First National Workshop on Sustainable Development and Disaster Reduction

Jointly Organised by :

BANGLADESH PUBLIC ADMINISTRATION TRAINING CENTRE

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FIRST NATIONAL WORKSHOP
ON
SUSTAINABLE DEVELOPMENT AND DISASTER REDUCTION

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REPORT ON THE FIRST NATIONAL WORKSHOP
ON
SUSTAINABLE DEVELOPMENT AND DISASTER REDUCTION

11-14 July, 1998

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FOREWORD

Bangladesh is known to the outside world as one of the most disaster-prone nations of the world. There are also attempts to project it as such, often in magnified expressions, to the people across national boundaries. However, it is undeniable that life in Bangladesh is inextricably associated with disasters like floods, cyclones, tornadoes, storm surges, drought, and environmental degradation because of man-made actions like air and water pollution, deforestation, etc. The supporting system for sustenance of life is, therefore, under constant threat in this part of the world. Even then the people of this land have learned over generations to cope with disasters and survive against all odds and the vagaries of nature. Their remarkable resilience has been demonstrated time and again, and more recently this year during the most prolonged floods in the recorded history of Bangladesh.

This report summarises the results of the First National Workshop on Sustainable Development and Disaster Reduction, held from 11 to 14 July, 1998 at Bangladesh Public Administration Training Centre (BPATC), Savar. It was a sequel to the regional workshop on the same topic held at BARD, Comilla in December 1997. This National Workshop was the result of close collaboration between BPATC, Disaster Management Bureau (DMB), CIRDAP and UNICEF/UNDP. More than 50 participants from home and abroad, government and non-government sectors, academia and the media took part in the workshop. The participants included policy makers, experts, members of the armed forces and scholars who actively participated in the workshop.

It is an accepted fact that we can not escape natural disasters. And given the prevailing socio-economic situations in our country, nor can we totally eliminate the effects of environmental degradation. It is however, acknowledged that human ingenuity and carefully considered actions can and does arrest the slide and help to stave off the total collapse of the system. That is why we need to review our strengths and weaknesses, our goals and strategies and then strive to develop an integrated approach that allows us to co-exist with nature and optimise all that it can offer and ensure that we do not deprive our future generations of those opportunities and resources.

This is what constituted the background of the workshop at BPATC. In fact, BPATC has been conducting short courses on disaster management every year for quite some time now. And certain long courses like foundation for the fresh entrants, advanced course for mid-level officials and senior-level courses for senior policy makers also contain special modules or lecture/discussion sessions on disaster management. The outcome of the Workshop will definitely enrich the contents of those courses.

The recommendations that sprung from the workshop ranged from national policy and action plan for education and capacity building in areas of environmental management, disaster reduction, sustainable development, GO-NGO cooperation and community involvement. The outcome of the workshop has helped us re-examine our focus and evolve new and all pervasive frameworks to develop the training courses on a sound matrix. Another important contribution of this workshop has been the focus on the concept of Disaster Impact Assessment (DIA) and suggestions of its incorporation into the overall planning process. I firmly believe that the outcome of this workshop shall serve as a starting point and guideline for future course of action in the area of sustainable development and disaster reduction in Bangladesh. This workshop is only the beginning as a lot still needs to be done. I sincerely hope that future deliberations will help to refine and further clarify areas that still remain somewhat fuzzy.

I would like to extend my sincere thanks to all those contributors, discussants, participants, members of CIRDAP, Disaster Management Bureau, UNICEF/UNDP and faculty and staff of BPATC who selflessly contributed in making this workshop a success. I especially acknowledge the contributions and guidance from Col. George Ritchie from Cranfield University, U.K. and Ms Rosalie Y. Say, Head Training Division, CIRDAP, I would also like to thank UNICEF/UNDP for providing necessary financial assistance through DMB. Last, but not the least, it should be recorded that without the ungrudging and untiring efforts of A.K.M. Nasirul Haque, Director, Syed Shamsul Alam, Director, and Kamal Uddin Ahmed, Deputy Director of BPATC, this workshop could not have been turned into reality.

Dr. Ekram Hossain
Rector
Bangladesh Public Administration Training Centre
Savar, Dhaka.

REPORT ON THE FIRST NATIONAL WORKSHOP ON SUSTAINABLE DEVELOPMENT AND DISASTER REDUCTION

INTRODUCTION

Frequent and regular occurrences of natural disasters like floods, droughts, cyclone, storm surges, saline intrusion, environmental degradation and hazards etc, alongwith effects of El-Nino-Southern Oscillation (ENSO) and other climate change, variabilities and anomalies in Bangladesh has prodded us to believe in the philosophy of "living with natural disasters". This diversity, complexity and dynamism of the natural disasters suggests to develop an appropriate system of early warning, forecasting, preparedness and mitigation programme with a view to reduce disasters and ensuring sustainable development.

The Bangladesh Public Administration Training Centre (BPATC), Savar in collaboration with Disaster Management Bureau (DMB), CIRDAP & UNICEF organized the first ever National Workshop on Sustainable Development & Disaster Reduction from 11-14 July, 1998 at the BPATC, Savar. As a follow-up to the regional workshop on the subject organized by CIRDAP at BARD, Comilla in December 1997, the national workshop aimed at linking disaster reduction with development, designing a comprehensive curriculum for public training institutes including defence staff colleges and developing a framework for disaster impact assessment. The title of the workshop was First National Workshop on Sustainable Development and Disaster Reduction.

BACKGROUND OF THE WORKSHOP

At the initiative of CIRDAP and in collaboration with Commonwealth Secretariat & UNDP a regional workshop on Sustainable Development and Disaster Reduction was held from 8-12 December 1997 at BARD, Comilla. The objectives of that workshop were, inter-alia, the following:

a. Examining the linkage between policy & practices in sustainable development planning, environmental management & disaster reduction and establish linkages between these aspect.

b. Identifying responsibilities with national government, UN agencies, NGOs, research & training institutions in order to improve environmental & disaster management, mitigate disaster effects and raise standards of disaster prevention & reduction within the context of overall national development planning.

c. Examining training & research needs & resource requirements to ensure improved management and co-ordination between development, environmental management, counter-disaster planning & disaster reduction.

Representatives from Bangladesh, China, India, Laos PDR. Malaysia, Myanmar, Nepal, Pakistan, Philippines, Thailand, Vietnam, Western Samoa participated in the 4 day workshop. The Bangladesh delegation comprised of, among others, representatives from Ministry of Disaster Management & Relief, Disaster Management Bureau and Bangladesh Public Administration Training Centre (BPATC), Savar, Dhaka.

It was stressed there that as a follow-up to the regional workshop each country would organize a national workshop using the CIRDAP workshop as a model.

Keeping in view the diverse objectives of the workshop at BPATC it was desired that the participation in the workshop be at a senior level which would permit framing of appropriate policy recommendations including designing curricula, framework for disaster impact assessment (DIA) for inclusion in project analysis and an empirical approach for linking disaster reduction with development planning.

Considering the diverse roles played by different organizations the BPATC designed the workshop topics, and was open to qualified candidates of the invited organizations. The workshop sought to pull together the resources & experiences from policy makers, administrators and managers, academicians, defense forces, development planners, journalists, NGOs & private individuals involved in sustainable development, environmental management and disaster reduction.

THE WORKSHOP AT SAVAR

The objectives of the workshop held at Savar were :

a. To take stock of current courses and training curiculum on disaster reduction in public administration training institutes and general and technical universities and examine these programmes with the view of designing a comprehensive curriculum for the institues of public administraiton and staff colleges at various levels, with a focus on the development of appropriate sectoral disaster management modules.

b. Examining the linkages between policy and practices in development planning, environmental management and disaster reduction in Bangladesh and assist in developing a well coordinated framework to manage the linkages between these aspects.

c. Examine the current State-of-the Art in disaster management and determining the research, training and resource needs to ensure improved management and coordination between development planning and disaster reduction.

d. Explore the possibility of developing a framework for Disaster Impact Assessment to be used in project analysis.

Accommodation and food for the whole duration was arranged by the host at the BPATC campus. Transport to and from the venue was the participants responsibility. BPATC's regular transport that plies between Dhaka and the Centre was also utlized.

As many as 54 participants from various organisations including participants (mid-level civil servants) from the Thirtieth Advanced Course on Administration and Development (ACAD) who were undergoing training at BPATC at that time participated in the workshop. The details of the participants are given at Annex-A.

The workshop was inaugurated by Dr. S. A. Samad, Principal Secretary, Prime Minister's Office as the Chief Guest while Dr. Ekram Hossain, Rector, BPATC presided over the session as the Chairperson. Mr. Nasirul Haque, Director, BPATC and Workshop Director gave the address of welcome on behalf of BPATC. The inaugural session was also addressed by Col. George Ritchie, member of the workshop team from Cranfield University and Mr. Azad Ruhul Amin, Secretary, Ministry of Disaster Management and Relief, as special guests. The vote of thanks was given by Mr. Kamal Uddin Ahmed, workshop coordinator.

The workshop was spread over three days and split up into the inaugural session, three working sessions, two sessions for the working groups and the final session for finalisation of recommendations. The details of the workshop programme are given at Annex-B.

The following papers were presented at the Workshop.

1. Keynote paper: Curriculum Development and Training on Disaster Management in Bangladesh: Focus on inservice Training Institutes

   –Mr. Safiur Rahman, Former Member Directing Staff, BPATC, and presently Training and Public Awareness Specialist at the Disaster Management Bureau.

2. Exploring the Possibilites of Developing a Framework for Disaster Impact Assessment (DIA)

   –Dr. A.K. Enamul Huq, Associate Professor, North South University, Dhaka.

3. Disaster Reduction : Need for Evolving an Effective Co-ordinating System in Bangladesh

   –Dr. K.M. Das, Additional Secretary to the Government and Director General, Disaster Management Bureau.

4. (i) Proposal For Regional and In-Country Programmes of Education and Trainng in Disaster Awareness and Understanding, Pre-Disaster Planning and Preparedness and Disaster Management for those in Senior Positions of Responsibility in Disaster-Prone Develping Countries.

   (ii) Education, Information and Public Awareness for Self-reliance and Lessened Dependency in Disaster.

   –Col. George Ritchie, Royal Military College of Sciences, Cranfield University, United Kingdom.

5. Role of Remote Sensing Technology in Disaster Management in Bangladesh.

   –Dr. A.M. Choudhury, Bangladesh Space Research and Remote Sensing Organization (SPARRSO) and Recipient of Independence Day Award for 1998 of the Government of Bangladesh on Science and Technology.

6. Role of NGOs and Civil Society in Disaster Preparedness and Mitigation

   –Mohammed Shahidul Alam, Additional Secretary to the Government and Director General, Bangladesh Civil Service (Administration) Academy.

7. Disaster Reduction : Experience of Andhra Pradesh

   –Dr. AVS Reddy, Director General, Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP)

8. Information Dissemination and Public Awareness Towards Self Reliance in Disaster Management : Role of Mass Media.

   –Qamrul Islam Chowdhury, President, Environmental Journalists Forum

9. Armed Forces in Disaster Management : Towards a Mechanism for Strengthened Involvement

   –Brigadier Rafiqul Islam, Bangladesh Army.

10. Development and Disaster Reduction in Bangladesh

    –AKM Nashirul Huq, Director, BPATC & Kamal Uddin Ahmed, Deputy Director, BPATC

11. Supplementary Presentation on : Disaster Management in Bangladesh : Presentation on Training by NGOs Disaster Management

    –ARM Saidul Huque, Coordinator, PRIP/DPIS Project.

The participants actively participated in all the activities of the workshop and were divided upto six groups and given topics (details given in Annex-C) to discuss and come up with group recommendations based on their detailed deliberations. The groups then presented their reports which were discussed and further deliberated upon in an open session. The final outcome of their reports and the inputs of the open session culminated in the final recommendations of the workshop on areas of national policy and action, technology, education and capacity building, GO-NGO collaboration and community involvement and funding (Please see Annex-D of this report.)

The workshop has helped us to reexamine our focus regarding the issues of sustainable development, disaster and disaster reduction and helped to provide us with a framework for future actions. The BPATC initiated a small step towards sustainable development and disaster reduction through this workshop which had long been felt and considered essential for development planners, training organisations, research centres, universities, defence staff college, academics, NGOs, journalists etc.

FUNDING

Due to the scarcity of adequate funds the Centre felt handicapped at the initial stage. We are however grateful that UNDP came forward and arranged for funding from the National Project on Disaster Management maintained by DMB and UNICEF. A significant assistance came from CIRDAP who provided untiring technical support to conduct a workshop of an international standard. It was their wholehearted efforts which also made it possible to bring Colonel Ritchie, an international expert on Disaster Management, all the way from the UK to participate and help conducting the workshop.

APPRECIATION

It was Dr Ekram Hossain, our respected Rector, who first felt the necessity of such a workshop and made an energetic initiative to undetake the effort. Because of his continuous guidance and encouragement we have been able to accomplish this workshop successfully. We express our heartfelt gratitude to him. Our profound gratitude also goes to Dr. AVS Reddy, DG CIRDAP, Col. Ritchie, Ms. Rosalie Y Say, Mr. Sabbir and Mr. Mazumder of CIRDAP.

We are highly grateful to our fellow colleagues at the BPATC for rendering us the utmost assistance in implementing this enormous task inspite of having a very short duration for preparation with a lot of uncertainties. Special mention may be made of A K M Shamsul Alam, MDS, Tofazzal Hossain, MDS, Debasish Nag and Abdul Matin, Directors, Rizwan Khair, Mahmudul Huque and Altaf Hossain, Deputy Directors, Zakir Hossain, Zahirul Huq, Ariful Huq, Ainul Haq and Amir Khasru, Assistant Directors, Abu Naser, Monzurul Huq, Kabir Ahmed, Munir Hossain, Ayub Ali, and all others.

Last but not the least our heartfelt thanks are due to all our distinguished resource persons and participants from different organisations, without whose able participation the workshop would not have been possible.

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Annex - B

First National Workshop on Sustainable Development and Disaster Reduction
11-14 July, 1998
Workshop Programme

11 July '98 (1st day)

1000-1030 Hrs. **Registration**
1030-1130 Hrs. **Inaugural session**
- Guests take their seats
  Arrival of Chairperson and the Chief Guest
- Recitation from the Holy Koran
- Welcome address : Mr. AKM Nashirul Huq
- Address by the special guest :
  Col. George Ritchie, RMCS, Cranfield University, United Kingdom
- Address by the special guest :
  Mr. Azad Ruhul Amin
  Secretary, Ministry of Disaster Management & Relief
- Inaugural address by the Chief guest :
  Dr. S. A. Samad
  Principal Secretary, Prime Minister's Office
- Address by the Chairperson :
  Dr. Ekram Hossain, Rector, BPATC
- Vote of thanks by Kamal Uddin Ahmed
  Workshop Coordinator

1130-1200 Hrs. Refreshments.

First working session
Chairperson : Dr. M. Alimullah Miyan
Vice Chanceller, IUBAT

1200-1230 Hrs. Keynote Address : Curriculum Development and Training on Disaster Management in Bangladesh. focus on inservice training institutes
- Mr. Saifur Rahman

1230-1240 Hrs. Discussion and clarification on keynote address
1240-1255 Hrs. Supplementary Presentation on Training by NGOs
- ARM. Saidul Huq

1255-1300 Hrs. Discussion on the supplementary presentation
1300-1400 Hrs. Lunch.

Second working Session

Chairperson : Dr. M. Alimullah Miyan
Vice Chancellor, IUBAT

1400-1430 Hrs. Presentation of paper (1)
Developing a framework for Disaster Impact Assessment (DIA)
- Dr. A. K. Enamul Huq.

1430-1440 Hrs. Discussion & clarification on paper-1
1440-1510 Hrs. Presentation of paper (2)
Disaster Reduction : need for evolving an effective co-ordinating system in Bangladesh.
- Dr. K. M. Das

1510-1520 Hrs. Discussion and clarification on paper-2
1520-1550 Hrs. Presentation of paper (3)
Public Service Training to meet the needs of Disaster Reduction in Development
Col. George Ritchie

1550-1600 Hrs. Discussion & clarification on paper-3
1600-1630 Hrs. Presentation of paper (4)
Role of Remote Sensing Technology in Disaster Management in Bangladesh.
- Dr. A.M. Chowdhury

1630-1640 Hrs. Discussion and clarification on paper-4
1640-1700 Hrs. Tea

12 July 1998 Sunday (2nd day)
Third Working Session
Chairperson : Birg. Kazi Ashfaque

0900-0930 Hrs. Presentation of paper (5)
Role of NGOs and Civil Society in Disaster Preparedness and Mitigation
- Mohammed Shahidul Alam

0930-0940 Hrs. Discussion and clarification on paper-5
0940-1010 Hrs. Presentation of paper (6)
Disaster Reduction : Experience of Andhra Pradesh.
- Dr. AVS Reddy

1010-1020 Hrs. Discussion and clarification on paper-6
1020-1050 Hrs. Presentation of paper (7)
Information dissemination and public awareness towards self reliance in disaster management : Role of Mass Media.
- Qamrul Islam Chowdhury

1050-1100 Hrs. Discussion and clarification on paper 7
1100-1130 Hrs. Tea break
1130-1200 Hrs. Presentation of paper (8)
Armed Forces in Disaster Management : towards a mechanism for strengthened involvement.
- Brigadier Rafiqul Islam

1200-1210 Hrs. Discussion and clarification on paper-8
1210-1240 Hrs. Presentation of Paper (9)
Disaster and Development : Bangladesh Context
- AKM Nashirul Huq & Kamal Uddin Ahmed

1240-1250 Hrs. Discussion and clarification on paper-9
1250-1400 Hrs. Lunch break

Working groups and discussions

1400-1500 Hrs. Briefing on working group discussion by Ms. Rosalie Y. Say
Head, Training Division, CIRDAP
Formation of working groups
1500-1700 Hrs. Working group discussion

13 July '98 Monday (3rd day)

0900-1030 Hrs. Working Group discussion
1030-1100 Hrs. Tea Break
1100-1300 Hrs. Working group discussion
1300-1400 Hrs. Lunch break
1400-1700 Hrs. Presentation of the recommendations of working groups by group leaders

14 July '98 Tuesday (4th day)

0900-1030 Hrs. Finalisation of the Recommendations
1030-1100 Hrs. Tea break
1100-1300 Hrs. Finalisation of Recommendations and closing of the workshop
1300-1400 Hrs. Concluding Lunch
1430 Hrs. Departure.

Annex - C

FIRST NATIONAL WORKSHOP ON SUSTAINABLE DEVELOPMENT AND DISASTER REDUCTION : WORKSHOP TOPICS AND BASELINE QUESTIONS

Working Group Discussion Topics

Topic A

How responsibilities should be allocated and capabilities developed, to ensure the development and maintenance of proper standards of disaster reduction, preparedness and response plans and their effective integration with sustainable development, at all levels from Union upwards to Central government.

Taking into consideration:

- The recognised importance of planning for disaster preparedness from bottom-up rather than top down.
- The responsibilities of Divisional Commissioners, Districts Officers, Union Chairman and the DMB.
- The training capacities present in BPATC, CIRDAP and DMB.
- GOB responsibilities for defining and implementing strategies and policies for sustainable development and disaster reduction.

Topic B

How can programmes of awareness and capacity building of sustainable development, environmental management and disaster reduction be established and integrated into programmes of public service training? In training and education, what are the appropriate modules to be introduced ? How should these modules be developed ? Who should be the responsible authority for developing and introducing these modules / programme?

Taking into consideration

- Creation and maintenance of political will.
- Public administration training does not embrace sustainable development and disaster reduction as an integral element of on-going responsibilities but as a specialist training.
- Need for public information and education programme to raise awareness of the importance of environmental management and where responsibilities for this lies.
- Low levels of awareness and understanding of the nature and value of disaster preparedness, mitigation and reduction and of the long term social and economic costs of disaster events.
- Low levels of understanding concerning the sustainable disaster reduction, environmental management linkages at all levels of government and in the community.

Topic C

What is the best source of technological and scientific advice to the government? How and when is this advice best applied in development and disaster reduction planning ? Who should be the responsible authority for evaluating this advice.

Taking into consideration

- How scientific and technological advice is best provided to the government
- How and when these technological advice are best applied when development and disaster reduction projects are initiated
- Who should be the appropriate authority to evaluate and manage the use of these scientific and technological inputs

Sources of scientific and technological advice :

- National universities and institute of specialised technology
- Government scientific and technological departments
- Government and regional research centres
- Experts on contract under direct, bilateral technical assistance programmes, Commonwealth Fund for Technical Cooperation, UN Agencies, World Bank, Asian Development Bank.
- Bilateral Academic linkages to develop national capacities.
- National Industrial Enterprises
- Multi-National project contractors
- Regional and national institutes (e.g Asian Institute of Technology)
- Conferences and workshops (national, regional and international)

Topic D

Identify how disaster impact assessment (DIA), in addition to environmental impact assessment (EIA) should be included in the analysis of all development projects. Who should be the responsible authority for developing and ensuring that these are applied in development planning and project analysis.

Taking into consideration

- Inadequacy of analytical models for evaluating development projects and their consequences for potential disaster and environmental degradation
- Establishment of industrial projects and other projects without assessment of the risk to the project from existing natural disaster threats.

Topic E

How should responsibilities and capabilities for post-disaster needs assessment relating to relief, rehabilitation and the maintenance of on-going development projects, be allocated, created and maintained.

Taking into consideration :

- Local responsibilities and capacities
- Political influences
- NGO activities
- MDMR and DMB responsibilities
- Donor. i.e. UN, international and bilateral (govt. and NGO) requirements.

Topic- F

In rural and urban areas, how can the community and NGOs be effectively involved in disaster preparedness and mitigation and environmental management and development.

Taking into consideration :

- How can effective linkages, coordination and collaboration between GOB and NGOs (national and international) be developed and maintained.
- How are the most useful projects that have a major impact on sustainable development and disaster reduction be identified?
- How can and should the community and NGOs be brought into the project identification and planning process?
- How can communities and NGOs be developed for effective involvement in the project and what roles and responsibilities should they have?
- How can all of those involved in these activities be most effectively encouraged and stimulated in the process?

Topic G

Outline a proposed syllabus for introduction into the curriculum of BPATC, BARD, the Defence Services Command and Staff College (BDSCSC) and similar tertiary education and training institutes to create disaster reduction understanding and working capabilities in responsible officers.

Taking into consideration :

- The need to create proper understanding of the objectives amongst politicians
- The responsibilities in all departments and of government
- The importance of multi-sectoral planning management and cooperation
- The important role of NGOs
- The linkages between sustainable development, environmental management and disaster reduction
- The need to avoid the creation of specialisation in a multi-sectoral responsibility (e.g. "I don't need to worry, we have the DMB to look after that")

RECOMMENDATIONS OF THE WORKSHOP

A. National Policy and Action

- The Government of Bangladesh should integrate disaster reduction plans in accordance with national strategy and implemented from the Union upwards to the national level.
- Divisional level committees may be required in certain circumstances to ensure better coordination and implementation.
- The Emergency Operational Centre (EOC) at MDMR be activated with required facilities.
- Representation from NGOs, the chairperson of the Chamber of Commerce and the Armed Forces are required in committees where applicable.
- Local bodies/committees should be given responsibility for the case of repair and maintenance of shelters which are presently not the responsibility of any agency.
- The Planning Commission should integrate disaster preparedness and mitigation measures into development initiatives.
- Executive orders are required to ensure that all government officials act under the Deputy Commissioner and TNOs in time of emergency.
- A national disaster management data bank and information system should be developed to support disaster reduction planning and management at all levels of government. Both manual and computerised systems may be included but should always be compatible.

B. Technology

- Sources of Technological advise are available in Bangladesh. This advise can be obtained from :
  - concerned government departments
  - research and training centres (government and regional)
  - universities and institutes of technology
  - individual experts/firms on contract under the Technical Assistance Programme
  - conferences and workshops (regional, national and international)
  - internet
- A committee should be created which can serve as the responsible authority for evaluating and monitoring technological advice. This committee should be headed by the Cabinet Secretary with the following members: secretaries of different ministries, experts, Ministry of Finance, Planning Commission, representatives of concerned department/ministries, armed forces division and representatives of NGOs.
- In additional to scientific and technological advice, the documentation or development of case studies on coping mechanisms of communities, taking into account the indigenous knowledge of local people should be undertaken.
- All development projects (multi-lateral, bilateral, government, private) should be subjected to DIA and EIA simultaneously. DIA should be included in the project cycle along with EIA. However, for small scale local projects, vulnerability analysis technique should be done.
- The Planning Commission should be responsible to ensure that DIA is conducted during project analysis. All concerned ministries shall be consulted in case of major projects.
- To develop the DIA methodology the following should be conducted :
  case studies/ survey research to develop "weights" for different categories of impact of different types of disasters affecting Bangladesh.
  A study should follow the case studies/survey to test the DIA methodology

C. Education and Capacity Building

- The BPATC's existing responsibility as the Apex institution for training should be extended to embrace the field of environmental management, disaster reduction and sustainable development.
- The BPATC and DMB should coordinate in the development of training modules. They should involve public service institutes, research and training centres and NGOs in the development of training modules. The training should be based upon clear objectives identified from the National Disaster Action Plan and the training needs assessment.
- In the implementation of approved training modules, the following institutions must be involved :

- Public service training institutes (e.g., BPATC, BARD, RDA, APD, NILG, ROTI, DSCSC).
- Research institutions (e.g., Livestock Research Institution, Fisheries Research Institute, Forest Research Institute, etc.)
- NGOs
- TTDC

- The development of curriculum for secondary and higher secondary education should be made through the National Curricula and Text Board (NCTB).
- To raise public awareness, proper utilisation of mass media (radio, TV, Newspaper, leaflets and local songs) should be promoted and encouraged.
- Arrangement must be made to ensure support for training and public awareness at the grassroots level.
- In development curriculum for different training the following guidelines can be used.

A. Sylabus for Foundation Course

i. Historical background and perspective of (Natural and other) disasters in Bangladesh, then effects and aftermath.
ii. Classification and origin of disaster : natural disaster: cyclone, tornado, flood, earthquake, etc. man-made disaster: gas disaster-Sylhet, violence, air/water/soil pollution, etc.
iii. Preparedness: Early Warning and Signal System (EWS), Alerting the local population likely to be affected; precautionary measures to be taken, shelter and evacuation as required.
iv. During the post disaster operations:
Emergency relief measures, search and rescue, first aid, disposal of dead bodies and debris etc.
Reactivisation of district/thana and union committees and relief camp (as required)
v. Damage assessment (true reflection is required) Methodology of DA
System of Assessment may be restructured: Damage Assessment may be coordinated and done through Thana committee to avoid duplication and is to be forwarded to High Committee (s) as appropriate.
vi. Post disaster rehabilitation.
Restoration of life line services, drinking water, medicare, etc.
vii. Integration of NGOs in every-phase of pre-and post disaster as well as in rehabilitation programme. GO-NGO coordination. Community involvement in development and disaster management.
viii. Importance of environmental management and disaster reduction for sustainable development, Afforestation, pollution control and basic requirement of health and hygiene and population management, etc.
ix. Legislation on Disaster Management.
(This syllabus is recommended for basic foundation and equivalent courses in all government academic/institute for 3-4 days package training like BPATC, BARD, CERDI, NILG, NAEM).

B. Syllabus for ACAD

i. Disaster classification, origin and perspective.
ii. Community involvement for disaster management.
iii. Disaster management policy, rules and regulations
iv. Utilisation and mobilisation of resources: mass media, local hospitals and schools, etc.
v. Legislation and delegation of authority: emergency standing orders and SOP.
vi. Monitoring, implementation and reviewing: pre-and post disaster phases.
vii. Linkage between sustainable development and disaster reduction.
viii. GO-NGO coordination in disaster management and sustainable development.
ix. Nature and value of disaster preparedness.
x. Responsibilities of elected officials in disaster management activities.

C. Syllabus for Senior Staff Course

Mode of conduct

i. Rules/regulations and strategies for disaster reduction and management.
ii. GO-NGO coordination on sustainable development and disaster reduction
iii. Relief coordination at national and international levels.
iv. Nature and value of disaster preparedness.
v. Responsibilities of elected official in disaster management activities.

(The course is to be conducted through 2-3 lectures followed by Syndicate Discussion. Specialist speaker is to be invited from the appropriate level/Institution including ministers/secretaries.)

D. Sylabus for Training of MPs
Orientation with the rules, regulations, existing standing orders and strategies of disaster management. Lecture is to be arranged by Secretary Ministry of Parliamentary Affairs in coordination with Ministry of Disaster Management and Rehabilitation and DMB.

E. One day training programme may be incorporated on motivation and creation of awareness, preparedness, search and rescue operation, disaster management in the NILG's syllabus for UP Chairman, Members, Secretaries and other local government representatives.

F. Defence Services Command and Staff College (DSCSC), Mirpur, may incorporate in their existing syllabus more about strategies of Disaster Management and Contingency plan for Rapid Deployment Force.

G. NGO may arrange training for disaster management and building awareness at local/rural level.

H. The training methodologies should include lectures, discussions, case studies, simulation exercises, etc. Opportunities to raise the importance of disaster reduction in the development process should be introduced in seminars and workshops.

D. GO-NGO Collaboration and Community Involvement

- Target groups in the area should be involved in all stages of the planning and management process with regard to development and disaster reduction activities.
- Union, Thana and District Committees should be activated so that emergency situation and normal development issues are properly addressed.
- All concerned, including local Bazar Samity and Chamber of Commerce, should be represented in local committees.
- NGOs should be represented in DDCC and TDCC and meetings of these committees.
- A mandatory workshop should be arranged after every emergency or disaster to review lessons learned for future action.
- Local government authorities should arrange for yearly evaluation of the process of GO-NGO collaboration and community involvement with respect to disaster reduction and development activities.
- Formation of planning cell at Thana and District levels where NGOs, the communities and GOB officials are represented in the planning, formulation, monitoring and evaluation of projects.
- Optimum utilisation of the knowledge, expertise and experience of the community people and the NGOs in project planning process.
- The community should play a conscious role in all the intervention stages with the NGOs providing facilitating and complimentary roles.
- The NGOs and the community should take part in the:
  (a) Protection of infrastructures like embankments, maintenance of law and order, market supply lines, communication and logistics; and
  (b) Monitoring of measures implemented against hoarding, especially during emergency situation.
- The NGOs and the community should contribute to awareness raising in the area of disaster preparedness and positive use of environment.
- All concerned should share in providing assistance/financial support to various projects/programmes, specially at the of emergency.
- In addition to elected representatives, relevant community leaders and NGO representatives in the Thana and District Committees should be co-opted to formulate projects towards sustainable development, disaster preparedness environmental management, and disaster reduction.
- Minutes/ resolutions should be prepared following meetings/ sessions and views / opinions aired by all concerned should be properly recorded.
- Proceedings of the meetings at Union, Thana and District level as well as information relating to sustainable development and disaster reduction including success story should be adequately covered by both print and electronic media at local as well as national levels. Special measures may have to be taken for allocation of more space in the media for this purpose.
- For rendering better social service in the area, deserving organisation(s) and individual(s) should be given special incentives in the form of award/reception.

E. Funding

- Funds should be allocated by the national government to augment local government's emergency funds to deal with disasters. The allocation should be made during the regular budget cycle to ensure that that funds are available well in advance to the local government.

Annex - E

CURRICULUM DEVELOPMENT AND TRAINING ON DISASTER MANAGEMENT IN BANGLADESH: FOCUS ON IN-SERVICE TRAINING INSTITUTES

M. Safiur Rahman

The Prologue:

The purpose of this paper is to make a general survey of Disaster Management Training in Bangladesh and the problems connected with curricula development and preparation of comprehensive Disaster Management Training Module.The experience and the present need of the Disaster Management training in GOs and NGOs and the initiatives of the major in-service training institutes will be a special focus of the paper.

According to the internationally accepted definition of Disaster, any event-natural or man made, sudden or progressive which impacts with such severity that the affected community has to respond by exceptional measures is called a disaster[1]. Yet the concept of disaster varies from country to country. What we call a big accident is often called a disaster in an advanced country. However, hazard and vulnerability are the two factors which constitute a disaster and normally by the term 'disasters' we connote natural disasters. Although there are various types of natural disasters in context of Bangladesh, principal disasters are: Cyclone with tidal bore, flood, drought and river erosion. Earthquakes also occasionally occur in Bangladesh. A recent one occurred in Chittagong area in November '97 killing about 22 persons and wounding about 100. A five storeyed building was completely damaged. In the winter season of 1997-98 the unusual chilly weather blew in the northern region of the country which assumed the form of a disaster. Land slides sometimes occur in the hilly region and at least on one occasion in recent years there had been a jungle fire in the Sundarbans although it could not be uncovered whether it was man-made or natural.[2]

Disaster Management is the body of policy and administrative decisions and operational activities which pertain to the various stages of a disaster at all levels[3]. Disaster planning and preparedness, dissemination of disaster warnings, constructing or fixing the place for evacuation, arrangement of evacuation, rescue operations, assessment of loss and damages, management of information and communication, procurement and distribution of relief materials, rehabilitation measures, long term planning for disaster reduction-all of them fall under the umbrella of Disaster Management.

There was a time when disaster in our country used to be regarded only as a misfortune of the gap of several years without any remedy. But when after the cyclone of 1960, severe cyclones were recurring in 1961, 1963, 1965, 1970, 1985, 1991, etc. everybody could understand that natural disaster might take place at any time.

Similarly, in an advanced country like Japan, it used to be thought that the earthquake was a frequent natural phenomenon and there was nothing to be worried about it because the buildings and houses were constructed in an earthquake proof way. But when in 1995, the earthquake in Kobe tolled the life of about 7 thousand people, not only the Japanese but also the people of the whole world were astounded and felt the need for rethinking about the disaster prevention and mitigation.

Until recently, procurement of relief and distribution of it after a calamity used to be regarding as the sole responsibility of the administration and social service oriented organisations for a disaster. Then came the structural approach for disaster-proofing by construction of safe havens like cyclone or flood shelters, 'killa' and embankments. But such approach was found inadequate by assessing the experience of disaster mitigation and prevention over the years. Now world-wide emphasis for disaster reduction is on non-structural measures. This means that the effects of a disaster might be substantially reduced if proper training and public awareness building could be organised. During the last few years, Disaster Management has come up as a subject of training and studies in our academic field.

Disaster Management Courses

Today Disaster Management subject is taught as an academic discipline in the different countries of the world. There are a number universities in the United States which give courses in Disaster Management. In UK, Cranfield, Coventry and some other universities have opened the Disaster Management Institute or Faculty. In our country, Bangladesh University of Engineering and Technology (BUET) teaches Disaster Management in the Urban and Rural planning Faculty and also in Civil Engineering Faculty under Water Resources Management. The Department of Geography and Environment of Dhaka University teaches Climatology at Honours courses, Resource Management and Agro Climatology at Masters courses and Environmental Management and planning in M Phil. Courses. In the Khulna

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University, Urban and Rural Planning Discipline keeps 150 marks in theory and 75 marks as session course tests for Disaster Management. The Public Administration Department of Rajshahi University now teaches Environmental Studies of hundred marks at Honours level and has kept Environment and Disaster Issues in the Development Administration subject at the Master's level. Shahjalal University of Science and Technology has recently opened Environment Department.

