

IV. MITIGATION APPROACHES AND PROGRAMMES

A. SELECTING THE APPROPRIATE PROGRAMME MIX

Any mitigation programme or approach must carefully balance the needs and priorities of the particular country at that moment. One consideration is that needs for preparedness (in the limited sense of preparations for post-disaster relief) must be balanced with long-term mitigation requirements. As Teferra and Kent (1988) warn, in speaking of a preparedness and prevention strategy for Ethiopia, "to ignore the immediate needs for preparedness by over-concentration upon a developmental process which can only be foreseen in terms of several decades will dissipate the momentum of an important initiative". To ensure continued public support for mitigation measures, any disasters that happen in the meantime must be dealt with adequately in a fair and efficient fashion.

There also needs to be a balance between structural and non-structural approaches. As the case study for Bangladesh illustrates when discussing proposed flood control plans, a strictly structural approach is usually extremely expensive and takes the initiative for action away from the communities that such measures are aimed to protect. On the other hand, while strictly local measures (such as helping a community learn which areas are of highest risk for flood and should be avoided) can help save lives, they are unlikely to have long-term wide-spread impacts on prevention and thus development at the national level.

Another consideration in developing an appropriate programme is to ensure a multi-sectoral approach. For example, assistance to the agriculture sector to increase crop production to mitigate a famine must be supported by help to the public works and transportation sectors to ensure that surpluses can be distributed.

B. ALTERNATIVES FOR ACHIEVING MITIGATION OBJECTIVES

The best approach for achieving a sound long-term mitigation strategy is the development of a national policy within which individual projects and activities fit. In the absence of such a policy, or during the period of time when such a policy is being developed, many low-cost, easily-implemented activities can be initiated to pave the way and show that mitigation is feasible. An example of this type of activity might be where an objective is to help build more disaster-resistant houses. In this case, governments can be encouraged to change the price structure of certain materials so that the poor have greater access to them. In Peru in the 1970s, the government provided a number of low-interest loans to private sector groups to increase the amount of cement production in Lima. Not only were new cement factories built, but a number of new cement outlets were created, reducing the price of cement from approximately \$11.00 to \$4.50 per bag. At that price, cement blocks could be produced locally at prices favorable to those of brick and even *adobe*, and a large percentage of new houses built by the poor evidenced the switch to that form of construction. National inventories can determine what types of input are needed to encourage better mitigation and to develop effective pricing strategies to make those materials

available at a price that will encourage their use. This process could also be followed in agricultural and other sectors.

Other mitigation activities need minimal or no investment on the part of the local government. For example, an inventory of existing development programmes can be conducted, and technical input provided to adjust those programmes to meet disaster mitigation goals. New design criteria can be developed for programmes, structures and projects that will incorporate disaster mitigation from the outset and should require no additional investment over what is already planned. Resource inventories can be conducted, and pricing policies and structures reviewed, to encourage the public to undertake visible disaster mitigation measures. This approach begins to educate officials in line ministries, policy planners and local government about mitigation possibilities, so that their integration into the planning process becomes second nature.

C. FOOD SECURITY AND FOOD AID

No discussion of disaster mitigation would be complete without examining the need of countries to establish food security and programmes to manage imported food aid. Food security is intricately linked to economic development. Most developing countries are agrarian societies; the little industry that exists can rarely compete effectively in the international marketplace. Often a high proportion of the food produced must be exported by the country in order to earn precious foreign exchange. In this situation, any natural hazard that affects food production will necessarily affect not only food security in the country but also the country's balance of trade, the national economy and the debt structure. Such hazards include drought, insect infestations (e.g., locusts), floods, frosts, windstorms and volcanic eruptions.

Food shortages can lead to price increases for the remaining food and, if appropriate interventions are not taken, can precipitate a disastrous decline in food availability on a regional level that may eventually deteriorate into famine.

While all food emergencies create hardships for the poor and increase the risk to people's lives, famine is of most concern. Many development workers believe that famines are caused by droughts but, while droughts may trigger a famine, they are rarely the only cause. Famines are essentially a pricing problem rather than an absolute shortage of food, and also a market problem, exacerbated by the lack of economic infrastructure to compensate for shortages in one area and to equalise prices by sending food from surplus areas to deficit zones.

