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DISASTER RESEARCH UNIT

Occasional paper No. 4

Some Definitions of Disaster

K.N. Westgate
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June 1976

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UNIVERSITY OF BRADFORD
DISASTER RESEARCH UNIT

SOME DEFINITIONS OF DISASTER

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PREFACE

The Disaster Research Unit was formed in December 1973 and is a research group within the Project Planning Centre for Developing Countries at the University of Bradford. Unit members are:

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This series of Occasional Papers will contain the results of the Unit's work. An index of the Occasional Papers is included on the inside back cover.

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ABBREVIATIONS CITED IN THE TEXT

CAFOD	-	Catholic Agency for Overseas Development
CRS	-	Catholic Relief Services
DEC	-	Disaster Emergency Committee
ECOSOC	-	United Nations Economic and Social Council
LRCS	-	League of Red Cross Societies
LWF	-	Lutheran World Federation
OXFAM	-	Oxford Committee for Famine Relief
UNDRO	-	United Nations, Office of the Disaster Relief Co-ordinator
UNESCO	-	United Nations Educational Scientific and Cultural Organisation
USAID	-	United Stated Aid for International Development
WCC	-	World Council of Churches

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1. INTRODUCTION

An overview of explicit and implicit disaster definitions reveals a lack of consensus. Diverse groups, organisations and individuals involved in the field of disaster must have terms of reference within which the question of what disaster means to them is posed. The answers to the question, in all probability, will be orientated towards that particular aspect of disaster with which the group, organisation or individual finds itself specifically involved. Also, the very nature of scientific explanation has, in the past, led to a restriction on the criteria upon which definitions of disaster are based. Natural disasters, considered to be essentially natural events, were considered to be the province of the natural sciences which tended to colour the responsibility for any study and prevention of disaster and the type and scope of preventive measures employed (Kates, forthcoming). Similarly:

> 'Varying definitions of disaster arise from the sociological structure of science and technology with its curious historical anomalies in the professional and disciplinary organisation of scientists and engineers. These disciplinary territories combined with an ideological bias towards neutral, non-human scientific study and abetted by the relative ease of some geophysical measurements leads to minor absurdities of observation and definition'.
>
> (Kates, forthcoming)

This rigidity of scientific discipline and its historical responsibility towards disaster has led to a lack of consensus with regard to definitions of disaster, a situation which is exacerbated by the fragmentary nature of actual involvement in the study and application of disaster-related research.

It is not the intention of this paper to attempt to look for or impose the consensus which is obviously lacking. Rather, this paper will

attempt to identify common denominators from within disaster situations which will aid an explanation of the disaster process as an ongoing phenomenon. It would be myopic to attempt a definition of disaster per se while the disaster process, expressed in terms of a stream of interlocking events within which specific disaster is located as a part, is ignored as a primary pre-occupation of disaster research. This is not to dismiss any definition as irrelevant but rather to accept that such definitions would generally be static, describing isolated events. To view disaster dynamically it is necessary to consider not merely the disaster event but also the system of activity that surrounds it, namely prevention, mitigation, warning, (DISASTER), relief, rehabilitation and reconstruction. More importantly it means analysing in depth both the nature of the physical agent and the vulnerability of the population. The paper will attempt a survey of present definitions of disasters and analyse the trends in disaster occurrence. From this, workable definitions will be compiled which, it is hoped, will take full account of the true nature of disaster and its affects on populations.

2. ORGANISATIONS INVOLVED IN DISASTER

Data produced by these organisations point to the direction and approach to disaster that each one has. A survey of these data sources will demonstrate the range of adopted approaches. This data on disaster occurrence can be obtained from a wide number of sources, but it does not conform to a standard pattern, some sources containing more detail than others. Nevertheless, the types of data source available can be broken down into five distinct categories:

a. International Organisations

b. National Governments

c. Non-governmental, voluntary organisations

d. Academic research institutions

e. Private insurance companies.

1/ The first category is reserved solely for United Nations constituent organisations, chiefly the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the United Nations Economic and Social Council (ECOSOC), and the United Nations Office of the Disaster Relief Co-ordinator (UNDRO). 2/ Among national governments, the only one consistently producing detailed figures is that of the United States (USAID).

3/ Non-governmental organisations include those charities from whom assistance is available during times of disaster; for example, Catholic Relief Services (CRS), the League of Red Cross Societies (LRCS), the Lutheran World Federation (LWF), Oxfam and the World Council of Churches (WCC). The Disaster Emergency Committee (DEC), is a British-based organisation involved in overseas charity work. Its members are British Red Cross, Save the Children Fund, Christian Aid/Cafod, Oxfam and War on Want. The DEC provides data on disasters in which it is involved as a

relief operator, although the disparate nature of the organisation, purely a fund-raising, non-executive body, means that accurate information on relief activity of the members is not immediately accessible. There are many academic institutions, chiefly in the USA, involved in disaster research but only two of these can be said to have the international scope necessary for the production of data on world disaster occurrence - the Smithsonian Institution for Short-Lived Phenomena and the Natural Hazard Research Group based at the University of Colorado in the USA. Insurance companies tend to pool information and publish data periodically through such journals as the Swiss Reinsurance Quarterly Review.

3. ANALYSIS OF ORGANISATIONS PRODUCING DATA ON DISASTER OCCURRENCE

The identification of the various data-producing organisations leads to an examination of the terms of reference behind their specific involvement in disaster. These terms of reference lend integrity to the actual data because only when an organisation's role in disaster is understood can the value of the data be interpreted.

Among the international organisations (those under the aegis of the United Nations) the most important is UNDRO, if only for the reason that it was specifically set up to work in the field of disaster. UNDRO have produced some of the more detailed and accurate sets of data. The function of UNDRO:

> '... is that of co-ordination and the mobilization of aid provided by other bodies ... to take action in disaster-prone and disaster-stricken countries both before and after a disaster strikes. It is concerned at all times with the prevention, control and prediction of disasters and with preparedness and contingency planning in disaster-prone countries; when disaster strikes, it is of course concerned with disaster relief itself'.
>
> (UNDRO, 1973).

Undoubtedly, UNDRO's brief is the most broad and loose of any of the organisations. It can be placed among those organisations whose emphasis is on relief, but UNDRO is also concerned with alleviative measures such as prediction and precautionary strategies which are distinct from the most immediate, post-disaster precautions. UNDRO indicates the undesirability of a duplication of the work of, or restriction of, already established organisations. Indeed,

> '... it has not been created either to limit or restrict the excellent work already being done by other bodies in connection with disasters, or, on the other hand, to duplicate such work. Its work is to act as a catalyst to stimulate others and to co-ordinate, and act as a link between the

> many governments and institutions which are active ... in disaster situations'.
>
> (UNDRO, 1973).

UNDRO, thus, has allied itself closely with relief activity.

UNESCO, on the other hand, is concerned more with long-term aspects of disaster prevention and has a distinct technological and scientific bias. Its role in disaster is to comprehend the natural phenomena involved - to study the disaster agent itself with the intention of future mitigation and, if possible, prevention. UNESCO, as a data source, reflects these objectives. The data is comprehensive and detailed in form and consists primarily as a

> '... regular publication of a scientific record of natural disasters in the form of an annual summary of information and data'.
>
> (UNESCO, 1970).

UNESCO sees its tasks as the provision of information in the form of a catalogue of (primarily) seismic events upon which researchers concerned with disaster prevention can draw. Detailed discussion and analysis on the disaster events covered, is minimal or non-existent.

The term 'disaster' is seen by UNESCO as necessary though naturally vague and all-embracing. The term is employed thus:

> 'The term "disaster" is given a rather broad interpretation. For instance, among the events ... recorded under "Earthquakes" and "Volcanic eruptions", there are many which, though producing visible or sensible effects, did not reach the full proportions of a "disaster". They have nevertheless been included for the light they may throw on the natural processes underlying seismic and volcanic phenomena'.
>
> (UNESCO, 1970).

In summary, the UNESCO data deals

> '... only with the scientific and technical aspects of natural disasters; information relating to rescue, relief or rehabilitation ...

(is not included)...'

(UNESCO, 1970).

ECOSOC produced data on disaster occurrence prior to and since the setting up of UNDRO in 1972. Since UNDRO's inception, ECOSOC, under whose jurisdiction UNDRO now is, only produces detailed accounts on the social, economic and political effects of individual major disasters such as Hurricane Fifi.

Among national organisations concerned with disaster, only USAID produces a significant amount of data. As far as sheer volume of data is concerned, USAID is the major source of information. It is primarily an aid organisation concentrating on development aid and development projects, of which emergency relief programmes in times of disaster are a part. USAID describes the nature of its emergency relief programme thus:

> 'Emergency relief operations are conducted to help the victims of disaster. They are supplemental to local country relief operations and do not supersede or take over the country's relief activities. However, it is recognised that in some countries there may be immediate need for emergency outside assistance due to the extent of social and economic disruption and the lack of local resources'.
>
> (USAID, 1964)

USAID's role in disaster is that of relief with inputs of immediate aid being the prime effort. It goes to great lengths to define its role in disaster. For example, it describes a foreign disaster as:

> '... an act of nature ... or an act of man ... which is or threatens to be of sufficient severity and magnitude to warrant United States emergency relief assistance. The severity and magnitude of a foreign disaster is determined by taking into account the local resources available for alleviating hardship and suffering caused, and the extent of social or economic disruption'.
>
> (USAID, 1964).

USAID, thus, give themselves a fair degree of flexibility in assessing

the relative needs of proposed recipients. It is in the nature of a definition such as this that the aid donor has the freedom to apply it as it wishes (Baird et al, 1975). Similarly, with the nature of disaster victims, the emergency disaster period and the relief itself, the same proposition holds.

