

CHAPTER 14

OVERVIEW

14 Conclusions

The following paragraphs discuss the pattern of survey responses across the main groups of countries that were addressed in detail in the preceding chapters of this report. The aim here is to identify similarities and significant differences between the responses from the various WMO Regional Associations and from other major groupings such as Developing and Least Developed Countries and Small Island Developing States. Paralleling the organization of the country-level survey questionnaire itself, this cross-group review is structured under the following four themes - Governance, Organizational, Technical, and Training and Capacity Development.

- The Governance theme centres on the national legislative and governance context within which NMHS operate. It also includes less tangible aspects such as the level of recognition and understanding of the benefits of NMHSs in support of national risk reduction planning and related operations.
- The Organizational theme addresses the national coordination structures or mechanisms for disaster risk reduction and coordination and partnerships among NMHSs and other involved national agencies.
- The Technical theme focuses on the internal capacities of NMHSs to provide support for disaster risk reduction. It includes such aspects as their ability to produce standardized hazard data products, their capacities for hazard detection, warning and forecast issue, and the integration of warnings and other specialised services in support of emergency preparedness, response and relief operations.
- The Training and Capacity Development theme is largely self-explanatory: It addresses the technical training and capacity development of NMHS staff, multi-disciplinary training programmes directed at strengthening knowledge and operational linkages between NMHSs and other national agencies involved in disaster risk reduction, and public outreach programmes.

It is hoped that the preceding approach will assist in highlighting particular weaknesses or deficiencies in regions or country groupings and provide a more solid basis for planning initiatives to address these needs. As pointed out earlier, it will, however, more detailed analysis at the individual country level will generally be necessary in order to obtain sufficiently precise information to prioritize, target and obtain funding for specific enhancements to NMHSs infrastructures and capacities.

14.1 Inter-Regional and Inter-Group Comparison

The results of the inter-group assessment applied to the major country groupings are summarized in the following sections.

14.1.1 Governance

On a comparative basis, national-level coordination of disaster risk reduction activities was least frequent in the South-West Pacific, followed by Small Island Developing States, African countries and Least Developed Countries. Coordination under the direct line authority of the Head of Government was least frequent in Europe followed closely by the South-West Pacific, Least Developed Countries and North and Central America and the Caribbean. Coordination under a single ministry occurred most frequently in the South-West Pacific and Africa and least frequently in South America followed by Europe and Least Developed Countries. The survey responses indicated that national legislation clearly defined the roles of organizations involved in the national coordination mechanisms for disaster risk reduction in all responding countries in South America. The existence of such national legislation was, however, least frequent in Small Island Developing States followed by countries in Africa, Least Developed Countries, European countries and those in the South-West Pacific. The strongest expressions of the need for clear legislation or policies regarding the role of NMHS in disaster risk reduction came from Africa, North and Central America and the Caribbean and Small Island Developing States, followed closely by Least Developed

Countries, Developing Countries and South America. Conversely, countries in the South-West Pacific, Europe and Asia expressed the least need for clear legislation or policies.

14.1.2 Organizational

The survey responses indicated that national coordinating committees for disaster risk reduction were most widely established in North and Central America and the Caribbean and least common in Europe. Least Developed Country responses showed the second highest occurrence of national coordinating committees while the South-West Pacific countries had the second lowest presence. NMHS membership on such national coordinating committees was universal among responding countries in North and Central America and the Caribbean, South America and in Small Island Developing States and high in Africa, Asia, Developing and Least Developed Countries. Conversely, the lowest NMHS membership rates on national committees were in Europe and the South-West Pacific. Possibly as a consequence, proportionately more responding NMHSs from Europe considered that their contributions to disaster risk reduction were limited by their national disaster management structures than was the case in other regions. Equally, respondents from Africa and South America felt least constrained by their national coordination structures. African NMHSs considered that their contributions to disaster risk reduction were limited by inadequate linkages with other involved organizations to a greater extent than did respondents from Europe and from Least Developed Countries, followed closely by Asia and South America, who felt least constrained by this factor.

