

## A PHILOSOPHY OF PRECAUTIONARY PLANNING

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Planning is a policy activity which sets its objectives in the form of targets to be reached in a determined time. Targets established by the plan must be feasible in terms of available resources if any success is to be achieved. Planning can be attempted at varying scales from the international, through the national and regional, to the local level. In this paper, we shall concentrate on one aspect of planning, namely, precautionary planning. The phenomenon of precautionary planning is relatively recent and we shall argue that it must assume a role of increasing importance within a framework of development planning.

During 1973, twenty-five large-scale disasters were recorded in which more than one hundred thousand people were killed and over 215 million lives were disrupted (USAID, 1974). The total value of assistance for these twenty-five disasters exceeded one billion dollars, but more than 60 per cent of the assistance was in-country self-help. To give a sense of the scale of this aid, ninety-three countries of the world had less than this amount of resource capital during 1973 (World Bank, 1974).

The cost of disasters and their increasing frequency, particularly in underdeveloped countries, prompts one to ask the question of what can be done. Can one develop a philosophy that will enable a more rational approach to disaster occurrence? On the basis of that

philosophy, can one develop a method which can successfully mitigate the conditions associated with disaster? To successfully mitigate the effects of disaster, it is obviously necessary to be prepared for an eventual disaster strike and to prepare plans for such a disaster strike; this activity is termed *precautionary planning for natural disaster*, and is a relatively recent phenomenon. It is only since 1970 that attention has begun to focus on pre-planning at all, but the major part of any interest in disaster situations is still relief (Lewis, 1975a). The recurrent and increasing costs of disasters would seem to indicate that there could be a more efficient way of using capital than merely providing relief: complementary precautionary planning would seem an obvious practical approach. In any case, it has already been indicated that relief aid can frequently reinforce the conditions of vulnerability associated with disaster-proneness (Baird et al., 1975).

Disaster must be seen not as a single isolated event but as one stage in a dynamic ecological relationship (Westgate, 1975). Disaster is the interface between an extreme physical event and a vulnerable population. The increasing number of disaster occurrences observed in the world is attributable not to an increase in the probability of the physical event but to the increased vulnerability of the human population (Baird et al., 1975). It has been shown that

over 60 per cent of the costs for disaster relief are borne by in-country self-help; the proportion of in-country self-help increases during the periods of rehabilitation and reconstruction. These costs underscore the necessity of some form of indigenous precautionary planning which, as the cause of disaster can be shown to be social as much as physical, should be orientated towards the social and economic conditions in which a population exists.

The most common approach to precautionary planning is the administrative logistical approach. This approach is currently favoured by most authorities and concentrates on the disaster strike, evacuation and relief. The same plans are often used for both natural and man-made disasters, for hurricanes and civil disturbance. The orientation is towards practicality immediately before and after a disaster strike. This orientation is summarised by the United States' Office of Emergency Preparedness:

It is important that government emergency response to natural disasters be accomplished through the existing organizational arrangements augmented as necessary. This approach should result in greater identification of government officials with their constituencies during times of extraordinary need. It is a logical extension of governments' dealings with day to day emergencies.

(1) to expand routine emergency services such as police, firefighting and sanitation;

(2) to provide those things which the individual citizen takes care of by himself in normal times but which have been interrupted by disaster such as food, housing and personal welfare;

(3) to make special provisions for medical care.  
(US Office of Emergency Preparedness, 1972)

There is great need for such an action plan but it should be seen as part of a wider program of precautionary planning. The concentration on administrative measures to alleviate conditions immediately after the disaster strike does not treat disaster as a dynamic situation resulting from resource utilization in a hazardous area. As such it is myopic, often treating the symptoms but not the causes of disaster.

The results of this administrative approach have also often tended to concentrate on the efficiency of the system rather more than on

the flexibility to cope with the multifarious requirements of victims in a variety of unknown situations. The results of systems analysis have been rigidly applied, often it would seem for their own sake in achieving a co-ordination of sectors and services, instead of designing these services to attend to an analysis and assessment of social needs.