> 'Disaster victims are persons who, because of natural or man-made disaster, are in need of emergency disaster relief'.
>
> 'Emergency disaster relief is aid which can be used to alleviate immediately the suffering of disaster victims, and which does not constitute a substantial, permanent contribution to the economy of the country'.
>
> 'The emergency disaster period is the interval of time, usually not exceeding sixty days, during which emergency disaster relief ... is needed ...'
>
> (USAID, 1964).

USAID, therefore, is in a position to select the recipients of its assistance and this selection will be, because of the organisation's base, necessarily a somewhat political one.

The various voluntary, non-governmental organisations, because of their very international character, operate without such explicit political connotations, although the similarities in the nature of their role in disaster are manifestly obvious. Organisations like the League of Red Cross Societies state their case very clearly. Unlike USAID, the LRCS states that internationally help is available on request given the premise that it is the duty of the LRCS to alleviate human suffering. The LRCS effort thus concentrates

> '... on emergency assistance during the period immediately after a disaster: provision of temporary accommodation, transportation of wounded, medical first aid, distribution of food, clothing and blankets, etc. But if the Society has the necessary resources, it may also undertake long-term rehabilitation programmes'.
>
> (Rörholt, 1974).

The Catholic Relief Services, whilst applying much of its resources to development projects, gives top priority to prompt and effective response in times of overseas disasters and emergencies and other critical relief needs (CRS, 1974). This has a certain logic when seen in terms of the CRS goal of an integrated series of projects for a particular area given the disruption disaster may cause the projects.

The World Council of Churches acts as a relief organisation in a similar manner. Both CRS and WCC have an obvious religious base which means that involvement in disaster areas could be dictated by the religious affiliations of the indigenous population. It is because they are Christian organisations that they are concerned with fellowship and Christian compassion, '... in mutual aid and in service to those in need' (WCC, 1973). Nevertheless, attitudes to disaster are similar to other relief organisations:

> 'Although originally conceived of as an emergency operation to help prisoners of war, refugees and other victims of World War II, this service to the distressed, wherever they may be, is now recognised as a permanent obligation of the Churches'.
> (WCC, 1973).

Academic organisations concerned with disaster can be divided into two types, namely, those simply recording disaster data and those analysing the data.[1] An example of the first is the Smithsonian Institution Center for Short-Lived Phenomena, whose emphasis is on the dissemination of information and, like UNESCO, to act as a clearing-house in order to maintain a

> '... global environmental alert system for rapid communication of scientific information on short-lived phenomena'.
> (Smithsonian Institution, Center for Short-Lived Phenomena, 1971)

Short-lived phenomena include, in this context, any event involving the natural or physical sciences which has a short time-span of existence.

As well as including earthquakes, volcanoes, and tropical storms, the Center would also include many other phenomena such as snail infestations, animal and bird mortalities, toxic gas emissions, etc. Essentially, the Center

> '... monitors the natural global environment and was established to improve opportunities for research by providing an organisation whose function is to quickly collect and disseminate information on short-lived events while environmental changes are still occurring and to improve the exchange of scientific information through the development of an effective global communications system'.
> (Smithsonian Institution, Center for Short-Lived Phenomena, 1971)

The contrasting type of academic organisation which analyses the data is that of the Natural Hazard Research Group now emanating from the University of Colorado. The approach of Natural Hazard Research

> '... has been concerned mainly with natural hazards and with the long-run pattern of human response and adjustment. The immediate post-impact situation is of lesser interest than the alternatives available for reducing damage from future occurrences'.
> (Hewitt and Burton, 1971).

The definition of a natural hazard is taken to be

> '... a function both of the physical event itself and of the state of human society, including specifically the adjustments adopted to cope with the hazard and the state of preparedness'.
> (Hewitt and Burton, 1971).

The ongoing research programme carried out by Natural Hazard Research has led them to undertake surveys of natural hazard types throughout the world in order to obtain the more significant natural hazard types and vulnerable locations leading to a more systematic approach to the research programme.

Insurance companies are concerned with disaster from a commercial point of view and produce data based upon claims on their funds by people who

have suffered a disaster strike. Disaster phenomena are often referred to as 'Acts of God or man'.

It is possible to summarise this discussion as follows:

1. Data on disaster occurrence is available from a variety of sources, from organisations within the United Nations, from national organisations (primarily in the USA), from various non-governmental, voluntary, international organisations, from academic institutions and from insurance companies.

2. Underlying the data produced by these sources are more explicit terms of reference which include implicit definitions of disaster and the role of an organisation in disaster situations.

3. UNDRO and the non-governmental organisations, whose emphasis is on relief and short-term precautionary strategies, implicitly recognize disaster as involving not only the physical phenomena but also a population and its infrastructure in that these organisations operate on calls for help from these populations. UNDRO, whilst not departing from this implicit reference, has, of necessity, the broader terms of reference in that it is a co-ordinating body and a catalyst between the non-governmental relief organisations.

4. UNESCO and the Smithsonian Institution Center for Short-Lived Phenomena concentrate on the physical phenomenon and produce catalogues of information for scientists. The Center for Short-Lived Phenomena excludes the more long-term disaster agents and short-term agents are included among a wide variety of environmental events. UNESCO uses the word 'disaster' to describe all the events it lists although many of them occur in areas devoid of population, and concentrates on seismic and volcanic phenomena.

5. USAID has terms of reference which are broad and give it flexibility of choice in its aid donations. It again recognizes the inclusion of population and infrastructure in the term 'disaster'.

6. The Natural Hazard Research group recognizes disaster (or hazard in this case) as a function of the physical event and the social state. It concentrated on the range of responses and adjustments that populations devise to alleviate the hazard and only lately on the actual disaster situation and its immediate aftermath.

7. Insurance companies' interest in disaster is of necessity through disaster insurance and the claims made upon it.

8. The survey of data institutions makes apparent the following aspects of disaster:

   a. Disaster can refer to the physical agent.

   b. Disaster can refer to the combination of a physical agent and a population and its infrastructure.

   c. Disaster can refer to the more complex human condition of which the effects of the strike of a hazardous physical phenomenon is merely a symptom.

   d. Disaster can be a function of a physical event and a social state.

4. ANALYSIS OF THE DATA

The preceding section outlined the definitions and terms of reference of various institutions and organisations supplying data pertaining to disaster occurrence. It is now necessary to consider the actual data on disaster occurrence produced by these organisations. Not only is disaster occurrence itself an important pointer to the bias of a particular organisation, but also the spatial distribution of this occurrence and the disaster agent involved in the occurrence.

International Organisations

1. UNESCO provide an annual summary of information on natural disasters. Taking 1969 as an example of these summaries, 759 disasters are recorded by UNESCO for that year. This figure may seem exceptionally high, particularly as it applies only to the natural hazards of earthquake, tsunami, storm surge and volcano. Of all the data sources on disaster occurrence, UNESCO figures are far larger than any other. They not only include the continental land masses but also oceanic and the Arctic and Antarctic areas. Table 1 shows the designation of disasters by type, while Table 2 indicates the spatial distribution of these disaster occurrences. The UNESCO data remains true to its definition of its role as the provision of scientific data without analysis. to UNESCO, the term 'disaster' applies to the actual physical event which in this case concentrates on geographical phenomena. Those 'disasters' which affect a population or infrastructural system are recorded as destructive phenomena and among the 759 items recorded in 1969 as 'disasters', only 12 were given the status of destructive. It is interesting to note that none of these twelve 'destructive' events resulted in a major disaster appeal.

In summary, the UNESCO data provides a list for scientists of extreme

Table 1

UNESCO : NUMBER OF DISASTERS BY TYPE, 1969

Earthquake	722
Tsunami	5
Storm surge	7
Volcano	25
TOTAL	≤750

(UNESCO, 1971)

Table 2

UNESCO : NUMBER OF DISASTERS BY REGION, 1969

Pacific	467
Atlantic	68
Mediterranean	67
Continental Africa, Indian Ocean, Australia	63
Asiatic ranges	61
Continental Europe	17
Atnatctica	1
Other	15
TOTAL	≤759

(UNESCO, 1971)

physical phenomena occurring during a particular year and these phenomena are referred to as disasters except in cases where the phenomena impinge on human settlement and infrastructure when they are listed as destructive phenomena. The disasters listed are purely geophysical - earthquake, volcano, tsunami and sea-surge - there being an absence of data pertaining to climatological phenomena - hurricane, tornado, flood, etc. The summaries containing the information are available from 1966.

2. ECOSOC, prior to the inception of UNDRO in 1972, published data on disaster occurrence between 1961-1970. The basis for the data is the number of times that the LRCS issued a major appeal; the data is, thus, based on second-hand, limited information. The data is concerned with what the LRCS consider to be a disaster. Compared with the UNESCO data, however, the definition of role on which the data is based contains an important orientation - the data here refers to the effect that physical phenomena have had upon a population and its infrastructure. A wider range of disaster types appears (Table 3) and the spatial distribution is allied to the major continental land masses with the emphasis firmly placed upon the three continents of Asia, Africa and Latin America, which can be said to contain the major areas of underdevelopment and high population density (Table 4). ECOSOC data, although based upon secondary sources, contains a distinctly different approach to disaster compared to that of UNESCO in that, by definition, disaster occurrence presupposes the presence of populations and their associated infrastructure.