Around the world, generally very high levels of NMHS support were expressed for the implementation of readiness systems that would require specific actions by authorities on receipt of receipt of hazard warnings except in Europe where support was more lukewarm. On a comparative basis, SIDS NMHSs expressed the highest level of support. The reported extent of NMHSs collaboration and coordination with national level agencies involved in disaster risk reduction was also very high across all regions and country groupings with the exception of Europe where it was noticeably less pervasive. Collaboration with other partners such as regional bodies, international organizations and non-government bodies such as national Red Cross and Red Crescent Societies varied considerably both across regions and country groupings and with respect to individual organizations. If a general pattern existed here, it was that collaboration and partnership was noticeably less well developed as one moved away from the national level or towards non-governmental organizations. Finally, NMHSs responses to the survey, in general, showed very high levels of endorsement for the view that improved coordination between National Meteorological Services and National Hydrological Services would result in enhanced warnings, forecasts and other products for disaster risk reduction. However, the survey responses from the South-West Pacific countries, though they were positive, displayed the most modest level of endorsement for this position.

14.1.3 Technical

This horizontal assessment of the operational capacities of NMHSs to support disaster risk reduction compares the following key components of NMHS infrastructure and warning and forecast production systems – observational capacities, telecommunications and informatics infrastructures, warning and forecast capabilities and data management/product generation capacities.

14.1.3.1 Observational Capacities

The lack of adequate observational networks was identified as a limiting factor on NMHSs ability to contribute to disaster risk reduction to varying degrees across all regions and country groupings. Survey responses identified it as least limiting in Europe. Conversely, lack of adequate networks was most widely identified as limiting in South America, followed by Asia and Least Developed Countries.

14.1.3.2 Telecommunications and Informatics

Telecommunications capabilities were also identified as a factor that limited NMHSs ability to contribute to disaster risk reduction by varying percentages of countries in all regions and country groupings. All responding NMHSs in North and Central America and the Caribbean and virtually all in Least Developed Countries, for example, cited telecommunications as a constraint. Conversely, the lowest level of support for this view was in Europe. In the broader informatics areas, most respondents in all regions and groups identified applications software as a major limiting factor and even in Europe approximately three quarters of respondents held this opinion. Similarly, a majority of respondents identified network equipment and computers as limiting factors but, once again, European countries were least widely affected with just over half of respondents citing these areas as problematic. Almost two thirds of NMHSs from Least Developed Countries identified Internet access as limiting their abilities to contribute to disaster risk reduction along with roughly half of the respondents from Africa and the South-West Pacific and somewhat fewer from Small Island Developing States and North and Central America and the Caribbean. In addition, at least some respondents from all of the remaining groups and regions also identified problems with Internet access.

14.1.3.3 Warning and Forecast Capacity

The distribution of hazard warning and forecast capacities showed a reasonably predictable pattern with most NMHSs in all groups and regions reporting that they had such capacity and that professional meteorologists were on staff to provide the services. Furthermore, in a majority of cases, they indicated that forecast and warning services were provided on a 24-hourly basis every day of the year. However, significantly smaller majorities of NMHSs in Least Developed Countries, Small Island Developing States and in Africa had warning and forecast capacities. Furthermore, even though all NMHSs in South America and most in the South-West Pacific stated that they had warning and forecast capacities, they also indicated that those capacities were not operational round-the-clock in a significant percentage of countries.

Coordination of warnings issue and content with key stakeholders, an important contributor to warnings effectiveness, was practiced to varying degrees across all regions and country groupings. South American, European, and North and Central American and Caribbean NMHSs reported the most widespread coordination with key stakeholders while such coordination occurred least generally in LDCs, SIDS and Asian countries. The need for better coordination of watches, warnings and other forecast products with neighbouring NMHSs and RSMCs was advocated by a large majority of respondents from all groups though the need for coordination with RSMCs was least strongly identified in North and Central America and the Caribbean.

