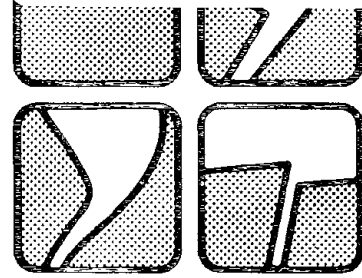


# Natural Hazards OBSERVER



VOLUME VI

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## THE UNITED STATES INTERNATIONAL DISASTER ASSISTANCE PROGRAM

—an invited comment

Natural and human-caused disasters are a constant threat to people throughout the world. Their highest toll is among the poor, who are the most vulnerable. Disasters mean death, suffering, and crippling of the social infrastructure. During the last 15 years, the United States government has provided emergency relief assistance to victims of more than 530 foreign disasters. In these catastrophes, 2.4 million people died, 651 million people were seriously affected, and nearly \$4.6 billion was provided in international relief. The United States contributed nearly one-half of this relief aid—\$1.9 billion by the federal government, and \$209 million by the private sector.

Through the international disaster assistance program, the American people extend their helping hand to the peoples of other nations suffering from disasters. This tradition of long standing reflects the humanitarian concern of the United States for those who are not able to fend for themselves.

Administrator M. Peter McPherson of the Agency for International Development (AID) serves as the President's Special Coordinator for International Disaster Assistance. In carrying out this responsibility, he maintains an operations center at the State Department which functions on a 24-hour-a-day basis, coordinating U.S. responses to foreign disasters. In the past three years, the Office of Foreign Disaster Assistance (OFDA) has responded to 68 disasters in 59 countries, affecting over 13 million people.

OFDA (within AID) coordinates the U.S. response to many requests for emergency assistance each year; monitors an average of 50 situations annually which could develop into disasters; develops early warning systems; provides technical assistance to strengthen disaster-related institutions in disaster-prone countries;



and performs managerial and administrative functions to make the program more effective. OFDA maintains an operational capability to rush life-support goods and services to disaster victims anywhere in the world.

The fundamental objective of this program is to help alleviate suffering resulting from disasters in foreign countries by providing efficient, rapid, relevant response to requests for emergency relief. A secondary

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objective is to strengthen the ability of foreign countries to cope with disasters by increased reliance on their own resources. This is being accomplished by helping countries achieve adequate levels of preparedness for disasters, and by assisting countries in providing warning of those natural events which cause disasters. The better prepared a country is for disaster, the less probability there is for death, suffering, and material damage. AID will continue to focus on those countries and regions which are most susceptible to disasters, which have the least local resources to cope with them, and which have a commitment to help themselves.

Paul F. Krumpe  
Office of U.S. Foreign  
Disaster Assistance

Editor's Note: Further information on the U.S. International Disaster Assistance Program and specific foreign disasters is available from the Office of U.S. Foreign Disaster Assistance, Room 1262A New State, 2201 C Street, N.W., Washington, DC 20523.

#### LIFELINE RESEARCH IN JAPAN

Research sponsored by the U.S. National Science Foundation and the Japan Science and Technology Agency has produced three recent reports on lifeline earthquake engineering in Japan.

*Lifeline Earthquake Engineering Literature in Japan*, by Leon R. L. Wang, *et al.*, is an unannotated bibliography of reports of investigations by Japanese researchers into the effects of earthquakes on tunnels, pipelines, and long-span bridges. All the writings collected herein were done since 1966 and published either in Japanese or in English.

A planned city for science education and research is the subject of *Tsukuba Science City and Its Magnificent Civil and Earthquake Engineering Research Facilities*, by Leon R. L. Wang. Forty-three national research and education institutions have either been relocated from Tokyo or newly established in Tsukuba. The report describes the urban environment, the civil and earthquake engineering facilities and the problems confronting the new community.

*Study of Ground Strains from Strong Motion Array Data for Lifeline Application*, by Leon R. L. Wang, *et al.*, examines the ground displacement and strain data from strong-motion arrays at two sites. The report concludes, however, that for the data from the area to be applicable to lifeline engineering, more strong-motion accelerographs need to be installed no more than 50 meters apart.

Limited numbers of copies of the technical reports are available free from the author at the *School of Civil Engineering and Environmental Science, 202 West Boyd Street, Room 334, University of Oklahoma, Norman, OK 73019, (405) 325-5913.*

#### HEALTH CARE AFTER DISASTER

The Pan American Health Organization has published a guide to the problems that may be encountered when a natural disaster overcomes a developing country's resources. Intended for decision makers and administrators responsible for providing health services, *Emergency Health Management After Natural Disaster* suggests general criteria that should be applied in choosing relief measures.

The first section of the handbook describes public health problems common to all disasters, and then distinguishes those that may happen more frequently after floods or earthquakes. The remainder of the manual deals with actual relief operations: roles of national emergency committees, managing mass casualties, epidemiologic surveillance and disease control, coordinating international relief and supplies, large-scale food distribution, and reestablishing normal health services.

Future manuals in the series will cover such specialized topics as medical supplies, health care in refugee camps, and communicable diseases. Meanwhile, order *Emergency Health Management After Natural Disaster*, Science Publication No. 407, from *Publications Office, PAHO, 523 23rd Street, N.W., Washington, DC 20037. \$6.00.* Also available in Spanish.



Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

## MORE INFORMATION SOURCES

Some organizations in unique positions to provide valuable information on particular topics of concern were inadvertently omitted from the list we published in the last issue of the *Observer*. We note them here and urge readers to add them to the original list.

ASSOCIATION OF STATE FLOOD PLAIN MANAGERS, P.O. Box 7921, Madison, WI 53707. *Larry Larson*, (608) 266-1926.

EARTHQUAKE ENGINEERING RESEARCH INSTITUTE, 2620 Telegraph Avenue, Berkeley, CA 94704. *Susan B. Newman*, Association Director, (415) 848-0972.

FEDERAL EMERGENCY MANAGEMENT AGENCY, DISASTER ASSISTANCE OFFICE, 500 C Street, S.W., Washington, DC 20472. *James L. Lewis*, Acting Assistant Associate Director, (202) 287-0504.

