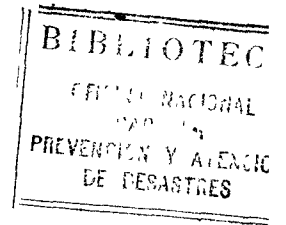




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DISASTER PREPAREDNESS
A Study in Community Perspectives

by

Prof. C. V. RAGHAVULU

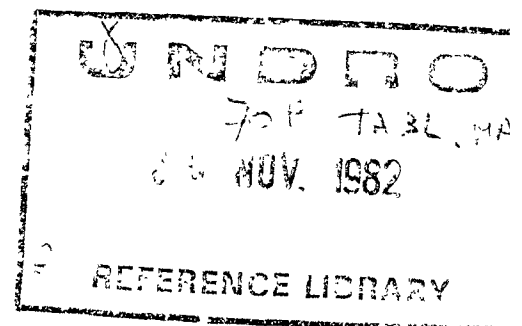
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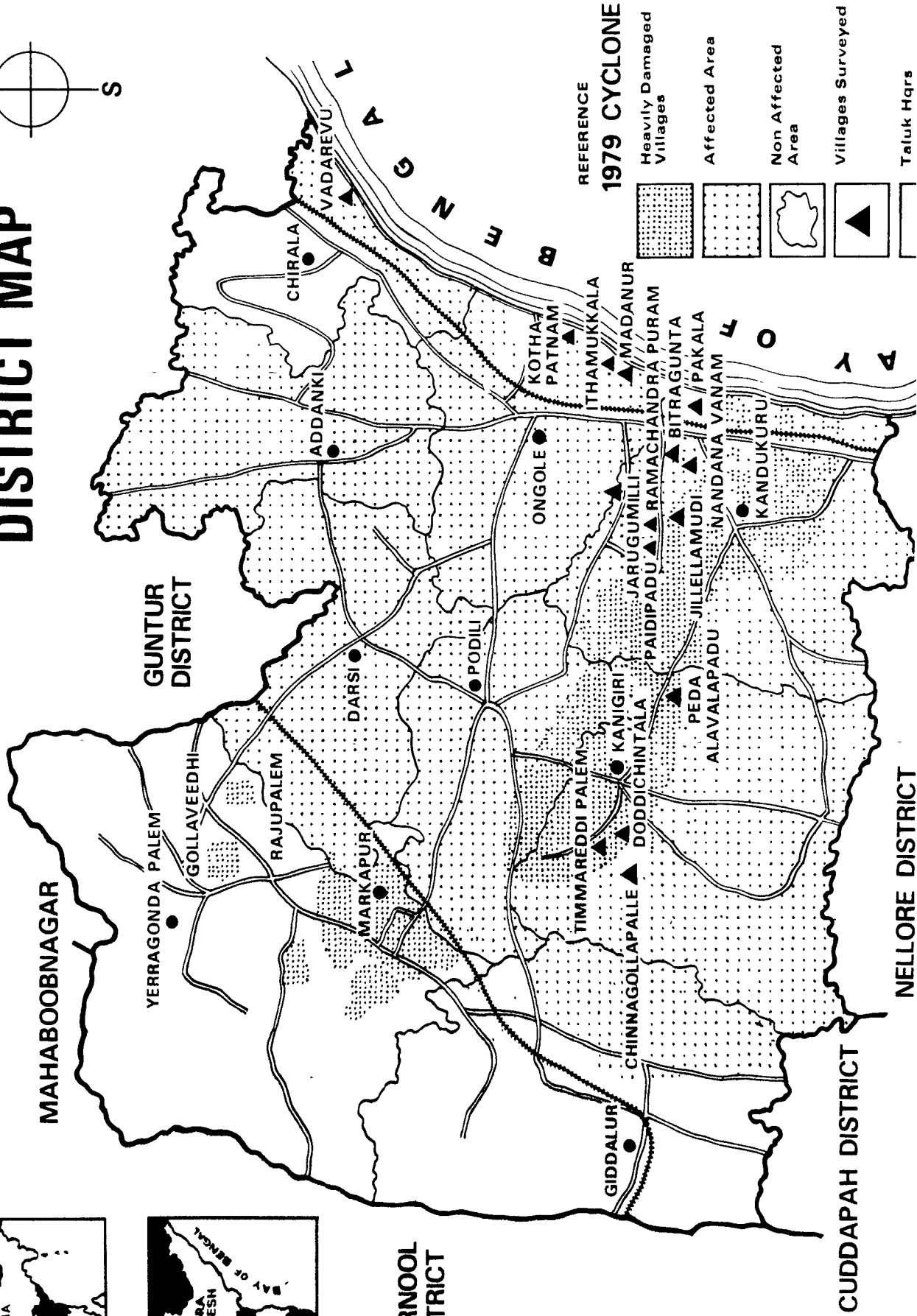
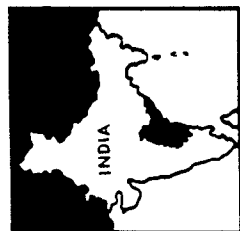
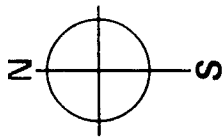
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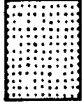
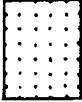



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PRAKASAM DISTRICT MAP



REFERENCE
1979 CYCLONE

-  Heavily Damaged Villages
-  Affected Area
-  Non Affected Area
-  Villages Surveyed
-  Taluk Hqrs

MAHABOBNAGAR

GUNTUR DISTRICT

KURNOOL DISTRICT

CUDDAPAH DISTRICT

NELLORE DISTRICT

P R E F A C E

Cyclones from the Bay of Bengal hit the east coast of India almost every year and those from the Arabian sea hit the Gujarat-Maharashtra coasts, though less frequently, but both cause extensive loss of lives and property in the coastal districts. The Government of India (GOI) is responsible for the detection, tracking and warning of cyclones and the State Governments for taking disaster prevention measures. The National Cyclone Warning System has been in existence since 1865 and functions under the India Meteorological Department (IMD) of GOI.

Detection of cyclones at sea improved considerably with the establishment of meteorological satellite monitoring facilities by IMD in 1963. Cyclone Warning Radars (CWS) were set up along the east and west coast of India from 1970 onwards and track cyclones continuously from distances of 400 KM out at sea. The Indian National Satellite (INSAT-Ia) positioned over the equator in April 1982 can keep a continuous watch of cyclones all over the Bay of Bengal and Arabian Sea and transmit their pictures every half hour to the Meteorological Data Utilization Centre (MDUC) at Delhi. India has thus cyclone detection and tracking capability second to none in the world.

In order to provide disaster prevention measures in coastal districts GOI appointed in 1970 a Cyclone Distress Mitigation Committee (CDMC) for Andhra Pradesh which submitted its report in 1971.* The Government of Orissa and West Bengal appointed similar committees in 1972 and 1974 respectively. The CDMCs recommended suitable precautions to be taken by Central and State Governments before, during and after a cyclone for disaster prevention.

In spite of the simple and practical steps suggested by CDMC 1970 to evacuate coastal villagers threatened by a tidal wave accompanying a cyclone to places of safety inland, a ghastly tragedy occurred in Andhra Pradesh in November 1977 when nearly 8,000 people and tens of thousands of cattle perished in Divi Taluk in Krishna District in a severe cyclone that crossed the south Andhra coast. Apparently something had gone wrong somewhere.

* Dr. P. Koteswaram was the Chairman of these committees — Dir. ARTIC.

Aid and Succour was rushed from all corners of the World to the helpless victims of the cyclone. An Appropriate Reconstruction Training and Information Center (ARTIC) was started in Jan 78 as a Non-Governmental Organization (N.G.O) at Vijayawada close to the scene of disaster. Apart from its dedicated and notable service to the public in rehabilitation and relief after the cyclone ARTIC undertook to investigate the possible underlying causes shortcomings and human failures that might have led to the occurrence of the human tragedy and recommend steps to prevent their repetition in future. ARTIC convened a seminar at Vijayawada in Aug. 1978 and a workshop in cooperation with the Administrative Staff College of India (ASCI) at Hyderabad in Feb. 1980. The findings of the seminar and workshop should be useful to the State and Central Governments and voluntary organization to design more effective Disaster Prevention measures in future cyclones and floods.

What is the reaction of the people at the grass root levels who are, or have been exposed to the ravages of cyclones and floods, to the disaster prevention measures recommended and/or taken by Governments and N.G.Os? In advanced countries where literacy is high, the threatened people take immediate precautions on receipt of Cyclone (Hurricane, Typhoon) Warnings and save their lives by evacuation to safer places. Loss of property is minimised by suitable protective measures. In a developing country like India where the literacy rate is low, simple coastal villagers have to be educated properly to protect themselves against onslaught of cyclones, tidal waves, floods etc. Science and Technology have provided tools by which reliable warnings can be issued 12-24 hours in advance for these cyclones and concerned public can be evacuated to safer places well in time. Losses of lives due to drowning in tidal wave or storm surges and floods can be totally prevented. Losses to buildings and crops can also be considerably minimised. In a cyclone that hit Southern Andhra Coast in May 1979, the Govt. of Andhra Pradesh did succeed in preventing loss of lives in the coastal districts by evacuating people in advance on a mass scale. The evacuation was however overdone as the State Government did not have information about the exact areas where storm surges were to be expected. Some losses however occurred in the inland taluks of Prakasam district by floods due to breaching of tank bunds. Here was an example to illustrate that advance warnings by IMD and advance evacuation by State Governments can save lives totally.

After the cyclone of May 1979, ARTIC sponsored a research project in Prakasam and Nellore districts of Andhra Pradesh with financial aid from UNICEF and under the leadership of Dr. C.V. Raghavulu of the Andhra University, Waltair, to investigate the attitudes and behaviour of the population

affected by the cyclone and accompanying floods. The findings of Prof. Raghavulu and co-workers contained in the present report entitled "Disaster Preparedness — a study in community perspectives" should be of considerable interest and assistance to disaster prevention workers in India and other developing countries in the world.

In a sample of fairly poor people — fishermen, labourers, farmers etc, with literacy of 43% — the investigation has identified behavioural patterns indicating readiness to evacuate to places of safety and save lives although they are averse to permanent shift of their abodes where they have been seeking a living for generations. This should serve as a pointer to planners who seek permanent remedies by shifting fishing villages well inland. The fisherman all over the world feels at home on or near the sea except when the sea grows furious and he would like to stay away from it. The separation will be only temporary since he will return to its bosom when the sea resumes its normal playful self! Another significant finding of Prof. Raghavulu has been the preference of villagers for the radio as a reliable means of communication of weather warnings. The purchase of transistor radio sets increased in these villages after the disaster! CDMCs rightly emphasised the crucial role of radio for disaster prevention and recommended hourly broadcast of cyclone warnings round the clock. With the latest picture of the cyclone being available on the radar, the cyclone forecaster should be able to inform the public about the latest position of its center and intensity not more than an hour ago instead of dishing out stale information of the cyclone some six or eight hours earlier.

Although Prof. Raghavulu's research was not directed towards assessing the accuracy, timeliness and usefulness of the cyclone warnings, which are important factors to instil credibility and confidence in the public, he has however identified a case of a false alarm in Aug. 1979 which the villagers rightly ignored. The fisherman can sense an oncoming cyclone based upon their observations of winds and state of the sea.

As far as I am aware, Prof. Raghavulu's investigation of public responses in Andhra Pradesh during the 10 May 1979 cyclone is the first of its kind in the country. ARTIC has rendered distinct public service by sponsoring such an useful study and UNICEF in funding it. With the growing awareness of Central and State Governments of their responsibility for disaster prevention from cyclones and floods, it is most desirable that organization like ARTIC and the universities should take interest to undertake similar investigations of the social behaviour and reactions of people in future disasters all over the country.

While designing future research, attention should also be given to the technical aspects of cyclone warnings like their accuracy, timeliness and the adequacy or otherwise of P & T telecommunications for quick transmission of cyclone warnings to the public.

Cases of false alerts or overwarnings should also be identified and investigated since they erode credibility and public confidence and necessitate infructuous expenditure on the part of state Governments, port authorities etc. With sophisticated equipment like radars and the geostationary satellite and reliable communications it should not be necessary for any cyclone forecaster to cry wolf whenever a cyclone passes near his coast without approaching to cross it.

Findings of research studies of population behaviour in natural calamities should be carefully taken into account in designing and/or revising disaster prevention measures by central and state Governments and voluntary agencies in the country.

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C. V. Raghavulu

CHAPTER I

INTRODUCTION

Two major trends seem to underline the approaches of the developing countries in regard to the problems posed by disasters. First, their response is predominantly post-impact oriented. Second, a lot more attention is paid to short-run adjustments than to long-range preparedness. As a consequence of these policy options, training and education of the public in disaster preparedness has received a low priority. Reflecting on this theme, the United Nations Water Conference (1977) observed :

" High priority should be given to education, training and public information in disaster prevention and preparedness, both by individual Governments and international organisations. This should be directed, *inter alia*, to public officials, decision-makers, professionals in building and construction industries, national health planners, public health workers and the general public situated particularly in vulnerable areas ".¹

If the need for long-range preparation is recognized and handled appropriately, damage to loss of life and property could be reduced considerably. Also, the adjustment of victims to disaster situations and quick restoration of normalcy tend to be significantly easier. Developing long-range measures of disaster preparedness is all the more pressing in the light of the projections about the frequency of disasters and the severity of their human effects in the next two decades.² The problem itself is so gigantic that it requires multi-level and multi-agency efforts from Government, non-governmental organisations (N.G Os) and the communities vulnerable to disasters. Further, policy shifts in

¹ Office of the United Nations Disaster Relief Coordinator (UNDRO), *Water: Resource and Hazard*, Geneva, 1977.

² See Green, Stephen, *International Disaster Relief: Toward A More Responsive System*, New York, McGraw-Hill, 1977 and Davis Ian, "Appropriate Technology : The Modification of Unsafe, Housing following Disasters", *Architectural Design*, July 1979, pp. 193-94.

this sphere also require sufficient knowledge-base. Hitherto, our understanding is based on rudimentary evidence in many spheres. The perceptions and attitudes of the communities toward disaster preparedness, is one such sphere. It was in this context that the present study was attempted. Based on the evidence of the attitudes and behaviour of the population affected by the May 1979 Cyclone/Flood that ravaged the Prakasam district and parts of the Nellore district in Andhra Pradesh, the study aims at extrapolating the role of the community/communities in disaster preparedness and disaster mitigation³ A study of how individuals, families and communities behaved in a disaster may provide us some clues about the social mechanisms and patterns of human adjustment that emerge in response to crisis. Identification and delineation of their respective roles will be helpful in working out programmes of disaster preparedness and in designing training programmes. It should, however, be cautioned at the very outset that highlighting the community's role does not discount the role of Governmental agencies or that of N. G. Os. On the contrary, it assumes that knowledge about this component—perceptions and attitudes of the victims and the range of responsibilities undertaken by the communities in the recent disaster—provides a necessary basis of formulating specific and effective disaster mitigation measures. Viewing the problems from the perspective of the victims and the affected communities would allow us to offer alternatives to policies and programmes. It also helps to identify the problems the communities cannot tackle by themselves without external intervention on a large scale.

In recent years, there has been a revival of interest on the part of both academics and action-oriented agencies, in identifying the patterns of community self-help and mutual aid and the potential for collective action. The upsurge of interest, is not borne out of any romantic view of the village communities. It is the result of a coalescence of several factors. Recognition of the need for a systems approach in analyzing the perceived linkages and patterns of interaction between the primary and secondary systems, is one such. The popularity of the participative ethic in the realm of political and administrative organisation, based on both faith and expediency, is yet another.⁴

3. The Study also draws some evidence from the 1977 Andhra Cyclone and the Srikakulam Floods (Andhra Pradesh) of 1980.

4. In order to sustain change introduced by outside action agencies, the development of a grass-root organisation is considered essential by votaries of the participative approach. Besides, 'conscientizing' the clients towards efficacious social action, it also inculcates the values of human dignity and self-esteem. Many action agencies also consider this approach expedient because the problems are overwhelming relative to their abilities and resources. Only people have to tackle them.