3. UNDRO, the third UN source of information, was never intended to be a relief agency as such but, as its name suggests, to co-ordinate the relief agency activity. Like the ECOSOC data, UNDRO's data was created out of other sources. On behalf of UNDRO, Stanissis, seconded to UNDRO

Table 3

NATURAL DISASTERS OCCASIONING A MAJOR APPEAL ON THE PART OF THE LEAGUE OF RED CROSS SOCIETIES DURING 1961 - 1970 : DISASTER BY TYPE

Hurricane	18
Flood	58
Earthquake	19
Volcanic Eruption	3
Drought/Famine	8
Epidemic	6
TOTAL	112

(ECOSOC, 1971)

Table 4

NATURAL DISASTERS OCCASIONING A MAJOR APPEAL ON THE PART OF THE LEAGUE OF RED CROSS SOCIETIES DURING 1961 - 1970 : DISASTERS BY REGION

Asia	46
Africa	22
Middle East	20
Europe	13
Americas	11
TOTAL	112

(ECOSOC, 1971)

from the LRCS, collected data for the years 1919-1971, on the occurrence of natural and man-made disasters based on LRCS information. This analysis was prepared as

> '... a tentative analysis of recorded major disasters which occurred since 1919 and for which assistance was necessary and provided by the international community'.
>
> (Stanissis, 1972)

The data is similar in type to that of ECOSOC, although it applied to a much longer time period. Setting aside those disasters arising from what Stanissis describes as

> '... the advancement of civilization and man-made situations',
>
> (Stanissis, 1972)

and concentrating on the natural disasters within the analysis, Table 5 shows disasters ranked according to region. It can be seen that again Asia predominates but curiously Africa does not, while the Americas and Europe figure more prominently than in the ECOSOC data. If the time span is shortened, a different perspective emerges. Taking the years 1951-1971, it can be seen that Europe is no longer in such a prominent position, although Africa is last (Table 6). Shortening the span even further to the years 1968-71 brings Asia, the Middle East and Africa to dominate, leaving Europe and the Americas, so prominent over the long period, appearing last (Table 7).

If disaster type is taken as a criterion for analysis and the same time-periods are observed, the mean occurrence of each disaster type increases with the increasing prominence of the more underdeveloped continents. The greatest increases in mean occurrence, on the whole, are with those disaster types which are frequent in underdeveloped countries (Tables 8, 9 and 10).

Table 5

DISASTERS RANKED ACCORDING TO REGION, 1919-71

Asia	89	
Europe	49	
Americas	42	
Middle East	38	
Africa	33	
TOTAL	251	Mean = 4.8 disasters per annum

(Stanissis, 1972)

Table 6

DISASTERS RANKED ACCORDING TO REGION, 1951-71

Asia	77	
Middle East	38	
Americas	35	
Europe	35	
Africa	29	
TOTAL	214	Mean = 10.2 disasters per annum

(Stanissis, 1972)

Table 7

DISASTERS RANKED ACCORDING TO REGION, 1968-71

Asia	24	
Middle East	10	
Africa	9	
Americas	6	
Europe	3	
TOTAL	52	Mean = 13 disasters per annum

(Stanissis, 1972)

Table 8

DISASTERS RANKED ACCORDING TO TYPE, 1919-71

Floods	139	$\bar{m}$ = 2.7 per annum
Earthquakes	68	$\bar{m}$ = 1.3 per annum
Cyclones	32	$\bar{m}$ = 0.6 per annum
Famine	13	$\bar{m}$ = 0.25 per annum
Epidemic	10	$\bar{m}$ = 0.2 per annum
Drought	7	$\bar{m}$ = 0.1 per annum
Volcano	3	$\bar{m}$ = 0.06 per annum
TOTAL	272	

(Stanissis, 1972)

Table 9

DISASTERS RANKED ACCORDING TO TYPE, 1951-71

Floods	127	$\bar{m}$ = 6.0 per annum
Earthquake	43	$\bar{m}$ = 2.0 per annum
Cyclones	25	$\bar{m}$ = 1.2 per annum
Epidemic	9	$\bar{m}$ = 0.4 per annum
Famine	8	$\bar{m}$ = 0.4 per annum
Drought	7	$\bar{m}$ = 0.3 per annum
Volcano	3	$\bar{m}$ = 0.14 per annum
TOTAL	222	

(Stanissis, 1972)

Table 10

DISASTERS RANKED ACCORDING TO TYPE, 1968-71

Floods	27	$\bar{m}$ = 6.75 per annum
Earthquakes	8	$\bar{m}$ = 2.0 per annum
Cyclones	7	$\bar{m}$ = 1.75 per annum
Drought	5	$\bar{m}$ = 1.25 per annum
Epidemics	2	$\bar{m}$ = 0.5 per annum
Famine	2	$\bar{m}$ = 0.5 per annum
Volcano	1	$\bar{m}$ = 0.25 per annum
TOTAL	52	

(Stanissis, 1972)

UNDRO has undertaken a most comprehensive information survey underlying which is a definition of disaster that includes the disaster agent and its effects on populations and their associated infrastructure. Unlike the data produced by ECOSOC, UNDRO's data covers a longer period and can be broken down into shorter time spans to observe trends which implicitly underline disaster occurrence. UNDRO, thus, begins to show the broader aspects of what disaster involves, with the emergence of specific areas and disaster types into greater prominence as the time period evolves.

National Organisations

It has been found that USAID has defined its role in relation to disaster relief in a very flexible way, thus allowing itself to be involved in any disaster situation in which it cares to be involved. The data produced by USAID comes in three forms:

1. Case reports on each disaster situation with which it is involved.
2. An annual summary of foreign disaster emergency relief which has been published since 1960.
3. A disaster file computer printout.

The data is generally more comprehensive than that produced by the United Nations organisations in that its concern is not merely with disaster occurrence and disaster type, but also with the provision of information on the number of people killed, the estimated number of victims, the total of United States assistance, reported assistance from other nations and reported assistance from within the country suffering the disaster. The cost of a particular disaster, though not stated, can often be determined from the text of the reports.

A brief glance at the USAID data regarding regional distribution reveals a substantial difference in orientation compared with the data produced by the United Nations. Whereas Asia again is prominent, Latin America figures greatly in the data and Europe is only nominally present (Table 11).

The reasons for this discrepancy quite reasonably can be found in the USAID definition and approach to disaster. Whereas the international relief organisations and agencies are committed by their terms of reference to calls for help from anywhere in the international community, USAID, being a national organisation, obviously has to have an awareness of national interest and policy. If USAID relief activity in Latin America is considered in the light of the enormous USA investments involved in Latin American countries, it can be quite clearly seen that an explanation of the orientation of USAID data is not difficult to find (Baird et al, 1975). It can be argued that relief aid backs development aid which, of itself, tends to preserve American presence.

USAID is a development agency and, as such, tends to invest in those areas which will give most return - emergency relief aid is of secondary importance. In allowing itself the scope for freedom of choice in its very definition of the various aspects of disaster relief, USAID emergency relief aid inputs are obviously likely to be greatest where the USA has most to lose politically and economically from disaster. This is reflected in the data.

The USAID parallel data system, the Disaster File Computer Printout, has the same regional orientation as the standard data source. The Disaster File is an attempt to synthesize information about USAID relief activity. Strangely, the computer printout lists ninety fewer disasters

Table 11

USAID : NUMBER OF DISASTERS BY REGION, 1968-71

Asia	68 *
Latin America	64
Africa	55
Europe	7
TOTAL	194

* Includes Middle East

(USAID, 1973)

than the standard data source for the same four-year period. Nevertheless, the Americas and Asia carry almost 75% of the total, the only difference being that the Americas head the list (Table 12).

Data on disaster type produced by the Disaster File Computer Printout compares favourably with that produced by the United Nations Organisations with floods and hurricanes or cyclones providing the major emphasis (Table 13).

The USAID data is comprehensive and detailed. Inevitably, because of the vague definitions of its role in disaster, USAID is able to contribute emergency relief aid to those locations of its choice. This leads to a regional distribution of disaster occurrence with a different orientation from that contained in the data available from the United Nations organisations. Basic to an understanding of this difference is an assessment of those areas carrying the greatest load of American overseas investment as well as a comprehension of the American political commitment. Because USAID is concerned with American foreign policy, no mention is made of disasters within the United States.

Non-governmental Organisations

The definitions of role which underlie the data produced by non-governmental agencies are necessarily similar to the definitions adopted by UNDRO. The provision of emergency relief aid amongst the international community leads to terms of reference which accept disasters as being some combination of a physical agent and a population and its associated infrastructure.

Data from these organisations exists in a variety of sources. It has already been seen that information from the LRCS has been used by ECOSOC.

Table 12

USAID : NUMBER OF DISASTERS BY REGION, 1968-71

Americas	41
Asia	32
Africa	19
Europe	7
Middle East	5
TOTAL	104

(USAID, 1974)

Table 13

USAID : NUMBER OF DISASTERS BY TYPE, 1968-71

Floods	41
Hurricanes	24
Earthquakes	19
Drought/famine	18
Volcanic eruption	2
TOTAL	104

(USAID, 1974)

Among the non-governmental organisations themselves, data is usually produced by the organisations working together and pooling their information. Thus CRS produce data based on the provision of assistance not only by themselves, but also by the LRCS, the LWF, Oxfam and the WCC. The inclusion of Oxfam within this group can imply the inclusion of other British charities - British Red Cross, the Save the Children Fund, Christian Aid/CAFOD and War on Want - because these charities come under the general administration of the Disaster Emergency Committee. Also DEC information is based on figures supplied by these five British charities.

The CRS data covers a two-year period, 1970-72, and has the highest incidence of disaster occurrence per annum than any other data source (Table 14). The CRS data tends to reveal the same regional ranking as that produced by USAID. This may seem surprising but it nevertheless reflects the religious credo of CRS dealing with Catholic countries particularly in Latin America. CRS as compilers of the data obviously show a bias in the direction of Catholic countries and, as it is an American organisation, it may also reflect spheres of American influence. Certainly the figures do not show the same interest statistically as USAID in Latin America and the presence of the data from the LRCS acts as a moderating influence.

The point to remember is that although these non-governmental organisations reflect the basis of their existence, they are nevertheless more in touch with the 'grass root' base, often drawing their volunteers from that base, and so tend to reflect more accurately the current situation regarding disaster occurrence. Thus, despite the concentration of Christian, underdeveloped countries, the figures can be assumed to be more reliable than other sources when listing the number of disasters that have occurred.

Table 14

CATHOLIC RELIEF SERVICES : DISASTER BY REGION
1970-72

Asia	45
Latin America	31
Africa	31
Europe	3
TOTAL	110

(Catholic Relief Services, 1974)

The figures on disaster occurrence by type generally parallel the other sources of data (Table 15).

