

5



A Review of the Disaster-Related Activities of the Asian Development Bank: An Economic Perspective

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Most of the Asian Development Bank's developing-country members are subject to disasters, which are defined as events that so disrupt the afflicted community that it is unable to cope.¹ In terms of the ADB's operations, a community would normally refer to a significantly large region or even a whole country. The Asia Pacific region is subject to about 60 percent of the major natural disasters of the world, resulting in losses of roughly \$5 billion to \$10 billion a year according to preliminary ADB estimates.² As population continues to become more dense in the region, many of the disadvantaged will be pressured to settle in hazardous areas. This will increase the vulnerability of the country as a whole to disasters. Each disaster threatens to impede economic development, and the ADB has been prompted by such events to seek

better ways of helping developing-country members resume progress in their development as soon as possible. As a part of this process, the ADB is carrying out an economic evaluation of some of its disaster-related activities. The preliminary results indicate that greater stress could be placed on economic analysis for improving the quality of the ADB's disaster-related projects.

In this chapter, the following definitions are used:

- *Disaster mitigation.* Works and actions to reduce the losses from the next disaster, such as providing physical barriers to impede the disastrous event (flood levees or cyclone-proof housing) and setting up constraints to development that reduce the exposure of people and their possessions to disaster (thoroughly

implemented building codes, land use planning).

- *Predisaster planning.* The formulation of procedures, lines of communication, and levels of responsibility for counter-disaster activities; the storing or ready provision of equipment and materials; public preparedness campaigns that determine evacuation routes, emergency shelters, and backup systems; training and exercise programs for emergency service personnel; and procedures for restoring essential services and infrastructure as quickly as possible.
- *Disaster relief.* Activities that provide the basic necessities of food, clothing, shelter, transport, and medical, psychological, and social assistance; the ADB is neither involved nor designed to become involved in this field.
- *Disaster repair.* Activities such as restoring essential services, reinstating communication links (including transport), providing temporary infrastructural items (such as temporary school rooms), and rapidly restoring items that are easily made workable again, even if in incomplete form.
- *Disaster reconstruction.* Restoration of damaged infrastructure to its level of effectiveness (or better) before the disaster.

The ADB's increasing response to disasters

Following its charter, until mid-1980, the ADB sought to foster economic growth and cooperation in the Asia Pacific region and to help accelerate economic development in its developing-country members. This aim was interpreted as requiring the ADB to concentrate on activities that emphasize long-term growth. Accordingly, the ADB developed policies and proce-

dures that were appropriate for laying the groundwork for economic progress. Projects emphasized efforts to develop infrastructure, strengthen institutions, and improve economic and financial efficiency. With this perspective, the ADB regarded its role as providing the infrastructural basis for coping with cataclysmic events and fostering self-reliance by strengthening those agencies needed to develop and maintain that infrastructure. In other words, it perceived its role as funding large disaster mitigation projects that frequently entailed heavy engineering construction *before* the event. Thus emphasis was typically placed on projects such as flood mitigation and drainage works and technical assistance to complement these projects.

Development of the ADB's role

In the 1980s, the ADB broadened its involvement in the field of disasters. Following requests for assistance after natural disasters in the mid-1980s, the ADB adopted policy papers to guide staff on recovery assistance following disasters. The first of these, *Rehabilitation Assistance to Small DMCs Affected by Natural Disasters* (Asian Development Bank 1987), was intended for small developing-country members, particularly Pacific Island countries and the Maldives. This policy paper outlined how to support simple repair projects by providing limited funding for imported goods needed for urgent repairs and associated local costs. It was reasoned that this specialized facility was desirable because the disasters would be more disruptive to very small economies than to larger ones.

To accommodate requests from larger countries, a more general policy was outlined in a follow-up paper, *Rehabilitation Assistance after Disasters* (Asian Develop-

ment Bank 1989). Again, the stress was on modifying procedures that would enable the ADB to help developing-country members to recover expeditiously.

