportunities in Changing Public-Private Processes and Cooperation

The increase in population in urban areas will continue to be the major giver of physical form to metropolitan areas in Latin America and the Caribbean. In terms of physical growth and change, the area to accommodate this increase will be predominantly undeveloped land immediately surrounding existing cities. This development will prompt most land use changes and determine the geographical location of the demand for basic and service infrastructure. Rare will be the instance when a municipal government will have the financial, technical, and administrative resources to predetermine growth patterns through the construction of basic infrastructure before the fringe areas of existing urban areas are occupied by some form of shelter.

Moreover, issues of land availability and location in relation to natural hazards and the provision of food, fuel, building materials and safe building sites for settlements have not often been directly addressed, but rather assumed to be resolved through the more complex issues of urban economic development policy. In many instances, such policies promote market-based approaches, but attempt to regulate out of existence their undesirable consequences.

Lower income families will instigate much of all land use-change. Most settlements will be built outside legal channels, at least with respect to physical planning, building codes and occupancy regulations. Their initial land use patterns will be less complex than those constructed by the formal housing sector for higher income groups. The evolution of provisional shelters constructed by the low-income families into permanent structures containing nonresidential uses will, however, ultimately allow for a variety of non-residential as well as residential space and densities to match or surpass those of existing areas of the city.

It is not enough to say that given local control, provisional shelter can be transformed into acceptable, safe housing, or that low-income settlements can evolve into stable communities. There are important distinctions that generally separate low-income settlements from other settlements in an urban area. Such distinctions are found in the difference in access to certain goods and services provided by the ecosystems that encompass the urban area, the periurban area, and the hinterland for such items as water, structural lumber, waste disposal, and recreation areas. As in the case of both institutionally sponsored and illegal housing, access to natural resources is an issue heretofore little discussed, particularly in regard to food, fuel, building materials, and safe building sites when examining different settlement options.

Low-income settlements are often built on previously uninhabited sites because of the sites' low value in urban land markets. Such sites often include solid or liquid waste disposal areas or are subject to one or more risks from natural hazards (fault zones and landslide prone areas, fresh water flood and erosion prone areas, surge tide prone areas, etc.) But even in these instances the settlements' inhabitants may undertake permanent construction of housing even in the face of probable periodic or catastrophic damage.

Low-income settlements traditionally have little open space for expansion, creation of employment centers and establishment of public services and recreational facilities. This open space, part of the desirable goods from the ecosystem, usually proves too costly to be included in settlement plans. More importantly, those goods and services related to basic needs such as food (including drinking water), fuel, and building materials are rarely if ever available from the immediate settlement, and the surrounding area may have suffered such resource degradation that little or no sustainable flow of desired goods and services may be presently possible. For the families living in these settlements, the situation is one of being thrust into the position of searching for these elements in the context of the natural resources offered by settlement itself, or depending on the provision of these elements from outside providers. While the settlements' inhabitants might, and often do, join together to resolve the problems they face, it is rare that the natural resources necessary to meet those needs are on site.

Quite simply, then, when preparing settlement projects the site selection process for low-income settlements would seem to be complicated enough without introducing additional criteria which would further limit the range of alternatives, even if it is recognized that the lack of resources to meet basic needs, including lessening vulnerability to natural hazards will present a major obstacle to settlement development in the future, and will place a disproportionate level of low-income families at great risk to natural hazards.

3. Public Subsidies, Private Expenditures in Strategic Interventions to Sustain Economic Development through Lower Vulnerability

Development literature often speaks of environmental management as investment in projects having special objectives that are somehow "environmental" as opposed to those that are "developmental." Sanitation, reforestation and flood control projects are seen as environmental projects often affecting urban areas: water, forestry and irrigation projects are development projects. A project-by-project approach with "environmental" projects cleaning up after "development" projects belies an operable definition of environmental management as well as its practical application.¹ It also points out the interrelationship of resource management and development and the need for an integrated approach.

The location of most, if not all, cities in the region is a response to the utilization of on-site or nearby (periurban, hinterland, offshore) natural resource goods and services – deep-water natural ports, mineral deposits, fishing grounds, rich soils, forests, beaches, abundant water supply for industrial or domestic consumption. But in many cities, some goods and services are no longer available in quantity or quality in their natural state to meet urban area demands. For tens if not hundreds of years value-added goods and services (the value being expressed in storage, transport, processing, and other costs) have been provided to ever larger urban populations. And while few, if any, cities were located to avoid natural or man-made hazards, the evolving urban ecosystems offered relatively hazard-free building sites for a variety of uses. Over time, however, the less vulnerable sites have become scarce in relation to population demands.

