

A Dissertation for the Degree  
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#### ABSTRACT

This study provides a framework for testing the hypothesis that disaster relief affects the development capacity of disaster-stricken less developed countries. The first part investigates in more general terms the economic consequences of natural disasters and of foreign disaster relief. The second part illuminates the nature and extent of the effects of relief on economic development in a concrete case. It focuses on Guatemala after the 1976 earthquake, when the country became the recipient of over \$ 100 million in disaster relief.

Disasters result not only in the destruction of real capital but also in the dislocation of institutions and markets which lead to aggravated economic conditions for low-income households in particular.

Different forms of relief induce different effects. The effects on economic development are more pronounced for *cash* relief and relief in *services*. Relief in *commodities* runs the risk of binding local resources or interfering with domestic production without major benefits.

It is argued that relief reduces the risk that disasters will lead to a state of long-lasting stagnation and improves the development capacity of the recipient country. In Guatemala real output increased after the earthquake.

The extent to which this increase can be attributed to foreign disaster relief is discussed. Individual cases are pointed out where disaster relief was used for activities that improved the economic capacity of recipient areas. There are strong indications that part of the disaster relief has benefited people that would have been difficult to reach with traditional forms of foreign assistance.

The assistance of different organizations seems to have improved economic development to different extents. Non-government organizations appear to have been more successful in implementing projects with beneficial long-run effects. However, there are factors that point to the advantage of keeping the existing pluralistic organizational relief structure.

Against this background, it seems reasonable to recommend that relief projects be planned with long-run effects in mind and that relief budgets be allocated among projects in consideration of their long-run as well as their short-run effects.

## PREFACE

Natural disasters hit many less developed countries (LDCs) and aggravate their economic problems. Attempts are made by various international organizations, as well as by individual donor countries, to mitigate the effects of natural disasters by providing special assistance. It goes without saying that such external disaster relief in general does not fully compensate the disaster-stricken LDC for all of the effects of the disaster. A closer look at the nature of the disaster relief reveals that compensation is attempted along two lines. One is, of course, compensation in the literal sense, i.e. relief aiming at satisfying the immediate needs for survival and at replacing what has been destroyed. The other is compensation that aims at improving the standard of living in the disaster-stricken country by providing - directly or indirectly - capital goods or services that did not exist in the recipient country prior to the disaster.

This latter kind of assistance, although a part of the disaster relief provided, may influence the future development of the recipient country in important ways. The mere fact that this part of the relief is not literally compensatory means that something "new" is added to the physical or technical equipment of the recipient country. What may be less obvious is that the measures taken may add developmental (and distributional) properties to the economy which for institutional, political or other reasons could not have been provided by traditional development aid to the country. If the "development-inducing" component of disaster relief turns out to be significant in actual practice or if it could be made significant, the question arises whether the overall efficiency of disaster relief to LDCs could be improved by explicitly taking into consideration the long-term as well as the short-term effects of the relief provided. As now seems to be the case with few excep-

tions, the donors of disaster relief intentionally focus on the short-term perspective - as it can be argued that they should, provided they only affect conditions in that perspective - whereas some of the decisions made actually have more far reaching economic consequences for the recipient countries.

The purpose of this study is to make attempts at testing the hypothesis that the provision of disaster relief, beyond its (partly) neutralizing effects, affects the capacity for economic development of the stricken region or nation. In order to do so we shall describe and analyze the effects of disaster relief on the long-term development of disaster-stricken LDCs. The first part of the study investigates the economic effects of natural disasters and of external disaster relief. The second part tries to shed some light on the nature and extent of the possible effects of disaster relief on the economic development of LDC. This part of the study concentrates on the case of Guatemala after the severe earthquake of 1976, when the country became the recipient of disaster relief amounting to more than \$100 million.

This work has been carried out under the supervision of Peter Bohm. My debt to him for his support and for entrusting to me the development of his idea, the central theme of this study, is great. I am grateful to my colleagues: Mats Bohman, Tord Eng, Per-Ove Hesselborn, Kari Lantto, Jan-Eric Nilsson, Sonny Soeria-Atmadja and Lewis Taylor, in the seminar at the Department of Economics where earlier draft versions have been discussed under the leadership of Professor Bohm. I have also benefited from comments on earlier drafts by Göran Eriksson, Carl Hamilton, Julius Holt, Tony Jackson, Otto Koenigsberger, Frank Long, Alek Markowski, Julián Martinez, Ana Ma Palomo, Torsten Persson, Lt. Col. G.N. Ritchie, Rob Stephenson, Peter Svedberg, Lars Svensson, Lars Werin and Roger Zetter. However, the responsibility for remaining errors and the views expressed is solely mine.

The extraordinary patience of Sonny Soeria-Atmadja and Lewis Taylor in helping me to put my confused ideas into English is sincerely acknowledged.

