MANUAL FOR
ESTIMATING THE SOCIOECONOMIC
EFFECTS OF NATURAL DISASTERS

Part Five

GLOBAL EFFECTS OF DAMAGE

INDEX

I. SUMMARY OF DAMAGE

The first part of this manual provides a detailed description of the general methodology and the best sources of information for evaluating the full scope of the damage caused by a natural disaster. On the basis of the conceptual definitions presented, and before going on to the chapter on estimating the effects of this phenomenon on the principal macroeconomic aggregates (such as economic growth, public finances, inflation or employment), this chapter will describe a methodology for quickly obtaining a summary of the direct and indirect damage, which can then be used, in aggregate form, to evaluate the global impact of the disaster

It is worthwhile reviewing what was discussed in the chapter of part one that deals with the definition of damage and other effects of a disaster.

In schematic terms, the effects of a natural phenomenon were categorized in that chapter as follows: those which have an impact on capital stock (direct damages), and those that affect production flows of goods and services (indirect damages), which in turn are reflected in the behaviour of the principal macroeconomic aggregates (secondary effects). The first-mentioned (direct damage) occurs, generally speaking, at the time of the disaster, or a few hours thereafter; the last two types of effect, on the other hand, involve the idea of duration and, depending on practical experience and the magnitude of the phenomenon, are understood as lasting for a period of up to five years.

From the standpoint of the objectives of the evaluation, it is essential to sum up the damage done, and this recapitulation makes it possible not only to evaluate the global order of magnitude of the damage (and the financial cost to the economy for the repair or replacement of what has been damaged) but also, in doing so, to identify the most severely affected economic and social sectors, distinguishing between damage to the public sector and damage to the private sector. Lastly, the summary of damage should include a list of imports which it is estimated will be required as a result of the external component involved in repair or replacement in connection with direct damage, and these import requirements should be listed separately in each of the sectoral evaluations

The information contained in the summary of damage discussed in this chapter is also fundamental for determining what activities will have priority in the rehabilitation and reconstruction programme being elaborated by the authorities of the country affected by the disaster

As indicated earlier, this summary is an attempt to calculate the quantifiable effects on capital stock and on production flows, which in turn simply represents the aggregation of direct and indirect damage. This is a somewhat hybrid concept, which is justifiable from the standpoint of the objective being pursued, namely, to arrive at an evaluation of the entire scope of effects caused by the disaster in the "first round".

The summary should not, therefore, include the secondary effects; otherwise duplications will occur. As stated repeatedly, secondary effects measure the impact of direct damage on the medium-term behaviour of the principal macroeconomic variables and on the fundamental balances of the economy (balance of payments, public finances and inflationary processes).

The global evaluator will prepare the chapter summarizing the damage by constructing a table or tables which will aggregate the information supplied by each sectoral expert concerning direct and indirect damage. The sectoral experts, in turn, will be alert to the possibility that the indirect damages of a disaster might produce net benefits to the society rather than harm or losses. If these are deemed to be significant, they should be estimated and subtracted from the total damage figure.

Table 1 presents a summary of damage. As can be seen, it is recommended that the damage be disaggregated by sector, as to whether it affects the social sectors, economic infrastructure or productive sectors, in accordance with the corresponding order followed throughout this manual.

Depending on the amount of time, information and human resources available, it may be feasible in the part of the summary table concerning direct damage, to break down damage to the following: a) buildings (including those that have been completely destroyed and those that can be repaired); b) machinery and equipment; and c) stocks, as in the case of damage estimates made by evaluation teams following an earthquake.[1]

In this case, the summary table would have a more detailed format (see table 2), maintaining the breakdown between public and private sectors and presenting a slightly different sectoral breakdown than in table 1.

On the basis of table 1 (or, where possible, the breakdown shown in table 2), the global expert would describe in the corresponding text of the report the total amount of the damage, and then characterize it as to its nature, the most severely affected sectors, the disaster's relative impact on the public and private sectors and the resulting import requirements, and would then draw conclusions about the financial requirements (both internal and external) for repairing or replacing what has been damaged.

[1] See ECLAC, Damage caused by the Mexican earthquake and its repercussions upon the country's economy (LC/G.1367), Santiago, Chile, 1985.