This spatial dimension of urban population growth requires expansion areas to accommodate the population increase in terms of land for shelter, for secondary and tertiary economic activities, and for components of physical infrastructure – transportation, health, education, and recreation. The periphery of existing urban areas have attributes that vary substantially in their endowed natural resources. They may provide goods and services comparatively cheaply for needed food (at least water), fuel, building materials, and safety from hazards. Ideally, they should do this without passing new problems to other areas, or without degrading the newly accessed goods and services to a point where they can no longer sustain some portion of the population.

The poor attempt to use the goods and services in the least value-added state possible. They use water, fuel wood, sand, clay, gravel, and land for food

¹ Saunier, R. and Bender, S. The Urban Dimension of Environmental Concern in Latin America and the Caribbean. Paper presented at the World Bank seminar on Urban Areas and Environmental Issues, May 26, 1988.

crops and livestock that is closest to their residence, and, other than their own account labor, with as little added energy or information (value-added goods and services) as possible.

The use of these goods and services involves subsidies because of the impact on the environment. Environmental degradation can be interpreted as a form of subsidy: someone will suffer if they have not been adequately compensated for this deterioration in their environmental quality. Subsidies that can be accounted for by degradation of natural processes and the part that this degradation plays in the cost of value-added goods and services are not well understood. When development policies (decentralization, privatization) call for a sector to boost supply and reduce cost (whether the target be potable water supply, housing, food or durable goods) one may immediately look to the involved ecosystems and wonder how much (or-how much more) degradation the ecosystems must bear. The topical question, "Who pays?" in this instance addresses the question of public and private sector interventions to lessen vulnerability to all types of hazards in order to sustain economic development.

Problems associated with those interventions and sustainability change can be expressed as follows:

i) The urban poor will constantly deal with the issues of access to food, fuel, building materials, and safe building sites. Urban environments are of concern because of the number of inhabitants, their proximity to one another, and because of the competition for space and the other goods and services that these ecosystems offer.

ii) Access to land can be seen as the critical issue for low-income settlement development. In high and low income settlements alike, mechanisms are available for land acquisition, for land-use determination, and for regulation of the buying, selling, and development of land. Some of these mechanisms, however, do not fall within accepted, formal control mechanisms, but can be efficient and locally managed.

iii) Lower income people are often forced to look for direct access to (a) drinking water (often untreated); (b) waste-disposal areas (often the same course from which they take drinking water); and (c) access to food and building materials. Higher income groups, on the other hand, demand treated water, waste disposal far from their residences, packaged and processed food and building materials from a variety of distant locations, and industrial and commercial areas that are distant from their own residences.

iv) The absolute number of urban inhabitants is often said to be the cause of system degradation. However, whether urban or not, the high-income population

would still seek relatively more value-added goods and services and certain kinds of natural goods and services; the poor would seek those with as little value-added input as possible. When the demands of the population exceed the systems' capacity to provide goods and services and when substitution with value added goods and services is not possible, degradation occurs. Moreover, when the cost of value-added goods and services does not cover system management, or if such management is not undertaken, additional degradation takes place and the life quality of the system's users decreases in terms of both access to goods and services and heightened risk from hazardous events.

v) The public sector cannot or may not subsidize many of the required value-added goods and services with the result that the poor's use of available natural goods and services is sooner or later subsidized in the form of degradation of the systems being used, lack of cost recovery or low user fees.

vi) The impact of natural hazards on urban, social and economic infrastructure can trigger natural disasters and the destruction of goods and services. As always, the poor are most vulnerable.

Thus the public sector has to deal with the combined problems of land acquisition cost, project budgets, availability and use of information, and meeting demands of the development financing institutions when addressing settlement development problems. Public institutions are confronted with environmental planning issues, although natural hazard issues are rarely dealt with in a straightforward way, particularly when related to low-income settlement development and the public infrastructure. Hazard levels affected by the availability of system goods and services, whether with or without value-added components, include waste-disposal that can affect flooding and landslides. Housing, industrial, and commercial development (in that order) affect flooding and landslides. Settlement areas, by not only occupying vulnerable areas but also by their overcrowd conditions and lack of infrastructure, constitute major triggering devices which affect landslide, flooding, and earthquake vulnerability. Transportation, particularly roads and airports, affect flooding patterns and landslides. And the extraction of building materials affects flooding and landslide prone areas.