NATIONAL SCIENCE FOUNDATION, DIRECTORATE FOR ENGINEERING, 1800 G Street, N.W., Washington, DC 20550.

Earthquake Hazards Mitigation Section—*William Hakala*, Acting Head, (202) 357-9545; *William Anderson*, Program Director, Societal Response Research, (202) 357-9780.

Office of the Assistant Director—*Ramona Lauda*, Program Analyst for Communications/Engineering, (202) 357-9774.

## HANDBOOK FOR MITIGATION TEAMS

In accordance with the 1981 Office of Management and Budget directive and the Interagency Agreement for Nonstructural Damage Reduction Measures (see *Observer*, Vol. V, No. 3, pp. 1 and 4), the interagency task force has prepared a handbook on flood hazard mitigation planning. *Flood Hazard Mitigation: Handbook of Common Procedures for the Interagency Regional Hazard Mitigation Teams* provides guidelines for the federal agency representatives and the team leaders who make mitigation recommendations immediately after a flood disaster.

To help them meet the goal of reducing the use of federal funds to perpetuate hazardous situations, the handbook outlines the actions the team members should take to prepare for their visit to a disaster site, the steps that should be taken during the evaluation, the content of the final report, and ways team members can assist in the implementation of the report's recommendations. One helpful appendix describes flood hazard mitigation techniques—structural and nonstructural measures, and combinations of the two. The texts of the OMB memorandum, the interagency agreement, and Section 406 of the Disaster Relief Act are reprinted for reference.

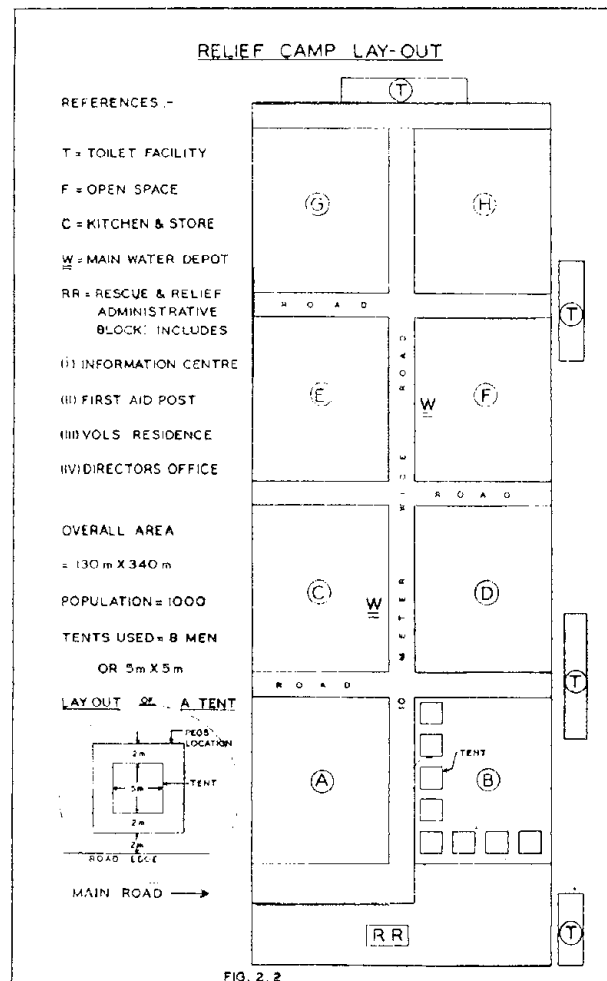
Copies of the handbook are available free from the *Federal Emergency Management Agency, Publications Management*, 500 C Street, S.W., Washington, DC 20472, (202) 287-0689.

## ADVICE FOR RELIEF WORKERS

Disaster relief workers in developing countries, and especially in India, will benefit from a wealth of information contained in a new handbook published by the Joint Assistance Centre in New Delhi. *Natural Disasters: A Guide for Relief Workers* introduces the reader to the characteristics of each natural hazard, describing, for example, the destructive force of cyclone winds and waves, the meteorological conditions which favor the formation of tornadoes, regions and seasons in which avalanches are likely to occur, and seismic zonation in India. A brief historical summary of world disasters is given, and warning systems and forecasting capabilities are discussed.

The body of the manual is a collection of practical information for those who must cope with injuries, deaths, confusion and destruction in the aftermath of a disaster. Chapters are devoted to relief camp organization, rescue techniques, camping equipment, disaster management, the use of ropes and knots, safety rules, and basic first aid and homeopathic remedies. Appendices list assistance agencies, references, training centers and case studies.

The *Guide* is available from the *Joint Assistance Centre, Adhyatma Sadhna Kendra, Mehrauli, New Delhi-110030, India*, for \$7.00 (£3.00, Rs.35.00).





EARTHQUAKE PREDICTION STUDIES

An Ad-Hoc Working Group on International Experimental Sites for Research on Earthquake Prediction, organized by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Association of Seismology and Physics of the Earth's Interior (IASPEI), met last summer to discuss ways to improve the theory and techniques of earthquake prediction. The group's task was to provide scientific advice to UNESCO enabling it to carry out a feasibility study and eventually a project proposal for establishing sites for earthquake prediction research.

Some of the group's conclusions and recommendations were as follows:

- Based on seismic activity, the availability of geologic, geotectonic, and neotectonic maps, instrumentation, and accessibility, six regions were deemed to be acceptable for further study—the Peru-Chile border, the Western Hellenic Arc, the North Anatolian Fault Zone, the Meckering area of western Australia, the Beijing-Tienjin-Tangshan area in China, and the Garm-Dushambe, East Fergana or Alma-Ata regions of the Soviet Union.
- The sites should be inspected and evaluated by a committee appointed by UNESCO to confirm their suitability.
- UNESCO should approach those governments to determine their interest in hosting the proposed program.
- The broadest participation will be achieved by having different teams of scientists studying in the same region and applying as many as possible of such available techniques as tilt and strain measurements; study of seismic gaps, swarms and foreshocks; groundwater monitoring; animal behavior; and time variation studies.
- UNESCO should sponsor a study to draw up guidelines for the formulation, evaluation and communication of future predictions.