Amongst the non-govt. Universities, North South University has a strong Environmental Studies department, and People's University has Agriculture and Environmental Management Department, International University of Business, Agriculture and Technology (IUBAT) has to its credit established South Asian Disaster Management Centre which offers Disaster Management workshops, Training of Trainers in Disaster Management and Seminars of International and Regional standard. The main course contents include : [4]

- Disaster Management Principles and approaches to practice
- Interaction of environment, disaster, and development
- Disaster risks
- Mitigation of disaster losses
- Human and organisational behaviour to disaster
- Pre-disaster Activities
- Post disaster Response

Training Institutes

Although there are about two hundred training institutes in the country in the public sector, Public Administration training institutes are a few. In the civilian sector, outstanding in-service training institutes are Bangladesh Public Administration Training Centre (BPATC), Bangladesh Academy for Rural Development (BARD), Bangladesh Institute of Management (BIM, previous BMDC), Academy for Planning and Development (APD) National Institute of Local Govt. (NILG), Rural Development Academy (RDA) etc. For the Armed forces, Defence Service, Command and Staff college are the outstanding ones. There are, however, per-service training institutes for cadre specific training for each cadre.

Under the Prime Minister's office circular dated 28.9.97 each training institute is to keep at least a two hour's session in each of the courses of the institute. This is generally followed in the pre-service training institutes which are mainly Dhaka based. Even in the law course for Additional District and Sessions Judges in the Judicial Administration Training Institute, a one-hour session is kept on Disaster Management. In the outlying areas, however, it was observed sometimes back that some institutes misplaced or did not receive the circular or could not make arrangement for Disaster Management training in their courses. This was found sometime back in the institute like Telecommunication Staff College, Joydevpur, Rural Development Training Institute(RDTI), Khadimnagar or Agricultural Training Institute Khadimnagar RDTI was, however, found to be hosting Disaster Forum Workshop on Disaster Management in its campus and Telecom Staff College has planned to include DM topic in its current course.

BPATC showed its concern on Disaster Management training mainly after the 1991 cyclone. The faculty members of BPATC spent a considerable time in the disaster affected areas after 1991 cyclone and prepared an excellent research report entitled 'Living with Disaster: Cyclone 1991'. The Centre also assisted in preparation of a regional report on disaster. BPATC has kept or rather increased its interest on the empirical study and even in early 1998, some BPATC faculty members including Rector himself visited off-shore islands like Hatia in search of empirical data. Over the last few years BPATC and its four regional centres (RPATCs) have been conducting special short courses on Disaster Management including a wide variety of topics like Disaster preparedness and mitigation to even Environment and Development. It has produced a Disaster Management Handbook containing 31 topics to its credit although some of the articles in it seem to be outdated.

Bangladesh Academy for Rural Development (BARD) has conducted a number of workshops and seminars on Environment and Development emphasising on disaster reduction aspects. Recently, the Academy organised a Regional workshop on Sustainable Development with focus on environmental protection and development vis-a-vis disaster reduction. No special course is however, arranged on Disaster Management yet.

Academy for Planning and Development (APD) plans to hold short courses on Disaster Management sometime in future but could not organise any such course until now. In its Training calendar, a course is designed for mid-level officials of the Ministry of Disaster Management and Relief, District and Thana Administration and other relevant departments towards the end of October, 1998. The one week long course has the objectives for situation analysis of the disasters, discussion on the mitigation measures and imparting knowledge and skill in preparedness. The course content includes [5] :

- Concept of Disaster and Disaster Management
- Pre-disaster Preparedness
- Crisis Management

National Institute of Local Government (NILG) has recently introduced a one and a half hour session on Disaster Management in the three day course for Union Parishad Chairmen and secretaries. It also intends to introduce the topic in the short course for Pourashava Chairmen and Poura-commissioners. Bangladesh Institute of Management (Previous BMDC) does not appear to run any course at present having Disaster Management focus. However, it transpires on discussion that the Institute might organise short course on Disaster Management if special funds are available to it.

Defence Services Command and Staff College has to its credit prepared a comprehensive training Module on Disaster Management. Although some topics are profession-specific, it also elaborately deals with topics like: Managing Disaster, Disaster Management, Cyclone, Flood, Planning for Flood Management, Cyclone and Storm Surge, National Disaster Preparedness Plan. Logistics of Disaster, Damage and Need Assessment, Search and Rescue Operation. Evacuation and Displaced persons' Management etc. The module, although comprehensive lacks empirical data but shows a theoretical mastery on the subject.

Training Modules of NGOs

Some of the NGOs in the country have made a significant contribution in developing curricula and training modules on Disaster Management. To mention some, one may name BDPC, CARE International Bangladesh, CARITAS, CCDB, DASCOH, Infants du Monde, Gono Unnayan Prochesta, HEED Bangladesh, IVS, KOINONIA, SDI, CMD, South Asian Disaster Management Centre of IUBAT, Disaster Information Service of PRIP, etc. Disaster Forum has an umbrella over a member of Disaster related NGOs.

Some of the main courses of BDPC are: Course on Disaster Management Training (7 days), Course on First Aid Training (6 days), Training of Trainers on Disaster Management (12 days). The main areas covered in Disaster Management Training are: Disasters in Bangladesh, Survey and Mapping, Disaster Preparedness, Activities During Disaster and Emergency Operations, Post Disaster Rehabilitation operation, People's participation, First Aid and Medical Assistance, Report writing and practical Demonstration. It has to its credit a member of clientele -specific Modules.

CARE Bangladesh emphasises on TOT on Disaster Management, Basic Disaster Management Training, Community Based First Aid, Needs Assessment, Logistic and Financial Management.The major contents of training courses of CARE include, interalia, Concepts of Disaster Management, Response system, Disaster and Development, Hazard and Vulnerability Analysis, Damages. Needs and Risk Assessment, Disaster Preparedness, Risk Analysis, Organisational Strategies, Contingency planning, Procurement Inventory and Logistics Management, Standard policies on Disaster Response, Media relations, Monitoring and Reporting etc. CARE Modules include short case studies and incidents helpful for easy understanding at lower level.

Caritas organises courses like community Mobilisation, DM Strategic Planning, Policy Meeting etc. CCDB organises volunteer training on Disaster preparedness, Training on Disaster Management, Training of Disaster Managers, Training of Calamity Preparedness and Management etc. It also puts emphasis on small cases. [6] HEED Bangladesh organises Disaster Preparedness course, Field level Disaster Management course, Mid level Disaster Management course, Central Disaster Networking Management course etc. Several other NGOs also organise courses and impart training on Disaster Management.

By an inquiry into the training programmes of some of the NGOs, it was revealed that the govt. sector and Public Administration Training Institute may enrich themselves by the experiences of NGOs. In fact, a GO-NGO give and take is necessary for preparation of training programmes and training modules.

Disaster Management Bureau

Disaster Management Bureau (DMB) was created in 1992 as a result of world consciousness to assist Bangladesh after the catastrophic flood of 1987 and 1988 and the devastating cyclone of 29th April 1991. It became a govt. organisation in 1993 under the Ministry of Disaster Management and Relief with a Director General usually of the rank of Additional Secretary to Govt. as its head. Broadly, the DMB has the following functions: [7]

a. To co-ordinate Disaster Management activities;
b. To organise Training and Public Awareness activities;
c. To collect, preserve and analyse data on various Disasters;
d. To operate an Emergency Operation Centre;

e. To promote prevention and preparedness at all levels on various disasters;
f. To arrange preparation of Union, Thana and District level Disaster Management plans including: Training and Public Awareness Building plan for short, medium and long term needs of the country;
g. To help line Ministries, Departments and Agencies to develop contingency Disaster Management plan and to test this plan, arrange effective dissemination of Disaster Warning.
h. To organise logistics arrangement in connection with Disaster Management.

In spite of several constraints of DMB, till June '98 it could organise 136 workshops, orientation curses, TOT courses and seminars at the National, Divisional, District, Thana, Union and community levels. These were participated not only by the government and semi-government officials of the different levels but also public representatives, NGO officials, local leaders, Imams of the mosques, school teachers and others. Recently, DMB also organised some Disaster Preparedness training programme for the fishermen communities of the islands as well.

DMB itself is not a training institute and, therefore, it is but natural that there will remain some flaws in its training programmes. But the main purpose of its training programmes is public awareness building against disasters. DMB has to a certain extent achieved success in it. Through an evaluation study made by an independent consulting firm, viz, Development Support Link (DSL) appointed by UNICEF, it was revealed that some amount of success was achieved by the local training of DMB. The Report, inter-alia, reads: [8]

(In Kuakata) even an UP Member could not trace out any member of DMC. Just opposite, a very congenial atmosphere was observed in Kolapara of Patuakhali during the same situation. The local Chairman who eventually received TOT was observed to convene and organise meetings .... at his own initiative. It was working very well.

The main problem of DMB is that its training resources including manpower are too small in relation to the vast area which are considered to be disaster-prone. Moreover, the civil administration connected with Disaster Management cannot spare more than a day or half a day to sit for a workshop or a course.

DMB is at present engaged in preparation and reshuffling of its training modules. The ProDoc (Project Document) of DMB keeps provision for assisting other major training institutes (and thereby be assisted) in preparation of training Modules.

The major problem in other training institutes is about the preparation of comprehensive Training Module on Disaster Management. Recently two DM lecture handouts were sent to DMB by two important training institutes of the country, but it was surprising to find that the handouts omitted the crucial topics like focus on Standing Orders on Disasters 1997, Function and responsibilities of District, Thana and Union Disaster committees, and Local Disaster Action Plans.

Conclusion

Training in Disaster Management in Bangladesh is a gigantic task. It is not possible for one agency or one training institutes to shoulder the responsibility of Disaster Management training. All training institutes and all the govt. agencies and NGOs are to understand the importance and magnitude of the task. Public Awareness Building against disasters can minimise the loss and damages. It was amply proved in the cyclones of 19th of May 1997 and 20th of May 1998. Therefore, for our development and environmental protection, all the agencies and institutes, Govt, and NGOs must co-operate and share in curriculum development and preparation of training modules. However, Disaster Management training can only be a means to an end. The ultimate goal is to create a widespread Public Awareness Building in the country for reduction of quantum of loss and damages of natural disasters so needed for environmental protection and development of the country.

References:

1. See W, Nick Carter, Disaster Management: A Disaster Managers' Handbook, Manila Asian Development Bank, 1992, pxxiii
2. The jungle-fire at Chandpai range of the Sundarbans under Mongla thana reportedly continued for about 60 hours covering over three hundred acres of land in April '96. See Daily Inqilab, dated 22.4.96 P.1, col 5.
3. W: Nick Carter, op cit pp. 51-59
4. IUBAT, South Asian Disaster Management Centre, Tenth Disaster Management Workshop. 1997.
5. Academy for Planning and Development, Course Brochure, 1998. P 18.
6. see Mahfuzallah, Living with Cyclone, Dhaka: CCDB 1993
7. see Dr Kshanada Mohan Das, "Disaster Management in Bangladesh and the Role of Disaster Management Bureau" Disaster Management News" Dhaka: DMB, Issue 3-5 (December '97) p-8
8. Development Support Link, "Evaluation Study of Training and Public Awareness Activities of DMB' Dhaka: August 1997. p.b.

Annex - F

EXPLORING THE POSSIBILITIES OF DEVELOPING A FRAMEWORK FOR DISASTER IMPACT ASSESSMENT

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Introduction

About 80% of the total land area of Bangladesh is flood plains, 12% is hills and 8% is uplifted terraces. The rich floodplain provides substantial benefits to the people of Bangladesh.

Seasonal flooding occurs in most part of Bangladesh in the wake of monsoon rains. Farmers are well adapted to variations in the depth and duration of seasonal flooding. However, when water level rise earlier, later or higher or more rapidly than expected by farmers, floods become disastrous with severe crop damages and also loss of life and property. These abnormal inundations are caused by flash flood, river floods, and rainfall floods.

The impact of such floods is further aggravated by river bank erosion of the major rivers in Bangladesh. Floods and bank erosion together are responsible for large scale migration of people (both temporary and permanent). To reduce such impacts, government often undertakes large scale projects whose ultimate goal is to reduce impacts from such disasters. At the same time it is not very difficult to see that such projects provide a sense of security which make people gradually less prepared against disasters and sometime catastrophic disasters may occur due to non-preparedness of the people living within the project area. It is perhaps due to this reason many people are calling for a disaster impact assessment during project appraisals.

Disaster Impacts

To start with an example, the 1991 cyclone affected 19 districts with 102 Thanas, and 9 municipalities. Around l0 million people were affected due to this cyclone while nearly a million homes were destroyed totally and another 882 thousands were partially damaged. Number of people who died due to this cyclone was138,882 and similar number of people were injured. Nearly 700 miles long embankments were totally or partially damaged. More than 1 million animals (domestic) perished and 1 million acres of crops were destroyed (totally or partially).

What is clear from this example is that impacts of disasters are manifold. Primarily they can be categorised into four sub-groups :

a losses of human health (death or injuries)
b. losses of private and public properties and durables
c. losses of crops and livestock, and
d. losses of bio-diversity and ecology

Disaster Management

In terms of managing disasters, there are several approaches. Reduction of risk and vulnerability of people and other resources in the impact area are obviously the primary goal of disaster management. Projects related to infrastructure development, management of waterbodies, disaster preparedness centers, embankments & polder development are usually undertaken to reduce disaster impacts and risks.

During project appraisals economists usually include all benefits and costs (direct and indirect). To conduct a full-fledged DIA, one must carefully analyse the benefits and costs so that they are not double counted. With this end in view, a framework is proposed in the following sections to develop DIA for projects.

This framework may be used to assess project related disaster impacts only. During the discussion we would be able to develop a comprehensive outline to conduct a DIA in relation to projects.

How the projects are related to disaster impacts

Activities of development projects may increase or decrease disaster impacts. For example, an embankment may reduce immediate risks of catastrophic disasters but at the same time, it may increase long term disaster risks. In cases of Beel Dakatia it has proven that people living within the polder-protected area were totally unaware of the consequences of its failure. Failure of the sluice-gate in the area resulted in catastrophic consequences in the life and ecology of Beel Dakatia. Such impacts were not included in the project analysis. It was this apparent failure that led to non preparedness of the people living in the area. A DIA should have clearly indicated possibilities of such disaster impacts and consequently, it is expected that people as well as the government would have been more prepared to deal

with such disasters. DIA will indicate **mitigation** (refers to steps leading to avoiding or minimising disaster impacts) measures during and after the completion of the project. This will prove the need and usefulness of DIA for projects.

On the other side, mitigations measures may alter project costs and benefits and so incorporation of DIA during project analysis would provide a 'real' IRR or NPV or BCR of the projects.

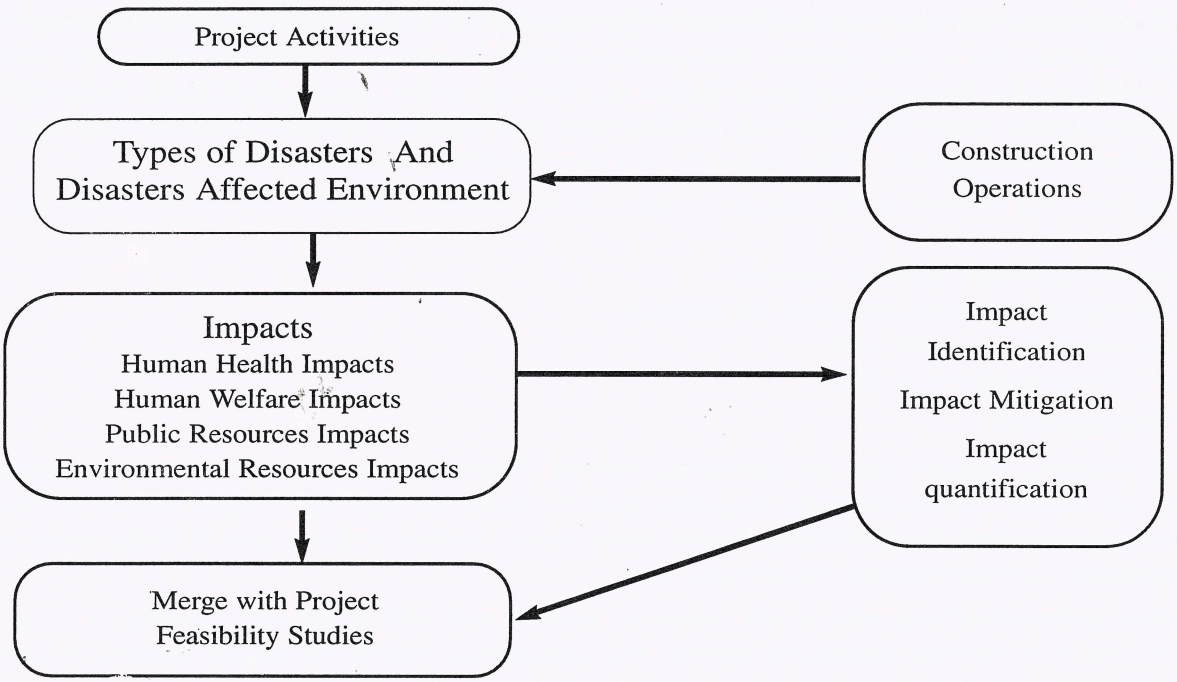
What is DIA

Disaster Impact Assessment (DIA) is an assessment procedure to be undertaken by the project proponents before the project under goes ECONOMIC ANALYSIS. Inputs from DIA can be used in quantifying and valuing disaster impacts. A DIA typically includes a description of the disasters, anticipated consequences and mitigation measures, possible alternatives, cost-benefit analyses and a suggested institutional requirements to confront disasters. DIA must also involve public participation so that views of the affected people/ groups and local organisations are taken into consideration in preparing DIA.

Steps in DIA

Steps in DIA involve identification of disaster affected environment during project construction and project operation periods. This disaster affected environment will include human and nonhuman losses, material, physical and psychological losses and environmental losses during a disaster in the project area (on-site and off-site).The following schematic diagram shows the steps involved in a typical DIA.

Steps to Identify Disaster Impacts



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Which impacts should be considered

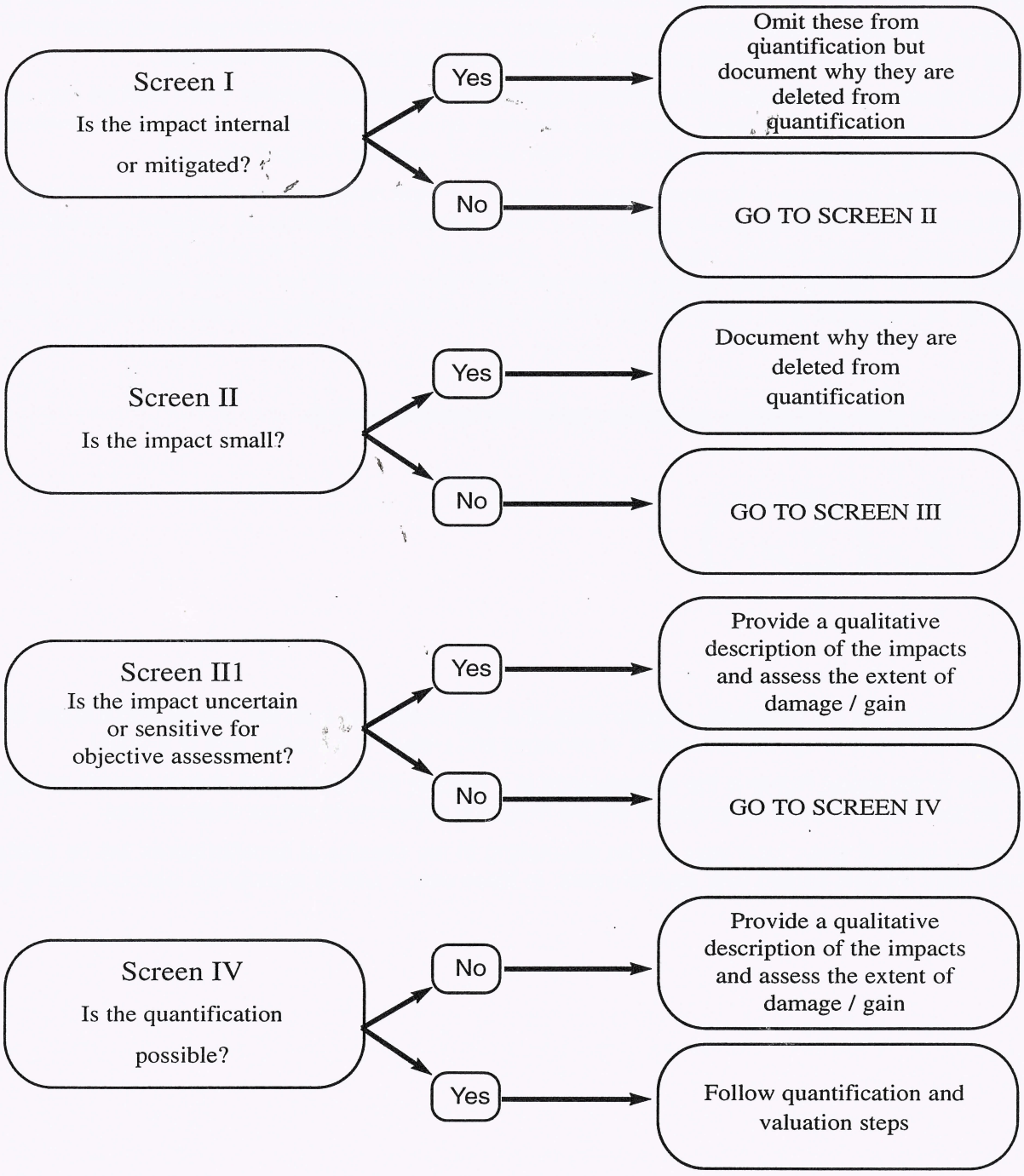
A project's disaster impacts may be defined as any changes in the human life and welfare and the environment that are related to increase or decrease in disaster factors from the project. These impacts may be physical, socio-economic or psychological. There may be long term and short term impacts. They may also be on site and off site. Some of the impacts may be internal, implying impacts that affect only those involved in production and consumption of the project and some impacts may be external that includes affect that are not directly related to projects consumption or production activities. All of these impacts may increase or decrease benefits or costs of the project.

Once project's disaster affected environment is identified, it is then up to the assessment team to develop a consistent estimate of the benefits and costs.

Quantification of Impacts

Quantification of disaster impacts should involve several steps. DIA may follow the simple **screen test** procedures used in EIA of projects. Each of the screens must be discussed and finalised during this workshop. Following diagram explain the screen test procedures for quantifying disaster impacts from a project.

Screen Test Procedure For DIA



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Impact quantification procedure

The data needed to quantify and value disaster impacts can be derived from project document and secondary sources. **Disasters** that passes screen III (above) should be closely monitored for four categories of impacts. The following forms (see table I) may be used to develop a description of disaster affected environment.

Value of Disaster Impacts

Once the quantification is complete, the value of the losses/ benefits in terms of disaster impact can be calculated. There are several techniques which provide values of losses and benefits. Value of economic resources are much easier to estimate. However, controversy exists in terms of finding a value of life. In absence of any other estimate, economists have been using the concepts of Value of Statistical Life (VSL). To estimate the damages due to illness (morbidity), the cost of illness approach is generally acceptable. To value environmental resources techniques like contingent valuation methods, hedonic pricing method or travel cost method could be used.

The problem of valuation is further complicated during aggregation of costs and benefits. How shall we sum up value of a life with loss of a house? What I mean here is that summing up is a major problem and this is obviously a major policy problem. During disasters if we protect life first. Then what ? Animals ? Crops? Houses?

The best way to solve this issue is to create relative weights for each categories of affected environment. These weights shall remain 'fixed' from project to project. As a result, it would be possible to compare and conclude on DIA between projects. 'Delphi method', may be used to develop the first set of weights. My suggestion is to the questionnaire (given at the end of this paper) to generate preliminary 'weights' for various categories of impacts. It is expected that at the end of this workshop we would be able to find a preliminary weights for various categories of impacts.

DIA index

The index value for a given year can be constructed using the following formula.

$$I = \sum_{j}^{k} p_j \left(\sum_{i}^{n} w_i v_i \right)$$

where w is the weight, p is the probability of occurrence of a type of disaster from the project, and v is the value of damages, Subscript i refers to specific categories of damages and j refers to a specific type of disaster.

Higher the value of the index, higher is the consequence of a disaster from the project. It also provide an objective assessment for the need to amend the project to ensure mitigating measures to reduce disaster risks.

Finally, the above index is given for a year and so discounting of the streams of benefits/losses will be needed for projects which have impacts spread over several years, In these cases, use of appropriate discount rate is indeed essential.

Table 1: Description of Disaster Affected Environment

Disaster Factors (vulnerable population and resources)	Embankment Project	Shelter Project	Roads & Highway Project
Human Health Impact (HHI)			
Population in the affected area Old (Over 60 years) Child (under 5 years) Female Male			
Human Welfare Impacts (HWI)			
Livestock Poultry Cattle Others			
Crop acres Rice Acres Vegetable acres			
Horticulture Culture fisheries Open water fisheries			
Housing Thatched Tinsheds Pucca Durables			
Fishing Net			
Boats / Trawlers			
Tubewells			
Irrigation pumps			
Public Resource Impact (PRI)			
Educational Institutions			
Hospitals (public)			
Embankments			
Tubewells			
Irrigation pumps			
Bridges			
Roads			
Other Economic Resources			
Environmental Resources Impacts (ERI)			
Coastal / Marine Ecosystem Freshwater ecosystem Endangered Species / Bio-diversity Terrestrial ecosystem			

Note : All These factors will be evaluated in terms of long-term and short-term impacts.

Questionnaire

Name :	Profession :	Age :
On a scale of 0~100 rate following disaster damages, a 0 value means 'it is not an important factor and less priority will be given to protect this loss' and 100 means ' the most important factor' and hence priorities will be given to protect them.	Minimum	Maximum
1. Loss of human life		
2. Outbreak of epidemics		
3. Human health losses (physical)		
4. Damage to domestic birds (ducks / chickens)		
5. Damage to domestic herds (cattle)		
6. Damage to inputs (seedlings, ploughing cattle, etc.)		
7. Damage to foodstuff		
8. Damage to feedlot		
9. Damage to crops		
10. Damage to drinking water sources		
11. Damage to Houses		
12. Damage to fisheries		
13. Damage to roads		
14. Damage to schools/colleges		
15. Damage to hospitals		
16. Damage to embankments		
17. Damage to bridges/culverts		
18. Damage to ecology		
19.		
20.		
21.		
22.		
23.		
24.		
25.		

DISASTER REDUCTION: NEED FOR EVOLVING AN EFFECTIVE CO-ORDINATING SYSTEM IN BANGLADESH

DR. Kshanada Mohan Das
Director General
Disaster Management Bureau

1. Introduction

Sustainable development is the aim of every nation. Reddy in a paper noted that "sustainable development implies a model of development in which both the present and the future are taken into consideration. Natural resources, ecology and economic growth are to be managed in such a manner that it leads to sustainability". Development has a closed relationship with disaster reduction.

The positive aspect of relationship between development and disaster are as follows:

(a) development can reduce vulnerability, (b) disaster can provide development opportunities. The negative aspect of relationship between the two may be stated thus : (a) development can increase vulnerability and (b) disaster can setback development. Even one time disaster can cause a great loss and setback in development. Hence for effective and long term disaster reduction, there must be a close relationship between disaster and development. Disaster creates an emergency situation. The importance of coordination is thus so important for effective management of emergency situation. Since disaster reduction requires involvement of many agencies / organisations both horizontally and vertically, coordination mechanism of disaster reduction in a disaster prone country like Bangladesh is indeed an imperative. The experience of frequent disaster in Bangladesh has led us to put serious importance on developing co-ordnating system in disaster reduction. We in Bangladesh have taken some steps for disaster reduction but the following discussion will also reveal the weaknesses in the existing coordinating system. This paper seeks to examine the coordinating mechanism as enumerated in the standing order on disaster, institutional arrangements for coordination of disaster management activities at the national and field levels.

2. Structural Arrangements for Disaster Management in Bangladesh.

Bangladesh is a disaster prone country. Cyclone, Tidal-surge, Flood, Drought, Erosion etc., are the major disasters in Bangladesh. As a step to co-ordination of disaster management activities, the structural arrangements in the country are as follows:

a) At the national level, the highest body for Disaster Management is the National Disaster Management Council (NDMC), headed by the Hon'ble Prime Minister. Her relevant Cabinet colleagues, Secretaries to the Government, the Principal Staff Officer of Armed Forces Division etc. are the members. This Council is the highest body supreme in Bangladesh, to co-ordinate disaster management activities and to formulate disaster management policies . One of the principal responsibilities of the other committees are to implement the decisions of the NDMC and to offer technical advice to the NDMC.

b)The Inter-Ministerial Disaster Management Coordination Committee (IMDMCC) is headed by the Hon'ble Minister/ State Minister in charge of the Ministry of Disaster Management & Relief. The relevant Secretaries to the government and Heads of other departments, Principal Staff Officer of Armed Forces Division, a representative of the NGO are the members. This Committee is to implement the decisions of the NDMC and also to co-ordinate activities of various organisations involved in disaster management. This committee is also responsible for arranging and formulating procedure for Disaster Impact Assessment of the development projects etc.

c) National Disaster Advisory Committee is to be headed by a famous expert on disaster to be nominated by the Hon'ble Prime Minister. MPs of disaster prone areas and the disaster experts of the universities, NGOs and other experienced persons etc. are to be taken as the members of the committee. This committee is to offer technical advice to NDMC and others concerning disaster on disaster management matters.

d) The Cyclone Preparedness Board is headed by the Secretary, Ministry of Disaster Management & Relief. Immediately with the formation of depression, the Board is to sit, review preparation and suggest actions to face the possible cyclone and water surge.

e) Focal Point Co-ordination group is headed by the Director General, Disaster Management Bureau (DMB), Director Generals of Health, Food, Agriculture Livestock, Fisheries Radio, Television, Heads of Meteorology Departments

SPARRSO and representative of NGOs and Armed Force Division are the members. The Group examines Contingency Plan for disaster of each department and review the disaster preparedness activities.

f) Disaster Management Training and Public Awareness Task-Force is headed by the Director General, Disaster Management Bureau (DMB) whereas heads of Government and Non-government organisations dealing with Disaster Management Training and Public Awareness activities are the members. The Training and Public Awareness activities with respect to disaster management are developed, evaluated and co-ordinated through this task force.

g) Committee on Speedy Dissemination of Warning Signals is again headed by the Director General, Disaster Management Bureau. Director Generals of Radio, Television, Mass Communication, Film and Publicity, Principal Information Officer and Heads of Meteorology Department and SPARRSO are the members. This Committee examines the plan for speedy dissemination of warning signal and suggest measures.

h) NGO Coordination Committee on Disaster is again headed by the Director General, Disaster Management Bureau where the representative of various NGOs and Government Departments sit together and decide ways and means for ensuring co-ordination of disaster management activities of Government and NGOs.

In addition to those there are Disaster Management Committees at District, Thana and Union levels each having representation from Government,NGOs, Armed Forces Division and other agencies involving disaster management. These committees are to horizontally and vertically co-ordinate the disaster management activities at their respective levels.

These are the existing structural arrangements for co-ordination of Disaster Management Activities in Bangladesh.

3. Other Efforts :

The Committees noted above are to co-ordinate the disaster management activities at the national and field levels both horizontally and vertically. Though vertical coordination is the responsibility of the individual department/ organisation concerned, however, through Focal point co-ordination group meetings preparation of Departmental Contingency Disaster Management Plan is pursued, analysed and discussed. Coordination among Government officers, Armed Forces, NGOs, Local Government representatives and also with the people is essential for effective disaster management. These committees provide for representation for all concerned agencies including the NGOs. In a circular in September, 1997 the Hon'ble Prime Minister directed the NGO Affairs Bureau to keep constant touch with the NGOs involving disaster management activities and coordinate their activities. The NGO Affaires Bureau was also directed to procure, compile and send disaster related information o the Disaster Management Bureau and the Government. In the same circular, the Chairpersons of District, Thana and Union Disaster Management Committees are authorised to coordinate disaster response, relief and rehabilitation activities with the NGOs and to ensure avoidance of duplication of relief and rehabilitation efforts at one place. When NGO report with items to District, Thana or Union Control Room, they must be given proper and adequate direction within two hours of the reporting of NGO concerned.

With a view to disaster reduction, the Government of Bangladesh have established Disaster Management Bureau (DMB) in 1993. DMB was created to coordinate disaster management activities and to serve as the store-house of all disaster related information. It has the responsibility to organise Disaster Management Training and Public Awareness activities to sensitise the people and the officials on Disaster. DMB was conceived as a professional organisation to arrange preparation of Disaster Action Plan at various levels, undertake research on disaster Management and to evaluate the impact of disaster and prepare recommendations for the Government. With the assistance of World Health Organisation a regional disaster reduction centre on health issues is going to be set up in Dhaka.

4. Some Issues:

Disaster has a direct link with development. It is observed that the affluent people of the society are less affected compared to the poor people in a Disaster. Hence socio-economic Development at the individual and community levels has a direct impact on disaster reduction. Adoption of development programmes needs therefore to consider disaster factor before adopting a project. Though provided in the Standing Orders on Disasters, the Disaster Impact Assessment (DIA) of development projects in Bangladesh is not done.

We are yet to find out a mechanism to link development projects with disaster reduction. Because of the absence of Disaster Impact Agreement (DIA) many costly projects of the Government face unfortunate consequences. The

cyclone of 1991 badly damaged many costly installations in Chittagong. We must find out ways to link projects.

We are a poor country. Construction of a cyclone shelter, for example, in the coastal areas involves a huge investment. Based on location, seven to ten million taka is necessary to construct one cyclone shelter. Government however have been constructing various buildings as schools, colleges, offices and hospitals etc. in the coastal areas. If such development / construction could be coordinated with Disaster Management, Government could construct those schools or office buildings etc. in such a way as could be utilised as shelter at the hour of disaster with a little higher investment for such construction. Expenditure on construction of separate cyclone shelters could thus be minimized significantly economising the expenditure on this count.

There is need to upgrade the socio-economic condition of the poor and vulnerable groups living in the disaster prone areas of the country. Location specific programmes for improving the socio-economic condition of the people may be taken up on priority basis. We could not yet involve and associate the community with the management of over 2000 cyclone shelters constructed at the coastal areas. The communities around the shelters may be encouraged to utilise such building for community development purpose by constituting Managing Committee for such building. Office of Co-operative Societies, community based organisation, Village Club or Library may be accommodated in such buildings.

The vacant land around the building can be utilised for appropriate tree plantation, kitchen gardening etc. and the landless and poor villagers may be given priority to utilise such a land. This may bring economic activities in the community.

There is however, lack of co-ordination in cyclone shelter management in our country. Role of the Ministry of Disaster Management and Relief, the Disaster Management Bureau is almost absent in cyclone or flood shelter management. The Planning Commission, Cabinet Division under IFAD project and the NGOs are independently constructing shelters without much co-ordination. At times it becomes difficult for us to know about the exact position and number of the cyclone shelters.

The provision for the maintenance and management involving the local communities of these shelters have not been done. Ministry of Disaster Management & Relief was not given any additional hand to look after these buildings. There is thus a gap in co-ordination at the macro level.

The above discussion will reveal that Bangladesh has developed a network for effective coordination of disaster management activities involving the Government Department, Armed forces, NGOs and other related organisations both at the macro and micro levels. No doubt there has been significant improvement in the field of disaster management in Bangladesh.

