Disaster Reduction in Urban Areas

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Abstract

The paper outlines the strategies and approaches of the International Decade for Natural Disaster Reduction (IDNDR, 1990 - 2000), and gives a brief overview of its institutional arrangements and programmes. It emphasises the importance of urbanization for the level of risk to natural disasters and other phenomena, and highlights the need to address disaster management issues in the context of urban development planning. The forthcoming Habitat II Conference provides an excellent opportunity to address disaster reduction and response in the context of development of human settlements.

The paper analyzes disaster reduction as a multi-sectoral issue in urban development and notes that the main issues that should be considered include housing, infrastructure, urban poverty, land use and urban management. The paper indicates how the IDNDR framework can assist in addressing these issues and outlines some key policies for consideration in the Global Plan of Action for Habitat II. Emphasis is placed on attainable goals in reducing the vulnerability of the people at risk, mostly the low income groups. Hazard and vulnerability assessments need to be carried out and new urban development programmes will need to duly consider these assessments. Urban infrastructure and critical facilities need special attention, in particular in very large urban areas. Institutional strengthening is required to improve the capacities of governments to prepare for and respond to disasters and other emergencies.

Development planners need to be involved in disaster reduction and disaster managers need to be part of the planning process if a more sustainable development is to be achieved, City administrators should become aware of the relationships between disasters and sustainable development and the implications this has for development programmes. This will contribute to the well-being of their city and its inhabitants.

Disaster Reduction in Urban Area

1. Introduction

Natural disasters are defined by the impact they have on human societies and by the extent to which human societies are able to cope with these impacts. Where there is an accumulation of people, natural disasters can have correspondingly greater impacts. No city is safe from disasters, and the world is rapidly becoming more urban. At the beginning of the twenty-first century, more than half of the world population will live in cities, where economic activity will also be concentrated.

Natural hazards, such as earthquakes, landslides, wind storms and floods are considered disasters as a measure of the disruption they cause to human population, to the built environment or to natural ecosystems. The areas most vulnerable to extreme natural events are those where there are concentrations of elements at risk: people, buildings and infrastructure, that is to say human settlements. Many recent major disasters have had their main impact in urban areas and densely populated human settlements. Where people have great problems in meeting their daily needs, the ability to withstand disasters will be limited. Urban poverty and its associated effects make communities more vulnerable to disasters.

One of the Technical Sessions at the World Conference on Natural Disaster Reduction in 1994 highlighted the effects of disasters on urban areas. The panel of experts recognized that urban areas are extremely prone to disasters and likely to become even more so, due to the concentration of population, resources and activities. Land use patterns often increase the level of risk. Disaster reduction should become an integral part of the development process of human settlements, and IDNDR aims to facilitate the activities associated with that.

Urban growth of cities puts big demands on the environment and causes an ecological transformation of the area on which they depend. This process is likely to increase risks to which the population is exposed. Hazard prone land is being occupied and the environmental conditions change, leading to more frequent or more severe hazards.

The Habitat II Conference provides a welcome opportunity to highlight disaster management issues in human settlements. The preparation of an action plan for habitat issues is an opportunity to address the multitude of disaster risks associated with urbanization. This paper outlines some key issues in urban disaster management and provides some strategies for addressing these risks.

2. The International Decade for Natural Disaster Reduction (IDNDR)

The International Decade for Natural Disaster Reduction (IDNDR) was declared by the United Nations General Assembly in December, 1989 as an international promotional mechanism for the period 1990-2000 when special attention would be encouraged to foster international cooperation to reduce the global effects of

natural disasters. The objectives, goals and targets of the Decade are given in Figure 1.

The organizational structure includes several mechanisms for cooperation with the scientific community, collaboration between UN-Agencies and liaison with diplomatic representations. The IDNDR Secretariat operates as part of the United Nations Department of Humanitarian Affairs. It services the organizational bodies of IDNDR and leads and supports the implementation of programmes and the establishment of disaster reduction policies. At the national level, governments were urged to set up National Committees or identify focal points as appropriate. Committees and Focal Points have been established in about 130 countries.

The World Conference on Natural Disaster Reduction, held in Yokohama, Japan in May 1994, reaffirmed the commitment of countries and the UN system to work towards meeting the objectives of the Decade. The Conference agreed on the strategies for implementation during the second half of the Decade.