Methodology

The research under report was based on field observation and interviews carried out during May-July and December 1979 and January and April-May 1980 in Prakasam and Nellore Districts comprising the area severely affected by the May 1979 cyclone/flood. During the first phase (May-July 1979) field observation and unstructured interviews were carried out. The next phase (December 1979 and January 1980) was utilized mainly for structured interviews of a sample of 318 respondents. Following the procedure of multi-stage sampling, four taluks in Prakasam District (Kandukur, Kanigiri, Ongole and Chirala) and one (Kavali) in Nellore District were selected. For each of the taluks a list of the "worst-affected" villages/hamlets was prepared. Seventeen main villages and 48 hamlets were selected at random from the five taluks sampled. About 48% of the sample of respondents was drawn from the coastal villages and hamlets with a high degree of vulnerability to cyclone/storm surge. A detailed descriptive account of the sample is appended to this Report (Appendix-I)

To ascertain the degree of commitment to disaster preparedness, the current research project utilized two separate sets of questions, both drafted in the vernacular. One set consisting mainly of structured questions was designed to elicit information about their disaster-related behaviour, referring particularly to the 1979 May Cyclone, and their level of awareness of the need for precautions in a future disaster. It covers items relating to background about his/her family; previous disaster experience; perceptions about future disasters; attitudes toward migration and aid received from various sources; expectation of aid in future; and disaster preparedness and community information structure about weather. In the second set, unstructured questions were posed through a sentence completion test to tap the emotive side of the responses and broad attitudes toward disaster mitigation.

The third stage of field work consisted of qualitative interviews of 30 informants drawn from the coastal villages of Prakasam, East Godavari and Visakhapatnam Districts. These interviews were intended to compensate for the pitfalls of survey research and to facilitate consideration of somewhat more complex items (community structure, communication of weather data at the village level, propensity for self-help and aid preference, etc.) in greater depth. Information available in our files about the 1977 Andhra Cyclone has been utilized wherever it is relevant. Similarly, impressionistic data from the Srikakulam flood of 1980 also constituted supportive background material for the final write-up.

The difficulties encountered in carrying out the study and the limitations should be noted here. There was a constant danger of the researchers being misperceived as aid-givers by the respondents. We had to struggle a lot to disabuse them of such feelings. Another problem concerned the validation of two scales constructed to measure community solidarity. These scales were used on a trial basis which yielded responses, giving rise to problems of validation.⁵ It was, therefore, decided not to analyse the data concerning the two scales. The study did not aim at covering all aspects of respondent attitudes. Initially, we intended to include personality variables, such as risk propensity. But these were given up, to keep the interviews short and uncluttered as the interview-schedule had to incorporate additional items on damage, housing, aid etc (These items were not included in the project proposal)

Profile of the Respondents

Nearly 43% (136) of the respondents are from Kandukur, 20% from Ongole and about 12.5% each from Kanigiri, Chirala and Kavali taluks. About 89% of the respondents are Hindu, 9% Christian and 2% Muslim. Nearly 43% of the sample is literate, the mean years of schooling being 6.5. The occupational breakup of the respondents is presented below :

TABLE - 1
OCCUPATIONAL STATUS OF THE RESPONDENTS

Sl. No.	Occupations	Respondents	
		Nos.	%
1.	Fishing	95	29.87
2.	Labourer (farm and non-farm)	75	23.58
3.	Farming (owner and tenant)	66	20.75
4.	Trade and Commerce	20	6.30
5.	Artisan	19	5.96
6.	Employee	18	5.67
7.	Service Occupations	16	5.03
8.	Others	8	2.84
Total :		318	100.00

5. Reliance on a computer for processing the project data did not become necessary partly because these scales did not tie-in. A shift in the research procedures, with greater reliance on additional qualitative data rather than on quantitative analysis of the existing data through advanced statistical techniques was suggested by a member of an informal review committee. With the shift of emphasis from quantification to qualitative analysis most of the survey data was processed on desk calculators.

Distribution of the respondents, by social background (religion and caste) is shown in Appendix-II. About 8% (26) of the respondents, suffered human loss within their families and 6% (19) severe injuries due to the 1979 Cyclone. At the time of the interview, three-fourths of the respondents were living in thatched houses or huts with brick walls and the remainder in pucca or semi-pucca houses. Only 7 respondents had cement-concrete, single or double storeyed houses. After the disaster, 290 (91%) families were living in houses similar to those before the disaster, 23 (7%) in better houses and 5 (1.6%) in worst houses.

CHAPTER II

ANTICIPATION OF DISASTERS AND DAMAGE

The implementation of realistic disaster preparedness measures at the community level is directly dependent upon the ability of the affected population to anticipate the occurrence of potentially destructive or harmful events and to assess their nature, frequency and effects. Their ability to relate the incidence of damage of past disasters to that of future ones indicate their predicative potential. Besides, there are likely to be differences in the human perception of risk. A high level of information coupled with analytic capacity in these spheres would directly contribute to better preparedness. Individual respondents were, therefore, asked to rate the recent Cyclone at their places of residence as being high, moderate, or low. Ninety-one per cent of the victims sampled perceive the 1979 disaster as one of high intensity, whereas the remainder (9%) categorise it as one of medium intensity. The categorization of the disaster as of high intensity by almost nine-tenths of the respondents is hardly surprising in view of the fact that our sample was drawn from the worst-affected villages. It does, however, indicate the absence of any significant disagreement about the respondents' assessment of what constitutes a hazard. Respondents were asked to indicate the extent of damage to their houses and other built-up property. About two-fifths (42%) of them claim that damage to their houses was above 75%. Nearly a third consider damage to their houses as moderate. Each individual research investigator also made his own assessment of the damage to the houses of the respondents covered by him. In about 35% of the cases, respondents' perceptions of damage were on the high side and in less than 2% of the cases on the lower side. There is greater divergence in the extent of non-housing damage reported by the respondents. About half of them report of a 'high' level of damage; a third consider it as of 'medium', and 6% have not suffered any non-housing damage.

Despite widespread awareness about the characteristics of a disaster, the level of individual anticipation about the frequency of disasters (cyclone/floods) is low. While a sixth of the sample consider them as a persistent

problem, occurring almost every year or alternate years, about seven per cent expect them, once in a few years. Those who speak of regularity in the occurrence of cyclones/floods do not claim support for meteorological data. They seem to claim validity on the basis of the experience of recent years. The proportion of respondents who do not anticipate a disaster in future is negligible (1.26%). Significantly, three-fourths of the sample do not see a regularity in their occurrence, but consider disasters to occur at random. The indeterminacy of the occurrence of disasters in future reflects a refusal to speculate. Some even consider it un-Godly and evilsome to indulge in guesswork. To them, much would depend upon the mercy of God. The reluctance to guess or indulge in probabilistic judgments is understandable in the context of their overall perception of causality. Natural calamities are not man-made. They are acts of God, only the Gods can prevent them, according to 47 per cent of the respondents.

To test the attitudes of respondent, on the extent of likely damage in future disaster, they were asked the question :

If by some misfortune, this area is affected by natural hazards (cyclone, storm surge, flood, etc.) in what way do you think it would affect your family/household? (List the effects volunteered by the respondent).

The replies to the item are presented in Table-2 :

TABLE - 2

PERCEPTION OF DAMAGE IN A FUTURE DISASTER

Sl. No.	Item of Damage	Respondents	
		No.	%
1.	2.	3.	4.
1.	House loss only	14	4.40
2.	Human loss only	13	4.09
3.	House and Human loss	22	6.92
4.	House and household articles loss	24	7.55
5.	House and crop loss only	7	2.20
6.	House and work tools/equipment loss	33	10.38
7.	Household articles and cattle loss	13	4.09
8.	House and farm animals loss	11	3.46
9.	Don't know/Can't estimate	41	12.89
10.	House, household articles and human loss	16	5.03
11.	House, household articles and crop loss	13	4.09
12.	House, work tools, etc., and cattle loss	9	2.83
13.	House, cattle and human loss	19	5.97
14.	House, crops and cattle loss	19	5.97
15.	House, crops, cattle and human loss	17	5.35
16.	House, household articles, crops loss and damage to land	13	4.09
17.	House, household articles, crop loss and human loss	13	4.09
18.	House, household articles, crop loss, cattle loss and damage to farm buildings	21	6.60
TOTAL		318	100.00

Table 2 indicates respondent perceptions of the type of damage(s) most likely to occur in the event of a disaster in future. Less than 13 per cent of the respondents are unwilling to speculate on this item. The perceptions of others responding to this item are much more categorical than that concerning the frequency of disasters. However, their estimates are at variance with the damage suffered by them in the previous disaster. An item-wise break-up

of the damage from the data (Appendix-III) shows that housing has the highest frequency (79%); about a third are concerned about cattle loss (34.3%) and crop loss (32.4%). Anxiety about loss of human lives figures next, with 31.5%, followed closely by damage to household articles. Damage to work tools and farm equipment and land are mentioned by less than one-eighth of the respondents.

The items of loss as perceived by the respondents, and especially the high frequency of house damage and the low frequency of farm-related items, should be understood in the background of a skewed sample. Our sample is deliberately biased in favour of the poorer stratum. House constitutes the major, and often the only, asset for many of the respondents. Equally significant is the high frequency of housing damage (79% relative to that of human loss (31.5%). Exclusive concern about human loss is expressed by four per cent.

From the preceding discussion it can be seen that the respondents not only have high awareness about the range of damage in a disaster but also about the short-term precautions. The precautions suggested by them are quite realistic in that they are within the range of possibility, and some were widely adopted in the most recent disaster. Recourse to evacuation was the most popular precautionary measure. There are two types evacuation: (a) voluntary evacuation by the victims to a pucca house or better house in the neighbourhood/main village¹ and (b) evacuation by Government to safe places away from the vulnerable zone.

Nearly 55% of the sampled population from the coastal villages was evacuated by the Government. About one-half of the evacuees express the view that the Government's role was crucial in evacuating them from the village; otherwise they would not have left the villages. Undoubtedly, many lives are saved due to Government's initiative in this regard. Most people are generally reluctant to leave their respective settlements unless and until they are convinced of the severity of the hazard.

II

Precautions, such as evacuation prevent loss of life although not permanently. They do not contribute to long-term preparedness by individuals and communities to any significant degree. Realizing the need for long-term preparedness, Government has contemplated two policy measures;

-
1. In either case victims generally move the children, women and the old people in the first stage. When they sense danger, the able-bodied males move out later.

- a) encouraging the construction of pucca houses through loans and subsidies ; and
- b) inducing people living within the 0-5 kms. zone from the coast to shift their settlements to safer places, away from the coast.

Besides these, construction of link roads and raising the tidal bund of the coast, have been taken up on a small scale. The construction of nearly 500 cyclone shelters across the 1000 kms. coast line and other flood-prone areas is being taken up by the Government in collaboration with the league of Red Cross Societies and 35 other N.G.Os. The construction of nearly 12,000 pucca houses (plinth area ranging from 150 to 200 sq. ft.) has been completed.² The construction of about 6, 000 pucca houses is in progress. Schemes are also afoot for another 2500 pucca houses. In all these schemes, participation by N.G.Os is on a massive scale, both in terms of financial contribution and responsibility for construction.

Quite a few of the fishermen's settlements have shifted 100 to 300 meters away from their original locations, pucca housing projects, taken up mostly in Krishna, Guntur and to a limited extent, in Prakasam and Nellore districts chose locations with ground elevations at a safe distance from the coast.³ Nevertheless, considerable opposition prevails against the idea of shifting villages beyond the 5-kms. zone from the coast. A flood of anger swept through many of the fishermen communities against this proposal.⁴

Responses to one of the items in our questionnaire also reveal an extremely low level of public acceptability to the proposal. If an incentive such as a pucca house is offered at a place 3 kms. away from the coast, about 6% of the respondents are willing to migrate and less than 2% would seriously think about it. An overwhelming majority (86%) would not move that far from the hazard-prone areas. A clean majority (55%) object to the proposal because they eke out a living from the resources (fish and other marine products) of the sea. Pushing them farther from the coast would mean cutting off their livelihood. About 27% of the respondents advance other reasons, such as social ties (15%) and immovable properties (12%) for lack of interest in migration. Details

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2. See Government of Andhra Pradesh, " Position Paper on Cyclones in Andhra Pradesh State and Disaster Preparedness " (mimeo.), paper presented at the ARTIC/ASCI Workshop on Disaster Management, Hyderabad, February 16-18, 1980.
 3. Government provided incentives for these projects by granting ownership rights to land freely
 4. The opposition was so intense that a rumour was in circulation that the Chief Minister who sponsored the move was in league with the lobby of mechanised fishing boat owners.

concerning the distributions of this item are shown in Appendices-IV and V. There is an important difference between the fishermen and non-fisherman groups in the assumptions underlying their responses to migration. The fishermen are well aware of the risk-propensity of the area in which they live. They seem to accept the situation despite its vulnerability to hazards. However, most of the non fisherman groups lack sufficient information about the availability of economic opportunities in alternative areas with lesser cyclone/flood hazard. Their present locations offer employment. Their family ties are also strong. There is also the expectation that in times of severe hazards, the Government would rush relief and rehabilitation assistance which though not substantial is adequate to keep them out of starvation. These factors seem to induce them to take risks and dissuade them from migrating to safer places.

Government's efforts to direct human settlements away from the hazards-prone areas are primarily exploratory. They are not backed by any zoning regulations or land-use controls for the countryside.⁵ Sensing the extent of public opposition Government seem to have dropped this strategy. Moreover, the strategy of shifting the people away from the vulnerable areas, coastal and inland, is beset with serious practical difficulties. The numbers involved is staggering. Finding housing and livelihood for them is no easy task.⁶

III

Current measures of preparedness, especially evacuation, concentrate upon preventing human loss, but not property loss or production losses. Schemes relating to pucca housing and cyclone shelters also aim at the same goal. The farming sector seems to be the most neglected one in this respect. Neither awareness of the existence of the cyclone hazard, nor indeed past experience with it, are sufficient to produce effective precautionary actions. The available evidence has only faint indications of an answer. The options open to farmers seem to be restricted because of several factors. Limited information about the space and time of an event like the occurrence of a cyclone—a factor common to other sectors—lands them in an area of uncertainty. Most of the farmers feel that they have to endure the losses till better times came along. Cyclones, in combination with other factors (drought, crop disease, price fluctuations) have produced major difficulties to the farmers of the region,

5. For a cross-national analysis of the legal problems involved see United Nations, *Disaster Prevention and Mitigation, Legal Aspects*, Vol. 9, Geneva, UNDRO, 1980.

6. In Prakasam district alone there are 61 villages across the 155 KM. coast with an estimated population of 50,000 within the 0-5 KM zone. Considering the size of the target area and the number of people involved, it is foolhardy to think of resettlement.

causing increasing economic hardship.⁷ After the May, 1979 Cyclone, there has been a shift in the cropping pattern of Prakasam District. The area under tobacco, a high-risk, capital intensive and export-oriented commercial crop, has been reduced by nearly 40 per cent. In its place, traditional subsistence-oriented crops have been raised. The response of the farmers represents an adjustment at a sub-optimal level. Given the current levels of indebtedness, the range of alternative adjustments is narrow. A subsistence oriented agricultural strategy matches their potential for investment and risk absorbing ability rather than soil fertility of the cropping. Agronomic and economic considerations are often sacrificed for survival and security needs. Preparedness on the part of the owners of middle-sized and large farms is reflected in another sphere too. Ownership of a few pairs of hybrid bullocks has been considered for long, a status symbol as well as a requirement for various agricultural operations. Many of them have lost a sizeable proportion of their cattle wealth in the 1979 Cyclone. The heavy losses seem to have induced a preference for inanimate power. They are no longer thinking of restoring their stock of bullocks to pre-disaster levels. When their economic position improves, they intend to go in for tractors instead of bullocks. The preference for tractors is a feasible alternative to minimise losses. The trade-off between a high-risk animate power and a low-risk technology represents an adjustment with a higher level of rationality. Such decisions would have long-term consequences, but their exposition falls outside the scope of this report.

7 Statistics of damage to land and crops for the period 1953 to 1978 from floods in India show that on an average an area of 82 lakh hectares is affected. About 26.5 million people are also affected. Crop damage alone works out to Rs. 185 crores (\$ 230 millions). See Sain, Kanwar, *The flood problem in India*, New Delhi, Birla Institute of Scientific Research, 1979, pp. 12-18.