Vast number of the people has been sensitized Action plan and contingency plan on disaster mitigation are in the process of finalisation, and disaster response mechanism has been improved. The United Nations in their IDNDR brochure, 1997 has appreciated Bangladesh for better disaster preparation and improvement in Disaster Warning System. There is, however little scope for complacency. Still we are to go a long way in vitalising and strengthening the co-ordinating system of disaster management.

The committee have been constituted to con-ordinate the disaster management activities. Effectiveness of these committees depends on their proper and regular functioning. The Hon'ble Prime Minister in her directive of 28 September, 1997 instructed that the committees headed by the Director General, Disaster Management Bureau and the field level committees in district, thana and union level must sit at least once in every three months. It was also directed that in extreme case immediate next officer below him should attend the committee meetings. The directive however advised that the member should put top-most priority in attending the disaster.

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PROPOSAL FOR REGIONAL AND IN-COUNTRY PROGRAMMES OF EDUCATION AND TRAINING IN DISASTER AWARENESS AND UNDERSTANDING, PRE-DISASTER PLANNING AND PREPAREDNESS AND DISASTER MANAGEMENT FOR THOSE IN SENIOR POSITIONS OF RESPONSIBILITY IN DISASTER-PRONE DEVELOPING COUNTRIES.

Lieutenant Colonel G.N. Ritchie, Royal Engineers
Department of Administrative Studies for Overseas Visiting Fellows
University of Cranfield, England.

PART-I

Introduction and Summary

The document to which this Summary relates describes programmes of education and training, designed to improve the standards of pre-disaster planning and preparedness in developing countries.

The proposal is for a pilot scheme lasting two years, followed by an introductory five-year programme. Courses would be organised on a regional basis (e.g. Caribbean, East African, S.E. Asian, etc.) throughout the world for those with responsibility for disaster preparedness in countries of the region. The aim of those courses would be to create planning capabilities at country level in relation to disaster preparedness and management, and simultaneously, to build up competence within regional universities and administrative colleges to carry out this training themselves. Support has been provided for a two-year programme of research at Manchester University which has identified the requirement and built up the teaching material on which the programme will be based.

The principal conclusions of this research programme are that :-

(a) Failures in disaster management and in development planning can result in administrative breakdown and create situations of disaster proneness which frequently cause greater hardship than catastrophic natural phenomena,
(b) Failure to plan the employment and deployment of indigenous human and material resources in disaster is commonplace, exacerbates distress and delays relief.
(c) Pre-disaster planning and preparedness is the most effective and cost-effective way to minimise distress and speed relief.
(d) Ill-judged and poorly planned development projects often create the circumstances in which a natural phenomenon is merely the catalyst creating disaster from a chain of planning and administrative events and failures.
(e) Growth in developing countries is severely retarded by disaster, particularly when pre-disaster planning and disaster preparedness is not a feature of government policy.

The research which provided the foundation of this proposal was made by Lieutenant Colonel G.W, Ritchie of the Royal Engineers of the British Army, who is an Honourary Fellow of the University of Manchester. It was made against the background of his considerable experience in civil engineering tasks related to development in South East Asia. This experience and his research into disaster situations throughout the world have provided the evidence upon which his conclusions concerning the significance of education and training to pre-disaster planning, disaster preparedness and disaster management are based.

Disasters will continue to affect mankind into the foreseeable future with particular significance to the developing countries. Although the need for assistance to these disasters from the developed countries of the world will continue, research shows that opportunities exist for the disaster prone developing countries to gain substantial benefits from investments in education and training which relate to pre-disaster planning.

THE PROGRAMME

The proposal is aimed at the elimination of these administrative and planning failures by a programme made up of:-

Appreciation Seminars to help those in positions of responsibility understand what can happen, what can be done to ensure the necessary administrative capabilities and how to deal with the inevitable.

Disaster Coordinator Courses for those given responsibility for pre-disaster planning, disaster preparedness and management in disaster. The training objectives of these courses are:-

a) Study of the analytical techniques and the processes of planning, particularly as these relate to disaster prevention and preparedness
b) Study and practice in the techniques of crisis (disaster) management.

c) Examination of the relationships between development strategies and disaster, with particular reference to disaster proneness and prevention.

An Advisory Service in pre-disaster planning and preparedness, and in education and training to developing countries establishing their own pre-disaster training programme.

A two-year Pilot Scheme, besides setting up the project, would provide not fewer than twelve, 3-day Appreciation Seminars and five, 6-8 week Disaster Coordinator Courses. During the subsequent five years, a number of Appreciation Seminars and three or more Disaster coordinator Courses would be run in each year.

STAFFING and COSTINGS

Initially, planning and organising the programme will be dependent upon a great deal of centralised effort and widespread pattern of world travel by the staff involved. To permit this and to ensure that momentum is maintained, the central staff will require a Director and assistant Director backed up by competent secretarial assistance.

The regional courses and seminars would be run by these full-time staff supported and supplemented by temporarily engaged lecturers from regional institutions and experienced administrators of disaster situations from disaster prone developing countries,

£122,992 is the estimated budget for the two-year Pilot Scheme and £329,305 for the subsequent five years. A detailed breakdown of this estimate is at Appendix III. Costings are at mid 1976 prices.

CONCLUSIONS

Education and training, in relation to pre-disaster and development planning, is certain to provide the most effective and cost-effective means of mitigating the effects of disaster into the foreseeable future, in spite of current scientific research relating to prediction and prevention. Both fields of activity are acknowledged as necessary and complementary.

Resources invested in training of this sort will be multiplied in the effectiveness of relief action when disaster strikes, whereas similar sums expended upon natural relief at the time provide diminishing returns both in relief and in social and in economic development.

RECOMMENDATION

Some proportion of the world's resources which are presently expended in disaster relief and development aid should be invested in a programme of education and training aimed at developing national capabilities and resources towards pre-disaster planning, preparedness and disaster management.

PART - II

STRUCTURE OF THE PROGRAMME

The programme is planned essentially as a regional one, It is intended to stimulate concern over disaster and development problems and to train those responsible for pre-disaster planning, disaster preparedness and disaster management. Courses run in this way are likely to generate inter-regional co-operation in planning and action and create the capability to maintain ongoing programmes of training, related to disaster and development, in regional universities and colleges.

Analysis by both the UNDP and UNDRO have indicated that natural catastrophes can cause serious setbacks to development programmes and that disaster has its most detrimental effect upon the poorer of the developing countries. Although no hard data showing the extent to which growth is being retarded in disaster-prone developing countries yet exists, UNDRO has initiated a World Survey of Disaster Damage Which is likely to show that in the poorer of the developing countries growth is in fact being retarded by recurrent disaster.

Other studies show that development planning must include comprehensive consideration of many factors including cultural, social, economic and political ones. Where this has not been the case, situations have occurred in which people have been placed at greater risk to the effects of disaster than they were prior to the development project.

Such situations have occurred in areas of pastoral farming subject to drought in Africa, Particularly the Sahel, and in India. There, improvements to animal health and husbandry lead to increased herds and the consequent demands upon water and grazing. Although technology enables increased water supplies to be provided from deep drilled wells, these improvements have rarely increased the available grazing or provided outlet market for the products of these herds. In periods of drought, surface water shortage has resulted in herds concentrating near drilled wells and

exhausting the already over-grazed areas. The consequence has been two-fold, not only have herds been lost but the grazing has gone too.

A comprehensive development policy would have ensured outlets for the beef and other products of these expanded herds and controlled their size at a level which the available water and grazing would sustain. Although it is easy to be wise after the event our aim must be to learn the lessons of such mistakes.

In other circumstances combinations of industrial development and cash crop farming have drawn and forced subsistence farmers off the land at a time when increasing population is making greater demands upon available food supplies. In consequence subsistence farmers are often forced to farm marginally productive land where a lack of cultural experience in suitable farming techniques have placed populations at risk to a variety of natural catastrophes.

An understanding of these aspects of the relationship between disaster and development is important to those involved in development and pre-disaster planning. Arrangements will be made to include these subjects in the syllabus of the courses planned.

Participants on courses would examine the problems of development, pre-disaster planning, and disaster management in a programme of syndicate projects, exercises and seminars in which learning would be an active and participating process. Presentation and lectures would be used only to the degree necessary to impart knowledge.

Research has produced a number of extremely relevant papers and at Manchester University a wide selection of detailed case studies have been made. Together, these provide a very comprehensive bank of teaching material. In addition, in support of this work, I.B.M, have sponsored feasibility studies aimed at creating a computer-based disaster simulation which will become part of the total "Disaster" teaching package. This simulation aims to create the working, pressures and difficulties of management in a disaster relief operation, particularly as these relate to a very complex situation both in the demands for decision and the priorities of action, It will illustrate the shortage and conflicting nature of the information frequently available and the need to establish sound sources and means of communication for this.

By all these methods participants will be exposed to the wide variety of aspects which affect pre-disaster planning and will become aware and practiced in the organisations and systems necessary to provide sound pre-disaster planning and control and co-ordination in disaster situation management.

Throughout the programme, resources would be available :-

(a) To assist regional universities and colleges to develop their own ability to provide pre-disaster planning and preparedness competence through education and training.
(b) To advise on in-country disaster training and preparedness.
(c) To carry out research to provide material for up-dating education and training programmes related to disaster.

CONTROL AND ADMINISTRATION

It is intended that the programme Director would act as an agency of the United Nations Organisation and would himself receive direction concerning the operation of the programme through one of the organisation's agencies, either the UNDP or UNDRO, or by some similar arrangement.

Similarly, the funds supporting the programme would be audited by auditors on behalf of the controlling agency to whom the programme Director would be required to account for the proper administration of these funds.

THE NEED FOR PRE-DISASTER EDUCATION AND TRAINING

Disasters must involve people because unless lives and livelihood are affected we need merely consider the earthquake, flood or hurricane a natural phenomenon. nevertheless, the greater proportion of disaster research relates to study of the natural phenomena, even though evidence shows that the breakdown of administrative functions and of the existing rescue and life support systems is frequently the cause of greater distress than the initial catastrophe.

Naturally disasters will continue to affect the populations of disaster-prone developing countries into the foreseeable future in spite of the scientific endeavours to predict and prevent them. There is indeed strong evidence that over the last 15 to 20 years natural disasters have been affecting increasing numbers in these countries with increasing severity. And yet, from surveys made by the United Nations Disaster Relief office (UNDRO), and the League of Red Cross and Crescent Societies, it is evident that very few developing countries have taken even elementary steps to study their problems and to initiate pre-disaster planning and preparedness, even though such measures can be shown as the most effective, cost-effective and readily available means of mitigating the effects of disaster upon their populations.

The great need is to provide the awareness and understanding of what is likely to happen; and what can be done about it. This is particularly important in relation to those in positions of responsibility, in government, the public and voluntary services and in the press and broadcasting services. With them lies the capability to stimulate public concern, and support for the programmes of pre-disaster planning which make disaster preparedness a reality.

Education programmes which stimulate concern must, however, be complemented by training programmes which provide the capability to analyse the problem, plan the solution and implement the action upon which the solution depends. This is the role of the national disaster Co-ordinator and his deputies, It seems unlikely, however, that the limited resources of talent and funds available will result in Disaster Co-ordinators having this as their only responsibility, More probably they will also hold administrative appointments which for disaster Coordinators at national and subordinate levels involve them in a range of administrative appointments which for disaster Coordinators at national and subordinate levels involve them in a range of administrative functions and policy responsibilities. This is an advantage in that it tends to link responsibility for disaster preparedness with responsibility or interest in development planning.

But pre-disaster planning and disaster management require specialised study of particular aspects of the management of national resources. Examples are:-

- Emergency financial and legislative powers
- Immigration and customs controls
- Public information and press briefings
- Warning systems
- Role of UN and International relief agencies
- Logistic planning
- Medical, particularly epidemic control
- The planning of rehabilitation, reconstruction, development and redevelopment.

LIMITATIONS OF THE ADVISORY EXISTING ARRANGEMENT FOR DISASTER PREPAREDNESS

Currently the United Nations Disaster Relief Office (UNDRO) engages consultants to carry out analysis of national situations with a view to providing advice on the development of national disaster preparedness measures. But, consultancy of this sort carried out by expatriates cannot be provided in the depth, or with the understanding which is possible. when the task is carried out by indigenous experts. At present, however, the shortage of suitably trained and experienced personnel in developing countries precludes this. the proposed programme provides an economic, effective and rapid means of developing these capabilities and of initiating widespread programmes of national and regional disaster preparedness.

The United Nations Development Programme Resident Representatives in developing countries also have responsibilities in relation to disaster, but these are principally to encourage countries to initiate disaster preparedness measures. There is no provision for training an indigenous capability to do so, which is the aim of this proposed programme.

The League of Red Cross and Crescent Societies also have a programme which provides a similar service to developing countries. Difficulties similar to those affecting the UNDRO programme apply to the LRCS but with the additional disadvantage that in some instances at least, it operates on a sub-official level. There are dangers that in doing so it can create responsibility without the authority which such responsibility requires to be effective.

Through International Disaster Seminars, the U.S.A provides some degree of training towards developing indigenous capabilities. But these seminars are held in the United States and Inevitably tend towards the study of the problem in general terms and against the background of the problems and capabilities of the United States in particular. The great majority of students on these Seminars come from Central and South America, and from countries with greatly different social characteristics and material resources to those of the United States. At present these seminars do not examine the significant relationships between development strategies and disaster. For these reasons these U.S. Seminars do not appear to meet the more specific needs envisaged by the programmes which this paper proposes, not do they appear to develop the national and regional training capabilities at which this proposed programme aims.

Disaster Co-ordinator courses run elsewhere than in disaster-prone regions or countries would appear to have the disadvantages:

(a) That problems are not discussed against the specific disaster threat nor against appropriate geographic, climatic,

ethnic, cultural, social and economic circumstances.

(b) They tend towards generalities, mix principles and comprise groups of widely differing cultural, political and social backgrounds.

(c) The are unlikely to engender understanding and co-operation over common problem within different regions of the world.

(d) If run in one of the major developed countries, this training might be interpreted as having the potential for political or other influence.

PROPOSED TRAINING PROGRAMMES

To meet the educational and training needs identified, three related training activities are proposed:-

(a) Appreciation seminars intended for those in positions of responsibility in order to develop the awareness and understanding of the implications of disaster and the value of preparedness, which stimulates action.

(b) Disaster Co-ordinator Courses to train senior Disaster Coordinators by the study of the problems of disaster and crisis management, the nature and role of pre-disaster planning and of disaster preparedness.

(c) Disaster Preparedness Training: This is seen as a national responsibility but it is proposed to provide an advisory service to disaster-prone developing countries which will assist them to set up in-country programmes to train and exercise disaster relief organisations.

Appreciation Seminars:

These would be kept as short as possible and would discuss previously distributed papers. Optionally a lecture facility could be provided so that "Disaster Preparedness" might be included as a feature of international conference convened for other purposes.

Appreciation Seminars would be prepared for those in senior positions in government, in the public services (medical, public works, transport, police, military, etc,), leaders of the voluntary organisations and members of the press, radio and television services.

Discussion would be related to:

(a) The disaster treat, the proneness of people to disaster and the implications of disaster situations particularly to administrative systems and the maintenance of the life support systems.

(b) The role of government in disaster and the nature and role of disaster preparedness would be examined using case study material.

(c) The nature of national training programmes as important elements of disaster preparedness.

It is planned that representatives, from disaster-prone developing countries where disaster preparedness is a feature of administrative and development planning, should present papers at these Appreciation Seminars.

Disaster Co-ordinator Courses :

The proposed programmes of training for senior national Disaster Coordinators would be run on a regional (Caribbean, Middle East, S.E. Asia, etc.) basis. Grouping courses in this way brings the advantage that problems are examined specifically against a background of the common threat (earthquake, hurricane, drought/famine) and in relation to similar ethnic, social and economic circumstances, Such regional training, of Disaster Co-ordinators, is also likely to develop co-operation in the study of, and action to overcome, common problems and to indicate how mutual assistance and an ability to deploy and coordinate national resources; is likely to provide the most rapid and appropriate aid in disaster.

Although Disaster Co-ordinators have the important responsibility of preparing plans for disaster preparedness these plans are eventually directly dependent upon people for their implementation. Those organisations most involved in the implementation of the plan will include elements of the public services and the voluntary organisation, all of whom must be trained and practiced and their actions integrated and co-ordinated in order to develop their full potential. To ensure this, training programmes and exercises are necessary if the various elements, hospitals, communications, transport, police, Red Cross, are to be aware of the extent of their particular role, practiced in it and understand where and how they fit into the overall plan.

Training of this kind is the responsibility of Disaster Co-ordinators, but advice and assistance will be available within this proposed Programme towards planning and setting up national programmes.

Fourteen principal regions in which: the threat of natural disaster is present can be identified, but it is anticipated that

deeper examination will enable these to be reduced to about eight. The regions are:-

Caribbean	Middle-East	Pakistan	South East Asia
Central America	North Africa	India	Indonesia
South America	West Africa	Bangladesh	Philippines
	East Africa		South West Pacific

Disaster Co-ordinator courses are planned to be the core of the programme. Allowing ten weeks in the year for staff leave, administration and travel, it will be possible to run five or six Disaster Co-ordinator courses of about eight weeks duration each, in the first two years, in addition to a pattern of appreciation seminars, advisory work and research for the teaching material upon which the courses are based and kept relevant.

These courses will permit Disaster Co-ordinators to:

(a) Study the problems of disaster and disaster relief management in a wide field including the way in which development can create situations of disaster proneness and disaster affects development policies.
(b) Practice the problems of disaster and resource management in disaster.
(c) Examine his own country's problems and requirements for national disaster preparedness including organisation, resources, communication, education and training.

Important inputs to the programme are seen to come from:-

(a) Disaster-prone developing countries where disaster preparedness is an on-going function of the administration.
(b) The United Nations agencies involved in development, in administrative, educational and economic planning, and in disaster relief and preparedness.
(c) International relief agencies.

PROPOSED PROGRAMME

The proposal is based upon establishing the following pattern of courses :-

(a) Pilot Scheme

Year One : First six months required for course planning and regional arrangements relating to students and training centers, In the subsequent months a number of Appreciation Seminars will be run and a disaster Co-ordinator Course.

(b) Pilot Scheme

Year Two : Three Disaster Co-ordinator Courses and a pattern of Appreciation Seminars. In addition about twelve weeks are available for advisory work to country setting up pre-disaster planning and training schemes,

(c) Programme

Year One : Similar pattern to Year Two of Pilot Scheme.

Years 2 to 5 of the programme will follow the pattern of Year One, but will use part of each year for Teaching Seminars in regional universities and institutions, with the aim of developing their ability to establish their own teaching.

Teaching in-puts in the second half of the Programme will come increasingly from staff of regional and national institutions, such as universities, colleges of public administration and from in-post administrator. The turn-over of officials in posts of responsibility in the public sector indicates a requirement to provide courses for potential Disaster Co-ordinators at three-yearly intervals in each region.

Appendices 1A and 1.B outline the programme of the proposal for the proposed Disaster Co-ordinator Course.

Appendix II details the proposed syllabus of the Disaster Co-ordinator course.

Appendix III details the estimated costing of the proposal. These do not include the costs of students travel and subsistence.

PROJECT PLANNING COMMITTEE

Professor A.S. Living stone. Head of Department, Department of Administrative Studies for Overseas Visiting Fellows, University of Manchester.

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Dr. V.G.E. Powell. Department of Administrative Studies for Overseas visiting Fellows, University of Manchester and Senior Advisor (I.L.O.) to the Government of Bangladesh in Management Development.

Definition : In the context of this paper DISASTER has the definition :-

"A situation created by natural or man-made catastrophe, other than war, which demands total integration and co-ordination of all life support systems available to the Administration responsible for the area affected, supplemented by additional resources as required and, available".

APPENDIX I (A)

PROPOSED PROGRAMME OF EDUCATION AND TRAINING INCLUDING PILOT SCHEME

Weeks	5 10 15 20 25 30 35 40				Remarks
Pilot Scheme Year one	Preparatory organisation and arrangements including liaison visits and Appreciation Seminars			Disaster Co-ordinator Course No. 1	
Pilot Scheme Year two	Disaster Co-ordinator Course No. 2	Course No. 3	Course No. 4	Advisory and Research Visits	Appreciation Seminars would be held where and when required throughout each year
Programme Year One	Course No. 5	Course No. 6	Course No. 7	-ditto -	
Programme Year Two	Course No. 8	Course No. 9	Course No. 10	Advisory & Research Visits. Seminars in Teaching Institutions in order to develop regional capabilities	Although in previous 3 years a significant element of teaching in-puts are seen to be provided to regional teaching institutes, increasingly in year TWO/ PROGRAMME onwards these are seen to come from regional institutions.
Programme Year Three	Course No. 11	Course No. 12	Course No. 13	-ditto -	
Programme Year Four	Course No. 14	Course No. 15	Course No. 16	-ditto -	At this point courses are seen to be returning to regions in order to meet staff turn-over needs, e.g. If first course where held in Bangladesh in Pilot Year One in Programme Year Three or Four another would be required
Programme Year Five	Course No. 17	Course No. 18	Course No. 18	-ditto -	At this point regions are seen to initiate regional programmes with the Central Programme Staff providing Advisory & Research Services.

APPENDIX I (B)

PROPOSED PROGRAMME FOR DISASTER CO-ORDINATORS COURSE

Daily Activities					Remarks
WEEK ONE	Preliminary Organisation and Course Administration		Disaster Management Exercise No. 1	Critique Exercise No. 1	For fuller description of course content see Syllabus Annex II
WEEK TWO	Presentation Natural Hazard The Phenomena & research	Seminars Development and Disaster and Examination of programmes of Development and disaster proneness		The machinery of Aid available from UN and other organisations	
WEEK THREE	Syndicate Project Disaster threat and analysis of the Disaster situation		Seminar The International Community International and Bilateral Aid	Presentation Third World visiting lecturer on Disaster Preparedness	
WEEK FOUR	Case Studies Earthquake Drought/Famine		Disaster Management Exercise No. 2	Syndicate National Resources	
WEEK FIVE	Syndicate Pre-Disaster Planning and Disaster Preparedness		Presentation Third World Visiting Lecturer	Syndicate Warning Measures and Public Information	
WEEK SIX	Pre-Disaster Planning Exercise No. 1	Building Codes & Practice Land Zoning Public Finance & Disaster	Case Study Flood and Cyclone	Disaster Management Exercise No. 3	Syndicate Disaster Management	
WEEK SEVEN	Pre-Disaster Planning Exercise No. II		Seminar Disaster Preparedness	Seminar Information Data Bank	
WEEK EIGHT	Syndicate Education and Training	Syndicate Communication in Management	Pre-Disaster Planning Exercise No. III	Dispersal	

Appendix II

PROPOSED SYLLABUS FOR DISASTER CO-ORDINATOR COURSE

The principal aim of these courses is the analytical study of a variety of real and hypothetical disaster situations with a view to maintenance of life support systems (water, food, medical aid and shelter) and the communication and transportation requirements related to these. From this analysis conclusions will be drawn which will enable participants to determine the precautionary actions possible and the remedial action necessary to mitigate the effects of disaster.

Besides a detailed examination of the requirements of disaster relief and disaster management the pattern of study will lead into the pre-disaster situation which involves rehabilitation, recommendation and development.

The greatest possible use will be made of exercises, simulations, and syndicate work in order to expose students to realistic situations and to involve them in considering these in relation to probable situations.

EXERCISES

DISASTER MANAGEMENT

Exercise I — This exercise will be run in the first few hours of the course and, using a computer-based simulation, will aim to demonstrate the pressure upon management in a disaster situation and the problems relating to the information upon which decision-making and action are based.

Exercise II — An exercise designed to examine the problems of implementing a written plan and thus highlighting the needs for training and practice of all plans for action, particularly in relation to communications and control.

Exercise III — An exercise to study the need for flexibility in the management structure and the requirements for sound communication and information systems.

PRE-DISASTER PLANNING:

Exercise I — Based upon previous exercise experience this is a planning exercise in which the process and problems of pre-disaster planning and the needs of liaison and arrangements with foreign neighbours and international agencies will be examined.

Exercise II — A planning exercise in which national problems and requirements will be studied by individual students or in national syndicates, with inter-syndicate consultation in order to discuss common problems. This exercise will be run on a tutorial basis and will aim to produce outline national plans.

Exercise III — An exercise in which the implications of disaster preparedness requirements are examined against the circumstances of social and economic development.

SEMINARS

(a) Development and Disaster (1) An examination of the social and economic effects of some development policies in disaster-prone countries of the world, with a view to illustrating how development planning can contributes to and create proneness to disaster in the poorer elements of all societies.

(b) Development and Disaster (2) An analysis of development planning to illustrate the continuous relationship between the regional disaster threat and national development policies with a view to establishing how consideration of the threat in the development planning phase can provide effective mitigation of disaster effects.

(c) Information : To examine the overwhelming need for information in relation to both development and disaster preparedness; how data banks and communication systems contribute to the processes of development planning, disaster preparedness and disaster management, and how the information important to development planning corresponds to that needed in pre-disaster planning.

(d) The Machinery of Aid : An examination of the forms and roles of U.N.; international, bilateral and charitable aid and how these operate.

(e) The International Community : An examination of the roles and significance of international and bilateral arrangements to illustrate how these relate to disaster preparedness.

SYNDICATE PROJECTS

(a) The Disaster Threat : An examination of the incidence of natural catastrophe with a view to determining the probable physical circumstances of disaster (in the "probable case").

(b) The Disaster Situation : An examination of the "probable case" with a view to determining the effects in social, administrative, infrastructural and economic terms.

(c) National Resources : An examination of the disaster situation with a view to determining the demands upon national resources, both human and material with a view to assessing the shortfalls.

(d) Pre-Disaster Planning : An examination of the disaster situation revealed in (b) and (c) above with a view to identifying what precautionary action could have contributed to mitigation of the situation.

(e) Preparedness Planning : The nature and role Disaster Preparedness Planning. An Examination in depth of the process of pre-disaster planning to illustrate why proposed courses of action must be examined in detail to determine their implications and complexity.

(f) Warning Measures and Public Information Services : An examination in depth of the social and administrative implications of establishing Disaster Warning and Public Information Systems.

(g) Communications in Management : An examination of the structure and requirements of communication systems and information flow in planning and management.

(h) Education and Training : A project to define the education and training programmes required as elements of any disaster preparedness plan.

(i) Disaster Management: Examination of an administrative structure in relation to its disaster management role with a view to determining in what way it may have to be modified to carry out this role.

CASE STUDIES :

A number of case studies have been made with a view to identifying the role of the Administration in disaster management and indicating how action, and lack of action, have contributed to the disaster situation. These case studies have been made from official files and therefore, go beyond the levels of newspaper reporting and interviews, and are of much greater value in consequence. Examples are :

Ethiopia, Famine 74/75
Somalia, Famine 74/75
Sahel, Famine 73/75
Peru, Earthquake 1970
Nicaragua, Earthquake 1972
East Pakistan, Cyclone 1970
Pakistan, Floods 1973
Darwin, Cyclone 1974
Fiji, Hurricane 1972 & 1975
Honduras, Hurricane 1961

Lecture and Presentations :

1. Natural phenomena and hazards
2. National disaster preparedness schemes and disaster management experience, by personnel from Third World Countries.
3. By the U.N. international and charity organisations.
4. Building codes and practice.
5. Land Zoning, planning and legislation.
6. Insurance and disaster funds.

APPENDIX III

ESTIMATED COSTING AND PLANNED STAFFING OF THE PROPOSED PROGRAMME

A breakdown of the estimated costs for the establishment and running of the programme over an initial two-year pilot scheme, followed by five subsequent year of the full programme.

Note : The estimate is at 1976 prices with no allowance for inflation.

ASSUMPTIONS:

1. The cost of travel and subsistence for study participants would be met from UN or bilateral aid or under own country arrangements.
2. Research related to the programme will be an on-going activity carried out by the full-time staff associated with the programme.

	COSTS BREAKDOWN	PilotScheme		Programme				
		Year 1	Year 2	Year 1	Year 2	Year 3	Year 4	Year 5
1	Salary and pensions							
	Director.....	7,500	7,500	7,700	7,700	7,800	7,800	7,900
	Assistant Director.....	6,000	6,000	6,200	6,200	6,350	6,350	6,600
2.	Fees- £150 per week.							
	Regionally recruited	3,600	4,500	4,500	4,500	4,500	4,500	4,500
	Lecturers	3,600	4,500	4,500	4,500	4,500	4,500	4,500
3.	Third World Visiting Lectures Travel and Fees Estimated £ 1600 per course	3,200	4,800	4,800	4,800	4,800	4,800	4,800
4.	Teaching materials- computer time and soft ware, publications etc.	3,000	4,500	4,500	4,500	4,500	6,000	6,000
5.	Hire of teaching accommodation	1,000	1,500	1,500	1,500	1,500	1,000	1,000
6.	Overheads at base secretary, telephone rent, etc.	4,325	7,650	7,650	7,650	7,650	6,250	6,250
		32,225	40,950	41,350	41,350	41,600	41,200	41,550
7.	contingencies-add 10%	3,222	4,095	4,135	4,135	4,160	4,120	4,155
	Grand total	£ 35,447	45,045	45,485	45,485	45,760	45,320	45,705

GRAVEL AND SUBSISTENCE

1. These costs come under two heads

   (a) Course : Where these are run at the request of a particular country the costs of the travel and subsistence of lecturers can be assumed to be met from arrangements made by the sponsoring government. Where courses are run on a regional basis these costs are assumed to be met either by regional agencies, by contributions from bilateral or UN aid, or on a per capita basis by the countries of students involved.

   (b) Research and advisory visits : It is proposed that these should be funded as a requirement of the teaching programme and as a services provided in association with it.

2. This estimate (also at 1976 prices) relates to the costs incurred by staff in liaison visits in organising the

programme, residence overseas in relation to courses and visits in relation to research and advisory visits. These estimates show the full cost and wake no consideration of the savings which should result from the use of national air lines, official accommodation any payments in local currency for services provided etc.

3. Travel and Subsistence Costs :

	subsistence at £150 per head per week	Air fares
(a) Pilot Scheme-Year 1		
i) Director and Assistant Director		
Total (subsistence 35 weeks	5,250	
Total (air fares 8X £500)		4,000
ii) Part-time lecturers (two)		
Total (Subsistence 24 weeks	7,200	
Total (Air fare 5X £300)		1,500
Year 1 Totals	£12,450	£5,500
(b) Pilot Scheme Year-2		
Programme-years 1, 2 and 3		
i) Part-time and Assistant Director		
Total (subsistence 45 weeks	6,750	
each yr. (air fare 8X £500)		4,000
ii) part-time Lecturers (two)		
Total (subsistence 38 weeks)	11,400	
each Yr. (Air fare 8X £300)		2,400
Total each year	£18,150	£6,400
Total for 4 years	£72,600	£25,600
(c) Programme-year 4 & 5		
i) Director and Assistant Director		
Total (subsistence 35 weeks)	5,250	
each yr. (Air Fare 6 X £ 500)		3,000
ii) Part-time Lecturers (two)		
Total (subsistence 15 weeks	4,500	
each yr. (air fare 4 X £300)		1,200
Total each year	£ 9,750	4,200
Total for 2 years	£19,500	£8,400

Totals

Pilot Scheme-year 1 and 2

Subsistence	30,600
Air fare	11,900
	£42,500

Programme - year 1-5

Subsistence	73,950
Air Fares	27,600
	£101,550

GRAND TOTALS: SALARIES, TRAVEL, SUBSISTENCE

Pilot Scheme-2 Year	£ 122,992
Programme-5 Year	£ 329,305

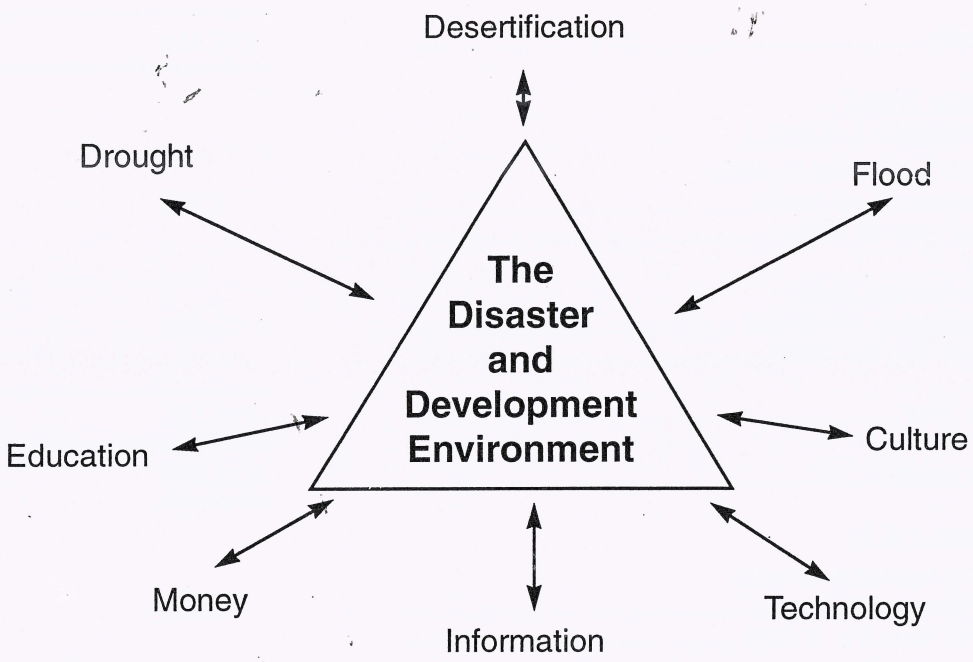
EDUCATION, INFORMATION AND PUBLIC AWARENESS FOR SELF-RELIANCE AND LESSENED DEPENDENCY IN DISASTER

Lt. Col. G.N. RITCHIE
University of Cranfield

Background

Disasters occur at the interface of natural events, (drought, floods, environmental degradation) with people, their livelihoods, economies and infrastructure. Without people we have no disaster but merely the occurrence of these natural events. These disaster threats provide the focus for this paper.

In a corresponding equation, development implies benefits to and participation by society in both human and economic terms if it is to be sustainable and successful. To be sustainable, development must manage and preserve the environment in which it takes place so that the benefits can be enjoyed by future generations.



Because of the crucial role which people play in disaster reduction, whether in government, non-government organisations, in the private business sector or in the community itself, it is of the greatest importance that they are aware of, trained and helped to meet their responsibilities. This implies programmes of education and training in the public service sector and in NGOs, to create and develop the analytical, planning and programme management skills which are essential elements of disaster reduction plans.

To ensure the success of these disaster reduction plans however the community must be encouraged and helped to play their complementary and fundamental role which is to increase their selfreliance and, selfhelp in both preparedness and in response when disaster strikes. The aim must be to achieve this through programmes of education, public awareness, information and training at the community level.

Education is an important aspect of the development process particularly as this relates to health, hygiene and sanitation and is already an important aspect of programmes mounted by such organisations as UNICEF. The importance of these factors and of clean drinking water and awareness at the family level, is essential in reducing the threats of disease and infection which are so frequently corollaries of disaster events.

In similar education, awareness and training programmes, the importance of environmental conservation and management can contribute to reducing the environmental degradation which is a significant element of the drought, desertification and flood threats which plague much of the developing world. Although people and communities are the first victims in disaster their contribution through self-help, community action and self - reliance is the first step in disaster reduction programmes.