II. GLOBAL EVALUATION

The final chapter of the evaluation should provide an overview that will help determine the full extent of the disaster's socio-economic impact, both on national economic development as a whole and on each of the main variables, highlighting the sectors or areas which were hardest hit and the period of time over which they will continue to feel the effects. It should therefore note, inter alia, losses of assets; ecological damage; and the impact of the disaster on the rate of economic growth and income, the external sector, public finances, employment, the level of prices and inflationary processes.

Below is a description of the content of this global chapter, the different concepts used are spelled out and a few suggestions are made as to a methodology for elaborating the chapter in relation to:

- the globalist's functions and the general content of the global chapter on evaluation,
- the situation before the disaster: recent economic development; some outstanding features; and economic policy priorities;
- the behaviour that had been expected during the year of the disaster before the disaster occurred, and
- the post-disaster situation, general economic effects - on the rate of growth and the population's income, on the external sector and the balance of payments; on public finances; on employment; and on prices

A. FUNCTIONS OF THE GLOBALIST AND ELABORATION OF THE GLOBAL CHAPTER ON EVALUATION

In general, the globalist shall elaborate his chapter on the basis of reports prepared by sectoral experts. However, on his own, he shall also obtain information and evaluations in the disaster area concerning the macroeconomic effects of the disaster. To that end, he shall establish contact with globalist economists in economic ministries or departments.

There are two approaches to understanding the global "dimension", which are complementary and not mutually exclusive. In the first approach, it is arrived at by looking at the disaster in terms of the behaviour of the broad aggregates and their interrelationships. In the other approach, the impact of the disaster is determined by piecing together sectoral, regional or partial information. Taking these two approaches simultaneously, the globalist can verify the consistency of different estimates in order to obtain more reliable results

Another fundamental goal of the globalist's field work should be forming his own view of the economic behaviour that was expected to take place before the disaster occurred and how that behaviour had been reflected in the main aggregates, both in the year in which the disaster occurred and in the following year or years. This topic will be raised again in the next section.

In addition to the "global chapter" - that is, the chapter which summarizes the repercussions of the disaster on the economy and society - the globalist shall be responsible for other aspects of the evaluation described in this manual. One aspect consists of "recapitulating" the direct and indirect damage included in the above section; frequently, he is also the one who must calculate the financial implications it will have for the economy, and both the additional financial and technical cooperation the international community will be expected to contribute during the rehabilitation and reconstruction process, which typically lasts for two years but which, in certain cases - depending on how great the impact is - has lasted up to five years.

The initial part of the evaluation report generally includes an introduction with a very succinct description of both the characteristics of the disaster and how extensive its impact was. The globalist's participation in this task is also important.

A general recommendation to sectoral evaluators that ties in with the globalist's work is that, in so far as possible, direct information should be presented in physical magnitudes. It will thus be possible, if necessary - which occurs especially in high-inflation countries - to make assessments at replacement value or adjust assessments based on cost of acquisition according to the replacement value, which is crucial to determining the financial requirements for restoring destroyed or damaged assets.[2]

The global evaluation should give the net results; in other words, the difference between the negative and positive effects. The recovery of the construction sector, for example, is a phenomenon that starts to become apparent in a relatively short time and that to some extent compensates for the lower levels of activity being projected for most productive sectors.

The global chapter may include a number of headings, such as "Effects on economic development" or "Repercussions of the disaster on the economy", in certain cases, the phrases "in the short term" or "in the medium or short term" may be added, depending on how far into the future the effects of the disaster are projected As indicated, most of

[2] One of the chapters in Part I of the manual sets forth the criteria for appraising direct damage and discusses the advantages and disadvantages of using the "acquisition" or "replacement" cost, depending on the situation. In this connection, the necessary flexibility must be maintained. In some cases, it may be useful to give both results, for this will show both the cost of the losses and give an idea of their replacement value (which takes into account the technological improvement deemed necessary to include when replacing destroyed assets). The relevance of this latter option is obvious in the case of the destruction of makeshift human settlements.

the time, such projections are limited to a maximum term of five years, although the destroyed urban services infrastructure and the devastated farmland, woodlands and other plantations may take longer to replace; this should be reflected in the report

B. THE PRE-DISASTER SITUATION

As mentioned, one of the globalist's functions will be to form his own fully developed idea of trends in the economy in question prior to the occurrence of the disaster, of its main problems and the salient features of the economic policy that was being implemented. This is a necessary backdrop for assessing how the disaster affected the economy and key areas of the country's economic policy, and the new challenges being posed to the economy. Central banks, planning ministries and ECLAC itself prepare annual reports or have the necessary information to develop this topic.