CHAPTER III

ATTITUDES TOWARD PREPAREDNESS

The adjustment alternatives available to potential victims of disasters may be conveniently divided into two groups: (a) the short-term and long-range precautions adopted by individuals and (b) those adopted by collective bodies, such as the community. Data from the current project in both the structured and unstructured question sets converge to provide evidence supportive of a high level of short-range preparedness. Virtually all the respondents (97.5 per cent) report awareness of the need for taking precautions against survival risks of a disaster. The precautions observed by the people in the 1979 Cyclone differ sharply between the coastal and non-coastal regions. As noted in the preceding chapter 55 per cent of the sample — or 48 per cent of the sample from coastal villages — report of being evacuated. Evacuation was done largely at the instance of the Government. Government officers and, in a couple of instances the elected functionaries, went to the vulnerable areas with trucks to induce — and at times coerce — the potential victims to move out to the shelter or relief camps. Interestingly enough, not a single person from the non-coastal villages covered in our sample, was evacuated.

The response from the people affected in the non-coastal region was mostly voluntary. About 28 per cent of the non-coastal respondents moved to pucca houses in the neighbourhood or to that of the neighbouring villages.¹ The proportion of respondents who took some precaution or the other is higher — by 11 per cent — in the coastal region relative to the non-coastal region. The difference between the coastal and non-coastal regions in terms of precautions taken is hardly surprising in view of the greater frequency of cyclones affecting the coastal region as well as initiatives taken from time to time by the Government. It is also worth recalling, that the interior villages accounted for more than 80 per cent of the deaths in 1979. It appears that precautions aimed at goals other than saving human lives, had a low priority. Less than 5 per cent of the sample report of having taken steps to take care of household materials

1. The latter category refers to moving from the hamlets to the pucca houses located in the main village.

and other assets, farm animal or essential commodities. Respondents were also asked whether they would take the same precautions if another cyclone/flood occurs in future. Half of them will take the same precautions; 47 per cent will take some other precautions too; and the remainder (2.5 per cent) are not sure what they will do.

To ascertain further the attitudes of the respondents toward preparedness the following item was used in the sentence completion test :

If I am forewarned about a cyclone or flood, I would

The responses to the item are summarised in Table 3

TABLE-3

Sl. No.	Response category	No. of respondents	% of total	Total % in each cluster
1.	Evacuate to an elevated place/ main village/safe place/pucca house	129	40.57	91.20
2.	Save myself/ take precautions/go somewhere/escape/run away	135	42.45	
3.	Move to neighbour's house/ neighbouring village/the hill top	19	5.98	
4.	Stay at home	7	2.20	
5.	Not do anything/not take any precautions/God would save me	10	3.14	8.80
6.	Think about it/act suitably	9	2.83	
7.	Don't know/no response	9	2.83	
TOTAL		318	100.00	

The above Table shows that an overwhelming proportion (91.20 per cent) of the respondents are favourably inclined to adopt short-range precautions if advance notice of the threat is given. A substantial proportion (83 per cent) of them would take precautions aimed at mitigating the loss of human lives only. Surprisingly, less than a tenth of those favourable to taking precautions have specific ideas as to where they would go in the event of a disaster; they are not sure about the locality or the place. Lack of knowledge about the specifics need

not be considered a major problem. Given the high proportion of respondents with a favourable attitude, educating them about the specifics of preparedness may not be difficult. The proportion of respondents who are indecisive or would not initiate any precautions is not sizable. It is also likely that some of them are residents of safe houses in which case precautions, such as evacuation do not arise. Let us now turn to the next item on the sentence completion test :

In facing difficulties (associated with a hazard) the most helpful thing to people is

The responses to this item are noted in Table 4.

TABLE-4

Sl. No.	Response category	No. of respondents	% of total	Total % in each cluster
1.	Government/Government aid	88	27.68	} 30.51
2.	Buses/Trucks/transport facilities	9	2.83	
3.	Pucca house/Good house/double storeyed house/terrace	85	26.73	} 35.59
4.	Elevated place/safe place/cyclone shelter	13	4.09	
5.	Essential commodities/rice/money	9	2.83	
6.	Radio	3	0.94	
7.	Mutual aid/working together/good advice/fellow beings/villagers/village elders/goodness	63	19.81	} 24.21
8.	Self-help/self-reliance	3	0.94	
9.	Courage/imagination/intelligence/precautions	11	3.46	
10.	God's grace/faith in God	13	4.09	4.09
11.	Others	3	0.94	
12.	Don't know/No response	18	5.66	
TOTAL :		318	100.00	

The responses noted in the above Table concern a number of issues, not all of them are directly related to the theme of this section. Respondent perceptions of precautions (item 2 to 6) account for nearly 38 per cent of the total, indicating the extent of significance attached to preparedness in the series of adjustments related to the pre-impact and post-impact stages. Some of the precautions, especially on housing, belong to the category of long-range preparedness.

From among the responses noted in Table-4, some clusters seem to emerge, indicating the dominant source of action. Items 1 to 6, grouped under clusters one and two account for nearly two thirds of the responses. Of these, the responsibility for the first cluster impinges directly upon the Government. A sizable percentage of the respondents expect the Government to come to their rescue, thus conferring legitimacy on its role. The items under the second cluster are basically concerned with a wide range of precautions, including access to reliable information through radio broadcasts. The source of action for the first and second clusters falls broadly within the sphere of the environment of the affected population. Nevertheless, there are exceptions to this generalisation as in the case of housing and essential commodities. The responses lend themselves to ambiguities in interpretation about the source of action. It is, therefore, fair to categorise them in an overlapping zone of environmental and individual action. A similar overlap is discernible from the responses concerning short-run and long-range adjustments. Government and community aid could be concerned with the immediate as well as the long-run adjustments. One significant feature of the response pattern is that solutions concerned with housing, primarily pucca housing, are salient to more than a quarter of the respondents.

Turning to aid from community sources of self-help, we note that nearly a quarter of the sampled individuals feel it efficacious to rely on community action and individual initiative. Although the proportion of respondents in this category is somewhat lower (24.1 per cent) than those opting for direct Government intervention (30.5 per cent), it is still significant in view of the spontaneous nature of the response.²

The responses under item 10 are self-evident. The low proportion of responses (4 per cent) under this category indicate that fatalistic attitude or re-

2 Strictly speaking, responses to item 9 should be categorised under personality traits. Our decision to club the item with community and individual sources is based on the assumption that emphasis on these traits is linked to self-reliance.

liance on super-natural forces is not widespread. It is a positive indication that the victims are generally seeking pragmatic and realistic solutions. However, our discussion on this point is inconclusive. We shall return to a discussion of this theme a little later.

The next two items on the sentence completion test are aimed at tapping directly the emotions of the respondents.

One item reads :

If caught in a disaster without prior information I would

Table – 5 summarises the responses to this item :

TABLE-5

Sl. No.	Response category	No of respondents	% to total	Total % in each cluster
1.	Die/Can't do anything/keep quiet/feel sorry/lose courage/get into trouble	164	51.57	
2.	Pray/Think of God/fate (Karma) destiny	38	11.95	
3	Try to rescue myself/put in effort to save myself/take precautions/try to escape/no fear	98	30.82	} 31.13
4.	Help others	1	0.31	
5.	Others	4	1.26	
6.	Don't know/No response	13	4.09	
TOTAL :		318	100.00	

The pattern of response to this item stands in contrast with that of the first item on the sentence completion test (Table-3). Both the items are phrased in hypothetical terms. The difference is that while the first item is based on advanced information and the latter without it. The percentage of respondents reporting of indecision or inaction is less than 10 per cent if an alert is given. In the absence of advance information the proportion of respondents indicating attitudes falling in this category (inaction, indecision, helplessness

and anxiety) increases dramatically, to nearly 52 per cent. Similarly, the proportion of respondents inclined to fatalism almost trebles. The proportion of respondents who think of precautionary measures is down to nearly one-third of the counterparts under Item-I. The differences in the patterns of response are significant in that they point out to the need for information. Obviously, advance warnings and accurate information make a lot of difference in terms of disaster preparedness.

Turning to the response pattern of the fifth stem on the sentence completion test we note that fatalistic attitude is more widespread. Given below are the stem and the table presenting the responses :

I would on God for saving my life (in the event of a disaster)

TABLE-6

Sl. No.	Response category	No. of respondents	% to total
1.	Depend/rely/leave it/faith (in God)/trust/prey	263	82.71
2.	Not depend/rely on self-effort/ not believe (in God)/lean (on God)	35	11.00
3.	Depend to some extent/combine self-effort with dependence (on God)/not depend entirely	12	3.77
4.	Don't know/No response	8	2.52
		318	100.00

Table-6 shows that more than four-fifths of the respondents would rely on God or pray almighty for saving their lives in the event of a disaster; eleven per cent would not rely on God, but exclusively on their self-effort; and about four per cent would combine faith with self-effort. It appears reasonable to argue that those who appear to be more fatalistic or who acknowledge the dependence of their lives on supernatural forces would not take significant steps toward disaster preparedness or enhance one's own range of capabilities

to cope with the situation presented by a disaster. Relating these attitudes with those concerning reliance on radio as a credible means of communication and the response patterns of items 1 and 2 (Tables 3 & 4) of the sentence completion test we are somewhat puzzled at the inconsistency. It seems appropriate to suspect errors in methodology or interpretation. A close look at the design of the stems on the sentence completion test seems to explain part of the problem. In contrast to the other items of the sentence completion test the wording of the preceding item is too directive, more so its telugu translation. It did not measure what it is expected to : instead of eliciting the extent of fatalistic attitudes relative to other possible adjustments it captured the respondents' faith in God. The item was too emotive for most respondents, to disclaim faith in God. It should be emphasised that the sentence completion items were used in an experimental way and with a great deal of hesitation. The responses should, therefore, be interpreted with caution and circumspection. To ascertain the attitudes of the respondents on this point, subsequent probing was done with a sub-sample of the respondents (1979 study). We have also analysed the qualitative data from the tapes of the 1977 Andhra Cyclone study. These exercises enable us to offer a different interpretation of the link between this cultural belief (faith in God) and its implication for the range of self-effort.³ A belief in God would not by itself preclude the possibility of initiative and self-effort in the event of a calamity. In other words, it is not highly salient when individuals have more effective options and prior information in their struggle for survival. But then it tends to be one more of the several adjustments a disaster victim summons to rescue himself. It involves prayers, appeals and offerings to supernatural forces. These acts of propitiation are performed in conjunction with or supplementary to other behaviours aimed at rescuing oneself or the dear ones. Viewed in this sense, one's faith in supernatural forces in times of distress would not turn them into inaction; instead, it fulfills an important psychological function of instilling confidence that one has mobilised all the forces at his command—individual, familial, communal, corporate and spiritual. The response pattern may be viewed as a continuing, multi-phased process, the most rational and efficient phase coming first, to be substituted by a less rational and more uncertain phases, finally leading to the fatalistic verification as a mode of adjustment. The latter can as well be a supplementary mode, not the exclusive mode. Interestingly enough, the survival instinct operates stronger than the instinct of faith in disaster contexts. It must also be reiterated that information (advance warning) tends to be a critical variable in shaping the response mode.

3. See Cohen, Stephen P, and Raghavulu C. V. *The Andhra Cyclone of 1977 : Individual and Institutional Responses to Mass Death*, New Delhi, Vikas Publishers, 1977, Ch. II.

CHAPTER IV

THE WARNING PROCESS AND PUBLIC RESPONSE

The preceding discussion demonstrates clearly the role of communication, Government intervention and corporate action in the degree of disaster preparedness. The transmission and dissemination of weather data should be considered part of a communication process which includes the cyclonic weather itself, radio broadcasts, interpretation of the warnings by the villagers (non-official communicators) and official alerts. The credibility, the timing, the completeness, the specificity and effectiveness of this communication process seem to determine the range of short-run precautionary measures initiated by the victims. This chapter deals with public response to changes in weather, the warning process and factors associated with the level of acceptability of official alert for evacuation. The following Table presents the sources of information about weather concerning the 1979 Cyclone, as reported by the respondents :

TABLE-2

SOURCES OF INFORMATION ABOUT WEATHER DATA

S No.	Medium/media of communication	No. of respondents	% total
1	2	3	4
1.	Radio and Government officers	96	30.18
2.	Radio	82	25.79
3.	Radio message through neighbours	55	17.29
4.	Neighbours, relatives or other villagers	39	12.27
5.	Village officers	11	3.46
6.	Radio and newspapers	6	1.89
7.	Other Government officers	6	1.89
8.	Others	5	1.57
9.	Don't know/None	18	5.66
TOTAL :		318	100.00

The above Table shows that almost 95 per cent of the respondents had prior information about the 1979 Cyclone flood. One-half of the sample report of having received the information through a single source. The data also indicate that reliance on the radio is more widespread than any other single source (25.8 per cent). Radio is also the most popular medium, with three-fourths of the respondents claiming reliance on radio messages either directly or indirectly or in combination with other sources of communication. Government officers were either a supplementary source or the main source of information for about 35 per cent of the respondents. Nearly 30 per cent of the respondents were alerted by other villagers (neighbours, relations, friends, etc.)¹

In order to assess the human response to cyclone warnings, we looked at data on this point from diverse sources: evidence from the 1977 Cyclone, unstructured interviews with two different sub-samples of the population, affected by the 1979 Cyclone and those not affected by a cyclone or flood in recent years. Relating data from these sources, we arrive at some inferences about the communication process. Undoubtedly, the radio is becoming the most potent medium of communication. Its credibility has been increasing dramatically, more so among the people living in the vulnerable areas. Radio's increasing popularity as a credible source of information can be gauged from the fact that nearly a third of the radio sets were bought after the disaster. Many from the lower stratum of the population consider it as a worthwhile investment to buy a transistor. The frequency of listening to radio for weather information has multiplied three times since the 1976 Nellore Cyclone. In times of inclement weather, almost twice the normal number of listeners assemble to listen to weather bulletins on the radio.

Besides the frequency and clarity of the messages, there are three major factors associated with the degree of human response to weather warnings. These are: (a) the existence of a second-line of communication from the official sources; (b) the experience of the people with a disaster in the recent past; and (c) the prevalence and use of traditional expertise in weather forecasting.

Our survey indicates that less than a sixth of the sample consider taking precautions on the basis of a single medium. Further, it was found that evacuation was most effective when radio warnings are followed by a second-line of communication either through Government channels or village leaders.

1. The Sub-totals exceed 100 per cent because of access to multiple sources of communication.

It is difficult to evaluate, on the basis of our own data and analyses reported here, the extent to which prior experience with a disaster can help people to take precautions in the event of a major disaster. The meteorological warnings broadcast in connection with the 1977 Andhra Cyclone — officially known as the Chirala Cyclone — were beset with ambiguities about the path, intensity and target area of the Cyclone. An analysis of the broadcast and the meteorological warnings issued to the local port authorities indicate that the predictions and forecasts left something to be desired.² As a consequence, there was some delay in official response to the Cyclone threat, more so in the worst-affected region. The survivors who heard the broadcasts did not consider it necessary to evacuate. Part of the reason for the complacency of the victims was lack of specificity in the warnings. Although the frequency of broadcasts was high (15 to 20 per day), few of them were able to pinpoint the target area and the intensity of the storm surge. As a consequence, the villagers, especially of Divi and Bander taluks, perceived it to be a routine cyclone with which they were familiar. They were confident that it would not be on a big scale. Lack of prior experience on the part of the villagers with a storm surge of that magnitude (20 feet high) and the absence of any large-scale official alert³ compounded the problem and contributed to lack of preparedness. The net result was a major disaster that devoured nearly 8,000 lives in two taluks, besides extensive damage to crops, cattle, housing, and land.

It appears that experience with minor or routine disasters, such as floods might engender erroneous assumptions. For instance, most people, in several of the delta districts on the east coast, are familiar with cyclones and floods of a lower intensity and floods. On such occasions, people living in the low-lying areas move to places of higher altitudes. Even in the case of a major disaster, the response of the people might be similar because of erroneous assumptions underlying the community's disaster sub-culture. Ambiguities in the official weather bulletins might compound the problem of apathy of the potential victims. They fail to appreciate the vague and complex sets of information about the impending danger. The magnitude, gravity and the specific locus of the damage may not be perceived and people may not comply with the warnings because of their complacency, induced by habitual experience of cyclones. This attitude — behaviour complex—may be termed disaster sub-culture. The latter's chief characteristic is short-run adjustment, leading to gross error of perception and misplaced optimism, especially so if the official information is not sufficiently

2. For a detailed analysis see Cohen and Raghavulu, *op cit.*, pp. 64-68.

3. While there was an official alert for evacuation in Bander, there was none in Divi. The response to the alert for evacuation in Bander was also extremely limited.

specific. It is, therefore, immensely important to see that the degree or force of certainty of the information is increased and this should be matched by an equally quick mobilisation of emergency action.