In completing this loop we see that development strategies and projects must therefore consider not only the existing

threats of natural disaster to them, but also examine how development may threaten the environment in which it takes place.

Take for example the development of pastoral farming in the Sahel region of Africa during the last 50 years. In consequence of improved stock and animal husbandry, as well as relatively good rainfall, herd sizes grew in the 50's and 60's. To satisfy increased demands for water in an area where surface water is perennially in short supply, ground water sources were tapped using tube well technology. But these developments and measures were not accompanied by increased off-takes of animal products (beef, hides etc) or by improved range management to maintain pasture. When drought occurred, as could have been foreseen, herds concentrate at the well heads and areas which had been over-grazed were soon grazed out.

Similar examples of environmental degradation caused by over - stocking poor development planning, environmental management and a failure to involve people in the plans and practices which will affect generations to come, are occurring in many areas of the world now.

Drought is frequently experienced in many countries but floods too are occurring more frequently. When they do they are often more severe and longer lasting. Over-grazing of hill sides and de-forestation reduce the vegetation cover. When rain comes, the run - off is unimpeded causing erosion and loss of top soil which is deposited in river channels. River channels silt up, flood more easily and drain flood water away more slowly. The loss of top soil will effect agricultural productivity for centuries to come.

Top soil, vegetation and trees are assets which people and their agricultural advisers (extension officers) must learn to preserve. For too long the focus has been on maximising production rather than protecting these as capital assets.

There are four main actors in this situation.

- Politicians in governments
- The news and information media
- Government administrators and professionals
- People in the community.

All must be helped to meet their separate responsibilities because, unless each can address their own responsibilities in regard to disaster reduction, development strategies and projects will continue to be set back by repeated disaster. Conversely sustained economic and human development will create more robust societies and economies more capable of resisting the affects of natural disaster upon them.

The USA in any year experiences a range of natural disaster events, drought, flood, hurricane etc., but due to its economic strength, available human and technical resources and its disaster preparedness and response plans, it survives and grows. In the last 20 years we have seen India make similar progress towards self sufficiency in disaster.

Development of this self sufficiency at the national level in any disaster threatened country reflects similar conditions of self-reliance at all levels of society and is a most important element of disaster reduction and preparedness planning.

The Problem

In primal societies responsibility for their people in disaster rests with chiefs and leaders. In modern societies these responsibilities have been assumed by governments, by international organisations, NGOs and the UN agencies. The growth of this external support to countries in disaster over the last 50 years has predominantly been in the provision of food, medicines, medical aid and other forms of disaster relief. Indeed when the UN created a special agency for disaster affairs in 1972 it was to be the UN Disaster Relief Office, recently renamed the Department of Humanitarian Affairs. The focus has therefore always been towards relief rather than the development of sovereign responsibilities and capabilities for disaster reduction, preparedness and disaster management.

To some degree at least, UN policy has eroded the necessity for national self sufficiency in disaster response to the needs of disaster - struck developing countries. This has manifested itself in commitment to working with and amongst the affected populations, invariably the poor and disadvantaged, when disaster strikes. The need for this support to disaster prone developing countries is unlikely to diminish for many years to come and disaster relief will continue to be an essential element of development aid. But it is important that ways are created and developed which will expand these disaster relief activities into fields which seek to reduce and eliminate dependencies which can and do arise.

A very large proportion of the world's population lives in disaster-affected developing countries, and many exist on the borderline between hunger and extreme food shortage. When disaster strikes, for many this borderline is crossed and

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their livelihoods and access to food needs are cut off. They become dependent upon others if they are to survive. The food relief operations of the national, international and UN agencies become life - lines. The problem which all must address is how to ensure that these life lines are only a means of pulling victims to safety and do not become life support systems from which they cannot be detached.

Because disaster disrupts economies and many for the first time may be freed from the constant worry of feeding themselves and their families, the need may arise to stimulate the revitalisation and restoration to normal, of the economy upon which their livelihoods depend.

In Mozambique the internal security situation led to the almost total collapse of normal production and agricultural activities for many years. A situation which has been seen in a number of other African countries. In Mozambique however the normal economy was replaced by a "food aid" economy which was dependent upon and driven by, the donors' aid programme which replaced all normal economic activity, production and many commercial activities. National politics and policies also became involved in the aid programme and it demanded a very great degree of political will and the return of peace throughout the country, to enable the dependency of all sectors of society upon the food aid programme to be ended.

Similar situations have arisen to a greater or lesser degree elsewhere in Africa and throughout the world. Because much of the developing world is dependent upon agricultural economies the affects of flood and drought are of particular significance to large sectors of the population, government departments and to government itself. Collapse or stalling of the agricultural economy can be of very great danger to the national economy, to political stability and to the general health and well - being of the people.

As increasingly rural populations drift from the agricultural economy towards the opportunities and promise offered by urban areas, so the importance of agricultural productions increases. Fewer agricultural workers seek to maintain or to increase production to meet growing demands, whilst harvest prices remain controlled at below market prices. A finely balanced economy can be badly upset by disaster and become dangerously significant to national stability and to the flow of agricultural labour to the towns.

The Way Forward

We have already suggested that there are four points of responsibility for action in relation to improved standards of disaster preparedness, better disaster management and in the development of selfhelp and selfreliance in communities :

— Government at all levels.
— News and information media
— Administrators and professionals
— The people, NGOs, and community based organisations and networks.

Research shows that in rapid on-set disasters(cyclone, earthquake, flood) whereas the event may cause destruction and death, it is the collapse of the government administration under load which brings deprivation and distress to the victims. In slow-onset disasters however (famine, environmental degradation, disease, pestilence, refugee movements) drought, infection, weather or man-made events are only the catalyst creating disaster from previous failures in programmes for environmental management, health and hygiene, agricultural practice and social development.

To remedy these failures programmes of educational, staff training, public information and awareness programmes are necessary.

National Policy and Responsibilities:

Disaster preparedness, relief management, post disaster planning and recovery are all sovereign responsibilities of national governments. In meeting these responsibilities governments may seek financial, material and advisory support from external agencies such as the UN, the Commonwealth Secretariat, international and national NGOs and from bilateral aid programmes. But government is responsible for determining national policy and for creating and demonstrating the political will without which little will be achieved.

In creating this climate of positive action and thinking government will be taking the first steps in eliminating attitudes of national and individual dependency in relation to threats, and the requirements for relief and recovery.

These demonstrations of political will embrace:

- The preparation of the national disaster preparedness and response plan.
- Development of early warning systems (EWS) based upon monitoring and surveys at community levels.
- Clear definition of government and local authority responsibilities for planning response and recovery.
- Identification of community and individual responsibilities in disaster preparedness and response.

It has been found that EWS which are aggregated at the national level frequently fail to identify slow-onset disasters, particularly drought, food insecurity, crop failure and environmental degradation which threaten local communities and geographic areas. They also tend to remove responsibility from government departments at the district level and become exercises in statistical gathering and analysis. In consequence EWS although important in their purpose of triggering response to developing situations by national and international agencies, must also be seen as important to those with responsibilities at local ("district") levels of government.

In the arid Turkana District of Kenya an EWS was established under a bilateral aid programme based upon the local knowledge and understanding of a team of young men, themselves from the District. They knew the culture, customs and language of the pastoral herders and were trusted by them. In consequence they were able to collect important data on the state of herds, the stability of the livelihoods of the pastoralist farmers, the health and nutritional state of the people and of environmental conditions and change.

The problem arose when this data and information was passed to the district office and staff. These were not, in the main, from the Turkana District and had grown up, been educated and had the benefit of university educations and training in the capital. In consequence they were not immediately confident of the value and usefulness of information which did not fit the data gathering systems developed to meet the national EWS. Similar problems have occurred elsewhere and indicate the need for educational and training programmes which ensure that administrators can use the best information available and can develop the interface which translates local knowledge into higher level statistical requirements.

In establishing and demonstrating its policies and political will in relation to disaster preparedness, government should use all available public information, education and news media systems. These should be staffed by professional educationalists with the communicators' freedom to apply their professional skills in the most effective way.

It is a common complaint throughout the developing world that very often, when technical departments of government became involved in public information and warning programmes (e.g. meteorology departments), the language used is technical jargon (the language of the subject) which is not understood by the target audience. It is for this reason that it is important, when developing disaster reduction, public information and awareness programmes, that the professional skills of media staff at national and also local levels are developed to meet the challenge in the most effective way.

Radio, television and newspaper reporting has an urgency and immediacy which is not well suited to the development of public awareness through educational and information programmes. These demand levels of skillful development, presentation and repetition more akin to the practices of the teacher or evangelist than news reporting. It is therefore important that public information and awareness programmes, using the news media systems, are developed as an essential element of national and local disaster reduction programmes and are provided with the resources which ensure their effectiveness. These resources include the definition of clear objectives and expert programme designers who are educationalists rather than reporters and then programme time made available as necessary, NOT, only as available.

Administrative Responsibilities and Action

To be effective in their purpose of creating effective standards of disaster preparedness, government policies must be translated into action. Although primary responsibility for this must lie with government it is essential that all concerned agencies, UN, NGOs, national and international, are brought in to support.

Institutes of public administration (IPA) should be required and encouraged to develop their programmes of public service training to embrace disaster reduction and preparedness training and to open these programmes to UN, and NGO staff, both national and international and also most importantly, to community representatives.

These IPA should be encouraged to establish travelling instructional teams whose responsibilities would include training local authority (district level) staff in their disaster preparedness planning, disaster management and post - disaster recovery duties and responsibilities. Such training and instructional programmes should be multi-sectoral at all levels and, most importantly, at district and community levels must include community leaders and representatives. By doing so, the people can become fully involved in national disaster reduction activities.

The most appropriate and rapidly available relief material is that which is nearest to the point of need. This applies to both human and material resources and implies the importance of developing disaster preparedness plans from the community level upwards. Cultural attitudes and knowledge of local resources, materials and markets can be built into district and national disaster preparedness plans and avoid the expensive, and often unnecessary movement of foreign "experts", equipment and material around the world. But the availability of local experts and appropriate local equipment is dependent upon local knowledge of the disaster threat, the local disaster response plan and of the communities' responsibilities and tasks.

Community Responsibilities:

The most effective environmental management begins at the field level and is practiced by individuals as members of a community respecting their individual and community responsibilities. This environmental management relates to nurturing young trees, fire wood gathering but not tree felling, soil conservation by terracing and counter walling, water conservation and harvesting using small dams, tap and pump maintenance and controls. It also means maintaining herd size at optimum levels by creating off-take outlets of meat and hides, stall feeding to limit pasture wastage when necessary, control of goat grazing by herding and protecting saplings and young trees, preventing and controlling pasture and forest fires, developing firewood plantations and encouraging re-forestation.

All of these are dependent upon communities working together towards common objectives and observing both individual and community constraints on the resources upon which all are dependent for their livelihoods.

Sanctions must exist to enforce observation of constraints imposed either by law or agreed jointly within and between communities.

These responsibilities and duties fall upon local government and the communities to which they relate. But, good laws are those whose objectives are clearly apparent to those whom they affect and are willingly observed by the majority. One of the principal responsibilities and tasks of local government, community leaders, including politicians of all colours and religious leaders of all denominations, NGOs both national and international, must be to lead the campaign throughout the threatened and affected areas of their country against drought and food shortage and the consequences of famine and disease which can follow.

The past has seen societies and communities crumble under the affects of prolonged droughts and their consequences. One of the most serious of these has been a loss of robustness, self reliance and a growing dependency upon government and external aid agencies when disaster strikes.

Self confidence and self reliance comes not only from material assets but more importantly, gains from knowledge and understanding.

Droughts and food shortages are not new to the developing countries of the world. What is new is the growth of population, increasing demands upon the environment for food, water, fodder and firewood and huge increases in external assistance in food, nutrition, technology and medical aid. A changing pattern in political systems livelihoods, lifestyles and economies, in education and communications has also led in many areas to a loss of knowledge of the customs, patterns and methods which enabled previous generations to cope and to survive in disasters.

It is therefore important that those with responsibilities, at whatever level of government, in societies and communities, should use those changes and new availabilities of improved communications, education, technologies, information media and external assistance, to address the old problems of drought and environmental mismanagement.

It may already be too late but "coping mechanisms" which are frequently spoken of in general by " outsiders" have developed in societies to address the recurrent problems of their livelihoods and environment. They are the local methods for dealing with local problems.

In western societies research programmes have been carried out and projects initiated to draw together knowledge of how things were done before the new technologies took over. Similar research at community levels in Africa would doubtless be able to capture some of the "coping methods" used periods of drought and crop failure.

The new technologies can also help. It has been estimated that as much as 30% of harvested grain in Africa is lost due to poor transport and storage. Disinfestation methods, improved low-technology storage systems, pest control, improved seed strains can all be used but can only come from public awareness of the problem and from information and training in relation to the remedies across sections of the community, external aid agencies and NGOs. Schools and school children are a most important channel through which understanding of the problem and possible solutions can be passed. On balance it is probably much more useful if the agricultural extension officer spends a day each month, teaching school children about soil conservation and improvement than it will be for him to learn about improved chemical pest control which might improve production.

What is required is a clear statement of policy and responsibility for the development of community based projects which focus upon environmental management, conservation and improvement of trees, ground cover, top soil and water resources. Community based projects cannot be expected to address and arrest drought as a natural event, they can however effectively deploy that major national resource, the people, in countering it.

Implementation Policy and Practice

Development of an effective disaster reduction programme, particularly in relation to drought, flood and environmental management is developed from "top down". Such a process ensures that the national disaster preparedness plan becomes a "jigsaw", a mosaic in which the specific and particular needs of the community elements are identified and linked into district, provincial and the national plans. This "bottom up" process of disaster preparedness planning also ensures the consideration of needs for mutual support between communities, districts, provinces and so on. This process also reveals gaps and deficiencies in resource availabilities, both human and material, which need to be met from external sources, including international aid. This provides an effective way of turning theory into practice, but in many ways is dependent upon effective integration of community needs and responsibilities which in turn are a product of public information and awareness programmes.

When drought, floods and environmental degradation are the principal threats it becomes important to establish community involvement as an on-going element of disaster reduction policies and practice. Environmental mismanagement, deforestation, over-grazing and human interference with the natural balance in the environment, all relate to the disaster threats and events mentioned at the beginning of this paragraph. The ancestors of those now affected by these disasters understood and respected this balance.

It therefore becomes important to the success of a disaster reduction programme, to the reduction of the dependency created by previous disaster relief and food aid programmes and to the creation of community self-help and self-reliance, that the support of a wide range of respected authorities is evident to the people at all levels. By involving religious, political and community leaders in public awareness and information programmes, the people in the communities and on the land will gain confidence in the disaster reduction programme and its aims.

It becomes important that the public sector are seen to be pursuing government disaster reduction policies. State farms, government forestry departments, the armed forces, water conservancy, irrigation and other government departments must set examples which communities and individuals can follow.

The private sector, particularly large scale enterprise such as multi-national companies must be encouraged or, if necessary, coerced into the programme.

Experience shows that industrial operations can have a major environmental impact for good and ill in developing countries. Examples of the good are to be seen in the United Kingdom where the coal mining industry has made major reinstatement of the environment in areas previously seriously scarred by opencast mining and by disposal of huge mining waste dumps as fill for new road constructions. These areas have also been sensitively landscaped to merge with the environment.

In another example elsewhere in England an oil extraction site in a coastal area, designated to be of outstanding natural beauty has been the subject to major environmental safeguards and management to maintain the beauty and integrity of the surroundings.

Examples of the ill can be seen in a multi-national company's oil extraction operations in Nigeria and in a chemical plant operation in Bhopal, India.

It is therefore of extreme importance that multi-national operations are carefully brought within the national disaster reduction and environmental management plans and actions.

Existing Public Awareness Programmes

In developing countries there are a range of programmes sponsored by UN and international NGOs aimed at social and community development which are current at any one time. Because many of these are themselves relevant to disaster reduction it is both economical and effective to graft public awareness and information aspects concerning disaster on to existing programmes rather than to launch specifically disaster oriented, but possibly confusing new ones, directed at the community level.

Examples of existing valuable programmes are the primary health care, woman and child and famine warning programmes which have been so effectively developed and implemented by UNICEF and Save the Children Fund. In

these programmes, home hygiene, sanitation and the importance of clean and safe drinking water are important aspects. In disaster, when victims may be crowded together in camps where water supplies may be affected and normal sanitary practices interrupted, hygiene, sanitation and care over drinking water become important in controlling the spread of disease. These aspects of disaster reduction are best addressed as extensions of normal practice rather than as introductions of new practices.

Community based Programmes

Agriculture extension officers work very much within the farming community but with responsibilities which relate more to the maximisation of production than to disaster reduction and environmental management. Environmental conservation and management are best practiced at the field level and responsibility and action for this lies with farmers themselves. By doing so they are ensuring the preservation of the top soil and vegetation which are the principal capital assets upon which their livelihoods depend. It is therefore sensible that the agricultural extension officers' responsibilities and programmes should be extended as necessary, to embrace these very important aspects of good farming practice and that their duties include the public awareness and information programmes aimed at raising farmers' understanding and actions in relation to environmental management and conservation.

In the agricultural sector in India "Food for Work", (FFW) now practiced as "Income Generation Projects" (IGP) have been important elements of disaster reduction, disaster preparedness and relief for over 100 years. These are built into disaster preparedness plans at the district and community level, with provision of resources made ready for their early implementation when disaster strikes. Experience over the years has shown how important it is to ensure that FFW/IGP plans are made in close consultation with the communities who will be employed on them.

FFW/IGP must therefore be the subject of early public awareness and information programmes so that community leaders can be consulted land thus reflect the community assessment of local projects and their value to them. Once mounted it is equally important that the awareness and information programmes are continued to ensure that the community understand what their responsibilities are, the basis of their participation in cash or food for work programmes and the responsibilities of government and any NGO involved.

Where as FFW and IGP are intended for implementation as relief measures when disaster strikes there are a range of community programmes important to drought and flood control and to environmental management and conservation which can be stimulated by public awareness and information programmes. Some fall within the particular area of responsibility of the department of agriculture but all are likely to require financial and technical support which must come from other departments of government and from NGOs.

Such programmes, demanding a wide range of community participation, will include a range of erosion control measures, hillside terracing for top soil conservation, water harvesting using small dams forestation and tree conservation.

Community leaders must take a primary role in the awareness programmes which are essential to create community understanding of the threats which the action programmes are designed to avert and must also take an active part, and lead by example in the work programmes. These community leaders will need the support of government and NGOs in playing their parts in both programmes.

Schools and School Children

Schools, school teachers and pupils must be included in the national and local programmes of disaster reduction and environmental management. This is probably one of the most cost effective ways of creating change and establishing improvements in farming practice and environmental conservation. Educational and literacy programmes can be effectively designed to reflect lessons in good agricultural practice and environmental management for both young and old, in addition to those mounted through the agricultural extension programme.

In addition to the classroom learning programme, projects and experiments based upon environmental conservation practices can also be used in schools and adult learning programmes.

At higher levels of secondary education, school programmes can also be used and incorporated into local weather and environmental monitoring programmes to raise knowledge and understanding of the physical environment in which development and change takes place.

The Mass Media

In addition to these programmes taking place in the more formal environment of school and adult learning, use must be made of all channels and means of communication and information to all sections of all people. These include the press, radio and television but particular care, and most probably finance, will be required to support and to sustain,

programmes of disaster reduction oriented public awareness and information programmes.

The news media characteristically, have an immediacy and an ephemeralness which detracts from a commitment towards sustained programmes related to any simple subject. On the other hand, they are the most commonly used advertising medium because of their wide audience, ability to attract attention and impact.

If therefore, a disaster reduction public awareness and information programmes is to be mounted by any one of the means of mass communication, it is essential that either government uses its authority or has the finance available to ensure a sustained programme and thus get its message to and properly understood by the target audience. The design of educational, public awareness and information programmes requires knowledge and abilities which are professional and quite different from those of either news reporters or journalists.

This subject is dealt with and described in the report by Cranfield Disaster Preparedness Centre "The Effective use of Radio for Mitigation of Drought in the Sahel".

Simple messages, particularly those related to family and individual responsibilities and actions, can be the subject of effective poster campaigns. The messages must be identified by the responsible authority for disaster reduction and then passed to professional illustrators for design of the poster and formulation of the message.

Display of the posters is of equal importance. They should be displayed widely but particularly in community centres, churches, temples and mosques, schools, medical posts, shops and markets. Action must also be taken to prevent their deterioration and damage. They should be renewed periodically, if possible in a new format and colour so that their impact is renewed.

In all of these programmes, including the simplest weather reports jargon and technical language must be avoided. Scientists and technicians are frequently poor communicators. They often exhibit a snobbery in their use of technical terms and language. It is therefore important that although the message may originate with the technical department it should be translated into "everyday" language by the communicators.

In the same way, use should be made of dialects and vernacular language in the spoken and written means of communicating the message. Whenever possible illustrations should be used to explain techniques and methods and the most appropriate means of communication used to circulate these as widely as possible.

But practical training and teaching will always provide the most effective way of transferring knowledge and skills.

In addition and importantly complementary to the formal means of stimulating public awareness and of communicating information at community level, there are a range of traditional methods of passing down and maintaining knowledge and wisdom. Different societies and cultures have created and established their own ways of doing this and it is sensible and useful to incorporate such methodologies into the disaster reduction public awareness and information programme. This may offer another opportunity to use existing programmes e.g. UNICEF and SCF health and hygiene programmes.

Existing traditional programmes use songs, dances, plays, jingles and slogans. In many ways and throughout the developing world which we are considering, these traditional systems are being overtaken by more modern ways and the wisdom of the past, particularly in relation to environmental management, is being lost. Nevertheless these traditional ways retain an authority, credibility and authenticity which remain relevant.

The opportunity to use these in disaster reduction programmes must be assessed by those within the culture who can make a judgement of their probable effectiveness and how to achieve this. This is an area which probably falls within the area of expertise and responsibility of local NGOs.

Where the "pop culture" of the North intrudes into local ways it may well be possible to recruit local "pop culture" and "pop stars" in support of disaster reduction public awareness and information programmes. This blending of new methods with traditional needs in relation to disaster, could provide local song writers and musicians with a challenge and opportunity, providing a market for their talents, records and tapes. How all this is to be done, developed and maintained demands commitment and involvement of national and local government in collaboration with the people, protagonists of all kinds and support of NGOs.

Clearly all this demands time and resources of people, funding and materials. But the costs of disaster and of the results of environmental degradation will always outstrip these. One penny spent now in disaster reduction activity or in environmental conservation of soil, water, trees or vegetation will pay its return one thousand times in reduced relief needs and increased agricultural production in the years to come.

Annex - J

ROLE OF REMOTE SENSING TECHNOLOGY IN DISASTER MITIGATION IN BANGLADESH

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INTRODUCTION

Bangladesh currently ranks as the world's foremost disaster-prone country. The situation is aggravated, all the more by its being the most densely populated country in the world. Environmental disasters like tropical cyclones, storm surges, floods, norwesters, tornadoes and droughts ravage the country almost every year. During the last thirty eight years, the country was devastated by thirty eight severe cyclones of varying intensities. One of the severe ones in recent times was that of 29 April 1991, when material damage was to the tune of about 2.4 million US dollars and human casualty of about 1,40,000 lives. On a previous occasion of a similar catastrophe in 1970, about half a million lives were lost. The Bangladesh flood of 1988 caused economic loss to the extent of about one billion dollars. And flooding in Bangladesh is a perennial problem. Every year Bangladesh is also affected by norwesters and tornadoes causing loss of lives and immense damage to property. Though Bangladesh is affected by floods frequently it is not spared from drought which occurs in Bangladesh occasionally causing extensive damage to crops. Bangladesh also lies in the seismic zone and hence comes under the risk of earthquakes. These disasters put the clock of our economic growth backwards. Unless we an adequately deal with them, our economic progress will remain a dream only.

The physical cause of these disasters are embodied in laws of science and hence proper scientific research is necessary to deal with them. The Role of Remote Sensing and information Technology in the mitigation of various natural disasters like Tropical Cyclones, Floods, Norwesters/Tornadoes, Earthquakes, Greenhouse effect etc. has been stressed in this paper.

TROPICAL CYCLONES

The tropics can be regarded as the region of the earth lying between 30° N latitude and 30° N latitude. All the tropical seas of the earth with the exception of the south Atlantic and east south Pacific give birth to deadly atmospheric phenomena known as tropical cyclones. On the average 80 tropical cyclones are formed every year all over the globe. Bangladesh is a part of humid tropics, with the Himalayas in the north and the funnel shaped coast touching the Bay of Bengal in the south. This peculiar geography of Bangladesh causes not only the life giving monsoons but also catastrophic ravages of cyclones, norwesters, tornadoes and floods. The Bay of Bengal is an ideal breeding ground for tropical cyclones.

Though solar energy ultimately controls the terrestrial weather, the following environmental conditions have been found to be prerequisite for the development of cyclones (i) Absence of strong vertical wind shear of the horizontal wind near the cyclone center and presence of strong vertical shear of opposite sign on either side of this system. The difference between the wind vectors between two vertical levels is known shear (ii) Presence of low pressure region with cyclone voracity (iii) Warm ocean temperatures. A tropical storm does not form if the sea temperature is less than 27° C. Such high surface temperature is necessary to produce a steep lapse rate for maintaining the vertical circulation in a cyclone. This condition is met throughout the year in regions of the Bay of Bengal where cyclones are formed. A cyclone can extend up to a height of 15 kms. All the low pressure systems may not develop into cyclones. Some just die out whereas others intensify into cyclones. A list of the major cyclones affecting Bangladesh is given in Table-I

Table-I

Cyclone affecting Bangladesh since 1960

Date		Max Wind Speed in Kms/hrs	Storm surge ht(in ft)	Deaths
09 Oct.	1960	162	10	3,000
30 Oct.	1960	210	15-20	5,149
09 May	1961	146	8-10	11,466
30 May	1961	146	20-29	-
28 May	1963	203	14-17	11,520

11 April	1964	-	-	196
11 May	1965	162	12	19,279
31 May	1965	-	20-25	-
14 Dec.	1965	210	15-20	873
01 Oct.	1966	146	15-30	850
11 Oct.	1967	-	6-28	-
24 Oct.	1967	-	5-25	-
10 May	1968	-	9-15	-
17 April	1969	-	-	75
10 Oct.	1969	-	8-24	-
7 May.	1970	-	10-16	-
23 Oct.	1970	-	-	300
12 Nov.	1970	233	20-30	5,00,000
08 May	1971	-	8-14	-
30 Sep.	1971	-	8-14	-
06 Nov.	1971	-	8-18	-
18 Nov.	1973	-	8-13	-
09 Dec.	1973	122	5-15	183
15 Aug.	1974	97	5-22	-
28 Nov.	1974	162	7-16	a few
21 Oct.	1976	105	8-16	-
13 May	1977	122	-	-
10 Dec.	1981	97	06	02
15 Oct.	1983	97	-	-
09 Nov.	1983	122	-	-
03 June	1984	89	-	-
25 May	1985	154	10-15	11,069
29 Nov.	1988	162	5-10	2,000
29 April	1991	140	20-25	1,38,000
02 June	1991	100	06	-
02 May	1994	200	-	170
19 May	1997	225	15	126
26 Sept.	1997	150	10	70
20 May	1998	120	0.0	03

Determination of Cyclone Track : The precise forces responsible for the motion of tropical cyclones is not understood clearly and hence determination of the path of the cyclone in advance is one of the most difficult tasks in meteorology.

Recently various statistical and numerical dynamical methods have also been introduced for the forecast of cyclone paths.

(1) Steering Principle was first applied by H. Mohn in 1870. Until 1950 forecasts of tropical cyclones were made by subjective methods based on synoptic maps and climatological behaviour. Following are some of the objective methods applied in modern times for cyclone forecasting. (2) Statistical methods relate predicted movement to one or more parameters in an empirical way (3) Dynamical techniques, on the other hand make use of some forms of the equation of motion to predict numerically the motion of cyclone from an observed initial state of the atmosphere (4) Hybird model in which output parameters from a dynamical model are used in a statistical model. SPARRSO has installed a model named TYAN for predicting the track of a cyclone based on climatology of Bay of Bengal Cyclones for the last one hundred years. The model has shown promising results for the forecast of cyclone movement twenty four hour ahead of landfall. In Bangladesh, Meteorology Directorate is, responsible for the issue of cyclone warning.

Protection Against Cyclones : What can be done to protect ourselves from the cyclones ? A cyclone is a natural phenomenon like an earthquake or a volcanic eruption. We have to learn to live with it. We have to strengthen the cyclone warning system and adopt protective and relief measures to minimise their onslaught. SPARRSO monitors the tropical cyclones on an hourly basis with the help of the remote sensing equipment installed and passes the information to all concerned agencies including Bangladesh Meteorological Dept. Bangladesh Air Force, Honorable Prime Minister's Office, Ministry of Disaster and Relief and so on. With the help of the facilities at SPARRSO, we can determine the location, the intensity and the future course of motions of the cyclone. As a matter of fact no cyclone in the Bay of Bengal can escape the notice of the remote sensing equipment of SPARRSO. However, an integrated computerised method of Cyclone warning system needs to be developed.

Strongly built houses have to be constructed high above the sea level to serve as shelter places. People from the low lying areas in the coastal region can be evacuated into these shelters in the event of a cyclonic hit, Coastal embankments have to be made to protect life and property from the onslaught of storm surges. Plantation of trees along the coastal area can also diminish the fury of the storm surges.

FLOODS

The primary cause of flood in Bangladesh is rainfall in the catchment areas of the rivers of Bangladesh. Situated in the monsoon belt with the Himalayas in the north, Bangladesh falls in the region of very heavy rainfall. About 80 percent of the rainfall occurs during the 5 month period from May to September. The annual rainfall varies from about 60 inches in the western part of the country to about 200 inches in the north eastern part. At Cherapunjee in Assam very near our Sylhet border the average annual rainfall is about 500 inches which is the highest in the world. But the average rainfall in Bangladesh generates annually only 100 million acre feet of water whereas 1100 million acre feet of water comes from outside Bangladesh. Thus about 90 percent of the water carried by our river system, the Brahmaputra, the Ganges, the Meghna and other similar rivers is brought from outside the country. These rivers carry water from area of about 600,000 sq. miles of which only 7.5 percent lies in Bangladesh. Water enters in Bangladesh through three major channels but the discharge takes place through one major channel. The river system has evolved to carry the normal flow of water generated in the catchment area. Whenever the inflow of water is greater than the carrying capacity of the rivers (and this happens very often) flood results. The magnitude of the flood depends on the magnitude of excess water that is generated. A list of area flooded in different years is shown in Table II.

Table - II

Area affected by flood in Bangladesh

Year	(Thousand sq.Km)	year	(Thousand Sq.Km)
1954	36.4	1975	16.4
1955	49.9	1976	27.9
1956	35.1	1977	12.3
1960	28.2	1978	10.8
1961	28.4	1980	32.5
1962	36.9	1982	3.1
1963	42.5	1983	11.0
1964	30.7	1984	27.9
1965	28.2	1985	11.3
1966	33.0	1986	3.1
1967	25.3	1987	56.6
1968	36.3	1988	81.8
1969	41.0	1989	6.1
1970	42.0	1990	3.5
1971	35.8	1991	28.6
1972	20.5	1992	2.0
1973	29.4	1993	28.7
1974	52.2	1994	0.42

Besides the primary cause, namely rainfall in the catchment area, there are other factors which may aggravate the floods. They are :

(1) Snow melting in Himalayas
(2) Hydrographic changes in the Brahmaputra Basin
(3) 2.4 million tons of sediments carried by the river system of Bangladesh every year reduces the water carrying capacity of the rivers, which worsens the flood.
(4) Deforestation in the catchment area tends to aggravate the flood
(5) Construction of unplanned roads, railways, barrages, embankments etc. also create obstacles to the flow of water and aggravate the flood.

Flood Forecasting and Warning : Bangladesh Govt. has taken up both the structural and non-structural measures of flood mitigation. In this respect regional and international cooperation has been sought. A Flood Action plan with 26 components with the assistance of World Bank has been undertaken. Structural measures of flood control like storage reservoirs, embankments or levees, channel improvements and bypasses or floodways are costly and time consuming. For immediate benefit to public, non-structural measures are accomplished at a much smaller coast and time. For flood forecasting a network of hydrological stations connected with telemetering gauges or by telecommunication or teleprinter links with the forecasting centre has been established by the Water Development Board. Available hydrological data consist of discharge, water level and rainfall records. Historical records of data have been analysed to prepare forecasting procedures. For major rivers, correlation of water levels or discharges between upstream and down-

stream stations are utilised in preparing forecasting procedure. For rivers with smaller catchments rainfall-runoff relation, flood routing, co-axial graphical correlation methods are used. Extensive modelling of flood in our river system is necessary for effective forecasting. The Flood Forecasting Cell of Bangladesh Water Development Board has considerably improved its facility for the issuance of flood forecasting. It uses the remote sensing data along with ground data. The methods need further automation. Remote Sensing data can be used to delineate the flood affected areas.

NORWESTERS AND TORNADOES

Though cyclones are the most devastating storms affecting Bangladesh, there are other kinds of storms which affect Bangladesh. Of these, mention may be made of Norwesters and Tornadoes which cause lot of destruction of lives and property.

Norwesters come mainly from the north westerly direction (and hence the name) and are land based. They are a very common phenomenon in Bangladesh during late Chaitra and Baishakh months and are known in Bengali as Kalbaishakhi.

Another kind of storm very similar to a tropical cyclone but is of much smaller dimensions and very destructive is known as a Tornado. A tornado is also a low pressure region where strong winds blow around a center in an anticlockwise direction in the northern hemisphere and clockwise direction in the southern hemisphere. But unlike a cyclone a tornado develops on land. A cyclone lasts for days whereas a tornado lasts for a very short duration.

A tornado is formed because of the interaction of two air masses, one moist and warm air and the other dry and cold air resulting in extreme form of instability. Tornadoes often form a series and travel in almost parallel paths. The whole tornado moves at a speed of 25-30 miles an hour, whereas the maximum wind in a tornado could be 300 miles/hr.

Since the horizontal diameter of a tornado is so small and it forms so suddenly that it is difficult to recognise a tornado either in the surface weather map or in the satellite picture and hence forecasting of a tornado well ahead of occurrence becomes very difficult. We have observed that certain cloud features as obtained from satellite pictures and some other meteorological parameters like the Showalter or total Total Stability Index may indicate the occurrence of a tornado but again it is very difficult to pinpoint the place, time and severity of a tornado occurrence. Surface meteorological observations are taken usually at certain specified towns whereas a tornado can occur anywhere. A network of radars and frequent satellite observations may be very helpful in the early detection of tornadoes. Extensive research is needed on tornadoes to make any forecast possible.

DROUGHT

Though Bangladesh is a land of abundant rainfall, drought is very familiar to us. It is difficult to define the term drought precisely and hence any definition is rather subjective. It simply means lack of water and may be defined as lack of sufficient water to meet requirements. Thus drought can be of various kinds according to various requirements.