The Disaster Emergency Committee in Great Britain, consisting of Oxfam, British Red Cross, War on Want, Christian Aid/CAFOD and the Save the Children Fund, act solely as a fund-raising body co-ordinating the financial efforts of the five charities in an appeal. The concern with fund-raising means the figures on the number of disasters with which the DEC is involved are necessarily small because over-exposure of appeals would lead, if not to an actual decrease in income from appeals, at least to small contributions per disaster occurrence. The data is limited and the relative disinterest in such long-term phenomena such as drought emanates from the need to mirror the humanitarian consequences of disaster which are often more evident from situations involving the more instantaneous natural or man-made agents (Tables 16 and 17).

Academic Organisations

1. The Smithsonian Institution for Short-Lived Phenomena true to its definition of role, concerns itself with the more instantaneous phenomena and, like UNESCO, provides an information service monitoring the environment for scientists. Its information amounts to pure descriptions of environmental events and what might be termed disasters are only included among a number of items of interest primarily to physical and life scientists. Again, like UNESCO, the information has as its emphasis the scientific data on impact rather than the effects of the disaster agent on populations and their associated infrastructure.

The Smithsonian Institution is American-based and the data tends to emanate from the American continent. The data is thus limited.

Table 15

CATHOLIC RELIEF SERVICES: DISASTER BY TYPE, 1970-72

Flood	51
Drought	34
Hurricane	15
Earthquake	7
Volcanic eruption	3
TOTAL	110

(Catholic Relief Services, 1974)

Table 16

DISASTER EMERGENCY COMMITTEE APPEALS: 1966-74
DISASTER BY REGION

Middle East	4
Asia	3
Americas	3
Africa	3
Europe	2
TOTAL	15

Table 17

DISASTER EMERGENCY COMMITTEE APPEALS: 1966-74
DISASTERS BY TYPE

Earthquake	6
Conflict	4
Floods	2
Cyclone	2
Drought	1
TOTAL	15

Spatially, it is not possible for an easy breakdown of disaster occurrence and in any case this would show an enormous bias towards America in particular and Western, more-developed countries in general. The distortion of the disaster situation in the world can be seen by observing the Smithsonian data on disaster type and comparing it with other data already discussed (Table 18). The small number of floods should serve as an indicator of this distortion.

2. The data produced by the Natural Hazard Research Group is undoubtedly the best information available from a research institution and a major source for data from any organisation providing its limitations are taken into account.

The intention behind the production of the data is to further the work of the Natural Hazard Research Group in a more practical way. The surveys of natural hazards on a world scale and the trends within these are considered to be worthwhile because they show regulations and variations which may not be apparent on a more micro, localised scale, as well as leading to empirical generalisations which may promote more detailed research.

The logos behind the surveys is clear:

> '... the needs of countries such as Iran, Bangladesh or Tanzania for reduction and alleviation of suffering from natural hazards at all levels, is much greater than in most of North America or Western Europe. We need to investigate the extent to which solutions in the latter areas are applicable to the more vulnerable nations. We need to test and evaluate the theoretical generality behind local solutions to hazard problems in Western countries. In turning to overseas areas and different cultures we need to explore the aggregate picture to define some of the broad differences or similarities of which our research designs should take account'.
>
> (Sheehan and Hewitt, 1969)

Table 18

SMITHSONIAN INSTITUTION CENTER FOR SHORT-LIVED PHENOMENA: SHORT-LIVED PHENOMENA, 1968-71

Volcanic eruption	71
Major earthquakes	86
Major floods, etc.	11
TOTAL	168

(Smithsonian Institutions Center for Short-Lived Phenomena, 1972).

For the first time in this review of data sources. an organisation has broadened its definition of disaster to cater for comparative vulnerability of regions. The very nature of the Natural Hazard Research Group's approach to disaster allows for this. With their concentration on hazard potential, with its implications of an extension of everyday existence rather than disaster as such, the factor of vulnerability to a hazard is created. They then go further by contesting that the less developed world is consequently more vulnerable.

Initially, the global survey covered the years from 1947 to 1967 and for the purposes of the survey a major disaster was defined as satisfying one or more of the following conditions:

a. at least $1,000,000 damage

b. at least 100 persons dead

c. at least 100 persons injured.

The material for the data survey was collected from a variety of sources, the most important being:

a. New York Times Index

b. Encyclopaedia Britannica Year Book

c. Collier's Encyclopaedia Year Book

d. The American People's Encyclopaedia Year Book

e. Keesing's Contemporary Archives.

The authors agree that their sources of information show a distinct bias towards North America while large areas of the world, including the Soviet bloc, large parts of Africa and Communist China are not represented. The actual data reveals this trend (Table 19). The criterion adopted for this regional analysis was the 10° grid square; thus, each disaster represented occurred within the confines of one 10° square. One disaster type entering more than one 10° square has been recorded as two disasters

Table 19

DISASTER OCCURRENCE BY REGION, 1947-1967

North America	46
Asia	38
Latin America	13
Caribbean	6
Europe	5
Africa	4
Australia	2
TOTAL	114

(Sheehan & Hewitt, 1969)

Table 20

DISASTER OCCURRENCE BY TYPE, 1947-1967

Typhoon, hurricane, cyclone	44
Floods	35
Coldwave	7
Heatwave	6
Storms	6
Tornado	5
Blizzard	4
Earthquake	3
Tidal wave	1
Dust	1
Hail	1
TOTAL	114

(Sheehan & Hewitt, 1969)

by this method. Table 20 delimits disaster occurrence by type and reveals the importance of the two major disaster types which affect North America and Asia (floods and hurricanes, typhoons or cyclones), thus corresponding with the figures for disaster occurrence by region.

(Dworkin)has updated this initial survey to 1973 and attempted to analyse the trends observable over the twenty-seven year period (Dworkin, 1974). To this end, disasters(those occupying less than one 10^{o} square) and large-area disasters (those occupying more than one 10^{o} square) are differentiated and subsequently compared, and an analysis of the years 1968-71 reveals that all disasters per annum are on a relative decrease (Table 21). But the analysis of large-area disasters indicates a rise in the four-year period of the number occurring in Asia as against the USA which still figures high on the list because of the bias of the source material (Table 22). For the same large-area disasters, disasters by type reveal a similar emphasis for the four-year period with the predominance of hurricane, typhoon and cyclone, followed by floods, (Table 23).

The Natural Hazard Research Group's analysis of disaster occurrence is somewhat limited by the sources utilised. This reflects the importance of the USA as against the more underdeveloped continents. The data is based on a simplified definition of disaster involving the number of deaths, injuries and the amount of dollar damage. This definition was necessary to the work of the Natural Hazard Research Group because some common denominator was required for the sources used and as this was primarily journalistic data, so a more journalistic definition was employed to gain continuity. The Natural Hazard data, along with that of UNDRO and USAID, is among the most comprehensive data available although it reflects its American bias in both area and type of disaster occurrence. One other important factor is that the data, because of the nature of the Natural

Table 21

NUMBER OF DISASTERS , 1968-71

Year	No. of Disasters
1968	48
1969	33
1970	31
1971	31
TOTAL	143

(Dworkin, 1974)

Table 22

NUMBER OF LARGE-AREA DISASTERS BY REGION, 1968-71

USA	11
Asia	12
Latin America	4
Africa	1
Europe	1
Australia	1
TOTAL	30

(Dworkin, 1974)

Table 23

NUMBER OF LARGE-AREA DISASTERS BY TYPE, 1968-71

Earthquake	3
Flood	9
Hurricane, typhoon, cyclone	10
Tornado	3
Heatwave	1
Rainstorm	3
Snowstorm	1
TOTAL	30

(Dworkin, 1974)

Hazard Group as a research group is analysed by the group for research purposes.

Summary of Organisations Producing Data on Disaster Occurrences

It is possible to tabulate the foregoing discussion. Thus:

1. UNESCO

   a. A list of disaster occurrences in the form of an annual summary is produced.

   b. The definition of disasters is wide and includes areas of no population.

   c. The data has a heavy emphasis on geophysical events.

2. ECOSOC

   a. The data is based on secondary sources, principally the League of Red Cross Societies.

   b. The data presupposes the existence of a population and its associated infrastructure.

   c. The underdeveloped sector of the world figures prominently in the data.

3. UNDRO

   a. The data presupposes the existence of population and its associated infrastructure.

   b. The data has been collected for a long period.

   c. The more underdeveloped sectors of the world and specific disaster types such as flood figure prominently as the time period is shortened.

4. USAID

   a. The data presupposes the existence of population and its

associated infrastructure.

b. The data is comprehensive and detailed.

c. The vague definitions which give the organisation great scope in its choice of emergency aid inputs are reflected in the data which shows a distinct bias to areas of heavy American investment or heavy American political involvement or both.

5. The Voluntary Organisations

a. The data, in general, is similar to that produced by UNDRO.

b. The data produced by the Catholic Relief Services reflects the interests of the Christian organisations by emphasizing Christian spheres of influence in the underdeveloped world, e.g. Latin America.

c. The inclusion of data from the League of Red Cross Societies offsets the bias of the explicitly Christian charities.

d. The emphasis of the Disaster Emergency Committee data is on the need to raise money and therefore not many appeals are made in case donations fall off. The appeals are a reflection of the picture of suffering portrayed by the media.

e. The data presupposes the existence of a population and its associated infrastructure.

6. The Smithsonian Institution

a. The data is in the form of an annual catalogue of short-lived phenomena.

b. The organisation is American and most of its examples are American.

c. It has a limited scope because it concentrates on short-lived phenomena which excludes drought and famine and it does not presuppose the existence of human population and its associated infrastructure.

7. Natural Hazard Research Group

a. The data is comprehensive and covers a longer period than most.

b. The data presupposes the existence of a population and its associated infrastructure.

c. The main source materials are American and this is reflected in the emphasis apparent in both disaster regions and disaster types.