One of the most difficult problems I have been confronted with in the elaboration of this work has been the collection of information. I gratefully acknowledge the assistance given to me in this respect by the "Unidad de Cooperación Nacional e Internacional" of the National Reconstruction Committee; CARITAS Arquidiocesana, Norwegian Church Aid, Save the Children Alliance, INCAP, UNDP, UNICEF, AID, CIDA and the Swedish and Ecuadorian Embassies in Guatemala City; IDB and the World Bank in Washington; and International Disaster Institute, Royal Military College of Science, OXFAM, and the Disaster and Settlements Unit of the Department of Architecture of the Oxford Polytechnic in England. Helpful advice of Weine Karlsson at the Institute of Latin American Studies in Stockholm, Frances D'Souza at the International Disaster Institute of London, Ian Davis at the Department of Architecture at the Oxford Polytechnic and Corrado Latina at the Florence University are also gratefully acknowledged.

I also want to thank all the personnel of the Department of Economics of the University of Stockholm for their resolute support. Special thanks to Ulla Blomqvist who typed the manuscripts with extreme patience with the assistance of Birgitta Lundin.

I gratefully acknowledge the financial support of the Swedish Agency for Research Cooperation (SAREC), University of Stockholm, The Royal Swedish Academy of Sciences and Stiftelsen Siamon.

Finally, thanks to my dear wife and son, my parents, sister and brothers for sharing this "enduring but fruitful task".

Galo Abril-Ojeda

Stockholm, October 1982

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## CHAPTER 1. GENERAL INTRODUCTION

As the title of the present work suggests, the major issue that we shall be concerned with is the development inducing effects of disaster relief. The direct purpose of our study is to analyze the effects of disaster relief provided to Guatemala after the 1976 earthquake. To the extent that other LDCs are sufficiently similar to Guatemala from the point of view of earthquake effects and relief effects, our results will be relevant for those countries as well. And to the extent that the effects of earthquakes on a less developed economy are similar to the effects of other kinds of natural disasters - primarily other "sudden" disasters such as hurricanes, floods, etc., it would seem - our results will carry over to such disasters as well. As our topic seems to have a wider, although conditional, relevance in these two respects, we will off and on use the general perspective of "sudden" natural disasters in LDCs.

To provide some starting points leading to the analyses that follow and to motivate our study we shall start this chapter with an overview of some background data. Subsequently, we present a number of issues that arise in connection with the occurrence of a disaster. This presentation of issues is used to describe the scope of the study. After referring to current research in disaster relief, we conclude this chapter with a summary and outline of the study.

### 1. Recurrence and Consequences of Natural Disasters

One of the most compelling problems facing the less developed nations is the recurrence of natural disasters which often have devastating effects on their economies as a whole. Recent historical observations have in fact suggested that devastating natural disasters, such as large-scale droughts, floods, earthquakes, landslides, and so on, occur often in the poorer countries of the world (Wisner, O'Keefe & Westgate, 1977; Long, F., 1978a, b; Razani, 1978). Wisner, O'Keefe & Westgate (idem, pp 47-49), after a review of global data on the frequency, magnitude and impact of natural disasters find that the most devastating ones occur in LDCs and, that there has recently been a significant increase in both the frequency of large-scale disasters and in the number of deaths per million of population afflicted per disaster. Other observations, such as those made by UNDRO (Development Forum, 1976; Long, 1978a), indicate that the heaviest toll of direct and indirect damage from natural disasters, including 95 per cent of disaster related deaths, occurs in the same developing countries which are already suffering from low levels of resource utilization, low productivity, economic stagnation and inadequate social and educational development. Developing countries, on average, account for 90 per cent of the natural disasters occurring throughout the world (Long, *ibid*). In fact, the data are compatible with the view that the disasters are actually a major cause of economic stagnation in some of these countries.

Information on fatalities due to earthquakes (Ambraseys, N.N., 1974; quoted from Razani, R., 1978, table 1) indicates that a major percentage of the deaths has been inflicted in seismic regions of LDCs (some figures are given in the next paragraph). In addition, comparing information on the seismic activity belts of the world (see Krimgold, 1974, p 12) with the classification of

low and middle income countries made by the World Bank (1979, Table 1) we find that almost all of the poor countries of the world are included among those which could be considered disaster prone. (See also Long, *ibid*).

Although comparative statistics for the developed and the developing nations are needed for a complete illumination of the relative effects of natural disasters, what the evidence referred to above implies for the economies of the LDCs is not hard to imagine. From this perspective such major natural disasters are bound to have had significant effects not only on the current welfare of the afflicted areas but also on their economic development potentials in the long run, even though it would be extremely difficult in general to single out the long-run effects that are attributable to a particular disaster.\*) Rough estimates of the damage caused by different disasters in some countries may give us a vague idea of their extent. For instance, in UNDR0's reports (1979, Vol. 7, p 1; Vol. 10, p 3; "Newsletter", No 2 and in Development Forum, *ibid*) it is indicated that:\*\*)

- from 1947 through 1970 cyclones and tidal waves accounted for 689,440 deaths and more than 150,000 people perished in earthquakes. More than one million lives were lost through all kinds of natural disasters (excluding droughts) during this period.