C. BEHAVIOUR EXPECTED DURING THE YEAR OF THE DISASTER

The globalist shall play an outstanding role in this respect. Based on often fragmentary interviews and information, he shall formulate projections on how the economy had been expected to function prior to the occurrence of the disaster and how this might have been reflected in the main aggregates: economic growth, inflation, exports, imports, balance of payments, external debt, etc. This speculation will be of great use not only in his work, as has already been seen, but also in the work of other members of the evaluating team.

The most important global sources of information used to evaluate such trends generally include, inter alia: i) projections of economic growth for the year - at times semester or even quarterly projections are also elaborated by planning offices or ministries or by central banks; ii) the fiscal budget adopted and budget estimates for the following months made prior to the occurrence of the natural disaster (Ministries of Finance), and iii) some other macroeconomic statistics generally compiled by Statistics Institutes: harvest growth index, trends in the manufacturing industry, monthly inflation trends, urban unemployment surveys, etc. By extrapolating on the trends shown by these statistics during the months for which they are available, the globalist will be able to estimate what the annual behaviour would have been had the disaster not occurred.

It is more difficult for the globalist to obtain global assessments of how the economy is functioning in the disaster-struck area or region, since planning ministries, regional development corporations, and state or provincial governments have only very recently begun to implement statistical programmes at the regional level. Naturally, the availability of this type of information would be extremely useful for the global expert's characterization of the situation and of the disaster area's economic outlook.

In projecting the macroeconomic effects of the disaster on the balance of payments, trends in the main balance-of-payments aggregates must be analyzed, e g., exports, imports, external financing, levels of international reserves and of external indebtedness. Trends in the prices and supply of the chief export products must also be taken into account in projecting the level of pre-disaster exports. This topic will be taken up again later. The estimated amount of the debt service is another vital element; the viability of making payments must be considered in the light of the new financial conditions and requirements that will emerge in the wake of the disaster.

The same holds true with regard to other major macroeconomic aggregates: among the most significant are public finances - including the projected deficit before the disaster occurred - trends in the consumer price index and in employment.

D. SITUATION FOLLOWING THE DISASTER

1. General economic effects

On this subject, the report should present, first of all, a summary appraisal of the disaster's repercussions in all economic sectors. This summary must include both losses of existing assets (direct damage) and the interruption of flows of assets (indirect damage), as well as secondary effects on the main macroeconomic variables mentioned earlier. The object is basically to recapitulate and analyze the data in table 2, which illustrate the extent to which the disaster has damaged physical infrastructure and natural resources, interrupted the production of goods and services and boosted import requirements, for a period which is conventionally set at two years but which can last up to five, depending on the magnitude of the disaster

This analysis is essential for designing rehabilitation and reconstruction programmes and for targeting the international cooperation that may be required. For the latter purpose, the various amounts often must be shown not only in local currency - at current prices of the period in which the evaluation was carried out-. but also in their equivalents in United States dollars. The text should also summarize the disaster's effects (which should later be disaggregated) on economic growth, per capita income, employment, inflation, exports and imports, and public finances.

The disaster's impairment of the normal functioning of the economy should be described in terms of its effects on economic infrastructure and stocks, transportation routes; ports, airports and communications; the marketing network, the generation of energy, the availability of national and imported inputs; tourist facilities; higher prices for certain products; the availability of foreign exchange; etc All these factors should be viewed from the perspective of the economy's trends and characteristics at the time of the disaster. The corresponding analysis could be supported by a table summarizing the main economic indicators for the most recent period, and how the disaster has affected them (see, for example, table 3)

2. Effects on economic growth and income

The aggregate that best expresses variations in the overall level of economic activity is the gross domestic product (GDP). The globalist expert should, therefore, estimate the disaster's effects on the growth rate of this variable, and the extent to which they alter the rate projected before the disaster. As stated previously, these calculations are generally relevant for one to two years beyond the year of the disaster

Constant prices - preferably current prices at the time of the evaluation- should be used in the calculations to illustrate the disaster's real effects on the economic growth rate. The expression of the main aggregates that make up domestic supply (gross output by branch of activity) and demand (expenditure for public and private consumption and capital formation) in current values for the year or period in which the disaster occurred often poses a statistical problem, since, in many countries of the region, these figures are only available in constant prices of a given year (usually a census year, such as 1980).