More information on the working group's activities can be had from its chairman, *Professor H. Berckhmer, Institute für Meteorologie und Geophysik, Feldbergstr. 47, 6000 Frankfurt, Federal Republic of Germany.*

MUDDY ISSUES

Approaches to the mapping of mudflow and mudslide hazard areas are evaluated in a report released recently by the National Research Council's Advisory Board on the Built Environment. The result of a study commissioned by the Federal Emergency Management Agency (see the *Observer*, Vol. VI, No. 2, p. 5), the report advises FEMA on which methods are most helpful in mapping mudslide hazard as part of the National Flood Insurance Program (NFIP).

As originally constituted in 1968, the NFIP did not include losses from mudslides in its coverage. Mudslides were added in 1969, but a clear definition of the hazard was not; the inclusion of mudflows in eligible losses a few years later did nothing to clarify the situation. The difficulties with the mudslide question were threefold: there was no unambiguous, technically acceptable



definition of mudslides, mudflows, or any hybrid thereof; there was no standard procedure for identifying mudslide-prone areas and calculating the degree of risk; and, consequently, there was no clear strategy for FEMA/FIA to follow to determine which losses were covered and which were not.

The study discusses the dynamics of mud on the move, the various causes of the phenomenon, and methods in use to assess the hazard. Although this attempt does not untangle the Gordian knot completely, it does make some recommendations which, if followed, could help those who make the determination of who benefits from insurance coverage:

- FEMA must decide exactly which phenomena will be covered, with reference to a standard classification scheme for origin and type of earth movement.
- FEMA must determine those needs of the NFIP that are being met by other agencies, for instance, land-

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slide mapping in the U.S. Geological Survey, and avail itself of both USGS expertise and findings.

- FEMA must draw on expert knowledge in the fields of geology, soil science, geotechnical engineering, and hydrology in order to formulate standard criteria for contractors to follow, and a mapping strategy for its own use.

*Selecting a Methodology for Delineating Mudslide Hazard Areas for the National Flood Insurance Program* can be obtained by contacting the *Executive Director, Advisory Board on the Built Environment, National Research Council, 2101 Constitution Avenue, Washington, DC 20418, (202) 334-3376.*

#### LAND VALUES AND REGULATIONS

The values of lots within regulated flood plains do not appreciate at significantly lower rates than the values of lots not regulated, as has been generally assumed. In fact, the mean appreciation rates for regulated parcels frequently increased more rapidly than those for unregulated parcels. These are two of the notable findings from a research project begun in 1980 (see *Observer*, Vol. V, No. 1, p. 9) in Oregon to resolve some of the many ambiguities concerning flood plain regulations and their influence on land values.

Six study areas in western Oregon were selected to test the hypothesis that mean rates of appreciation for regulated lands would be significantly less than those for similar, proximate, unregulated lands. The hypothesis was rejected in most instances; when it was supported, flood damage rather than land use regulations appeared to be the cause.

Though most of the evidence presented in *Floodplain Regulations and Residential Land Values in Oregon* suggests that flood plain regulations have not had a dampening effect on residential land values in the state, the authors offer a couple of caveats about the research: considerable residential development antedated implementation of the regulations in some of the study areas; and in most of the study areas, regulations were in the emergency (less stringent) phase of the National Flood Insurance Program. Notwithstanding these less than ideal circumstances, the findings of this study are valuable contributions to resolving a question that has troubled researchers and policy makers for some time.

Obtain *Floodplain Regulations*, by Keith W. Muckleston, Michael F. Turner and Richard T. Brainerd, from *Water Resources Research Institute, Oregon State University, 114 Covell Hall, Corvallis, OR 97331, (503) 754-4022.* Single copies are available at no cost.

#### DISASTER ASSISTANCE REQUESTS EXAMINED

The U.S. General Accounting Office recently reviewed the procedures the Federal Emergency Management Agency uses to evaluate state governors' requests for federal disaster assistance. Because the federal disaster assistance program is intended to supplement resources that states, their political subdivisions, private relief organizations and citizens can contribute to relief efforts, FEMA must assess the severity and magnitude of each situation and the sufficiency, or lack, of local resources before it makes its recommendation to the president.

In *Requests for Federal Disaster Assistance Need Better Evaluation*, GAO describes its findings and recommendations, among them that FEMA reevaluate and improve its assessment criteria; publish in the *Federal Register* its evaluation policies, procedures, and guidelines; and develop comprehensive, standard forms for state and federal officials to use in handling the request process. As part of its review of 96 disaster declaration requests made to FEMA in the past two years, GAO developed computer models to assess the disaster losses and damages, and the commitment of local resources; it is suggested that FEMA do the same to improve its decision making and provide a record for management evaluation.

Single copies of the report are available free from the *U.S. General Accounting Office, Document Handling and Information Services Facility, P.O. Box 6015, Gaithersburg, MD 20760, (202) 275-6241.*

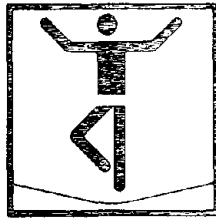
#### WATER RESOURCES COUNCIL PUBLICATIONS

In the course of putting its affairs in order, the U.S. Water Resources Council has issued a comprehensive list of its publications since 1979, with directions on how to acquire each one. Because of the planned termination of the agency, the WRC has not stocked many copies of recent reports, and the supplies of many earlier reports have been exhausted. However, because of continuing and frequent requests for the publications, provision of most of them has devolved upon other agencies, among them the U.S. Government Printing Office and the National Technical Information Service.

The publications list is grouped according to topic areas; included in it are all reports done by WRC staff, WRC committees, river basin commissions, and consultants to the WRC. To obtain single copies of the *Publications List* at no cost, contact the *Water Resources Council, 2120 L Street, N.W., Washington, DC 20037, (202) 254-6453.*

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## ON THE LINE



### BUILDINGS FOR THE FUTURE

On Christmas Day, 1974, the north Australian city of Darwin was hit by a severe tropical cyclone (hurricane) called Tracy. Approximately 5,000 of the city's 10,000 buildings were destroyed and only about 500 remained habitable. Of the 45,000 inhabitants, 35,000 had to be evacuated over 2,000 miles to other Australian cities. The economic losses and social distress made the event one of Australia's biggest natural disasters.