4. Interpreting Settlement Growth and Change in View of Regulations and Market-Based Approaches

Against this background of competing uses for resources and the need for lowering the vulnerability of low-income families stands the settlement development experience in the region. This experience indicates that settlement development as

exemplified by land use development, can provide additional income to defray the cost of needed resources if land and building material are available.²

The preponderance of low-income families find housing solutions through owner-contracted (self-help) means whether in the invasion, illegal land sales, or government sectors of the housing market. The major contribution of such housing solutions is the income to low-income families' through the relief from rental payments that possession of a dwelling unit (with or without legal title) represents, the quantity of living space potentially available, and the security associated with possession of land.

Investors in either the clandestine or government settlements have chosen these for economic reasons. Ownership of property and better housing conditions are believed to be available at a lower price. Only in the minority of cases are factors such as proximity to employment, friends and family, transportation, or security selected as the principal reason for moving to a settlement and the lower the income, the more the economic factor appears to dominate.

In owner-occupied dwellings in low-income settlements, dwellers most often pay nothing for housing services. The amount that this housing expenditure relief represents as a percentage of total income can only be roughly estimated, but it is evidently considerable, especially in the lower income categories. If families who possess dwelling units in settlements were forced to seek housing on the rental market, it would be extremely difficult for them to duplicate the services that they are now consuming. They, like the families to whom they rent, would be forced to locate in fewer rooms, lose the income resources the dwelling unit represents, and pay a significant portion of their real income for rent.

The attractiveness of clandestine settlements depends partly on the cost advantages of self-contracted housing and partly on relatively low land prices. Land prices in clandestine settlements are indirectly subsidized by the government through its inability (or unwillingness) to control illegal land occupation. Without the legally mandated public services sites in clandestine settlements are substantially less costly than comparably priced land in "urbanized" commercial settlements.

Clandestine settlements have the additional advantage of lower construction costs. The involvement of family labor in the construction process has long been cited in this connection and has led to the extensive use of the term "self-help" housing to imply erection of the dwelling unit solely with family labor, with or without

² Bender, S. "Low Income Housing Development and Income Distribution: the Impact of Growth and Change" in Berry, R. and Soligo, R., eds Economic Policy and Income Distribution in Colombia (Boulder: Westview Press, 1980).

technical assistance. In the case of initial or first phase dwelling units, which are provisional in nature, that term is probably correctly applied. For permanent construction, however, skill levels are needed which, while present in the settlement, may not necessarily be present in every family. The availability of unskilled family labor is not an important source of the lower construction costs of clandestine settlements.

Some of the housing services at the command of owners are rented to other families. The observed fraction of households per dwelling unit over unity can be attributed to roomers in owner-occupied or rented dwelling units. The rental income varies as a total monthly family income, but can be as much as 30%. The income derived from rental dwelling unit space can be increased (by squeezing the family's own living quarters) according to family contingencies. Investment can be matched to available resources in any given period, providing a flexibility that is not offered by other investment opportunities. It is doubtful that the available funds and labor of low-income families can be invested in other sectors so effectively and efficiently.

A second important source of cash revenue for low-income families is utilization of the dwelling unit for nonresidential purposes. Settlement dwellers provide needed goods and services as their communities evolve, and the establishment of commercial and producing businesses are a natural outgrowth of community development.

Almost all income-producing use of dwelling unit space takes place in units which are of permanent construction. Rental of space to roomers is most commonly found in smaller units and is associated with households with lower incomes. Nonresidential activities are most generally found in households who own rather than rent the units they occupy, and they usually have higher incomes than those families who rent to roomers.

The issue is not what share of the production of low-income housing will be assumed by the participating public and private sectors, be they legal or illegal, but rather whether these sectors will be able to continue to deliver the opportunity for low-income families to participate and gain from evolutionary settlement development. Access to land and construction materials at affordable prices are necessary if low-income settlement development is to continue. These issues are, however, controlled by forces external to the settlements themselves. Issues of vulnerability reductions to natural and population-induced hazards are also most often beyond the control of local settlement dwellers to resolve. There is no guarantee that the policies and resources necessary for sustainable settlement development will be available to low-income families and that the benefits derived therefrom will continue.