A recent example of how famine can threaten a country can be seen in Sudan. In the best of times, Sudan has the capacity to feed itself and, if harvests are good, Sudan exports grain to neighbouring countries. Despite the year's poor harvests, grain reserves still held at the end of 1989 were sold abroad, and the resultant decrease in supplies for the urban markets was not offset by wheat imports as the government expected. The price of grain thus began to rise in Khartoum, and dealers in rural areas diverted their supplies to the capital. When it became clear that the next harvest was also going to be poor, merchants

and farmers in rural areas withheld existing stores of grain from the market, waiting for further price increases. Subsistence farmers without grain to sell were then forced to sell livestock for grain but, as more farmers did so, the market became flooded with goats and their value compared with wheat declined, resulting in panic sales.

One solution for rural farmers in such situations is to send family members to work as day labourers, but the war in the south combined with crop failures increased the available labour supply. Thus wages dropped dramatically. In addition, drought contributed to fewer employment opportunities in some mechanised schemes.

The situation deteriorated greatly before the government stopped exporting grain. When officials confiscated grain from illegal exporters, more merchants withdrew from the market in fear of similar treatment. Prices climbed even higher, and the trickle of grain into local markets declined further. Thus, the impending crisis is not strictly a result of low yields due to low rainfall, but of a combination of factors. Early and appropriate market interventions by the government, supported by agencies such as UNDP, could have prevented this crisis.

To ensure food security in drought-, flood- and famine-prone areas, a country needs:

1. Buffer Stocks and Improved Food Storage: A national food reserve should be developed. Food should be held at the national level in hermetically-sealed silos, at the regional level in warehouses or food banks, at the village level in cooperative silos, and on farms in improved, hermetically-sealed storage bins. It has been estimated that up to one-half of all developing country agricultural production is lost between maturity in the field and delivery to consumers. Most of this loss occurs on the farm due to improper storage and handling techniques. By concentrating on on-farm and village-level food security measures, countries can often increase the amount of real food available in the markets by 25% to 40%. Thus, the introduction of improved food storage systems can be a major disaster mitigation measure.
2. Increased Production: Increasing food production, especially in basic grains (wheat, maize, sorghum and rice), will improve agricultural development and, thus, is one of the most important disaster mitigation measures. Introduction of improved varieties such as drought- or wind-resistant strains can have a major impact on food security.
3. Crop Diversification: Many developing countries have mono-crop agricultural systems. For example, many countries in Africa rely heavily on sorghum as the primary staple. Mono-crop societies are highly vulnerable to disasters. A blight or rust, an infestation of insects, a sudden frost or the failure of rains in one season can be disastrous. Many famines in India were linked to an over-reliance on rice as the primary staple grain, and food security was not accomplished until crop diversification was achieved, coupled with the introduction of high-yield varieties of rice and wheat.
4. Crop Risk Reduction: Often the risk to crops can be reduced by adjusting the agricultural cycle or changing varieties. In Bangladesh, encouraging farmers who live

on flood plains to grow long-stem rice during the expected flood season reduced the risk of total loss in the event of a major flood. In hurricane areas, crop cycles can often be adjusted so that crops do not mature during the peak period for windstorms.

5. Local Economic Diversification: It is important that the bases of rural families' income be protected and diversified. At the individual level, integrating animal husbandry, fish production, poultry, or dairy production can help improve income security for rural families. Few disasters will destroy all the assets of the integrated farm. As a stand-by measure, alternative employment projects that can quickly be activated should be explored.

In some countries, disaster insurance for small farmers has been developed, ranging from conventional insurance programmes offered by the national government to innovative investment programmes with a disaster insurance component.

6. Counter-Famine Interventions: In countries that are known to be susceptible to famine, a number of measures designed to counter the development of famine conditions and to contain their spread should be developed. Counter-famine interventions are based on market interventions using food aid to manipulate grain prices and supporting agriculture and livestock price structures. These measures are easy to put into place but require sound government infrastructure and a knowledgeable bureaucracy in order to implement them effectively. Thus, one of the prerequisites for these interventions is the training and support of regional government staff, especially personnel in agricultural ministries and food aid agencies.

Food security also requires that development officials focus on agricultural development and creative uses of food aid. UNDP staff can assist their government counterparts in reviewing national agricultural policies and strategies and help them to make necessary adjustments.