If there is a favourable cost-benefit ratio for short-term plans in taking early measures when disaster is imminent, how much greater will be the cost-benefit ratio of taking long-term ameliorative action? Preparatory action taken against spring floods in the USA (Operation Foresight, 1969) had an estimated 10:1 benefit-cost ratio (US Office of Emergency Preparedness, 1972). The general ratio of sustained losses per single disaster event to the costs of prevention is 1:13. Burton et al. (1976) graph the ratio of all damage loss to adjustment expenditure. The ratios vary between approximately 1:1 for drought to 15:1 for hurricanes. All this data is based on the US experience, for little work has been done in the rest of the world, but there is little reason to doubt that substantial capital expense following disasters could be avoided if precautionary planning were to be implemented.

The Disaster Research Center at Ohio State University concentrates on sociological analysis of specific disaster situations; the Disaster Research Center's perspective on predisaster planning reflects this research orientation. Underlining this approach are a number of planning principles, namely:

- a. Planning is a continuous process – written plans are only a small part of the total planning process.
- b. Planning involves attempting to reduce the unknown in a problematical situation.
- c. Planning aims at evoking appropriate actions – the *impulsive* action must not override that which is appropriate to the situation.
- d. Planning should be based on what is likely to happen – the realistic approach is to plan according to how people will react and not plan and hope that people will conform to the plan.

- e. Planning must be based on knowledge -- actual observed behaviour in disaster is imperative to any realistic plan.
- f. Planning should focus on principles -- simplicity is the key to successful disaster planning.
- g. Planning is partly an educational activity -- educational not merely for the general populace but for the planners and administrators as well.
- h. Planning always has to overcome resistance -- there will always be sections of the population who believe they are in no danger. (Dynes et al., 1972)

Many of these principles may seem obvious, but that is a prerequisite for achieving implementation, and to state these principles brings them into the realm of the consciousness. Latent awareness of a particular situation often promotes latent action.

From each of the areas of study, certain elements are stressed as being important for the disaster planner. From the nature of disaster agents the following characteristics emerge: predictability, frequency, controllability, speed of onset, length of forewarning, duration of impact, scope of impact and intensity of impact. It is suggested that the disaster planner should have knowledge of these characteristics. Similarly, disaster promotes distinct areas of organisation and related tasks: warning, pre-impact preparations, search and rescue, care of injured and dead, welfare, restoration of community services, protection against continuing threat, and community order (all demands which are generated by the disaster agent); communication, continuing assessment of the emergency situation, the mobilization of human and material resources, co-ordination, and control and authority (all demands generated by a community's response to the disaster agent).

The changes required in normal organisational structure in order to accommodate the new extreme situation lead to new sets of tasks for which mobilization of resources is neces-

sary but under conditions which must be understood to be uncertain, urgent, promoting an emergency consensus, expanding the role of citizens, convergent and de-emphasising of contractual and impersonal relationships. The way a community organises itself in times of disaster is expressed in terms of organisational domain, organisational tasks, organised activities and human and material resources.

These areas of study provide the material for the planner and must be coordinated in planning. The planning priorities are delimited among various organisational domains which have distinct responsibilities which are not necessarily mutually exclusive. These various domains are organised into tasks and the tasks into sub-tasks, etc. An important part of any planning framework must consider the performance of these tasks and the relationships between the various organisations.

The Disaster Research Center approach is essentially a sociological one. It is concerned with the co-ordination of community activity based on an understanding of that community's response to a particular disaster event -- the periods immediately before, during and immediately after a disaster impact. The Disaster Research Center's approach to precautionary planning is a short-term one operating for as long as impact characteristics last; it pays no concern to the disaster process -- the hazard environment (Baird et al., 1975). Such a planning approach has little relevance for the underdeveloped countries where many of the organisational facets of society required by this approach are non-existent.

A regional planning approach is best illustrated by the work of Krimgold (Krimgold, 1974). Krimgold argued that it was in the pre-disaster phase that investment of effort and resources would give the greatest returns in human and economic terms and that planners have an important part to play in this phase. Recognising the significant increase in recent years in the amount of aid provided as disaster relief by developed countries, Krimgold argued that this aid is only of a temporary and curative

nature. It does not provide protection and does not prevent the occurrence of the disaster. What is required is for attention to be focused on mitigative aspects and perhaps prevention. 'Predisaster' planning must be seen, particularly in underdeveloped countries, as a development priority.

