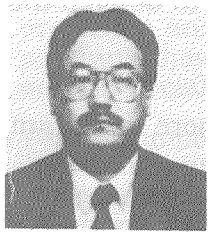
Session 1-2 : Urban Planning to Reduce Damage from Natural Disasters

Chairman

Hideki Kaji
Director, United Nations Centre for Regional Development (UNDDSMS/UNCRD), Japan

- In the morning session, the relationship between urbanization and hazards was discussed. The problem is that countermeasures against disasters cannot catch up with the increasing disaster vulnerability of cities. In order to mitigate this disaster vulnerability, it is important to incorporate in urban planning itself disaster prevention mechanisms that support urbanization, thereby reducing the expansion of vulnerability accompanying urbanization.
- Conventional urban planning is largely centered on convenience and enhancing economic activity Safety considerations tend to be neglected. Particularly in developing countries, the rush toward economic growth is delaying disaster mitigation planning. When a large disaster occurs, the progress achieved through development is, in many cases, wiped out. A disaster could well obliterate a major portion of a country's GNP.
- In this session, I hope that each speaker will introduce examples of how to incorporate disaster mitigation mechanisms into urban planning.

Presentations



Speaker

Itsuki Nakabayashi
Professor, Tokyo Metropolitan University, Japan

"Urban Planning Based on Disaster Risk Assessment"

- Safety in urban areas is apt to be overlooked in everyday life As a result, developed areas as well as developing countries promote urban development and urbanization without considering the disaster risk.
- As urbanization progresses, the environment surrounding security and convenience deteriorates. Urbanization improves the city's convenience and hygiene, but it does not necessary improve its safety. Urban disaster prevention plans to enhance safety and halt the increase in urban hazards should be made
- The most pressing requirement for an urban disaster prevention program is that residents of the city recognize the disaster risks. Disaster prevention activities are implemented through the correct recognition of the disaster information and decision-making. This process can be enhanced by repeating actual disaster experience or education and training.
- There are two objectives in assessing disaster hazards for disaster information First, to clarify the challenges of urban disaster prevention planning to make the city "resilient" to disasters Second, to clarify the possible damage in order to prepare for emergency countermeasures against disasters that have already taken place. The former could be called "regional risk assessment" and the latter, "damage estimation".
- Regional disaster hazard assessment is based on the small-scale regional unit called the "statistical survey zone" to assess the relative disaster vulnerability and to measure which zone is more vulnerable. Using the results of the assessment, the

most vulnerable area in a surveyed city is defined Conversely, it is important to control and manage urban development to avoid deterioration of safety caused by disorderly urbanization in relatively safe areas.

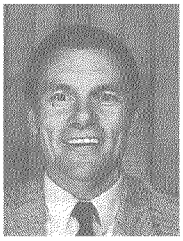
- Damage estimation assesses the extent and the type of damage that would be caused by an urban disaster. By clarifying human casualties and damage to buildings and facilities, basic data could be provided to prepare disaster countermeasures quickly and efficiently in an emergency

- Tokyo's weaknesses to earthquake disasters are as follows: (1) the city is on soft ground, such as alluvial deposits, which are likely to liquefy; (2) many parts of houses are of wood, and population density as well as building density is high; (3) there are too many people and traffic is heavy; some areas lack sufficient roads and empty space, and land use is mixed in urban areas; (4) there are many large structures such as subways, underground shopping malls, highways, crowded railroads, high-rise buildings and skyscrapers have never been subjected to an earthquake, (5) there are many hazardous substances such as large volume of gas and petroleum, (6) industrial economic and political centers are concentrated in Tokyo

- On the basis of regional risk measurements, Tokyo has promoted several programs: (1) to improve the fire break consolidation plan, which will form an urban disaster prevention "life sphere"; (2) to designate evacuation spaces and roads to ensure open space; (3) to implement aggressive urban renewal plans to improve urban areas; (4) to obtain permissions and to implement regulations for zoning programs and development plans; (5) to carry out several projects to enhance the safety of existing buildings.