Drought History: The scourge of drought may be regarded as an integral part of the world climate. Wherever there is rainfall, there is drought also. Just like there is excess of rain causing floods, there is inadequate rain causing drought. Drought is by no means an isolated phenomenon or a purely local phenomenon. Sometimes drought occurs in large part of the globe and sometimes in many parts of the earth simultaneously. Excess rainfall may occur in some parts of the earth and drought may occur in another part. This may be due to the atmospheric teleconnections. Drought is again a recurrent phenomenon. There are records of severe draughts in history. In Bangladesh, drought of 1979 if the severest in living memory. In the seventeenth century, repeated drought and consequent crop failures occurred in Scotland which, in the opinion of some, forced the union of Scotland with England. In the 19th century repeated drought parts occurred in many parts of USA and Canada. In the sixties, drought occurred in various parts of India and in the late sixties and early seventies there was drought in the Sahel region of Africa.

Bangladesh Climate : Bangladesh is situated in the active monsoon regions of the world with an average rainfall of about 90" per year. But the rainfall distribution is not uniform throughout the year. Most of the rainfall i.e. about 80% occurs during the monsoon period i.e. June to October. About 5% rainfall occurs during November to February and about 15% rainfall occurs during March to May. This shows that the months November to February are very dry and may be regarded as permanent drought months. But this does not mean that Bangladesh has an arid climate because aridity in these four months is amply compensated by abundant rainfall during the rest of the year. However, the amount of rainfall varies considerably from year to year and from region to region. In some areas in the northwestern part of the country, the amount of annual average rainfall may be as low as 50" whereas in the north-eastern part, aver-

age annual rainfall may be as high as 200". There is a lot of variation of rainfall at different places from year to year. Specially during the premonsoon period, decrease of rainfall may seriously affect various crops. For example in 1979 rainfall during January to May was about one third of the normal though for the whole year, rainfall was only about 10% short of the normal. As people have adapted their crop to average climatic conditions, substantial decrease of rainfall may seriously affect the crops and other activities. Though a severe drought like the one that occurred in 1979 is not very frequent, a study has shown that milder droughts occur in Bangladesh after an interval of 5-10 years. The years 1950, 1951, 1957, 1958, 1966, 1967, 1972 and 1979 were years of less rainfall in Bangladesh. We have witnessed severe droughts in 1989 also. Some drought occurred during the post-monsoon season in 1979. Drought condition prevails in some part of the country almost every year for some of the time. Some of the droughts in Bangladesh seem to be related to EL-Nino phenomenon.

THE GREENHOUSE EFFECT

Man through his activities has started acting as an agent of climatic change. He is releasing enormous quantities of CO_2 (carbon dioxide) by burning both fossil fuels and nonfossil fuels (including burning wood). Part of the CO_2 is absorbed in the ocean and part is released in the air. It is estimated that since 1860, the CO_2 content In the atmosphere has risen by about 20% and will continue to rise further in future and may double by the middle of the next century. CO_2 and other greenhouse gases can increase the temperature of the lower atmosphere by re-emitting back part of the radiation emitted by the earth. Thus this can definitely change the earth's climate. Large scale increase of the earth's temperature and the consequent rise of sea level has been predicted because of the increased amount of CO_2 and other gases in the atmosphere in future. Even there could be damaging change in the regional climate because of the global warming. For example, Bangladesh could face increasing floods because of this effect .Thus the disaster situation in Bangladesh will multiply manifold because of the greenhouse effect. If the prediction of the greenhouse effect comes true then low lying deltaic countries like Bangladesh will be faced with the worst kinds of disaster in human history.

Here again various space platforms under Mission to Planet Earth and being launched by US and other countries. These space platforms will help in understanding the greenhouse effect and adopting remedial measures.

EARTHQUAKE

There is ample evidence from various geological studies that the earth's crust is in motion both horizontally and vertically. The modern theory of this aspect of the earth's surface is called plate tectonics.

Earthquakes occur in regions of the earth's crust which are undergoing deformation. As the region is deformed, energy is stored in the rock in the form of elastic strain. This continues until at some point the accumulated strain exceeds the strength of the rock. Then fracture or faulting occurs. Of the theories of earthquakes, perhaps the elastic rebound theory is the most successful one. This states that opposite sides of the fault rebound to a position of equilibrium and the energy is released in the form of heat, in the crushing of rock and in the vibration of elastic waves. The waves or vibrations which are generated at the moment of fracture produce the shaking which is experienced in earthquake.

The major earthquakes that have affected Bangladesh since the middle of the last century are the Cachar earthquake of January 10, 1869, the Bengal Earthquake of July 14, 1885, the Great Earthquake of July 12, 1897, the Srimangal Earthquake of 8th July, 1918, the Dhubri Earthquake of July 3, 1930, the Bihar-Nepal Earthquake of January 15, 1934 and the Assam Earthquake of August 15, 1950. of these, only the Bengal Earthquake of1985 and the Srimangal Earthquake of 1918 had their epicenters in Bangladesh.

The damages caused by these shallow focus earthquakes however were restricted to narrow zones surrounding the epicenters. The greatest damage was caused by the 1897 earthquake. The tremors were felt all over the country and severe damages were caused in the northern parts of Sylhet and Mymensingh districts and in the eastern part of Rangpur District. The 1950 earthquake was felt all over the country though no damage was reported.

Thus we see that Bangladesh is not entirely free from the menace of earthquakes. Specially the northern belt of greater Sylhet, Mymensingh and the eastern put of Rangpur Districts could be vulnerable. Bangladesh should develop adequate facilities for detection and study of earthquakes.

Satellite Remote Sensing can easily identify earth's fault zones where the earthquake mainly occurs as very high resolution satellites are being used for the detection of tectonic movement of the earth.

ROLE OF CIVIL SOCIETY AND NGOs IN DISASTER PREPAREDNESS AND MITIGATION.

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In this paper attempt has been made to highlight the following issues :

(a) Whether there is a really conscious, viable, vocal and effective civil society in Bangladesh ;
(b) What has been the role of NGOs in disaster preparedness and its mitigation during the post disaster period;
(c) What is the mechanism through which disaster reduction programs can be linked with development;
(d) In what way the civil society and the NGOs who have expertise in disaster management can contribute their efforts in developing a socio-economic and political framework from disaster management through sustainable development.

The Image of Bangladesh In Disaster Management.

Bangladesh is best known to the outside world as a country of natural calamities like cyclones, tornadoes, floods and drought. Though few years like 1954 (flood) 1960 (Cyclone), 1970 (Cyclone), 1974 (Flood), 1987 (Flood), 1988 (Flood) and 1991 (Cyclone) were known for their devastating natural calamities there is hardly any year in which the country is not affected by local floods, tornadoes, storms and other forms of disaster which seriously affect the lives of the disaster prone areas, who are further pushed below the poverty line.

In government statistics about 45% people live below the poverty line. Considering the fact that about 65% people are landless and quite a good percentage of them are affected by river erosion, droughts, floods, storms, cyclones etc. at regular intervals, one can always claim as did Dr. Akhtar Hamid Khan that Bangladesh is a miracle of human endurance. The poor of Bangladesh live in continuous disaster. Malnutrition, disease, hunger, illiteracy and exposure to poverty make the life of the poor extremely difficult. Needless to say the majority of the people, who are poor, are born in disaster and they die in disasters. In fact the people of Bangladesh have a tremendous power of resilience and survival. whenever there is a disaster, as was the case of 1991 cyclone(in which about 138000 people perished) people of the affected areas, are hardhit, shocked and bewildered, but they do not give in. Experiences have shown that the local community takes the lead in handling both the disaster preparedness and post disaster rehabilitation . This is the people's power that need to be exploited. Unfortunately, the government is so much dependent on foreign aid that with every Disaster it has to prepare an action plan for aid-led post disaster management. Most of the elite NGOs are also donor led and donor dependent and they don't spend even 1% of their accumulated wealth in disaster reduction or rehabilitation . Naturally, the disaster affected people have to depend on the local community with the first warning of a disaster like cyclone. The elite NGOs and aid agencies start preparing their ambitious budget for aid from abroad. Needless to say MOST AID AGENCIES ARE THE CHILDREN OF DISASTER. This comment about NGOs and aid agencies are true about man made disasters like the civil wars in Afganistan, Rwanda, Burundi and Arakan also. The table below shows how the number of NGOs (both foreign and local) have gone up quickly after the April cyclone of 1991 :

Number of NGOs

Period	Local NGOs	Foreign NGOs	Total No.
1989-90	293	89	382
1990-91	395	99	494
1991-92	521	111	632
1992-93	596	126	722
1993-94	684	122	806
1994-95	848	138	986

This is also a fact that quite a large number of foreign NGOs started their operation in Bangladesh after the man made disaster in 1971. Leading NGOs of Bangladesh like BRAC and Gonoshasthya Kendra were born during 1971-1972 period.

NGOs In Bangladesh

At the moment there are about 1200 NGOs which are registered with the NGO Affairs Bureau under the Act of 1978. If we include the NGOs which are registered with the Department of Social Services, Department of Women's Affairs

and the Directorate of Family Planning their number will certainly cross 25,000. One may observe therefore that Bangladesh is a land of NGOs. There has been a mushroom growth of NGOs. This is the reason why many donors sarcastically say that there are too many traders in poverty and disaster management in this country . A glance through the following table will indicate that the NGOs of Bangladesh which receive funds from abroad, are quite resourceful. They take a big share of the total inflow of external assistance to Bangladesh.

Number of projects with flow of funds going to NGOs

Year	Approved Projects	Amount in Tk(crore)
1990-91	464	634
1991-92	549	1148
1992-93	626	1599
1993-94	581	1260
1994-95	579	1762
1995-96	702	1467
1996-97	746	1025
1997-98	324 (upto Nov.97)	319

The cumulative fund for the approved project is Tk 9219 cr.($2083m). The cumulative fund release is Tk. 5693 cr ($1286m). The total number of project is 4579. Here, one may raise two pertinent questions:

(a) How much resource of this huge NGO budget goes to disaster management and post-disaster relief/ rehabilitation ?

(b) How many NGOs are really involved in disaster management ?

Since elite NGOs are not transparent and accountable, it is very difficult to say how much is the share of disaster preparedness and disaster mitigation. One may only wish and pray that the NGOs, which receive funds from abroad, keep out at least 10% of their funds for disaster management in consultation with their donors/ partners. Such a reserve fund would be about Tk. 1000 cr. for the period 1990-98 only. Let us imagine, what a huge amount could have been earmarked for disaster affected people with little concern about the sustainability of the rehabilitation programmes. We may, at this stage have an idea about the range of activities of the NGOs in Bangladesh from the following table :

Sector	No. of Project	No. of NGOs
1. Agriculture	80	31
2. Children's home/orphanages	22	20
3. Cultural / Human Development	82	69
4. Disaster Management and Rehabilitation	79	50
5. Education	238	114
6. Environment and Forest	45	36
7. Family Wefare	154	126
8. Fishery and Livestock	29	20
9. Health	171	134
10. Income Generation	185	150
11. Infrastructure	37	26
12. Legal Aid	22	17
13. Prevention of Drugs	1	1
14. Primary and Mass Education	103	90
15. Water supply and Sanitation	27	22
16. Women in Development	76	63
18. Youth Development	2	2

One may derive the following conclusions from the above mentioned statistics:

a) Number of NGOs working in disaster management is not small

b) Number of Projects taken up by NGOs in disaster management is relatively smaller.

It is however not unrealistic to observe that the total number of NGOs which get themselves involved in the post-disaster rehabilitation programmes, is actually much higher. NGOs working in health, education, sanitation,

infrastructure , rural development, agriculture, fishery. livestock and income generation normally take up integrated rehabilitation programmes after disaster. What is needed is a coordination of the package rehabilitation programmes of the NGOs working in the disaster affected areas. Their programmes should not be overlapping The programmes should strengthen the local voluntary groups and NGOs so that after every disaster they don't have to depend on the instructions from Dhaka.

Is Civil Society caught by Disaster ?

The so-called Civil Society is a new jugglery in the dictionary of democracy. Like the elite Povertycrats and Developmentalists of Post-Rio Earth Summit, the urban-based intellectuals are mostly pre-occupied with urban Seminars, Workshops and Dialogues. For them, disaster mitigation is an occasional hobby. The poor in Bangladesh cannot except anything from the high flying intellectuals heading some pocket organisations. The civil society is in deep sleep being quite withdrawn from the realities of the general people. May we dare to say that the Civil Society, as pampered by the donors, aid agencies, foreign NGOs and political parties are really caught in disaster? We may only pray that God would kindly raise their awareness about the poor who live in permanent disaster.

Sustainable Development After Disaster

Sustainable Development is a process of change in which the exploitation of resources, the direction of investment, the orientation of technological development and institutional changes are made consistent with future as well as present needs. One must see the resources of our country not as inherited from our forefathers , but as borrowed from our children. We must come out of the group of LDCs. We should recalculate our national income and verify whether it is really $280/- or at least $ 400/-. We have to give up the culture of beggary and come out of the trap of foreign aid in phases. Otherwise, our children and grand children will not forgive us.

For a really sustainable disaster management we need to take the following steps:

(a) Strengthen local governments;

(b) Rightsize and defatten central govt.

(c) Strengthen mid-level and local NGOs since only 20% NGOs control about 80% resources of the NGO sector, GOB and donors should promote local and small NGOs and make big NGOs and their cartels accountable to the Govt. as well as to the local government organisations.

(d) Private trusts, foundations, institutions, associations (including 'Samities') should be promoted and motivated to work both before and after the disasters.

(e) Leading service/professional associations, like the Bangladesh Medical Association, Bangladesh Education Service Association Bangladesh Institution of Engineers, Bangladesh Civil Service Administration Association, Bangladesh Bar Association. should be directed by the GOB to earmark a part of their annual income for a National Disaster Management Fund which will be under the control of the President of the Republic,

(f) Bus owners association ,truck and launch owners association etc. have tons of money. They should be asked to sacrifice and contribute to the above mentioned fund.

(g) People should be educated about disaster and local voluntary youth organisations should be given the leadership for social mobilisation.

(h) GOB should decentralise and delegate its authority to local government officials so that local officials at district and thana level can work with NGOs and LGOs in partnership with full devolution of authority.

(i) The country should be divided into at least 12 provinces with 64 elected Zila Parishads in each district so that Disaster Management becomes the responsibility of the Provincial and Local Governments.

(j) At least 50% of the resource of the ADP should be earmarked for Poverty Alleviation for the next 10 years so that the people below the poverty line are reduced to maximum 20% by 2000.

(k) Local community and NGOs should utilise the facilities of the cyclone shelters in the coastal areas during normal periods with the help of NGOs.

(l) Culture of efficiency among government servants should be promoted while a culture of simple living should be enforced on the elite NGOs. Simultaneously NGOs as non-commercial voluntary organisations must reengineer themselves and work with the GOB as supplementary forces without raising issues against the bureaucracy which has to play a neutral and paternal role during disaster.

Sources of Data :
1. NGO Affairs Bureau Govt. of Bangladesh.
2. Planning Commission Govt. of Bangladesh.

Annex - L

DISASTER REDUCTION : EXPERIENCE OF ANDHRA PRADESH

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ABSTRACT

Andhra Pradesh is located in the peninsular region of India in the east. It has the longest coastline in the country which is prone to severe cyclones and storm surges. The State is also frequented by droughts and floods. Andhra Pradesh has developed a very effective system of dealing with disasters. Experience shows that regular disasters necessitate intervention through rehabilitation and reconstruction though for long, response to disasters has been through distribution of relief.

Disaster management is a complex operation with no single, simple solution. The key is to link long-term development strategies with environmental management and disaster reduction policies in the countries of the region. One significant step in achieving this must be to develop working relationships between government departments, NGOs and community based organisations (CBOs)

This paper proposes the creation of a National Disaster Reduction Coordinating System (NDRCS), to coordinate counter-disaster measures with the national, provincial, regional and local echelons of governments in each country of the region. At present the trend has been to address the mitigation efforts through adhoc measures on a case by case basis. In view of this, it can be emphasised that it is not enough to create a cell or a committee which meets and discusses the measures to be undertaken following each calamity. There is, therefore, an urgent need for the creation of a permanent statutory body like the NDRCS at the highest levels of government. Such an organisation should have a profile befitting its stature and armed with clear-cut guidelines for its proper functioning. In addition, a prescribed procedure should be laid down for its interaction with state, provincial, grassroots level governments, CBOs and NGOs in the disaster-prone countries of the region. Perhaps, the NDRCS should be associated through CIRDAP to co-ordinate their capacity-building activities in training and research.

Generally speaking the precision with which scientific and 'technological missions' are carried out in many developing countries have been found wanting with regard to consideration of the disaster threat. The reasons for the success of technology missions on various aspects has been attributed to the 'mission mode', which identifies the critical inputs to be carried out on the basis of the vision of a nation vis-a-vis the various facets of development.

Based on his experiences, the author suggests the application of a 'mission mode', keeping the long-range development in view, by integrating disaster reduction with the overall planning process for the all-round socio-economic development in the countries of the region. The 'mission mode' ensures: (a) a clear vision related to measurable results within a given time frame; (b) dependence on self-help and self-reliance; (c) beneficiary participation; (d) improved communication systems; (e) awareness building by disseminating relevant information; (f) availability of reliable data on various facets of development and subsequent follow-up action through proper monitoring its reliability; (g) effective coordination between various government departments, NGOs, CBOs, etc., in measures like prevention, relief, rehabilitation, etc.; and (h) delivery of quick and qualitative services. This is essential because, even a one time disaster can cause a big setback to whatever development that has been achieved through planned efforts over time. Unless disaster reduction is treated as an essential element of sustainable development achieving progress will be frustrated. This paper attempts to fill the gap in the understanding of the relationships between development and regulatory departments in disaster reduction practices systematically so that long-term development is ensured.

A. INTRODUCTION

Andhra Pradesh is one of the bigger States in India accounting for a fifth of its area and population. It is located in the peninsular region. The State has the longest coastline in the country which is prone to severe cyclones and storm surges. It is exposed to both pre-monsoon (April-May) and post-monsoon (October-December) disasters. The frequency of the post monsoon disasters is more as compared to pre-monsoon disasters. Out of 73 cyclones that occurred in Andhra Pradesh between 1892 and 1997, only 11 were pre-monsoon cyclones. The damage to the States' physical infrastructure is quite substantial under both these types of cyclones. The damage to crops is more conspicuous in post monsoon cyclones and usually rice which is the staple food crop gets exposed to wind and water inundation. Apart from cyclones, the State is also flood-prone as the major river systems in peninsular India consisting of the Godavari, the Krishna and the Pennar pass through the State before draining into the Bay of Bengal in the east.

The State is also frequented by droughts and scarcity, almost every year in some part or the other, especially in southern and mid western region. Among all the States of India, Andhra Pradesh has developed a very effective system of dealing with disasters especially, the quick on set disasters such as cyclones.

This paper aims to focus on the interface between government departments in development planning, the environmental aspects and the disaster threats. The author has drawn heavily on his previous experience and responsibilities in local self government, crisis management and relief administration in the South Indian State of Andhra Pradesh which has been ravaged, time and again by cyclones, floods and drought.

Scenario of Disasters in Andhra Pradesh

Before going deeper into the subject, it would be pertinent to elucidate a little more about the State's geography and also in some detail about the history of cyclones which may be relevant as an experience, to be taken note of in a national workshop organised in cyclone-prone Bangladesh.

Andhra Pradesh is India's fifth largest State, accounting for 8.4% of its geographical area and the fifth populous State with a population of 66 millions. It is bounded in the East by the Bay of Bengal and has a coastline of 1035 Kilometers. The coastal area is traversed by three major rivers, namely the Godavari, the Krishna and the Pennar which drain finally into the Bay of Bengal. The deltas formed by the three major river systems cover nearly half of the coastal belt of Andhra Pradesh. In addition, there are other minor river systems like Vamsadhra and Sharada which have also sizeable delta systems in the coastal areas of the State. The deltas formed by the Godavari, Krishna and Pennar river systems constitute nearly 1 million hectares of highly productive agriculture area with rice as the predominant crop. The State is surplus in rice production and is a major contributor to the food grains pool maintained at the national level for supply to the public distribution system in the country.

The coastal area of the State is also the most populous with densities as high as 670 persons per square km in some of the districts compared to the State's average of 268 persons per square km. There is intense economic activity in this area which revolves around agriculture and agro-based process industries. The industrial activity in this region is also high in view of the availability of natural gas in the Godavari river basin and well developed port facilities on the coast.

The population living in the coastline is highly vulnerable to cyclones. With a frequency of four cyclones per year, one of which usually becomes severe, the coastal areas of the Bay of Bengal are subjected to severe cyclonic activity. Among the four States of Tamil Nadu, Andhra Pradesh, Orissa and West Bengal on the coastline of the Bay of Bengal, Andhra Pradesh normally bears the brunt of severe cyclonic storms. The coastal districts of Andhra Pradesh were subjected to 73 cyclone storms between 1892 and 1997 of which 33 were severe cyclonic storms as indicated in the following Table.

	Coastal District	Cyclone Storms	Severe Cyclone Storms	Total
1.	Nellore	12	11	23
2.	Prakasam	5	3	8
3.	Guntur	-	1	1
4.	Krishna	7	8	15
5.	West Godavari	1	-	1
6.	East Godavari	8	2	10
7.	Visakhapatnam	2	2	4
8.	Srikakulam	5	6	11
	Total	40	33	73

Disaster Management and its Significance

Effective disaster planning process is essential for minimising the debilitating effects of a major calamity, which may affect an area and its population in several ways. Such a process will also facilitate in establishing prompt communication so that rescue, evacuation, relief and rehabilitation activities can be promptly undertaken. All these objectives can be classified and grouped into various operating units to facilitate specification of functions and duties. Such an exercise would avoid confusion in emergency situations so that post-disaster plan of action can be put into operation.

Generally speaking, the natural disasters are 'location specific' occurring mostly in the east coast of India. Bangladesh, Vietnam, etc. while volcanic eruptions are experienced in countries like the Philippines, Indonesia and Japan. Floods followed by heavy rains are a constant phenomenon in the small Pacific island nations besides in the Gangetic plains and the Brahmaputra valley. Droughts mostly occur in the Deccan plateau, some parts of Orissa and western states of India. Various parts of the CIRDAP member countries are no exception to these phenomena. Due to advancement of science and technology, especially the Remote Sensing (RS) and Geographical Information System (GIS), it is possible now more than previously to do hazard mapping, vulnerability analysis, threat analysis, planning for prediction, warning system, rescue and relief management, rehabilitation and reconstruction and development, prevention, mitigation, preparedness, etc., which constitutes the core of the Disaster Management Cycle.

B. ENVIRONMENTAL MANAGEMENT IN THE CONTEXT OF DISASTER THREAT

According to Subhankar Banerjee,[1] the Earth Summit in Rio (1992), provided us with some alarming indicators. A few of the relevant indicators include : (1) About 1 billion hectares of land was degraded and deemed lost for crops; (2) The non-agricultural uses of precious arable land for townships and parks, air strips, car parks, etc., is accounted at 0.1 to 0.2 hectares per person; (3) The population ratio between developed and developing worlds moved from 1.2 (in 1950) to 1.4 (1980) and is projected at 1.5 (by the year 2000); (4) Only 35 percent of the world's crops are produced from 15 percent of the available irrigated area; (5) The water table has been descending by 80 feet in Bangkok (Thailand) and in Tamilnadu (India) by 100 feet, since 1958: and (6) India lost three percent of forest per annum and hence India's areas of degraded land are the largest in the world.

The above alarming information is not confined to earth crust alone. Currently, people's life styles have become so indiscreet that even the atmosphere is not spared from disasters. In fact, the catastrophic implications of global warming have forced environmental scientists desperately searching for immediate solutions. The planet earth is endowed with a complex atmospheric system since it reflects, absorbs and retains a certain proportion of solar radiation. It ultimately results in a Green House Effect (GHE). This would further compound the situation since the opaque gases and pollutants from industries act as a blanket obstructing the escape of heat from the earth's atmosphere. This is making the world hotter. As a result, the snow and ice would melt and raise the sea levels. As a result of the Green House Effect, it is quite likely that habitations which are built at sea level could get submerged over a period of time. Banerjee[2] further concedes: "These unhealthy changes in our eco-system have occurred mainly due to the imprudent pattern of living adopted by the human beings as it requires no expert to inform us about these natural tragedies. It is, hence, cautioned that the world must cut its material consumption by 50 percent and the developed nations, particularly by 90 percent to stop environmental disaster."

Who are the main defaulters ?

According to a German economist, Friedric S. Bleek, on an average, the people living in the industrial nations consume 19 times as much aluminium, 18 times chemicals, 14 times paper and 13 times iron and steel when compared to their counterparts in the countries of the Third World. These findings were validated by an American Scientist, John Young of Worldwatch Institute (Washington). In Young's opinion, the average American uses large quantities of raw materials for example, 540 tones of construction materials, 18 tones of paper, 23 tones of wood, 16 tones of metals and 32 tones of organic chemicals in a life span.[3] To quote S. Banerjee again "These findings are enough to quip that the development of developed countries is the main reason for the under-development of the under-developed countries, which could be even proved by means of studies conducted on this matter."[4] Then, it would be safe to infer that in our greed, we have been indulging in destroying what the nature has given us by overly exploiting it, which now appears to "striking us back with vengeance." Again to revert back to the example of USA, which represents the most developed nations in the world, 71 percent of the toxic emissions are produced by its four major industrial products like chemicals, plastics, paper and primary metals.[5] Thus, over exploitation of nature has resulted in the gradual skewed ecological balance worldwide and the developed nations have to share a major portion of blame on this score.

Commenting on the denudation of forest cover. Banerjee says, "In the most beautiful regions of Papua New Guinea, Chile and America, whole mountains, valleys and rivers have been ruined even beyond recognition. Due to relentless logging, forests and eco-system have been destroyed.[6]

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[1] Subhankar Banerjee (1995), "Protecting Environment from Disaster" Kurukshetra (December), p. 45-46

[2] Ibid [3] Ibid [4] Ibid [5] Ibid [6] Ibid

Sustainable Development for the Survival of Mankind

Viewed in another dimension, "sustainable development implies a model of development in which both the present and the future are taken into consideration. Natural resources, ecology and economic growth are to be managed in such a manner that it leads to sustainability. In this process, three basic tenets are paramount. Firstly, temporal sustainability demands careful maintenance of delicate balance between productivity parameters and conservation practices. Secondly, environmental sustainability implies development strategies which are eco-friendly, energy-efficient and waste minimal and thirdly, economic development models should optimise growth subject to ecological, economic, social and cultural constraints, which may include pro-poor and gender equity bias as well".

The Washington-based Worldwatch Institute's 'State of the World' report notes that as a result of our population size, consumption patterns and technology choices, we have surpassed the planet's carrying capacity. Human demands are approaching such gigantic proportions that would even force the marine fisheries to be used as supply to support the livestock apart from extending the hydrological cycle to produce fresh water. In addition, polluted water sources on a vast scale have been causing shortage of drinking water not only in India and China but also in Mexico, the Middle East and even in the United States.

Sustainable development, although a new concept, has assumed greater importance in the environmental circles. It connotes radical changes in our way of living starting with smaller populations. According to Banerjee, "Family Planners, not farmers or scientists, hold the key to future food supplies."[7]

In sum, it can be said that unless mankind mends its ways and reconciles to the fact to restore simpler modes of living and economy, the assault so far unleashed on the environment will have a snow-balling effect on the human civilisation. Sara Parkin, spokesperson of the British Green Party, noted in her contribution titled: Green Future, that both the terms "economy" and "economics" originated from the Greek term "Oikos", which means, house.[8] In view of this, it could be inferred that sound economics should be about good planetary house-keeping: and thus it generally connotes that sustainable development should be based on minimum use of raw materials. This leads consequently to the minimum wastage of natural endowments which in effect means emitting less 'pollution', which has become the concern of the people in almost all countries of the world. Currently, it has become the responsibility of the entire 'Global Community" to work in harmony for the protection of environment and thereby saving the Mother Nature from any possible disaster threat.[9]

C. THREAT REDUCTION : TASKS BEFORE GOVERNMENT ADMINISTRATION

According to a UN publication (1991)*, there are at least three significant criteria in organisational arrangements to dovetail disaster reduction functions in the overall public policy. These are listed below:

1. Recognising disaster occurrence as a dynamic and uncertain process

The governmental machinery for disaster management shows competency for both growth and change. As knowledge regarding disaster reduction increases capability increases and communities at various levels - local, regional. provincial and national - become self-reliant.

2. Awareness that almost everyone, every voluntary group, industry, or government department has some measure which it can contribute to risk reduction.

The primary task of government through its organisational arrangements is to identify the required efficiency, by responding to initiatives, distribute duties and responsibilities and coordinate the efforts as and when required. Also it is pertinent for governments to provide a lead by giving an example in the disaster reduction exercise vis-a-vis their endeavours.

3. Mitigation of disaster is wide ranging in scope and complex in its relationship with government ministries and agencies.

A clearer identification and allocation of roles and responsibilities is basic to have an efficient preparedness planning and reduction of a disaster threat. Thus, a demarcation of tasks is desired between various levels of government - local, regional, provincial and national - as well as sectoral agencies to promote cooperation, coordination and optimum utilisation of scarce resources. It would be relevant to remind that every country operates in a distinctive social, economic and political setting and this has its implications on what the government wants to do with regard to disaster

[7] Ibid [8] Ibid [9] Ibid

* This section is adapted from 'Manual for Policy Makers on and Planners on Disaster Reduction' Chapters 2 and 3, Publisted by U.K., 1991, New York

reduction. Furthermore, the international political situation and the condition of national economy of the disaster-prone country would focus some critical issues that need to be addressed.

Whenever a disaster strikes an area, it is imperative for the government to make some more efficient responses and efforts to minimise the risks involved. Therefore, the concerned government should resolve to intervene for accomplishing the reduction of risk and thereby, ensuring preparedness in the wake of a disaster threat.

The involvement of any government in counter-disaster measures generally encompasses a continuum of activities, which leads from one event to the next one. Such a continuum of events may, therefore, be described as a Disaster Management Cycle.

Hence, it is possible to do hazard mapping, vulnerability analysis, threat or risk analysis, planning for prediction, warning systems, rescue and relief, management, rehabilitation and reconstruction, development, prevention, mitigation and preparedness, etc., which form essential components of the Disaster Management Cycle.

The Disaster Management Cycle can be broadly divided into three major phases. These are (a) the impact phase; (b) the recovery phase, and (c) the reconstruction, development and preparedness phase.

It is pertinent to sound a note of caution here, that these three phases cannot be put into watertight compartments. In fact, there is a continuum as well as complementarily between one phase and the succeeding next phase. For example, reconstruction, development and mitigation phase provides a sound base for preparedness.

There is a lot that can be contributed by the scientists, researchers, planners, practitioners and policy makers at every phase of the disaster management. A listing of few important stages where they can play a significant role is as follows:

Preparedness : This has two facets: Preparedness in the shape of structural and non-structural, both long before the event occurs; and just before the event occurs.

Hazard mapping : As is well known, the hazards are location-specific. The services of scientists, engineers and researchers can be utilised for hazard mapping.

Vulnerability analysis : The habitations and communities that are vulnerable can easily be studied based on the past experience by collecting scientific, socio-economic and other relevant data to assess the level and magnitude of the vulnerability of various sections of people like farmers, agricultural labourers, women, children, etc.

Risk analysis : Depending on the location, the season in which the disasters usually occur the type of structures including the buildings, bridges, roads, electricity, communication, water tanks and other life supporting systems that will face the risk of damage or destruction can be studied.

Once the exercises like hazard mapping, vulnerability analysis and risk analysis are done keeping in mind the resources both internal and external with the level of resilience of people in view, an appropriate disaster management plan can be prepared to counter various types of disasters in different areas. Such plans based on scientific data will come in handy for the policy makers besides enabling proper budgetary allocations not only for relief measures but also for long term mitigation and preparedness.

The disaster cycle represents what should be the case under ideal situations; disaster impact-rescue/relief-rehabilitation - reconstruction including mitigation and preparedness - disaster.

Depending on the situation, certain aspects of the cycle may be better evolved and developed in one country than in the other. In case of any kind of disaster, this may lead to unbalanced as well as unintended consequences. For instance, an over-emphasis on relief planning at the expense of longer term mitigation may cause ever improved relief management but the costs of disaster in terms of unchecked capital losses can severely erode the socio-economic viability. On the other hand, an over-emphasis on purely scientific hazard analyses may not directly serve the overall disaster response. Striking a middle path between these options may provide optimal protection of life and property.

Preparedness and risk reduction or mitigation have to be viewed as complementary to each other. To the extent that mitigation is frustrated, preparedness needs to be increased in scale. Issues falling in the domain of humanitarian concern generally control the relief phase and penetrate that of preparedness. Also, economic issues tend to control mitigation measures and practice. However, the role of government is always central, and its administration of the field level reflects both its line of thinking and commitment.

Once resolved on a national consensus to natural disasters, a government will gradually create a small 'task force' or a 'coordinating system' to define an organisation and spell out its terms and conditions of reference. Creation of such

a task force or a coordinating system demands both political will as well as resources like personnel and finances, as a back-up for effective management.

Proposed objectives for the National Disaster Reduction Coordinating System (NDRCS)

Among others, its main task is directed toward co-operating with other organisations and communities to acquire greater local self-reliance in answering to the threats from natural hazards. As the principal co-ordinating body, the NDRCS by delegation, allocates the essential responsibilities to other agencies and departments. In such an arrangement, hazard and threat reduction analyses are mainly the task of regional and inter-national liaison and interpretation. But the NDRCS should be able to recognise important aspects aimed at preventing the effects of both natural and man-made disasters. Implementation of detailed measures becomes the responsibility of designated departments, as are preparedness and relief measures planned to obtain rapid effective response in the event of a natural hazard which subsumes short-term rehabilitation. And this measure often involves in launching schemes to be immediately carried out frequently through NGO interventions within a very short span of the declaration of a national or provincial or regional disaster. But such short-term solutions should be so delineated as not to pre-empt more broadbased medium-and long-term mitigation, rehabilitation and reconstruction and the maintenance of development. Such an arrangement will make the preparation of a long-range plan more effective and pragmatic.

The current position in most of the countries is that only the temporary measures are resorted to whenever, there occurred a disaster. In view of this, it can be emphasised that it is not adequate to create a cell or a committee which meets and discusses endlessly after each calamity. There is, therefore, a need for a statutory body about which we have discussed above at length. A prescribed procedure should be laid down for interaction with various state/ provincial/ local governments in a disaster-prone country. This would serve the purpose of information flow apart from co-opting the assistance of armed and para-military forces and other agencies in emergency situations that might crop up from time to time. It is relevant to mention here that such NDRCSs established in the Countries of the region, should be affiliated to CIRDAP so that it can co-ordinate the capacity-building aspects on a regular and sustainable basis.

Disaster Reduction in the National Disaster Management Plan

Since many mitigation measures are local as well as routine in nature, it is not desirable to regulate all arrangements through the national government. According to the UN Manual, the concept of disaster management is based on some of the explicit measures listed below:

1. The encouragement and support of local self-reliance in the face of disasters and of local accountability for performance under emergency circumstances.
2. The allocation of responsibilities for the detailed planning and execution of relief operations in the provinces and metropolitan areas to their respective governments.
3. The defining of the functions of the coordinating (committee or) system at the provincial, metropolitan and grassroots (local community) levels is important so that plans come into force and provide wide co-ordinating functions linked with regional and international preparedness.
4. Emergency planning should conform to the national administrative chains of command where these are responsive to the communities felt-needs.
5. Ensuring that mitigation and preparedness responsibilities are widely dispersed and thereby using resources effectively through delegation to existing units as an extension of their specialised expertise.
6. The National Disaster Management Plan allots responsibility to enable the agencies and departments for contributing to the collective action implementing mitigation exercises in the areas of their specific interest and for discussing emergency contingency plans that can be integrated with other action plans to augment self-reliant efforts.