Krimgold sees predisaster planning as being most effective when applied to the disaster process, the long-term situation. Relief aid is not adequate if the purpose is the alleviation of human suffering. As development aid has repeatedly failed in underdeveloped countries, more emphasis has been placed on relief aid – a palliative, not a cure to disaster vulnerability.

Krimgold argues that the emphasis must be pulled away from relief aid to predisaster planning, which will include relief aid but only as part of the whole predisaster planning procedure. Predisaster planning includes disaster mitigation (which Krimgold refers to as principally land use zoning and building codes) and disaster prevention and must be contained within development planning and seen to be a priority in those countries with a vulnerable population.

The regional planning approach is not without its difficulties. Economists and geographers in the USA analysed water resource investment, particularly in flood control, irrigation, navigation and power generation within a framework of regional planning. One starting point for their analysis was the interest rate used for justifying public works in water development, contrasting the new public rates against the so-called 'social opportunity costs' and the private rates of return for investment and saving.

Artificial low interest rates, it was argued, lead to a distortion of the investment pattern, providing larger amounts of flood control or drought control (in the form of irrigation) than was justified by a rational appraisal of the benefits and costs. This, in turn, led to a favouring of large technological projects over alternative hazard adjustments. This initial critique was followed by an outpouring of research effort and subsequent refinement of the economic distortion argument. Neoclassical economists argued for minimal government intervention and for allowing the market processes to lead to more sensitive assess-

ments of risk by individuals and firms. Welfare economists argued for improved public procedure for resource allocation (Kates, 1976).

Such a debate indicates that even with a regional planning approach the problem of integration remains paramount. This necessitates a multidisciplinary approach but the multidisciplinary approach must develop into an interdisciplinary one to allow effective planning.

Both the sociological and regional planning approaches outlined are an inadequate base for planning because they adopt a single factor approach to the problem. The complex reality of disaster can only be adequately understood within an interdisciplinary approach. The Disaster Research Unit at the University of Bradford has attempted to develop such an approach and studies have been conducted on this basis.

The Disaster Research Unit argues that local resource utilization is an important part of any attempt at planning within an underdeveloped country. Indigenous resources are defined as everything present within a particular locality and includes infrastructural and administrative elements.

Precautionary planning was originally seen

... as a comprehensive precautionary strategy ranging from administrative contingency planning, strengthening of buildings and revision of building codes, flood plain control and land use zoning to the technology of warning systems and psychology of response to them. These precautions will be prepared for a known vulnerability and analysed risk. Furthermore, the economic impact of natural disaster events can be explored (and their role in a condition of low development examined) in an assessment of losses from past disasters and a forecast of probable future losses (Lewis, 1975b).

This view is still the keystone of the Disaster Research Unit's philosophy, but with further field experience, planning implementation and academic research the expression of the view has been considerably amplified. With the certain knowledge that disasters are increasing, especially in underdeveloped countries, and that the explanation of this phenomenon lies not in an increase in the probability of the

physical event but in the increased proneness of human populations to the vagaries of the environment, a more comprehensive precautionary planning strategy was designed (Baird et al., 1975). This strategy is outlined in *A Study in Predisaster Planning* and *A Primer of Precautionary Planning for Natural Disaster* (Lewis, 1975c; Lewis, 1977).

The basic orientation of the strategy is to recognise that disaster proneness is associated with underdevelopment. Logically, therefore, it would seem that precautionary planning should be associated with development planning. Precautionary planning should be seen as the insurance mechanism in the development planning process. It is important to realise the inter-relationship between disaster and development. A recent publication outlined this relationship as follows:

Perhaps the most thought-provoking idea of all is that just as natural processes such as environment affect social structure, so social process such as economic development can affect natural systems "causing" famine and soil erosion for example. This should make us think again about the term "natural" disaster (Richards, 1975).