Investigation of the damage revealed that the basic cause of the extensive loss was the failure of housing under the strong winds which had estimated maximum gusts of 150 mph or more. Over 70% of the housing was destroyed; an additional 20% was seriously damaged. By contrast, less than 5% of the large commercial, industrial and government buildings were destroyed, and over 70% suffered little or no damage. If the houses had performed as well as the larger buildings, no evacuation would have been needed, economic losses would have been an order of magnitude less, and the human distress would have been only a fraction of what it was.

The larger buildings stood up better primarily because they had been structurally engineered, i.e., someone had estimated the likely wind loads and, using knowledge of mechanics and the strength properties of the materials, had ensured that the buildings would resist those wind loads. Few such calculations had been performed on the housing. Housing design in Darwin evolved in just the same manner as it has almost the whole world over—by a mixture of intuition and experience. Alterations due to changing technology and materials were made on the basis of intuition, and experience with subsequent performance was used as the test of whether the changes were satisfactory.

Such a process works well where changes are slow and experience of severe events relatively common, but where changes are rapid—as they have been in Australia in the last 30 years—and where severe events are rare as they often are in hurricane-prone areas, such a process can set the scene for a great catastrophe.

Damage to housing is a frequent consequence of hurricanes and other severe wind events such as tornadoes. Nonetheless, there has been a tendency to accept it with the argument that because of the low cost of housing relative to larger buildings, houses are unimportant. This overlooks the fact that, in aggregate, housing often accounts for over 50% of the capital cost of buildings in a community and also provides the prime shelter for the community, especially during an extreme natural event.

There were two major consequences of the Darwin disaster for the building industry in Australia. The first was recognition that housing is quite important when

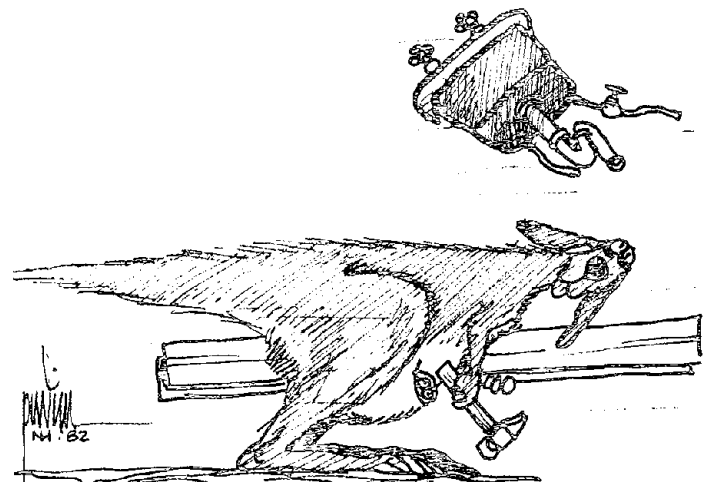
dealing with events like hurricanes which affect a whole community. The second was a decision that in hurricane-prone areas houses should be structurally engineered. At first sight the latter seemed an impractical recommendation to many people—it would lead to uneconomic construction with high design costs. The recommendation has been implemented in Australia and these fears have not been realized; however, it has involved considerable effort, research and education.

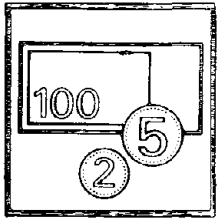
This goal was achieved primarily through the development of standardized structurally engineered details of construction suitable for the majority of houses. This has eliminated the need for individual structural engineering in most situations. Providing these standardized details has not been easy. Much basic experimental research needed to be done on basic housing components since engineering design information on these did not exist. Structural wind loads had to be established, and the basic types of construction to be standardized had to be determined. The details had to be practical and economic. The basic conservatism of the building industry had to be overcome through its education and involvement in the standardization process.

In Queensland it took five years to produce a politically acceptable document that would be endorsed by the State Government as part of its building regulations. This is the *Home Building Code* which has been adopted as Appendix 4 of the *Queensland Standard Building By-Laws* and which will come into effect on July 1, 1982.

As a consequence, future housing construction in Queensland will be engineered to resist extreme winds and should not contribute to a disaster such as that in Darwin. It has not been easy to achieve and without the strong public awareness of the damage potential of strong winds arising from the impact of Cyclone Tracy, it may not have happened. Queensland has, however, demonstrated what can be done. And if it can be done in Queensland, it can be done in other places.

George Walker  
Associate Professor in Civil Engineering  
James Cook University of North Queensland





## GRANTS

*Family recovery.* "Disaster Aid Programs and Minority Family Recovery: A Two-Site Longitudinal Comparison," National Science Foundation, \$273,446, 30 months. Co-Principal Investigators: *Robert Bolin, Department of Sociology and Anthropology, New Mexico State University, Las Cruces, NM 88003, (505) 646-3610, and Patricia Bolton, Battelle Human Affairs Research Centers, 4000 N.E. 41st Street, Seattle, WA 98105, (206) 525-3130.*

This project will examine the variety of ways in which Black, Mexican-American and white families recover from a natural disaster. Of particular interest will be different degrees of local, state and federal program utilization, as well as reliance on insurance or kin group assistance. In each of two as yet undetermined communities, 250 white and 250 Black, or 250 Mexican-American, families will be surveyed at two intervals after the impact of a natural disaster. The study seeks to determine whether groups vary with respect to the agencies they do approach for aid, whether they vary by the amount of aid they receive from formal and informal sources, and, as a consequence, whether different groups have disparate recovery rates.

*FEMA resource directory.* "Analysis of Data Bases Relevant to the Interests of the Federal Emergency Management Agency," FEMA, \$10,000, 9 months. Director: *Martha E. Williams, Information Retrieval Research Laboratory, Coordinated Science Laboratory, University of Illinois, 1101 West Springfield Avenue, Urbana, IL 61801, (217) 333-1074.*

The purpose of this project is to identify bibliographic data bases with contents most pertinent to the work done in various units of FEMA. Fifteen publicly available online bases will be searched and evaluated, and grouped by degree of applicability to the needs of the FEMA groups. The outcome of this preliminary project will be the evaluation, a model of a resource directory, and estimates of the costs of producing a comprehensive directory at a later date.