The work of the National Disaster Reduction Coordinating System

The efficiency of a disaster reduction highly relies on the administrative and technical leadership of its chief executives, besides with their ability to maintain a representative committee system alongside a coherent decision making mechanism. Final choices are a matter for a disaster reduction coordinating system and their mitigation assessment will provide a key element in the justification to government with regard to project design, costs and location. Thus, mitigation procedures do not take the shape of a separate scheme of government. On the other hand, the attitudes conveyed will lead to changed priorities and actions in a wide spectrum of existing schemes. The strategy of focusing on mitigation will form just but one of the many plans of action vis-a-vis the department or bureau of national disaster management whose objectives subsume: (a) encouragement of self-reliance (b) ensuring that mitigation strengthens developmental efforts; and (c) ensuring guidelines to good practices, are widely disseminated.

Suggested Responsibilities of a National Disaster Reduction Coordinating System

The following elements form the programming schedule:

1. Monitoring and evaluating the implementation of functions indicating under the Disaster Management Act (if there is one).
2. Establishing liaison with agencies and persons pursuing hazard and threat reduction analyses and commissioning of such endeavours.
3. Preparing a National Disaster Management Plan and ensuring that this is incorporated in the overall National Development Plan.
4. Ensuring that disaster reduction and mitigation measures are reviewed by appropriate agencies, when development projects are at a feasibility stage.
5. Ensuring that disaster reduction measures are allowed within responsible agencies and by the private sector organisations.
6. The fostering of community self-reliance and accountability in disasters.
7. Guaranteeing national preparedness toward disasters.
8. The identification and the setting of performance levels in relief work.
9. The probable stockpiling of emergency supplies.
10. Creating and maintaining effective liaison with provincial, regional and metropolitan disaster agencies.
11. Undertaking public awareness campaigns and assisting other related organisations.
12. Supervising the activities of the National Emergency Coordination Centre (if this is a separate organisation).
13. Other programmes as and when initiated are to be delegated to the concerned departments and organisations.

Organisational and Policy Appraisal

The efficacy of government and the administration for evaluating the mitigation performance calls for a three-pronged strategy, which includes appraising the (a) government policies (b) government practices; and (c) government institutions. In order to effectively alleviate disaster caused problems, government administration may have to put a hold or shift certain policies/programmes which at first sight do not seem to be relevant to disaster reduction.

It would be instructive to quote the UN manual here on this aspect "complete policy shifts may be necessary, for example, to stop subsidising agricultural developments in disaster-prone areas which encourages people to move there. It may also be necessary to discontinue public building programmes in the areas since any government development will encourage private developments and thus increase vulnerability".

The above strategy entails that all government development policy areas are required to be critically examined by the NDRCS to thwart the occurrence of vulnerability caused by the unintended consequences of government land use, agricultural or any other matters, for executing any such policy change may acquire institutional change of considerable magnitude. This is due to the fact that the institutional status-quo may block policy shifts and therefore hinder complete disaster mitigation.

In addition, any planned approach to disaster reduction should scrutinise all government policies and programmes which might aggravate vulnerability in a given situation. Such sectors that need attention, among other things, in this regard include: Agricultural policy (especially cropping patterns); Building regulations or specifications; Land-use planning. Transportation policy (rail-road coordination); Regional development policies: Social security (equity related aspects); Support services; Forestry and Water resources. To be effective the following questions should be addressed in such an analysis :

1. Does any aspect of the policies of the government contribute directly or indirectly to the occupation of disaster-prone areas in the country?
2. Do any government policies or practices directly or indirectly contribute to aggravating the vulnerabilities of communities occupying disaster-prone areas?
3. What kind of changes are needed to diminish the 'vulnerability increasing effects' of government policies?

These question which are of paramount importance, be addressed at higher government levels commensurate with inter-departmental coordination and consultation. Furthermore, the institutional structures of those parts of government having responsibilities for disaster reduction may not sufficiently fit to the types of levels of threat experienced by the country concerned. Thus institutional structures of government need to be examined to determine their efficiency and

effectiveness in responding properly to reduce threats and vulnerability. The following aspects need to be given due consideration in this regard (a) Institutional policy objectives (b) Administrative jurisdiction (c) Financial resources (d) Enforcement powers (e) Administrative flexibility and discretion (f) Staff quantity and quality and (g) Decision-making effectiveness.

In conclusion, it may be added that in such an analysis what is important is that disaster reduction in many situations may have more to do with correcting certain existing policy and institutional imperfections, instead of investing on new resources in the hope of making the communities believe overly of their vulnerable conditions. It may be a good investment for the politicians with regard to their future, but for the vulnerable communities it may become more a 'bane' than a 'boon'.

D. DISASTER THREAT PERCEPTIONS

In the previous section, we have seen how the creation of a 'macro' level organisation is necessary for reducing disaster threat for co-ordinating various activities that matter most. Now we turn our attention to what happens when disasters strike, at the micro level, especially with regard to administrative preparedness, support systems, organisational framework, etc. The experience gained in the state of Andhra Pradesh (AP), India, is presented by way of illustrating how a systematic approach is developed over time to counter natural disasters like cyclones and floods. In simple terms, preparedness means pre-disaster planning. Generally, preparedness subsume the following aspects:

1. Preparatory or planning period of emergency management to include policies and programmes to mitigate the affects of a disaster threat.
2. Preparedness which involves the organisations response and stocking of adequate resources and their inventories for emergency use, and
3. Immediate response to the emergency which includes situation assessment, critical resource allocation and establishing command and control.

While preparing for immediate response to the disaster threat and longer term recovery, the most critical stage is the first stage as described above. Although it is futile to attempt disaster relief management efforts without first attending to this step, adequate attention is not paid to this stage and thereby causing tragic events to follow. In what follows, sub-themes like (a) lessons learnt from the previous disaster experiences and (b) organisational framework for disaster reduction are dealt with. These have been exhaustively covered by Randeep Sudan in his study. Although his analysis deals with problems encountered in Andhra Pradesh, his process documentation of the case study has been found both interesting and instructive for the purpose on hand[10].

Lessons Learnt from Previous Disaster

It is interesting to note that a remarkable similarity of experiences faced in handling rescue and relief operations in different types of disasters across the world. Though the disaster may range from earthquakes to nuclear radioactive emissions, yet rendering of immediate relief to a large number of vulnerable persons poses similar problems. In the case of cyclone disasters, the most important problem generally encountered is the delay in positioning of adequate staff and relief materials to be used in the zone or area likely to be affected as per cyclone warming. Experience shows that the lead time available after receipt of the first warning onwards is not enough to attend to the full range of operations that are necessary for relief work. The administrative responses in such circumstances often tend to be adhoc and will not have sufficient time for planning thereby causing avoidable confusion and delay in rendering relief to the victims.

At the field level, effectiveness of relief operations is largely determined by government functionaries immediately before, during and after the disaster. A high degree of advance planning and co-ordination is needed to achieve it . The saying that 'a chain is as strong as its weakest link' is truly reflected in a cyclone situation when the presence and actions of the lowest functionaries of the government at the grassroots determine the effectiveness and the image of the entire governmental machinery. For this the lower level functionaries are to be properly trained to face any eventuality.

It has been further observed that while a large number of officers are mobilised for relief operations, responsibilities and authority to be assigned is not properly defined. As officers are drawn from a large number of departments having different work cultures coordination of their activities becomes rather difficult. It may so happen that the situation

[10] Randeep Sudan (1992) "Disaster Management - Administrative Response to Cyclones" Indian Journal of Public Administration (New Delhi) pp 32-49

worsens further when personnel detailed for relief themselves become victims. Absence of a clearer understanding about responsibilities and proper coordination results in delays for estimation of damages and distribution of relief. This not only causes public resentment but on occasions has resulted in avoidable law and order situations. Another important lacuna in cyclone relief efforts is lack of knowledge of local terrain on the part of relief personnel, besides their ignorance of standing government instructions or orders on various aspects of relief operations. Immediately after a disaster strikes, a large number of prominent persons called very important persons (VIPs) normally visit the affected areas making substantial additional demands on the scarce resources of officials involved in directing relief operations.

It has been widely perceived that due to non-availability of authenticated lists of vulnerable people, especially the small and marginal farmers with the Agricultural Department, enumeration of crop/horticultural damages gets frequently delayed. Although such lists are required to be maintained by the department, these are often not available for various reasons. Due care must therefore, be taken to have such lists prepared for ready use. Such lists would prove useful even for routine interventions of the department concerned.

In addition, there are, of course, a large number of other problems which arise from time-to-time in the course of disaster relief, but most of these can be taken care of , if the more immediate problems are tackled. As can be gleaned from the experiences of relief operations in various situations, the aforesaid problems are generally observed in a variety of disaster situations.

Absence of a clear division of work and tasks would naturally result in disorganised, competing, overlapping and ineffective responses. It is interesting to note some of the recommendations made by officers of the State Police after the Flint-Beeche disaster in USA in 1953.[11] The following are the measures recommended in the said report :

1. A clear definition of authority
2. A more rapid and complete survey of the extent of disaster
3. A posse of manpower outside the area and the entrance into the area as a group of terms with specific jobs assigned
4. A more adequate control of entrance into the area (pass system)
5. Walkie-talkies in the area, to facilitate communication
6. More men at the hospitals to get needed information about the victims and
7. More equipment, such as bulldozers and chain saws[12].

Most of the items listed above are equally true in respect of not only in cyclone but also in other disaster situations, when similar constraints have been experienced. Thus there is a common element of experience which comes to service for planning disaster relief operations.

2. Organisational Framework for Disaster Reduction and Relief Management.

After a disaster strikes, the task of management boils down to the administration of relief and rehabilitation aspects. Randeep Sudan[13] developed an organisation set-up for disaster reduction and relief especially dealing with management at the district and below levels. It comprises a list of various departments that perform important functions in a disaster situation. It must be mentioned, however, these examples are drawn from India where the district and sub-district units have long been established and recognised as the fulcrums of activity in dealing with natural calamities like cyclones and floods. It may be added that the districts are further divided into disaster zones for the purpose of an effective management of activities of various departments. Before we take up these aspects a bird's eye view of the status of Relief Administration at the provincial level in the State of Andhra Pradesh, India is presented below :

(i) Status of Relief Administration at the State/Provincial Level

At the State Level during 1993-1996, there occurred a reorganisation of relief Administration in Andhra Pradesh, India. The Commissioner for Relief, who has been the functional head with regard to disaster management in the State, was placed under the overall control of the Principal Secretary, Panchayati Raj (PR-Rural Local Self-Government) Rural Development (RD) and Relief. The following Chart provides the organisation of Relief Administration during 1993-96 in Andhra Pradesh State.

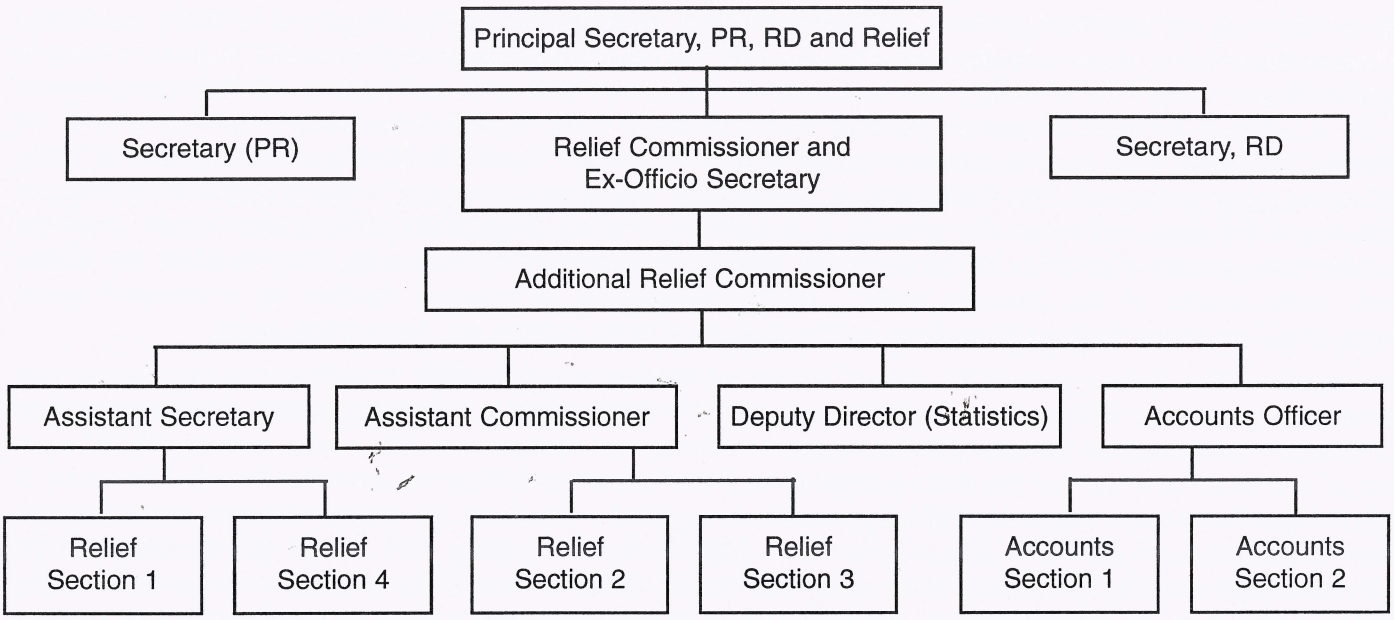
Quoted in William H. Form and Sigmmund Nosow (1955), Community ut Disasrer, New York. Haper and Brother. pp 28-29

[11] Ibid

[12] Ibid, P. 155

[13] R. Sudam op cit

Chart I : Relief Responsibilities in Government at the State/ Provincial Level



Notes :

There are six sections in all dealing with the following subjects :

Relief Section 1	:	Cyclones, floods, heavy rains, etc.
Relief Section 2	:	Drought
Relief Section 3	:	Other calamities like earthquakes, thunderbolts, fire accidents and Disaster Management.
Relief Section 4	:	Establishment matters, like personnel, salaries etc.
Accounts Sections 1 and 2	:	These look after releases of amounts sanctioned by Government for various calamities and monitor the status of the calamity relief fund (CRF)

As can be seen from the chart, the composite Department had three divisions namely, Panchayati Raj (PR) Rural Development (RD) and Relief, each again was manned by senior level officials. And the overarching Department was headed by a senior Indian Administrative Service (IAS) official in the cadre of a Principal Secretary. In effect, he functioned as the Chief Monitoring Authority at the highest level.

In his work, the Relief Commissioner is assisted by an Additional Relief Commissioner who in turn, is aided by four senior officials (a) an Assistant Secretary (b) an Assistant Commissioner (c) A Deputy Director (Statistics) and (d) an Accounts Officer. The notes given under Chart I Provide a brief description of the exact distribution of functions under each section. The Deputy Director (Statistics) is charged with the collection of relevant data from all the districts on various aspects concerning disaster management. It must be added that the Secretary, PR and the Secretary, RD are of the equal rank of the State's Relief Commissioner-cum-ex-Officio Secretary, also share the burden of the latter in times of natural calamities. Form this it could be inferred that the Principal Secretary of PR, RD and Relief functioned as the head of this triumvirate.

As far as is known better, coordination can be forged by bringing together all the three departments viz Local Government (PR), Rural Development (RD) and Relief since they are all interconnected in one way or the other. Although Relief has been mainly recognised as one of the subjects of Revenue Administration, its lumping with PR and RD has facilitated a more pragmatic approach to disaster management during mid-1993 to mid-1996 in AP. However from the middle of 1996, the services of the Relief Commissioner are tagged to the Revenue Department once again.

At the district (a sub-unit in the scheme of State Provincial Administration) level, the collector is the principal coordinating officer (as shown in Chart - II) of various line departments (having functional jurisdiction at the sub-district and village levels) in all types of calamities. He works under the overall control of the State's Relief Commissioner and receives directions/instructions from the latter, whenever there occurred a disaster in the district. Hence, it must be said to the credit of the procedures established over time, the State Administration is fully prepared to face any eventuality.

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Advantages of having PR, RD and Relief under one Principal Secretary

As can be made out from the experiences in Andhra Pradesh, there has been an overlapping of functions with regard to the implementation of rural development schemes under the new local governance dispensation in India. A massive amount is earmarked for and spent on the execution of employment generation and poverty alleviation programmes in the countryside annually. If these programmes are implemented in the disaster-prone areas by giving priority to the people's felt-needs, there could be minimum opportunities for corruption, thereby facilitating proper utilisation of funds. Moreover, local government (PR) institutions can play a major role in sensitising and involving people in constructive activities at the grassroots levels. For example, in drought-prone areas, projects like drinking water supply under the employment generation schemes can be attempted. Similarly, development of waste lands along the coast line, shelter belt, modernisation of the drainage system, expansion/extension of irrigation facilities to unattended areas, agronomical measures for flood control etc., can be thought of in the cyclone and flood-prone areas.

In extension of the above argument, the case of Watershed Management to facilitate drought proofing and sustainable development, can be presented here. Guidelines issued by the Government of India allocate 50% of funds earmarked for Employment Assurance Scheme (ESA) to be spent on Watershed Management. This comes to nearly Rs.200 crore per annum, which is more than the entire budget of the Relief Department. If placed under the Principal Secretary of PR, RD and Relief Department, the Relief Commissioner would have access to this massive amount, which could be spent in drought-prone areas or in coastal areas, susceptible to frequent cyclones. This amount can also be dovetailed with the budget provided for drinking water under relief works. Likewise, most of the projects under Jawahar Rojgar Yojana (JRY) such as minor irrigation excavation of tanks and their maintenance, social forestry and creation development and maintenance of infrastructure, which have a direct bearing on relief administration can be usefully included by the Relief Commissioner for disaster reduction.

Since the relief measures are aimed at the amelioration of affected population both in rural and urban sectors, the linkages established in the implementation of development programmes with a long-term perspective is possible if all the three departments. viz. Local Government (PR) Rural Development (RD) and Relief are placed under the overall supervision of one Principal Secretary as the nodal head for relief measures. That apart, a senior official like the Principal Secretary can be very effective in taking quick decisions as also getting the needed funds sanctioned in times of disasters. Hence it is widely desirable to place the services of Relief Commissioner under the overall supervision of the Principal Secretary, Local government (PR), Rural Development (RD) and Relief with regard to the scheme of Disaster Reduction, at the state/provincial level. Based on the frequent occurrence of natural and man-made (which include both political and administrative omissions and commissions) disasters, the profile of the entire disaster management gets a big boost, if a committed high level functionary in the rank and status of Principal Secretary to the Local Government (PR) and Rural Development (RD) department is also vested with the task of overseeing and monitoring the Relief Administration in the state. However, on the basis of what had happened from the mind-96 onwards, it is felt that a fair trail was not given to the system so assiduously evolved and presided over by the author while being the Chief (i.e. Principal Secretary) of Rural Development, Local Government and Relief Department.

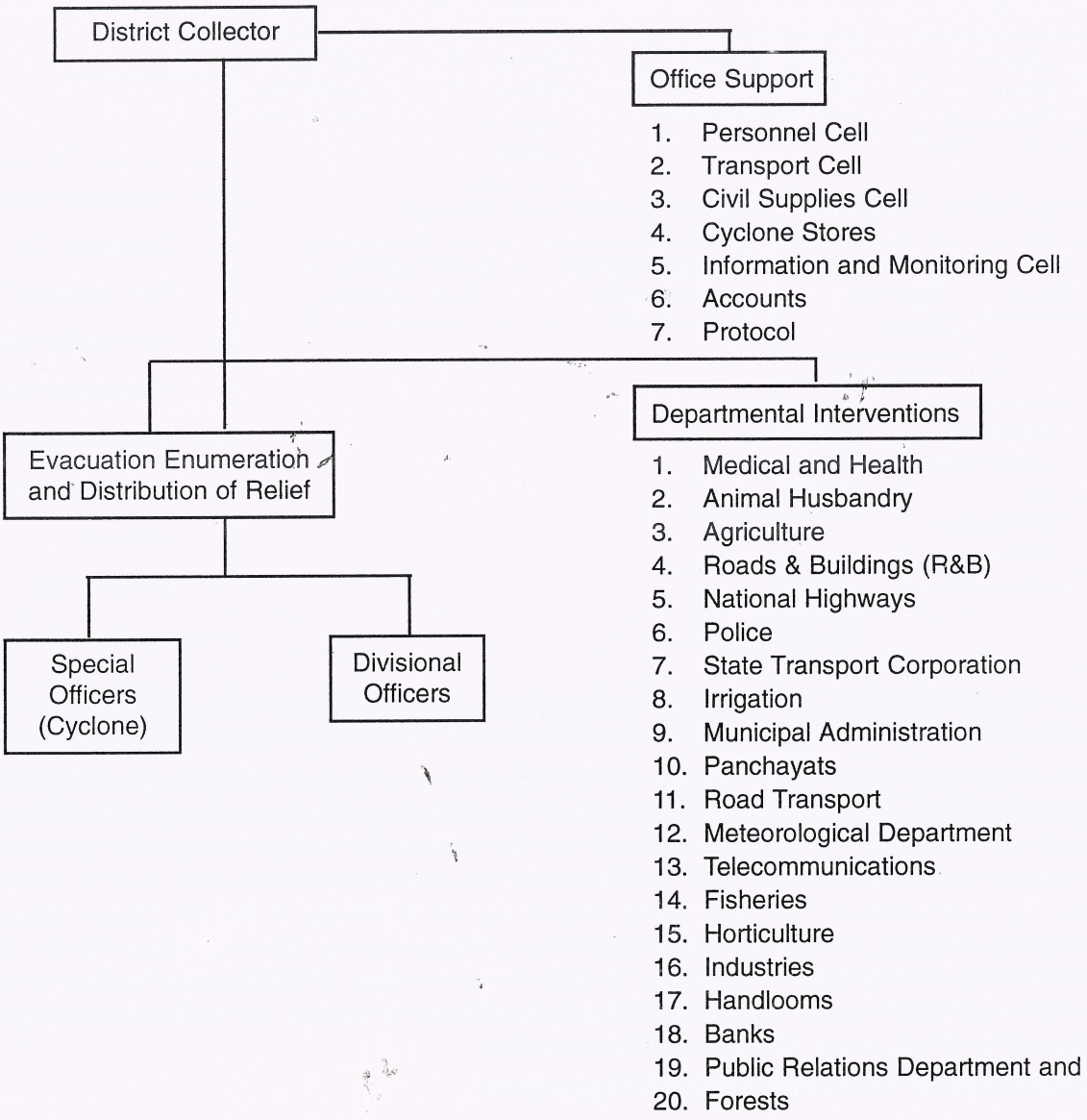
(ii) Relief Administration : District and Below Levels

A board organisational set up for carrying out relief measures is provided in the following charts II and III. As can be gleaned from Chart II in addition to Special Officers, who supervise disaster zone, departmental officials will be required to perform their duties in connection with cyclones and floods. The divisional officers will be required to give necessary support to the Special Officers and Evaluation Officers in performing their duties.

In India, the administrative head of a district is known as the district Collector and Magistrate and in some states s/he is known as the Deputy Commissioner. The District Collector and Magistrate will be supported by various cells created in the Collector's Office for co-ordinating the cyclone relief measures.

As regards Disaster Zones, the suggested organisational framework is represented in Chart II. As can be inferred from it, the Special Officer (cyclone floods) is required to attend not merely the evaluation/enumeration of damages and distribution of relief - cash or kind - but is also responsible for coordination of activities of several different departments within the disaster zone. This is very essential as it had been found that a major weakness in cyclone relief operation is due to the absence of coordination between various departments at the field level since they generally tend to function as water-tight compartments. Thus, it becomes necessary to provide a clear-cut demarcation of responsibility for each affected area in the district as a whole besides making it easier to the District Collector to personally monitor relief measures. Of course, he can rely on the Special Officers for full information with regard to each Disaster/ Zone.

Chart II : An Organisational Framework for Disaster Management Operations and district Level



Furthermore, this would facilitate the collector to have two alternative sources of information viz. from the concerned departments and from the officials specially charged with this task on the progress of relief operations.[14] Further down the line, the Special Officers will be aided by the Area Officers, stationed at the sub-district units called Mandals for conducting enumeration of damages and for relief distribution to the affected persons. The Area Officers will be able to coordinate this work locally with the help of teachers. Senior/Junior assistants consisting of the enumeration and relief distribution teams working under his supervision. Generally the Area Officers are deployed in a group of villages and take responsibility of the entire enumeration damages to infrastructure house and property and for the resultant distribution of relief The Area Officer will be given a vehicle for his swift movement and is assisted by nearly 3 member teams for enumeration[15].

Aside from the Area Officers, some important department and also required to mobilise their personnel and resources. For Example, the Roads and Building (R&B) Department, the Panchayati Raj (Rural-government) Engineering Department and the State Electricity Board with their mobile teams of workers will move into action for clearing of roads and opening access to hasten the process of relief operations. Positioning of these teams at strategic locations will help facilitate smooth relief measures. The Medical and Health Department has a critical role to play in providing preventive vaccinations and chlorination of drinking water wells in the affected areas. Likewise, the Department of

[14] Ibid
[15] Ibid

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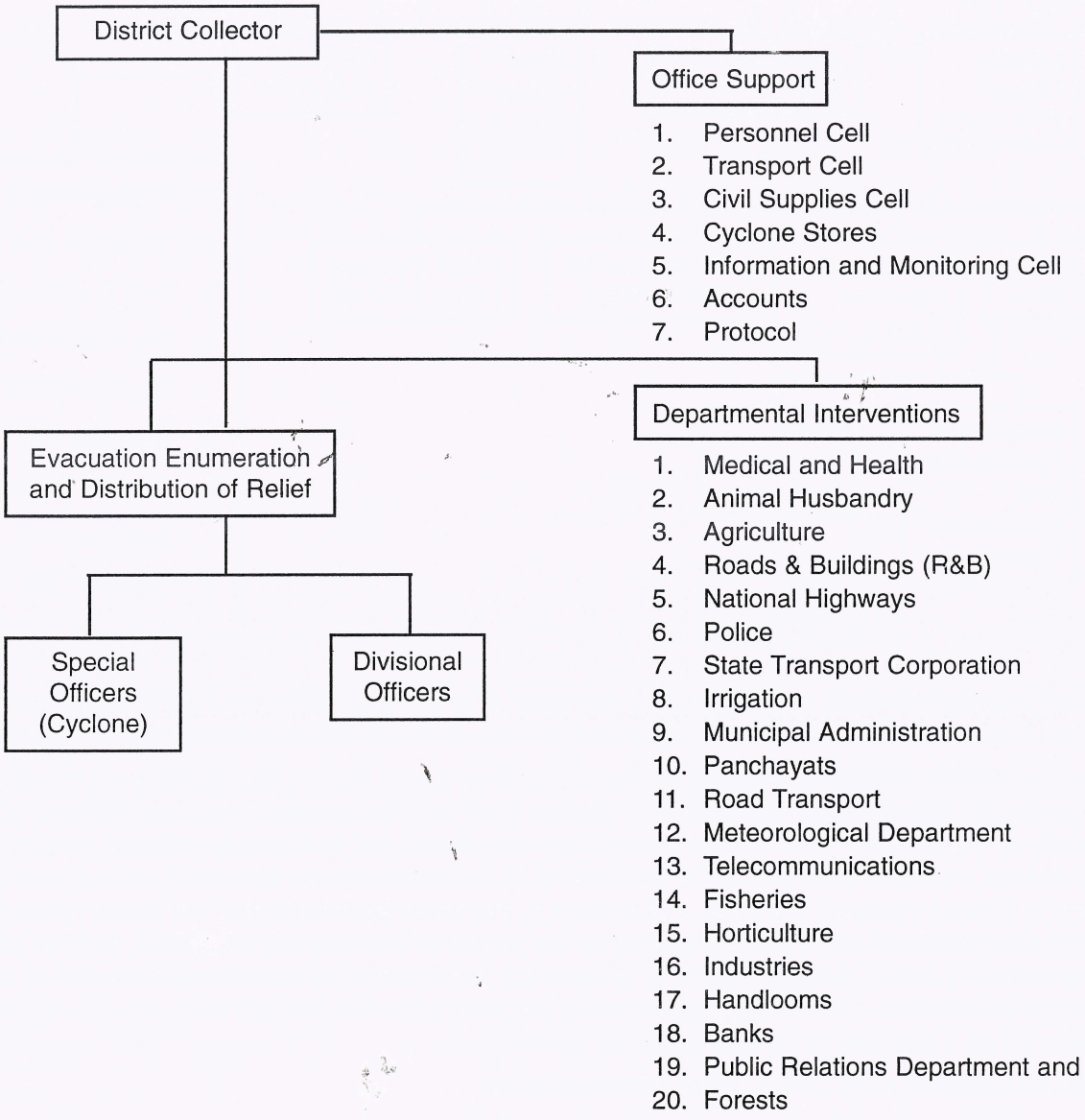

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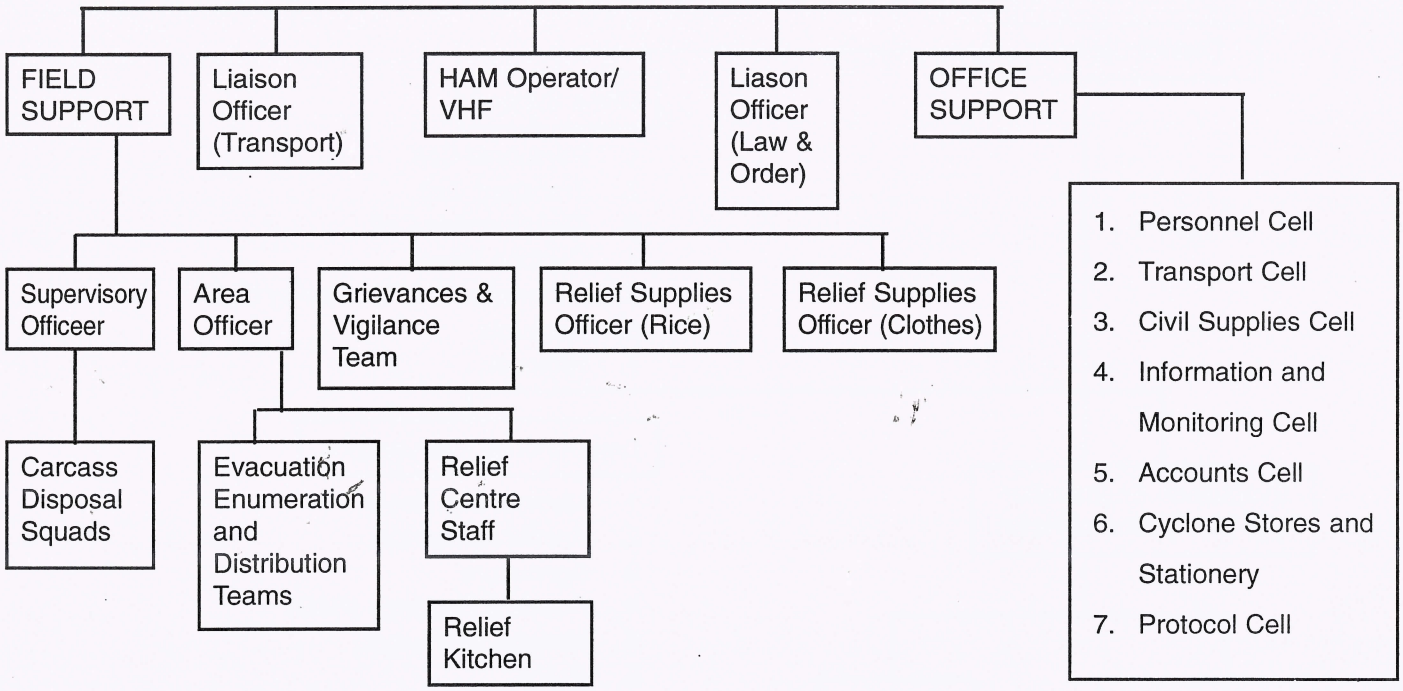
[14] Ibid
[15] Ibid

Chart III : A Framework for Oranising Disaster Zone [Special Officer (Cyclones/Floods)



Agriculture has an important function in assessing the damages to crops, cash crops and horticultural plantations. Besides its officials should be geared up to swing into action at once on the receipt of cyclone/flood warning signals.

Randeep Sudan's exhaustive itemisation of duties as per the requirements of various departments will not differ from the tasks to be faced and attended to in the wake of a disaster in all the disaster-prone countries depending on the nature and intensity of the disaster[16]. As can be inferred from the above, the multifarious activities involved in the management of disaster situations effectively are in fact depend on the preparedness with which various departments are endowed with in a given situation. The most critical stage in this entire exercise is the first phase relating to the planning of contingency measures and thereby preparing for the numerous onerous responsibilities. Both for planning and actual implementation during disaster situations, a clear-cut demarcation of duties/responsibilities is a must. Besides, an effective coordination system with support from appropriate administrative and institutional arrangements, as narrated above, will go a long way in disaster reduction exercises.

E. DISASTER MANAGEMENT AND LONG-TERM DEVELOPMENT

Natural disasters frequently obliterate years of labour and resources invested in development, and budget allocations by governments aimed at development programmes are all too often diverted from long term development to short term relief measures and the restoration of stricken areas. The effects of disasters on human life are only too apparent and the society is forced to pay dearly, besides the sufferings of the victims.

In India and Bangladesh, the occurrence of floods and cyclones is more frequent than in many other countries and the scale of losses is greater from them than from other natural calamities. Floods and cyclones frequently cause many deaths and great damage to individual and community assets resulting in many cases to seriously affecting the economies of whole areas and occasionally the country as a whole. The plight of the assetless people who are more vulnerable to such calamities is extensive. The UNDRO (1990) realised that :

"While creating emergency situations which require immediate relief measures to preserve life, these 'endemic' disasters are symptoms of the underlying problem which require longer term and more complex multi-sectoral responses involving the whole government structure."

Natural calamities and the political upheavals result in the uprooting of millions of people, both relief seekers and refugees. This brings a tremendous strain on the economics of countries, particularly those in the Third World. The poorer the country affected, the greater the number of victims and the adverse effects on their economy.

[16] Ibid

However, the effects of natural calamities are not entirely unavoidable and casualties and losses can be minimised. There is a possibility of reducing the losses of human lives and public and private property through a planned set of measures taken well in advance. Certain types of disasters are recurrent in particular areas and their vulnerability or proneness can be estimated. Specific measures, i.e., Actions Plans, both for long-term and short-term, can be implemented to lessen the effects of such potential disaster.

Based on the analyses of historical and empirical data and supplementing these with appropriate studies, disaster mitigation can be planned. These measures fall into the following two broad categories within disaster areas:

(a) Long-term structural and non-structural measures

These include measures evolving sustainable development models such as changing the cropping patterns and land uses, improving specifications for durable assets such as roads and buildings, improving watershed management in catchment areas, changing vocational patterns through upgrading of skills and introducing new skills and integrating rural development with disaster management programmes.

(b) Organisational measures

These are based on the principle of the right in the right place at the right time with the right equipment-both physical and psychic.