- To develop an urban disaster mitigation plan is to reduce vulnerability. Changes made to the city also change the nature of a disaster, create unexpected damage and may cause new risks. Urban preparedness planning should improve hazardous environments and conserve and develop safe environments.

- Disaster risk assessment serves as a very important source of disaster information for implementing urban disaster mitigation planning and for disseminating to citizens so that they can be prepared for disasters. Disaster risk assessments should be made available to citizens and public corporations



Speaker

Dusan Zupka
Co-ordination officer,
DHA-Geneva, Switzerland

" Cost-effectiveness of Disaster Mitigation in the Development of Metropolis "

- Many lives are lost every year due to natural disasters. The direct economic loss is enormous, and there are many human casualties in developing countries. Moreover, the loss measured against GNP can be 20 times that of developed countries. This situation will continue well into the next century.

- The risk to the natural environment in urban areas of developing countries is accelerating due to over-concentration of the population, particularly in slums. The ratio of the population in the city's major slums is 80 percent in Addis Ababa and 60 percent in Casablanca Much of the urban population in developing countries is concentrated in slum areas

- We should conduct a cost-effectiveness analysis and identify when, where and how disaster prevention measures are required Large cities have become increasingly complex We need to review the priorities of disaster-prevention measures.

- There are two phases to a decision-maker's adoption of policy options: first, decision and selection; second, appropriate implementation.

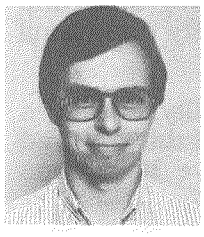
- The method most frequently applied for deciding alternative disaster-mitigation investment options is cost/benefit analysis (CBA method). This analysis adds all the benefits gained from disaster mitigation measures and deducts the investment from the total loss avoided. If the result is positive, the disaster-mitigation measures are worthwhile.

- This CBA method is widely used, but it has limitations. Because the data is insufficient, we need to use our imaginations Moreover, the social aspects of a disaster are not fully accounted for in this method. An appropriate calculation for human factors is another problem of this method.

- Another approach is quantitative analysis. That is to compare the social, economic and political influences of similar disasters that have taken place at different times in one place. The limitations of this method are that identical disasters almost never occur, and that the interval between natural disasters is long

- Given these limitations, we must select disaster-prevention measures while considering other political and social structural factors. The social, economic and political impact of a disaster is tremendous, and disaster-prevention planning should be considered as part of urban development plans Cost-effectiveness should be considered, as should social, political, cultural and psychological factors.

- Despite its limitations, the cost-effectiveness method is considered appropriate when deciding which options should be adopted.



Speaker

Jukka Nieminen
Special Adviser-Data Management
UNCHS (Habitat), Kenya

"ViSP-A New Methodology in Urban Planing and Disaster Management"

- UNCHS (Habitat), in cooperation with the Technical Research Center in Finland, has developed a new approach to urban planning disaster mitigation. Visual Settlement Planning, or ViSP, incorporates visual factors such as aerial photographs, video images, slides, still pictures, satellite image and photographs

- Ordinary desktop computers using 386 chips can make full use of this approach, and all computerized data can be shown on the special display unit. Whereas an ordinary VGA monitor displays only 256 colors, a system incorporating all our packages can display full-color images.

- The biggest problem with desktop computers is limited hard disk capacity; by using an optical disc drive, however, we can store a huge volume of data. One optical disc drive can store 1.3 gigabytes, equivalent to 250,000 pages of text, or 1,300 full-color aerial images

- System and software maintenance are easy, because the system is constructed from off-the-shelf components. This system is very easy to learn, and doesn't require a master's degree in computer science to operate for urban planning or formulation of disaster mitigation measures.