*Changing hazard risk.* "Demographic Change and Societal Response to Natural Hazards: A Problem Assessment," National Science Foundation, \$87,470, 12 months. Principal Investigator: *Joseph Coates, J.F. Coates, Inc., 3738 Kanawha Street, Washington, DC 20015, (202) 966-9307.*

As the distribution of population and human activities changes, so does the distribution and type of natural hazards in a region or country. This study explores the implications of dramatic changes in the demographic structure of the United States for present and future vulnerability to natural hazards and their

costs and losses. Two areas of influence have been selected for scrutiny: the effects on hazard risk from migration, mortality, mobility, marital status, aging, immigration, and other related demographic considerations; and the changing capacity of any social unit—group, municipality, state—to respond to a natural hazard or lessen the risk before disaster strikes. The researchers are eager to hear from anyone with information in which demographic characteristics influenced a community's behavior before or after a disaster.

*Federal disaster policies.* "Implementing Federal Natural Disaster Policies: Management Strategies under Shared Governance," National Science Foundation, \$147,664, 16 months. Co-Principal Investigators: *Walter Williams and Peter J. May, Institute for Public Policy and Management, University of Washington, 3935 University Way, N.E., Seattle, WA 98105, (206) 543-0190.*

This study will explore the role of the federal government in coordinating a combined federal, state, and local effort in disaster mitigation, preparedness, and recovery. The primary objectives are to describe the political, organizational, and technical exigencies that either foster or inhibit federal application of natural disaster policies; develop recommendations about federal strategies to enhance the sharing of responsibilities among subnational governments; and add to knowledge about complex behavior in large organizations. The data and methods used in the examination build upon the researchers' previous in-depth interviewing and analysis strategies in studying cooperation among other federal agencies and state and local entities.

## TUNISIAN HAZARD MANAGEMENT

In spite of 22 dams that have been constructed in Tunisia for flood control and water storage, the country has suffered repeatedly from severe flood damages. In the past it has relied on financial assistance from other countries, both for building the dams and recovering from the flood disasters. Recent studies of this problem indicate that less emphasis on structural solutions and wider application of land use regulation, risk zoning and public awareness programs would reduce both Tunisian and international expenditures.

Although land use planning has been used in Tunisia since the mid 1960s, its primary purpose has been to control random urbanization and, as such, it has been initiated and implemented by local governments. By contrast, reclamation projects are the responsibility of the central government. Lack of coordination between the two levels has inhibited effective flood loss reduction. Suggestions for coordinated government planning are made in *Water Management: A New Approach to Flood Plain Management in Tunisia*, by Mustafa Tag-Eldeen. It is available from the *Royal Institute of Technology, Architecture Building Design, S-100 44 Stockholm, Sweden.*

In 1977, an interdisciplinary, intercultural project was

## Tunisia (cont.)

begun by the Royal Institute of Technology in Stockholm, Sweden, and the Direction de l'Aménagement du Territoire of the Ministère de l'Équipement in Tunis, Tunisia. Its goals were to prepare flood risk zone maps, conduct vulnerability analyses, and make technical recommendations for safe construction of buildings. The results of the investigations have been applied in Tunis, Tebourba, Jedeida and Gafsa; details are given in the following reports, all in French, and all available from the *Royal Institute of Technology, Department of Architecture Building Design, S-100 44 Stockholm, Sweden*:

*Cartographie de Risques d'Inondation: Jedeida et Tebourba.* L. Y. Nilsson, B. Sundlof, M. Ryberg, Y. Hamdi. Volume 1, *Projet de Cooperation Tuniso-Suedoise*. 1980. 64 pp.

*Cartographie et Analyse de Vulnerabilite: Jedeida et Tebourba.* M. Tag-Eldeen, Y. Hamdi. Volume 2, *Projet de Cooperation Tuniso-Suedoise*. 1980. 103 pp.

*Planification Urbaine—Inondations: Jedeida et Tebourba.* K. Dahl, C. Nemes, R. B. Amor, S. Saidane. Volume 3, *Projet de Cooperation Tuniso-Suedoise*. 1980. 66 pp.

*Recommandations Techniques de Construction: Jedeida et Tebourba.* D. Blazejewicz, S. Khrici. Volume 4, *Projet de Cooperation Tuniso-Suedoise*. 1980. 38 pp.

*Confrontation: Gafsa.* M. Tag-Eldeen, S. Saidane, Y. Hamdi. Volume 5, *Projet de Cooperation Tuniso-Suedoise*. 1980. 47 pp.

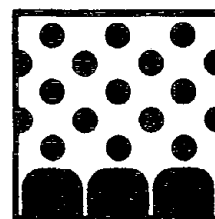


A related study, growing in part out of the author's participation in the Swedish-Tunisian Technical Cooperation, explores the potential for mitigating disaster impact through disaster preparedness in developing countries. *Disaster Preparedness: Risk Zone Mapping and Vulnerability Analysis for Disaster Preparedness*, by Mustafa Tag-Eldeen, describes the social adaptation approach to hazard mitigation. This method uses local resources instead of imported technology that requires high capital expenditures and pro-

fessional staff, lacking in most developing nations. The integration of risk and vulnerability analyses and pre-disaster land use planning has been applied in three test villages in Egypt as well as in the Tunisian communities. The results of the work should be useful to bilateral aid organizations, central and local authorities in disaster-prone countries, international consultants, and others involved in development programs.

Obtain *Disaster Preparedness* from *The Royal Institute of Technology, School of Architecture, S-100 44 Stockholm, Sweden*.

## CONFERENCES



*Innovations in Flood Plain Management: Cost-Effective Approaches.* *The Association of State Flood Plain Managers.* Madison, Wisconsin: June 7-9, 1982. Practitioners will meet to discuss nonstructural flood loss reduction techniques as they have been applied in local, state and federal programs. Nonregulatory as well as regulatory approaches will be considered, with special attention to their cost effectiveness. In preparation for the meeting, each state coordinator for the NFIP has received a summary of a strategy for building state capability in flood plain management, and a questionnaire about that state's program.