Plans for the second half of the Decade focus on the application of existing knowledge and support to country level activities with particular emphasis to be given at local community levels. The Secretary-General's Report to the UN General Assembly in 1995 identifies four strategic elements:

(i) Gaining widespread recognition for disaster reduction as part of the development process;
(ii) Mobilizing political commitment and resources for the implementation of projects at all levels
(iii) Integration of the implementation of programmes
(iv) Establishment of effective systems for information exchange.

Given these strategic elements, four core activities are established: the development of national capabilities; the transfer and application of existing knowledge and technology; information management; and international collaboration. The work programme of the Secretariat focuses on these core activities. Areas of attention for the Secretariat are the strengthening of cooperation with regional and national levels, and to further build on international mechanisms for cooperation.

Promotional activities of the IDNDR include the International Day for Natural Disaster Reduction, which is observed annually under a specific theme. In 1995 the theme was 'Women and Children'. In 1996, IDNDR Day will relate to the theme of 'Disasters and Urbanization'. Information materials will be distributed to national committees for the Decade, community and non-governmental organizations and other partners within and outside the UN system.

The Decade secretariat organized, in co-operation with the Meteorological and Geophysical Agency of the Department of Communications of Indonesia, and the Regional Office of UNESCO at Jakarta (Indonesia), the International Workshop on Earthquake Disaster Reduction in Urban Areas, at Jakarta from 28 to 30 June 1995. The Workshop brought together participants from 21 countries and

international organizations, to assess progress made in their countries and to discuss further co-operation in the field.

3. The Characteristics of Urban Environment

The world is steadily becoming more urban. By the early decades of the next century, more than half of the world's people will live in cities. The number of cities with more than one million people in developing countries will increase from 125 in 1990 to almost 300 by the year 2000. In Africa, the least urbanized continent, there are now 37 such cities, as compared with only two in 1950. Many African cities will double in size every 12 years. By 2000, there will be over 20 cities with a population greater than 10 million - and more than 15 of these are located in developing countries. Figure 2. illustrates the development of large urban agglomerations between 1950 and 2000. During the 1990s no less than 80 per cent of the world's population increase is expected to take place in towns and cities -81 million people every year.

These changes have a profound effect on the organization of societies and the demand on services; not only in large urban agglomerations -mega cities- but also in intermediate and smaller cities. The rate of change requires enormous efforts to provide even the most basic level of services to the population. New resources have to be found to provide adequate amounts of safe water, electricity, construction materials and space. Degradation of the urban environment is a serious problem as pressure on scarce land and limited water resources increases. Flood plains and landslide-prone hill sides are used for housing, often informal, low-quality housing, because there is no other land available at reasonable cost sufficiently close to employment opportunities.

The major challenge of the Habitat II Conference is to identify strategies and policies for the sustainable development of human settlements within this context.
The Bangladesh cyclone in 1990, the eruption of Mount Pinatubo and the Bagio earthquake in the Philippines, the Chinese river floods in 1991 and 1995, the United States floods in 1993, the mudslides in Colombia in 1994, the earthquake in Maharashtra, India, 1994, the floods in western Europe in 1995, and the earthquake in Kobe, Japan, 1995, and even the severe cyclone season in the Northern hemisphere in 1995, are but a few reminders of the devastation caused by natural disasters. Many of these events have been the worst events of their kind in the countries where they occurred. Many have had their main impact in urban areas, where there is a large concentration of people with a heavy dependency on infrastructure and services. Environmental degradation has often increased the vulnerability, in particular of low-income groups. Figure 3 shows some recent disasters since 1990.

The fact that so many of these disasters have occurred in only the past five years, since the IDNDR started, highlights the importance of looking at disaster risks in the framework of human settlement developments. Natural disasters can only be reduced adequately, if they are analyzed as an integral part in the resource allocation and planning for urban development. Development planners need to be involved in

disaster reduction and disaster managers need to be part of the planning process if a more sustainable development is to be achieved.

4. Disasters in the urban environment

4.1. Why cities are vulnerable to natural disasters

The accelerated growth of cities and increasing scale of urban industrial activity is exacerbating environmental degradation in cities. This raises the vulnerability of urban areas to both natural and technological hazards. It is commonly recognised that the characteristics of "urban natural disasters" have become increasingly complex due to the high density of population and the strong concentration of social capital.Factors influencing vulnerability will vary from one area to another and from one city to another.