One of the sources of interpretation and communication of weather data, lie within the occupation-related sub-culture of the vulnerable communities themselves. By sensing the direction of the wind, its velocity and the height of the waves (in the case of fishing villages) they arrive at judgments about the severity of the threat. When the direction of the wind changes suddenly the fishermen predict a cyclone. They also cognise to other indications that help prediction. A couple of days prior to a cyclone, some varieties of fish disappear to the ocean depths whereas some other varieties come within the fishing range. If the fishermen are on the high seas they could also sense the changes in the under current of the sea. When they sense a severe cyclone the fishermen do not go for fishing. Evidently, the indigenous methods of forecasting — folk knowledge — are helpful in minimising the loss of human lives on the high seas. Traditional expertise in forecasting a cyclone is not widely distributed among the fishermen. However, more than a quarter of the fishermen and farmers on the coast and the interior villages are familiar with the implications of the wind direction.

Respondents' evaluation of the extent of reliability of official weather bulletins seems to be related to their prior experience with a disaster. A major difference does emerge between the response patterns of the communities frequently affected by cyclones/flood and those not affected. In contra-distinction to the response pattern of the sample of Prakasam and Nellore districts, the sample of the unaffected seem to rely to a much greater extent upon their own assessment of the weather situation. Corresponding to this, they seem to repose much less trust in the authenticity of the radio bulletins. On the whole, the people living in areas not frequently affected by disasters have a lower level of preparedness than those with prior experience of disasters.

Within the village communities in coastal Andhra there is a human communications network, for disseminating information about weather, be it from indigenous or official sources. This network is activated in times of disasters. It operates through neighbours, fellow-workers, extended family and community leaders or members of other reference groups. They usually seek confirmation for information received through word-of-mouth from other channels—radio or official alert. In other words, the convergence of information about weather from more than one source increases the level of its acceptability and action-

inducing potential. The normal authority structures and roles tend to be important for conveying information based on local expertise. For disseminating information from radio broadcasts these structures are much less salient. The village youth who are frequent listeners of the radio pass on the information from this source to others. Our survey indicates that the radio bulletins are clearly understood by nearly two-thirds of the listeners. The village youth also play a prominent role in explaining and interpreting the content of the messages. The role of the community/caste leaders is significant in making an appraisal of the accuracy and completeness of the information received through official channels.

A comparison of evidence concerning the levels of response to the May 1979 and August 1979 official alerts for evacuation demonstrates how communities tend to make their own evaluation of official information. In May 1979, the response to a call for evacuation was overwhelming whereas in August 1979, the response to a similar official alert was very poor. On the earlier occasion, many of them felt that the situation was critical, but not so in August 1979. In the latter event, residents, and most significantly the community leaders, felt that the official alert was a false alarm, not authenticated by their knowledge of the weather situation or their estimate of the potential severity of the hazard.

The prevalence of a disaster sub-culture in the coastal villages seems to be a mixed blessing: While ensuring a minimal level of response from the communities, it also inhibits them to prepare sufficiently in facing major disasters. It may even turn out to be a negative factor in the case of flash floods. Because flash floods occur due to heavy rain in the catchment area, usually far from the affected zone, there may not be any inclement weather in the latter zone. With the result, the victims would go about their routine without taking precautions, as they did in some villages affected by the Vamsadhara flood in Srikakulam in 1980. An official alert would make all the difference in such contexts. In the case of the Vamsadhara flood, everything appeared to be normal to the victims until they noticed a sudden rise in the water level of the river.⁴ Even then their initial response was geared to a routine flood of the sort they had experienced in the recent past.⁵ In instances of this category, Government intervention, through an official alert, is crucial for the community

4. It took less than 13 hours for the water level in the river to increase by 16 feet.

5. The flood level was 5 to 7 feet higher than that of a major flood experienced by them in 1972.

to take short-range precautions. It is in this context that improvements to the warning system, including the installation of rain gauges in the catchment areas of major and minor rivers, assumes significance. Since the submission of the report of the Cyclone Distress Mitigation Committee (CDMC)⁶ progress in this sphere has been rather slow, One Cyclone Warning Station was set up at Visakhapatnam. Although the proposal to set up a radar station at Machilipatnam was cleared in the early 70s its installation got delayed until very recently (May 1981). Meanwhile, two major cyclones lashed the coast around Machilipatnam, causing considerable human loss and property damage.

Before closing this section, a couple of observations concerning the content and the lead time of official bulletins may be cited. A few fishermen respondents complain that the weather bulletins are not comprehensive enough: they tend to concentrate on wind, rain and precipitation, but not estimate the height of the waves till the day or reckoning. They consider advance information about the height of the waves as crucial to their decisions; it determines whether they should go for fishing or not. A further complaint is that the early warnings are not early enough. These complaints suggest the need for more completeness in the content of the official weather bulletins as well as the communication of weather data sufficiently in advance.⁷

6. See Government of India, *Cyclone Distress Mitigation Committee (1971) Report*, New Delhi, Ministry of Irrigation and Power.

7. Given the current levels of technical sophistication of the Indian warning system no significant improvements are possible. Its capability will improve once the ISRO satellite comes into operation

CHAPTER V

SELF HELP, MUTUAL AID AND OUTSIDE ASSISTANCE

The primary response early in an emergency must rely on local resources and capabilities. Disaster research has repeatedly confirmed three observations. Firstly, human communities have tremendous adaptability and resourcefulness, in coping with problems during the first phase. Secondly, disasters tend to draw together people within a community and integrate them into a united front to face challenge. Thirdly, the various social control mechanisms developed to insure conformity to group expectations become operatively intensified during disasters, thereby enhancing group morale and collective action.¹ Some of the old structural alignments begin to reassert themselves in the face of challenges to survival. Sometimes, the old norms may completely be abandoned in favour of new norms, generated by the crisis situation. This happened in Divi in the aftermath of the 1977 Cyclone when orphaned children were adopted by parents who lost their own offspring in the calamity. When husbands and wives who lost their spouses contracted marriages among themselves ignoring normal structural regulations. Alternatively, an effective state of corporateness may also be short-lived and may disappear once the crisis wears off. The aftermath of crisis situations may also engender or aggravate conflicts between social groups over the distribution of relief and rehabilitation assistance.²

The population of disaster victims can be defined in various ways—as individuals, families, neighbourhoods, homesteads, hamlets, communities, villages, regions, and so on. What role each or some of these collectivities can play in disaster preparedness? The answer would depend upon a number of factors: the form of distinct social life, degree of solidarity within the group(s), and the resources, especially leadership, information and technology, at their command. Turning to evidence from our field study we note that there are

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1. See Fritz, C E., "Disaster". In Merton R. and Nisbet R. *Contemporary Social Problems*, New York, Harcourt Bruce & World, 1961.
 2. Politicization of the relief and rehabilitation process of the 1977 Cyclone is discussed in Cohen and Raghavulu, *op cit*, Chs. IV to VI. In the immediate aftermath of the disaster there was also a temporary disappearance of the social organisation because of the fact that almost entire villages were washed away in some cases.

many ranges and degrees of community as perceived by the respondents. From this diversity, we could identify at least three major types of communities.

These are :

- i) The family
- ii) the neighbourhood/hamlet/human settlement within a contiguous territory, and
- iii) the revenue or panchayat village, usually consisting of one main village and several hamlets territorially dispersed.

These typologies are based on the prevalence of several characteristics, such as community sentiment ("we - feeling"), social bonds based on kinship, caste or class ties and perceived dependence on each other. Empirical data from our project show that the family continues to be the basic unit of social organisation, fulfilling these criteria. The hamlets covered in our sample are mostly uni-caste settlements. Many of these hamlets are losing their former coherence and mutual aid patterns. This is evident in more than half of the fishermen communities despite the fact that fishing continues to be a group-centred activity and the caste Panchayats still perform the basic functions, such as enforcement of caste norms/codes, arbitration of disputes and maintenance of intercaste relations. A distinctive part of the situation in the fishermen communities, is that the demands posed by a disaster, are not likely to be completely unexpected. With the result, community members are familiar with pre-existing, traditional authority relationships as to what they should do when a disaster occurs. In nearly a third of the sampled hamlets, the caste elders called the general body to discuss the issue of evacuation, both in May and August 1979. Their decisions were generally followed by the members of the community. Neighbours and kinsmen and other villagers communicated weather information from the official warnings to others within the community. These channels of communication did not follow the legitimate sources of authority within the village. Instead, the youth played a prominent part in communicating official messages about weather. In both the coastal and non-coastal villages there was also a spontaneous enactment of the 'rescue' rôle by able-bodied persons. In the first phase, they took care of the old, the disabled and the children. In the second phase, women were led to safer places. In the third phase, respondents took care of themselves. Neighbours rushed to assist others in difficulty. There was no prior assignment of responsibilities for disaster-relevant tasks in any of these communities.

We have some evidence concerning the attitudes towards self-help (see Table-4.) It shows that about one-fifth of the respondents, perceive mutual aid and self-reliance, the most helpful things in a disaster context. In contrast, Government's role/aid is considered important by about 30 per cent of the sample. The broad distribution of attitudes ranging from self-reliance (0.9 per cent) and mutual aid (19.8 per cent) to dependence on Government points to some divergence in respondent attitudes. However, such divergence in the attitude pattern is to be expected. In a disaster of colossal dimensions individual's faith in his ability to cope with it or rehabilitate himself and his family may utterly be shaken and the victim would ordinarily look to external sources of help, either from one's own community or the Government or a supernatural source. Such an interpretation of the evidence is consistent with our earlier conceptualisation of a multi-dimensional response system.

Viewed from another angle, there is some evidence indicating decline in customary attitudes toward self-help. Although we have no base line information on this point, data from unstructured interviews with a sub-sample of the respondents indicates a declining trend in self-reliance and mutual aid patterns. This can be seen from the following illustration. In the past, most fishermen communities used to take care of the families of individuals losing their lives on the high seas. The norm was that other fishermen teamed with the deceased individual who loses life should take care of the bereaved family for at least an year and the entire community would contribute for the funeral expenses. The norm is no longer operative in any of the communities sampled. Only in a few communities, the family in distress, is being helped until the first funeral ceremony. The common practice now obtaining in most of the communities is to petition the Government for an ex-gratia payment. The response from the Government is positive in a majority of the cases. The artisan groups—weavers in particular—have been used to receiving aid (grants, loans and subsidies) from the Government. Of course, disasters offer major opportunities to petition the Government successfully for aid.

Unquestionably, the family continues to be the most significant unit of the social organisation, with sentimental and social bonds. One of the items on the sentence completion test attempted to elicit the respondent attitudes concern his social responsibility in a disaster. The relevant item and the responses are noted in the following Page.

In the context of a disaster my main responsibility is toward

TABLE - 8

Sl. No.	response Category	Number of Respondents	% to Total	Total % in each cluster
1.	Family/wife and children/parents	210	66.04	} 69.81
2.	Myself and family	12	3.77	
3.	Myself	44	13.83	
4.	Relatives/Neighbours/ Fellow sufferers	24	7.55	
5.	Nobody	4	1.26	
6.	Others	9	2.83	
7.	Don't know/No Response	15	4.72	
Total :		318	100.00	

As Table 8 shows that more than two-thirds of the respondents consider that their major responsibility is towards their family; 14 per cent towards self; and 8 per cent towards neighbours, relatives and fellow sufferers within the hamlet. Widespread concern for the members of the extended family is consistent with findings from studies of disasters in other parts of the world. What is more important, the family roles of individuals seem to gain at the expense of wider community roles when the magnitude of the disaster is overwhelming. To demonstrate the significance of this observation it is necessary to examine evidence from the 1977 Andhra Cyclone. The effects of the 1977 calamity were so vast that pre-existing group/community structures other than that of the family broke down and the family roles tended to dominate. The collective capabilities of the caste, neighbourhood and village level structures declined sharply. There was a temporary disappearance of the village/hamlet level social organisation, as the members were thrown helter-skelter by the storm surge. These people ended up in different relief camps, losing their territorial identity. Even after their return to the villages, many of them were in a state of acute anxiety and depression. They were not in a position to perform the normal social roles expected of them. There was also the problem of functional overload. Given the existing resources of the groups the impact of the disaster was too much to

be handled. Consider the functions of burial of corpses and carcasses and removal of debris. Traditionally, these functions were handled by families and communities (village level). In 1977, there were heaps of debris and piles of corpses and carcasses all over. Not only were the capabilities of the survivors limited to handle the tasks but they were also overcome by grief caused by bereavement and loss of properties. They waited until relief workers did the job, but they rarely assisted them. The following quote summarises the situation.

“From the perspective of the survivor, deep in shock, there was little incentive to assist. His world had been destroyed, and his family and village torn apart; there was clearly no prospect of picking up where they had been before the cyclone, for the crops were ruined. Finally, the dead were strangers (many literally so, as bodies floated back and forth across a 350 square miles area). Regions sentiments forbade them from disposing of the corpses in any manner other than that sanctioned by custom”.³

In this context, survivors merely performed the rituals associated with cremation, but no cremation *per se*. Besides, the survivors lacked the technological capabilities to dispose of huge numbers of bloated carcasses.⁴ The situation provides a classic instance of the need for intervention from outside the village communities. When endogenous social response processes breakdown, external agents, such as the government or the N.G.O's must intervene.

In major disasters, the psychological help normally provided by kinsmen and neighbours, to the affected families would not be forthcoming. Once again, we rely on evidence from the 1977 Andhra Cyclone in support of our hypothesis. Victims who lost several family members could not get any appreciable psychological help, advice and information from other villages, because most of them were also severely affected. It may not be possible to avoid feelings of grief. However, it is possible to ease the agony so that grief does not turn pathological. In order to enhance the abilities of victims to cope with the psychological affects of major disasters and enable faster recovery psycho-social therapy may have to be provided by outside agents.⁵ Such help would enable the victims to perform their normal social roles and restore patterns of community and individual self-help.

Patterns of mutual aid at the level of the revenue village or Panchayat are diverse and complex. They seem to vary with the type of on-going economic relationships and functional social linkages. In order to assess the mutuality

3. Cohen and Raghavulu *op. cit.*, p. 37.

4. The estimates for Divi taluk alone ranged between 75,000 and 1,00,000.

5. See Vijayalakshmi B. "Rehabilitation of Disaster Victims in Andhra Pradesh : Need for Psycho-Social Therapy" (mimeo). Department of Social Work, Andhra University, 1977.

in their relationship the range of aid received by the victims from various sources of the community during the first post-disaster phase (within 48 hours after the disaster) of the 1979 Cyclone was used as an indicator. The extent of aid provided by the community was quite extensive in non-coastal region where an alert for evacuation by the Government was conspicuous by its absence. During the first post-disaster phase the proportion of victims who received aid from community sources is about six times that of people who received food packets from Government helicopters. The details of community aid are furnished in table 9:

TABLE - 9
SOURCE OF AID WITHIN 48 HOURS AFTER THE DISASTER
VILLAGE COMMUNITY

Item of aid	RESPONDENTS					
	Coastal		Non-coastal		Total	
	No.	%	No.	%	No.	%
Rescue	3	0.94	11	3.46	14	4.40
Shelter	3	0.94	5	1.57	8	2.52
Food	17	5.35	36	11.32	53	16.67
Removal of corpses	0	0	2	0.63	2	0.62
Shelter and food	10	3.14	21	6.60	31	9.75
Rescue and food	0	0	11	3.46	11	3.46
Food and removal of corpses	0	0	2	0.63	2	0.63
Rescue, food and shelter	1	0.31	1	0.31	2	0.63
Shelter, food and clothing	1	0.31	1	0.31	2	0.63
Others (medical aid, loans, etc.)	0	0	2	0.63	2	0.63
Total :	35	11.00	92	28.93	127	39.93

Sample Size : 318

Clearly, local effort and self-help rendered by the non-coastal village communities is much wider than that provided by the coastal village communities. Although the reasons for variation have not been investigated thoroughly at least three supportive environmental conditions become apparent. First, the extent of assistance required by the vulnerable groups on the coast from the respective local communities was somewhat limited. The bulk of the vulnerable groups from these coastal villages had been evacuated. A second person perhaps concerns the differences in the pre-existing social relations between the inhabitants of the hamlets and that of the main villages in the two regions. The groups badly affected in the non-coastal region mostly consisted of agricultural labourers, tenants or small land-owners. These people have been part of a patron-client network typical of a agricultural economy of Andhra Pradesh. One of the norms of this relationship is that the clients (labourers, tenant farmers, etc.) get help in kind or cash advance in times of distress from the better-off farmers of the main village who employ them.⁶ Provisions of shelter, food and other aid, therefore, fits into an on-going pattern of socio-economic relationships in these village communities. In contrast to this, most of the fishermen domiciled in the coastal villages are devoid of such socio-economic ties with the farmers and other better off stratum of the main villages. The fishermen usually draw cash advances from the fishing merchants located in the nearest marketing centres. After being evacuated to these centres on the eve of the May 1979 Cyclone, many fishermen went straight to the fishing merchants. They received food aid and loans from the respective fishing merchants.⁷ Thirdly, the higher level of aid received by the victims of the non-coastal villages was also being occasioned by the low frequency of disasters and the higher magnitude of human and property losses relative to that of the fishermen communities.⁸ The latter are battered by cyclones more often than the interior villages. The flash floods of 1979 have no parallel in the meteorological history of the region. The uniqueness of the event seems to explain partly the degree of response.