- In comparison to the conventional measuring method, our system has the advantage of easy surveying. A new aerial picture is digitized and overlaid on an existing map to update it.

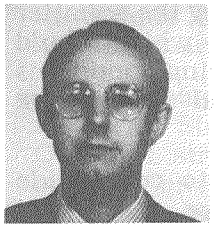
- With this approach we can monitor new information in areas particularly susceptible to disasters This is particularly useful for rapidly changing areas.

- Detailed images obtained from ViSP can be used as awareness-building programs, because the images serve as information for those who do not understand urban planning or maps.

•The DXF conversion system can convert data for any geographical system package. Because it is possible to link the collected data, you can combine the databases used to make a map.

•These same materials are used to make scenarios If there is an efficient database, it is possible to estimate the volume of structural damage and number of human lives lost by overlaying digitized information.

•With ViSP, we can monitor a disaster situation earlier. Therefore, this system is useful not only for disaster mitigation measures in urban planning but also for quick response to emergency situations. We can dispatch helicopters to disaster sites, take photographs, and enter the data into computers for immediate mapping so that the entire disaster situation is provided in visual form for decision-makers.



Speaker

Andrew W. Coburn
Director/Earthquake Protection Specialist,
Cambridge Architectural Research Limited, U K.

" Introduction of a Vulnerability Assessment System to Development Planning "

•In order to ensure the safety of a city, economic development will be a key. In other words, the amount of money availability to spend determines the safety of a city. This fact leads to the gap between developed and developing countries. We therefore need to implement measures suited to a city's circumstances.

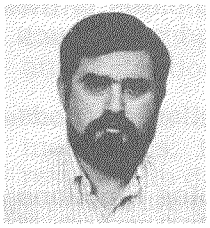
•After the 1985 earthquake in Mexico City, we studied Mexico City's master plan to consider how to avoid urban disasters and found that poverty is a big problem. Disaster mitigation is not an option for the poor, so government initiative is important. We must carefully study the costs and benefits.

•We can use computers for cost/benefit analysis to formulate space plans with which we can control the use of land incorporated in urban planning as well as the density and locations of residential areas.

•In the past, a planner's level of influence in most cities was not very high The greatest influence was exercised by the civil engineers in charge of city planning. They are the ones who go to a construction site and determine whether a building is strong. They would be ineffective if they did not have the authority to order to destroy any building not satisfying the standard.

•Communication is also important, particularly how we convey necessary information to the people who need that information. Words alone may fail, whereas drawing a picture may be effective.

•It takes a long time to make people aware of our efforts. It takes about ten years for people to hear our message and adopt our ideas, so perhaps designating an international decade is the most realistic approach.



Speaker

Ronald S. Parker
Consultant to the World Bank, U.S.A.

" Disaster Vulnerability in the Formal and Informal City: Lessons from Istanbul "

•Development planners are confronted by rapidly growing numbers of squatter communities over the world.

- Turkish cities are becoming more crowded every year. Farmers have been massively migrating into cities. The population of Istanbul increased eight-fold between 1950 and 1990, from 1 to 8 million. Insatiable demand for urban land and a shortage of housing have resulted in low- and medium-income groups living in illegal zones known as *gecekondus* Houses are built literally overnight and almost everywhere, both on public and private land.

- In 1957, there were 50,000 *gecekondus* units. In 1990, the number rose to 1.75 million. The population in the same period went from 250,000 to 10 million. Looking at all of Turkey, we see that 33 percent of urban dwellers live as squatters. These illegal dwellers are a serious problem for urban development.

- The disaster vulnerability of *gecekondu* is not shown in urban planning. Any disaster prevention measures that do not include these squatters would not achieve its goals.

- There are several options for reducing disaster vulnerability and curbing the squatter problems. One such measure is to legalize the squatter dwellings, which would improve their living conditions. However, legalizing and improving living conditions in squatter communities would create further incentives for informal settlements This is the dilemma that Istanbul faces now.

