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Prepared Under the Auspices of
The U.S. National Committee for the Decade
for Natural Disaster Reduction

DRAFT OUTLINE
U.S. NATIONAL REPORT
FOR THE
WORLD CONFERENCE ON THE IDNDR
October 1993

U.S. National Committee for the Decade
for Natural Disaster Reduction
National Research Council
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Timetable for the U.S. National Report

1993

March	First meeting of the Working Group. Begin to lay out structure and substance of the U.S. Report, the preparatory process, and a timetable to meet U.S. obligations
April/May	Design framework and structure for report and preparatory process
May 20-21	Board on Natural Disasters meeting -- Discussion/assignment of draft framework and format for report
July 11-14	Preparatory meetings in Boulder, Colorado
August	Assignments of chapter coordinators and begin outlining of chapters and assignment of contributors
October	Outlines/drafts of chapters collected, gaps identified, consensus on progress/achievements, and establish priorities for balance of Decade, final drafting
October 5	First meeting of the U.S. National Committee -- review and guidance on report. Draft of Overview/Executive Summary and draft of report completed.
December	Report to NRC Report Review Committee (RRC) review

1994

January	Report to press
February	Report published and sent to Secretariat for translation of the Executive Summary

U.S. National Report for the 1994 World Conference for the IDNDR

OBJECTIVES

The U.S. National Report's primary objectives are to assess progress towards meeting the IDNDR targets at the mid-point of the Decade and to describe plans for the remainder of the Decade. The process of preparing the Report will be used to promote awareness of natural disaster reduction and to stimulate tangible actions both at home and abroad that will reduce disaster vulnerability in the short term and help build a disaster-resistant society for the decades ahead.

Within the U.S., participants from a broad range of sectors -- including the scientific and technological, governmental, private, and voluntary sectors -- must be consulted to produce the National Report. The Report aims to reflect a national commitment to disaster reduction and to integrate the efforts of the natural disaster community.

REPORT FORMAT

The U.S. National Report to the World Conference will have an Executive Summary and Overview, and four additional chapters. The first three correspond with the 3 IDNDR targets (Risk Assessment; Mitigation; Access to early warning), and the fourth reports on special issues related to developing countries. Chapters II through V will include sections that:

- report on the status of activities to meet the target (sections from federal, state/local government, private sector, NGO, professional and individual efforts),
- discuss the most salient "issues" surrounding that target area (boxes might be used to highlight the variety of issues/themes, such as success cases, technologies, changing vulnerabilities, etc.), and
- set out plans for the remainder of the Decade.

The Report will be composed of authored articles and will include an annex listing selected references. Coordinators have been designated for each chapter.

The Report will be approximately 100 printed pages, of which roughly half will be text and the other half graphics. For purposes of planning drafts, that translates into roughly 200 double-spaced pages of text. Below is the chapter outline with target length followed by a more detailed outline.

OUTLINE OF THE U.S. NATIONAL REPORT

<u>Chapters</u>	<u># of Pages (Approx)</u>	<u>Chapter Coordinators</u>
I. Executive Summary and Overview	20	Walter Lynn
II. Risk Assessment	50	Lester Lave/Walter Hays
III. Mitigation	75	Henry Quarantelli/Mark Russo
IV. Warning	40	Dennis Mileti/Ed Gross
V. International Cooperation	15	Stephen Bender/Walt Hays Kim Fletcher/Barry Heyman
TOTAL:	<hr/> 200 (double-spaced draft text)	

CHAPTER I OVERVIEW

Walter Lynn, U.S. National Committee for the Decade
for Natural Disaster Reduction

I. **The Executive Summary** summarizes the progress towards the three IDNDR targets of Risk Assessment, Mitigation, and Early Warning and the nation's cooperative efforts with developing countries. This "state-of-the-union" for disaster reduction in the U.S. includes initiatives of government (federal, state, and local), and nongovernment (private sector, professional) sectors. A forward-looking discussion of **plans for the remainder of the Decade** is also summarized here.