Coordinators have been asked to comment on the strategy, and to provide information about their state's flood plain management program, such as its authority, standards, community assistance and training, and data needs. For more information about the state strategies and the survey, contact *Larry Larson, Association of State Flood Plain Managers, P.O. Box 7921, Madison, WI 53707, (608) 266-1926*. To find out more about the conference, call *Lynn Goldade, (608) 266-3093*.

*Mount St. Helens Two Years Later.* *Eastern Washington University.* Cheney, Washington: May 17-18, 1982. This symposium will continue to assess the physical and social impacts of Mount St. Helens' eruptions. Issues for environmental scientists will include agriculture and soils, climatology and meteorology, hydrology and water quality, and geology, geomorphology and geophysics; social scientists will consider hazard evaluation problems, economic costs to tourism, forestry, and public utilities, and psychological effects and future emergency planning. Additional information is available from *Eastern Washington University, Geography and Anthropology, Cheney, WA 99004, (509) 359-2433*.



*Meeting of the World Organization of Volcano Observatories. Reykjavik, Iceland: August 15-22, 1982.* Representatives of volcano observatories and other research institutions will work to strengthen the ties between scientists involved in monitoring volcanoes. An assessment will be made of the observation network's equipment and instrumentation. For more information, contact *Gudmundur Sigvaldason, Nordic Volcanological Institute, University of Iceland, Reykjavik.*

*International Workshop on Earthen Buildings in Seismic Areas was convened in Albuquerque, New Mexico in May of 1981. The meeting was sponsored by the National Science Foundation, the Office of Foreign Disaster Assistance/Agency for International Development, and Appropriate Technology International, and organized by the College of Engineering of the University of New Mexico and INTERTECT.* The goals of the workshop were to define the state of the art in earthen building materials and in design and construction methods in seismic regions; to identify research findings and their applicability; and to discuss the transfer of technology across international boundaries. Proceedings have been published that include the 55 papers presented at the workshop, briefing papers on different aspects of earthen construction in seismic areas, research recommendations, and a bibliography. Order *Proceedings: International Workshop on Earthen Buildings in Seismic Areas (1981) from INTERTECT, P.O. Box 10502, Dallas, TX 75207. \$35.00 per copy, plus \$5.00 foreign postage.*

*Issues in the Management of Relief and Reconstruction Programmes after Major Disasters was convened by the Asian Institute of Technology and UNESCO in Bangkok in April, 1982.* Relief and reconstruction managers from Bangladesh, Burma, China, India, Indonesia, Philippines, Thailand, and Vietnam gathered at the invitational workshop to discuss ways to improve the delivery of disaster services at the community level. Topics addressed were victim behavior, organizational problems common to relief agencies, disaster relief strategies, housing reconstruction, and emergency services for refugees. Obtain more information from *Everett M. Ressler, No. 64 Soi Charoenmitr, Ekamai, Sukhumvit Road, Bangkok, Thailand.*

*Annual Meeting of the Great Plains/Rocky Mountain Division of the Association of American Geographers. Laramie, Wyoming: September 24-25, 1982.* Local officials, consultants and planners are invited to share their experience in natural hazards management. Although the meetings will cover all aspects of geography, a special session will be devoted to an examination of natural hazards issues. The deadline for submission of papers will not be until midsummer, but expressions of interest or requests for more information should be directed at once to *Nicholas Helburn, Department of Geography, Campus Box 260, University of Colorado, Boulder, CO 80309, (303) 492-6975.*

*First International Assembly on Emergency Medical Services. Maryland Institute for Emergency Medical Services Systems, George Washington University Medical Center, Center for Strategic and International Studies/Georgetown University, U.S. Department of Transportation. Baltimore, Maryland: June 13-17, 1982.* The assembly will concentrate on the medical and clinical aspects of dealing with terrorism and mass casualty incidents. In recognition of the need to exchange experiences and ideas on improving response and care, the assembly is designed to permit many discussions among international experts, medical personnel, and government authorities. Papers and recommendations will be published after the assembly and distributed by the U.S. Department of Transportation. For more information, contact *FIAEMS, Convention Office, 428 East Preston Street, Baltimore, MD 21202,* or call the *Maryland Institute for Emergency Medical Services Systems, (301) 528-7406.*

#### SUMMER READING

By mid June, the Center will have published two new monographs, one new working paper, three special publications, and its annual bibliography.

*Long-term Family Recovery from Disaster*, by Robert C. Bolin, describes and analyzes the ways in which families recovered from the effects of devastating tornadoes in Vernon and Wichita Falls, Texas. Since families are primary institutions in society, it is important to understand what they typically lose in a disaster, what aid they need and use to recover, and how long it takes. In this longitudinal study, victim and control families were followed for two years after the disasters, as were the economies of the cities in which they live. A thorough review is made of social theory on families in stress, and a model of family recovery is presented and tested. Monograph #36 is 280 pages long and costs \$8.00.

Attempts at educating the public about natural hazards have too often consisted of random distributions of information without knowledge about whether it will be understood or used. *Cultivating and Using Hazard Awareness*, Thomas F. Saarinen, ed., is a collection of papers which demonstrates the need for more careful design and implementation of public information campaigns and provides guidelines for doing so. The relationship between knowledge and behavior is analyzed, and hazard awareness programs already in use are surveyed. Monograph #35 is 200 pages long and sells for \$8.00.

Working Paper #44, *Agroclimatic Hazard Perception, Prediction and Risk-avoidance Strategies in Lesotho*, by Gene C. Wilken, presents the results of a survey of hazard perception and strategies used to avoid perceived risks among 236 lowland and mountain farmers in Lesotho, a small southern African kingdom. Although environmental hazards are commonly thought to hinder agricultural operations there, this is the first

systematic study of farmer attitudes and responses. The paper is 76 pages long and costs \$4.50.