\*) UNDR0 in its article ("Development Forum", 1976) points out that "in most developing countries, reliable statistics on the frequency, intensity, direct and specially the indirect losses attributed to natural disasters are virtually non-existent". Some data on natural disasters have been collected over the years by the UNESCO. However, one important limitation of UNESCO's data is that they refer only to physical damage without dealing with the indirect economic effects that disasters cause (Long, F. 1978a, p 151).

\*\*) All figures presented in this section have been taken at their face value. The sources from which they have been taken do not indicate how the values were arrived at.

The region most severely affected was Asia, with over 980,000 fatalities.

- in the five countries of the Central American Common Market disaster damage has averaged 2.3 per cent of the gross domestic product in the 15-year period 1960 to 1974. This figure does not take into consideration a number of indirect effects, such as the probable greater prevalence of certain diseases. Nor does it include the effects of many small incidents such as small floods which, taken together, might have been equivalent to one or more disasters.
- the Economic and Social Commission for Asia and the Pacific (ESCAP) has estimated that between 1961 and 1974 the cumulative total damage caused by monsoons, tropical cyclones and floods in the ESCAP region was \$29,800 million. Altogether more than 280,000 lives were lost (although this toll excludes the enormous 1970 Bangladesh cyclone disaster the losses of which are not known with any degree of certainty), 458 million people were affected, 139 million hectares inundated and 35 million dwelling and buildings damaged. This staggering estimate does not include the damage in Afghanistan, China, Indonesia, Iran and a number of other countries of the region on which no data have yet been collected in a systematic way.
- an example of the overwhelming impact of an earthquake in a developing country for which statistics are available is that of the Guatemalan earthquake (on which our study concentrates). This natural disaster caused nearly 23,000 deaths, more than 77,000 injuries, and made nearly one million people (one sixth of the population) homeless. The total reconstruction costs as a result of the earthquake equal 900 million or 30 per cent of the Guatemalan

GNP for one year.\*) In addition, as is indicated in chapters 2 and 7 below, the damage appears to have been most serious in the poorest and most isolated areas of the nation where disaster prevention has been almost non-existent. In general, the areas seriously affected were areas that are almost exclusively populated by Indians (as Comalapa with 97 % Indians), with high levels of illiteracy, lacking effective means of communication and with a high share of self sustaining peasants (Weymes, H. & Hol, J., 1977). In other words, they are areas that present the typical picture of isolation to which we shall refer everywhere in this study.

## 2. Extent and Role of the Foreign Disaster Relief

Primarily since the end of World War II the problem of the economic development of the LDCs has received worldwide attention, which in the course of time has led to the idea that foreign aid is a moral (and often also strategic) commitment of the rich nations to the poor. Extensive foreign disaster relief in the sense to be defined later on, however, is of more recent vintage (UNDRO's Newsletter, 1976, No. 1). Even if international disaster assistance has been given for years, a more comprehensive provision of relief to disaster afflicted LDCs seems not to have begun until in the late 1970s.\*\*) It was in 1976 that UNDRO (Office of the United Nations Disaster Relief Coordinator), in a effort to plan in a systematic way to meet the overall challenges that natural disasters pose for the economic growth and social well-being of developing countries, proposed an "International Strat-

\*) Different sources present somewhat different values for this estimate (cf. the estimate presented in ch. 2, section 4a).

\*\*) For example, Red Cross agencies whose general work dates back to as early as 1864 did not get involved in natural disaster relief and, specially, pre-disaster planning in LDCs on comprehensive basis until the 1970s when disaster occurrences in such countries increased (Donald, 1975, pp 23-25).

egy for Disaster Assistance and Prevention" (UNDRO's Newsletter, *ibid*). This strategy was approved by the General Assembly of the U.N. in 1976.

Generally, disaster relief programs have involved the rendering of material aid with a view primarily to relieving the immediate miseries caused by a disaster and then to restoring other endowments. The possibility of illustrating the importance of this assistance in the neutralization of the losses caused by disaster is, however, limited by the availability of statistics. Most often, statistics record only the amount of cash relief and some part of the relief in kind for which an often fictitious monetary value has been reported. In addition, in most cases the information refers only to the relief given during the emergency phase. Thus, the statistics often record neither the value of the technical assistance (services, such as medical, health, technicians etc) nor the disaster relief given at a later stage, i.e., during the phase of reconstruction.