- In order to promote urban disaster reduction measures, we need to cover wide geographical areas and cope with every kind of hazard. This is expensive.

- There are no comprehensive disaster prevention measures. Urban planners are introducing new rules and regulations, but it is very doubtful whether they are effective in reducing illegal squatters. The risk potential of a squatter zone is very high, but it is very difficult for the government to carry out disaster-reduction measures effectively Squatters in many major cities in the world already violate many laws. When voluntary compliance is unlikely, there is a need for effective education that helps them understand the importance of disaster prevention and teaches them how they should react when disaster occurs.

Speaker

Ulpiano P. Ignacio, Jr.
Associate Professor, University of the Philippines, Philippines

" Control of Construction Activities for Disaster Mitigation in Metro Manila "

- The Philippines was hit by a magnitude-7 8 earthquake in July 1990 The intensity measured in Manila was between 6 and 7. The death toll was 2,000, due mostly to collapsed buildings.

- Manila's metropolitan area has a population of 8 million in an area of 600 square kilometers, so the density is very high. One important point to note is that a typical house is a single one- or two-story house with light roofing material and wall structures This type of structure is more favorable for an earthquake.

- The American procedure is used in the construction method. The standards of the American Concrete Institute (ACI), the American Institute of Steel and other such standards are applied

- Construction engineers carry out the supervision. Systematic inspection methods such as guidelines and detailed checklists are not used

- There is a shortage of qualified staff for buildings. There are overlapping functions and jurisdictions, as is often seen in developing countries. Our filing system is disorganized.

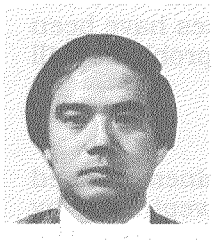
- The licensing of civil engineers is insufficient. Strict requirements for civil engineering have not been established. There is no adequate screening.

- The implementation of the inspection and management system is slack. Sometimes there is collusion between the owner, contractor, and inspector. No systematic method has been established for inspections. The training of inspectors and supervisors is insufficient.

- After the major earthquake in Luzon, efforts were made to improve disaster mitigation measures. For example, the building structure is now being reviewed by the government authority. Manuals and guidelines for earthquake-resistant structures are being introduced. The Association of Structural Engineers held several seminars to disseminate earthquake-resistance methods. Public works and highway authorities are improving their management systems so that construction should follow the drawing and specifications.

- A new system was established for civil engineers. They need to upgrade their skills through a continuous education program to renew their licenses. Conflicting codes in various construction standards should be adjusted and penalties should be applied. Standards using the latest technology should be established.

- In developing countries, there is a discrepancy between standards and actual methods Standards should be changed to be suitable to our actual situation. Qualified structural engineers should be involved in a structure's design. Using ordinary civil engineers is not enough. Training for inspectors, building engineers, and planners should be institutionalized.



Commentator

Takashi Onishi
Associate Professor
Department of Urban Engineering
Faculty of Engineering, University of Tokyo, Japan

- The first principle in avoiding disaster is not to live in a dangerous area. The Japanese, however, have no choice but to live in a dangerous area. Awareness of danger differs from person to person: some think that a dangerous area is still livable, and others have an attachment to a particular area. It is a difficult problem for the national government as to how it determines a vulnerable area.

- People have a right to live where they wish, and modern law stipulates the right of property. Therefore, it is very difficult for a public authority to say that a particular place is too dangerous to live in or to make a plan based on such an assumption unless there is a compelling reason. It is very important to convince them that an estimate of damage or danger is accurate.

- Even when a scientific damage estimate is obtained and reported through public organizations, specific references become generalized and a rather ordinary estimate is publicized. This kind of generalized estimate cannot necessarily persuade residents to accept mandatory measures. We need to enhance the tools and methods used to obtain accurate estimates.

- When we have better risk and damage estimate methods, we can improve corresponding urban planning measures. Urban planning has two aspects: projects and restrictions. Both are needed for urban disaster prevention.