II. **The Context and Issues** in the U.S. that shape disaster risk and its management will follow the Executive Summary. Possible elements might include:

- Economic/social context: population, investment, distribution of income, state/federal burden shift for disaster management (post-war trends and present situation)
- Current national policy environment: participants in natural disaster reduction in the U.S., critical policy for disaster reduction, legislation, and other national priorities such as environment, research/technology, health care, infrastructure investment, economic recovery
- Figures on relief expenditures, disaster losses, amount spent for disaster reduction (breakout for preparedness, warning, mitigation, recovery);
- New directions for disaster management: organizational crosscutting, institutional priorities, technologies, insurance industry
- Trends of natural disasters by hazard/region

CHAPTER II RISK ASSESSMENT

Walter Hays, U.S. Geological Survey
Lester Lave, Carnegie-Mellon University

Introduction

Trends (1900 or 1940 to present): USA data for deaths and property damage, and deaths/pop and property damage/total value of property for various natural disasters (floods, hurricanes, earthquakes, etc.) Expenditures on prevention and mitigation.

Have our programs been effective? What could be done to save more lives and prevent more property damage?

Institutional Setting for Risk Management: Responsibilities for research, data collection, monitoring, warning, building codes, immediate post-disaster relief, rebuilding: Government vs. private (insurance, etc.), federal/state/local, different federal agencies.

We cannot eliminate losses from natural disasters; we cannot realistically hope property damage will decrease over time. We can save more lives and make our programs more effective.

I. Status of Risk Assessment and Accomplishments

- Accomplishments
 - Research
 - Legislation
 - Post disaster investigations
 - Education, training and technology transfer
- Improved Capability to Monitor Natural Hazards
- Improved Predictive Systems
- Health Care
- Improved Knowledge of Vulnerability Functions
- Improved Loss Estimates
- Improved Cooperation and Coordination

II. Issues

- Identifying Risk
 - Qualitative identification of vulnerable areas, structures, populations, and social systems by the type of natural hazard.
 - Areas in the 100 year flood plain or on earthquake faults
 - Unreinforced masonry buildings (earthquakes)
 - People living on barrier islands (hurricane threat)
 - Water and electricity distribution systems
- Quantifying the Occurrence Rate (Quantifying the Qualitative Risks)
 - Estimating the return rates of rare events with limited data
 - Statistical techniques
 - Using physical (not human records) data
- Damage Functions (Loss as a Function of Severity)
 - Predicted deaths and property damage depending on flood height or earthquake location and intensity
 - Who and what are at greatest risk?
- Communication
 - Agency warning
 - Insurance, price, and other signals
 - Zoning and building code
 - Personal perceptions of hazards and appropriate behavior
- Acceptable Risk
 - What qualitative and quantitative risks are acceptable?
 - How do risks to schools differ from risks to factories?
 - Building Codes, Zoning, Warning Systems, ...
- What is the Governments' Role?
 - Communication-Labeling
 - Require Insurance -Regulate Insurance
 - Zoning-Building Codes-Inspection
 - Forced Evacuation
 - Warning of the Approaching Event
 - Police-Rescue Services During the Event
 - Protection, Health Care, Food, Shelter in Days Following Event
 - Relief, Loans, Grants, etc. for Public, Nonprofit, Private Loss
- Engineering Criteria
 - What is the Design Event to be Protected Against (MPF, MCE)?
 - What are the Performance Standards?
 - What are the Building Codes - Design Standards?

- Protecting Lives vs. Protecting Property

III. Plans

- Plans for Future Risk Assessments
 - Continue research on hazards
 - Continue research on vulnerability
 - Continue programs to assess the vulnerability of existing structures and systems
 - Integrate research with post disaster investigations and technology transfer

Contributors:

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William Boning, US Geological Survey

James Cooper, Federal Highway Administration

Thomas Durham, Central United States Earthquake Consortium

Robert Fuller, Housing and Urban Development

Edward Gross, National Weather Service

James Hill, Department of Energy

Charles Lindberg, Citadel, South Carolina

Shirley Mattingly, City of Los Angeles

Eric Noji, Center for Disease Control

Robert Odman, State Farm Insurance

Lawrence Reavely, Reavely Engineers/University of Utah

James Riehle, U.S. Geological Survey

Claire Rubin, Environmental Protection Agency (Consultant)

Eleonora Sabadell, National Science Foundation

Kaye Shedlock, U.S. Geological Survey

Susan Tubbesing, Earthquake Engineering Research Institute

CHAPTER III MITIGATION

Mark Russo, Federal Emergency Management Agency
E.L. Quarantelli, University of Delaware