Despite these characteristics of the information, UNDRO has estimated that during the 1965-1975 period the disaster relief from the "International Community" to disaster stricken LDCs amounted to about \$1.6 billion (the prices in which this figure is expressed are not indicated by the information in this case either). Very roughly, this represents an average annual provision of relief of US \$160 million. It is equivalent to 4 per cent of the average annual development assistance of approximately US \$3.8 billion (loans not considered) given to LDCs by the industrialized countries (DAC) during the same period (OECD, 1975, pp 14-16 and Table 17, p 218). It should be pointed out that during the same period the disaster relief given to affected people by the disaster stricken LDCs themselves (own relief) amounted to US \$5.3 billion or an average of

US \$530 million annually (UNDRO, *ibid*). This is equivalent to 10 per cent of the average annual development assistance received by the LDCs.

Even if the figures just mentioned indicate that the internal disaster relief far exceeds the amount of foreign relief given looking at individual disaster-stricken areas of LDCs one finds that the disaster relief from foreign sources is an important means to neutralize the losses (direct and indirect) caused by natural disasters. For example, as is shown in chapter 6 of this study (see Table 15), the foreign disaster relief to Guatemala during 1976-1979 amounted to US \$112 million, in 1970 prices, or 18 per cent of the estimated value of the damage caused by the earthquake. Furthermore, during 1976 alone (the year of the earthquake) the disaster relief amounted to US \$80 million, in current prices (the sum of figures in tables 2, 7 and 9 of Chapter 6). This amount exceeds the US \$68 million received by the country (disbursed) as grants for development during the same year (quoted from World Bank, 1980, Guatemala Country Economic Memorandum).\*) The importance of this massive influx of investment resources from abroad will be more apparent if it is taken into consideration that they were directed to sectors and regions in the economy which traditionally had not participated in the development programs of the country. (This is shown in chapter 7 of this study.) Since about 1 million people received foreign disaster relief, each recipient received about US \$100 on the average. This corresponds to about 20 per cent of the Guatemalan GNP per capita

\*) The disaster relief given during 1976 may be suspected to have reduced the grants for development which otherwise would have been given to the country, i.e., that there was only a reallocation of a given foreign aid budget. However, the share of grants for development in the total amount of development assistance (which also include development loans) during 1974, 1975, 1976, 1977 keeps an unchanged level of 33 per cent for each of these years (World Bank, *ibid*).

(see chapter 7, section 3). Moreover, given the income disparities characterizing the Guatemalan economy and specially, the low income levels of disaster stricken areas, there may be cases where the disaster relief received is on the order of 100 per cent of the annual income for typical individuals in the areas assisted.\*)

In our study of Guatemala we also note that some of the organizations that had the initial purpose of providing disaster relief for emergency conditions gradually became involved in economic development programs, so that the disaster and, in turn, the disaster relief became a catalyst for the provision of development aid to areas which had not participated in development programs. Reviewing the agreements reached between disaster relief organizations and the Guatemalan Government (contracts for the period up to 1987!) we find that more than 90 per cent of this assistance in the amount of US \$25 million is earmarked for activities to improve the economic conditions of the afflicted areas.\*\*) Relief continues to flow to the afflicted areas in Guatemala but with emphasis on activities not directly connected with the actual damage from the earthquake.

It should be noted that the role of disaster relief has of late been pointed as being more effective for the achievement of development assistance objectives than traditional aid. The failure of development programs in many developing nations to benefit the poor appears to have induced those who are engaged in international development aid to reconsider their assistance strate-

\*) This has also been pointed out to the author by different officials who worked with the distribution of relief in Guatemala, e.g., Tony Jackson, OXFAM in a personal interview at Oxford.

\*\*) These estimates have been calculated on the basis of the information in "Listado de Convenios Vigentes Hasta el 30 de Septiembre de 1980". Palomo, A.M., 1980, CRN's archives, Guatemala City.



gies. In most cases these new strategies have involved forms of development projects that emphasize either income distribution improvements by the creation of employment or the satisfaction of "basic needs" by direct resource transmissions to the poor strata of the population.\*) In Sweden it is currently being debated whether or not such programs are to be preferred to the more traditional forms of development assistance such as "bilateral" or "foreign trade guarantee" arrangements.\*\*) Gunnar Myrdal, for example (ibid), argues for shifting the emphasis from development assistance of the traditional type to aid to the poorest or to disaster relief. In this respect, we have found indications that in Guatemala the disaster relief given via non-governmental organizations (NGOs) such as OXFAM, CARITAS, Norwegian Church AID, etc. has improved the economic capacity of the poorest people living in traditionally isolated areas of the nation. In this case replacing development assistance with "aid to the poorest" or "disaster relief" has not necessarily meant that general development objectives were left behind.

Finally, the disaster relief given to LDCs appears to be an increasing share of the development assistance budgets of different donor countries. For example, in Sweden the disaster relief budget has been increased from about 5 per cent of the development assistance to LDCs in 1978 to nearly 10 per cent or US \$80 million in 1981 (Swedish Foreign Assistance Budgets, internal documents). There are two possible explanations for these changes. One is related to the efficiency arguments just mentioned. The other lies in the fact that

\*) Currently, these questions have been the increased concern of multilateral development lending institutions such as the Inter-American Development Bank and the World Bank (see Karlsson, W., 1981b; Streeten, P., 1972 & 1979) and the United Nations Development Program (UNDP).

