

IV. Benefit-Cost Analysis of Disaster Prevention and Recovery

Having specified four areas in which the circumstances faced by the developing countries differ from those of the wealthier countries, we can now look at the ways in which these influence the benefit-cost ratio of disaster prevention and disaster recovery strategies in disaster-prone developing societies.

IV.1. Disaster Prevention: Benefits and Costs

The direct benefits of disaster prevention, in all countries, are equivalent to the savings of the losses that would have been incurred through a disaster. In developing countries, these must reflect potential losses in productive assets in the nonformal as well as the formal sector. Furthermore, in the context of development, secondary and indirect benefits of disaster prevention are of special importance. These include the creation of a climate for development in which stability and certainty are sufficient to promote investment and entrepreneurial incentives. Also involved is the avoidance of the secondary costs of undermining a sense of efficacy among the population on whose efforts development ultimately depends. Without these circumstances which affect attitudes and motives, and therefore incentives, it is unlikely that major economic progress can be made in developing countries.

In all countries, disaster prevention costs include the direct expenditures which are undertaken to control, or mitigate the impacts of, any natural crisis events that could result in disaster. These may be very large, as in the Thames project, or much smaller as in construction of fuel efficient stoves which may reduce deforestation and subsequent disastrous ecological deterioration.⁴⁵ The size of the costs of prevention differ significantly with the types of potential disasters that countries face and with the available technologies for prevention. Disasters that cover large areas and which involve deep environmental degradation are the most difficult, and expensive, to prevent. We shall turn to a discussion of different disaster types below.

IV.2. Disaster Recovery: Benefits and Costs

The recovery option involves spending after a disaster has occurred. Thus, in all countries, the costs of recovery are the costs of disasters, including the direct, indirect and secondary losses incurred and the costs of supporting rescue and relief operations and a recovery management capacity. These costs, we have seen, are significant for developing nations both as a proportion of national wealth and as they have long term negative impacts on the prospects for achieving development.

⁴⁵. Of course, use of fuel efficient stoves is insufficient for reversing major environmental damage due to deforestation. Below, we shall discuss the relative costs of preventing different types and scales of disasters.

A question remains as to whether there are any **benefits** to be derived from disasters that would affect our choice and, in particular, whether there are any benefits that are of special importance for development. There are two possibilities. First, as a result of a disaster which gains international attention, countries receive injections of aid in the form of grants (though these may have negative effects as well positive ones). However, international aid to disasters has been estimated as seldom exceeding 4% of the losses from the disasters.⁴⁶ This direct benefit is, therefore, negligible. A much greater positive impact may result when the event of a disaster attracts significant developmental aid focussed on long term programming to reduce disaster vulnerability and to increase productive capacity.

A more important benefit of the recovery option may be a secondary, long term, economic gain which results from "starting with a clean slate."⁴⁷ The recovery of Europe and Japan after World War II provide an example in which obsolete factories and machinery were destroyed by the war resulting in the installation of an entirely new capacity in the recovery period. Countries which have historically produced a crop which is repeatedly susceptible to destruction by cyclones may, when the crop is completely destroyed, decide to plant an alternative (possibly newly developed) crop which is less vulnerable to wind and from which greater profits may be realized. Such recovery benefits are highly particularized. They depend on very special circumstances: an available modern or invulnerable technology, the means to adopt it, and a pricing situation which made the replacement of old approaches uneconomic until very great destruction occurred. Benefits such as these could be quantified, but because of the special circumstances in which they could be expected, they do not make much difference in the benefit-cost ratio of the recovery option.

IV.3. Cost Effectiveness for Different Disaster Types

In the discussion above, we have noted that the assessment of costs and benefits may vary among different disaster types. It remains now for us to examine how these might affect the decision to undertake prevention or recovery. We divide disasters into three types.

1. Predictable Sudden-Onset Disasters.

In many disaster prone countries, though there is variation in the severity of the natural crisis events from year to year, such crises are seasonal and, to that extent, predictable. In these circumstances, it is difficult to defend a failure to address disaster prevention when technologies

⁴⁶ Zupka, D. op. cit., p.22.