- Restrictions are more difficult because they tend to run counter to the rights of individuals. How many specific restrictions we can suggest and implement in response to damage estimate is the grave challenge for future urban planning.

- Professor Zupka referred to the importance of Cost Benefit Analysis (CBA) in obtaining a quantitative understanding of the benefits of measures. This approach should be used when comprehensively assessing such measures and establishing priorities.

- Although disaster preparedness measures are not easy to implement in times of order, it is important that we recognize disaster reduction measures on a daily basis. For example, buildings in Japan have earthquake-resistant designs even though earthquakes do not occur very frequently. Clearly, we construct such buildings when the threat is not imminent.

- Nevertheless, disasters hit unexpectedly. Although we prepare for disasters with our scientific risk and damage estimates, disasters are bound to exceed our estimates. We always need to prepare emergency measures in case of disaster.

Discussion

Mr. Shiono

Generally speaking, developing countries do not consider investing in disaster prevention if it will lead to surging construction costs What can we do in response to this situation?

Andrew W. Coburn

It is important to motivate them to be responsible for disaster prevention and to make sure they understand the idea that we are responsible for protecting our own lives.

Hideki Kaji

It was pointed out from the floor that disaster problems specific to Africa were not discussed at all. Such issues as drought, desertification and insect plagues have been included among the natural disasters that IDNDR has targeted These problems will be our next agenda items since they were not covered by speakers today.

Mr. Sonoda

I personally surveyed the Olmok district in the Philippines that Dr. Nieminen referred to. Several thousand poor people living on a riverbed in this area were swept away by the flood. When I later returned, many people had moved back to this risky area. The city government has a disaster-prevention organization, but they did not take effective measures. People often say that problems with disaster-prevention measures in developing countries are due to lack of citizen awareness But I feel that there is a lack of awareness on the part of local government decision-makers, as was the case in the Philippines.

Raymundo S. Punongbayan

What you said is true. Policy makers make plans with only narrow viewpoints. Problems with disaster-prevention planning are seen worldwide. We need to present the situation regularly and we need to persuade them repeatedly.

Mr. Sudo

What does the term "human risk" refer to? How much does it cost to conduct risk measurement in developing countries?

Itsuki Nakabayashi

The term "human risk" is not a good expression. It means to assess how many people are in what part of a city during the day and night, how much a building vibrates in an earthquake, how many casualties are suffered, including psychological stress.
In Japan as well as in developing countries, it is very difficult to take such surveys anywhere but in a major city. The biggest problems are the cost and how to improve the quality of the data.

To lower the cost, we need to develop new technologies that if developed by the advanced countries, would be applicable to developing areas and newly industrialized regions.

Mr. Sudo

How can we raise the awareness of policy makers and citizens regarding disaster prevention? What is needed to measure vulnerability and enhance awareness?

Dusan Zupka

A very important way to make IDNDR successful is to present specific ideas to aid donors and decision makers regarding how much our lives would be improved if disaster mitigation measures were implemented, how these measures can be implemented, and what the social and economic impact of a disaster would be. All of us and IDNDR should improve various methods, including cost and benefit assessments of disaster mitigation measures.

Ronald S. Parker

We need to consider the political situation when we ask policy makers to participate in the disaster mitigation process in developing countries. Political responsibility and political merit should be considered when we approach politicians
We can make a map of risk areas or we can forecast disasters using computers, or we can build cyclone shelters. However, we don't know how to move people. How to issue warnings and how to explain cyclones to people are difficult jobs. We need to focus on these problems during the latter half of the IDNDR.

Ulpiano P. Ignacio, Jr.

For illegal squatters, finding the next meal is a more pressing problem than preparing for earthquakes or floods that may or may not occur. It is not very realistic for them to prepare for an earthquake that will happen next year or 10 years from now. Donor countries and organizations should consider this point.