\*\*) On the Swedish debate see: Myrdal, G., 1980; Hamilton C., 1978; Bohm, P., 1980; SIDA's budget proposal 1982/83.

it is often easier to get political support and backing from the public opinion for increasing or at least maintaining the level of foreign aid if it takes the form of relieving the effects of disasters. For these reasons the extent of disaster relief to LDCs is likely to grow in the future, at least relatively.

### 3. Concepts and Classification of Disaster Relief

Before going on with our presentation of the scope and issues of this study, let us specify what we shall mean by disaster relief. To our purposes here disaster relief is assistance that is motivated by the occurrence of a natural disaster and is given to alleviate immediate needs or to restore, perhaps in improved form pre-disaster socioeconomic conditions of the stricken areas or nation. In addition, this is assistance that has been explicitly reported as foreign disaster relief by the organizations or the local governmental bodies involved. In general, it is difficult to give an unambiguous definition of disaster relief since the definition will differ according to the way in which the following factors are considered: the declared intent behind the relief extended, the timing of the transfer of the relief and the media through which relief is channelled. In this respect, our definition has both analytical and operational advantages. Analytically the definition permits choosing typical disaster relief activities (declared intent) and looking at the extent to which they could have properties that are other than compensatory or neutralizing. (We return to this shortly.) Next, our definition is operational for empirical assessments since it comprises only activities that have been motivated by the occurrence of a disaster (timing) and reported as disaster relief by the relief media. In other words, this definition leaves little room for including in an estimate of the disaster relief assistance of other kinds, e.g., de-

velopment aid given after the occurrence of a disaster or, for excluding disaster relief given by other organizations than those specializing in this kind of assistance.

In order to evaluate the extent to which disaster relief affects economic development it is necessary to try to distinguish between a "compensatory" and a "development inducing" component in disaster relief. Given that the assistance provided to disaster stricken areas aims at replacing what has been destroyed (housing, equipment, infrastructure, etc) or alleviating the immediate needs arising from deaths, injuries, diminished consumption possibilities etc, disaster relief may in principle be taken as "compensatory" only. However, compensatory activities may in the long run also have development inducing properties in that they create a stimulus or facility for development that was not present in the pre-disaster situation. For example, production units reconstructed on the basis of techniques that are better adapted to the local situation may be more productive than the ones replaced and would often improve conditions for other activities in the economy as well. The transmission of know-how, managerial and other knowledge to the stricken area intended to facilitate certain relief operations may induce lasting changes in the general development preconditions of the region. This new know-how, if it improves the level of knowledge of the people, may induce fundamental changes in the conditions for production and consumption in the areas assisted and, thus, induce changes in their possibilities for economic development. New houses, infrastructures, etc., may be better adapted to withstand future disasters, and the individuals as well as the society will gain from resource savings if there are new disasters. In the long run all these changes will have an impact on the growth capacity of per capita income and thus on the economic development of the stricken region or nation.

(A more detailed discussion of these properties is presented in chapters 4 and 6). This is why, in spite of the operational difficulties underlying a practical differentiation of the effects, we have defined the "compensatory component" of disaster relief as the assistance given to replace what has been damaged or to neutralize the effects of the disaster and the "development component" as all the improvements in preconditions for economic activities that the compensation itself or its implementation may induce. This definition will suffice for the primary purpose of our analysis: illustrating the existence of development inducing properties in the disaster relief. In addition, we shall in the empirical parts of this study group disaster relief activities as follows:

- 1) "Purely compensatory". This includes all expenditures on the provision of the physical units to compensate for physical destruction. Examples are expenditures on the reconstruction of houses and infrastructure, the replacement of destroyed machinery, equipment etc.
- 2) "Complementary to compensation". This includes expenditures on the transmission of the know-how, material and equipment required to implement disaster relief tasks.
- 3) "Unrelated to compensation". This includes expenditures on additional physical units or technical facilities provided to improve the productive capacities and the socioeconomic conditions of the areas assisted.

Although it is conceivable that certain expenditures in this latter group are not productive in any relevant sense, this classification would seem to permit an approximate assessment of activities capable of inducing economic development. More specifically, an estimate

of the total expenditures on such activities will be assumed to be given by the sum of the "complementary-to-compensation" and "unrelated-to-compensation" components.