The paradox presented by such an analysis is obvious. Does the planner concentrate resources exclusively on long-term development strategies which would reduce the proneness of a population to hazard but forego the relief needs which will occur after the inevitable disaster, or does the planner concentrate on relief activities encouraging a further dependency which will inevitably make a population more prone to disaster? The general tendency is to place too much emphasis on relief and little emphasis on precautionary planning (Livingstone, 1975). In each situation, the emphasis will change, but there is evidence to show that in terms of cost-effectiveness emphasis should be placed on precautionary planning (White and Haas, 1975). There are two major contradictions in planning method. The first has already been mentioned, namely, the question of the way in which planning can be achieved, particularly when the target is long-range. In any system similar to the

democracies of the developed world, potential governments win popular elections by indicating their achievements or the failings of their opponents. Because elections occur frequently potential governments concentrate on short-term success and tend to disguise long-term planning. The second contradiction also relates to the political process, namely how can collective interests which the plan should consider be reconciled with individual interests.

Given that precautionary planning is more cost-effective in disaster-prone areas than relief and that monofactor approaches to the problem are less beneficial than interdisciplinary ones, it is important to outline the framework of expertise required by a precautionary planning team (Disaster Research Unit, 1975).

The orientation of precautionary planning will be divided into three parts:

- a. policy
- b. strategic planning
- c. detailed planning.

Initially it is necessary for governments and other institutions to become aware of the possibilities of precautionary planning. When this awareness is current then it is possible to produce a strategic plan, but the detailed precautionary planning is the realm of the indigenous planning core.

The history of the Disaster Research Unit at the University of Bradford indicates an amplified view of the nature of precautionary planning. Initially a framework for research was divided into three areas: the risk of natural hazard; the economic impact of hazard; and forms of precautionary planning. With further experience from actual research and application, the scope of the Unit has been reinforced and the increasing demand for the application of the Unit's work is clear expression of the need.

Precautionary planning must rest upon the body of knowledge contained within the physical and social sciences. There must be information available about the nature of natural hazards and techniques to prevent their impact. Monitoring systems and forecasting methods

for a variety of natural hazards should also be included. There is little point in duplicating research work in the physical sciences on the nature and prevention of natural phenomenon but it is imperative that there be a clear understanding of the nature of the work. From the social sciences, it is necessary to compile statistics of disaster occurrence and disaster losses, to study the effect of losses on the national economy and the relationship between disaster and development. Most importantly, the cost of relief should be calculated so that it can be compared with the capital cost of precautionary planning expenditure.

With such a theoretical base of knowledge, it is possible to consider a specific location with a view to formulating precautionary plans. For a specific location it is necessary to estimate the vulnerability to a specific disaster impact. For each disaster type it is necessary to know the intensity of the physical event and the risk, the perjorative probability. Similarly, it is necessary to understand the physical and social proneness of a population to a disaster situation. This is achieved by undertaking a detailed analysis of the prevailing social and economic conditions in the specific location.

The data gathered and subsequent analysis after research into the disaster context provides material for the preparation for precautionary planning. Precautionary planning is divided into three sectors, namely, physical precautions, social precautions and contingency planning. Physical precautions include land-use zoning, building construction codes and practice. Social precautions include the preparation and promulgation of warnings, training, education and public information. Contingency planning considers the use of indigenous resources, problems of logistics, emergency organisations and sectoral plans.

Planning is essentially a continuous process and implementation is its code word. It is imperative that the planning be implemented and not exist solely as a document to be kept in a bottom drawer for emergencies. The implementation of the Bahamas Predisaster

Plan (Lewis, 1975c) has rightly been regarded as an integral part of the planning process and of the overall project which is continuing. It is important that some feedback mechanism exists so that modifications can be introduced over time paralleling change in the specific disaster context. Planning implementation obviously has short, medium and long-term stages. However, because planning is within a dynamic framework, allocation of implementation to each stage varies as implementation proceeds. Thus, the short-term is under continual review, and implementation of the long-term is coincidental with the implementation of the short or medium-term stages.