Both policies justified ADB assistance to disaster reconstruction by noting that, as a multilateral agency, the ADB would have a role in responding to the needs of developing-country members affected by disasters if the resultant damage threatened to interrupt, or was prejudicial to, economic growth and development.

Recent considerations of the ADB's role

Recently, the ADB began to reconsider the role it plays in supporting reconstruction following a disaster and in coordinating the efforts of donors who are assisting with disaster relief, repair, and reconstruction.

DISASTER RECONSTRUCTION

Simply reproducing previous structures may not always be the most viable approach because outdated and weak structures may be destroyed and should be replaced by more modern and stronger ones better suited to meeting the country's long-term development requirements. Such new structures may even help to prevent damage from disasters in the future. It follows that a disaster may provide an opportunity to improve previously existing facilities, and the next opportunity may only arrive when the next disaster strikes.

To overcome the dilemma of trying to implement a disaster reconstruction project quickly and ensuring the project is of a high quality, some recent projects have been implemented in two stages: repair and reconstruction. In the repair phase, the emphasis is on restoring sufficient facilities to allow economic life to start to return to normal. Examples of such items are bailey bridges, temporary

school buildings, temporary shelters, and portable power generators. Such repairs reduce the pressure for hasty action and give planners time to formulate the final project, which constitutes the reconstruction phase.

DONOR COORDINATION

A matter requiring increased attention is ensuring proper coordination of the donors who are assisting with disaster relief, repair, and reconstruction (disaster recovery). Different donor agencies have different sectoral strengths and country programs, and every effort should be made to take advantage of these. It is becoming apparent that the coordination must do more than simply facilitate sharing the task of helping the country recover from the disaster. It is essential, first, to agree on the fine details of who is responsible for different aspects of the disaster-recovery program, particularly where activities and schedules are linked. It is also important for the overall progress of each donor to be monitored, to ensure that the work is appropriate, that any gaps in the assistance provided are attended to before they become serious, and that there is close liaison with the developing-country member.

An economic review of some of the ADB's disaster-related projects

The ADB is involved in both disaster mitigation and disaster reconstruction projects funded by emergency loans. This section reviews and evaluates those efforts and presents a case study of a flood-prone road network in Bangladesh.

Disaster mitigation projects

Since 1972, nine loans totaling nearly \$660 million in support of disaster mitigation have been approved, of which, five have

had their benefits evaluated. All of the disaster mitigation projects except one were concerned with flooding. In addition, ten new disaster mitigation loans amounting to \$490 million are in the pipeline for 1994–96. Considerable technical assistance was also provided during this period, mostly in support of the loans. A pipeline of seven technical assistance loans costing nearly \$4 million is earmarked for 1994–96.

Based on the assessments of completed and ongoing mitigation projects, through the ADB's post-evaluation activities, criteria were selected to analyze the relative successes and weaknesses of the various loans. The projects encompassed major public works such as embankment protection, construction of dikes, dredging, and improvement of drainage.

The cost of the mitigation project loans ranged from about \$10 million to \$160 million. The completed projects were all successful in securing land against regular inundation or against interruptions in the supply of water for irrigation. Support was also extended to the fisheries sector, and some projects addressed issues related to poverty reduction. In projects that covered settlements of a certain magnitude, issues of urban development, housing, and sanitation were also addressed (for example, the Secondary Towns Integrated Flood Protection and Dhaka Integrated Flood Protection projects in Bangladesh and the Irrigation and Flood Protection Rehabilitation Project in Viet Nam).

Although project objectives seldom changed, the scope of the projects frequently entailed time extensions. Most projects were flexible enough to adapt to changing circumstances, and this is to be commended. Most of the project objectives were achieved, as were additional benefits, most noticeably, an increase in

private construction, employment, and economic activity.