#### 4. Issues and Scope of the Study

The scope of our study is confined to the following main issues: 1) the aggravation of economic underdevelopment resulting from disasters, 2) the type of economic effects that disasters cause, 3) the effects of disaster relief, in particular its long-run effects, and 4) the possibilities for improving the efficiency of disaster relief with respect to its effects on socio-economic development

The aggravation of economic underdevelopment indicated previously suggests that prior to an analysis of the development inducing effects of the disaster relief the economic effects that natural disaster causes need to be specified. Most of the reports of the economic effects of natural disasters emphasize the money costs of the physical damage or the disturbances in macroeconomic indicators (such as the fiscal budget and the balance of payments). Here, we concentrate on the effects on various forms of real capital, on the distribution of real income, and various characteristics of long-term development. Moreover, we shall examine the degree of individual preparedness to confront the risks of catastrophes. Thus, this study deals mainly with microeconomic aspects of natural disasters.\*) In particular, we discuss the following questions:

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\*) Macroeconomic aspects are discussed only to a very limited extent. This is the case specially in the empirical part of this study (ch. 5) where we look at the effects of the disaster relief on the capacity of the Guatemalan total output.

- Why do natural disasters seem to cause such "devastating economic effects" in the case of an LDC?
- Does society lack the ability to confront the risk of catastrophes so that disasters turn out to be a major problem in just LDCs?
- Do natural disasters tend to reinforce existing disparities in income and wealth?

In this last respect, our approach coincides with that of Amartya Sen in his "exchange entitlements" approach (see A.K. Sen, 1977, 1979, 1981). Referring to natural disasters, such as droughts, he analyzes the causes of famine by centering not on the supply of commodities but on the entitlements of individuals. An entitlement "is the set of relations that determines the ability of people to command food". Starvation "occurs when a person's bundle of entitlements does not permit the acquisition of enough food". Such a situation, under a given institutional set that regulates entitlements, may arise due to market developments disadvantageous for the person. In our analysis, although we refer to natural disasters of other types, such as earthquakes, hurricanes etc. which are characterized by a sudden disruption of markets, we find as well that in the absence of appropriate relief market adjustments tend to worsen individual and regional income disparities and to have dramatic effects on people that are living under minimum levels of subsistence.

In spite of the risk of adverse economic effects just referred to an issue that arises in this respect is whether there are hidden beneficial long-run effects of natural disasters. For instance, there may be improvement of economic conditions relative to those which may have existed if a natural disaster had not occurred. Compare, e.g., the rapid economic development

in West Germany and Japan after the second world war following the almost complete destruction of the real capital of the two countries. Could the same phenomenon arise in disaster stricken LDCs?

At first glance, the economic problems of a nation affected by total or partial destruction of productive capacities and the economic development inducing effects of a massive influx of foreign resources has an analogy in Germany, Japan and South Korea and the Marshall Plan and other American aid programs after the second world war. But a closer look at these two situations shows that the analogy is far from complete. With some exception for South Korea, there are great differences in the post-war (or post-disaster) economic development of such countries. Obviously, some reasons will be found in the differences of their pre-war (or pre-disaster) levels of economic development. For example, while Germany and Japan after the war had the "structure" (know-how, management techniques, business relationships, institutional and organizational facilities, etc) needed to make efficient use of aid (see Denison, F. & Shung, W., 1976, ch. III-V), LDCs most often do not. South Korea, however, despite a lower pre-war level of development made efficient use of the foreign aid in the post-war period (see Krueger, A.O., 1979).

In this connection it is worth pointing out that the destruction caused by a natural disaster may create opportunities for technical innovations, the application of new ideas, changes in individual and social attitudes etc., that may have an impact on the economic development of the stricken country in the long run. Furthermore, the changes in supply and demand for goods and services induced by the damages that natural disasters cause will generate a great deal of growth

inducing economic incentives.<sup>\*)</sup> These incentives, and the opportunities just mentioned, if properly managed, e.g., under the assistance of the foreign disaster relief, may improve the preconditions of economic development of the stricken areas and probably those of the whole nation. From this point of view one may say that our study, in regarding situations of economic disequilibria with an increased level of growth inducing economic activities, is a particular case of Albert O. Hirschman's "unbalanced growth" approach (for a description of this approach, see Hirschman, A.O., 1966, especially chapter 4).<sup>\*\*)</sup> Note, however, that in our study it is the addition of foreign disaster relief which may lead to economic growth.

In this last mentioned respect we shall point out that disaster relief could have something more than a neutralizing effect (P. Bohm, 1977). It may have important side effects that influence the long-term development capacity of and the distribution of economic wealth within the region or country. A partial explanation of these development inducing effects may be found in precisely the elimination of social and legal institutions (or of their inefficiency) which under normal circumstances would have persisted and which may have been a deterrent to economic progress. Under such conditions, the effects of the disaster relief on the long-term development capacity may come about in several ways: from the transmission of new techniques, from changes in the efficiency of production when re-

<sup>\*)</sup> Such a situation may be reflected by a higher level of market activities than would otherwise be the case, increasing integration of the labor force and of sectors/regions (such as agriculture and handicrafts from isolated rural areas) into the market system, etc.