While the extent of community aid was enormous during the immediate aftermath of the Cyclone, it certainly was not so after two days. Less than 8% of our sample have received aid from community sources during this phase. It is appropriate to note, at this point, two other observations. Most of the victims

6. See Appendix VI for details.

7. Data on aid received from this source is mainly qualitative and does not figure in Table 9 which gives the aid particulars from other sources.

8. The experience of most NGOs indicates that the level of charity declines if disasters occur too frequently.

whose houses were destroyed or severely damaged by the Cyclone took up the job of putting up either temporary shelters or repairing the houses with materials salvaged from the rubble. The fact that this happened much earlier than the arrival of aid—mostly bamboos and palmyrah leaves or cash assistance for housing—from the Government or NGOs indicates one type of spontaneous adjustment to the situation. Although this was in contrast with the attitudes of the victims of the 1977 Cyclone—who lost everything and there was little to pick up from the debris—it illustrates a clear pattern of self-help in the sphere of shelter. Victims of the Vamsadhara (Srikakulam District) flood of 1980 also put up temporary shelters on their own. In the worst-affected villages, the first thing the residents did after the flood receded was salvaging of materials from the rubble. Then they moved to elevated places and fixed the shelters. There were also many others, in villages with less severe affect who chose not to repair their huts in anticipation of the cash grant (Rs. 75 to Rs 150) from Government. They felt that if the huts are repaired everything might look normal, thus making them ineligible for Government aid for housing.

Our next observation concerns the mobilisational role of community leaders, both formal and informal. Caste leaders from the hamlets and Sarpanches and political activists belonging to all organised political parties took to petitioning for aid from Government. Scores of poor people in small and large groups visiting the offices of the Government at the taluk and District levels was a common sight. Very often, they had to wait for long hours to contact the key officials with their requests for aid, ranging from rice and housing materials to loans and subsidies. In a sense, the community leaders, both formal and informal, assumed new roles to mobilise outside help or to speed up the process and to act as channels of communication with Government officers, prominent politicians and, to a limited extent, with the personnel of N.G.Os.

Aid from Government

As in all other disasters in the developing countries, Government's role in rushing aid to disaster victims tends to be a matter of critical importance. Given the extent of Governmental response in the previous disasters victims also expect the Government to come to their rescue in the event of a disaster. As alluded earlier, about 30% of the respondents perceive that the most helpful thing in a disaster context is the Government's role or aid (Table-4). The response is quite high considering the unstructured format of the questionnaire item.

Besides evacuating large numbers of potential victims from the coastal region during the pre-disaster phase, the Government organised relief camps for taking care of them. Nearly 55% of our sample — all from the coastal villages — were evacuated by the Government. In the first post-disaster phase of relief operations, the non-coastal region received priority in terms of helicopter sorties. However, helicopter sorties have more of a symbolic effect. Besides the dramatic effect of helicopters roving in the air, they symbolised the presence of the Government and the concern of the outside world towards them. Most victims feel happy about the mere presence of helicopters on the scene. Opinion was far less concerted on the extent of help rendered by the helicopters. Less than 5% of the respondents report of having received the helicopter drops. Nearly half of them felt that the food dropped by helicopters was not in an edible condition by the time it reached them. The extent of aid rendered by the Government during the second post-disaster phase (48 hours after the disaster) was quite extensive. The details of Governmental aid during this phase, as reported by the respondents, are furnished in Table 10.

TABLE-10

AID RECEIVED AFTER 48 HOURS FROM GOVERNMENT

Type of Aid	Coastal		Non-coastal		Total	
	No.	%	No.	%	No.	%
Gratuitous relief and medical aid	2	0.63	—	—	2	0.63
Food, medical aid, clothing and gratuitous relief	133	41.82	49	15.41	182	57.23
Food, clothing, medical aid, gratuitous relief and drinking water supply	6	1.89	56	17.60	62	19.50
Food, clothing, medical aid, gratuitous relief, drinking water supply, ex-gratia and housing material*	2	0.63	11	3.46	13	4.09
Food, clothing, medical aid, gratuitous relief and housing material	1	0.31	9	2.83	10	3.14
Food, clothing, medical aid, gratuitous relief, housing material and drinking water supply	—	—	12	3.77	12	3.77
Food, clothing, medical aid, gratuitous relief, drinking water supply, removal of corpses and housing material *	—	—	7	2.20	7	2.20
Food, clothing, medical aid, gratuitous relief, removal of corpses and ex-gratia	—	—	5	1.57	5	1.57
Food, clothing, medical aid, gratuitous relief and ex-gratia	1	0.31	7	2.20	8	2.52
Others	1	0.31	5	1.57	6	1.89
Not received	8	2.52	3	0.94	11	3.46
					318	100.00

* Includes three cases of housing material aid

Virtually all the respondents (97%) were covered by some item of aid or the other, provided by the Government. Respondent satisfaction about aid was also fairly high. More than three-fourths of the aid-recipients were either fully or partially satisfied. Dissenters from this view account for about 22%. The main reasons for dissatisfaction with Government aid are noted in table 11.

TABLE - 11
REASONS FOR DISSATISFACTION

Sl. No.	Attitude	Respondents	
		Nos.	% of 318
1.	Promised more, gave less/expected more, got less	28	8.80
2.	Lower level Government Officers corrupt or irresponsible	12	3.77
3.	Estimates of damages incorrect	8	2.52
4.	Aid norms discriminatory-favour some social groups only	8	2.52
5.	Middlemen or village influentials cornered aid	7	2.20
6.	Delay in distribution of aid	7	2.20
Total		70	22.01

The most difficult issue concerns the impact Governmental relief policy would have on attitudes of the victim population toward self-reliance and mutual aid. Dependence on the Government among the poorer stratum of the victims is almost universal. The practice of granting relief in a liberal manner has induced many others — poor and not so poor — to demand assistance on an equal footing. Many local urban groups as well as others who are far away

9. For a detailed presentation of the Governmental response see Government of Andhra Pradesh. *Disaster Preparedness in Andhra Pradesh*, op cit., For an analysis of the Government's organisational adaptations to the 1977 and 1979 Andhra Cyclone see Raghavulu. C.V., 'Disaster Management and Organisational adaptation. In Chaturvedi T. N., and Shanta K. C (Eds) *Social Administration, Development and Change* New Delhi, Indian Institute of Public Administration, 1980.

from the core of area of devastation have now joined the relief lines. In the normal course, these very people should have assisted the people of the worst-affected area. Instead, they have turned out to be the most effective and organised claimants for relief and rehabilitation assistance. As a former Commissioner of Relief and Rehabilitation puts it, "a disaster is now perceived by such people as an opportunity to extract". The attitude of the Government is not unfavourable to them either. With a view to avoiding political and public controversies during such events, the Government have adopted the line of least resistance. News about disasters tends to be highly emotive. The local press can put the Government in jeopardy by sensationalising what is at best a non-issue. On the whole, the Government's policy is one of non-discrimination between the most affected. Its spill-over effects are a matter of consequence in shaping the attitudes of population towards self-reliance and mutual aid. The dependency syndrome is being reinforced and legitimised by a policy of indiscriminate aid-giving. This may have long-term effects on their attitudes towards self-reliance.

Aid from Non-Government Organisations

Aid to the disaster victims of the 1979 Cyclone from N.G.Os was practically non-existent during the first phase (48 hours after the disaster). The aid provided by them during the second phase (48 hours after the first phase) was highly diverse and covered nearly 55% of those who responded to this item of the interview-schedule. N.G.Os which provided rehabilitation assistance include Ananda Marg, Arthika Samatha Mandal, ARTIC, AWARE, Baptist Mission, Catholic Rural Development Centre, CARE, Catholic Relief Services, Church of South India, EFICOR, Gandhi Peace Foundation, Indian Red Cross, Jamat-E-Islami, Mennonite Central Committee, OXFAM, Ramkrishna Mission, Rastriya Swayam Sevak Sangh, Society for Sericulture, UNICEF VIRASAM and Village Reconstruction Organisation. Besides these, a number of *ad hoc* organisations, service clubs, student groups (NCC, NSS, etc.) and semi-Governmental organisations like the A P State Road Transport Corporation, Singareni Collieries, Sites and Services, A P State Weaker Sections Housing Corporation, etc., have also rendered aid to the disaster victims. The range of services provided by the N.G.Os is extensive. An item-wise summary is presented in table 12.

TABLE-12

AID RECEIVED AFTER 48 HOURS FROM NON-GOVERNMENTAL ORGANISATIONS

Item of aid	RESPONDENTS					
	Coastal		Non-coastal		Total	
	No.	%	No.	%	No.	%
Food	10	3.14	6	1.89	16	5.03
Clothing	9	2.83	14	4.40	23	7.23
Medical aid	3	0.94	3	0.94	6	1.89
Housing material	0	0	3	0.94	3	0.94
Money/Loan/Subsidy	7	2.20	16	5.03	23	7.23
Pucca housing	2	0.63	0	0	2	0.63
Food for work programme	5	1.57	0	0	5	1.57
Food and clothing	10	3.14	3	0.94	13	4.09
Food, clothing, and monetary help	9	2.83	20	6.29	29	9.12
Food, clothing, household material	17	5.35	7	2.20	24	7.55
Food, clothing, household material, and housing material	2	0.63	2	0.63	4	1.26
Food, clothing, and housing material	2	0.63	7	2.20	9	2.83
Food, and household material	1	0.31	4	1.26	5	1.57
Food, clothing, medical aid, and household materials	1	0.31	2	0.63	3	0.94
Other relief aid	3	0.94	5	1.57	8	2.52
Not received any aid	72	22.64	73	22.95	145	45.60
Total :	153	48.11	165	51.89	3184	100.00

The involvement of a limited number of NGOs in the 1979 Cyclone aftermath is in contrast with that of 1977 when a large number of groups were around. Their number, even at the relief stage, would seem to depend upon the severity or sensationality of the disaster. Since quite a few of the groups that participated in the relief and rehabilitation effort of 1979 were specialist agencies, their approach was much more systematic. Agencies like the VRO, MCC, EFICOR, ARTIC and Catholic Rural Development Centre undertook a systematic assessment of the needs before plunging into action. The VRO and MCC went about their job methodically. They refused to yield to pressures from the Government and the victims to proceed with projects in which community involvement, or commitment from the Government was considered doubtful. OXFAM and EFICOR stuck to their community projects though there were more news-worthy projects. It is significant to note that many of the professionally oriented groups did not surrender their respective approaches even when they were up against severe odds.

The approach of the *ad hoc* groups was not dissimilar to the experience of 1977. The chronic problem both in 1977 to 1979 was for most *ad hoc* groups to unload their goods, get adequate press coverage and then wind up their activity. They were also guilty of a subjective assessment of the needs of the victims. Most of them ended up delivering food and clothing even after the victims received their quota of 10 to 20 Kgs. of rice and clothing from the Government. The indiscriminate manner of distribution of relief seems to have delayed the return of normalcy, especially in the case of road-side villages. The tendency for many of the victims of these villages was to wait at the road-side in anticipation of the arrival of some relief vehicle. It is interesting to note the emergence of a 'relief syndrome' in many of these communities.

Among the long-term preparedness programmes, no other issue has perhaps received as much attention as pucca housing. A continuous outpouring of ministerial pronouncements, along with the promise of a matching contribution lured quite a few NGOs to get on to the bandwagon of pucca housing. In this context, consideration of alternatives to pucca housing or other schemes of rehabilitation have been pushed to the background. The demonstration effect of the pucca house, coupled with a predilection for western technology make them attractive to the victims also.¹¹ So much so, moving to a pucca

11. For a detailed discussion of the various issues involved, see Cohen and Raghavulu, *op cit.*, Also see Cuny, Fred, et al., *Issues and Problems in the Provision of Shelter and Housing*. Vijayawada, ARTIC, January, 1978.

house seems to be the only optimal adjustment, according to a quarter of the respondents. Differences in regard to long-term adjustments are based on the options open to them. Precautions such as improvements to traditional housing have not been campaigned on a systematic basis. The efforts of N.G.Os, such as OXFAM and ARTIC are an exception to the over-arching predilection for pucca housing. Often, constraints to improved traditional housing seem to be in the realm of awareness of low-cost technology which is locally available. The improvements to traditional housing suggested by OXFAM and ARTIC require a minimum of preparation, very little monetary outlay and no major change in belief systems. Elevation of the house-sites can also be adopted in the vulnerable areas.

It may not be out of place to consider the experience of ARTIC in this respect. ARTIC has been actively involved in disaster education and training programmes relating to improvements to traditional housing. Given a high expectation of housing damage, solutions concerned with housing would receive the attention of victims. This view is being supported by our observations of the post-disaster situations of Prakasam (1979) and Srikakulam (1980). In both the instances the victims were favourably inclined to the suggestion of improvements to traditional housing. What more positive evidence should we have than witnessing people salvaging the housing materials from the rubble and putting up shelters by themselves. The demonstration huts erected by ARTIC in some villages of Prakasam district have created interest and some dissemination of knowledge about improved traditional housing, if not actual adoption of the pattern. Improvements based on locally available technology seem to offer a major attraction to the victims. The impact of the carpentry training programmes is yet another matter; it has not been covered by this study. Their impact may not, however, be significant in view of the fact that most poor people erect their own huts and seldom consult or employ a carpenter. The carpenters are usually hired by builders of pucca houses. To make the programme more effective, ARTIC should intervene right after a disaster. It should also supply the steel braces at a nominal price.

CHAPTER VI

DISCUSSION AND CONCLUSIONS

Cyclone hazard has been a persistent feature, affecting the residents of several states abetting the east coast and Gujarat on the West coast. Flood hazard in India is an annual feature, affecting nearly all the States. The severity of cyclones and floods from the human and economic point of view, should be a matter of the greatest concern to policy-makers in Governmental and non-Governmental organisations and international agencies interested in disaster mitigation. Much interest has been focussed on the cyclones which hit Andhra Pradesh in 1977 and 1979.

Unfortunately, disasters tend to be events of sensationalism with a widespread, but short lived concern. Press coverage, public attention, elite concern and Governmental involvement converge once an event of ghastly proportions takes place and then the interest wears off quickly. This report is the outgrowth of interest in the broader issue of disaster preparedness at the community level. The main focus of the study is on understanding the perceptions and attitudes of disaster victims and the human response patterns associated with preparedness. But community preparedness cannot be considered in isolation from the policy initiatives and managerial strategies of the Governmental and non-Governmental agencies. Further elaboration and discussion of the salient issues thrown up by the study is attempted in this and the following chapter.