The economic internal rate of return at appraisal averaged 31 percent per project and ranged from a low of 12 percent to a high of 42 percent. In one project, Special Agricultural Inputs Supply in the Philippines, the implementation period was deemed too short to calculate its economic internal rate of return, and its benefit-cost ratio was computed instead. A note of caution is warranted: many of the projects analyzed were explicitly concerned with the robustness of the calculated result. A primary cause was the lack of high-quality data. The paucity of data, both *ex ante* and *ex post*, is a serious impediment to measuring the benefits of disaster-management projects in general. The intrinsic issue is the need to assess what would have occurred without the project. In most of the projects reviewed, social and economic benchmark indicators were not available for the period before and after the disaster, which impeded any attempt to assess the benefits of the project. If net benefits are to be estimated with any degree of certainty—and this needs to include the evaluation of certain intangibles—then increased project expenditures are necessary to ensure that the data relevant for assessing project outcomes are collected.

The required information often does exist, albeit in an uncommon form or in a location different from that of the government agency with which the ADB is dealing. Also, sometimes local knowledge or judgment may be used, as was done in Viet Nam to assess the stability of Hanoi Di-ke when subject to floods. This assessment was used to estimate the probability that the dike would fail before and after rehabilitation. To ascertain this information in a more scientific manner would have taken more time and expense than

was warranted at that stage. These matters are being addressed in a forthcoming publication, *Handbook for Preparing Emergency Loans* (Asian Development Bank, forthcoming). There has also been a growing appreciation of socioeconomic and environmental concerns in line with the general policy directions of the ADB.

Disaster reconstruction projects funded by emergency loans

Since 1987, 8 percent of the ADB's soft Asian Development Fund loans have been for emergency projects totaling \$606 million. This total comprises twenty emergency loans, whose benefits are normally high. This is not surprising, since the work of rehabilitation frequently builds on existing assets, which, although they are damaged, substantially reduces the need for expensive tasks such as clearing, land purchase resettlement, foundations, and earthworks.

The practice of not accounting for sunk costs—funds already spent and related to the project—warrants closer attention in calculating the costs and benefits of a project. Marginal analysis requires that only additional benefits and costs actually accruing to the project be considered. Sunk costs are precluded. If activities having high marginal returns are considered, regardless of existing accumulated investment, the actual benefits of a project may be distorted. A careful approach is therefore necessary in defining the scope of projects involving reconstruction.

Because the benefits realized by disaster-recovery projects are almost invariably high, the ADB formulated guidelines for preparing emergency loans that downplayed the need to evaluate the benefits of a project. It was argued that because the worthiness of the project was almost self-evident, the benefits for ur-

gent projects did not have to be proved. As it turned out, once the new guidelines were issued, few emergency projects had their benefits evaluated.

In hindsight, this advice did not put sufficient stress on a second use of benefit-cost analysis, namely the insight it gives for improving the form of the project. In order to address this shortcoming, a handbook is being written to guide ADB staff on preparing emergency loans. One section of this handbook will outline techniques for rapidly evaluating the benefits of emergency loans. Although their accuracy will be relatively poor, such evaluations are still valuable for several reasons:

- When a project manager knows only the cost of a project, he or she may try—albeit unconsciously—to minimize those costs, rather than to maximize the benefits.
- Without understanding the benefits of a project, the project designer will have to rely on noneconomic criteria such as standard practices and judgment. However, these can be misleading, because the circumstances of the ADB's projects vary considerably.
- In a sense, less stress could be placed on the estimated economic internal rate of return of the disaster-recovery project because it is virtually certain to be very high. What is important is the set of questions that the investigator asks when evaluating the benefits. That is, asking questions that enable the benefits to be calculated may uncover contradictory information. This may suggest that a given line of action, which seemed appropriate initially, may not be all that beneficial.