<sup>\*\*)</sup> Some beneficial effects of natural disasters may come about from increased land fertility. This seems to be the case in connection with volcanic eruptions, flood, etc. For example, flood brings silt and organic materials from the sea increasing land fertility. Effects of this type, however, are not our main concern in this study.



placing broken physical inputs and from changes in the infrastructure of the disaster-prone country. Moreover, the distribution of economic wealth may be influenced by the foreign assistance given to segments of the population to an extent which, for political or institutional reasons, would not have been possible by traditional forms of development aid. Disasters also create a sense of urgency which may be absent from the ordinary aid programs: "new climate may create new thinking".

Disaster relief is something that involves more than the provision of tents, blankets, medicine and similar first-aid items; it is something that also includes the reconstruction of housing and working places; the replacement of machinery, equipment or social overhead capital destroyed by the natural hazard; activities complementary to disaster relief operations in general, etc. Moreover, the assistance provided by disaster relief organizations involves not only emergency assistance but also increased disaster preparedness and development inducing activities as well. In other words, it is something that also has long-run consequences. It is mainly the issues brought up by these distinctions that will make our study different from other studies of natural disasters and disaster relief.

##### 5. Current Research in Disaster Relief

To our knowledge the long-run economic effects of the disaster relief given to LDCs has not been given an extensive analytical treatment. As a matter of fact there seems to be very little economic research on predisaster planning and disaster relief in progress. Some previous studies have been of a statistical or sociological character, like the studies by Russel (1970); Westgate and O'Keefe (1976); Wisner, O'Keefe and Westgate (1977) etc. Others have been of an econo-

mic character, but concerned either the immediate economic consequences alone or an analysis of economic effects related to more developed market economies, e.g., the studies of H.C. Cochrane (1975), Dacy and Kunreuther (1969; Kunreuther (1973) and (1978), P. Rossi et al. (1978) and (1978a), and P. Friesman (1976). When the role of international aid for predisaster planning has been discussed, e.g., in the study by F. Krimgold (ibid), it has mainly addressed aspects in connection with the role of architects and other technicians in such a context. Some recent studies concerning economic aspects of disaster relief and natural disasters in LDCs are concerned with computer-aided simulations of disaster relief management training, e.g., M.L. Cocklin and G.N. Ritchie (1979). Another study, in which the analysis centers on people's ability to survive, has dealt with the cause of catastrophes, such as famines; see A. Sen (1981).\*)

## 6. Outline and Summary of the Study

Chapter 2 examines the economic consequences of natural disasters with reference to some actual cases of natural disasters in LDCs, in particular, Guatemala. This is done mainly by looking at the impact of different natural disasters on the productive capacity of individuals and regions, i.e., by looking at how the conditions underlying their consumption possibilities are affected. We can identify potential reasons why damage affects mainly the poorest individuals living in isolated and traditionally poor areas. In addition, the poorest individuals and regions, owing to a lack of institutional prerequisites or preventive measures (such as insurance), are the ones that after market adjust-

\*) A description of research needs in connection with the impact of natural disasters and the effects of disaster relief are presented by J. Lewis (1977), J. Rivers (1978), F. Long (ibid and 1979), Ritchie (1981).

ments, bear the major share of the costs of destruction. The market adjustments seem to have specific characteristics in LDCs. These specific characteristics appear to be correlated with the kind of natural disaster, the existing conditions of production of the country, the level of development of its pre-disaster infrastructure and the kind and amount of the disaster relief provided from abroad to producers and consumers.

Chapter 3 attempts to answer some of the questions raised by our observations in the previous chapter. For example: why do insurance markets fail as a solution in LDCs?; which are the remaining alternative solutions?; what role does foreign disaster relief play in those circumstances?. Analyzing these matters we find that there exists a "potential" demand for insurance in disaster-prone LDCs. However, owing to the low levels of real income, information and institutional development (as of insurances and financial markets) as well as to the lack of appropriate techniques to withstand disaster effects in general this "potential" demand does not seem to be able to materialize. That is, the possibilities for individuals to take adequate measures of their own to reduce the consequences of natural disasters appear to be very restricted. If they in fact are, direct intervention from governments and disaster relief organizations appears as the remaining alternatives. In particular, we conclude that international assistance may be the main instrument for a significant improvement of the conditions in disaster-prone LDCs.

In chapter 4, we first attempt to improve our conception about the economic adjustments to be expected in an LDC under conditions of disaster, especially about how such adjustments in the absence of sufficient prevention will affect different groups of individuals

and regions. We then analyze the effects of the disaster relief. Here we look at the compensatory vs the development inducing potentials of the disaster relief, distinguishing between cash disaster relief and disaster relief in kind and separating relief in terms of commodities from relief in terms of services. These distinctions are motivated by the fact that different forms of disaster relief affect the capacities for economic development differently.