There is an absolute need to anticipate various disasters which are area specific and to keep the mitigation aspect in view while planning socio-economic development and administration activities. Disaster-prone countries should take explicit account of disaster hazards, within the context of appropriate over all policies and priorities and seek to reduce the associated risks, particularly for the poorest sections of societies since these are invariably the most vulnerable to natural disasters and they should receive the highest development priorities in terms of disaster mitigation and preparedness measures.

Some measures have to be aimed at protection and preparedness during the actual occurrence of a disaster, but most of these measures can be designed and implemented as part of regular development activities. This assertion has implications for the institutional frameworks in which disaster mitigation programmes are carried out as well as having implications for the personnel with responsibilities for managing disaster-relief, design sector projects, etc., who should interact accordingly. There is a need to investigate the institutional, political and financial frameworks that govern present day Disaster Management at the same time as reviewing current disaster mitigation and long-term development policies and programmes.

Long-Term Strategy for Disaster Management and Mitigation

The policies and strategies for disaster management and mitigation presently are focused on Crisis Management and therefore, long-term aspects of the disaster reduction are neglected. In order to provide a broader canvas to the disaster management it is necessary to redefine the subject so that it includes both crisis management and disaster reduction planning and integrates them with long-term development and environmental management.

India is one of the most disaster-prone countries in the world as every year it suffers from various types of disasters. Disasters caused by cyclones and floods have become routine events and, year after, the loss of human lives and livestock, damage to houses and other physical infrastructure and economic losses like crops, plantations, etc., are on the increase at an alarming rate causing considerable hardship to the people besides resulting in economic disaster to the nation. Though investment on activities related to disaster reduction such as flood control shelters, and relief and rehabilitation has increased manifold, the overall losses continue to increase.

The situational analysis as it obtains in India, clearly indicates that we are unable to evolve a definite policy nor appropriate models for disaster management and development for the disaster-prone areas. So far, most of our disaster management efforts are concentrated as short-term measures like relief and rehabilitation, and little has been done to undertake preventive to undertake preventive and protective measures on a long-term basis which are essential to mitigate the impact of disasters. Stated otherwise, in most of the states, we are still adopting a fire-fighting approach. In the management of disasters and practically nothing is being done to control causative factors and develop protective measures. Even in restoring the normal condition after a disaster in an area, temporary measures are taken which further deteriorate the situation with successive disasters. The situation in the countries of the Asia-Pacific region is no different from India's in facing the problems arising out of disasters.

High rate of population growth has increased pressure on land and the demand for more area for cultivation had led

to ecological degradation affecting water retention capacity of the land and increasing run-off on the one hand and pushed people to occupy hazardous flood-prone areas on the other, which adds to the gravity of the problem. The astronomical increase in the value of infrastructural losses in India due to cyclones and floods every year and earthquakes (1991, 1993 and 1996) is indicative of the fact that policy makers have not been able to evolve or use appropriate technology for the construction of physical infrastructure and housing.

It is only recently, to be precise, from 1990, the government of India had started making budgetary provision in the form of Calamity Relief Fund in each state budget and thus sharing 75 per cent of the financial burden. This change in the financial policy for managing disasters is inadequate as it provides financial support for the short-term needs like relief and rehabilitation and nothing about long-term preventive and protective measures required for disaster reduction. This also tends to be the case in relation to both multi-lateral and bilateral disaster relief funding.

Disaster management should be seen in a broad spectrum and the problem should be dealt with in its entirety. In order to evolve a broadbased policy and operational model for management of disasters and mitigation, the issues that need the attention of policy makers, administrator, planners and professionals associated in this activity must be identified for further consolidation. The major issues related to disaster management with specific reference to India and some of the countries in the Asia-Pacific region can be briefly listed:[17]

1. Disaster management should be a part of the total development perspective of an area. To achieve this, the development needs for different disaster-prone areas should be assessed and specific planning approaches should be evolved keeping in view the physical characteristics, resource endowments, population pressure and the types of disasters in the area.
2. Within the disaster-prone areas, vulnerability analysis and risk and hazard mapping should be carried out on a large scale so that area specific plans could be prepared and the disaster reduction activities and socio-economic development of the area could be integrated appropriately.
3. There should be a specific settlement and housing policy for the disaster prone areas so that concentration of population in high risk areas could be checked and disaster proof housing designs and technologies be enforced to ensure reduction in the loss of lives, cattle and housing.
4. There should be a well organised and scientific data base system, networking and information sharing which not only helps in improving preparedness and providing decisions options in crisis management, but also helps in the assessment of losses and damages. Detailed guidelines and appropriate techniques should be evolved besides, improving administrative and organisational network for this purpose.
5. Over the years, demand for relief and rehabilitation funds in the aftermath of each calamity, has become more political than the actual requirement. To curb this situation, a specific policy for financing relief and rehabilitation should be evolved in such a way that the states need not depend on central pool for funds every time. Introduction of Calamity Relief within the state budget augurs a good beginning in this direction. However, arrangements should be made to tap other sources of finance for funding disaster reduction activities. After all, funds for counter-disaster measures are scarce, the country's policy makers have other pressing problems to deal with and investment in the country is dampened by the mismanagement of natural resources. Although creation of a Calamity Relief Fund is welcome, it is not enough given the enormity of situation in a big country like India. The Calamity Relief Fund gives an impression that it is only for relief and rehabilitation. It should be treated as Development of Disaster, Prone Area Fund and should be used as such for both long-term and short-term disaster reduction activities besides financing relief and rehabilitation.
6. As 'Socio-Economic Security System' involving insurance Agencies should be evolved for all disaster-prone areas so that that individual losses could be compensated through Insurance and the Financial Burden on the government is reduced to a great extent.
7. All the construction departments should evolve special equity control systems and specifications for the construction of physical infrastructure so that these could withstand cyclones and floods. Appropriate technology with cost consideration should be used to safeguard the physical infrastructure and public utility facilities from recurring disaster and thus costs on repair and reconstruction could be minimised.
8. People should not only be made aware of but also involved in disaster reduction measures and environmental conservation. Besides participating in relief and rehabilitation activities, they should also be made to share costs

[17] AVS Reddy (1996), Presidential Address at the IInternational Conference on Disaster Management, January 19-22 Madras (India)

to reconstruction and disaster reduction activities. Total dependence on government for relief, rehabilitation and economic compensation will not only reduce their capability of facing calamities but it makes them more vulnerable too.

9. Rural development and poverty alleviation programmes for disaster-prone areas should be specifically designed. Programmes like drinking water supply, construction of roads and school buildings, housing should be planned and implemented keeping in view their vulnerability to disaster. Employment generation programmes could be fully focused on disaster-reduction activities. All types of Integrated Rural Development Programmes (IRDP) could be covered under an Insurance Scheme to safeguard the interests of the poor people.
10. Flood control, soil conservation and afforestation in flood-prone areas and in the river catchments should be integrated and brought under a single administrative authority so that all activities are implemented in a more co-ordinated manner and thus a visible impact could be created.

In retrospect, it may be emphasised that there is an urgent need to evolve a National Policy for disaster reduction in all the CMCs and in the small Pacific island nations which not only takes care of disaster reduction but also provides security by mitigating the impact and leads to speedy development of such areas. In this task, the role of scientists, technologists, researchers and professional would be of great importance to implement the disaster mitigation and preparedness plans. There is also considerable scope for scientific and technological research and development to evolve suitable, sustainable and cost-effective technologies applicable both to the construction of physical infrastructure which can withstand disasters and also to carry preventive measures wherever possible.

The foregoing suggests a set response pattern i.e., the environmental degradation accentuates disaster threat, which could be tackled to a large extent by establishing relationships and interactions between and among various government departments and other community based organisations (CBOs) that are engaged in disaster reduction. The famous adage"prevention is better than cure", is more applicable to disaster management in various countries of the region. Steps to tackle disasters should be planned well in advance keeping in view the specific calamities that may strike at a particular area/region/zone. As commented on earlier, disasters are caused by man, undesirable acts by disturbing the ecological balance. Due emphasis should, therefore, be given to preparedness to meet a crisis rather than 'planning for the post-destruction phase'. In the ringing words of Muhammad Ali, the world famous Heavyweight Boxing Champion: "It is no time to start planning the fight, when you come out of you corner and start taking punches." From this, the main lesson to be learnt is that there should be adequate preparedness. The fact remains that coordination and channelling of resources with all promptness sometimes becomes unassailable due to the meagre resources like personnel and finances at the disposal of the administration whenever a massive disaster strikes with all fury. In such situations, prompt action by all the concerned is possible if a 'Mission Mode' (which is explained below) strategy is adopted for disaster mitigation.

F. DISASTER REDUCTION : NEED FOR MISSION MODE

According to G R S Rao,[18] in order to further the cause of the disadvantaged people, it would be strategically useful to adopt a 'Mission Mode' for the success of the Technology Mission of Socio-Economic Development. For example, the success of the Technology Missions in India on various aspects like the Drinking Water Supply, Immunisation, Oil Seeds, Dairying, etc., should hold a great promise for overall national endeavours. This strategy can be extended to Disaster Reduction in the context of sustainable long-term development.

For instance, India's Scientific Policy Resolution (1958) aims to secure for the people the benefits that can flow from acquiring and applying scientific knowledge and vision in the context of overall development. The Approach Paper to the Seventh Five year Plan underlined the fact that planning and development strategies have not made use of the potential of Science and Technology for achieving transformation especially in the area of overall development including establishing linkages between disaster reduction and long-term development. Various plan documents have been reiterating the fact that although considerable growth has been registered, the country's developmental record did not match its full potential due to the inadequate strategy adopted for involving people, especially of the vulnerable sections in the process of development.

It was in this backdrop, the 'Mission Mode' of Socio-Economic Transformation as experienced in India in recent times is also likely to succeed in the field of disaster reduction in the other countries of the region. The introduction of several Technology Missions have represented a systematic method of combining a given task with people's active

[18] Adapted from GRS Rao 1995 'Resurgence of rural India, The Gandhian Perspective', Administarive staf College of India (ASCI) Hyderabad.

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[18] Adapted from GRS Rao 1995 'Resurgence of rural India, The Gandhian Perspective', Administarive staf College of India (ASCI) Hyderabad.

participation. While the technology missions made noteworthy contributions as illustrated by the success of the "Mission Mode", it is difficult to fathom the fact that such innovations were not made use of by the politico-administrative set-up both in India and elsewhere. For instance, the effectiveness of the "Mission Mode" with regard to development is exemplified in the campaign for Polio Eradication in India (1995). The main elements which formed the Technology Mission strategy included the following:

1. Clear vision, related to measurable results within a time-frame;
2. Dependence upon self-help and self-reliance;
3. Motivated community participation;
4. Usage of improved communication systems;
5. Awareness building through information sharing with government and non-government organisation (GO-NGO Cooperation) in a systematic way by collecting, collating, analysing and interpreting the data on various aspects of development and related problems, which in other words amounts to 'information empowerment';
6. Gathering reliable and verifiable data and subsequent monitoring;
7. Effective co-ordination; and
8. Delivering quality services to the community.

It is generally felt lack of "political will" and "official apathy" have again come in the way of increasing the pace of technology missions in recent times. That said, it is hoped that by commissioning the "Mission Mode" significant development, especially in the area of disaster reduction, can be attained more meaningfully. Also, it can be added that the "Mission Mode" is not only relevant but also has a huge potential for linking long-term development alongside disaster reduction, provided it is inducted in a systematic manner, in the countries of the Asia-Pacific Region.

G. CONCLUSION

Andhra Pradesh (India) which is prone to severe cyclones and storm surges has developed a very effective of dealing with disasters. The people's life styles with indiscriminate exploitation of resources have a cascading effect on environment leading to disasters. As such, unless the mankind mends its ways and reconciles to the fact to restore simpler modes of living and economy, the assault so far unleashed on the environment with have a snow-balling effect on the human civilisation. It is suggested that organisational arrangement could dovetail disaster reduction functions in the overall public policy. A clearer identification and allocation of roles, responsibilities and demarcation of tasks are desired between various levels of government- local, regional, provincial and national-as well as the sectoral agencies to promote co-operation, co-ordination and optimum utilisation of scare resources.

Constitution of a National Disaster Reduction Co-ordinating System is suggested as the Principal Co-ordinating Body at the national level to co-ordinate counter-disaster measures with the national, provincial, regional and local echelons of governments with clear-cut guidelines for its proper function.

It is suggested that the subject 'Relief' be brought in the ambit of the Panchayat Raj and Rural Development Department and a single officer at the highest level to be in-charge of all the three subjects, viz, Panchayat Raj (Local Self-Government in Rural Areas), Rural Development and Relief. It is also suggested that a mission-mode be applied keeping the long-range development by integrating disaster reduction with the overall planning process.

INFORMATION DISSEMINATION AND PUBLIC AWARENESS TOWARDS SELF-RELIANT DISASTER MANAGEMENT : THE ROLE OF MEDIA

Quamrul Islam Chowdhury
Chairman Forum of Environmental Journalists of Bangladesh

Bangladesh, one of the most disaster-prone countries of the world, has a strong population of 120 million within 144,000 sq. km area and a less than one dollar per capita per day income. Given the large scale, intensity and frequency of the disasters, density ,low level of literacy, vulnerability of the population and socio-economic and environmental losses, disaster management is regarded as a major challenge and complex task. True, the people of Bangladesh have learnt to live with natural disaster but we are yet to formulate a participatory and comprehensive national disaster action plan. Because of geographical location and topographic condition, disasters range from ravaging tornadoes to devastating floods, Maghurchhara blowup to catastrophic cyclones, often associated with high tidal surges. Whether localised or widespread, disasters are destructive. In November 1970 a devastating tropical cyclone with wind speeds of 324 km per hour claimed 3,00,000 lives. The April 1991 cyclone was fractionally more severe, wind speeds reaching 225 km per hour, but less deadly:1,38,882 people died, according to the official count. In 1989 a major tornado affected six thanas of Manikganj, Dhaka and Tangail districts killed 526 persons while the devastation brought by this tornado was so colossal that barring some skeleton of trees there were no sign of standing infrastructure anywhere in 58 sq km affected area in a couple of minutes. In May 1996 another devastating tornado hit Tangail and Jamalpur districts killing 545 persons and damaging infrastructure. Flooding is very much part of normal cycle of the seasons in our country, each year about 26,000 sq. km or 18 per cent of Bangladesh is flooded and during severe floods, the affected area may exceed 50,994 sq km or 35 per cent of the country. Devastating effects of 1988 flood were enormous and still visible and capital stock losses were well over one billion us dollars while GDP growth was setback severely. The consequences of drought can be as far reaching and disastrous as the effect of major floods. In 1972 Bangladesh had a major drought when about 42.48 per cent of the area and 43.05 per cent of the population were affected. Another drought hit the country in 1979 when 42.04 per cent of the area and 43.90 per cent of population had to suffer from the wrath of it. Riverbank erosion, coastal erosion and earthquakes are some other types of disaster the country has been facing. According to a study to the European Commission Humanitarian Office[ECHO]' the disaster risk to which Bangladesh is exposed is amongst the highest in the world. The study also revealed that combined disaster of SAARC and ASEAN countries over the past 10 years, Bangladesh has witnessed 90 per cent of the disaster while the rest of the countries in the region have lived through only 10 per cent of the disasters.

Role of the Media

Though information dissemination and public awareness creation are two major steps towards self-reliant disaster management, proper priority has not been given. For a better management of the crisis situation, the role of our print media [newspapers], electronic media [radio, television], non-formal media [cassette, video], popular media [cinema, theatre] and other media [mega phone, miking] is very vital. The role of media is not only important in disseminating the forecast and early warning of a disaster, also critical in facilitating the evacuation in order to reduce the damages and losses of lives and in promoting prompt and effective rescue and relief operations immediately after the disaster.

In post independent period given the constraints, our media especially in general have played more or less a significant role. Coverage's on disasters have also increased. Because of this increasing coverages in the media coupled with the efforts of the government, the loss of lives and damages have been reduced in some cases in recent past. But the media is yet to be involved in formulating a comprehensive national and local disaster management plan in a participatory and holistic manner. Mediapersons have to shuttle door to door for getting even early warnings or disaster forecasts. Met office, SPAARSO, Flood Information Centre and other agencies responsible for disseminating information to the media at times couldn't cope with the emergency situations. Crisis coping capacity of our primer institutions in this regard must improve in order to disseminate those information, early warnings or forecast through the mass media in this high-tech information age. If the flood warning system that starts with Flood Information Centre forecasts could be improved so that the information is fast delivered to the flood-prone areas, losses of lives and properties could be avoided significantly. With modern technology and international cooperation, forecasts based on conditions in Nepal and India and the Bay of Bengal may allow for one or two weeks advance notice about major foods and cyclones. These combined with accurate data on Bangladesh rainfall and run-off conditions and with thana and

union level water indicators keyed to water surface elevations at key FIC forecasting points, would give newspersons enough time to report on it: so that urban and rural people get prepared to face the possible flood.

In most of the times, Bangladesh Television couldn't give the right forecast before BBC, CNN or other cable networks. Historically speaking, even there coverage of the disaster news have been centred around the relief distribution activities of the VIPs. Immediately after any disaster, on-rushes of the VIPs also put heavy pressure on the limited logistics, vehicles, relief carrier air-crafts and local officials who can't pay adequate attention to their rescue and relief operation responsibilities. Indepth news are missing in our electronic media. ~ 'Even our newspapers and news agencies in most of times don't get support from the administration to reach the affected area to give the eye-witness accounts. But this support from the administration is very important in the context of our country as immediately after a disaster strikes, in most cases normal communication network gets disrupted making the newspersons entry into the affected area unaccessible. Telecommunication lines with affected areas invariably breaks down during the cyclone and flood. Moreover, we don't have disaster maps. Therefore, media has to depend on briefings. But briefings at the capital are essential but not sufficient. The briefings should be exhaustives. If newspersons could get an idea of the worst hit areas then they may rush to those places on priority basis. The newsmen could even help the administration in cross-checking the official figures which at times don't match with the ground level.

What messages are we giving? Are our scientific languages of forecasts communicable to the illiterate people? Should we need to change the age-old danger signals numberings? How better and easily we can communicate ?

Creation of awareness among the people is a tough task. You have to sensitise the literate and illiterate people. You have to sensitise your fellow colleagues, seniors and juniors. You have to use different language and medium for different set of people or groups or communities or localities. You have to popularise it. You have to explore lots of innovative idea. You don't have any easy solutions. You have to be well equipped and trained for successfully disseminating early warnings and forecasts.

A comprehensive media action plan is essential for effective utilisation of the media to support disaster management programme. There should be a well established network or newspersons and disaster managers. We: should explore the possibility of using satellite photographs and aerial reconnaissance to obtain a first hand and accurate information of the disaster.

An effective disaster management depends on the efficiency of the concerned officials from forecast to post-disaster rehabilitation and coping capacity of the people of the affected areas. Mediapersons are just here just the communicators and watchdogs. What we newsmen need correct forecast, first hand and accurate information and real side of the story. If all groups of the society play its own role seriously and efficiently nation can face any disaster. Bangladesh has been blessed with so many resilient people. Even a commonman or woman of our country has mastered the skill of living through an endless string of adverse circumstances. Stories of their lives are the tale of innovation, creativity, resilience and resourcefulness. What Bangladesh needs is a comprehensive disaster management plan for its sustainable development.

Devastating Tropical Cyclones of the Bay of Bengal Affecting Bangladesh Coast

Sl. No.	Cyclones	Maximum wind (Kph)	Height of Storm surge(m)	Human casualties
1.	Cyclone of June, 1822	-	Great height	50,000
2.	Cyclone of October 31, 1831	-	2.12 - 4.55	22,000
3.	Cyclone of November 1,1876	220	3 - 13.6	200,000
4.	Cyclone of October 21-24, 1897	-	-	7,000
5.	Cyclone of May 21-24,1941	-	3 - 3.64	5,000
6.	Cyclone of October, 14-18,1942	-	3.02	15,000
7.	Cyclone of October 9-10, 1960	129	6.0	6,000
8.	Cyclone of October 31,1960	209	6.6	5,149
9.	Cyclone of May 5-9,1961	145	5.0	11,468
10.	Cyclone of May 28-29, 1963	193	6.0	11,520

11.	Cyclone of May 9-12, 1965	161	3.7	19,279
12.	Cyclone of November 8-13,1970	224	3 - 10	300,000
13.	Cyclone of May 24-25,1985	154	4.55	4,264
14.	Cyclone of November 29,1988	161	4.4	5,683
15.	Cyclone of April 29-30,1991	225	6.1	138,882

Relative Intensity of Hazards Faced by Some Countries in Asia and the Pacific

	Flood	Earth Quakes	Drought	Volcano	Cyclone	Landslide	Tsunami	Fire	Epidemic	Defares-tation	Civil strifs	Frost	Accidents
Australia	M	L			S			S					
Bangladesh	S	L	S		S	L	L	L	M	M	M		L
Chine	S	S	S		M	L		M	L				L
Cook Islands	L	L	S		M	L	M						L
Fiji	S	M	M		S	S	S			M			
Hongkong	L				M	M		M		M	L		L
India	S	M	S		M	L		M	M	M	M		M
Indonesia	M	S	M	M	L	L	L	M	L				L
Laas	M		L										
Malaysia	M					L		L		M			
Mayanmar	M	S	M		M			S					
Nepal	M	M	M			M		M	M				
Pakistan	S	S	M		L	L		L	L		L	L	L
PNG	S	S	M	S	L	S	S	L	L	M	L	L	L
Philippines	S	S	M	M	S	M	L	S	L	L	M		L
Solomon Island	S	S	L	S	S	S	S	L	L				
Sri Lanka	M		M		M	S		L	L	L	S		
Thailand	S	L	S		M	L		L		S			M
Tonga	M	S	M	S	S	L	S						
Vanuatu	S	S	L	S	S	S	S	L	L				M
Vietnam	S	L	L		S	L		L	L	L			
Western Samoa	S	M	L	L	M	S	S						

Legend S-Severel M-Moderate L-Low

Asia Disaster Preparedness

Casualties and Losses due to monsoon flood of 1988

1.	Total number of affected districts		52
2.	(a) Total number of affected upazilla		346
	(b) Total number of affected municipality		27
3.	Total affected area (sq. km)		50,994.08
4.	Total number of affected people		357,32,336
5.	Crops damaged in hectres	(a) Totally	14,74,708
		(b) Partially	7,70,432
6.	Houses damaged	(a) Totally	10,30,659
		(b) Partially	22,65,776
7.	People killed		1,517
8.	Poultry Lives killed		50,059

9.	Total number of cattle heads lost		2,97,986
10.	Educational Institutions damaged		
		(a) Totally	2,593
		(b) Partially	6,506
11.	Road damaged (km)	(a) Totally	73,804
		(b) Partially	22,727.04
12.	Affected Embankments (km)		2,657.55
13.	Affected Culverts / Bridges		2,397

Areas and Population percentages of Bangladesh under drought conditions

Year	Percentage of area	Percentage of Population
1950	13.79	14.13
1951	31.63	31.51
1952	6.57	5.95
1954	3.43	3.92
1955	9.83	15.49
1956	11.25	9.53
1957*	*46.54	53.03
1958	37.47	36.24
1960	2.70	3.11
1961	22.39	20.76
1962	11.30	9.74
1963	8.60	6.63
1966	18.42	16.54
1970	9.10	10.55
1971	4.80	5.66
1972*	*42.48	*43.05
1976	5.02	5.48
1978	3.66	4.51
1979*	42.04	43.90

Devastating Nor'westers / Tornadoes

Sl. No.	Place of Occurrence	Date of occurrence	Area affected (sq. miles)	Duration (mins.)	Estimated wind speed (mile/hr.)	People		Property loss (million Taka)
						Killed	Injured	
1.	Demra	14-04-69	60-65	5-7	400	922	10511	40-50
2.	Manikganj	17-04-73	8	8-10	200	100	1000	10
3.	Bogra	11-04-73	10-12	10-15	150	28	75	10
4.	Faridpur	10-04-74	10-15	12-15	150	46	Imumerable	A few millions
5.	Narayanganj	09-05-76	1	1-2	150	1	42	A few millions
6.	Faridpur	01-04-77	20	2-3	200	500	6000	12
7.	Manikgonj (Saturis)	26-04-89	58	A few mins.	210-260	526	Innumerable	A few millions
8.	Serajganj	20-04-90	30	40	120	29	2000	-
9.	Gazipur	07-05-91	-	A few mins.	185	56	400	-
10.	Gaurnadi	18-05-91	40	A few mins.	156	17	400	-

ARMED FORCES AND DISASTER MANAGEMENT : TOWARDS A MECHANISM FOR EFFECTIVE AND STRENGTHENED INVOLVEMENT

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Introduction

1. The 120 million people of Bangladesh have learnt to live with natural disasters as the country is typically disaster prone due to its geographical setting as well as topographic condition. These disasters range from ravaging tornadoes to devastating floods to catastrophic cyclones, often associated with high tidal surges. Whether, localised or widespread, disasters are destructive and costly to whom they affect.

2. In case of any devastating natural disaster, various government agencies including the Armed Forces, NGOs, international and UN agencies play vital role in terms of massive immediate response and subsequent rehabilitation of the affected people. For evolving a mechanism of effective and strengthened involvement we may have a look at the current mechanism of involvement of the Armed Forces in disaster management

Aim

3. The aim of this presentation is to highlight the mechanism of involvement by Bangladesh Armed Forces in disaster management.

Disaster and the Armed Forces

4. **Disasters and its Management** Disaster is an event, natural or man-made, sudden or progressive, which impact with such severity that the affected community alone cannot get over the crisis but needs outside assistance to bring back normalcy and order by taking immediate measures. Its management seeks the systematic observation and analysis of disasters, to improve measures relating to prevention, mitigation, preparedness, emergency response and recovery. The main types of disasters what we frequently encounter are :

Natural	Artificial
* Flood	War
* Drought	Famine (Man-made)
* Cyclone	Political Unrest
* Tornado	Environmental Pollution
* Epidemic	Industrial Pollution
* Earthquake	Population Boom
*Volcanic Eruption	Accident (Road, River and Air)

5. **Advantages of involving Armed Forces In Disaster Management** In case of disaster, the armed forces can play significant role in rescue, evacuation and relief and rehabilitation operations. Because of the organisational structure, the Armed Forces can have effective and immediate contribution in post disaster relief operations. The capabilities of Bangladesh Armed Forces related to the disaster management are listed below :
   a. Effective chain of command ensures quick response in mobilisation.
   b. Can quickly re-organise to undertake any rescue, relief and reconstruction works by deploying well-trained, energetic and disciplined troops.
   c. Can provide various types of transportation facilities on land, air and sea to reach relief materials to the affected areas.
   d. Can provide a good number of medical and engineering teams in response to meet immediate needs.

6. **The Focal Point.** : When a disaster befalls the country, the Government utilises all its available resources including the Armed Forces. On the decision of the Government Army, Navy and Air force are deployed in co-ordination with civil administration through the Armed Forces Division to assist the civil administration in different stages of disaster management. In the event of any disaster a monitoring cell in the PM's Office is activated to co-ordinate and monitor the overall disaster management activities in close co-ordination with the Ministry of Disaster Management and Relief. Through this cell the PM can directly feel the progress of evacuation and relief

operations. The PM is periodically briefed on the situation and she gives executive decisions on the spot. This ensures a responsive command and control apparatus. The manning of this cell is done by the Armed Forces Division. Major functions of this cell are :

a. Collection, collation and compilation of damage assessments.
b. Monitoring progress of evacuation and assessment of relief requirements.
c. Management of Prime Minister's Relief Fund and related storage facilities.
d. Receipt, storage and distribution of locally and foreign donated relief supplies, provision etc.
e. Co-ordination of air supply drops.
f. Co-ordination of transportation requirements.
g. Public relations including briefing of the media and donors.

7. **Operating Procedures** : Based on the National Disaster Management Standing Order, the Armed Forces at various levels of command have their own Standing Operating Procedures which ensure pre-disaster standby arrangements of military resources. The deployment of the Armed Forces is in aid to civil power. The conventional tasks that Armed Forces perform are:

a. Evacuation.
b. Repair, damage assessments (specially logistic support to mixed assessment teams).
c. Search and rescue.
d. First aid/medical treatment
e. Handling of relief (from overseas and local).
f. Logistic support (land, sea and air) for the delivery of relief supplies.
g. Policing of relief storage and distribution.
h. Clearance of debris.
i. Emergency repairs (closing breaches, raising banks etc)
j. Burial of human bodies and animal carcasses.
l. Telecommunications.
m. Temporary shelters.
n. Reconstruction / construction of houses.

Involvement of the Armed Forces in Disaster Management

8. For a comprehensive idea about the involvement of Armed Forces in disaster management, I shall apprise you about the sequential tasks of the Armed Forces Division, the Army, the Navy and the Air Force in different stages of disaster management.

9. **Armed Forces Division**

a. **During Normal Time**

(1) Select Disaster Focal Point and inform all concerned in the Armed Forces. Maintain constant contact with the Ministry of Disaster Management and Relief.
(2) Ensure that all necessary precautionary measures are taken by the three services for the safety of their personnel, equipment, establishment and transport in disaster prone areas.
(3) Co-ordinate preparatory activities for the support of Armed Forces to civil administration in giving warning, taking precautionary measures, evacuation, rescue, relief and rehabilitation activities.
(4) Co-ordinate deployment of Armed Forces "In Aid to Civil Power" as per the request of Ministry of Disaster Management and Relief.
(5) Ensure training of Armed Forces on Disaster Management.

b. **Alert Stage**

(1) Keep the Units of Army, Navy and Air Force standby for rescue, evacuation and relief operations as per requisition/request of the civil administration.
(2) Ensure preparation of sending required task force to the affected areas.

c. **During Disaster**

(1) On PM's approval, deploy Armed Forces 'In Aid to Civil Power' for disaster, relief and rehabilitation operations.

(2) Assist in co-ordination between the Ministry of Disaster Management and Relief and three services for smooth operations of Field Task Forces.

(3) Send information regularly on rescue, relief and rehabilitation activities of Armed Forces to Inter Ministerial Disaster Management Co-ordination Committee and Ministry of Disaster Management and Relief.

d. **Rehabilitation Stage**

(1) Co-ordinate participation of Armed Forces in rehabilitation tasks.

(2) Complete the relief operation at the appropriate time in consultation with National Disaster Management Committee.

(3) Assess and submit report on relief and rehabilitation activities of Armed Forces to the National Disaster Management Committee, if required.

10. **The Army** : In case of any disaster, the Bangladesh Army plays a vital role in evacuation, rescue, relief and rehabilitation. The Army performs the following functions:

a. **During Normal Time**

(1) Instruct all concerned Units to earmark light vehicles, trucks, recovery vehicles and motor boats for emergency duty.

(2) Ensure the safety and security of personnel, materials and establishments. Army Headquarters also examines the planning and preparedness of various directorates.

(3) Formulate operational plan to respond the call of Civil Administration during any disaster.

(4) Train officers and men on disaster management. Arrange exercises on disaster management.

b **Alert Stage**

(1) Establish disaster control cells. Detail liaison officer to the Monitoring Cell at PM's office and maintain contact with Ministry of Disaster Management and Relief control cell.

(2) Promulgate warning Signal to all concerned. Promulgate instruction for preparation of transport and earmark troops for disaster prone areas.

(3) Form task forces in each formation to act as disaster control units. Such units have full complement of Infantry Battalion, Engineers and Medical support. Earmark reserve task force for reinforcement if necessary.

(4) Co-ordinate with local civil administration for the deployment of task forces for rescue and relief operations.

c. **Disaster Stage**

(1) Keep the disaster control cell at the Army Headquarters and Formation Headquarters operational round the clock.

(2) Collect information on preparation and other activities from affected areas and pass on the same.

(3) In consultation with the civil administration deploy Task Forces in the affected areas.

(4) Provide other humanitarian assistance felt essential on the spot.

(5) Render relief activities at all affected areas and assist local administration for rescue operation.

d. **Rehabilitation State :**

(1) Carry out survey of affected areas and assess and the requirement for relief and rehabilitation

(2) Assist local administration for evacuation and clearing dead bodies and debris.

(3) Render medical assistance in the affected areas and assist local agencies in controlling epidemic.

(4) Assist local administration to ensure supply of pure drinking water.

(5) Establish field hospitals if necessary.

(6) Assist homeless families to construct temporary shelters.

(7) Take part in re-construction activities at the request of civil administration.

(8) Take part in any other humanitarian activities, as per the local circumstances.

11. **Bangladesh Navy :** Bangladesh Navy renders all possible assistance to the local administration of coastal areas during any disaster. This assistance extends from Chittagong to offshore islands of the coastal belt and Narayangonj/ Khulna to Barisal/ Patuakhali. Navy vessels carry medical teams, medical and other relief goods. They perform the following tasks :

a. **During Normal Time**

(1) Naval Ships/ establishments remain standby to undertake long term relief operation at short notice.

(2) Prepare a list of Operation Ships to undertake relief and rescue operation during cyclone.

(3) Train all Naval Personnel on rescue and rehabilitation activities.

(4) Examine the capability of own disaster management planning through annual exercise as per standing order and take steps to improve the existing standard.

(5) Formulate plan to safeguard the ships, equipment, materials and personnel from disaster.

b **Alert Stage**

(1) Promulgate warning signal to all units.

(2) Establish a Disaster Control Cell at Naval Headquarters and at Khulna and Chittagong bases.

(3) Take adequate preventive measures to safeguard navy ships, establishments, personnel and equipment.

c. **During Disaster**

(1) Naval Headquarters deploy required manpower to the Control Cell at Khulna and Chittagong

(2) All ships and establishment remain standby for relief operation at short notice.

(3) Naval Headquarters maintain close and constant liaison with Prime Minister's Co-ordination Cell and Ministry of Disaster Management and Relief.

(4) Take all possible safety arrangements and co-ordinate with concerned civil authority.

(5) At the appropriate moment distribute relief goods to the affected areas by Naval Ships.

(6) Render all possible assistance to civil authority by Naval Ships.

d. **Rehabilitation Stage**

(1) Assess the damage of affected areas and arrange necessary relief and rehabilitation activities.

(2) Render all possible assistance to the civil administration for relief and rehabilitation activities in the affected areas.

(3) Assist civil administration to distribute relief goods to the distressed people.

(4) Continue assistance to local authority / civil administration till the situation becomes normal.

12. **Bangladesh Airforce :** The role of Bangladesh Airforce against any natural disaster is very important. Bangladesh Airforce remain standby to face any situation caused by natural disaster. They perform the following tasks :

a. **During Normal Time**

(1) Preserve all up-dated chart of coastal areas, offshore coastal islands and disaster prone areas. Maintain up-to-date list of air fields and helipads.

(2) Promulgate standing order for the safety of air-crafts, equipment, establishments and response to assist civil administration at their need.

b. **Alert Stage.**

(1) Promulgate warning signal to all concerned.

(2) Keep all transport air-crafts and helicopters in readiness for emergency flights.

(3) Take necessary precautionary measures for the safety of aircraft and equipment.

c. **During Disaster.**

(1) Keep a constant watch over cyclone/flood situation.

(2) Furnish any additional meteorological information gathered through own resources to supplement the information of Weather Department and provide same to the concerned authorities.

(3) Keep all transport aircraft and helicopters ready for preliminary test if weather permits to undertake the rescue operation and to assess the damage due to cyclonic storm.