Planning is an activity in the present for the future. It is crucial to any plan to know what timescale is envisaged. Precautionary planning, like development planning, is essentially a long-range planning activity; the aim of precautionary planning is to reduce the proneness of a population to a hazard and this is achieved by relieving the existing social and economic conditions. The aim is similar to that of development planning, i.e., increasing human welfare and thus the ability to absorb disaster effects. This is the grand design, however, which is useless without practical application. Medium-term measures such as land-use zoning are necessary to reduce vulnerability to hazard – these measures decrease the effects of disaster. The short-term measures are those associated with relief work necessary after a disaster strike.

The following can be said to be the phases of the pre-planning process grouped on either side of a line representing the disaster event itself; the first three phases applying to time before the event and the last three phases to periods of time after the event. (Whilst pre-planning for a single disaster event can, by its nature, only take place before that event, the opportunity to pre-plan for subsequent events will be in the last two phases after the single event.)

The purpose of precautionary planning at a practical level accepts that a disaster is likely to occur and in any case the total *prevention* of disaster calls for the prevention of the causative

## Prevention

Precautions for mitigation – physical precautions:  
within building and planning/land-use zoning

Precautions for warning – social precautions: warnings and associated advice

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Emergency – during and immediately after the disaster event

Rehabilitation – emergency housing and provision of food and water

Reconstruction – rebuilding and reconnection of utilities and services.

natural phenomena, calling upon expertise, technology and resources beyond the capacity of the majority of disaster-prone countries. It is perhaps an aspect of precautionary planning that belongs to an international level and a distant future.

Pre-planning for reconstruction might appear to be an exercise beyond the scope of this subject except that clearly the provision of permanent building and supporting services and utilities must take account of the possibility of a future disaster. In fact, processes belonging to reconstruction will take place whether or not there has been a disaster and the needs of precautionary planning must be incorporated. These activities belong to what is generally called 'development' and it is illogical for the processes of development to ignore probable damaging effects of disaster.

The essence of precautionary planning, therefore, in any practical context are the phases of:

Precautions – physical and social

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Emergency

Rehabilitation

Of these three phases the latter two depend entirely on what happens during the disaster itself and can be covered in short-term precautionary planning only by *contingency planning* – the identification and preparation of a range of aids to decision-making during and immediately after the disaster event. Long-term precautionary planning will be incorporated in the rehabilitation phase.

The disaster event itself may, in the extent or severity of its impact, be: *national, regional* or *local*. Here we are not referring to administra-

tive concern, involvement or action, but to the comparative extent or severity of destruction and losses in the overall context of the country in which the event has occurred. Variations in the degree of severity may be due to variations in size or intensity of one type of event, the area of territory affected by an event or smaller and localised disaster events. Variation of these kinds may affect communities by depriving people of their *immediate bodily needs*, needs such as potable water and edible food or of less immediate but equally essential needs of *social organisation* such as simple shelter, warmth and sanitation. A third category may be affected by the more violent of disaster events where the *physical infrastructure* of a community on which life has come to depend is disrupted causing loss of permanent housing, services and utilities (water, gas, electricity) and transportation, and the more complex life support systems within an industrial infrastructure.

Precautions themselves can now be expanded and considered in *either* the:

Short-term: social precautions – warnings

Medium-term: physical precautions – land use zoning and construction

Long-term: development

depending on resources and expertise available, but all precautions being taken as those actions which are possible at a given time for application for a future span of time from that point. In other words, these are *not phases for future action*. Through their application in development, long-term precautions should automatically involve reconstruction after a disaster event. Contingency plans and precautionary plans may be prepared at a number of 'levels' such as government and non-government (and sectoral plans within each of these) and each of these plans will examine disaster with the same kind of analysis and with the same kind of division and tabulation. They will be co-ordinated by the 'highest' level, i.e. government, within the national disaster plan.

There are therefore two principal headings for activity within the precautionary planning process:

### Precautions, and Contingency planning.

Note that the line denoting the disaster event has now been omitted as these are now activity headings within the precautionary planning process itself; this is an integrated simultaneous process, and the time sequence on which the original disaster phases were based (from which the precautionary planning activities took their description) becomes irrelevant. Contingency planning will be considered first.