In Western Samoa, for example, a severe cyclone, with storm surges and highly erosive waves, damaged the south coast

of the island of Upolo in 1991. As part of the rehabilitation strategy, beach protection was proposed using large rocks. However, these rocks would detract from the last unspoiled beaches on the island and would reduce the attractiveness of the beaches to tourists and thus the income derived from them. Further, when seeking to quantify the benefits of these coastal protection works, it was found that, based on historical records, this was the first cyclone to affect the southern coast for more than a hundred years. It was concluded that the high cost of coastal protection works was not justified.

Evaluation of the benefits of disaster-related projects

Under the ADB's guidelines, a project is normally evaluated to provide an economic internal rate of return to justify assistance. Project analyses tend to focus on easily measurable costs and benefits. Most of the flood-control projects reviewed here simply analyzed the benefits derived from reducing direct property damage. Even the indirect benefits derived from preventing the intrusion of saline water by improving drainage systems and from using embankments as roads and temporary shelter for the populace and livestock during floods were rarely assessed. Such benefits do not necessarily have to be evaluated, insofar as the direct benefits may be sufficient to demonstrate that the project is viable. However, where the economic evaluation is to be used as a tool for designing the most cost-effective project, this omission can be important.

Furthermore, if the project also has disadvantages, these may need to be balanced against both the direct and the indirect benefits both to determine the project's feasibility and to formulate projects with

high cost-effectiveness. By the same token, negative externalities from flood control, drainage, and irrigation systems are not always considered. Examples of common environmental impacts from flood-mitigation works are changes to the level and quality of groundwater and separation of juvenile fish-breeding areas and local drainage lines by dikes that are built to protect against mainstream flooding.

To assess all economic benefits, it would be necessary to take account of social and environmental effects as well as benefits readily measurable in monetary terms. However, these have rarely been quantified in economic terms. In disaster mitigation or reconstruction projects, social effects can, in one sense, be more important than economic benefits represented simply by capital stocks and flows. Victims often report that the social impacts of a disaster are worse than any monetary loss even when there is no injury or loss of life. This implies that, in evaluations, overall economic benefits (which include social and environmental benefits) can normally be assumed to be considerably greater than benefits that can be readily measured in monetary terms, such as the reduction in damage to property.

This raises an important issue: how should the ADB take the social impacts of disasters into account. On the one hand, the ADB needs to ensure that both itself and the borrower get a return on the investment. On the other hand, the ADB has a commitment to pay special attention to vulnerable groups such as children, indigenous people, ethnic minorities, squatters, socioeconomically disadvantaged people, disabled people, and immigrants. Such groups are often poor and unable to absorb shocks and, in the nature of many disasters, tend to be disproportionately represented among the victims. What is required are measures to

evaluate the social and environmental costs and benefits of disasters, and these are being developed in a forthcoming ADB publication, *Handbook for Preparing Emergency Loans*. On top of this, vulnerable groups frequently receive a very high proportion of their incomes in the informal sector, and an economic analysis may have to ensure that the impacts of disasters take the informal sector into account.

Despite the problems of valuing intangibles such as social and environmental effects using conventional numeraires, other ways of taking social and environmental impacts into account have been used. For example, ADB's policy states that projects should have economic internal rates of return that reach 12 percent. However, although the Tulungagung Drainage Project in Indonesia did not quite reach this value, it was approved partly because of its obvious social benefits. Even so, the economic internal rate of return remains the main criterion for selecting subprojects, and this needs further consideration.

Various tests on projects have been undertaken using social benefit-cost analysis. However, these might come up with a range of results, some higher because of existing infrastructure, some lower because of density of population. This is demonstrated in an evaluation of the benefit-cost ratios of projects to rehabilitate sea dikes in North and Central Viet Nam. These sea dikes are vital for protecting coastal agricultural lands against storm surges and waves generated by the four to six typhoons that strike Viet Nam in an average year. The benefits to the North Vietnamese coastal dwellers were about ten times the costs, while the benefit-cost ratio for the Central Vietnamese coastal zone was only two. Yet the people of Central Viet Nam are extremely poor, and many suffer malnutrition. This suggests

that a simple ranking based on benefit-cost analysis may not recognize the extent of damage from a social perspective. Moreover, disasters that occur frequently may have little physical impact, but serious dislocational effects. This would go some way toward overcoming the criticisms made by developing-country members that some ADB projects have not been as appropriate to their needs as could be desired.