Background

- Mitigation and the disaster reduction planning cycle
- Past trends in mitigation activities
- The current social context for mitigation
- The major social actors in mitigation
- Learning from research and experience
- The all-hazards approach

I. Status of Mitigation and Accomplishments

For each of the five areas there will be examples of activities drawn from federal, regional, state, local, NGOs, and private sector

- Structural mitigation measures
 - Building codes/ordinances
 - Standards for federal facilities/federally assisted undertakings
 - Guidance on structural mitigation techniques
 - Cost data on structural mitigation
 - Building performance investigations
- Insurance and financial policies and programs
 - Flood insurance
 - Earthquake insurance
 - Multi-hazard insurance
 - Special financing mechanisms
 - Cost rebates for mitigation
 - Low/no-interest loans
 - Tax policies
- Land use planning and management policies and programs
 - Floodplain management
 - Acquisition of property
 - Coastal development management

- Training, technology transfer, and awareness programs
 - Multi-hazard emergency preparedness and mitigation
 - Seismic safety
 - Flood and hurricane mitigation
 - Other hazard-specific mitigation
- Mitigation research, preparedness, relief, and recovery activities
 - Mitigation through preparedness actions
 - Mitigation through relief and recovery operations
 - Mitigation research

II. Issues

- The issue of any and multi-hazard insurance
- Barriers to hazard mitigation implementation at the community level
- Problems and possibilities in the better integration of research and application programs
- Better linkages needed between specific disaster agent organizations, programs, policies, and practices with the all-hazard approach
- The effects of a litigious social climate on future mitigation planning, practice, and research
- Developing and strengthening the cooperation and coordination between the public and private sector with respect to disaster mitigation planning and efforts
- Mitigation planning and managing implications of the continuing social trends and the increasing sociocultural heterogeneity of American society
- Political aspects of mitigation policies and programs

III. Plans

- Implementation of a national mitigation strategy
- Improved hazard mitigation planning following disasters

- Hurricane safety
- Seismic safety
- Epidemiologic-based studies
- Use of automated information systems in disaster mitigation
- Land-use planning initiatives

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CHAPTER IV THE WARNING SYSTEM

Ed Gross, National Weather Service
Dennis Mileti, University of Colorado

Introduction

The introduction will define what we mean by integrated (monitoring and detection, management and response) warning systems and why they work best. The importance of partnerships, coordination and cooperation in warning the public about the potential impacts of the hazard threatening their community and assisting the public in making protective action decisions will be stressed.

The organizations and actors in the warning process will be outlined. Two boxes illustrate how far the U.S. has come regarding warning the public for all hazards, and a comparison of lives lost in Hurricane Camille versus Hurricane Andrew. Background will also be provided for all the issues that will be presented in the chapter, as well as explain how the chapter is laid out.

I. Status and Accomplishments Systems for Observing Forecasting and Warning

For each hazard* we will describe the status of the coverage and use of systems for observing, forecasting, and warning; the effectiveness of our nation's warning communications capabilities; and plans for future initiatives to improve warning systems and communications. This section will be prepared by the respective Federal agencies with the hazard warning responsibility.

- This section will also include maps showing sites for NWS radars, surface and upper air observations, and offices responsible for issuing warnings. The USGS seismic and volcano networks and centers, as well as the Soil Conservation and US Forest Services sites.
- Dissemination Services - A paper titled "Getting the Word to the People" describes methods in place and plans for a more effective delivery of timely warnings and vital post-event information. Pieces on:

* earthquakes, volcanoes, landslides, hurricanes, severe storms (tornadoes), floods and flash floods, tsunamis, wildfires, and drought

- NOAA Weather Radio - An "all hazards" radio network
 - The new Emergency Broadcast System (EBS)
 - The Dissemination Project describes the development of capabilities to combine modern weather information with other relevant data located within emergency management offices and how to display this combined information for use in emergency management operations.
- The development of an Earthquake Aftershock Warning System - Department of Energy
 - Other geological event distribution capabilities
 - State and Local Perspectives of the Warning System. What the local warning system is now and what locals hope to see in the future. Included will be a discussion on the warning messages they require and how they use the data and warning prepared by the Federal agencies and others. Invited pieces by:
 - City of Los Angeles
 - State of Florida
 - Denver Urban Drainage
 - How states redistribute severe weather and flood warnings