Countries that exhibit chronic food insecurity normally receive substantial amounts of imported food aid. As a general rule, food aid is used rather unimaginatively (in large part because donors set unrealistic requirements for its use). A number of countries, however, have demonstrated that food aid can have positive benefits and can be used to decrease the country's dependence on imported grains. Examples include monetisation of food aid, the use of food aid to create village-level buffer stocks, the provision of food as loans rather than gifts, and food-for-debt swaps.

D. ALTERNATIVES TO FOOD AID, AND HOW AND WHEN TO USE THEM

In disaster-prone countries, especially countries where regional food deficits often occur, it is important for UNDP personnel to recognise that there are viable alternatives to food aid. These alternatives usually address the core of the problem much more effectively than simply giving food when shortages occur. However, to carry them out, government bureaucracies, especially the relevant development ministries, must be prepared in advance.

These interventions can often prevent a full-scale famine from occurring if the onset of pre-famine conditions is detected early (through early warning systems).

Alternatives to food aid include market interventions, income support, credit and cash-based assistance. All of these alternatives require that the project infrastructure needed to carry out the approaches be established well in advance of an emergency so that they can be activated in time to prevent a disaster from occurring. This infrastructure is not unique to a disaster, but serves a development purpose that in the long term is even more important. Programmes such as local thrifts, savings and loan cooperatives, and agricultural marketing schemes are all important to economic development and are vital to any counter-famine programme.

Alternatives to food aid are only effective if they are used at the right time. In general, they should be used:

- to mitigate food insecurity (i.e., to prevent a famine caused by food price inflation);
- to mitigate food losses (i.e., to provide income support to disaster victims whose food crops have been destroyed);
- to create demand in local markets in the aftermath of substantial food losses (i.e., to help draw food into a disaster-affected area);
- when importing food assistance would take too long and would result in increased mortality or unacceptable levels of hunger in the local population.

HYPOTHETICAL CASE STUDY 1 - DROUGHT IN AFRICA

Country A is one of the least developed countries in Africa, and is especially prone to droughts in most of its territory. Even in normal times, its population suffers from malnutrition and high infant mortality. Infrastructure outside the capital and one or two other major cities is weak, and communications patchy. The country depends on the export of a few major grain crops for foreign exchange, although migrant workers also contribute to the economy. In the rural areas, most people invest the little wealth they have in livestock. Some of the population is nomadic. This country would be similar to many in the Sahel region or in the Horn of Africa.

The last major drought in the country had a large impact on the country's development, with GDP per capita declining in the following year. The memory of this disaster is still fresh in the minds of both relief-oriented and non-relief government personnel. No new drought has occurred but, based on past history and the limited information available on which to base projections, another one could develop in the eastern part of the country in the next 3-5 years. However, little has been done by UNDP or the relevant government agencies to help prepare for this likely drought and/or to mitigate its probable consequences. The mitigation of natural disasters does not distinctly fall under any particular agency, since the main disaster-related organisation, Civil Defence, deals with preparedness in terms of preparation for the delivery of donated commodities, while planners in other organisations have little knowledge of the subject or of the issues involved.

In this situation, UNDP helped the government to mitigate the effects of a probable future drought by capitalising on current awareness of the problem from the last drought. This awareness was further raised by helping the government organise and fund a seminar on the subject of mitigating natural disasters through development efforts. The seminar was hosted by the President's Office with participants including civil defence officials, central level planners, regional and local government officials, NGOs, an UNDRO representative and UN technical agencies. Topics for discussion at the meeting included assessing the lessons learned from the last drought, and establishing whether any conditions had changed which would increase or decrease the likelihood of a future one. These discussions led to a determination of what could be done by whom to delay the next drought and/or to make the population less vulnerable to it. Preliminary investigations revealed that one or more donor agencies were funding projects in the area likely to be affected that were decreasing vulnerability and that could be expanded or better targeted, such as reforestation watersheds, building subterranean dams to conserve water, and introducing drought-resistant varieties of seeds. Some other development efforts were increasing risk, such as well-drilling without regard for long-term effects on the water table or livestock populations, but it was possible to modify these without great cost. Where UNDP discovered it was assisting projects in either of these categories, it reviewed the projects with the implementing agencies (government line ministries) and adjusted them accordingly. UNDP's willingness to adjust its projects was seen as an example to other donors to do so as well.