⁴⁷ Cuny, Fred, "A Model Program for Economic Vulnerability Reduction and Recovery," paper prepared for the Pacific Islands Development Program for the Disaster Preparedness Strategies Seminar, March 23-25, 1983, Suva, Fiji.

are available for doing so. And, in many instances such technologies do exist. For example, technologies exist for developing wind resistant housing suitable for preventing most hurricane and typhoon damage. While flood management and control technologies are more expensive, they exist and are in use in many parts of the world. Winds and floods tend, in many places, to be seasonal and, therefore, predictable. When such crises, with some frequency, cause significant damage, it is unreasonable to carry on with development as if they may not occur.

2. Unpredictable Sudden-Onset Disasters.

While it is impossible to predict exactly when an earthquake will occur or its actual damage potential, we do know which areas are subject to seismic activity and, to that extent, can predict that, at some time, a severe earthquake will occur. As with floods and winds, a great deal is known about the design and construction of earthquake resistant buildings using varied local materials. The potential damage from earthquakes is extensive and expensive. Thus, there is a strong argument for undertaking preventive activities. It makes particular economic and political sense to factor potential earthquake damage into development projects which would become disasters under earthquake conditions (such as dam construction).

3. Slow-Onset, Environmentally Based Disasters.

Increasingly, major disasters are the result of a combination of slow-onset natural events (such as droughts) and environmental degradation (such as deforestation) due to human activity. When the causes of disasters are far-reaching, as is the case when cumulative environmental degradation changes entire land or water use patterns, small communities and even entire nations are increasingly unable, by themselves, to affect changes that would lessen the threat of disaster. Bangladesh provides an example of a country, which as recipient of flood waters and silt from other, up stream countries, cannot achieve flood control by domestic, national programs alone. A wider effort, crossing national boundaries and relying on technologies and financial support of world-wide scope, would be required for flood management inside Bangladesh.

Under the circumstances of environmental disaster threats, the costs, and benefits, of disaster prevention change significantly. So also, however, do the costs of disaster recovery. This is because the costs (to the extent that we can predict them given the current state of knowledge) of not preventing such disasters may involve extinction of species, including, in some cases, the extinction of the human race. In extreme cases, recovery is not an option because it is impossible.

We are, therefore, concerned with assessing the benefits and costs of prevention of this kind of disaster. Benefits may be equated with the preservation of life and productive capacity, that is, benefits are assumed to be very great. Because of the magnitude and scope of environmental disasters, costs of prevention may also be very high. Attempts to prevent or mitigate

such disasters involve a series of special, sometimes costly, actions. They involve the creation of what we might call the non-structural apparatus of disaster prevention, that is, that set of activities that create the climate and the capacity for undertaking the preventive actions.

Elements of the nonstructural apparatus can be categorized into three groups though the separation among them is somewhat arbitrary since each depends on and interacts with the others. First, disaster prevention (and to some extent, recovery) requires data and tools for analysis. The more complicated the data are, the higher the costs entailed in collecting and analyzing them.⁴⁸ Second, prevention of environmental disasters requires systems and institutions for coordinated decision-making. Such systems entail costs--of arranging and holding the meetings in which the decisions to create the systems are made and of setting up institutions and maintaining them. Third, large scale prevention efforts often require public education and/or political lobbying.

These nonstructural apparatus costs are often significant. They apply to some degree to all disaster prevention and recovery, but they are most significant in prevention of massive and systemic disasters of the environmental sort because prevention cannot be effective without broad consultation and coordination. The discussion of these costs is not intended to imply that prevention of environmental disasters is so costly that it cannot be justified. Because of the scale and coordination of such activities, there may be opportunities for economies of scale. For example, the same data and communication systems developed to address a large scale disaster may be utilized to prevent other types of disasters. We cannot be sure how great the economic returns to investments in the areas related to the prevention of large-scale environmental disasters would be; we do know that the physical and social outcomes would be preferable to the losses that such disasters would bring.