The study shows that awareness about the consequences of disasters is widespread among the population of the sample region. Previous cross-cultural research has shown that awareness concerning natural hazards is closely associated with preparedness.¹ Our research findings appear to collaborate this view. Reviewing the response patterns of the victims to the call for evacuation we noted that it probably needed much less persuasion to evacuate

1. Baker E. J., and Patton D. J, "Attitudes Toward Hurricane Hazards on the Gulf Coast". In White, G. F. (ed.) *Natural Hazards - Local, National, Global*. New York, Oxford University Press, 1974, pp. 32-33

the vulnerable population in 1979, partly because the 1977 disaster was still fresh in their memory. This as well as other evidence indicates that at least short-term preparedness was viewed by the victims seriously. Speculation may turn in another direction. Disasters seem to provide major learning experiences by themselves, contributing to the emergence of a disaster sub-culture.² While the prevalence of a disaster sub-culture would contribute to a greater degree of preparedness to face minor disasters it seems to inhibit the communities to prepare for large-scale disasters. The experience of 1977 and 1979 Andhra Cyclones provides evidence in both the directions. This is not to argue that preparedness measures, based on recent experience, would come to naught. On the contrary, it suggests that education and training programmes should aim at sensitising the victims about a broader range of probabilistic judgments concerning the source and magnitude of the events as well as their differential effects. Besides bringing about awareness about the scale and intensity of each type of disaster and the risks involved it would help disaster mitigation through spontaneous action from the vulnerable communities. Voluntary evacuation is one such possibility.³

The field study indicates that among the social and institutional variables, group sanctioned individual response turns out to be important in regard to decisions on evacuation, petitioning for aid, communication of weather data and perhaps improvements to traditional housing. Group legitimation, therefore, assumes importance in regard to some aspects of disaster preparedness. Similarly, family ties, kinship bonds and socio economic relationships within the agrarian structure seem to be important in patterning mutual aid within the village communities. Some aspects of disaster preparedness appear to have been institutionalised. The best illustration of this category is, of course, the round type of hut with roofing all the way down to the ground.⁴

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2. See Dynes R. R., Quarantelli E. L. and Kreps G. A., *A Perspective on Disaster Planning*, Washington DC, Civil Defense Preparedness Agency, 1972.
 3. The suddenness of a disaster would not always provide scope for timely intervention from outside the affected communities. Accessibility is yet another problem. If some of the vital road links are cut off evacuation of large numbers of people through public transport would turn out to be an impossible exercise. In such an event, the victims and the communities have to move out on their own. Community self-help and initiative would come in handy even after a disaster strikes. For instance, accessibility by road could not be established with nearly 20 villages in Kandukur taluk until 10 days after the 1979 disaster. In this context, the bulk of the immediate relief was provided by the people of the communities. It took nearly six days to establish meaningful contact with 21 of the 187 villages affected by the Srikakulam flood in Andhra Pradesh (1980).
 4. It has a wide bottom and gets narrower as it goes up. The upper tip is being reinforced either by a used fishing net or a bottomless earthen jar. Unlike in concrete buildings the whole weight is geared towards the bottom of the structure. The arrangement of the roofing material (palm or coconut leaves, hay or other indigenous fibre) makes the hut compact and less vulnerable to high velocity winds.

It is a paradox that while communities have been constantly adjusting to situations created by disasters, victim expectations of outside help, especially Government assistance, have been going up. What is worse, non-victims and marginally-affected individuals have joined the bandwagon of claimants for relief assistance and other concessions from the Government. While in 1977 the Government were able to evolve a rational approach, demarcating the worst affected area in Krishna District for priority attention, a similar attempt was not made in 1979 or 1980. The consequences of such an indiscriminate distribution of aid are deplorable. The recipients were just eagerly looking forward to the next disaster.⁵

The motives behind a policy of lack of prioritisation are complex. Successive Chief Ministers seem to be wringing with each other in demonstrating their attention, if not concern, for the disaster victims. In this respect, the quantum of relief aid distributed and the number of recipients were considered easy indicators. A few policy-makers also felt that provision of relief assistance to the non-victims or marginally-affected was a mere extension of the Government's welfare policies, not directly connected with disasters. Local or regional political elites, regardless of their party affiliation, have also contributed their share towards fostering the new belief structure. The cumulative impact of these developments is that 'receiving' has gained greater legitimacy. One major implication of reliance on Government interventions is a corresponding decline in the community's responsibility. Customary practices of community cooperation and mutual aid, as in the case of the fishing villages, are fast disappearing. A stage has reached that most disaster victims would like to wait for the Government buses and trucks to arrive for evacuating them. The function of removal of corpses and carcasses, once the responsibility of families and Panchayats, has now been effectively transferred to Government squads. The communities used to undertake minor flood protection schemes—deepening of drains, building of bunds, etc. These are now perceived to be entirely the responsibility of Government. On top of all these comes pucca housing. In India, the responsibility for housing was always considered to fall in the realm of the individuals and families. Post-impact rehabilitation programmes in this sphere by the Government and the N. G. Os have pushed housing into the public domain. Since pucca houses were given away freely in the aftermath of the 1977 Cyclone most victims are now unwilling to put in their share of cash or labour or take them on a loan or subsidy basis.

5 For instance, Kandukur the worst-affected Taluk in Prakasam District, received more or less the same amount of per capita relief aid as some taluks of Nellore District where the 1979 disaster was a non-event.

Containment of the 'relief syndrome' is by no means easy. Education and training programmes toward community preparedness might help check these rising expectations and minimise the fall-out effects of disaster-relevant programmes from solidifying into an institutional structure. Instead, the sub-culture elements of self-help and mutual aid must be exploited. A careful design of the post-impact operations of the Government and the N. G. Os can help mitigate the 'dependency' complex. In this scheme of things, outside intervention would still be necessary in a number of disaster-relevant operations. However, external assistance, governmental and non-governmental, should, therefore, be complementary to local efforts and self-help of communities. It is as much important to rush the required items of aid as it is to prevent the flow of unneeded items to the victims. The assumption that the local population will be helpless in a disaster aftermath is without foundation, more so after the 1979 experience. The implication for the N. G. Os is obvious. A slow and studied response from them to disaster-induced needs would allow for greater coordination and improve the quality and usefulness of their assistance. It would allow them enough time to assess the needs of the victims and priorities of assistance. Such an approach is all the more important in the case of international or multinational relief agencies with mandates to complete their programmes of assistance within 60 to 90 days.

As pointed out earlier, relocation of whole settlements or shifting millions of people beyond the 0-5 KMs., would be as futile as enforcing regulations prohibiting new structures in this zone. It is, therefore, appropriate to consider programmes aimed at motivating potential victims and communities to work out adjustments within the range of possibility. Simple measures, such as improvements to traditional housing with low-cost locally available technology and elevation of house sites offer pragmatic solutions. Such improvements can be—and were—undertaken by the residents themselves. Timely intervention by outside agencies with programmes of motivation could be of great help in this regard. They could supplement the housing programmes of the victims—or potential victims—with the supply of key materials used in traditional housing on a subsidy basis. They could offer expert advice in regard to construction methods to improve the safety of the houses. The intervention strategy should, however stress upon extending support to the local economy, local skills and be in turn with the ecology.⁶ Putting up a few concrete structures here and there would not mitigate the overall problem across the coast. The life of a concrete

6. See Cuny F., Davis I. R., and Krimgeld F., *Issues and Problems in the Provision of Shelter and Housing*, Vijayawada. ARTIC, 1978.

structure on the coast is estimated to be less than half of the life of the same structure in the interior. We will not be mitigating the problem if these houses do not last more than a generation.⁷

We will now turn to a review of the impact of a disaster on different occupational groups. The problems encountered by different occupational groups vary both in terms of their magnitude and intensity. For the fishermen the loss of life, property — boats, nets — and employment is much more than that of any other occupational group. Fishing on the sea cannot be undertaken before and after a cyclone. The dislocation caused by severe cyclonic storms to their livelihood pattern is anybody's guess. Considering this difficulty, Government have been granting to the fishermen double the quantum of relief entitlement. Both the Government and the N. G. Os have also been sensitive to their requirements of fishing equipment — boat and nets.

Farmers figure next only to fishermen with respect to the impact of a cyclone. Loss of life is not heavy for them because most of them live in the main village or elevated places. Quite a large proportion of them live in pucca houses too. Yet, the loss of property — damage to crops, land, farm buildings and equipment, cattle loss, etc. — is the heaviest. It takes several years for a farmer to recoup from a severe disaster. Artisans suffer loss of employment though their tools and equipment are replenished over a period of time. Most artisan groups are entitled to Government subventions in times of disasters. They are also in the priority list of N.G.Os for aid purposes. Loss of life and damage to housing on account of a cyclone/flood is heavy among the agricultural labourers. They rank next only to the fishermen in this respect. Since Government relief policies are weighed in favour of the poorer stratum their hardship is mitigated partly, contributing to their early recovery to normalcy. Moreover, disasters seem to increase the demand for the employment of 'casual' labourers. Very often, a boom in the employment of manual/unskilled labourers follows each disaster because of the need for repairing railway lines, irrigation works and for initiating housing and other rehabilitation projects.

Considering the differential impact of a cyclone/flood and prevailing policies of mitigation, one cannot avoid the inference that the farmers remain a vital but neglected occupational group.

⁷ In the 1977 disaster, such concrete structures turned to be as vulnerable as the thatched huts. There is little that one can expect by way of mitigation, through Government sponsored pucca structures, because of the non-observance of norms of construction of public buildings. It was reported recently that a cyclone shelter collapsed in Nellore District before its construction was complete. See *The Indian Express*, Vijayawada, October 16, 1980.

It is important to realise that when the acceptable risk-benefit ratio is down for most farmers and especially those cultivating commercial crops outside intervention becomes necessary. Contributory crop and cattle insurance schemes are often being suggested in this context.⁸ An insurance cover, at least for the high-risk oriented commercial crops like tobacco, cotton, and orchards merits attention. Such a coverage exists for flood-prone areas in the West. The suggestion is in keeping with the recommendations of many expert studies on agriculture. Time and again, the proposal has been turned down on grounds of feasibility. This attitude of indifference toward the farmers battered by a series of natural calamities is in startling contrast with the treatment meted out to sick industries. While the Government has a policy of bailing out the industries in trouble there is not even an insurance cover, much less to speak of any substantial assistance.⁹ Insurance coverage would provide some protection to mitigate the losses suffered by individual farmers and help to put the damaged agricultural economy back on its wheels. It would enable farmers to contribute a part of their profit margins during a good year and meliorate losses during bad years. Disaster insurance should, therefore become an integral part of an over all community disaster preparedness policy.

Our discussion on community preparedness would be incomplete without relating it to the role of the Government. As in all other Third World Countries the role of the Government is of critical importance in initiating measures of disaster preparedness. Such measures impinge upon the roles and responsibilities of individuals and communities and especially the extent of self-help. The response of the Union and State Governments to successive disasters during last decade has been on an ascending scale. There has been a heightened concern for preparedness measures, especially since the submission of the CDMC Report.¹⁰ It is reflected in modest improvements to the warning system, the construction of a chain of cyclone shelters across the coast, support for pucca housing schemes in the area of devastation and the preparation of detailed district plans for disaster mitigation.¹¹ Nevertheless, the overall response of the Union and State Governments tends to be crisis-centred and post-impact orien-

8 See Ranga N.G. *Natural Calamities, Measures for Mitigation*. Hyderabad, The Indian Peasant Institute, pp. 3-9.

9. Rescheduling of loans, remission of land revenue and special crop loans and subsidies and loans for clearing the sand do not offer adequate compensation. Recently, the Government of Andhra Pradesh has announced a policy of crop insurance. It will become operative on a pilot basis for select commercial crops.

10. See chapter IV of this Report.

11. The Governments of Tamil Nadu and Andhra Pradesh prepared such plans during 1978-80.

ted with a predominant focus on relief assistance. Correspondingly, programmes aimed at preparedness, at the macro and micro (community) levels, lagged far behind verbal pronouncements on the issue.

Installation of an efficient forecasting and early warning system can contribute significantly to a rational response pattern from the Government. Time and again expert bodies have underlined the need for speedy improvements to the warning system. People in the vulnerable zones have also been catching up with the transistor revolution. Yet, the Government's response in the installation of a warning system across the east coast and the catchment areas of the rivers is lagging behind. Obviously, pre-impact preparation is given a low priority relative to meeting the demands generated during the post-disaster situation. Thus, the Central Government is prepared to pump in huge sums into a relief programme rather than invest modest sums in improving the warning system. Evidently, a more rational approach on the part of the Union Government and the international disaster relief agencies can contribute directly to a higher level of disaster preparedness, even at the community level.

Recommendations

The following recommendations emerge from the study :

- i) Besides initiating schemes for evacuation of potential victims, the Government and/the N.G.Os. should undertake programmes aimed at increasing their awareness about possible sites/routes for evacuation to facilitate voluntary and spontaneous action.
- ii) Both the Central and State Governments should give priority to policies aimed at long-range preparedness rather than relief assistance. (Loss of life was mainly due to lack of disaster preparedness measures rather than starvation following a disaster). This would mean massive investments in scientific research, especially in meteorology; evolution of suitable cropping patterns; wind-resistant house designs; and educational and training programmes for policy-makers, policy-analysts, potential disaster victims, and personnel of N.G.Os. (The following chapter deals with the design of training programmes for community preparedness).
- iii) Improvements to the warning system across the coastal belt to facilitate a more efficient and effective communication of weather data by recourse to satellite technology is imperative. The Government of India and the International Relief agencies could collaborate in this venture.

- iv) In countries like India where the local (State) Governments are in a position to provide relief to the disaster victims the International Relief agencies should give priority attention to measures of long-range preparedness.
- v) The Central and State Governments should work out norms of relief assistance for each of the zones after classifying the area struck by a disaster according to the degree or extent of damage.
- vi) Considering the overall magnitude of the problem of shelter for disaster victims, both the Governmental and non-Governmental agencies should focus attention on improvements to traditional housing rather than attempting pucca housing schemes.
- vii) Very often, a return to normalcy by disaster victims is delayed due to delays in the identification of the extent of damage to housing by Government teams. The Government could utilise the services of N.G.Os to facilitate an early identification of damage so that the victims could salvage the materials and put up their shelters.
- viii) In designing the training programmes for community preparedness the prevailing system of authority and communication channels should be taken into consideration.
- ix) Rehabilitation programmes for the revival of the agricultural economy are awefully inadequate. The Government of India, in collaboration with the Reserve Bank of India and the State Governments, should work out schemes for soft loans on a large scale to the affected farmers.
- x) An insurance cover for all the important food and commercial crops and orchards should be provided. The State and Central Governments should jointly work out schemes for crop insurance in regions of disaster vulnerability.

CHAPTER VII

EDUCATION AND TRAINING PROGRAMMES

There is a growing realisation, among specialists as well as non-specialists, that effective public education and training programmes would minimise loss of life and damage to property.¹ Such programmes would not only help specific groups and individuals to understand the basic preparedness measures but also to motivate them to adapt and respond to critical situations with some element of spontaneity. The basic issue, from the standpoint of disaster preparedness, is to improve the grass-root capabilities and foster favourable attitudes to face disaster situations. More specifically, these capabilities fall in the realm of survival and rescue in the short-run and self-help and mutual aid within the community in the long-run. Trained local leadership becomes imperative to dovetail these concerns at the community level. While suggesting the need for education and training programmes at the community level, it is not assumed that outside assistance is redundant. Indeed, special situations could still require a great deal of outside support. Outside intervention could precede community initiative as in the case of a warning system or facilitate community decision-making through an evacuation alert, or follow it as in rescue operations in a large-scale disaster. Governmental effort would be crucial in measures aimed at long-term preparedness, such as major improvements to the warning system, construction of sea walls, tidal bunds, embankments or flood banks to rivers, afforestation, cyclone shelters, etc.

The design of appropriate public education and training programmes involves a number of dilemmas concerning the choice of the target communities, the selection of beneficiaries (trainees), the agencies which should take up the training schemes, and the content of the training programmes. This Chapter is devoted to a discussion of this issues. Specific suggestions for education and training offered in this Chapter are based partly on the research material presented in the preceding Chapters, and partly on the author's insights from a number of research studies and discussions with experts engaged in disaster

¹ See United Nations. *The protection of Human Settlements from Natural Disasters* Geneva, 1976. UNDRO Office.

consultancy and operations besides reliance on a vast body of published and unpublished literature on disaster management.²

It is not yet possible to predict exactly when or where future cyclones or floods would occur or which areas they would affect. There have been quite a few most damaging cyclones on the east coast of India since 1850, though unevenly distributed in space, time, and magnitude. On the basis of historical records it is reasonable to anticipate a major storm surge once in every 100 years and a severe cyclone once in every five years. When we are not sure where a disaster would occur the next time we are faced with a dilemma. It revolves around the question whether awareness and skills should be thinly spread over the entire coastal region and other flood-prone areas or large portions of it (hoping for spread effects later) or it should cover a limited number of individuals and village communities, but on an intensive scale. The trade-offs between these two different strategies should be evaluated by the training agencies, taking into consideration their own resource base, especially financial and manpower resources.

If the educational programme has to be thinly spread, no other agency, excepting the Government, has the capability to take it up. Such an educational exercise would be similar to that of family planning or adult and continuing education. It would use the existing public information media, school systems, but supported by a core staff structure at all levels. Alternatively, it could be more selective, aiming at special publics and officials in the areas with recurring disasters, where the designated populations would have a higher level of motivation to react favourably.