Urban development itself may contribute to disaster vulnerability.The accelerating growth of cities has contributed to the ecological transformation of their immediate areas, which even in well-established cities, can be self-destructive. The demand for space in fast-growing cities has led to the use of land which is fraught with hazards when developed. For example, according to the WMO (1995), urban development often increases the risk of flash flooding. Urbanization of land increases the volume and speed of runoff thereby significantly increasing the severity and the speed of the flood. Other impacts of urban development on the environment include: lowering or rising of the water table; subsidence; loss in bearing capacity of soil foundations; instability of slopes and underground excavations, contamination of soil waters (UNCRD/UNDDSMS, 1994).

Some critical variables, common to different areas and important in determining the degree of vulnerability in urban areas, are indicated below:

Density of the population

Population density is one of the variables that determines the severity of a disaster. Where people are concentrated in a limited area, any single cataclysmic event can cause more injury and death than would occur if these people were more dispersed. The city of Kobe, Japan, has an overall density of 2,765 persons/km2. The area most severely affected by the earthquake of 17 January 1995 was the Nagata Ward, which had a density of 11,498 persons/km2.

The density of urban population per square kilometre is particularly high in the largest cities of developing countries. The density of older sections of some cities may be as high as 20,000 to 60,000 persons/km2, although the average densities for such cities may be less than 10,000 persons/km2. Densities in informal settlements may be much higher. For several areas in India, densities of up to 148,000 people/km2 are reported. (Havlick,1986)

Hazardousness of the location

Some cities are more vulnerable than others because of their hazardous location, earthquake-prone areas, coastal zones and river deltas. It needs to be recognised that the location factor which is now considered a hazard, was often the reason that people

settled in the areas in the first place. Productive floodplains, inviting coastal zones and fertile volcanic slopes are examples. With the growth of settlements and the decreasing dependency on nearby agriculture, the potential danger of a location has, in some cases become more important than the positive attributes of a particular place for settlement.

Degree of functional importance of the city
The concentration of political, economic and administrative activities in a major city contributes to the disaster vulnerability as well. If a hazard event occurs in a major city where a country's principal functions are concentrated, the functions of that entire country will be affected, in particular by damaging the economy. In view of the increasing interdependence within the global market, a major earthquake striking a city such as Tokyo could have a world-wide impact on commercial activities.(ICE,1995)

Dependency on infrastructure
Urban societies depend on infrastructure systems for the provision of their basic services. In large urban agglomerations, infrastructure systems are increasingly complex, and therefore more subject to disruption, and more costly to repair or replace. In developing countries, there are major problems in the provision of basic water supply and sanitation services. The rapid development of urban areas makes it difficult to keep pace with the development of infrastructure and basic services. Funds go to the extension of services, with less funding or attention given to maintain the existing ones. The poor maintenance further increases the vulnerability of infrastructure.

Damage to urban infrastructure by natural disasters has long-term as well as short-term impacts. Natural disasters can often trigger secondary disasters caused by the failure of infrastructure. Breakage of gas lines can cause fires; collapsing infrastructures cause deaths and further damage. Immediate health hazards due to the failure of water and sewage systems can pose major threats, in particular in densely populated, low-income areas. The long-term impact of damaged infrastructure can be enormous in terms of disruption of the economy and difficulties in re-establishing the urban community.

Urban management capacity
The very fast growth of urban areas puts severe strains on the ability of local authorities to regulate developments and to provide an adequate level of safety and services. This growth also means that mechanisms and arrangements to carry out disaster preparedness and emergency operations become increasingly complex, posing additional strains. The potential impact of disasters increases rapidly with population growth. But the urban management capacity is often lagging behind, even in the provision of basic services. The lack of ability to cope with increasingly severe disasters leads to additional risks including the occurrence of secondary disasters.

4.2 Distribution of risks among the urban population
It is generally accepted that disasters do not affect all people equally. The pattern of risk is related to socio-economic development. Some of the factors related to the exposure of risks in urban areas, are discussed below.

Urban poverty and disasters
People with different income levels are likely to be affected differently by the same event. The vulnerability to disaster tends to lessen with increasing income. This is partly because more expensive buildings have been engineered to a higher standard. Higher-income households are also more likely to live in areas that are less vulnerable to natural hazards. On the other hand, low-income groups are likely to live in marginal areas, the low value of which reflects their vulnerability.