In all cases the organisations remained true to their definitions of role as outlined in the first section of this Chapter, except for the Natural Hazard Research Group whose methodological base as a research institution is too broad to be confined within definitions of actual disaster involvement. One may conclude from this survey that definitions of role in disaster reflect the organisations' individual specific interest and involvement in the disaster field. This is true not only of the explicit, written definitions of the organisations, but is also observable from the data which they produce reflecting their particular involvement in terms of the regional occurrence of disaster and the disaster types.

The survey and analysis of the data-producing organisations provides the following conclusions:

1. There is no common definition of disaster, no universal scale of disaster measurement and consequently little compatibility

between the data.

2. There is little or no accounting for disaster losses.

3. The data contains a bias which results from its specific definition of role in a disaster.

4. The best and most reliable available data is that produced by UNDRO and the Natural Hazard Research Group. USAID produce the most comprehensive data but the internal and external consistency of the data is much in question.

It is clear from this analysis that there is no single way in which to consider disasters. There is no apparent common, broadly-based definition of disaster implicit in the organisations involved in disaster which would allow explanation of the disaster process. Instead there are a number of differing definitions which reflect the interests of the organisations producing those definitions. To understand more clearly the process involved it is necessary to investigate the trends that are observable from the data.

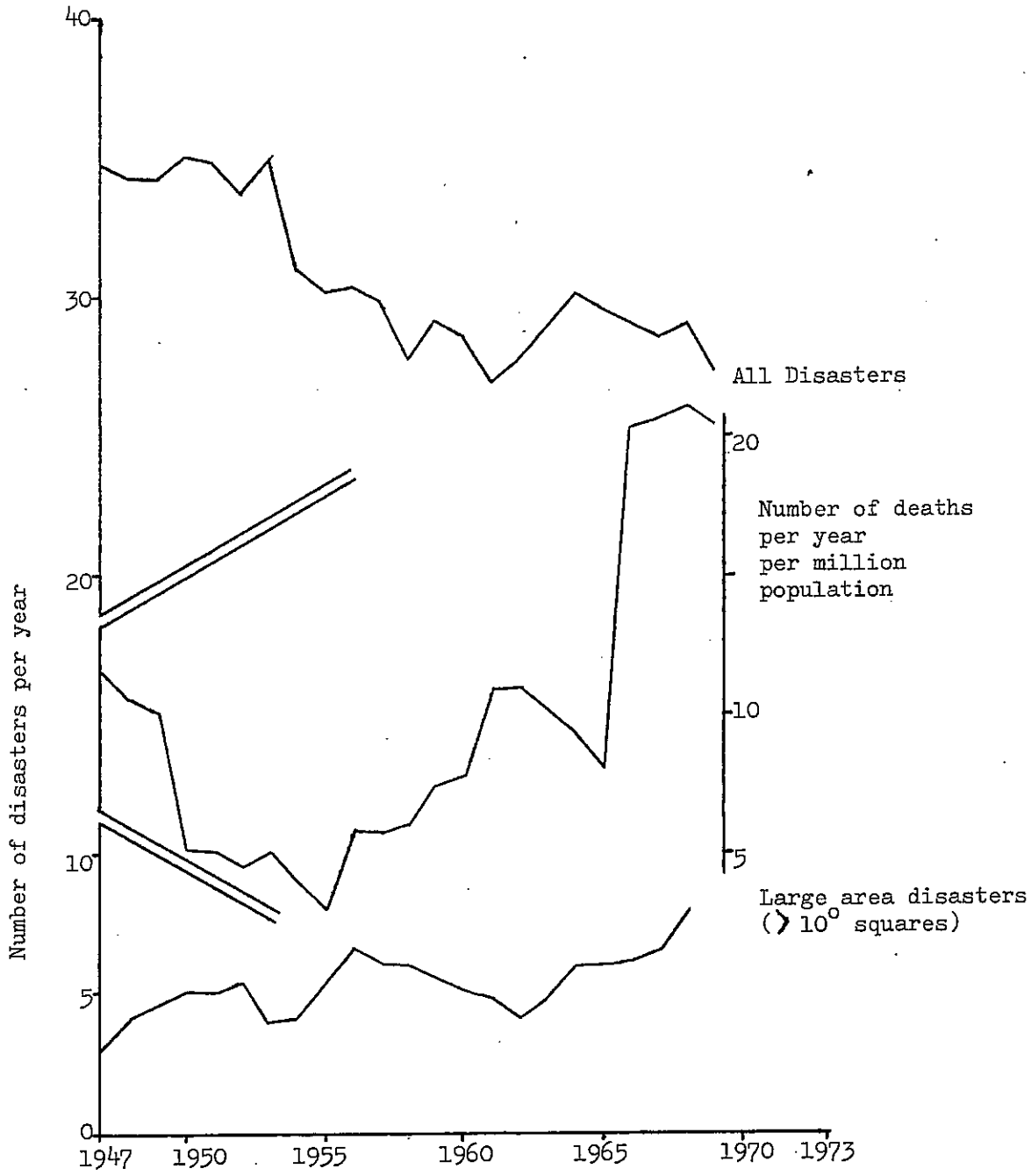
5. DISASTER TRENDS

Dworkin, in her analysis of data for the Natural Hazard Research Group attempted graphically to demonstrate those trends (Diagram 1). She observed that there appeared to be an increase in large-scale disasters and an increase in the number of deaths per year per million population but that there was an apparent decrease in the overall number of disasters. Remembering the particular bias of the Natural Hazard source material, this trend highlights a serious flow in the data. If overall disasters are decreasing and this conclusion is based, inter alia, on a criteria of at least $1,000,000 damage, it is nevertheless true to say that such a figure remaining constant over a period of 26 years takes no account of a decrease in value. $1,000,000 was a considerably greater amount of damage in 1947 than in 1973. One may conclude that as this real damage value is decreasing, so consequently disasters in 1973 based on the dollar damage criteria, will include those of a considerably less destructive nature than would appear in the 1947 figures. On this criteria many more disasters would be eligible for inclusion in the later figures than in the earlier ones. This criticism can be laid at the door of the Natural Hazard Research Group's admittedly biased source material because their conclusion that overall disasters are decreasing does not seem to be supported by recent data from elsewhere. The implications of the CRS data (Table 14) are that disasters are occurring very much as they were before rather than decreasing in total numbers. Table 14, which is very much a table of recent data on disaster, does not contradict the conclusion drawn by Dworkin in Diagram 1 that there is an increase in serious disaster situations.

These conclusions can be backed up by the UNDRO data. Table 24

DIAGRAM I

Global Disasters 1947-1973 : 5-Year Moving Average



(Dworkin, 1974)

Table 24

DISASTER AVERAGE BY TYPE PER ANNUM

Type	1968-71	1919-71	% Increase
Cyclone etc.	1.75	0.62	182.26
Drought	1.25	0.13	861.5
Earthquakes	2.0	1.3	53.8
Epidemics	0.5	0.19	163.6
Flood	6.75	2.7	150.0
Volcanic Eruptions	0.25	0.06	316.6
Famine	0.5	0.25	100.0

contains average disaster occurrences per annum for the periods 1919-71 and 1968-71 and both sets of means are derived from the same disaster population. In every case there is a substantial percentage increase in disaster occurrence, despite the probability of the physical event remaining constant. It is impossible to accurately assess the probability of the physical event being constant because of the dearth of material. Logically, however, one can assume that the probability is constant because there have been neither major geophysical nor major climatic movements that would induce a significant change in the probability of the physical event. This leads to a conclusion that despite the unreliability of the data, there does seem to be a general increase in disaster occurrence particularly when the probability of the physical event is considered.

Thus, five tendencies can be observed from the analysis of the data:

1. There appears to be an increased disaster occurrence over a four-year period as compared with a fifty-two year period.
2. There appears to be an increase in large-scale disasters although it cannot be seen that there is a tendency for an actual decrease in the number of disasters.
3. There appears to be an increase in every disaster type.
4. There appears to be a greater increase in the disaster phenomenon such as drought.
5. There appears to be an increasing vulnerability in underdeveloped regions and a greater loss of life per impact.