Based on the discussions and conclusions arising out of the seminar, UNDP encouraged the establishment of a coordination committee to monitor the highest risk area, and to plan actions and special projects that could be phased in if conditions worsened. (If mitigation efforts had failed and a full-blown disaster resulted, this committee should have phased out efforts and ceded responsibility to normal channels.) The committee was at a high level, with a representative of the President's Office as chairperson, and the head of the regional planning department of the Planning Commission involved to handle substantive matters. The committee included representatives of most of the agencies who sent officials to the seminar. UNDP encouraged the committee by offering technical assistance, making a deputy resident representative or the office disaster focal point available for meeting preparation and following up relevant issues with donors, and providing funds for establishing a library of information on the subject. With high-level attention now focused on this issue, UNDP encouraged the government to incorporate more aspects of mitigation into the next country programming process. UNDP used this opportunity to help the government develop a comprehensive national mitigation policy to provide a framework in which future activities of this nature could take place.

V. POLICY ISSUES

A. UNDP POLICIES ON INTEGRATING DISASTER MITIGATION IN DEVELOPMENT PLANNING

The aim of the UN system's efforts as a whole is to assist governments of disaster-prone countries to strengthen their disaster management capacities so as to develop self-sufficiency in disaster mitigation and response. Various UN directives exist which establish the particular role of UNDP in disaster mitigation activities, and its relationship with UNDRO and other UN agencies. Activities to strengthen the capacities of countries to plan for, and respond to, the effects of natural disasters are very much within the UNDP mandate, and it is UNDP policy to encourage the inclusion of projects in disaster prevention and preparedness in country programmes (Joseph, 1989).

The disaster-related policy goals of UNDP and UNDRO (in all disaster-prone countries), as stated in the draft of the UNDP/UNDRO manual, are:

- to strengthen the ability of societies to avoid, or protect themselves, their property and means of livelihood, from natural hazards;
- to ensure that programmes and projects funded by UNDP do not exacerbate the potential adverse effects of natural hazards, nor increase the risk of disaster, but rather lead to an avoidance of disaster or a lessening of adverse effects;
- to encourage the integration of disaster prevention, mitigation and preparedness measures in planning and budgetary processes related to development in all sectors;
- to facilitate exchanges between disaster-prone countries of experience, knowledge and skills related to disaster management.

UNDP has an important role to play in assisting governments to incorporate disaster mitigation into the development planning process through its country programming activities. To date, most disaster-related activities have been in the form of projects to meet specific needs recognised after a disaster. While country programmes in disaster-prone countries often acknowledge the impact of disasters on the development process, they do not generally approach mitigation in a comprehensive manner. Most disaster-related efforts, whether for relief, reconstruction or mitigation, tend to be individual projects. Recent UNDP guidelines encourage moving away from a project approach for technical cooperation to a programmatic one, for all UNDP assistance. Some of the rationale for this new emphasis is that assistance will be more likely to yield a greater impact and be easier to monitor and evaluate. This programme approach would also be important for mitigation efforts, which should be long-term and encompassed within a broad national policy framework wherever possible. In the short-term, however, it may be easier to interest governments in mitigation through limited demonstration-type projects and adjustments to existing programmes.

B. SPECIAL DISASTER MECHANISMS

All Resident Coordinators serving in disaster-prone countries have been instructed to form UN Disaster Management Teams. These teams are made up of country representatives of those UN organisations with a specific mandate in disaster management, such as UNICEF, FAO, WFP and WHO. While their primary duties are related to providing and coordinating assistance in case of disaster, the teams also have a role to play in alerting governments to the danger of slow-onset disasters, and assisting in implementing aspects of disaster mitigation as part of each agency's efforts.

Each Resident Coordinator has been instructed to nominate a senior UNDP national professional officer to serve as the focal point for disaster management matters in the UNDP office. As well as being the person called upon in case of disaster, he or she should also be well-grounded in the issues of disaster mitigation and integrating these concerns with development. The case studies found that the three countries designated a person for this work, but in two cases this person had many other sectoral responsibilities to attend to and, in the third, an international staff member was temporarily filling this position. Their general orientation was more toward responding to disasters with commodities than overseeing mitigation issues.