Contingency planning is required to pre-determine a group of actions and activities of unknown number, sequence and magnitude, but all of known likelihood in a disaster event. These activities can be broken down into the following areas of application:

National, regional and local areas of application.

Government and non-governmental areas of responsibility.

All, or almost all, contingency planning activities will concern areas of application, the area of effect being the principal difference between them.

Governmental and non-governmental areas of responsibility produce the essential and most significant classification in practice, but as it is likely that within their respective area of responsibility both sectors will follow a similar activity pattern, it is useful to consider further sub-classifications.

For this purpose a re-examination of the origins of the contingency planning heading is useful and reveals the dual source of 'emergency' and 'rehabilitation'. For even further ease of identification and definition the 'emergency' phase has been divided into 'emergency' and 'relief' phases to produce now the headings for contingency planning activities of *emergency*, *relief* and *rehabilitation* where 'emergency' is the period *immediately before* the disaster event if any warning has been possible (for practical purposes in this context the disaster commences on receipt of warning), *during* the disaster event and *immediately afterwards*; and where relief is the period of easing the state of

suffering and distress, and rehabilitation is the re-connection of dislocated services, utilities and shelter. These headings could be alternatively and simply, short, medium and long-term contingencies.

The other of the two principal headings for the precautionary planning process is 'precautions', which has already had its first or primary classification on the basis of mitigation and warning or 'physical precautions' and 'social precautions'. These two sub-headings can be taken separately and further sub-divided for practical purposes. Actual physical precautions against natural disaster and encouragement given to individuals to take physical precautions are seen as belonging totally to the government sector. There is therefore no practical purpose to be achieved by applying the government/non-government classification. On the other hand this is the heading under which there may be precautions involving considerable expense and therefore the differences of time scale are seen as being the most significant activity division. Long, medium and short-term precautions may then be identified by or allocated to national, regional or local competence.

Social precautions are based on 'warning' and clearly any warning system must only emanate from a single controlling source. The resources and responsibility for that source are governmental and the governmental/non-governmental division becomes the most significant classification, some of the related activities belonging to the non-governmental area of responsibility. Warnings themselves will be given on a national basis even where they may be regional or local in effect and by their nature are short-term, but again some of the related activities may be classified into national, regional or local areas of competence.

The complete implementation of this total framework for precautionary planning relies, in the first instance, on an awareness of the total precautionary planning process by governments. With a concept which is in its infancy in research terms, it is unlikely that governments will be even aware of research activity and least

of all of the results of that research. This is not to be derogatory of governments – it is the normal process perhaps – but the first step in implementation is to promulgate information of research activity and its results.

When it does take place, implementation in the form of projects of precautionary planning is likely to be fragmented and piecemeal, but if these projects are undertaken within an awareness of the total concept little will be lost. There is after all a sheer manpower problem in the undertaking of projects so all-embracing as to be capable of implementing the total framework. For instance, a pilot study in the Windward Islands has examined the effects of hurricane and drought on the production of bananas, the principal commercial activity of St. Lucia and St. Vincent (O'Keefe, 1975). Another pilot study has set out to examine the feasibility of and management for a regional disaster fund set up by nine (now ten) countries of the South Pacific (Lewis, 1976). Neither of these projects, both of considerable size and extent, embrace the total concept of precautionary planning but both have achieved considerable impetus and support from being considered within a total theoretical strategy of precautionary planning for natural disaster.

Furthermore, if the need for planning is accepted and therefore if the need for precautionary planning is obvious (as has been demonstrated by the demand placed on the Disaster Research Unit), the approach to precautionary planning must be to incorporate it within a development planning framework. Such an incorporation would mean that development planners could conceive the risk involved in development programmes but more importantly that the infant applied science of precautionary planning could avoid the pitfalls experienced by development planning. The ethnocentric approach of planners, the willingness to transfer Western models of planning and technology to often wholly inappropriate environments can be avoided. Monofactor orientations will be avoided because of the interdisciplinary nature of the exercise. Planning can be implemented with the people, not mere-

ly for the people, by an acceptance of grass-roots participation in the planning and implementation stages. Such a strategy as outlined will produce a safer world.

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