The globalist expert must therefore consult with national experts in order to select the most appropriate and reliable price index (be it the GDP deflator, the wholesale price index or the cost-of-living index) for converting these figures into current values of the year in which the disaster occurred. This conversion is vital for correctly estimating the magnitude of losses in GDP or income caused by the disaster, and their effects on the expected growth rate. Once this adjustment is made, data for the following year (or the following two or more years) should be expressed, to the extent possible, in constant prices of the year the disaster occurred, i e , eliminating the effect of inflation. This is important because the aim of this calculation is to estimate the disaster's effects on the real growth rate.

As mentioned earlier, the estimate should also include positive-sign effects of the reconstruction process, from the viewpoint of economic growth.

The globalist expert will receive each sectoral expert's loss estimates (at producer prices in the case of goods that will no longer be produced while production equipment is being repaired). In other cases, the losses represent income that will no longer be received (especially in the case of small businesses, handicrafts, various service industries, hotels, restaurants, cinemas, etc.). All of these should be combined into a general table that will enable the globalist expert to estimate the economic growth rate during the reconstruction period.

Depending on the sources available and the activity in question, the sectoral experts may estimate production losses in any of three ways. (i) products and services which, owing to the destruction of infrastructure and equipment, will no longer be produced; (ii) income that will no longer be received for the same reasons (estimated on the basis of wages, salaries and profits that will not be forthcoming while production plants are

being rehabilitated)[3]; or (iii) in the special case of the housing rental sector, according to the methodology used in national accounts, i.e., the rent paid by tenants plus the rent imputed to the owners for the service they receive from their own dwellings. In this case, the sectoral expert should estimate losses in the output generated by this activity as an indirect effect, imputing to the dwellings destroyed, while they are being rebuilt or repaired, the approximate average rents being paid, by category, at that time.

The sectoral experts should provide the necessary data (basically contained in the calculations of indirect damage)[4] to help the globalist expert incorporate the expected growth rate for the current year and for the following year (if such a projection exists) into his basic table illustrating the level of total and sectoral GDP in the year or period in which the disaster occurred. He will then be able to determine how those projections should be changed on the basis and as a consequence of the disaster. Of course, the possibility of disaggregating the information by branch of activity will depend on the amount of data provided and the time available for the evaluation team's work, which – as emphasized repeatedly– is generally very short.

The globalist expert, for his part, must –if the sectoral evaluator has not done so– convert these gross amounts to added values, so that they can be incorporated into the estimates of GDP and the effect of the disaster on the latter's growth rate can be calculated. In this process, information from national accounts is generally used, in which ratios between gross values and added values are usually given for large economic sectors and branches of activity. These data could also be obtained from an input-output table, if it is fairly recent (so that the ratios are still valid) Table 1 shows the ratios between the added value and gross value of production in a medium-sized Latin American country, by economic sector and branch of industry.

Following is an attempt, based on an actual case, to use the proposed methodology to calculate the effects of a natural disaster on the economic growth rate.

The disaster consists of a severe storm followed by intense rainfall, affecting a large part of the coastal region of a country in mid-1990 and causing serious losses in agriculture and electrical infrastructure, and also affecting the population of some cities and towns, destroying industrial activities, dwellings and businesses.

After gathering and evaluating the relevant information, the sectoral experts give the globalist expert their calculations of indirect damage, i.e., of the amount of goods and services that will fail to be produced for the rest of the year and in the following year.

[3] For small businesses in which a wide variety of goods or services is produced, this method of estimation is more feasible and reliable than the method described in point (i).

[4] In calculating indirect damage, the sectoral evaluators will undoubtedly have estimated: (i) the volume (or units) of losses in projected production of goods and services for the period of recovery of productive capacity; (ii) the prices of those goods and services (producer prices or, in the case of services, consumer prices), and (iii) the gross value of these losses, based on a combination of these data

The globalist expert will combine this information into a table showing the various economic branches that make up the GDP. These data appear, according to the example chosen, in the first two columns of table 4 (gross value of the production lost, valued at current prices of the period in which the disaster occurred). As these amounts indicate, for some tertiary activities the calculation of the gross value of production makes no sense, since GDP is normally calculated directly (and not by subtracting inputs from the gross value of production). In these cases, as in the case of general government, banks, other services, etc., the method for calculating GDP uses the income generated (or no longer generated); i.e., wages and salaries, interest and profits. In other words, the sectoral experts must, in these cases, estimate losses in GDP mainly on the basis of the pay that will no longer be collected for a determined period and/or the income of individual businessmen in the case of personal service providers.