Disaster education programmes designed in the United States, to combat the hurricane hazard offer an example of the extensive use of mass media—broadcast, films, newspapers—along with distribution of printed literature on preparedness. China undertook a similar education programme on a massive scale since the 1966 earthquake to prepare the public about earthquakes and similar disasters. The general public has been drawn into it. It is estimated that about one lakh persons are also involved in amateur prediction work apart from 10,000 experts working at nearly 270 seismic stations. When an earthquake seems imminent, individual communes and family brigades put up tents and construct temporary shelters and organise working groups to help the

2. I am especially indebted to Daniel 'O' Dell of UNICEF, Allan Taylor of INTERTECT, Nagendra Swamy of V. R. O. Fred Kaufman of M. C. C., Srikanth and Pradeep of OXFAM and R. Prakash of ARTIC for their discussions/interviews

young, old and disabled. Education and involvement of the people in the mass prediction programmes is a special feature of the Chinese approach to disaster preparedness. Soviet Union has an effective programme of compulsory civil defense education and training since several years. Every Soviet citizen has to participate in the programme and acquire the information and learn the skills needed in the event of natural or man-made disasters (wars).

The experience of the United States, China, and the Soviet Union are mentioned merely to provide us some information as to how other countries with large populations at risk have designed disaster preparedness programmes, covering the general public. If the Government were to provide similar public education programmes, they require the combined effort of the Central, State and local authorities. Creation of specialist agencies for this purpose at all levels, as in the case of family planning or National Adult Education Programme (NAEP), is perhaps a far cry.³ Nonetheless, it may not be difficult to combine education for disaster preparedness with that of continuing and adult education schemes or with other on-going programmes of rural development.

The second option consists of a more restricted coverage of the area and the target population for training. At present, there seems little possibility of the Government's involvement in public education programmes for disaster preparedness on a massive scale. The Government could take up a few areas—subjected to high frequency of disasters—for pilot projects in public education and training. A batch of five to ten youths from each village carefully selected for this purpose can be trained under this scheme.

A third option is for the Government to support the on-going programmes of training in disaster preparedness undertaken by non-Governmental agencies. Such programmes would naturally be confined to a few areas considered vulnerable to disasters. The fourth option consists of a combination of the second and third options. In this, both the Government and the N.G.Os take up training programmes. Their efforts, as in the case of NAEP would be complementary rather than competitive. According to this scheme, the N.G.Os would also receive some assistance from the Government and would work within the overall framework suggested by the latter.

The fifth option involves training programmes to be handled exclusively by N.G.Os, though on a limited scale. But most of the N.G.Os cannot handle the job. There is a great deal of diversity among the N.G.Os: they vary greatly in

3. The inference is based on discussions with key Government officials.

their size, support structures, resource base, interests and degree of specialisation in disaster-relevant work. The experience in recent disasters indicates that many N.G.Os would enter the relief phase and withdraw from the field once this phase is over. In disasters of the scale of the 1979 Cyclone, the non-specialist agencies participating in disaster relief were mostly those with non-disaster related projects in the affected area or in the adjoining districts. It is possible to involve the specialised agencies in disaster-related work, such as ARTIC and V.R.O. as well as the non-specialist groups with sizable programme commitments in the area. The involvement of the latter would have the advantage of linking disaster education and training programmes with on-going projects in the area. However, the key to N.G.O's involvement in programmes of education and training must have flexibility and careful local planning. They should strike a balance between the requirements of public participation and the imperatives of disaster management.

A number of factors have to be considered in selecting the geographic regions and the groups of individuals for training purposes. Villages or communities subjected to a high frequency of attacks from storm surges/cyclones/floods should get priority.⁴ From this criterion fishermen villages on the coast should be considered as the most appropriate ones for community level training programmes. It should not, however, be forgotten that these groups have a disaster sub-culture which induces them to take some precautions in the event of a disaster. Despite their vulnerability, the fishermen are not generally overcome by panic and have better survival and rescue skills than the other ethnic/occupational groups on the coast. Their huts are also better equipped to withstand cyclonic winds than that of the non-fishermen groups on the coast. Yet, the disaster sub-culture seems to breakdown when confronted by major disasters of the scale of 1977. Evidently, most fishermen groups do not need training toward short-term preparedness concerning minor disasters. But other ethnic/occupational groups on the coast still need it. All the vulnerables require training in terms of long-term preparedness.

4, Low-lying settlements, mostly fishing villages on the coast, number about 60 in Prakasam district alone.

The most difficult questions relate to the choice of individuals to be trained from the villages identified and the content of the training programmes. As regards the clientele for training, several options come up for consideration. The following are a few of them :

- 1) Pick people from political parties or political organisations : Since political activists at the village level, including the Sarpanches, are also active in community organisation, they could influence, in their turn, the potential victims. Even otherwise, the local political elites were found to be performing communication and mobilisational roles in times of disasters.
- 2) Select only the elected functionaries of Panchayati Raj institutions: This option would avoid the problem of selection in the case of faction-ridden villages.
- 3) Pick youth community groups which have taken up some community projects at the village level : Since these people have demonstrated their interest and initiative, they can be trusted with the roles of communicators of disaster-relevant information to other villagers.
- 4) Select caste leaders from the main village and each of the respective hamlets.
- 5) Select persons from groups one and three listed above.

Of the five options, the last one seems to be a sensible one. Political activists, including the Sarpanches, are not found in the village most of the time. Their frequent absence from the village and commitments outside the village would make them ineligible to play the roles of communicators and mobilisers on a continuing basis. Yet, these people matter in the decision-making structures of the respective villages/hamlets. It is very important to gain their support for disaster mitigation measures and their effective implementation. Their involvement in the educational process would also obviate any negative political influences. Persons covered under category three, especially a few village youths who stay in the village most of the time, could supplement the roles of political activists in the matter of communication of weather bulletins, offer of advice to people against panic and snap decisions on evacuation, etc. In sum, the responsibility for matters of short-term and long-range preparedness, would be broadly shared between the village youth and the political activists. Educated unemployed youth should be kept out of the training circuit, as these persons are also found to be away from the village very frequently. In the experience of many voluntary groups, the educated youth in the villages are

somewhat alienated from the village to play any constructive role in community disaster preparedness. Caste elders should also be eliminated for another reason. Caste elders, who preside over the caste panchayats for the adjudication of intra-caste and inter-caste disputes, lack the necessary articulation to deal with issues of disaster preparedness. In many non-coastal villages, one finds some convergence between the caste leadership and political leadership of the settlements/hamlets. In such an event, it would be redundant to pick caste leaders. Taking a pragmatic view of the situation, both the caste leaders and the college educated youth should be eliminated from consideration. The selection of youth who are settled in one of the village - centred occupations, with some education (preferably lower than junior college) along with a few political activists would meet the basic requirements. Care should, however, be taken to see that the vulnerable settlements or hamlets in a village receive priority in the selection of candidates for training.

The scheme suggested above involves the setting up of command posts — Village Volunteer Forces, if you will — which would perform several basic functions at the village level. They would :

- a) bring about awareness among the general public about disaster preparedness measures. (More specifically, they would dispel rumour, reduce panic and disorganised behaviour and keep up the morale of the people in times of disasters);
- b) watch the pre-disaster situation, interpret the clues, disseminate reliable information about the weather to house-holders either by knocking at the doors or through bull horns ;
- c) foster new relationships among potential victims to enable community mobilisation for self-help;
- d) collect advance information about the shelter camps or relief camps in case of evacuation;
- e) identify before hand the most endangered population groups for evacuation;
- f) undertake rescue if necessary;
- g) establish or strengthen lines of communication and information-sharing with the appropriate Government and non-Governmental agencies;
- h) make arrangements for stocks of food, groceries, water, kerosene and other essential items in case the evacuation camp or cyclone shelter is located in the village; and
- i) maintain the cyclone-cum-community shelter, if any.

Basically, the Village Volunteer Force would supplement and reinforce the work carried out by families and other social or formal organisations in the village. It would maintain liaison between the people and outside agencies. Their exposure to scientific knowledge concerning the weather and other disaster-relevant matters would enable them to communicate the same to the villagers in layman's terms.

As part of long-term preparedness, the Village Volunteer Force could suggest precautionary measures about wind-resistant houses, elevation of house-sites or other low-cost improvements. The exercise could also involve linkages of crop planning with climatic changes. Education about adjustment of crop seasons to avoid becoming targets of major floods or storm surges would become an integral part of the educational process. It might also include community works programmes for providing or improving flood banks, etc. The list is somewhat ambitious, but the specific content of their activities would depend upon the nature of the threat to their locality. The design of the training programmes should be tailored to the requirements of the communities from which volunteers are picked. It is, therefore, desirable to allow for some flexibility in the curriculum of training programmes for each group of contiguous villages. The training programmes should ordinarily be preceded by a survey of the area, its vulnerability to specific types of disasters, its potential destructiveness, or points of vulnerability and measures of disaster preparedness already in vogue and on-going development programmes. After the survey is complete, it would still be open for the N.G.O(s) to concentrate their training programmes on one or two items of priority, such as housing and community works or public health and nutrition, agriculture and animal husbandry and so on. Prioritisation on these lines also satisfies the cost-utility criterion.

At a conceptual level, the content of the training packages should concern three major areas :

- a) Awareness about natural calamities and preparedness measures;
- b) leadership training; and
- c) technical knowledge about the atmosphere and skill of survival and rescue.

The size of the Volunteer Force should not be unwieldy, say, not be more than seven or eight. It should have at least four to five youths. While training the groups the technique of simulation could be used. The Volunteer Force be supplied with an all-purpose rescue-kit to motivate the group to improve self-

help capability. Such a kit might include water container, flash light, hurricane lantern, distress signals, bull horns, manual saw, hammer, floatation devices and a few essential medicines. A transistor radio should be supplied to trainees from each of the hamlets if there is none in the hamlet. The technical hardware suggested here is simple and inexpensive.

The Government should adopt a range of measures—minor and major ones—to reinforce the effectiveness of training programmes attempted by the N.G.Os. A regular disaster drill every year during August-September, conducted by the Revenue Department in each village/hamlet would improve preparedness measures on the part of the community. The village panchayats with a favourable resource base may be allowed to spend a modest sum on disaster preparedness as well as corpse removal. In the case of panchayats without any appreciable income or assets, funds should be transferred by the Government for this purpose.

Generally speaking, the training programmes should fit into the intervention strategy of the concerned N.G.O or Governmental agency. It should, however, key upon maximising the role of the people and deploying external inputs to increase the potential for community action. External aid, such as the supply of safety devices, rescue kit or key housing materials, artisan tools or agricultural inputs on a subsidy basis should be conceived primarily as motivators for securing the acceptance of new ideas or devices for securing an entry point for the organisation rather than as delivery of charity. This approach fits in with the perspective of a few professionally oriented groups which are committed to the twin goals of awareness-building and the dissemination of appropriate technology.

Statement About the Sample
(Villages and Number of Respondents)

Sl. No.	Main Village and Hamlets	Taluk and District	Coastal or Non-coastal	Number Interviewed
1	2	3	4	5
1.	Nandanavanam a) Madigapalle b) Harijanawada	Kandukur, Prakasam	Non-coastal	19
2.	Paidipadu a) Harijanapalem b) Madigapeta c) Reddypalem	-do-	-do-	26
3.	Ramachandrapuram (Agraharam) a) Christianapalem	-do-	-do-	18
4.	Jillelamudi a) Balijapalem b) Malapalli c) Kammavaripalem	-do-	-do-	20
5.	Jarugumilli a) Yetimalapalem b) Madigapalem c) Penuguluri Varipalem	-do-	-do-	20
6.	K. Bitragunta a) Yenadi Colony b) Adi Andhrapeta c) Harijanapeta	-do-	-do-	22
7.	Pakala a) Pallepalem b) Christianpeta c) Vengapalli	-do-	Coastal	11
8.	Thimmareddypalle a) Elikevaripalle b) Vengapalle	Kanigiri, Prakasam	Non-coastal	8
9.	Chinnagollepalle	-do-	-do-	4
				148

Sl. No	Main Village and Hamlets	Taluk and District	Coastal or Non-coastal	Number Interviewed
1	2	3	4	5
10.	Peda Alavalapadu	B F :		148
	a) Vaddelapalem	Kangiri,	Non-coastal	20
	b) Chintalapale	Prakasam		
	c) Gudivaripalem			
	d) Regada			
	e) Vengalapuram			
11.	Doddichintala	-do-	-do-	8
	a) Madigapalem			
	b) Sitarampuram			
	Malapalle			
12.	Kothapatnam	Ongole,	Coastal	21
	a) Dakshina Pallepalem	Prakasam		
	b) Uttara Pallepalem			
	c) Harijanawada			
13.	Ithamukkala	-do-	-do-	20
	a) Pattapupalem			
	b) Pallepalem			
14.	Madanur	-do-	-do-	22
	a) Pattapupalem			
	b) Sahebpeta			
	c) Yenadipalem			
	d) Harijanapeta			
15.	Vadarevu & Hamlets	Chirala,	-do-	40
	a) Vakavaripalem	Prakasam		
	b) Busla Varipalem			
	c) Perla Varipalem			
16.	Chennayapalem	Kavali,	-do-	22
	a) Pedapattapupalem	Nellore		
	b) Yenadipalem			
	c) Mulampeta			
	d) Pallepalem			
17.	Thummalapenta	-do-	-do-	17
	a) Pattapupalem			
	b) Bestapalem			
	c) Sreerampuram			
	d) Puvvula Doruvu			
			TOTAL	318

Caste Background of Respondents

Sl. No.	Caste / Caste Group	No.	%
1	2	3	4
1.	Scheduled Castes and Scheduled Tribes	100	31.44
2.	Jalari, Agnikula Kshatriya, Vada Balija (Fishermen group)	95	29.88
3.	Kshatriya, Reddy, Kamma, Kapu/ Telega/Balija (Peasant caste group)	72	22.64
4.	Dhobi, Barber, Kummari, Yadava, Vaddera and Gowda (Service Castes and Backward)	33	10.38
5.	Brahmin, Vysya, Viswa Brahmin, Vadrangi, etc. (twice born and artisan)	11	3.45
6.	Muslims	7	2.20
		318	100.00

Sample Size : 318

Appendix : III

Perception of Damage in a Future Disaster
Item-wise Tabulation of Frequency Data

Sl. No.	Item of Loss	Respondents*	
		Nos.	%
1	2	3	4
1.	House	251	78.85
2.	Human loss	100	31.41
3.	Household articles	113	35.49
4.	Cattle and other farm animals	109	34.24
5.	Crop loss	103	31.95
6.	Work tools/equipment	42	13.20
7.	Damage to land and farm buildings	34	10.68
8.	Don't know/Can't estimate	41	12.89

* The total of the percentage figures exceeds 100 because the respondents were allowed to mention more than one item of damage.

Appendix : VI

Interest in Migration
(If a Pucca House is Offered Beyond
3 Km from the Present Location)

Sl. No.	Attitude	Respondents	
		Nos.	%
1	2	3	4
1.	Not interested	273	85.84
2.	Interested	19	5.97
3.	Has to consult others or think about it	5	1.58
4.	Not applicable (Employees)	16	5.04
5.	Don't know	5	1.58
TOTAL :		318	100.00

Sample size : 318

Appendix : V

Main Reason for Lack of Interest in Migration

Sl. No.	Attitude	Respondents	
		Nos. 3	% 4
1	Present House is safe	4	1.25
2	Livelihood difficult	176	55.35
3	Social ties	47	14.78
4.	Immovable properties	39	12.26
5.	Item not applicable	47	14.78
6.	Others	5	1.58
TOTAL :		318	100.00

Sample size : 318

Appendix : VI

Source of Aid within 48 Hours after the Disasters

Sl. No.	Item of Aid	Respondents					
		Coastal		Non-coastal		Total	
		No. 3	% 4	No. 5	% 6	No. 7	% 8
1.	Rescue	1	0.31	0	0	1	0.31
2.	Shelter	3	0.94	2	0.60	5	1.57
3.	Food	8	2.51	15	4.72	23	7.23
4.	Shelter and food	9	2.83	12	3.77	21	6.60
5.	Rescue and food	0	0	7	2.20	7	2.20
6.	Shelter, food and clothing	1	0.31	1	0.31	2	0.63
7.	Food and removal of corpses	0	0	1	0.31	1	0.31
TOTAL :		22	6.92	38	11.95	60	18.87

Sample size : 318

PROFILE OF SAMPLE VILLAGES

NANDANAVANAM

Nandanavanam is located five Kms. of the National Highway-5, between Tangutur and Singarayakonda and is connected by a metalled road. The village is 14 Kms. from Kandukur (the Taluk headquarters) and 9 kms. from Singarayakonda. The total population of the village is 1940.* Scheduled Castes and Scheduled Tribes who reside mostly in the two hamlets of the village (Madigapalli and Harijanawada) account for 20 per cent of the village population. Other castes in terms of numerical importance are Kamma (farmers), Vaddera (manual labourers), Balija (farmers), Yadava (farmers and agricultural labourers), Dhobi (washermen), and Brahmin.