V. Summary and Conclusions

Disasters occur most often in poor societies and cause suffering, most often, among poor people. These are precisely the societies and people for whom development is most urgent. Yet, by ignoring disaster proneness, many development efforts do nothing to decrease the likelihood of disasters and many actually increase disaster vulnerability.

Development planners have sometimes dubbed disaster prevention efforts as "unaffordable extras" as they design development projects and programs. However, the attitude which this reflects is without a sound basis. Development spending and disaster spending are not trade-offs. We return to the point made above that every decision in a disaster prone country about its allocation of resources to development has an impact on the likely extent of future disaster damage, and every decision about disaster response strategies

⁴⁸ Peskin, H.M., op. cit., pp.48 ff.

(by which we mean actions that acknowledge the likelihood of disasters and prevent, mitigate, recover from, or reconstruct after them) has an impact on the society's potential development.

Elsewhere,⁴⁹ a colleague, Peter J. Woodrow, and I have defined development as "the process by which a nation's capacities are increased and its vulnerabilities reduced." The definition makes explicit the link between efforts to affect long term systemic development and the impacts of development on disasters and of disasters on development. We, furthermore, suggested that capacities and vulnerabilities should be understood as more than physical or material things (such as physical assets or, conversely, a drought prone or flood prone environment). Of equal importance in understanding the development process, we claimed, are social/organizational and attitudinal/motivational factors. A society which is less well endowed materially, but which has a strong and effective political system, may be "more developed" in the sense of being able to cope with a natural hazard than one with greater wealth but severe social divisions. The "attitudinal/motivational" category is intended to highlight the importance of the motivations which prompt people to undertake actions energetically and entrepreneurially or, alternatively, to resign themselves to "fate," passively accepting whatever comes. When people share a strong sense of their ability to bring change and to manage their society, they have greater capacities both for producing national wealth and for coping with natural crises.

These concepts are useful for understanding the way in which a development expenditure may be more or less related to disaster prevention. This understanding of development as a composite of capacities and vulnerabilities challenges the misperception that spending for disaster prevention will divert resources away from development. Development and disaster prevention spending are different investments in the single goal of development. They are linked and, at times, identical.

Thus, governments of disaster prone nations should always undertake their development oriented investments with an eye to their impact on the nation's disaster proneness. To do this, any development investment should include in its design measures to ensure that it does not, itself, increase disaster vulnerability as well as measures that support and improve the nation's capacity to cope with disasters. Physical planning should always be based on an analysis of disaster vulnerability in order to avoid increasing the potential for disasters and to realize opportunities for reducing environmental and other vulnerabilities. Beyond the physical vulnerability analysis, however, development planning should also take account of the ways in which alternative actions may promote, or undermine, the organizational and attitudinal capacities of a society. The direct, indirect and secondary costs--especially those associated with the cycle of poverty and disasters--are of such importance to the potential for any long term, sustainable

⁴⁹. Anderson, Mary B. and Woodrow, Peter J., Rising from the Ashes: Development Strategies at Times of Disasters, Westview Press, Boulder Colorado, and UNESCO, Paris, 1989.

development that all development efforts should, as a matter of course, include disaster prevention elements. Not to do so is both economically irrational and politically unwise.

Even the most efficiently managed disaster recovery operation, if it is focussed on getting things "back to normal," leaves a society no less vulnerable to future natural hazards. Prevention, on the other hand, produces benefits, in addition to those that are equivalent to the savings of disaster damage, that are completely unrealizable through the recovery option. These are the promotion of a stable environment which provides incentives for investment and entrepreneurial activity, the potential development of a sense of efficacy on the part of the broader population, and the development of improved management and planning skills. Only if these are promoted and strengthened can we expect that sustainable long term development can ever be achieved. Thus, disaster prevention, incorporated into development planning, is one important area for investment to achieve sustainable development.

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