The poorest people live in the lowest quality housing on the most hazard prone locations, and have the fewest opportunities to lessen potential disaster impacts. They simply have fewer options because of their lack of resources. The urban poor are a very large and growing category: In 1988 it was estimated that approximately 330 million people, or 27.7% of the total urban population of developing countries, live below the poverty line. In Africa, which is urbanizing at an extremely rapid rate of about 7% per annum, this percentage is estimated to be about 42%. The largest number of urban poor is found in Asia: 136.5 million people in urban areas live below the poverty level.

Physical vulnerability to the stresses imposed by natural hazards
The vulnerability of urban areas to natural hazards depends partly on the physical characteristics of the buildings and infrastructure in relation to the hazard to which these structures are exposed. The physical vulnerability is a measure for the potential degree of damage that will be caused by a given hazard. Buildings and infrastructure have a different level of vulnerability to different hazards. Earthquakes do not kill people, collapsing buildings do. More than 80% of the casualties from earthquakes are associated with collapsing buildings. This makes the suitability and quality of housing construction a vital issue in earthquake disaster reduction.

Quality construction is also very important in relation to tropical cyclones. Basic technologies to build hazard-resistant, low-cost housing have been developed and tested in numerous locations. Although important successes have been achieved, many more improvements are feasible. In particular, it is important that existing knowledge can be disseminated and used or modified elsewhere. These will require educational programmes to inform people, and especially builders of the benefits of disaster-resistant housing and construction control mechanisms to reduce disasters caused by inappropriate construction practices.

4.3 Informal Settlements at risk
All people are affected by a disaster, but they are not affected equally. Within a community, individuals differ in vulnerability because of differences in gender, physical status,social ties, control over socio-economic resources as well as to the location of their dwellings. Social categories usually stated as particularly vulnerable are women, children, the elderly, the disabled, and low-income groups.

Given the rapid pace of urbanization in Asia, Africa and Latin America, most municipal governments have lacked financial and administrative resources to provide basic urban services. Government investments have largely been allocated to provide basic services to planned settlements. Low-income groups have, in many cases, occupied

government or privately owned land and built shelters with their own resources without following building codes, standards or other government regulations. This has led to the proliferation of informal settlements in many developing countries.

It has been estimated that 30-60% of the residents of most large cities in developing countries live in what are called 'informal settlements' or 'shantytowns'. The UNCHS Global Report on Human Settlements (1986) pointed out that in Sao Paulo 32% of the total population of the city live in informal settlements, in Mexico City this proportion is 40%, in Manila 47% and in Bogota 59% (Figure 4).

Unplanned informal settlements grow at about twice the average urban rate and the density of the population may be as high as 148,000/km2 (India). These areas generally suffer from the lowest standards of infrastructure, accommodation and basic services. Due to their location, these areas will often be particularly vulnerable to natural disasters.
The pattern to which human settlements have developed tends to place the low-income groups onto marginal land, such as flood plains or unstable slopes, rendering them easily susceptible to natural hazards such as flooding, landslides or earthquakes.

Why low-income groups occupy the hazard-prone areas
In most cases, low-income groups occupy hazard-prone areas because they do not have financial resources to compete for planned urban land in safe locations. In some cases, the urban poor choose to settle on marginal lands near the inner city in order to have access to central area employment opportunities. Hazard-prone areas are often the only land within reach of low-income groups. In cities of many developing countries, however, the underlying causes of urban land shortages that push low-income groups to hazard-prone areas are not always recognized. It has been argued that in many cities the scarcity of land is artificially induced by imperfections in urban land markets and ineffective land management practices, often because of inappropriate land regulation, lack of secure tenure and inappropriate taxation (Bernstein,1992). This scarcity of land puts people at risk.

Some of the causes are the following:

Inappropriate land regulation
Poor regulation is one of the factors influencing the location of the urban poor in marginal lands. In some cases, land development standards artificially reduce the supply of land by requiring large lot sizes or excessive amounts of land for open space and circulation within subdivisions. In other situations, low-income groups occupy hazard-prone areas because local authorities have not formulated effective land use policies, laws or standards that address development in these areas. (Bernstein,1992)

Inadequate information
The lack of adequate information on urban land and the immediate environment can impose severe constraints on land market transactions, as well as on land use and environmental planning. Information about hazard-proneness of areas and the carrying capacity of the land should be available. Local authorities find it extremely difficult to establish effective regulations and policies concerning hazard-prone areas without

adequate land use and environmental information about the land resources to be managed.