(4) In case of flood, assist and help civil administration in conducting air drops of food and relief goods for affected people.

d. **Rehabilitation Stage.**

(1) Carry out aerial survey of the cyclone/flood affected areas, assess nature and amount of damages and report findings to the Armed Forces Division.

(2) Evacuate casualties to nearest hospitals.

(3) Provide transport air-craft/helicopter sorties for survey/visit of high Government official, Journalist, Ambassador and other concerned personnel to the affected areas.

(4) Carry essential relief supplies especially food and drinking water to affected areas and air-drop the same if required.

(5) Assist civil administration, Bangladesh Red Crescent Society and other important agencies in carrying essential relief goods, medical stores and medical team to the inaccessible areas by the helicopters.

(6) Supplement the existing civil wireless network by the Bangladesh Airforce wireless and Radio Telephone links for transmission of very important operational messages.

(7) Perform any other task assigned by the government.

Strengthening Involvement

13. **Experience of 1991 Cyclone :** On 29 April 1991, just before midnight one of the severe cyclones hit the land of Bangladesh.

a. **Facts and Figures.**

(1)	Wind speed	- 225 km per hour.
(2)	Peripheral affect	- Area of 250 to 300 km.
(3)	Tidal surge	- 10 - 20 ft high, duration 12 hours.

b. **Damage and Destruction.**

(1)	Area affected	-15,000 Sq km (15 Administrative Districts out of 64).
(2)	Total population affected	-10 million.
(3)	Number of persons missing	- 20,000
(4)	Number of persons dead	- 135,886
(5)	Cattle head dead	- 90,000
(6)	Educational institution damaged	-642,553
(7)	Crops damaged (area)	- 350,000 acres.

Upon receiving request from the Government, Armed Forces were deployed on 30 April 1991. Army alone established 66 temporary camps in the affected areas, involving elements of 3 infantry divisions with approximately 6,000 personnel. Bangladesh Navy deployed 15 ships (mixed types). Bangladesh Airforce (BAF) employed 9 Bell 212, 3 MI-8 helicopters and 2 AN-32 transport aircraft.

c. **Lessons Learnt**

(1) The decision to employ Armed Forces in post disaster relief operation was little delayed. Therefore the Armed Forces units lost valuable time in reaching the affected areas.

(2) Because of the breakdown of tele-communication links with affected areas, the Government did not get accurate and timely information on extent and nature of damage. This delayed the organisation and despatch of resources for evacuation/assistance and distribution of relief materials. A system of field communications is needed to cover the disaster prone areas, as part of predisaster preparation measures.

(3) The population evacuation measures in the areas threatened by the cyclone were not properly or adequately implemented. Cyclone/tidal surge warnings were also not transmitted to the concerned population in the desired manner. This resulted in a great loss of life part of which could be prevented with better organisation and more effort.

(4) Foreign assistance in terms or military assets such as helicopters and ships proved crucial for post disaster relief operation. A regional and international framework for effective employment of these resources seemed essential for the future. A great deal of effort and time was expended to work out common working and tasking procedures. A standardised regional Standing Operating Procedure would definitely save time and increase efficiency.

(5) It was found that cyclone shelters, where these existed, were instrumental in saving a large number of lives. Unfortunately the numbers of such shelters were minuscule compared to those needed to protect the population in the vulnerable coastal belts.

(6) It was not possible to predict exactly the precise area where the cyclone was to hit the land. In the absence of accurate information it is difficult to focus Government efforts in population evacuation and in propositioning of relief resources. A computer-based cyclone forecast modelling system needs to be developed to obtain a more accurate forecast of the cyclone.

14. **Experience of May 1997 cyclone.** Another cyclone hit the coastal area on 19 May 1997.

Facts and Figures.

(1)	Wind speed	200 - 240 km per hour.
(2)	Tidal surge	12 - 15 ft high.

b. **Damage and Destruction.**

(1)	Area affected	- Chittagong, Cox's Bazar, Noakhali and Chittagong Hill Districts.
(2)	Total population affected	- 3.7 million
(3)	Number of persons dead	- 127.
(4)	Cattle head dead	- 7,960
(5)	Educational institution damaged	- 4,824
(6)	Corps damaged (area)	- 257,735 acres
(7)	Evacuation	- 1,000,000 persons were evacuated to cyclone and other shelters.

In view of the impending cyclone Armed Forces were kept standby from 18 May and were deployed in the affected districts in shortest possible time. Bangladesh Navy put into operation 4 ships and Bangladesh Airforce deployed 5 helicopters.

c. **Lessons Learnt**

(1) An effective system of early warning and an efficient grass-root level organisation can help evacuate large number of people to cyclone shelters or safe-areas in a short span of time. This can drastically cut down human as well as live-stock losses.

(2) Appropriately stationed military and civil resources can be deployed to the disaster areas immediately after the cyclone abates. This cuts down response times.

(3) Post disaster damage assessment remains a relatively weak area. Telecommunication lines with affected areas invariably breaks down during the cyclone. It is very difficult to obtain a clear picture of the damage caused in the aftermath of the cyclone. Radio communication links of the Police exist up to thana level. The para-military force (BDR) also has radio communications in remote border areas. These radio links were exploited to get a clear picture of the disaster. A reconnaissance flight by a BAF helicopter after the cyclone was helpful for a better estimate of the damage.

15. **Experience of 19 May 1998 Cyclone** This year a cyclone hit the country's coastal area on 19 May and the 'eye' passed over Chittagong area in the early hours of the day. This time the wind speed was about 120 km per hour with a tidal surge of 6' - 8' high. The affected districts were Cox's Bazar, Chittagong and parts of Noakhali. The strength of the cyclone was weaker compared to the cyclone of the last year and the degree of damage and destruction was negligible. But the government machinery and the Armed Forces were fully prepared for managing the cyclone. If we examine the involvement of the Armed Forces in May 1998 cyclone we shall have a fair idea about the latest mechanism of involvement in disaster management.

a. **Pre-disaster Involvement:** The Armed Forces Division activated all the services monitoring cells on receipt of warning from the Weather department. The Prime Minister's monitoring cell was functional at least 48 hours before the cyclone was estimated to hit the coast. During this period Army, Navy and Air Force were standby to respond at the earliest to the call of civil administration. DC Chittagong asked for the assistance of Armed Forces promptly when faced with problems of evacuating people to cyclone shelters. Army was immediately sent to Shitakundu, Banskhali, Mirsharai and Anwara area with a view to motivating and evacuating people to cyclone shelters. Meanwhile, Naval vessels, transport aircraft and helicopters were kept standby to meet the post disaster requirements.

b. **During the Cyclone:** During the cyclone all monitoring cells were functional in different formation Headquarters to co-ordinate involvement of the Armed Forces. Communication was maintained with the teams who were evacuating people in the likely affected areas to the cyclone shelters. Liaison and communication was uninterrupted with the civil administration and other monitoring agencies associated with disaster management. The main idea was to assess the extent of damage and likely tasks that would be required by the Armed Forces immediately after the cyclone.

c. **Post Disaster Activities :** Immediately after the cyclone passed over the coastal area, an aerial survey was carried out by the COAS and the PSO Armed Forces Division to the affected areas to assess damage. They

flew to Barisal, Noakhali and Chittagong coastal areas in an hour. The PSO briefed the Hon'ble Prime Minister on completion of the aerial survey. Navy ships and the aircraft were kept standby till the situation was completely under control of civil administration. Physical survey from the air helped the govt in assessment of damage thus deciding about the post-disaster actions to be launched. However, no remarkable efforts were required by the Armed Forces in the Post-disaster Stage.

Recommendations

16. Based on the experience of disaster management we may highlight the following recommendations for an effective and strengthened involvement of the Armed Forces :

    a. Armed Forces may be involved in the planning and preparation of disaster management at all levels. Frequent co-ordination meeting should take place at all levels to set modalities of disaster management.

    b. Joint disaster management training may be conducted for policy planners as well as field level workers.

    c Appropriate equipment in adequate quantities may be made available with the Armed Forces so that involvement of Armed Forces can be more effective.

    d. A Joint communication network may be established to reduce loss of time in co-ordination. This communication system should be uninterrupted during the disaster period.

    e. Duplication of efforts should be avoided wherever possible during the rescue and rehabilitation stage. Well co-ordinated plans would help to chalk out actions by different agencies in different areas during rescue and rehabilitation.

    f. Contingency plans may be prepared to address all possible kinds of disaster instead of only cyclone and flood (Last year an emergency meeting had to be called to combat severe cold but the time was too short and the weather was not favourable to mobilise required resources as well as to send those in the affected areas).

Conclusion

17. Currently Armed Forces attach highest priority in the disaster management. Our experience of handling disasters in the past has paved the way to a comprehensive disaster management programme at national level. This experience would further help to evolve a mechanism of effective and strengthened involvement. Public awareness, co-ordination of various aspects down to the grass roots level, integration of various agencies including NGOs have enabled us to take appropriate measures at pre, during and post disaster periods. Though at present we are better prepared to combat disaster than any time in the past but however, our resource constraints remain as a major hurdle to cope up with the extent of damage and sufferings caused by disasters.

18. In any natural disaster, whenever called, Bangladesh Armed Forces responded quickly. Subsequently non-govt organisations, the Red Crescent and foreign aids came to our assistance. The nation has always been looking forward to the Armed Forces to stand beside in any disaster. Armed Forces for its command structure, trained manpower, capabilities in terms of mobility, communication, medicare, construction etc is in a better position to make fast response in the hour of need. Disaster management has become one of the prime concerns. Training on this special aspect has been incorporated with due care in all military institutions including staff college. Our exposure to the devastating flood of 1988 and cyclones of April 1991, May 1997 and May 1998 has enriched our experience in disaster management. This experience can further help towards a mechanism of effective and strengthened involvement.

Annex - O

DEVELOPMENT AND DISASTER REDUCTION IN BANGLADESH

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Introduction

Bangladesh is known to the outside world as one of the most disaster-prone countries in the world. Natural disasters like flood, tornado, cyclone, storm surges, drought etc. frequent the country at very short intervals; a family hardly gets enough time to recover loss and settle life between two successive disasters. In each disaster, the damage to agriculture, housing, infrastructure and human lives is colossal putting enormous strain on the fragile economy and retarding the pace of development process. The environmental degradation is also very heavy. Restoration of the environment also calls for reallocation of resources diverting funds from investment programs. The most badly affected people are from rural areas with very little income. The high population density with low income make the people more vulnerable and raises the index of damage.

Disaster Vulnerability of Bangladesh

Cyclone:

The funnel shaped coast touching the Bay of Bengal in the south of Bangladesh is most vulnerable. The Bay of Bengal is the ideal breeding ground for tropical cyclones. People in the coastal area and in the offshore inslands become most vulnerable in the event of severe cyclone. Cyclone along with tidal surge hit the area more than 70 times during the last century of which at least 20 were very severe. The dreadful cyclone of 1970 took the heaviest toll of half a million people. The storm surge and cyclone of April, 1991 is still vivid in our memory, about 140,000 people perished. The damage to agriculture, environment, livestock and infrastructure was colossal, estimated at US$2.4 billion. The causes of such massive destruction during cyclone and tidal surge are identified as.

i) Insufficient number of remote sensing device for advance information
ii) Delay in signaling cyclone warning
iii) Lack of communication facilities such as radio, wireless etc. at the grassroots level and offshore islands
iv) Shortage of evacuation facilities
v) Traditional belief and attitudes of people (people don't want to leave their home)
vi) Sense of insecurity
vii) Inadequacy of safe shelter
viii) Inadequacy of logistic support services for rescue operations
ix) Weak or poor housing
x) Scarcity of resources for relief, rehabilitation and reconstruction

Damage from Cyclone and Storm in Bangladesh

Year	Death
1961	11,500
1965	19,000
1970	500,000
1985	11,000
1991	138,000
1997 (May)	126
1997 (September)	70
1998 (May)	03

Flood:

Flood a common recurrent phenomenon in Bangladesh is often looked upon as a blessing as they leave behind on submerged areas a rich alluvial deposit that greatly increases the fertility of the soil. In some years, it was so severe and extensive that its effect upset the balance between man and nature, taking a heavy toll in human and animal life

and damaging crops. The marginal farmers and land less labourers are worst hit. Embankments and bridges are broken, roads are submerged, villages are cut-off from all communications for days together. The flood of 1988 will go down in the history as one of the worst in Bangladesh; about two-thirds of the total area of the country were completely inundated affecting the vast majority of the population. The major portion of the capital city of Dhaka was under water. The damage was estimated at US$ 1.6 billion. The following table shows how Bangladesh was affected in some severe floods:

Year	Area Flooded	% of Bangladesh
1954	36,800	25%
1955	50,500	35%
1970	42,400	29%
1974	52,600	36%
1987	57,300	40%
1988	89,700	62%

Drought :

Drought is another hazard for Bangladesh. Some parts of Bangladesh are often hit by drought. Agriculture is the first casualty. Agriculture, the lifeline of Bangladesh in terms of both employment and GDP contribution faced very adverse situation for want of rainfall in time in several years. In 1978-79 the damage to agriculture was 50% in the northern districts; the crop output was lowered and the deficit was met up by imports resulting in the draw-down of the forex reserve. The 1979 drought was the severest in the living memory and although this type of drought is not very common, the milder ones are fairly common in Bangladesh as one study reveals that milder droughts occur at an interval of 5-10 years. Depending on severity, drought has been classified in the flowing categories.

Very severe class : Rajshahi and Nawabganj (5.75 lac hectres), Length: 105-135 days
Severe class : Dinajpur, Bogra, Kushtia, Jessore districts (17.48 lac hectres), Length : 125-160 days
Moderate class : Dinajpur, Rangpur, Bogra, Kushtia, Jessore, Barisal Districts, (21.78 lac hectres)
Slight class : Eastern and Northern parts of Bangladesh, (25.95 lac hectres)

Earthquake :

Bangladesh also lies in the seismic zone and is vulnerable to earthquake. Although no severe earthquake has hit Bangladesh in recent years, the possibility can't be ruled out because of many factors e.g. high population growth, faster development, urbanization, over-exploitation of national resources etc.

River Bank Erosion :

There are 250 rivers in this country. The padma, the Meghna, the Jamuna, the Teesta, the Surma and the Karnaphuly are the main rivers. River erosion is very common in rainy seasons and at times it takes a serious turn. A village may be completely wiped away within days. This compounds the problem of land availability and rural poverty. The resultant homeless, destitute ultimately move to the urban areas.

Natural Disasters and Environment

The overriding interrelationship between natural disaster and environment is well recognised. Natural disasters can cause extensive disruption of the development process. The level of damage by disaster usually depends on the degree of vulnerability and the coping capability of the affected community. The state of the natural environment contributes to the vulnerability of communities.

Environmental degradation is being increasingly considered a cause contributing to the intensity and frequency of natural disasters. River floods are aggravated or even caused by deforestation; the 1988 flood in Bangladesh was attributed to, in part, the large scale deforestation in the Himalayas. The factors are related to the way in which man manages his environment . Storm surges may have increased coastal erosion and damage to human settlements because of the removal or damage of natural protective elements such as mangroves, reefs and dunes.

Sustainable management of the environment will contribute to the reduction of natural disasters or slow down the increase of natural disaster. The example in which this relation is generally recognised is the management of watersheds, upstream reforestation and terracing not only serves to conserve valuable top soils, but also reduces downstream floods through a decrease of siltation and an increase of the retention capacity of soils. Conservation of reefs and mangroves help counter damage by storm surge and sustain development of precious ground water

resources and maintenance or establishment of sustainable cropping pattern to prevent degradation of soil to the level it will no longer support vegetation and result in drought conditions.

Environmental management can contribute to either the reduction of or the increase in natural disasters. It would be advisable to evaluate environmental measures, projects and activities on their (+v or - ve) impact on the intensity and frequency of future normal disasters in order to bolster positive impacts and lessen negative impacts. Thus, mitigation of natural disasters will be facilitated.

It is known that disaster mitigation measures are intended to increase the resilience of communities to natural disasters. While disaster mitigation will continue to focus on mankind and human environments it seems useful to identify damages to the natural environment caused by natural disasters. Nature is now viewed as a 'Scarce Resource'.

Damages to environment may be quite severe. Damage to reefs by tropical cyclones and loss of wildlife habitat by excessive droughts are but some examples. Increasingly, natural disasters are aggravated by men, and natural environments are manipulated, sustained or damaged by man.

How man manipulates his environment should be seen against the risk of natural disaster. Environmental management strategies should also be evaluated against the risk to which these strategies may be adversely affected by natural disasters and how these can be mitigated. Example, reforestation programs should be assessed on how forests will perform in a tropical cyclone. This may give rise to other planting scheme, introduction of other species and measures.

Disaster mitigation measures and the preservation of environment are often interwined, one compliments the other. Since natural disasters are in many cases aggravated by environmental degradation, many disaster mitigation measures like community preparedness and training are very close to environmental management strategies. Disaster mitigation options that address the causes and factors that aggravate natural disasters, can in many cases serve a dual purpose: reduce the impact of disaster and realise a more sustainable management of the environment. Further, development of this type of mitigation measures could be advocated as an efficient way to mitigate natural disasters that are also beneficial to the sustainable management of the environment. For example, the rehabilitation of mangroves to reduce future damage by wind and storm surge or the improvement of drainage to prevent waterlogging could also contribute to a reduction of agricultural losses. The additional benefits that disaster mitigation can have on the natural environment deserves to be stressed in program designing.

Natural Disaster and Development

For a long time, the cause and effect relationship between disasters and socio-economic development have not been fully understood or was ignored. Traditionally, disasters are seen in the context of emergency response, with most efforts and expenses ploughed into the receipt and distribution of relief and in recovery operations. Development planners did not concern themselves with disasters. At best, development planners hoped that disasters would not occur and if they did, they would be effectively taken care of by relief from donors and relief organisations. Development programs were not assessed in the context of disasters - neither from the effect of the disasters on the development program nor from the point of whether the development program increased the likelihood of a disaster. Disasters are not treated as part of a long term development planning issue. Yet they undermine development efforts and waste scarce resources and, therefore, have long lasting impact on growth. Hence, there can be no trade-off between disasters and development issues. If the costs of disasters are to be reduced, disaster mitigation will have to be a part of the national development process.

The Impact of Disasters on Development:

Disaster wipes out the products of previous investment. The effects on economics and development are direct, indirect and secondary. The direct loss occurs from damage to capital stock and inventory which may include damage to buildings and dwellings, infrastructure, crops, factories, ports, power and telecommunication systems and the cost of restoring basic services and utilities. Examples of indirect losses include decline in production and services, loss of income due to unemployment, increased costs of goods and services, disruption of education, training and other socio-economic development activities etc. The secondary effects also disrupt the development process in Bangladesh. These include balance of payment problems, inflation, increase in fiscal expenditures and decrease in monetary reserves.

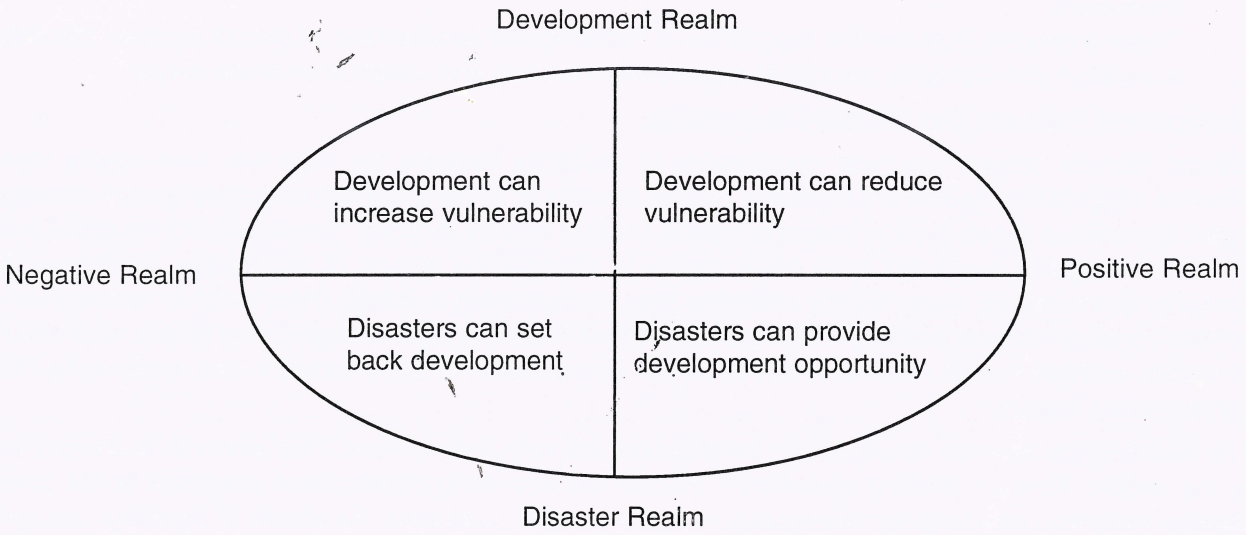
The Impact on non-formal Sector:

Disasters have negative impact on non-formal sector also in Bangladesh. Accounts of disaster losses are often underestimated because loss to non-formal is either not fully assessed or is ignored. Social and economic activities in the non-formal sector, such as housing commerce, agriculture etc. are particularly vulnerable.

In addition, dependency on government and external assistance to provide relief, a norm in developing countries including Bangladesh can inhabit recovery. Import of relief items may be a disincentive to local producers. Alternatively, it is within the non-formal sector that traditional coping mechanisms are usually practiced. Traditional systems are being replaced by modern approaches through development process.

The Relationship between Disaster and Development:

Development planners in Bangladesh are now realising the importance of linkage between disaster and development. Disaster elected communities and the post disaster environment were earlier seen as the most unlikely places to institute development or to foster changes that will promote long-term development. The growing body of knowledge on the relationship between disasters and development indicate four basic themes.



These four themes may be expanded as follows

i) Disaster can set back Development Programs:

Natural disasters can cause extensive destruction and damage, Disasters often directly, destroy years of development initiatives e.g. transport and utility systems. Some of the damage and destruction will be inevitable especially in agricultural activities where reliance is more on nature than on human influence. Yet, there is substantial potential to reduce the disruptive impacts of disasters, even in the agricultural sector.

ii) Disaster Provides Significant Opportunities to Initiate Development Programs:

Disaster can be a vehicle for major development program. The political impact of damage and disruption can be a real catalyst for change. Disaster inspired development initiatives are influenced in a number of ways. First, disasters can highlight particular areas of vulnerability; for example, where serious loss of life has occurred, or where the economic damage is disproportionate to the strength of the impact. This usually highlights the general level of development. Second, disasters also create a political environment that favours a much higher rate of economic & Social change than at normal circumstances. For example, new job training, housing improvement through implementation of building codes, restructuring of the economic base. Many countries including Bangladesh have resorted to transformation in agricultural cropping pattern due to disaster.

It should, however., be borne in mind that development opportunities are often missed or compromised because of an excessive focus on relief assistance. This had what happened in Bangladesh also. Relief assistance may introduce substantial flows of resources into small communities, resources which would be purchased locally. Such phenomenon may discourage independence and entrepreneurism.

iii) Development Program can Increase Vulnerability.

The development process itself may increase vulnerability. There is a clearly established linkage between poverty, marginalisation, over-population and vulnerability. To a large extent, vulnerability derives from poverty. Poor people are likely to live in vulnerable areas, for example on slopes vulnerable to landslides, in flood-prone

areas, on marginal agricultural land. There are also specific development activities in an area that may increase certain types of vulnerability. For example:

- Urbanisation often leads to an influence of relatively low-income groups setting on marginal land or in high density, low duality housing. Dwellings and/or commercial buildings are located on flood zones or steep unstable slopes, thus increasing vulnerability.
- Marine and coastal zone development may lead to population concentration, exposing people to possible danger from storm surge, strong winds, floods and erosions. Development activities and economic and commercial programs along the coastal strips allure people to settle there in Bangladesh.
- Poorly managed forestry programs triggers vulnerability. The deforestation often leads to landslides, soil erosion and increased run-off causing floods downstream. Similarly, poor watershed management and badly conceived agricultural programs, often lead to the same hazardous outcome.
- Livestock development projects may lead to severe loss of vegetation cover and conditions to near-desertification and commercial agricultural projects that displace food crop production leads people to be dependent.

  These examples illustrate the importance of including risk assessment as part of program planning and evaluation and highlights the critical importance of training and education in these areas.

iv) Development Programs can Decrease Vulnerability.

Natural hazards present the most manageable of situations because the risks are most readily identified, effective mitigation measures are available, and the benefits of vulnerability reduction may greatly outweight the costs. Experience shows that the impact of natural hazards may be reduced. Combination of structural and non-structural mitigation measures have been shown to alleviate the effects of earthquake, landslides, floods, droughts and cyclones. Some simple examples are : strengthening buildings (retrofitting) to render them more resistant against hazards, building codes, planting hazard resistant crops, changing crop cycles, land-use zoning to restrict activities in high risk areas; and economic diversification to allow losses in one sector to be offset by gains in other sectors.

The relationships between disasters and development are very often ignored. This amounts to doing disservice to the people. Forward thinking government officials are assessing development programs in the context of disaster mitigation with long-term development needs in mind. Over time, the effects of disasters can seriously degrade a country's long-term potential for sustainable development. At the same time, disasters can provide opportunities for development. They can induce change and create grounds for development programs.

Integrating mitigation measures with regular development planning has a wide range of options. In Bangladesh, successful disaster reduction should be seen in relation to present institutional arrangements to prepare for and respond to natural disasters.

Disaster Management in Bangladesh.

Disaster management in Bangladesh embodies a collective actions - pre, during and post disaster activities ranging from preparedness to emergency relief to rehabilitation to development. There is increasing awareness for improvement of disaster preparedness especially in the form of community awareness program. Disaster mitigation, as a deliberate activity to reduce the impact of future natural disasters, has been precticed as part of traditional coping mechanisms. However, disaster management actions may be described as under.

Structural:

A. Land use Planning : In order to reduce the effect of cyclones on detached islands, coastal afforestation has been planned. Some afforestation projects have been already implemented in the coastal area and in few offshore islands. This will help absorption of cyclone/storm energy weakening the cyclone on the land after crossing the forests on the coasts.

B. Embankment Building : Embankments in offshore islands, coastal areas and on some river banks have been built to mitigate on-rush of surge and their harmful saline effects. More are being planned for protection of environment and avoidance of flood.

C. Road Construction : Roads are required in the cyclone prone area for pre-cyclone evacuation and post-cyclone relief and rehabilitation operation. Roads network has been planned but progress in the construction of those roads are slow due to resource constraint.

D. Construction of Cyclone Shelters : During last 25 years about 1500 cyclone shelters of varying size and designs have been constructed in the high risk area by PWD of the Ministry of Works. Local Government Engineering Department of Local Government Division and Facilities Department of the Ministry of Education for multipurpose uses. Some NGOs are also involved in such housing and shelter programs. But these are still inadequate compared with the number of vulnerable population.

E. Raised Earthen Platforms to be used as Flood Shelter : Bangladesh has a vast flat plain land of which only about 15% is hilly terrain. Plain lands are on an average only 20 feet above the nearest sea level. In the event of high river floods, thousands square miles of land including infrastructures and dwelling houses lying upon it go under water. In some areas during a high flood, human beings and cattle do not have any dry land to stay on. They have to be evacuated to higher lands but dry land may not be in the area. This situation can be largely mitigated having more uprising educational institutions, bazars and growth centres where affected people can take shelter in the face of danger. Government has already taken some steps to build raised earthen platforms under "Flood For Works Program" in the flood prone areas.

Non-structural:

a) Standing Order on Disaster : The Government in last January have published a Standing Order enumerating the duties and responsibilities of various Ministries. Departments, and other Organisations working for Disaster Co-operations at Pre, During and After disaster. This is a guide book on Disaster Management for every one concerned with the management aspects.

b) Introduction of Disaster Management subject in Primary, Secondary and Higher Secondary Classes: To raise awareness among the students on various hazard and disaster management, the Government has decided to include a chapter on Disaster Management from Primary level to Higher Secondary level.

c) Inclusion of a Session of 2 Hours on Disaster Management in all types of Training institution in Bangladesh : To train the Government official of all types on Disaster Management, Government has decided to compulsorily keep a session of at least 2 hours on Disaster Management in their Training Curricula. Ministry of Establishment as the Secretariat of National Training Council (NTC) has already instructed several Training Institutions to include a session on Disaster Management.

d) Government and NGO Relationship on Disaster Management: The NGO simultaneously with the Government operate Disaster Management activity. To ensure coordination and to avoid duplication of rescue, relief, rehabilitation and disaster related training and public awareness building activities, constant liaison between the Government and NGOs is essential. NGO representatives are, therefore, included in different Disaster Management Committees at all levels.

e) NGO Affairs Bureau collects facts on NGOs activity on Relief and Rehabilitation work and report to the Ministry of Disaster Management and Relief and the Disaster Management Bureau for maintaining National Accounts on relief and rehabilitation activities. The NGO Affairs Bureau is also instructed to collect facts on Training and Public Awareness activities on Disaster Management and report to Ministry of Disaster Management and Relief and the Disaster Management Bureau (DMB).

f) Meteorology Department, SPARRSO and Flood Forecasting Unit of Water Development Board : These organisations are responsible for assessing, predicting and disseminating warning on various hazards and disasters.

Community Involvement:

Community involvement in disaster management was not, until recently, so systematic due to lack of policy and awareness. Government plans to strengthen disaster management committees at grassroots level through strengthening the local government. Through participatory process, mitigation projects will be drawn up and implemented. The NGOs will also play a very active role.

Institutional and Administrative Arrangements:

The Ministry of Disaster Management and Relief is designated as the focal point for coordinating disaster management activities in Bangladesh. It formulates and coordinates all the disaster related projects and programs and liaises with other related organisations like Meteorological Department, ERD, Planning Commission and other agencies. It's Emergency Operation Centre (EOC) remains in operation day in and day out during disaster.

The Disaster Management Bureau (DMB) and the Directorate of Relief and Rehabilitation (DRR) are two attached departments of the Ministry. The DMB, created for institutional strengthening, is implementing a 3-year technical

assistance project for capacity building and other related activities. The DRR is fundamentally for emergency operation and rehabilitation.

Armed forces are also actively engaged in relief and rescue operations. Ministries like Home, Agriculture, Health, Water Resources, Education, Environment and Forest and many NGOs play active role in disaster management.

The Cyclone Preparedness Program jointly managed by the Ministry and the Bangladesh Red Crescent Society (BDRCS) work in coastal belt and has about 35,000 volunteers and a radio network covering all the coastal districts.

The following committees have been set up for effective disaster management.

a. National Disaster Management Council (NDMC) : headed by the Prime Minister. This is the top most committee for policy making on disaster management.
b. Inter-Ministerial Disaster Management Co-ordination Committee headed by Hon'ble Minister in charge of the Ministry of Disaster Management and Relief. The committee ensures and co-ordinates preparedness measures in the event of disasters.
c. Cyclone Preparedness program implementation Board headed by the Secretary, Ministry of Disaster Management and Relief to decide issues on cyclone.
d. Committee for monitoring impacts of Disaster on Development Projects headed by the Minister for Planning
e. Committees with NGOs in Disaster Management activities headed by the Director General of Disaster Management Bureau to review and co-ordinate the activities of NGOs involved in Disaster Management Activities.
f. IDNDR ACTIVITIES: Every year in IDNDR day is observed with seminar, symposium, demonstration and postering. These are arranged to create awareness and disseminate the spirit of IDNDR. Ministers, MPs and other Government and foreign dignitaries attend these formalities. The President of Bangladesh was the Chief Guest in several occasions.

Funding Arrangements:

In the annual budget, there is a provision of a Contingency Fund to meet emergency relief need. Not too severe disasters were managed by this fund. In case of severe disasters, the donor community comes in.

Disaster Mitigation Strategy for Sustainable Development:

Sustainable development implies development in which both present and future needs are taken into consideration. Strategies that reduce impact of natural disaster also contribute to sustainable development. The vulnerability of communities can be reduced in a cost-effective way. It also includes strengthening of national capacity, hazard and vulnerability assessment and the integration of natural disaster with development planning.

Integration of Disaster with Development:

Develop plans, project proposals and environmental management strategies developed in Bangladesh often disregard the threats of natural disasters. A mechanism similar to EIA would, therefore, be in order. The basic questions that would be asked.

- What are the potential negative impacts of natural disasters on the proposed development scheme
- Does the proposal include adequate measures to counter these impacts or are additional measures required.
- What are the impacts (positive or negative) of the proposed development on the vulnerability of communities and the frequency and intensity of natural hazards.
- What actions would be necessary to bolster positive impacts and reduce negative impacts.

Conclusion:

Integration of disaster impact measures with development planning at the initial state of project formulation would definitely go a long way in reducing disasters and increase project sustainability. Environmental impact assessment (EIA) could generate ideas for the development of a framework for disaster impact assessment (DIA) which could be used in project analysis. The socio-economic and environmental conditions of Bangladesh are very fragile and the problems may be compounded if the effect of global warning and climate change begins to be visible. It is estimated that about one-fifth of Bangladesh shall go under water due to sea level rise as a result of Greenhouse effect. Current efforts and programs of afforestation, combating desertification programs and restoration of coastal ecology through coastal zone management would, in the appropriateness of things, be in order. National and international supports would be needed to achieve the desired results.

- Coordination during disaster: GO-NGO/NGO-NGO/NGO-Donor/GO-donor/NGO-media
- Monitoring/accounts keeping/evaluation/reporting
- Linkage between disaster and development: disaster affecting development/ disaster creating opportunity for development

Needless to mention that

The objective of such awareness session and training is obviously increasing concerned people's acquaintance with the theoretical and practical aspects of the natural calamities, towards lessening people's suffering and reducing their negative impact on development process.

Staff of the organisation, partner NGO staff and grassroot beneficiaries are generally the target group of such awareness session and training

The entire course is of various duration like 1-day/3-day/5-day/7-day/10-day

Registration, participation introduction to each other, focus on participants expectation out of the exercise: all these take place day 1

A recap of previous day's discussion/output take place at the start of the session the following day

Each topic is dealt for a duration ranging from half-an-hour to two hours depending on its nature and content

Training methods practiced include:

Brain storming * Lecture session

*Question and answer * Group work

* Group presentation * Study circle

* Case study * Demonstration

* Simulation exercise * field visit

Training materials/teaching aids include:

* Training manual * Training schedule * Flip chart * Poster * Leaflet * Map * Handout * Video show * Slides * OHP/transparency * Board * Marker * Poster paper * Paper/forms * pen * pencil * Notebook * VIPP cards

The following non-govt. organisations stand out prominently in the area of disaster management training of awareness raising sessions:

Bangladesh Disaster Preparedness Center, Bangladesh Development Partnership Center, BDRCS-CPP, Care, Caritas, CCDB, Codec, Concern, Dascoh, DWIP Unnayan Sangstha, Gano Unnayon Kendro, Gano Unnayon Prochesta, HEED, IVS, KOINONIA, OXFAM, Prodipan, RDRS, VERC.

In addition, International University of Business, Agriculture and Technology is also a noteworthy name in this area; besides, CIRDAP, Dhaka University Disaster Training, Research and Management Center, and Khulna University Urban Planning and Discipline, are preparing to involve in the exercise shortly.

As for PRIP, it supports few organisations program on training, research and information service in the area of disaster preparedness and management.

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