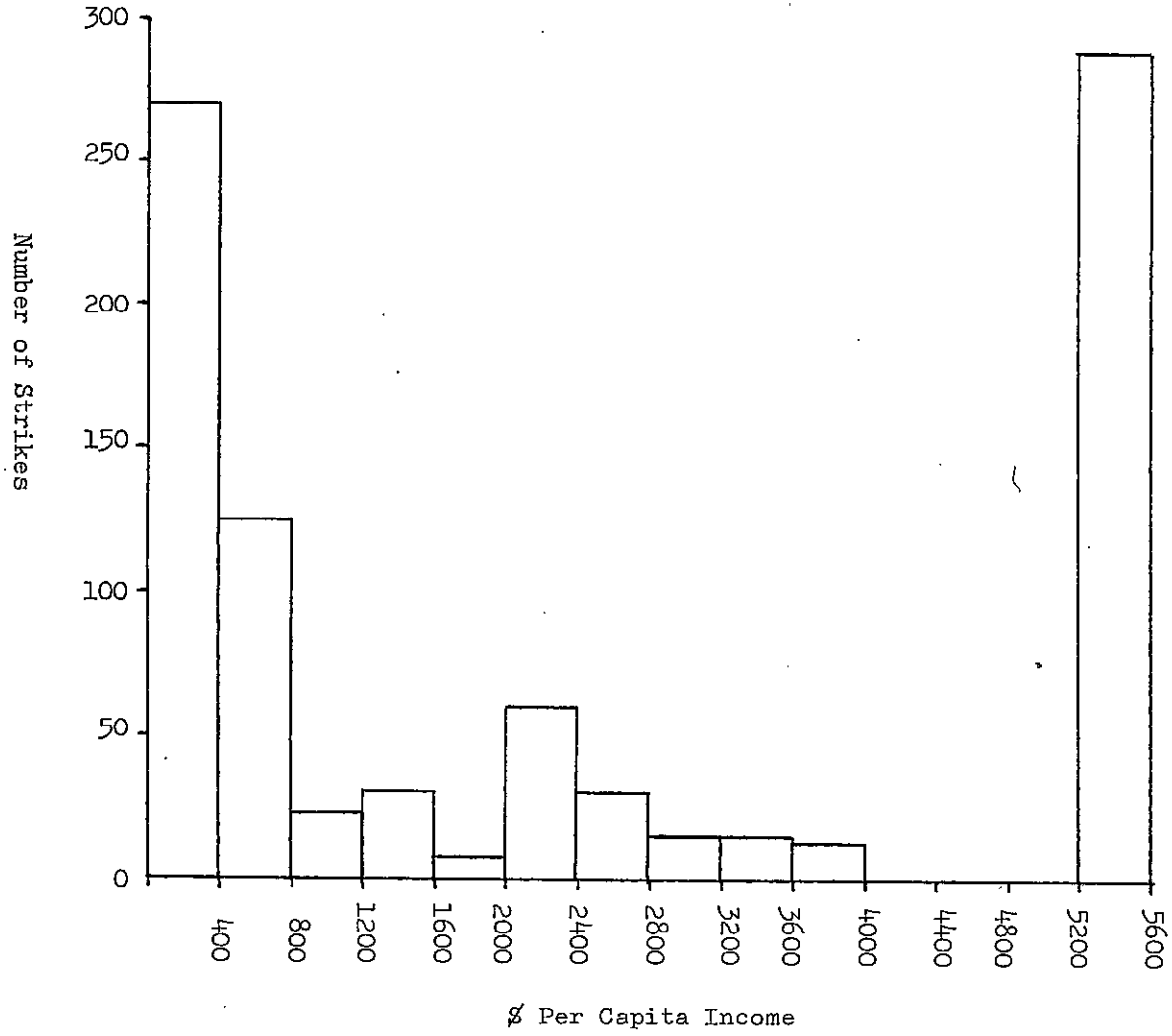
The foregoing discussion of disaster in terms of the defined roles of the organisations operating in disaster situations indicates that the organisations do not have a coherent view of the disaster process. Any definition of the disaster process must attempt to accommodate those trends

outlined in the data. It must include an assessment of the apparent increase of disaster occurrence, of every type of disaster with the greater increase in the long-term phenomena such as drought and famine, and the apparent increase in vulnerability in underdeveloped regions. The latter can be substantiated by graphing the number of disaster strikes from 1947-73 against the per capita income of the strike area (Diagram 2). Given the bias of the source material towards the USA (which accounts for the extraordinary number of strikes against a per capita income of $5,600 in Diagram 2) the diagram reveals that a significant proportion of strikes occur in areas where per capita income is less than $800. These trends are the key to the disaster process as it is occurring now. Before an attempt can be made to create the appropriate definition which caters for these trends, it is necessary to first assess the range of detailed academic research on disaster.

DIAGRAM 2

Number of Disaster Strikes by per capita Income of Disaster-Strike Area

(Data Source: Dworkin, 1974)



6. DISASTER - USE AND MISUSE OF AN EMOTIVE WORD

The term 'disaster' is often found to be in common misuse. It is used in many contexts but, although it is generally assumed that people know what is meant by 'disaster', precise meaning may often escape them. These questions of semantics may be unimportant in everyday parlance, but in the realm of disaster relief, research and planning, it is necessary to understand the exact connotation while not placing such a precision on any definition adopted as to render the situation rigid and imperious. A definition has its use in dispelling confusion and ambiguity while retaining a flexibility which is a necessity where so many intangibles are involved and where so many different physical characteristics impinge upon the situation. It is clear from the survey and analysis of the data institutions (see Sections 3 & 4) that the interpretations of the word 'disaster' are often dependent on the orientation of the organisation. In other words, the word 'disaster' can mean different things to different people. The problem is one of discretion.

'Disaster' is used by people in many walks of life - journalists, politicians, relief teams, academics, etc., and can be used to refer to the following factors:

1. The physical agent.
2. The physical consequences of the agent, i.e. damages and deaths.
3. The way in which the impact of the physical agent is evaluated.
4. Social disruption and social changes brought about by the physical agent and its impact. (Anderson, 1969).

Reference to the physical agent alone as disaster cannot justifiably be accepted. UNESCO, for example, produces data on the physical agent but is this a disaster? A hurricane far out over the Atlantic Ocean or an earthquake in an uninhabited mountain region cannot be called disasters per se. They remain physical phenomena all the time they are out of contact with the most significant factor in any disaster situation - people.

This is the major premise behind any discussion of the definitions of disaster. Disaster is about people, primarily a lot of people, their artefacts and appurtenances, their way-of-life and means of livelihood. Nevertheless, the disaster agent can be recognised as a necessary instigator of a particular effect on people, which can induce disaster. The characteristics of the physical agent in contact with a vulnerable group of people can be summarised as frequency of occurrence, physical consequences, speed of onset, length of possible forewarning, duration, scope of impact, destructive potential, gross predictability and gross controllability (McLuckie, 1970).

Given the fact that the physical event itself is not an adequate definition of disaster, it is obvious that the basis of any definition has to do with the interaction of more than one factor. The physical event itself is not disaster but the physical event is inextricably involved with disaster and disaster cannot be defined without the physical event. The interaction which is most likely to produce the appropriate collection of factors resulting in disaster is that between the physical agent and a collection of people.

It is necessary to impose some sort of limitation on the concept of disaster as it includes and is applied to collections of people. The

most likely limitation concerns numbers of people who would be assessed to be accessible to probable death, danger and destruction from a physical event. Michaelis suggests the following definitions:

> 'ACCIDENTS 1 - 1,000 people dead, or imminent danger of death.
>
> DISASTERS 1,000 - 1,000,000 people dead or imminent danger of death.
>
> CATASTROPHES More than 1,000,000 dead, or imminent danger of death'.
>
> (Michaelis, 1972)

Michaelis offers these as definitions but it would be facile to suggest that they are comprehensive. It can be assumed that were a physical agent to strike a desolate, virtually uninhabited area and one hill farmer was to die, this situation would not necessarily be referred to as a disaster. Yet where can the line be drawn? Of necessity this line is arbitrary. The important element in a disaster strike is to comprehend why so many people have died, so many are injured, so many are homeless, etc., without the hindrance of rigid definitions which would imply that because 999 people are dead or in imminent danger of death, a disaster is not declared. Disaster is the disruption of normalcy.

> 'It is an event (or series of events) which seriously disrupts normal activities'.
>
> (Cisin and Clark, 1962)

A long argument could ensue concerning what is or what is not normal. However, suffice it to say that disaster presents an individual by himself and individuals collectively with the occasion to behave and make decisions which are outside the scope of everyday life, <u>whilst at the same time being extensions of this everyday life</u>. This last point is important to emphasise as it is basic to the comprehension of disaster vis-a-vis the community. Disaster is properly applied to a collection of people

whose societal structure has maintained and perpetuated itself over a reasonably long period of time and in which these structures are easily recognisable (Barton, 1969). Thus, a situation of disaster exists when a structure is disrupted and then asked to extend its functions; societal structure does not suddenly cease to behave in the way in which it normally would and adopt behaviour which is alien to an everyday context. The apparent groups within the community's structure, somewhat interdependent in a normal situation, retain this interdependence in disaster and also tend to retain the rigid structure of priorities that may exist for each group. In fact, much of the structure and behaviour of normality is strongly emphasised in a disaster situation.

Form and Nosow, in a study of the effects of a tornado on the townships of Waco and San Angelo in the United States, discovered that, in general, people responded to the tornado by aiding others within the group structures to which they were attached and that their reactions were towards the most important groups in their lives first, graduating towards the less-important groups, for them, as they moved further away from the impact period. Generally, first responses by individuals were towards close family, followed by responses to relatives, close friends, neighbours and, finally, others. Individuals began with an orientation towards their own specific home environment and ended by adopting the role of rescue worker, similar to those who had come in from outside and had no previous contact with the area (Form and Nosow, 1958). This analysis reinforces the argument that community priorities are re-emphasized in disaster. Nevertheless, Form and Nosow claim the following definition of disaster as:

> '... a condition in which the established social life of a community or other type of social organisation abruptly ceases to operate'.
>
> (Form and Nosow, 1958)

The definition limits the time-space characteristics of disaster to that

period of strike or impact which may be measured in terms of seconds or hours. It is only during this short period of time that social organisation abruptly ceases to operate. Yet is this the period of disaster? Certainly it is the period when groups of people and a physical agent interact, the two factors essential for disaster. But the passage of the physical agent from the area does not imply that the state of disaster abruptly ceases. This period of impact is the state in which disaster is engineered. The resultant disruption can be considered as much a part of disaster as the impact itself because, although the actual period of interaction has passed, the effects of that interaction continue. The time period following impact displays the ability communities have for not remaining unoperational. The segments of society begin to operate again as an extension of the norm without the efficiency of the norm and certainly without many of the aspects which the norm would contain.

Thus, Form and Nosow understood disaster behaviour as occurring within the same sort of framework as customary behaviour, although in stating that social life ceases to operate, they neglect the nature of disaster as operating over a longer time period than merely that of impact. A community will tend to react rather in the way in which a person's heart may cease to function but on receiving requisite inputs of massage or resuscitation may begin to operate again quite quickly, if at first less efficiently than before.

Form and Nosow make statements on the conditions necessary for disaster to prevail. That is to say, they extend disaster to include a time period after impact.