Lack of tenure security
The lack of tenure security and irregular access to land titles in many cities has profoundly affected the ability of the low-income groups to acquire safe land for housing. In the absence of secure tenure, residents have little incentive to maintain their dwellings, thereby increasing the vulnerability of their homes to earthquakes, cyclones and other hazards. Incentives are also lacking to make improvement such as drainage and terracing, which reduce the area's susceptibility to floods and landslides (Ibid.).

5. Proposed policies, strategies and priority actions

This analysis points to a wide range of issues which link the development of human settlements and vulnerability to disasters. Specific areas and functions are exposed to higher risks than others. Informal settlements and key infrastructures particularly should form the core of attention for disaster reduction.

Reducing the impact of disasters needs a solid foundation in the form of what was referred to in the Yokohama Conference as a 'global culture of prevention'. This is not something that will emerge immediately, or even in the time span of the IDNDR. It comprises a gradual change in attitude that is based on the conviction that the impact of disasters can be reduced through the way society is organised and the way in which people are motivated to act. This conviction will grow if it can be based on the shared experience that disaster reduction does make a difference in the extent to which people are exposed to risks.

5.1 Policy directions

There are four main **policy directions** that need to be pursued in order to reduce the risks of disasters in urban areas:

(i) Striving for development that takes account of the risks imposed by natural disasters, and thus is more sustainable;

(ii) Establishing city management that is prepared and ready to cope with potential disasters;

(iii) Having a community that is alert and prepared to cope with disasters by their realistic assessment of the risks and the knowledge, ability and resources to take adequate protective measures;

(iv) Addressing high risk situations, particularly related to critical infrastructures and high risk informal settlements, through special disaster mitigation programmes.

These policy directions need to be underpinned by **essential requirements**, of which the following are considered the most critical:

(a) **Political commitment:** The most important is the political commitment made at the national and local levels to address disaster risks on a pro-active basis. As a direct consequence of this commitment, resources need to be mobilized for preventive measures.

(b) **Understanding the risks:** Any action to reduce disasters in urban areas needs to be based on an understanding of the hazards and the vulnerability of the communities and facilities at risk. An understanding of differences in vulnerability and of the mechanisms which cause risk is required. Systematic assessment of risks is necessary as a basis of all disaster related programmes, both before as well as during and after disasters.

(c) **Enabling role of the international community:** Commitment at the national and local levels needs to be supported by the international community, in particular for highly vulnerable countries and communities. The international community should enable the implementation of disaster reduction in towns, cities and countries at risk.

(d) **Community based programmes:**Disaster reduction policies need to be focused on communities at risk, and built upon an increasing ability for inhabitants themselves to be directly involved in their own protection. Solutions for disaster reduction will only be effective if they are based on the needs and resources of the people at risk

5.2 Strategies for disaster reduction in urban areas

Recommendations for disaster reduction have been made on a number of occasions. The comprehensive Yokohama Strategy and Plan of Action covers disaster reduction at a global level and makes recommendations that reach out to the local and community levels. It is encouraging to note that the Habitat II Conference will consider disaster impacts on human settlements, within the framework of plans for sustainable human settlements development in an urbanizing world.

This paper focuses on strategies that can help to shape policies which can serve as a basis for the development of action programmes at the national and local levels. Programmes should be based on local conditions to respond to the considerable variation in local conditions. The following strategies can contribute to that process:

(i) Striving for development that takes account of the risks imposed by natural disasters, and thus is more sustainable

- **Vulnerability reduction as a development objective:**The reduction of human vulnerability to disasters needs to become integrated as one of the core objectives of sustainable development This makes it possible

to put into practice the 'culture of prevention' in the broad spectrum of development activities. Operational concepts and strategies need to be developed for that purpose:

- **Risk assessment:** Assessment of both hazards and vulnerabilities are necessary to provide a basis for identifying a form of development that reduces risks rather than increases them;
- **Disaster impact assessment:** Analysis is required to identify how investments in development are affected by disasters and how these investments impact upon the potential occurrence of hazards and the vulnerability of populations. A methodology similar to the environmental impact assessment (EIA) should be applied as a matter of routine in critical development decisions.
- **Land use planning:** Suitable land use has to be defined and enforced for hazard-prone land. Functions and activities need to be located where they do not have a detrimental impact on the risk of other activities in the urban fabric
- **Quality of construction:** An adequate level of safety needs to be achieved for all construction. The establishment and enforcement of building codes is necessary, but additional policies are needed to reduce risks, in particular in non-engineered construction. These can include the use of incentives, pricing arrangements, training and professional education.