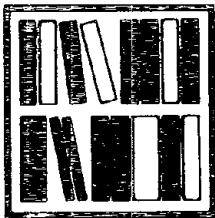
*A Selected, Partially Annotated Bibliography of Recent (1980-1981) Natural Hazards Publications*, compiled by David R. Morton, lists over 250 citations and is indexed by subject and principal author. The bibliography sells for \$5.00.

Natural Hazards Information Center Special Publication #2 is *Volume 3, Regulation of Flood Hazard Areas to Reduce Flood Losses*, by Jon Kusler. It was contracted for by the U.S. Water Resources Council to update and supplement Volumes 1 and 2 which were published by the Council between 1968 and 1971. *Volume 3* reviews accomplishments and problems of the 1970s in the use of flood plain regulations as one element of flood plain management. Strategies are suggested for improving the quality of regulations and for combining regulations with other management tools to achieve multiple state and local goals during the 1980s. The volume is 300 pages long and sells for \$8.00.

*Volume 3's* Appendix A, *Strengthening State Floodplain Management*, by Patricia A. Bloomgren, has been published separately as Special Publication #3, and can be purchased for \$8.00. It is 123 pages long. This report reviews existing state flood plain management, makes suggestions for strengthening existing programs, and provides a framework for developing new ones. State statutes, their enforcement, and litigation based on them are analyzed. Profiles of state flood plain management programs provide specific information.

Appendix B to *Volume 3* is *Innovation in Local Floodplain Management*, by Jon Kusler, and it is also available separately as Special Publication #4 for \$8.00. It examines innovative community flood plain regulatory programs and efforts to combine regulations with nonregulatory techniques. The volume is supplemented by 75 case studies of communities with creative flood plain management programs. Its length is 262 pages.

*Volume 3, Appendix A and Appendix B* can be purchased as a set for \$21.00.



## RECENT PUBLICATIONS

*Flood Preparedness Planning: Metropolitan Phoenix Area*. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Water Resources Support Center. 1982. 81 pp. For availability, contact the Corps' Hydrologic Engineering Center, 609 2nd Street, Davis, CA 95616, (916) 756-1104.

Existing flood preparedness measures in the Phoenix area are evaluated for flood events of varying magnitudes, with findings revealing that a flood exceeding the calculated 100-year level could prove devastating to the metropolitan district. Features of the report include cost/benefit analyses of the improved preparedness measures, an estimate of the flood hazard posed by the area's major watersheds, and scenarios for both moderate and severe floods under existing and enhanced conditions.

*Emergency Planning for Dams: Bibliography and Abstracts of Selected Publications*. Flood Loss Reduction Associates, H. James Owen. Prepared for the U.S. Army Corps of Engineers. 1982. 30 pp. Available from the Hydrologic Engineering Center, U.S. Army Corps of Engineers, 609 Second Street, Davis, CA 95616. \$2.00.

The document is intended to assist those engaged in emergency planning for dams and development of flood evacuation plans. It covers both publications concerning the conceptual aspects of planning and those providing detailed analytical information on specific technical points. Review of the abstracts provides an introduction to emergency planning and illustrates the large number of considerations involved in such planning.

*Volcano*. The Editors of *Time-Life Books*. One volume in the *Planet Earth* series. Available from *Time-Life Books*, 541 North Fairbanks Court, Chicago, IL 60611. 1982. 176 pp. \$9.95 plus \$2.03 shipping costs.

This volume combines history with geology to produce an informative yet readable account of the forces which generate volcanoes and the effects that eruptions have had upon human society. Although considerable attention is paid to volcanoes in the Hawaiian Islands and the Cascade Range, the book has an international flavor. Among others, the eruptions of Vesuvius, Mount Pelée, and Heimaey (Iceland) are described in vivid detail. Many excellent photographs and illustrations accompany the text. The extensive bibliography is particularly useful for those who have an historical interest in volcanic events.

*Handbook, Living Life's Emergencies: A Guide for Home Preparedness*. Patrick LaValla. The Emergency Response Institute. 1981. 72 pp. \$3.00 plus postage. Order from the Survival Education Association, 9035 Golden Given Road, Tacoma, WA 98445.

Self-reliance under emergency conditions is explained thoroughly in this useful booklet. The basic rules for avoiding or surviving natural hazards are given. Topics which receive most attention include first aid and injury treatment, water storage and purification, planning for emergencies, food storage and management, and most importantly, managing one's body and psyche after a disaster has taken place. Handy charts of safety hints and preparedness tips are scattered throughout the publication.

*A Proposed Model for Crisis Intervention in a Community Disaster*. Bruce G. Nilson. Unpublished M.A. thesis, Pennsylvania State University, Middletown, PA. 1981. 81 pp. Available from the Natural Hazards Research and Applications Information Center for the cost of photocopying—\$4.00.

Disasters cause a significant impact on a community by disrupting routine activities and interfering with social networks. Since most disaster victims do not typically experience enduring stress or permanent emotional effects, hospitalization and long-term therapy are usually unnecessary. This paper proposes that disaster relief workers be trained in crisis intervention techniques to help victims cope with the immediate situation, readjust their personal and community relationships, and understand their own temporary emotional responses to the crisis. A workshop for training these skills is outlined and discussed.

*Earthquake in Campania—Basilicata, Italy, November 23, 1980: Architectural and Planning Aspects*. Henry V. Lagorio and George G. Mader. 1981. 103 pp. \$7.50. Available from the Earthquake Engineering Research Institute, 2620 Telegraph Avenue, Berkeley, CA 94704.

With funds from the National Science Foundation, EERI dispatched the two researchers to Italy three months after the earthquake in order to study the long-term problems related to architecture and city planning in the reconstruction period. Meetings were held with academicians, engineering and design professionals and government officials in Milan, Rome and Naples, field investigations were conducted in the heavily damaged areas, and local officials and reconstruction supervisors were interviewed. This final report summarizes all that was learned in the following areas: damage, implications of damage, and relief efforts; architecture and planning needs; guidelines for undertaking architectural research in foreign countries; and elements of the Italian reconstruction law.

*"Hard Times in the Mountains."* Robert Muir Wood. *New Scientist* 14 (May, 1981): 414-417.