> 'Disaster prevails wherever there is disfunction between the personal expectations for emergency behaviour and the community fulfilment of disaster services. This occurs when individuals do not fulfil their expected emergency roles, when emergency "organisations" fail to perform as

> expected, and when the expected emergency relationship between individuals and organisations are not reciprocally functioning'.
>
> (Form and Nosow, 1958)

Here, another aspect of disaster is introduced. To recapitulate, it has been stated that initially disasters emanate from interactions of physical elements and human communities. Furthermore, disaster does not apply merely to the period of impact but to that period of time when the results of that interaction are evident. Disaster does not imply the change from one societal structure to another, but rather an extension of the societal structure already in existence. Thus, Form and Nosow recognize that although the extension of pre-disaster community structure exists in disaster this very fact may lead to conflict between the functioning of the structure and the needs of the community which exacerbate the disaster situation. Anderson takes this one stage further by viewing the presence of actual threat as conducive to activity which anticipates disruption to everyday life. In other words the functioning community structure is assumed to be disrupted by the presence of threat.

> 'Conceptually it is convenient to distinguish disaster as an event of acute crisis which physically disrupts otherwise "normal" way of life and causes palpable loss from threat as a situation of chronic crisis which anticipates disruption in expected routine'.
>
> (Anderson, 1968)

Field research has observed that the community structure is extended in a disaster situation and that there is often conflict between the structure in action and what is expected of it. Anderson observes that it need not be actual disaster which assumes disruption but the threat of impending disaster as such leaves an indelible mark on the community which reveals itself in their everyday life. This idea in an ecological perspective, is the orientation of the Natural Hazard Research Group.

In this social context, Endleman attempts the following definition.

Disaster is

> '... an event, concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of society undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfilment of all or some of the essential functions of the society is prevented'.
>
> (Endleman, 1952)

This, to a great extent, summarizes disaster in a social context. It emphasizes the key aspects, the key factors which make the interaction between physical event and human community the basis of disaster - disruption to essential services, losses both human and physical, the failure of the community structure to come up to the expectations of the people of that community. The community's expectations are not acceded to, not because the community structure itself is destroyed, but because the structure is unable to carry out the functions that underlie its existence.

How do these disruptive factors manifest themselves within the community? Beach lists ten such factors:

'1. Sudden death or injury ...
2. Destruction of homes and other property ...
3. Destruction of the means of satisfying basic needs ...
4. The injury, death and disorganisation of emergency personnel ...
5. Destruction of roads and vehicles ...
6. Breakdown of the communication system ...
7. Threat and fear ...
8. Emotional shock ...
9. An extreme sense of urgency (by survivors) ...
10. The relative suddenness of disasters ...'

(Beach, 1967)

Disaster may not manifest itself within a community in all these ways at a single time, but a situation of disaster is dependent on one or more

of these states existing within a community after the period of immediate impact.

Similarly, Dynes, Quarantelli and Kreps outline the demands that disaster makes upon a community given the manifestations of the disaster in the ways described by Beach above. These demands form the basis of the formation of alleviative measures and methods of planning to offset the effects of disaster. It can be assumed that disruptive factors will make their appearance within a community and that the demands emanating from these disruptive factors can give a temporal classification to disaster, namely:

1. Pre-disaster phase.
2. Warning phase - alert phase (early warning)
   - threat phase
3. Impact phase.
4. Emergency phase - isolation phase
   - assistance phase
5. Recovery phase.

(Beach, 1967)

Within these time characteristics the demands made upon a community can be assessed and inputs of each prepared and fed into the relevant time phase. These demands are divided into those which are generated by the agent of disaster and those generated by the expected response of the community to the disaster impact. Agent-generated demands are:

1. Warning
2. Pre-impact preparations
3. Search and rescue
4. Care of the injured and dead
5. Welfare demands

6. Restoration or essential community services

7. Protection against continuing threat

8. Community order

Response-generated demands are:

1. Communication

2. Continuing assessment of the emergency situation

3. Mobilization and utilization of human and materials resources

4. Co-ordination

5. Control and authority

(Dynes, Quarantelli and Kreps, 1972)

It is essential when examining the process of disaster, to see it in a total context. The social activity apparent in disaster situations is as much a part of the process as the initial causal interaction. The demands made by a community in a disaster situation are attempts to offset the disaster and to contain occurrence and effects within as short a period as possible.

It is possible to summarise the considerations about social response to disaster.

1. There is an interaction between a physical event and a community which results in the destruction or disruption of normal activity whilst normal social structures remain.

2. This interaction affects a community. That is to say, it affects a collection of people who occupy a common territory and are bound together in relatively permanent social relationships.

3. The interaction confronts a large section of the community with actual dangers or threats of danger and loss to

cherished values and material objects.

4. The interaction results in deaths, injuries, the destruction of property, and other losses and deprivations to the population: for example, the disruption of community utilities and other community services.

5. The direct and/or indirect consequences of the interaction affect a large proportion of the population within the community. That is to say, the repercussions of the interaction are diffused throughout the community rather than focused on a particular group or collection of individuals.

6. The interaction leaves the social structure in the same position as it was before impact but the functional status of that social structure may be faulty in the face of disruptive elements and may lead to a situation after impact which does not come up to the community's expectations and therefore demands change.

7. The interaction manifests itself after impact in a number of disruptive factors, combinations of which may affect the community to some degree.

8. The probability of combinations of disruptive factors affecting a community lead that community to make certain demands of itself by way of alleviation from the disruptive factors, these demands being placed within a time phase reflecting the course of events during which occurrence or the effects of interaction are actually taking place.

This is disaster as it affects a community with the emphasis on that community and its behaviour and response to the disaster before, during and after impact. It is summarised in the unitary theory of

disaster behaviour which states that disasters

> '... affect a relatively large number of persons; they are disruptive of normal behaviour, requiring sacrifice in the predisaster stages and rapid change in behaviour modes during and following the disaster itself; they frequently impose new norms and new ways of life as the price of survival; social structures and social controls are frequently destroyed and new means of control must be improvised; recuperation from disaster frequently involves a community in an unfamiliar dependency on other communities and on larger governmental structures'.
>
> (Cisin and Clark, 1962)

If it is the case that disasters result from the interaction of a physical event and a human community, does this interaction manifest itself in the form of a single event to be defined in a static way, or does the true nature of disaster definition lie in the potential interaction in the more dynamic interaction between man and his environment on a wider plane and over a longer time period? Even sociological research on disaster, whilst retaining its emphasis on the community during and after an actual disaster strike has bowed a knee to the potential for disaster occurrence rather than the actual.

> 'A narrow reading of disaster definitions may lead the unwary to conclude that only destructive events can be considered disastrous. The requirement that a disastrous event actually occurs would be unnecessarily restrictive in disaster research. But a potential disaster may be just as disruptive of individual and community behaviour as the actual event. The responses generated by hoaxes and false alarms clearly demonstrate that disaster behaviour can and does occur in the absence of objective danger. It is the perception of threat and not its actual existence that is important'.
>
> (Cisin and Clark, 1962)

Although retaining the link with a single event, this statement goes some way to the acceptance of potential disaster as a means of expressing the term dynamically, of expressing disaster as one small part within the whole spectrum of man/environment relations. In this respect it is

important to view the disastrous quality of the environment as a hazardous element of that environment, as an extreme event among a whole host of what would be termed more normal events. Disaster must be seen within the framework of man relating to his environment within a time span. The interaction is still there but it is a potential interaction, a hazard to be considered in the everyday association with the environment.

> 'A natural hazard of any sort is a function both of the physical event itself and the state of human society, including specifically the adjustments adopted to cope with the hazard and with the state of preparedness ... Hazards are largely implicit in the ordinary conditions, and it is important to define the latter, as well as the extremes'.
>
> (Hewitt and Burton, 1971)

It is in the nature of man to be in interaction with the environment because he is a resource user and the environment provides the resources. It is also in man's nature to select from the environment those elements of greater resource potential - flood plains, fault lines producing deep harbours, volcanic soils, etc. In choosing these more favourable situations man expects to develop a harmony with the environment which will result in an accumulation of wealth from the resource available. It is in the nature of the environment to carry with its more favourable elements, elements of hazardousness which could constrain the expected accumulation. Man attempts in various ways to negate the hazardousness of the environment by responding to it by means of adjustments to reduce the hazardousness. The response in the form of adjustment is a result of his perception of the hazard whether he has experienced an actual disaster situation associated with the hazard or not.

In discussing the hazard potential of the environment it is important to recognise this hazard as extreme. The hazard factor is that behaviour of the environment which shows several deviations from the mean.

It must be seen in the context of the day-to-day interaction of man with his environment - drought is merely too little water, flood is too much water: they are deviations from the optimum.

This is an attempt to define disaster in its ecological context. The foregoing sociological definitions of disaster heavily emphasize the extraordinary conditions that prevail during and after a specific disaster occurrence and they presuppose a level of technological development and a firmly-based and complex social structure to go some way to alleviating the disruptive and destructive effects of an impact. But does this static approach have relevance for all situations where man is in contact with the vagaries of his environment? It is strongly contended that to thoroughly comprehend the disaster process, a dynamic feature of the man/environment relationship, it is important to see disaster as the extreme situation which is implicit in the everyday condition of the population.

To explain this further, it is necessary to observe a range of disaster definitions from those having some involvement in disaster situations: journalistic, economic, sociological and relief definitions.

1. Journalistic. Michaelis' definition in terms of the number of people dead or in imminent danger of death has been discussed (see page 47 above). Walker's definition is much simpler:

> 'A disaster is an accident on a large scale'.
> (Walker, 1973)

Definitions such as this contain implicit references to the impact that the disaster may have in newsprint or via the visual media. It is a search for the devastation that will produce impact, the pictures of destruction, the heart-rending storyline to hold the reader or viewer in the interests of humanity.

2. Economic. The former United States Office of Emergency Preparedness offers the following definition:

> '"Disaster" means occurrence of imminent threat of widespread or severe damage, injury or loss of life or property resulting from any natural or manmade cause, including but not limited to fire, flood, earthquake, wind, storm, wave action, oil spill, or other water contamination requiring emergency action to avert danger or damage, volcanic activity, epidemic, air contamination, blight, drought, infestation, explosion, riot, or hostile military or paramilitary action'.
>
> (US Office of Emergency Preparedness, 1972)

Here, the underlying principles are those of economic origin. The emphasis is placed firstly on the damage a disaster event might cause and secondly on the resulting deaths and injuries that might result. Thus, this definition is concerned with the degree of disruption insofar as it counts as a loss to the economy.