(ii) Establishing city management that is prepared and ready to cope with potential disasters

- **Policies:** Clear policies need to be established for the way in which emergency situations and disasters are handled, in order to ensure equal distribution of disaster support and optimum use of resources.
- **Disaster Planning:** A disaster management plan is needed at the National as well as the Local level Such a plan outlines the roles and responsibilities of the various departments and actors and puts in place appropriate arrangements fro preparedness and response. From the point of view of the IDNDR Secretariat, it would be useful if such plans would have an integrated character, covering all aspects of disaster management, including responsibilities for disaster reduction.
- **Institutional strengthening:** Establishment and strengthening of disaster management institutions at the national, local and community level is a priority in many countries. The systematic allocation of responsibilities, resources and the development of capacities to manage disasters and risks also needs to be extended to the local level, in particular in urban areas.
- **Communication:** Proper channels for communication need to be established to allow authorities to communicate with the people at risk and to facilitate emergency and relief operations.
- **Effective disaster warning:** Effective warnings are not always possible, but where the technical capacity exists to predict the occurrence of

natural hazards. this information should be made available to the people at risk as well as local decision makers, in a form that can be understood and acted upon.

(iii) Having a community that is alert and prepared to cope with disasters by their realistic assessment of the risks and the knowledge, ability and resources to take adequate protective measures

- **Hazard and risk information:** Information on hazards and risks should be freely available to communities at risk, and should be provided in a way that allows people to make a realistic assessment of the threats to which they are exposed;
- **Community based programmes and solutions:** Disaster reduction activities need to be developed by or in close consultation with communities at risk. Programmes need to be based on community needs and should provide attainable solutions to the problems of disaster risks. Community based hazard mapping and vulnerability reduction programmes should be considered as part of the programme.
- **Public information and awareness:** Programmes are needed to make people aware of the risks to which they are exposed and to provide them with the knowledge and capacities to resolve critical risks. Also people should be well informed on the measures, such as evacuation arrangements, that need to be taken in the case of a disaster;
- **Disaster warnings:** Warnings of an impending disaster need to be widely disseminated in a way that can be readily understood by the population and advice and instructions should be given on the measures that need to be taken.

(iv) Addressing high risk situations through special disaster mitigation programmes.

- **Establishing priorities:** High risk situations need to be identified and prioritized through risk assessments. This provides the basis for disaster mitigation programmes and special measures that are within the resources and carrying capacity of the urban society. Additional resources may need to be found to address the most high risk situations.
- **Critical facilities:** Special measures are often needed to reduce the risks of critical facilities. These include structures that accommodate a large number or particularly vulnerable groups of people, facilities that are of critical importance during emergency and relief operations, installations that may cause secondary disasters and infrastructure elements that are of critical importance for the functioning of the urban society.
- **High risk communities:** Communities that are exposed to high risks may require special programmes to address their risks. Innovative solutions will need to be found by communities at risk with support of local authorities.

5.3 Priority Actions at the International Level

The policy directions and strategies described above paint a broad picture of how disasters and disaster risks in urban areas can be addressed. Significant progress can be made if the international community focuses its disaster related urban programmes on the following actions:

(i) Establish **internationally agreed policies** on disaster reduction
(ii) Pursue a pro-active policy to **provide relevant information** to communities at risk
(iii) **Provide resources,** including technical support, to assist urban communities to address the risks to which they are exposed
(iv) Facilitate **cooperation between urban communities** with similar risk patterns
(v) **Address gaps** in the available knowledge about disasters in urban areas
(vi) Establish mechanisms for **disaster impact assessment** for internationally-funded development cooperation programmes

(vii) Provide post-disaster assistance which includes **disaster mitigation elements in the rehabilitation phase**

6. A proposed IDNDR programme for urban disaster risk reduction

The IDNDR Secretariat proposes to establish a programme that will support urban communities in addressing disaster risks. The project can be considered as one of the international activities to support the implementation of the Habitat Agenda. The development objective of the project would be to reduce the impact of future natural disasters on selected urban areas and thus to contribute to the sustainable development of these areas.