As a first step in taking account of these social costs, a greater degree of thoroughness might be exercised in capturing the monetary benefits. The higher the benefits, the better the project that could be justified and the lower the social losses. A second means of capturing social costs might be to put more effort into developing simple models of income generation attributable to the provision of infrastructure, particularly among the poor. For example, Kumar and Bhattarai (1992) document how landless people increased their caloric intake 7.5 percent and their caloric adequacy 9 percent through better access to improved employment, wages, and prices.

Results from a case study of a flood-prone road network in Bangladesh

As part of the project to produce the *Handbook for Preparing Emergency Loans*, some current emergency loans of the ADB were investigated to provide case studies to illustrate the procedures. One of these studies was of a flood-prone road network south of Chittagong in Bangladesh. The study area was subjected to floods in 1987, 1988, and 1991. The initial work of recovery after the 1987 flood was funded under the Flood Rehabilitation Project by retroactive financing, whereby the funds are formally approved by the Board after the work commences. Following the 1988

flood, funds were diverted to enable work to start straight away before the Flood Damage Restoration (Roads and Railways) Project was initiated. In contrast, in 1991 the project ran into substantial delays, and nearly three years were lost before reconstruction began.

Rapid analyses of the projects have been carried out to simulate what would need to be done after a disaster, and these have come to the following conclusions:

- It may be justified to spend more on reconstruction if this would help to avoid delays.
- If the delay can be avoided, the break-even period of the project could be reduced.
- It seems justified to raise the level of some of the roadways to above the currently designed 5 percent flood level.

These results reinforce two points made earlier: disasters require very rapid responses to reduce the delay as much as practicable, and evaluating benefits even roughly should help to formulate a cost-effective project. Although cost-benefit analyses are always used in regular loans to improve the form of the project, more emphasis could also be given to this task in the approval of emergency loans.

Conclusions

ADB's involvement in disaster management is based on the principle that disasters disrupt economies. Although the ADB's position on disaster rehabilitation is clearly focused, conceptual analyses of other important issues need to be addressed, including the extent and nature of disaster management assistance and implementation. The extent of disaster assistance is large and represents an important component of the ADB's Asian Development Fund loans.

In addition to addressing disaster reconstruction with loans totaling about \$600 million between 1988 and 1993, the ADB also supported disaster mitigation projects totaling about \$660 million, mainly in irrigation and flood control. Ten new disaster mitigation loans are programmed for 1994–96 amounting to about \$500 million.

Following a disaster, donor coordination is vital and should adopt the principles of project management. Although most completed projects were hampered by cost and time overruns, they generally met their objectives and were sufficiently flexible to adapt to changing circumstances.

Economic benefits should be calculated to include social and environmental aspects. Greater effort should be put into evaluating such benefits and ensuring that externalities entailing property damage are taken into account. Paucity of data is a serious impediment to the measurement of benefits of disaster-management projects in general, and more time should be allocated to collecting relevant data. The treatment of sunk costs requires further consideration to avoid distorting benefits.

Disaster mitigation activities must be recognized for their value in preventing or alleviating serious economic disruptions and are thus critical in determining a country's path of economic growth. Disasters are clearly linked with poverty: poverty increases vulnerability to disasters, and disasters, in turn, have a particularly devastating effect on the destitute and the poor. More consideration should be given to the practicalities of implementing disaster-recovery projects in two phases, a repair phase and a rehabilitation phase. This may result in earlier recovery by affected communities.

