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Disaster Prevention and Mitigation

A Compendium of Current Knowledge

Volume 4

METEOROLOGICAL ASPECTS



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FOREWORD

The Office of the United Nations Disaster Relief Co-ordinator (UNDRO) presents the fourth volume in the series entitled "Disaster Prevention and Mitigation". The purpose of these publications is to provide the international community with a comprehensive review of existing knowledge of the causes and characteristics of natural phenomena and the preventive measures which may be taken to reduce or eliminate their impact on disaster-prone developing countries.

These volumes are prepared in accordance with General Assembly resolution 2816 (XXVI), which calls upon the Office of the United Nations Disaster Relief Co-ordinator to promote the study, prevention, control and prediction of natural disasters, including the collection and dissemination of information on technological developments.

The aims of these studies are, first, to identify the existing knowledge and expertise which may be applied directly toward the prevention and of natural disasters, particularly in developing countries and, secondly, to identify the gaps in current knowledge which require concerted action by the international community.

During the last two decades the international community has become increasingly alarmed by disasters, which have tended to be more destructive as they affect ever larger concentrations of population. While the response of the international community has been focussed primarily on relief action, it is now realized that the actual and potential consequences of disasters are becoming so serious and increasingly global in scale, that much greater emphasis will henceforth have to be given to planning and prevention. The effects of natural phenomena must be viewed not only in humanitarian and broad social terms, but also, and primarily, in economic terms. Natural disasters are a formidable

obstacle to economic and social development. In terms of percentage of gross national product, the losses caused by disasters in some disaster-prone developing countries more than cancel out any real economic growth. There has thus been a growing awareness by Governments of the need to focus more attention on disaster preparedness and prevention, and a recognition of the fact that disaster prevention and pre-disaster planning should be an integral part of national development policy.

The "International Strategy for Disaster Prevention", proposed by UNDRO and approved by the General Assembly at its twenty-ninth and thirtieth sessions, will provide the conceptual framework for national and international action in the prevention and mitigation of natural disasters. This strategy will harness the collective human and material resources of the world towards removing the scourge which natural disasters represent for many disaster-prone developing countries. The present series on "Disaster Prevention and Mitigation" provides one of the inputs for the formulation of the strategy.

Meteorological phenomena are responsible for many natural disasters. The severe storms which occur in the tropics and are known variously as tropical cyclones, hurricanes or typhoons are characterised by winds of extreme violence and rainfall which may be very heavy and prolonged. Associated effects are river flooding and the inundation of coastal regions (which are treated at length in the second volume of this series) as a result of invasion by the sea in the form of storm surges brought about by strong winds. Tornadoes affect relatively small areas but, in their short

lifetime, can cause immense devastation. Meteorological conditions also play a significant role in other dangerous phenomena such as avalanches and the storm surges produced by the intense depressions of temperate latitudes.

This volume, Meteorological Aspects, is concerned with the nature and meteorological properties of the phenomena mentioned in the preceding paragraph. Major attention is given to tropical cyclones, since numerous developing countries in some of the world's most densely-populated regions are situated in the path of these storms and individual countries are frequently exposed to recurring possibilities of wide-scale disaster. Various technical procedures and problems are discussed primarily within the context of meteorological services endeavouring to make their full contribution to disaster prevention and preparedness. The main objectives are to provide a background knowledge of the meteorological phenomena that can cause disasters and to impart an understanding of the capabilities and limitations of meteorological services and governments and organisations in their efforts to prevent and mitigate disasters caused by these phenomena.

All the publications in the series "Disaster Prevention and Mitigation" are addressed to a broad range of users, including high-level government officials, administrators, technical experts in the field and specialists in the various areas of disaster prevention. They are also designed to guide officials at the national and regional level in the formulation of policies for preventive measures against the types of natural phenomena affecting their region.

The Office of the United Nations Disaster Relief Co-ordinator invites the readers of this volume, Meteorological Aspects, to provide their comments and suggestions.

This monograph was prepared by the Office of the United Nations Disaster Relief Co-ordinator, with the co-operation of the World Meteorological Organisation, and in collaboration with Mr. Patrick J. Meade. Contributions were also made by Mr. R. Cecil Gentry and Mr. Paul Föhn. The monograph was made possible through the active co-operation of the United Nations Environment Programme (UNEP).

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