The project activities would be concentrated in three areas:

1. The establishment of a framework for cooperation and exchange between disaster prone urban areas around the world, to allow national and local agencies to learn lessons from disasters and disaster reduction activities in other areas, and to share their experiences with people with similar responsibilities in other urban areas
2. Contribute to the reduction of disaster impacts in at least ten urban centres worldwide, by providing specific technical support and advice on a variety of subjects, on the basis of an identification of critical activities for disaster reduction in those urban areas, undertaken in close cooperation with national and local policy makers
3. Provision of case histories, project descriptions and evaluations, analysis of disaster impacts and other relevant materials for disaster reduction in urban areas in support of capacity development and disaster reduction activities in target cities and other areas.

The scope of the project is limited by available resources and considerations of manageability, rather than by the size of the problem. The project needs to be output-oriented and to produce tangible benefits for the urban areas in which it works. The following approaches outline the scope of the project and illustrate how the best use

can be made of available resources. The proposed approach for the project combines targeted in-country programmes and international exchange on a broad range of subjects related to disaster reduction in urban areas.

Targeted in-country support
The in-country activities of the project will have to be limited to some key areas in order to provide targeted support at the local level. These activities have to address a local priority issue and should be able to be used as 'learning experiences' for other urban areas. Identification of key areas will be based on an analysis of the local situation and discussions at the policy level.

Broad-based international exchange and cooperation
Activities related to cooperation and exchange need to be more broad-based. They should not only facilitate regional and inter-regional exchange between well defined professional categories, such as earthquake engineers or hydrologists, but should also facilitate exchanges between professional categories. This will allow the solution of disaster risk problems in an interdisciplinary manner by making use of knowledge in various disciplines around the world.

Using local resources
The project aims to facilitate the work of local institutions and to provide technical contributions if required. The experiences at the local level will form the major input for international exchange activities.

Complement existing programmes
The project seeks to complement existing project activities by selecting other areas for its local-level interventions. Current and recent urban disaster reduction projects will be expected and encouraged to participate in international cooperation arrangements and support activities.

The proposed duration of the project is three years. The first six months will be used for inventories and assessments and the last four months for consolidation and evaluation of project findings. The country-level activities will finish in conjunction with the end of the International Decade for Natural Disaster Reduction (IDNDR).

The IDNDR provides an opportunity to highlight disaster reduction activities at the local level. It provides a framework for activities endorsed by the UN General Assembly. The activities of the project respond to the Yokohama Strategy and Plan of Action. The project is an important element in the IDNDR strategy to promote disaster reduction. Similar considerations are valid for the Habitat II Conference: the project aims to contribute to the implementation of the Global Plan of Action for Human Settlements.

FIGURE 1 IDNDR INTERNATIONAL FRAMEWORK OF ACTION

The international community, mobilized under the auspices of the United Nations, proclaimed the objective of the Decade to be,

"The reduction of loss of life, property damage, and social and economic disruption caused by natural disasters, through concerted international action, especially in developing countries".

In order to achieve this objective the following **goals** were declared for the Decade:

1. To improve the capacity of each country to mitigate the effects of natural disasters, with special attention being given to assisting developing countries in the assessment of disaster damage potential, and in the establishment of early warning systems and disaster-resistant structures;

2. To devise appropriate guidelines and strategies for applying existing scientific and technical knowledge, taking into account cultural and economic diversity;

3. To foster scientific and engineering endeavour aimed at addressing critical gaps in knowledge in order to reduce loss of life and property;

4. To disseminate existing and new technical information related to measures for the assessment, prediction and mitigation of natural disasters; and

5. To develop measures for the assessment, prediction, prevention and mitigation of natural disasters through programmes of technical assistance and technology transfer, demonstration projects, education and training, and to evaluate the effectiveness of those programmes.

Three programming **targets** have been established as a basis for assessing the achievements of the Decade by the beginning of the 21st century. Their accomplishment depends upon concerted international efforts and the policy commitment of national and local governments to establish coordination mechanisms for the implementation of disaster reduction. By the year 2000, all countries should have in place, as part of their national plans to achieve sustainable development,

1. Comprehensive national assessments of risks from natural hazards integrated into development plans.

2. Mitigation plans of practical measures for application at national and local levels that address long-term disaster prevention, preparedness and community awareness.