The total ayacut of the village is 3,270 acres, of which 2,689 acres is under cultivation. The main crops sown in the village are tobacco, maize, paddy, millets, and pulses. There are 248 cultivators and 494 agricultural labourers in the village.

Nearly 80 per cent of the houses in the main village are constructed with brick and mortar with tiled roofs. A few of them have cement plaster. There are only four concrete buildings with a terrace, all in the main village. There are no pucca houses in the hamlets which are within a radius of half-a-kilometre from the main village.

In the May 1979 Cyclone the village was one of the worst affected. Flood water rushed to the village hamlets mainly through Paleru supply channel which is adjacent to the village. There was heavy sand casting of land due to the flood. Sand casting was reported by 175 farmers and the extent of land affected was 421 acres. Almost all the huts in the hamlets and a few in the village were washed away by the flood. The number of casualties due to the flood was 21, all from the hamlets.

PAIDIPADU

Paidipadu is located on the ring-road which is connected to the National Highway-5 at two points, between Tangutur and Singarayakonda. The distance is 16 kms. from Tangutur and 21 kms. from Kandukur, the Taluk headquarters.

The population of the village is 2,464, distributed over the main village and the five hamlets (Reddypalem, Janardhanapuram, Akkacheruvupalem,

* The figures of population for this and the other villages of the Sample are based on the 1971 Census. To update them 12 per cent should be added.

Harijanawada and Madigapeta). Scheduled Castes and Scheduled Tribes constitute about one-eighth of the total population of the village. Other numerically important castes are Telaga (farmers), Padmasali (Weavers), Kummari (Potters), Kamsali (Goldsmiths), and Brahmins. About 60 per cent of the village ayacut (2,296 acres) used to be under tobacco, but now has declined to less than 40 per cent. Other major crops are paddy, maize, pulses, and chillies. There are 377 cultivators and 470 agricultural labourers in the village.

There are 15 terraced concrete buildings (including three public buildings), covering the main village and all the hamlets. Nearly a quarter of the houses in the village have tiled roofs and the remainder are huts.

The damage due to the 1979 cyclone is quite heavy. There were 14 casualties. About 75 acres of crop land was affected by sand-casting. One hamlet (Madigapeta), abetting Paleru river, was completely washed out by the flood. There is not even a trace that a hamlet once existed there. The main village and the hamlets are within the distance of 100 to 500 metres from Paleru river, the main source of flooding in 1979.

RAMACHANDRAPURAM (AGRAHARAM)

The village is on the ring-road, within 14 kms from Tangutur (located on the National Highway-5) and is connected by a metalled road. Its distance to Kandukur (the Taluk headquarters) is 11 kms which can be reached from this village by farm roads and by ferrying across river Paleru. The total population of the village is 850 of which Scheduled Castes and Scheduled Tribes constitute 212 (25 per cent). Other major castes are Kamma, Vaddera, Dhobi, Yadava and Vysya (retail merchants). The total ayacut of the village is 692 acres, of which 540 acres are under cultivation. Major crops are tobacco, paddy, maize, chillies, millets and pulses. There are 178 cultivators and 128 agricultural labourers.

Nearly 70 per cent of the houses in the main village are having tiled roofs. There are three concrete buildings in the main village. The remaining ones are huts with mud walls. Eleven deaths are reported from this village. Damage to land due to sand-casting was to the tune of 30 acres. River Paleru flows within a distance of half-a-mile from the village. The river was the main source of flooding in 1979.

JILLELAMUDI

Jillelamudi is located on the southern bank of river Paleru and is connected to Kandukur by a-6 km. length farm road. However, its ayacut and

two of its hamlets (K. Palem and B. Palem) are located on the northern side of the river Paleru. Malapalli, a small hamlet, is on the southern bank of Paleru. It has a population of 1,358. Nearly 48 per cent of the population consists of Scheduled Castes and Scheduled Tribes. Other numerically predominant castes are Kamma, Reddy, Kummari and Dhobi. The total ayacut of the village is 2,565 acres, of which 1,820 acres are under cultivation. Major crops sown are maize, millets, tobacco, and paddy. There are 257 cultivators and 198 agricultural labourers in the village.

There are only two concrete structures in the main village, fourteen tiled houses and the rest are huts. There are quite a few pucca and terraced buildings in K. Palem and B. Palem but not in Madegapalem. Sand casting was very high as the Paleru river bund breached near this village.

Paleru, the main source of flooding is within a furlong from Madegapalem hamlet. The main village is about one km from the river and the remaining hamlets are at a distance of two kms. The 1979 flood washed away the entire Madegapalem and along with it 34 lives.

JARUGUMILLI

Jarugumilli is located on the ring-road and is connected to the National Highway-5 by a metalled road (2 kms). It is about 4 kms. from Tangutur and 22 kms. from Ongole, the district headquarters. The population of the village is 4,194 of which Scheduled Castes and Scheduled Tribes account for 1,698 (40 per cent). Kamma, Reddy (farmers), Balija, Dhobi, Kummari, Mangali (barber), Brahmin, Viswabrahmin (Goldsmith) and Vysya are the next important castes numerically.

The total ayacut of the village is 3,562 acres. Of this 110 acres are under cultivation. Major crops sown are tobacco, chillies, maize, hybrid bajra, millets, and pulses. There are 490 cultivators and 1,210 agricultural labourers in the village.

In the main village, there are quite a large number of pucca structures along with tiled roof houses in the main village and two of the hamlets (Chintalapalem and P. Palem), but none in Madigapalem and Yetimalapalem. There were ten deaths reported from this village, all from Madigapalem and Y. Malapalem. About 517 acres of crop land was affected by sand-casting. The main village is within a distance of two furlongs from the tank, the main source of flooding.

K. BITRAGUNTA

Kalikivaya Bitragunta is located on the National Highway-5, about 21 kms. south of Ongole. Kandukur, the taluk headquarters is 19 kms. from K. Bitragunta. The village has three hamlets (Yenadi Colony, Harijanapeta and Adi-Andhrapeta), all within a radius of half-a-kilometre.

The population of the village is 3,266, of which Scheduled Castes and Scheduled Tribes number 647. Other numerically predominant castes are Vaddera, Yenadi (denotified tribe), Kamma, Reddy, Yadava, Baliya, Raju (farmers), Kummari, Dhobi, Brahmin, and Vysya.

The total ayacut of land is 2,365, acres, of which 965 acres is irrigated. Major crops sown are paddy, maize, millets, chillies, and pulses. There are 25 cultivators and 519 agricultural labourers in the village.

There are 12 pucca buildings and more than 150 tiled roof houses. The remaining are huts. The number of deaths reported from this village due to the 1979 Cyclone/flood was 46. Most of the dead are from the Yenadi Colony, east of the village. River Paleru is two furlongs west of the main village. There is also one tank (300 acres) located two furlongs away on the northern side of the main village. On the eastern side there is a rail track, which prevented the flood water from being drained out, thus causing considerable damage to property and loss of life.

PAKALA

Pakala is 6 kms. east of Singarayakonda and is connected to National Highway-5 by a metalled road. It is a large village with 14 hamlets and total population, of 9,061. Six of the hamlets are within two furlongs distance from the sea. Three of them are between the Buckingham canal and the sea. Scheduled Castes number 1,569 and Scheduled Tribes 773. Jalari (fisherman) Reddy, Yenadi, Baliya, Dhobi, and Vysya are the numerically significant castes.

Total ayacut of the village is 2,641 acres, of which 2,381 acres is irrigated. Major crops are paddy, ragi, and tobacco seed beds. Salt farms are in a large number. There are 582 cultivators and 2,106 agricultural labourers.

There are more than 20 pucca buildings with a terrace, 600 tiled houses in the main village, 2 pucca houses in Harijanawada; 2 in Yenadipalem; and 2 in Pakalapeda Pattepalem and one in Polayyapatta Palem. About 30 acres of land was affected by sand casting. There were no cyclone-related deaths in this

3,005, distributed over the main village and six hamlets. Scheduled Castes and Scheduled Tribes comprise 20 per cent of the total population. Kamma, Vaddera, Vysya, and Sale are the other major caste groups.

The total ayacut is 9,800 acres. Of this, 4,271 acres are under cultivation. Cultivators number 671 and agricultural labourers about 430. Maize, millets, pulses and tobacco are the major crops. Land with irrigation facilities is 624 acres.

There are four pucca houses, 30 tiled houses and the remaining ones are thatched huts. The main source of threat is Paleru river which passes by the village. Sandcasting of land was quite heavy. There were 23 casualties due to the May 1979 Cyclone/Flood.

DODDICHINTALA

Doddichintala is located in Kanigiri taluk. This village is connected to Kanigiri-Cumbham road by a kachha road (5 kms.). The distance to Kanigiri is 14 kms. It contains 2,282 persons. It has eleven hamlets. Scheduled Castes and Scheduled Tribes population constitutes 19 per cent. Other numerically predominant castes are Reddy, Yadava, Vaddera, and Dhobi.

Out of 1,790 acres of total ayacut, 893 acres are under cultivation. Major crops sown are ragi, maize, and other millets. There are 30 wells with motors and another 20 wells without motors. There are 300 cultivators and 469 are agricultural labourers. The sources of irrigation are tanks and wells. There is one pucca building in the main village, the remaining ones are huts with mud walls. Seven casualties are reported in this village. Major sources of threat in 1979 Cyclone/Flood is Gollacheruvu, near the village.

KOTHAPATNAM

Kothapatnam is 10 kms from Ongole. It is connected by a black-topped road. The population of this village is 12,503, of whom 20 per cent are Scheduled Castes and Scheduled Tribes. Kothapatnam is 2 kms. from the coast whereas Pallepalem (hamlet) is right on the coast. Almost 95 per cent of the population of Pallepalem are Jalari (fisherman). Major castes in the twin villages as per the order of their numerical strength are Jalari (fisherman), Yenadi, Gowda, (toddy tappers), Reddy, Vysya, Dhobi, and Brahmin.

The total ayacut of the twin village is 8,430 acres. Of this, 1,164 acres are under cultivation. There are 1,397 cultivators and 3,125 are agricultural labourers. Major crops sown in this village are tobacco, paddy, vegetables, onions, millets and groundnut. There are also salt farms in this village.

Most of the houses in the main village are with tiled roofs. There are 15 pucca houses (7 with a terrace) and the remaining ones are thatched houses. All houses in the hamlets are huts, excepting one building. Five deaths were reported from this village. Damage due to sand casting was almost nil. Major sources of irrigation are Doruvulu (country wells) and filter points.

Damage due to the 1979 Cyclone was mainly to farm buildings and thatched houses.

VADAREVU

Vadarevu, though a big village, is a hamlet of Burlavaripalem (Chirala Taluk). It is situated on the sea coast and is connected by a 4 - kms. black topped road from Chirala, the taluk headquarters. Vadarevu has been subjected to attack by successive cyclones. The population of the village is 4,156. Numerically predominant castes are Jalari (85 per cent), Reddy, and Vysya. Nearly 50 per cent of the fishermen are floating population. They come here from Srikakulam and Visakhapatnam for fishing.

The total ayacut of the main village is about 2,500 acres. Major crops sown in this area are groundnut, paddy, and millets. Most of the area under cultivation is rain fed.

There are eight pucca buildings with a terrace, four tiled houses and the remainder are huts. No casualties are reported from this village, since the village was evacuated. The construction of one cyclone shelter and a pucca housing scheme (HUDCO) for 685 houses are being completed.

CHENNAYAPALEM

The village is situated east of the National Highway-5. The main village is within 2 kms. from the coast and 6 kms east of the National Highway and connected by a metalled road. It is 16 kms. from Kavali, the taluk headquarters. Of the seven hamlets, Peda Pattapalem and Chinna Pattapalem are situated within 2 furlongs from the sea, and west of the Buckingham canal. The total population of the village is 2,468, of whom nearly 55 per cent are fishermen and 15 per cent are Scheduled Castes and Scheduled Tribes. Other major caste groups, in terms of numerical importance, are Yadava, Baliya, Dhobi, Reddy, Vysya, and Brahmin.

The total ayacut of the village is 1,348, acres of which 687 acres are under cultivation. Nearly 50 per cent of the population is engaged in fishing or

collection of sea-shells. Paddy, groundnut, millets, and chillies form the important crops. There are 218 cultivators and 321 agricultural labourers in the village.

In the main village, there are six pucca buildings with a terrace and 10 tiled houses. The remaining ones are huts, excepting one school building in Harijanawada and a temple in Pedapattapupalem. One cyclone shelter is under construction. Signareni collieries constructed about 50 pucca houses in Pattapupalem. The State Government has plans to construct a housing colony in Pattapupalem. No deaths were reported from this village. Most of the huts suffered serious damage due to the 1979 Cyclone. Sea water flooded crops. Besides, another source of flooding was a tank (two furlongs on the South-west of the main village) which breached at two places. The tank is fed by Gundala vagu which is a major source of irrigation apart from the Buckingham canal. The latter also inundated the adjacent hamlets. Sand casting was heavy for about 70 acres of crop land.

THUMMALAPENTA

Thummalapenta is a coastal village of Kavali taluk in Nellore District. It is connected to the National Highway-5 at Kavali (taluk headquarters) by a 9-kms, length blacktopped road. The main village is within one km from the sea, whereas half of its 14 hamlets are within one or two furlongs from the sea, and within 6 to 8 feet mean-sea level. The total population of the village is 6,619, of which nearly 18 per cent are Scheduled Castes and Scheduled Tribes. Other major caste groups are Balija, Yadava, and Dhobi. Muslims are estimated to be around 100

The total ayacut of the village is 6,168 acres. Of this, 1,092 acres are under cultivation. Major crops are paddy, millets, and groundnut. Nearly, 30 per cent of the households are dependent on fishing. There are 553 cultivators and 1,445 agricultural labourers.

There is one terraced pucca house in the main village, besides a post-graduate centre complex with sound pucca structures. There of the hamlets also have one to two pucca buildings. Nearly 20 per cent of the houses in the main village are having tiled roof and the remaining ones are huts. Ten of the hamlets have no pucca buildings.

The main source of threat to the main village and the hamlets is the Bay of Bengal. In 1979, breach to an irrigation tank west of the main village caused extensive damage to land and housing. One death was reported from this village on account of the 1979 Cyclone.

ABOUT ARTIC

Appropriate Reconstruction Training and Information Centre (ARTIC) was founded in December, 1977 in the wake of a violent cyclone and tidal surge that struck the coast of Andhra Pradesh.

Shelter was the major problem and an urgent need. As such, ARTIC was involved in this field. Since then, ARTIC's main thrust has been towards housing the rural poor of the cyclone-prone area in safer traditional houses. However, ARTIC's concern is not only housing. ARTIC has broadened out into other areas of disaster and development work.

ARTIC believes that in the final analysis only the victims themselves can reconstruct their lives. External agencies can only play a subsidiary helping role. ARTIC's goals are to mitigate impacts of disasters and to foster appropriate response to restore normalcy quickly to disaster victims. Towards this end, ARTIC endeavours to actively educate both the people in vulnerable areas and others who may be involved in rescue, relief and rehabilitation operations.

Based in Koturu, ARTIC is operating in a group of villages affected in 1980 Vamsadhara Floods.

ARTIC Publications

Cyclones - An explanation with recommendations for precautionary measures - Telugu & English.

Recommendation for structural improvements to the traditional house - Telugu & English.

How to make your house safer against strong winds - Telugu.

Issues & Problems in the provision of shelter and housing - English by Frederick C. Gony, Ian R. Davis, Frederick Kingold.

Seminar Report - Problems and lessons from the Andhra Pradesh cyclone - English.

Disaster Management - Preparedness & Response - Edited by Aqbal Ahmad - English.

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