For all other sectors or branches, the globalist expert should express the gross values as added values in order to incorporate them into the GDP table and determine their effects on expected growth (see table 5).

Continuing with this example, the last two columns of table 4 show the result of this conversion. The disaster caused reductions of GDP in nearly all activities, agriculture being the hardest hit.

The biggest impact was in the year of the disaster (1990). The effects projected for the following year were considerable only in export agriculture and ownership of dwellings, where reconstruction takes more time. The effect on the construction sector the following year was positive.

The globalist will have also prepared a table for suitably incorporating the information calculated in the last two columns of table 4. Indeed, table 5 gives the sectoral GDP of the year prior to the disaster (1989), and also the projected growth for the current year and the following one before the disaster struck (columns 1,2,4,6 and 8), all at prices of the year in which the disaster took place (in this case, mid-1990).

In the example given, the disaster caused the growth rate of the agricultural sector to decline from 3.1% to 1.2% the year it occurred (1990), owing to losses in exportable output (which would later be reflected in the balance of payments) and in output for the domestic market, which dropped from 2.5% to 0.4% and from 3.0% to 0.3%, respectively. Secondary sectors were only moderately affected, except for mining. Among the services, the most impacted sector was electricity generation, whose growth rate fell from 7% to 4.4%. The growth rate of the economy as a whole was only moderately affected (declining from 4.5% to 3.8% growth of total GDP). Agriculture continued to be significantly affected the following year, due to the impact on crops sown, forests and land, but thanks to the expected surge in construction and the recovery of the other sectors, the effect on the overall growth predicted for 1991 before the disaster was virtually nil (see table 5).

Calculating the effect on income is another way of analyzing the impact of the disaster on the level of activity (which should not be added to the effect on income). At times, it is helpful to break down the effect on income to specific strata of the population (especially when the lower percentiles are affected), in order to design programmes to absorb unemployment by providing reconstruction-related jobs in both rural and urban areas. Obviously, these estimates would be closely related to estimates of the effects on the population on employment At times, these phenomena affect real income by accelerating inflation, due to inelasticities in supply caused by the temporary interruption of normal supply channels.

3. Effects on the external sector and the balance of payments

In making their estimates, sectoral evaluators will have calculated among the secondary effects those that affect the balance of payments of the current account and, if pertinent, the external financial requirements of reconstruction The globalist expert, in turn, will have to depend on estimates of the balance of payments for the overall economy and its projection for the year in which the disaster occurred (and the following year, if possible). This information should be completed with information about other basic magnitudes of the external sector of the economy, such as external indebtedness, debt service and international monetary reserves

The current account of the balance of payments during the year of the disaster will have to be estimated by the globalist expert on the basis of the following main items i) lower exports of goods –due to output either being destroyed or diverted to the domestic market in response to supply problems– and services. Services are affected when the country suffers losses in its merchant fleet, tourism, or in the productive capacity of firms that export services, like engineering, etc.; ii) more imports, indispensable during the restoration phase (such as fuel, foodstuffs to replace lost harvests, more inputs); for the following year, reconstruction-related imports should be estimated by the sectoralists on the basis of the imported component of the assets destroyed; iii) donations in kind or money received because of the emergency; iv) disaster-related insurance and reinsurance, and v) possible reduction in interest payments on the external debt in virtue of agreements made with creditors in the face of the emergency (see table 6).

The capital account of the balance of payments should be estimated by the globalist expert essentially on the basis of the need for medium- and long-term external financing of restoration and reconstruction during the two years following the event The globalist should also take into account additional external financing to confront a possible worsening of the imbalance on current account arising from the previous projections

As seen in the example given in table 6, the natural disaster trebled the deficit on the current account of the balance of payments in the year in which it occurred, from US$

100 million to US$ 300 million, the deficit rose to US$ 370 million the following year Depending on the nature of the disaster, additional imports could be needed for several years, a fact that would have to be considered in balance-of-payment projections.