II. Issues

Issue One: Adoption and Maintenance

- constraints and incentives
- cost-benefit analysis
- drills and exercises

Issue Two: Uncertainty and Disagreement

- pre-planning and prior policy decisions
- probabilities issued for event
- recommending protective actions

Issue Three: Decision Making

- deciding (if, when, who, where, how) to warn
- perceptual dilemmas delaying warnings

- information overload
- needed decision making enhancements
- planning who says what to whom beforehand

Issue Four: Organizing to Give Warnings

- interorganization conflicts
- communication hardware
- preparing to interpret scientific information
- monitoring response for feedback
- organizational dilemmas

Issue Five: Constructing Effective Messages

- content and style
- recommending protective action
- monitoring response
- public response

Issue Six: Delivering Warning Messages

- disseminating the warning
- frequency
- alerting and warning special populations
- media role
- TV vs. radio vs. newspapers
- Informal notification

Issue Seven: Emerging Warning Needs

- fast moving events
- concurrent hazardous events
- cross hazard systems

Issue Eight: Public Education and Awareness

- Case examples
- Bay Area Newspaper Insert
- Parkfield Stream article

Issue Nine: Research Activities

- Describes areas of research currently underway or needed to enhance the effectiveness of warning systems in the U.S. Topical research categories include:
- discovery of societal factors that inhibit the adoption and maintenance of systems in communities that need them

- determining special needs for special warning events and circumstances such as for fast moving and/or concurrent events
- developing improved means for warning communication and transmission between organizations in the warning system and to the public
- defining the role of the media in warnings and ways to involve the media in preparedness
- conducting special human behavior studies on warning response, quantitative decision making and other specialized topics, and
- determining the link between public education and response in future warning events.

Boxes

Boxes will be included to highlight the variety of issues/themes, such as success cases, technologies, etc. The following are possible boxes:

- The modernization of the National Weather Service
- Storm Surge Modelling and Evacuation Planning - The NWS's Sea, Lake, Overland Surges from Hurricanes (SLOSH) model
- The U.S. Weather Research Program (USWRP)
- The Water Resources Forecasting Service (WARFS)
- The modernization of the Seismic Monitoring Network
- Hurricane Camille vs. Hurricane Andrew - An examination of the differences in the lives lost, pointing out just how far we have come
- Office of Emergency Services Rumor Control Center
- Parkfield earthquake prediction experiment alert levels and triggered human actions that follow
- The elements of a sound public warning
- Conflicting weather information
- The Ian Browning Prediction of a 1990 New Madrid earthquake

- An overview of the National Earthquake Education Program
- Bay area newspaper insert, used after Loma Prieta
- Possible increase in intense land-falling hurricanes in the coming decade
- Skywarn

III. Plans

The conclusion section will focus on technology, awareness, preparedness, coordination, cooperation, and partnerships, as well as future plans and initiatives underway or planned to improve warning systems and communications. It will describe assessments underway to determine new directions, changes in policy and practice and research required to more effectively warn the public about the potential impacts of hazards threatening their community.

Contributors:

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CHAPTER V

International Cooperation

Stephen Bender, Organization of American States
Kim Fletcher, Environmental Protection Agency
Walter Hays, U.S. Geological Survey
Barry Heyman, Office of Foreign Disaster Assistance

Introduction

This chapter presents the status of international cooperation during the first four years of the International Decade for Natural Disaster Reduction (IDNDR). Some of the most significant accomplishments are described to illustrate the kind of activities that have been undertaken and how they were accomplished. Both natural and technological hazards are emphasized. Critical issues in international assistance for disaster reduction are discussed. The plans for future international cooperation are presented to show the range of options that are being pursued by the United States to accomplish the goals of the IDNDR.

- Global trends of the frequency and intensity of natural disasters. During the past 20 years, 3 million have died, nearly 1 billion have been adversely impacted, and average annual direct losses have reached \$50 billion from natural hazards
- Post-war trends in U.S. policy and resources for humanitarian and economic assistance and their regional distribution
- Natural disaster reduction as a component of sustainable development: the paradigm for the 1990s and beyond
- Institutional and other actors in international disaster reduction

Boxes and figures:

- Map of World with loss information
- Four quadrant diagram of activities according to: i) saving lives or mitigating economic losses, and ii) collaborating with the most capable or assisting the most needy
- Assistance trends