Notes

1. This chapter was prepared with the assistance of Terry Lustig (staff consultant), John Brooks, Dagmar Graczyk, and Bruno Carrasco (World Bank staff). The views expressed are those of the author and not necessarily of the Asian Development Bank.
2. A billion is 1,000 million.

Bibliography

- Anderson, Mary. 1990. "Analyzing the Costs and Benefits of Natural Disaster Responses in the Context of Development." Environment Working Paper 29. Environment Department, World Bank, Washington, D.C., May.
- Asian Development Bank. 1987. *Rehabilitation Assistance to Small DMCs Affected by Natural Disasters*. R74-87. Manila, June
- . 1989. *Rehabilitation Assistance after Disasters*. R191-88. Manila, February.
- . 1991. *Disaster Mitigation in Asia and the Pacific*. Manila.
- . 1993. *Guidelines for Incorporation of Social Dimensions in Bank Operations*. Manila, October.
- . 1994. *Report of the Task Force on Improving Project Quality*. Manila, January.
- . Forthcoming. *Handbook for Preparing Emergency Loans*. Manila
- . Forthcoming. *Workbook on Economic Assessment of Environmental Impacts*. Manila.
- Carpenter, R., and J. Maragos. 1989. *How to Assess Environmental Impacts on Tropical Islands and Coastal Areas*. Environment and Policy Institute East-West Center, Hawaii, October.
- Carter, W. N. 1991. *Disaster Management. A Disaster Manager's Handbook*. Manila: Asian Development Bank.
- Funaro-Curtis, R. 1982. *Natural Disasters and the Development Projects: A Discussion of Issues*. U.S. Agency for International Development, Office of Foreign Disaster Assistance, Washington, D.C., July.
- Gagey, F. 1989. *Report on Macroeconomic Effects of a Flood Control Project in Bangladesh*. Direction de la Prevision, Paris, May.
- Japan Development Institute and Engineering Consulting Firms Association, Japan. 1992. *Study on Disaster Prevention and Preparedness in Developing Countries*. Tokyo, July.
- Kreimer, A., A. Hartland, and E. L. Quarantelli. 1990. "Lessons Learned from Emergency Lending." Divisional Working Paper 1990-15. Policy Research Division, World Bank, Washington, D.C., November.
- Kreimer, A., and M. Zador. 1989. "Colloquium on Disasters, Sustainability, and Development: A Look to the 1990s." Environment Working Paper 23. Environment Department, World Bank, Washington, D.C., December.
- Kumar, S. K., and S. Bhattarai. 1992. "Effects of Infrastructure Development on Intrahousehold Caloric Adequacy in Bangladesh." In *Proceedings of Conference on Intrahousehold Resource Allocation: Policy Issues and Research Methods*. Washington, D.C.: International Food Policy Research Institute and World Bank.
- Lustig, T. L. 1992. "A Method for the Rapid Assessment of the Economic Benefits of Strategies for Mitigating Floods with Limited Data: The Case of North and Central Vietnam." In *Vietnam:*

Proceedings of the International Workshop on Flood Mitigation, Emergency Preparedness, and Flood Disaster Management. United Nations Development Programme and Socialist Republic of Viet Nam, June.

Office of the United Nations Disaster Relief Coordinator. 1991. *Mitigating Natural Disasters: Phenomena, Effects, and Options: A Manual for Policy Makers and Planners.* New York.

Organization of American States, Depart-

ment of Regional Development and Environment, Executive Secretariat for Economic and Social Affairs. 1991. *Disaster, Planning, and Development: Managing Natural Hazards to Reduce Loss.* Washington, D.C.

United Nations. 1991. *Natural Disaster Reduction in Asia and the Pacific: Launching the International Decade for Natural Disaster Reduction, Vol. 1, Water-Related Natural Disasters.* Washington, D.C.: United Nations, ESCAP, December.