A rise in the deficit will create more need for external financing, which will somehow have to be made compatible with external debt commitments the country might have and the level of its reserves, probably through a change in the conditions governing external financing and debt service

4. The effect on public finances

Here, the sectoralists should include the following among their estimates of secondary effects i) lower taxes collected due to the decline in the production of goods and services, income loss, and lower expenditures for consumption; ii) higher recurring expenditures related to the disaster, especially to meet the needs of the population and repair damaged public services, and iii) larger investments during the restoration and reconstruction phase The globalist should put coherence into information that might be contradictory because of its diversity of sources, and then estimate the deficit on government accounts during the year of the disaster and the following two years, in order to determine the financial requirements that will have to be faced by the public sector during that period

5. Employment

Reports on social and economic sectors should include estimates of the overall effect on employment arising from: i) the destruction of productive capacity or social infrastructure, and ii) employment requirements during the emergency and the restoration phase.

6. Prices and inflation

Although the globalist evaluator cannot be expected to attempt to measure general levels of inflation before and after the disaster, he should at least offer an opinion based on sectoral reportt about the effect that constraints on supply, food (due to destroyed harvests), manufactured goods, marketing channels, transport systems, etc. could have on the prices of specific goods and services that will have to be supplied by alternative means. The impact of these variations on the overall level and on relative prices will have to be seen and included in the description of the overall impact of the disaster

TABLE 1
RATIO BETWEEN ADDED VALUE AND GROSS VALUE OF PRODUCTION BY PRODUCTION SECTOR1

AGRICULTURAL SECTOR	VA/GVP (Percentages)
Crop-farming	45.0
Livestock-raising	46.5
Forestry	51 0
Fishing and hunting	41 5
MINING	
MANUFACTURING	30.0
Food	25.5
Beverages	28.0
Tobacco	70.0
Textiles and clothing	32.0
Leather and footwear	21.0
Wood and furniture	40.0
Paper and printing	42.0
Chemicals and chemical products	43.5
Petroleum and petroleum products	10.5
Rubber and plastic products	32.5
Non-metallic mineral products	38.5
Iron, steel and non-ferrous metals basic industries	26.5
Metal products	38.5
Non-electrical machinery	35 0
Electrical machinery	42.0
Transport equipment	41.0
Other industries	35 5
ELECTRICITY, GAS AND WATER	58.0
CONSTRUCTION	49.0
COMMERCE	74.5

1 Data obtained from a recent input-output table for a medium-sized Latin American country.

Table 2
SUMMARY OF DAMAGE CAUSED BY THE DISASTER
(In millions or billions of the national monetary unit)

	Direct	Indirect	Public	Private	Imported component of direct damage
OVERALL TOTAL.					
1 Social sectors and urban infrastructure					
Housing1					
Health and social welfare					
Aqueducts and sewer systems					
Education					
Public buildings					
Urban pavements					
Theatres, churches, monuments and archaeological sites					
Archaeological sites2.					
2.Production sectors and supporting infrastructure					
2.1 Infrastructure					
Highway transport and bridges					
Railway transport					
Ports and airports					
Telecommunications					
Electricity generation					
Agricultural infrastructure2					
2.2 Sectors					
Crop-farming, livestock-raising, forestry and fishing3					
Mining4					
Industry					
Commerce					
Tourism					
Financial and other services linked to production					

1 Including destroyed or damaged dwellings and durable goods inside them

2 Including irrigation works, silos, local roads, etc.

3 Of course, in some cases these subsectors are best presented separately in this summary table (even if they are already disaggregated in the sectoral chapter).

4 Depending on the type of disaster and the productive structure of the country, it may be best to present damage to the hydrocarbons subsector separately from the rest of mineral and metallurgic production

5 These figures could be expressed in current dollars or in percentages of the first column.

Table 3
SOME MAIN ECONOMIC INDICATORS

	1988	1989 Before the disaster	1990 After the disaster
Gross domestic product a/			
Per capita gross domestic product a/			
Exports of goods f.o.b. b/			
Imports of goods f.o.b. b/			
Consumer prices c/			
Recurring government revenues a/			
Total government expenditures a/			
Fiscal deficit (percentage of GDP)			
	Millions of dollars		
Balance on current account			
Net international reserves			
External public debt disbursed			
External debt servicing			
External debt servicing (as percentage of exports)			

a/ In national monetary units

b/ In dollars

c/ Average annual variations.