The author takes a brief look at some of the natural hazards to which the mountain dwellers of southern and central Asia are prone—earthquakes, landslides, floods and rapid erosion. Also described are some of the mitigative measures taken by the native populations to reduce their vulnerability and hasten their recovery after disasters. It is noted that often the real needs of the communities in this region are not the ones for which the Western world sends disaster aid.

*Skredet I Tuve: Familjen Och Desshustadsituation.* Birgitta Björklund. *Disaster Studies #13.* Uppsala University, Department of Sociology, Box 513, S-751 20 Uppsala, Sweden. 1981. 74 pp.

One of a series of reports produced since 1975 by the Disaster Study Group at the University of Uppsala, this study describes a 1977 landslide in the Swedish community of Tuve, and the experiences of 58 families that were evacuated from their homes, housed in emergency structures and, subsequently, relocated from the hazardous area into new homes in new neighborhoods. The state bought all the houses that had been destroyed and the householders were given choice of new sites developed by the municipality of Gothenburg. Before the sites could be readied, however, there were many delays and the families had to occupy a number of temporary dwellings. The ramifications of all this change are analyzed in this report. It is written in Swedish, with an English summary.

*Climate Impact Assessment: U.S. Economic and Social Impacts of the Record 1976-77 Winter Freeze and Drought.* U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data and Information Service, Center for Environmental Assessment Services. 1982. 50 pp. For availability, contact Malcolm Reid, Center for Environmental Assessment Services, 3300 Whitehaven Street, N.W., Page Building #2, Room 135, D-242, Washington, DC 20235, (202) 634-7288.

Using statistics from *Business Week* and meteorological data from NOAA, this document analyzes U.S. economic losses due to extreme weather in 1976-77. Low temperatures in the East and Midwest and drought conditions in much of the West caused direct losses estimated at \$26.9 billion (1977 dollars). Sectors scrutinized include crop production, major industrial production, energy consumption, and retail sales. Much of the economic and meteorological information is presented in graphs.

*U.S. Earthquake Observatories: Recommendations for a New National Network.* National Academy of Sciences, National Research Council, Committee on Seismology. 1980. 122 pp. \$7.00. Available from the National Academy Press, 2101 Constitution Avenue, Washington, DC 20418.

At the request of the NAS, a panel of prominent members of the seismological community was asked to examine all aspects of earthquake monitoring in the U.S. This report presents the panel's findings and suggestions, the first such effort to enhance the distribution and functions of earthquake observatories across the nation. The report makes a number of recommendations for coordinating recent advances in theoretical seismology and digital technology. Among them is a proposal for an upgraded, integrated U.S. Seismological System (USSS) to provide information on earthquake sources, seismic hazards, and ground motions. Such a system would help improve earthquake prediction and the safer siting of lifelines.

*"Earthquakes, Volcanoes and Hurricanes: A Review of Natural Hazards and Vulnerability in the West Indies."* John Tomblin. *Ambio* 10 (1981): 340-345.

The article summarizes the known loss of life and property damage in the Caribbean region from each hurricane, earthquake and volcanic eruption since 1691. Future risks to the population from these hazards are assessed, as are migration patterns of the people to regions of different exposure, changes in building construction methods, and improved capability to predict destructive events. The author suggests that future vulnerability may be reduced by upgrading routine monitoring and warning systems, and by expanding local emergency programs.

*Multi-Government Management of Floodplains in Small Watersheds.* Office of Training and Education, Federal Emergency Management Agency. 1981. 59 pp. Single copies are available free from the Office of Publications, FEMA, 500 C Street, S.W., Washington, DC 20472, (202) 287-0689.

In 1978, a team of researchers conducted a national study to assess the extent of fragmentation in management authority along small and medium-sized streams and their flood plains, and to recommend ways to better coordinate intergovernmental efforts to use flood plains wisely. This document is a condensed version of the comprehensive report published in 1980, and is limited to consideration of floods in small, urbanizing watersheds. Among the topics discussed are floods as a natural process, techniques of flood plain management, various management sectors and governmental levels, and legal arrangements for intergovernmental coordination. A second section presents case histories of different approaches to coordination undertaken at specific locales in the United States.

*State and Local Acquisition of Flood Plains and Wetlands: a Handbook on the Use of Acquisition in Flood Plain Management.* U.S. Water Resources Council. 1981. 137 pp. Single copies are available from the WRC, 2120 L Street, N.W., Washington, DC 20037, and from the Natural Hazards Information Center.

Land acquisition is a nonstructural flood management alternative which offers a number of distinct economic and social advantages. Directed at state and local planning officials familiar with flood management problems but without experience in flood plain acquisition, this handbook addresses economic, organizational, and managerial difficulties associated with the acquisition process. Elements of an acquisition program discussed include funding, the condemnation procedure, relocation assistance, and legal authority. Ten case studies of successful relocation projects disclose the features of each acquisition program which contributed to its ultimate success. The handbook stresses that land acquisition is not an end in itself, and that the process usually needs to be used in conjunction with other flood management tools to achieve best results.

*"Earthquake-vulnerable Populations in Modern Turkey."* John Kolars. *Geographical Review* 72 (1982): 20-35.

The article proposes a method for differentiating the vulnerability to natural disasters of subgroups in a nation's population and regions within its boundaries so that administrative procedures can be tailored to provide appropriate services and assistance. Although a myriad of variables (e.g., regional architectural styles, the availability of doctors, and the number of newspapers and radios) could be determined for any country, the author correlates spatial expressions of population potential, seismicity, and regional accessibility to determine the differential vulnerability of the country to earthquakes. The result of the analysis is a four-point strategy for efficient disaster planning in Turkey: some regions would benefit most from the direct delivery of information through the mass media; certain provinces need better communication between their urban and rural sectors; officials in well-developed rural areas could use more training and more contact with the central government agencies; and a full-scale program to develop emergency planning and response capabilities is called for in most of the rural eastern provinces.

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NOTE: The publications listed here should be obtained from the author, organization or publisher cited. They are not available from the *Natural Hazards Observer*.

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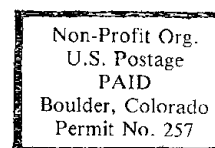
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