In the UNDP/UNDRO manual on disasters now being finalised, there is a chapter on disasters and the country programme. This chapter provides guidelines and instructions for Resident Representatives in relation to the incorporation of disaster management considerations -- specifically the promotion of risk reduction measures -- into the UNDP country programme.

C. OPPORTUNITIES UNDER THE INTERNATIONAL DECADE

As the 1990s have been declared the International Decade for Natural Disaster Reduction, the attention to the subject that decade promotion will bring should help in creating awareness of the issues and a willingness to implement effective measures to mitigate disasters. The decade is aimed at reducing the impact of natural hazards by instituting an integrated approach to disasters, by stimulating data acquisition for their application in more widespread forecasting and warning systems, by making improvements in disaster preparedness, and by changing the sometimes fatalistic attitudes to disasters. Increased community participation, and more and better education and training, are considered important components of the Decade. Achievement of these aims is meant to bring a change in the basic approach to disasters, from the present concentration on post-disaster relief to a future emphasis on pre-disaster mitigation.

Most disaster-prone countries have committed themselves to, and in many cases have already created, national committees for promoting the decade. These national committees can be used as springboards for opening a dialogue on institutionalisation of decade efforts.

HYPOTHETICAL CASE STUDY 2 - FLOOD IN ASIA

Country B in Asia has a mixed economy, with part of the country lush and somewhat developed, and other parts much poorer and highly vulnerable to disasters. While in the capital conditions approach those in developed nations, health and economic indicators in other areas reflect a situation of low educational standards, few employment opportunities, and worsening rural conditions, although the area is beautiful and rich in water resources. Many countries of south-east Asia and Latin America would fit this profile.

Heavy flooding and mudslides in the north of the country confirmed earlier warnings of likely natural disasters due to ecological imbalances. Deforestation up-stream, silting of the main river, and increasing numbers of people forced to live in the floodplain, were among the causes. The development community was vaguely aware of the vulnerability of the area affected, but because it was not considered a high priority for development under the previous national government, and resources were limited due to a large national debt, little preventive work was carried out. Efforts in preparedness and relief activities, from government and NGOs, limited casualties, but economic losses were great, with much damage to housing and both rural and urban infrastructure. As environmental conditions in the area did not improve since the flood, and as the economy there is in even worse condition, the likelihood of more floods exists. The main requirement to prevent a repetition is comprehensive development of the area.

Various possibilities existed for UNDP to assist in this sort of situation. By becoming involved in a limited way in rehabilitation and reconstruction efforts through a small contribution of Special Programme Resources (SPR) funds, UNDP took the opportunity to develop relations with regional planners. UNDP used routine communications about these projects to create greater awareness of the underlying causes of this disaster, and to focus the attention of national and local policy-makers on what could be done to prevent a repeat of the catastrophe within the context of the overall development of the area.

While these UNDP efforts helped to raise consciousness, this consciousness also needed to be matched by resources in terms of both technical expertise and funds to carry out the needed work. UNDP encouraged the local government to develop a comprehensive programme and apply to a major donor or development bank for funding. Since the application to this type of institution must be carefully prepared and technically adequate, UNDP provided assistance in preparing the necessary documents.

The type of programme that UNDP helped the local government prepare integrated mitigation concerns with efforts aimed at increasing the well-being of the most vulnerable population through the general development of the area. The elements of the programme included:

- reducing vulnerability of the affected population, through provision of improved housing in a safer area for those who had to be evacuated during the previous flood;
- environmental control of the lagoon and river complex where the flooding occurred;
- identification and exploitation of local alternatives for economic development to generate employment which would have no great detrimental affect on the ecology of the area;
- alternative generation of energy, as a way to ensure local economic and social development.

By providing funds for technical expertise for long-term programme development, UNDP ensured that part of this process would include careful analysis of the previous flood, mapping of the area to locate other vulnerable areas, and immediate actions to relocate people out of the most dangerous ones identified.

UNDP's involvement in this endeavour gave experience to the organisation and to the government agencies involved which was later used to assist in other disaster-prone areas in the country, and to encourage similar efforts on the part of the national government.