Table 4
DISASTER-RELATED LOSSES IN GROSS VALUE AND VALUE ADDED OF PRODUCTION OF GOODS AND SERVICES

	Gross value of production		Value added 2	
	1990	1991	1990	1991
Primary activities	...	...	27 190	10 100
Export agriculture	20 000	10 000	9 000	4 500
Domestic consumption agriculture	8 600	2 000		
Stock-raising	14 000	6 000		
Forestry	4 000	2 000		
Fisheries	3 000	2 000		
Secondary activities	...	...	13 740	-1 000
Manufacturing	16 800	2 000	5 040	600
Construction	2 000	-10 000 3	1 000	-4 900 3
Mining				
Hydrocarbons	6 000	2 000	3 300	1 100
Other minerals	8 000	4 000	4 400	2 200
Tertiary activities 4	..	..	18 000	8 500
Trade	4 000	2 000	3 000	1 500
General government	..	...	2 000	. .
Transport and communications	...	...	1 200	1 000
Banking and insurance	...	...	200	200
Electric energy and drinking water	2 000	1 000	1 600	800
Ownership of dwellings 5	...	...	8 000	4 000
Other services	...	. .	2 000	..

1/ In this example, the disaster is presumed to have occurred in mid-1990.

2/ Calculated on the basis of the coefficients in Annex I that relate value added to gross value.

3/ Corresponds to an increase in output owing to reconstruction.

4/ Except for trade, electric energy and drinking water; for the other tertiary sectors, the methodology normally used provides a direct estimate of losses of generated income, therefore the distinction between gross value of production and value added makes no sense.

5/ See the method of calculation in the text.

Table 5
EFFECT OF THE DISASTER ON THE RATE OF ECONOMIC GROWTH
(Billions of 1990 pesos)

	1989	Projections				Annual growth rates (%)			
		1990		1991		1990		1991	
		Before disaster	After disaster	Before disaster	After disaster	Before disaster	After disaster	Before disaster	After disaster
Priority activities	1605	1655	1621	1715	1704	3.1	1.2	3.6	2.9
Agriculture	805	825	808	850	844	2.5	0.4	0.3	2.3
For export	350	360	351	370	365	3.0	0.3	2.8	1.4
For domestic consumption	455	465	457	480	479	2.2	0.4	3.2	3.0
Stock-raising	450	460	451	575	472	3.0	0.2	3.0	2.6
Forestry	200	210	208	220	219	5.0	4.0	4.0	4.0
Fisheries	150	160	159	170	167	6.0	6.0	5.5	5.5
Secondary activities	3200	3370	3356	3555	3556	5.3	4.9	5.5	5.5
Manufacturing industry	2500	2630	2625	2775	2774	5.2	5.0	5.5	5.5
Construction	300	320	319	340	345	6.5	6.3	6.0	7.8
Mining	400	420	412	440	437	4.0	3.0	4.5	4.0
Tertiary activities	4930	5145	5127	5365	5357	4.4	4.0	4.2	4.1
Commerce, restaurants and hotels	2800	6930	2927	3060	3058	4.5	4.5	4.5	4.4
General government	350	360	358	370	370	3.0	2.3	3.0	3.0
Transport and communications	450	470	469	490	489	4.5	4.2	4.3	4.0
Banking and insurance	150	160	160	170	170	5.0	5.0	5.0	5.0
Electric energy and drinking water	180	190	188	205	204	7.0	4.4	8.0	7.4
Ownership of dwellings	350	360	352	370	366	2.8	0.6	2.8	1.7
Other services	650	675	673	700	700	4.0	3.5	4.0	4.0
TOTAL	9735	10170	10109	10635	10617	4.5	3.8	4.6	4.4

Note: See the methodology in the text.

1/ Obtained by deducing from the previous column losses in value added shown in table 3.

Table 6
EFFECTS OF THE DISASTER ON THE BALANCE OF PAYMENTS
(Millions of dollars)

	1990				1991	
	Before disaster		After disaster			
	Revenues	Outlays	Revenues	Outlays	Revenues	Outlays
Exports of goods	1000		900		950	
Imports of goods		1200		1350		1500
Exports of services including tourism	200		100		200	
Imports of services		100		150		120
Emergency donations			100		50	
Insurance and reinsurance			100		50	
Total	1200	1300	1200	1500	1250	1620
Deficit on current account						

1/ Excludes financial services (interest payments on the external debt and services of private capital).