The analysis in this chapter shows that the effects on economic development of a given amount of relief depends on the specific form in which aid is given, the behavior of its recipients and the structure of production of the country. For example, cash relief to producers may lead to improvements in the state of financial institutions in poorly integrated areas. More specifically such an improvement will permit the realization of economic activities otherwise discriminated against owing to the segmentation of financial markets. Cash relief also gives possibilities of investing in projects that are better adapted to the structure of the local economy. In coordination with relief in services, and in some cases relief in commodities, projects of this type will increase productivity and levels of utilization of local resources and improve the conditions of income distribution in general. In giving modern equipment, in teaching people new and more efficient techniques, disaster relief may provide low-income sectors and regions with a better basis to participate in trade. Disaster relief given to consumers in isolated areas, beyond the evident beneficial effects from improvements in income and wealth distribution, may support economic development in different ways. Through qualitative improvements

in the physical items reconstructed (new houses, better infrastructures for social services, etc.) and the transmission of administrative, managerial and organizational capacities disaster relief seems to increase disaster preparedness and levels of self-sufficiency in the assisted areas. Among other things, these changes will improve the intertemporal allocation of wealth in society with beneficial results on economic development in the long run.

Chapter 5 is the first of the three chapters devoted to empirically elucidating the possible effects of disaster relief on the economic development of recipient LDCs. In this chapter we use GDP growth as a measure of changes in the conditions for economic development. This is the same as saying that the growth of total output may be studied to see if there is any indication of a net development-inducing effect of the disaster relief. Here, our empirical task will consist of comparing the post-earthquake growth of GDP with an estimate of the pre-earthquake trend while checking the development of various growth factors for the two periods. We find that the nation's real output levels during the post-earthquake period 1976-79 increased significantly. No obvious growth factors of a conventional type seem to be responsible for this increase. Thus, this increase is compatible with a possible net development-inducing effect of the relief operations in Guatemala during that period.

In chapter 6, owing to the fact that in the Guatemalan case it is too early to speak of definite changes in economic development from improvements of the levels of total aggregate output only, we take a closer look at the nature of the disaster relief and try to quantify relief going into typically compensatory vs typically non-compensatory development inducing activities. That is, in this chapter we move to a more disaggregated level for the purpose of investigating the composition

of the disaster relief operations, in particular to what extent they involve anything more than pure reconstruction or similar forms of compensation. This is made by differentiating three media of disaster assistance, namely: 1) non-governmental organizations (NGOs) such as OXFAM, CARITAS, Save the Children Alliance, Norwegian Church Aid, etc., 2) foreign governmental organizations and international institutions (FGOs), such as AID, CIDA, UNICEF, UNDP and, 3) local governmental organizations (GnG) such as the different ministries and other local institutions. We find that there exist activities of the "development inducing" type with possibly considerable effects on economic development. Moreover, despite the fact that no exhaustive comparative analysis of the different relief media can be made here we find that these possibilities of changing development preconditions seem to differ among the media involved. For example, NGOs have succeeded in involving local people in designing and executing relief plans and in providing an administrative and executive capacity to the communities assisted in a manner unusual for international organizations of the FGOs type. This, in turn, appears to have improved the capacity of the communities to identify local problems and to find solutions to them appropriate for the specific conditions of the locality. Furthermore, most often, the groups of individuals and regions assisted have been those traditionally not reached by other types of assistance.

In chapter 7 we move further towards the microeconomic level and attempt to identify individual relief projects illustrating in more detail the development effects we have indicated so far. This identification is made by reviewing operations reports and evaluation studies of relief projects and by describing different projects at some length. The results in this chapter show, firstly, that there are cases where physical units destroyed have been improved by reconstruction or re-

placement. For instance, houses, schools, health centers, etc. are nowadays equipped with more facilities and improved structures. Secondly, we have found instances where the implementation of "purely compensatory" activities have required the provision of new physical capital such as equipment, machinery, brick factories, communication facilities, etc. which continue to serve the economy to increase employment opportunities in the communities assisted. Thirdly, there are indications that the new level of knowledge (made possible by the transmission of managerial, organizational and other techniques) have increased the level of self-reliance of traditionally isolated areas. Among other things, this is shown by the increased levels of participation in market activities, involvement of communities in the design and implementation of welfare programs etc. These results, together with some signs of increased real wages and decreased unemployment rates in the areas, make us conclude that individual disaster relief projects can make a significant contribution to economic development and can be designed to have such effects to an even larger extent than has been the case so far.

Finally, chapter 8 reviews the most important implications of our study and presents some policy conclusions. Particularly, in an attempt to generalize and illuminate the practical implications of the results obtained, adverse as well as beneficial effects of disaster relief are noted and compared to those of traditional forms of development assistance to LDCs. This is done in order to relate our results to one of the main issues of the on-going debate about the forms of development aid.

Our policy conclusions point to need for planning individual relief projects with the long-run as well as the short-run effects in mind, reallocating relief budgets with respect to their overall effects, in-

creasing the relief budgets of organizations which engage in activities with considerable long-run development effects and reallocating foreign aid budgets so as to increase the share of foreign disaster relief given to LDCs.