3. Sociological definitions. These have already been discussed at great length and this definition of Killian's accepts the major points

> '... any disaster involves a disruption of the social context in which the individual functions. Deaths, injuries, destruction of property and disruption of communications all acquire importance principally as departures from the pattern of normal expectations upon which the individual builds up his actions from minute to minute'.
>
> (Killian, 1954)

This definition is chiefly concerned with societal structure, its disruption at disaster impact, and the behaviour of individuals and groups resulting from that disruption.

4. Relief. Krimgold attempts to define disaster for relief by referring to different levels of disaster and consequently different levels of relief.

> 'The real quality of disaster is that it presents problems within a context which cannot be solved

> with the resources found within that context. This means there are different levels of disaster. One may speak of local, regional, national, or even international disaster. A local disaster would be one which cannot be handled by strictly local resources and therefore require help from the regional level. A regional disaster would be one which would require help from the national level, and a national disaster would be one which would require help from other nations. This is the basis of a definition of disaster for relief purposes. What may be a national or international disaster in a small country with a fragile economy may not even constitute a local disaster in a rich country with well developed internal relief organisation'.
>
> (Krimgold, 1974)

Each one of these four definitions presupposes a physical event and a human community interacting but each of them is content to present the disaster occurrence - the static symbol of the disaster process - rather than the disaster process itself. These definitions do not envisage a continuing process of man/environment of which the specific disaster events about which they talk are but a manifestation.

It is clear that the same dilemma has arisen with the more academic research definitions as arose with the data-producing organisations. The definitions reflect the interest of the organisation, and contain no continuity - 1) the sociologist emphasizes the social structure in a disaster event; 2) the economist emphasizes economic loss during a disaster event; 3) the journalist emphasizes the impact of a disaster event and the human condition emanating from it; 4) the relief worker emphasizes the inputs of aid to a disaster event. None of them emphasizes the fact that disaster is a manifestation of the environment at an extreme level. None of them emphasizes the increase in the number of disasters of every type. None of them assesses the increase in disasters in the underdeveloped regions of the world. What is so significant to an understanding of the disaster process is the environmental context which surrounds each dis-

aster event - the state of things. If disasters are increasing generally, particularly in the underdeveloped regions of the world, then the underdeveloped world is absorbing much of the increase in disaster occurrence. Why is this so? What are the concomitant constituent parts of the environmental context that may impinge on this situation?

It is of paramount importance to recognise that much of disaster research is inapplicable to the underdeveloped world for two important reasons:

1. The majority of disaster research has had an intra-American domination and it therefore assumes or is heavily weighted towards a pro-Western, pro-technology, pro-capital context.

2. Following from the intra-American dominance, most of disaster research is naturally concerned with the developed context with all that this implies - a complex social organisation, a high level of manufacturing industry, a high level of available technology, the relative control of indigenous resources, the high level of alleviative measures such as insurance and the presumption of free choice.

Many of these developed world characteristics are not found in developing countries to the same degree, if at all. Necessarily then, definitions that have emanated from Western research and Western involvement may not offer a correct summation of what may exist in the developing countries. The limitations of many definitions have already been exposed. What is required is a set of workable definitions for the analysis of disaster which can be applied to locations for which an understanding of disaster is most needed. This will promote a better understanding of disaster and aid the tackling of problems emerging from the analysis of data on and trends in disaster occurrence.

7. DISASTER - PROPOSED WORKING DEFINITIONS

Two initial points must be stated:

1. It is essential, from the foregoing discussion, to view disaster as an extreme within a series of non-extreme events - an extension of everyday life where the latter is as important to an understanding of disaster as the disaster manifestation itself.

2. In all disaster situations, one word is operative. Societies and communities are always vulnerable. Disasters occur because a community is vulnerable to the vagaries of the environment.

Placing these two factors together, it can be asserted that disaster events occur at the interface between extreme physical and natural phenomena and a vulnerable human group. Disaster events are a manifestation of this interaction. This definition places disaster firmly in its ecological context by stressing extreme phenomena within the context of non-extreme phenomena which occur day-to-day. This interaction holds true for every manifestation of disaster throughout the world. Where it differs from disaster situation to disaster situation is between the relative ameliorative and recuperative qualities inherent in the situation in the developed context as compared with the underdeveloped context. The degree to which a vulnerable human group does not have the surplus to ameliorate the effects of an interaction with extreme physical or natural phenomena as distinct from a vulnerable human group with an adequate surplus capacity is a key factor operating within the disaster process.

Initially, it was proposed to assert that this surplus capacity, or

the comparative lack of it, be referred to as proneness. Proneness was to be seen as the ability to accept, absorb, reduce or change the vulnerability to disaster (Burton, Kates and White, forthcoming), and as being associated closely with vulnerability although distinct from it. The argument for the indentification of two distinct types of vulnerability - vulnerability and proneness - centred on the fact that two distinct components exist. Vulnerability, it was considered, implies that a given community is at risk from extreme phenomena where risk refers to the perjorative probability of the occurrence of a disaster event. Thus, in any given locality, certain sections of the community may be vulnerable, the degree of vulnerability being dependent on the degree of risk. But not every member of the community will be affected in the same way. Two individuals within the same community with equal vulnerability may not have the same capacity to absorb the effects of a disaster event - their proneness is not equal. Proneness was to refer to the degree to which socio-economic or socio-political factors affect the community's capacity to absorb and recover from the effects of a disaster event. Proneness was to aid the comprehension of the fact that socio-economic and socio-political factors may have as much a bearing on the cause of disaster as the physical or natural phenomena involved or the vulnerability of the community. Proneness was to be seen in terms of degrees. Extreme proneness, the complete lack of any surplus capacity to absorb the effects of disaster, can be witnessed in the underdeveloped world. This extreme proneness can be applied to the millions of people on the margins of society - the rural and urban poor. These marginalised peoples are the poorest of peoples. When a disaster event occurs they lose little because they have little to lose. But that little they do lose is probably all they have. Consequently, they lose all and because of this they stay lost, with no hope of immediate or near-future recovery. A succession of

disaster events exacerbates and hardens this position producing itself a continuing human disaster. This human disaster, of necessity, is not just promoted by the physical phenomena or the vulnerability of the location, but by the socio-economic or socio-political status of these marginalised peoples, as the lowest echelons of a hierarchical system which leaves them remote from accessible improvement.

Given that vulnerability implies a lack of protection against attack, it was felt that whereas the concept of proneness was useful and its constituent parts outlined above should be retained, in no sense could proneness be divorced from vulnerability and that the former could prove a misleading concept. To distinguish between vulnerability from the hazard environment and socio-economic status was considered to be a backward step because the two elements are inextricably one. Vulnerability to a hazard implies all that the concept of proneness attempted to define - vulnerability to a hazard includes the degree to which societies have the capacity to accept, absorb, reduce and change. Socio-economic status is often the key to a lack of protection against attack. Consequently, it is proposed that vulnerability should be a term which embraces not merely the risk from extreme phenomena but the endemic conditions inherent in a particular society which may exacerbate the risk. Vulnerability is an ecological concept.

The contention throughout this discussion has been that to comprehend fully disaster and the apparent increase in disaster events, especially in the underdeveloped countries, it is necessary to broaden the perspective of disaster. Vulnerability can explain this apparent increase. People who are very vulnerable to environmental vagaries tend to become more vulnerable to the next environmental extreme because of their lack of an adequate absorptive capacity and each successive environmental extreme will

leave the population more vulnerable to increasingly less severe disaster events. Thus, disaster proportions are being reached by the interaction of a vulnerable human group with physical phenomena which are becoming less and less extreme and consequently more and more frequent.

Concentration on the disaster event alone is myopic and does not give adequate enough insight into the part that these events play in the everyday lives of the population or the overall long-term effects. To observe, thus, a disaster event as but a manifestation of a continuing process which will include other such manifestations, is considered to be a more realistic way of approaching the overall disaster problem.

In conclusion, therefore, it is proposed that the following definitions be adopted as workable definitions which demand a genuine comprehension of disaster.

1. Disaster Event. The manifestation of an interaction between extreme physical or natural phenomena and a vulnerable human group. The manifestation results in general disruption and destruction, loss of life and livelihood and injury.

2. Disaster context. The sum total of the possibilities, probabilities and frequencies of the occurrence of various disaster events, including previous disaster histories, in any given location, which render the location vulnerable.

3. Disaster environment. The combination of the disaster context and the social, political and economic conditions prevailing within any given location.

4. Disaster process. The dynamic operation over time of the distinctive elements contained within the disaster environment and their inter-

relationship.

5. Vulnerability. The degree to which a community is at risk from the occurrence of extreme physical or natural phenomena where risk refers to the perjorative probability of occurrence, and the degree to which socio-economic and socio-political factors affect the community's capacity to absorb and recover from extreme phenomena. The term should be applied to the disaster context, the disaster environment and the disaster process.

6. Marginalisation. The most extreme manifestation of vulnerability occurring on the margins of society and properly applied to the urban and rural poor of the underdeveloped countries with little or no absorptive capacity in the face of extreme phenomena.

These definitions cannot stand in isolation. They are properly applied to the application of research in actual situations where human groups are vulnerable to extreme natural phenomena. This practical activity which attempts to instigate strategies of amelioration and mitigation can be referred to as predisaster planning. Predisaster planning is a policy implementation over time which sets its objectives in the form of targets for mitigating the effects of disaster by a comprehensive co-ordination of indigenous resources and infrastructure. Predisaster planning does not imply that the planning activity occurs before the next disaster event and then abruptly ceases. It implies that predisaster planning, to be successful, should begin in the time period between two events and continue as an ongoing process.

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