MANUAL FOR
ESTIMATING THE SOCIOECONOMIC
EFFECTS OF NATURAL DISASTERS

ANNEX

LIST OF ECLAC DOCUMENTS ON ESTIMATING THE SOCIOECONOMIC EFFECTS OF NATURAL DISASTERS

LIST OF ECLAC DOCUMENTS ON ESTIMATING THE SOCIOECONOMIC EFFECTS OF NATURAL DISASTERS

		English	Spanish
1	Informe sobre los Daños y Repercusiones del Terremoto de la ciudad de Managua en la Economía Nicaragüense (CEPAL/MEX/73/ Nic.I, E/CN 12/AC.64/2/Rev.I), 1973.	X	X
2	Informe sobre los Daños y Repercusiones del Huracán .Fifi en la Economía Hondureña (E/CEPAL/AC.67/2/Rev.I), 1974		X
3.	Evaluación de los Daños Causados por el Temporal en Granada y Repercusiones para los Programas de Desarrollo Económico (E/CEPAL/CDCC/9), 1975.	X	X
4.	Informe sobre los Daños Causados en Antigua y Barbuda por el Sismo del 8 de octubre de 1974 y sus Repercusiones (E/CEPAL/1001 – (ESP), POS 74/15-English, 1975	X	X
5.	Daños Causados por el Terremoto de Guatemala y sus Repercusiones sobre el Desarrollo Económico y Social del País (CEPAL/MEX/76/Guat I), 1976.		X
6	Report on the Effect of Hurricane "David" on the Island of Dominica (E/CEPAL/Ó.1099), 1979.	X	
7	República Dominicana· Repercusiones de los Huracanes David y Federico sobre la Economía y las Condiciones Sociales (E/CEPAL/G.1098/Rev I), 1979	X	X
8.	Nicaragua: Las Inundaciones de Mayo de 1982 y sus Repercusiones sobre el Desarrollo Económico y Social del País (E/CEPAL/G.1206), 1982.	X	X
9.	El Salvador: Los Desastres Naturales de 1982 y sus Repercusiones sobre el Desarrollo Económico y Social (EICEPAL/MEX/1982/L.30), 1982.	X	X
10	Guatemala: Repercusiones de los Fenómenos Metereológicos Ocurridos en 1982 sobre la Situación Económica del País (E/CEPAL/MEX/1982/L 31), 1982.		X
11	Repercusiones de los Fenómenos Metereológicos de 1982 sobre el Desarrollo Económico y Social de Nicaragua (E/CEPAL/MEX/1983/L.1), 1983.		X

12	Ecuador: Evaluación de los Efectos de las Inundaciones de 1982/1983 sobre el Desarrollo Económico y Social (E/CEPAL/G.1240), 1983	X	X
13	The Natural Disasters of 1982-1983 in Bolivia, Ecuador and Perú (E/CEPAL/G.1274), 1983.	X	X
14	Damage Caused by the Mexican Earthquake and its Repercussions Upon the Country's Economy (LC/G.1367), 1985.	X	X
15	Economic and Social Consequences of Recent Mayor Natural Disasters in Latin America and the Caribbean: A Need for Prevention and Planning, 1986.	X	
16	The 1986 San Salvador Earthquake. Damage Repercussions and Assistance Required (LC/G.1443) plus addendum containing Project Profiles (LC/G.1443/Add.1), 1986.	X	X
17	The Natural Disaster of March 1987 in Ecuador and its Impact on Social and Economic Development (LC/G.1465), 1987.	X	X
18	Damage Caused by Hurricane Joan in Nicaragua, its Effects on Economic Development and Living Conditions, and Requirements fot Rehabilitation and Reconstruction (Lc/G.1544) plus Addendum containing Proyect Profiles (LC/G.1544/Add.1), 1988	X	X
19	Economic Impacts of the Eruption of the Cerro Negro Volcano in Nicaragua (LC/L 686; LC/MEX/L.187), 1992.	X	X
20	The Tsunami of September 1992 in Nicaragua and its Effects on Development (LC/L.708; LC/MEX/L.209), 1992	X	X