3. Ready access to global, regional, national and local warning systems.

FIGURE 2 LARGE URBAN AGGLOMERATIONS IN 1950 AND 2000

1950 rank	Agglomeration	Country	Population (mio.)	2000 rank	Agglomeration	Country	Population (millions)
1	New York	USA	12.3	1	Mexico City	Mexico	25.6
2	London	UK	8.7	2	Sao Paolo	Brazil	22.1
3	Tokyo	Japan	6.7	3	Tokyo	Japan	19.0
4	Paris	France	5.4	4	Shanghai	China	17.0
5	Shanghai	China	5.3	5	New York	USA	16.8
6	Buenos Aires	Argentina	5.0	6	Calcutta	India	15.7
7	Chicago	USA	4.9	7	Bombay	India	15.4
8	Moscow	USSR	4.8	8	Beijing	China	14.0
9	Calcutta	India	4.4	9	Los Angeles	USA	13.9
10	Los Angeles	USA	4.0	10	Jakarta	Indonesia	13.7
11	Beijing	China	3.9	11	Delhi	India	13.2
12	Osaka	Japan	3.8	12	Buenos Aires	Argentina	12.9
13	Milan	Italy	3.6	13	Lagos	Nigeria	12.9
14	Mexico City	Mexico	3.1	14	Tianjin	China	12.7
15	Philadelphia	USA	2.9	15	Seoul	Korea	12.7
16	Bombay	India	2.9	16	Rio de Janeiro	Brazil	12.5
17	Rio de Janeiro	Brazil	2.9	17	Dhaka	Bangladesh	12.2
18	Detroit	USA	2.8	18	Cairo	Egypt	11.8
19	Naples	Italy	2.8	19	Metro Manila	Philippines	11.8
20	Leningrad	USSR	2.6	20	Karachi	Pakistan	11.7

Source: United Nations Urban Agglomeration Chart 1990. New York, United Nations 1990

FIGURE 3 SOME MAJOR DISASTERS SINCE THE START OF IDNDR

Year	Hazard	Country	No. of Dead	Damage estimate (million US$)
1990	earthquake	Philippines	1,660	920
	tropical cyclone	South Pacific	8	119
	tropical cyclone	Philippines	503	720
1991	earthquake	Georgia	270	1,700
	volcano	Philippines	932	260
	cyclone and flash flood	Philippines	4,899	
	tropical cyclone	Bangladesh	138,866	1,780
	river flood	China	2,470	21,000
	cyclone	USA/Caribbean		20,000
	earthquake	India	2,000	
	tropical cyclone	South Pacific	12	331
1992	tsunami	Indonesia	2,080	100
	tsunami	Nicaragua	116	25
	earthquake	Turkey	547	
	mudflow	Philippines	333	320
1992-93	drought	Southern Africa		
	earthquake	Egypt		
1993	river flood	United States		20,000
	earthquake / tsunami	Japan	122	
	31 typhoons	Philippines	514	
	tropical cyclone	Fiji	21	134
	earthquake	India	10,000	
	flood	Western Europe	7	hundreds
	mudflows	Philippines		of millions
1994	earthquake	United States		20,000
	earthquake / mudslide	Colombia	650	
	volcano	Papua New Guinea	100,000 affected	
	flood	China	1,400	
	flood	India	2,001	
	mudflows	Philippines		
1995	earthquake	Japan	5,500	100,000
	earthquake	Russia		
	earthquake	Turkey	70+	
	earthquake	Indonesia	100+	
	hurricanes, 20+	Atlantic and Caribbean basins		
	mudflows	Philippines		
	floods	Dem. Republic of Korea		
	earthquake	Mexico	100+	
	floods	Thailand	171+	120+
	typhoon	Philippines	500+	

(indicative losses cited, from various sources)

FIGURE 4. ESTIMATES OF THE PERCENTAGE OF CITY POPULATION IN INFORMAL SETTLEMENTS

City	Total population (1980) (000's)	In Informal Settlements	
		Number (000s)	Percentage
Mexico City	15,032	6,013	40
Sao Paulo	13,541	4,333	32
Manila	5,664	2,666	47
Bogota	5,493	3,241	59
Karachi	5,005	1,852	37
Ankara	2,164	1,104	51

Source: United Nations Centre for Human Settlements, Global Report on Human Settlements (UNCHS,1986)

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