I. Status and Achievements

- U.S. participation in the IDNDR: Formation of US National Committee for the Decade, support of the IDNDR Secretariat, Scientific and Technical Committee, and the Special High Level Council
- U.S. support of international disaster and development programs: The following programs (federal, private, and NGO) are representative of the many diverse international activities that are underway to reverse the global trends of increasing casualties and economic losses from natural and technological hazards
 - Droughts: The most pervasive natural disaster having slow-onset, long duration, and wide-spread impacts. E.g., Famine Mitigation Program and World Food Program (OFDA)
 - Floods: The most frequent natural disaster which has caused more than 3 million deaths during the past 20 years. E.g., Hydrology Forecasters Course (NWS); Natural and Manmade Hazards Mitigation (NSF)
 - Severe Storms: The cause of hundreds of thousands of deaths in coastal communities such as Bangladesh and annual losses of \$2.3 billion. E.g., USA-Japan Panel on Wind and Seismic Effects (NIST and others); Structures and Building Systems (NSF); Mesoscale Dynamic Meteorology (NSF, NOAA, and NASA)
 - Earthquakes: The deadliest natural hazard because of its unpredictability which has caused 1.53 million deaths in 70 countries during 20th century. E.g., National Earthquake Information Center and National Strong Ground Motion Program (USGS); Los Angeles - Mexico City Partnership (cities); Latin American Partnership (FEMA, OFDA, CUSEC, others); Worldwide earthquake Risk Management Program (OFDA and USGS); Reduction of Earthquake Losses in the Eastern Mediterranean Region (USGS and Department of State); Post-earthquake Investigations (NIST, USGS, FEMA, NSF, OFDA, and CDC)
 - Volcanic Eruptions: One of the most violent hazards which has caused more than 266,000 deaths during the past 400 years. E.g., Volcano Disaster Assistance Program (OFDA and USGS); Polar Orbiting Environment Satellite Volcano Hazards Monitoring Program (NOAA); Prediction of Worldwide Explosive Volcanic Eruptions (USGS)

- Tsunamis: The cause of more than 53,000 deaths to coastal residents of Pacific Rim, Caribbean region, and Mediterranean region during the 20th century. E.g., Pacific Tsunami Warning System (NOAA and others); Tsunami Inundation Modeling Exchange (NOAA)
- Landslides: A worldwide problem which probably has resulted in tens of billions of dollars in declared and undeclared damage each year. E.g., Landslide Hazard Reduction Training (USGS)
- Wildfires: The cause of economic losses at the wilderness-urban interfaces. E.g., USA-Canada and USA-Mexico Fire Protection Programs (USFS)
- All Natural Hazards: E.g., Latin America and Caribbean Preparedness (OFDA); National Association of Partners of the Americas Emergency Preparedness Project (OFDA and others)
- Health Impacts of Natural Hazards: Investigation of Health and Medical Impacts of Natural Disasters (CDC and OFDA)
- Continuing participation in humanitarian assistance, from crisis through transition
- Support for and participation in post-disaster investigations and technology transfer programs

II. Issues

- Sustainable economic development -- A paradigm for the 1990s and beyond: Why do losses continue to increase as development proceeds?
- Measuring the cost-effectiveness of prevention, mitigation, preparedness, and alert programs
- Closing the intra-institutional gaps between disaster assistance and development assistance
- Orienting policy resources for prevention, mitigation and preparedness under changing demands on humanitarian assistance
- Distributing the resources in response to particular situations
- Determining intervention strategies: What is the appropriate role of assistance?

- Determining the intervention points: Who are our counterparts?

Boxes and figures:

- Picture diagram showing related atmospheric and hydrologic phenomena, like El Niño Southern Oscillation (ENSO), compounded by landslides and flood way encroachment by settlements with: Symbols/pictorial representation of monitoring ENSO, mapping landslide hazard areas, resettling out of the floodway.
- Summary table of strategies, tactics and tools for disaster mitigation and preparedness through/in international cooperation.
- Discussion of the information required for validating investments in disaster mitigation: is it available, adequate quality, strategies for building simple/practical information systems.
- Discussion of communities' role in hazard management and working with international assistance.

III. Plans

- Coordination of National and International Activities
- Training and Technology Transfer Programs
- Bilateral and Multilateral Technical Assistance
- Joint Research and/or Applications Projects
- Crisis Environment and Post-Disaster Investigations

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