A large, though variable, majority of respondents in all regions and groups considered that upgrading their warning and forecast services would enhance disaster risk reduction in their countries. Support for this view was universal in Africa, South America, North and Central America and the Caribbean and among Developing Countries and Small Island Developing States. European NMHSs, though largely supportive, were, however, less adamant regarding the need for upgrading of these services. All responding NMHSs identified professional staff as a primary target for upgrading efforts though forecasting infrastructure and forecasting tools and technologies were also identified by significant numbers, especially from South America, Asia and North and Central America and the Caribbean.

14.1.3.4 Training and Capacity Development

A majority of responding NMHSs in almost all groups identified the availability of professional staff with appropriate training as a factor that limited their ability to monitor hazards. The notable exception was Europe where less than half of respondents cited this factor. Across all regions and groups, half or more of respondents also indicated that a lack of forecaster training reduced the effectiveness of their hazard warning services except, once again, in Europe where just over a third endorsed this viewpoint. The lack of joint training with disaster risk authorities was

considered to limit NMHSs disaster risk reduction efforts by a substantial majority of respondents except in Europe and the South-West Pacific where just over half identified this issue. Inadequate or lack of joint training with the media was also widely identified as limiting the effectiveness of NMHSs contributions to disaster risk reduction with the notable exception of Asia where less than half the respondents held that view. Very strong endorsement was expressed among all groups for upgrading the training of professional staff to improve support for disaster risk reduction and for the conduct of cross border training with neighbouring NMHSs that addressed the forecasting of hazards of mutual concern.

An important, but often under-emphasized, component of capacity development is the provision of training and outreach to the recipients and users of NMHSs products and services. The survey responses highlighted a general need for expansion of outreach activities directed towards ensuring that stakeholders, including the public at large, are aware of and understand hazards, watches, warnings and other NMHS products and that they know how to act in response to NMHS warnings and advice. A very large majority of respondents identified that a lack of public awareness and understanding limited the public response to warnings, though a somewhat lower number (three quarters) held this opinion in Europe and Asia. The lack of joint training with disaster risk and emergency authorities and the media was also widely seen as an important limiting factor in relation to disaster risk reduction. This factor was least frequently identified as a constraint in Asia, Europe and the South-West Pacific, though even there roughly half of respondents drew attention to it. Not surprisingly, therefore, the provision of educational modules that NMHSs could target at the media, public, and disaster authorities was endorsed by a large majority of respondents, receiving unanimous endorsement in Africa and in North and Central America and the Caribbean.

14.2 General Conclusions and Recommendations

Taken overall, the detailed examination of responses to the WMO Disaster Risk Reduction country-level survey outlined in this report has confirmed the earlier identification of Common Gap Areas (GA) that need to be addressed in order to optimize NMHS and WMO support to disaster risk reduction. It has, in effect, provided further validation of widespread requirements for increased emphasis on the following critical Gap Areas:

- **The need to mainstream NMHSs and their technical capacities into national disaster risk management systems and development planning and legislation.**
- **The need to enhance NMHSs capacities for maintenance of standardized hazard databases, hazard analysis and mapping in support of risk assessment and planning applications.**
- **The need to enhance end-to-end NMHSs capacities for early detection of hydrological and meteorological hazards and preparation and dissemination of hazard warnings, supported by strong governance, organizational and operational capacities.**
- **The need to enhance NMHS capacities for provision of meteorological services in support of pre- and post-disaster emergency response and relief operations.**
- **The need to enhance partnerships between NMHS and other key agencies to achieve a more coordinated approach to natural disaster risk reduction.**
- **The need to undertake educational and training programmes for NMHS and their key stakeholders such as authorities, emergency response operators and media.**
- **The need to enhance NMHSs public outreach programmes and materials.**

There are wide variations in the type and severity of hazards to which individual countries and regions around the world are exposed, in their vulnerability to these hazards, and in the post-disaster resilience of their societies and economic infrastructures. Equally, there are variations in underlying governance and legislative frameworks and in national systems for disaster risk reduction. In addition, the capacities of NMHSs to support disaster risk reduction vary widely

between wealthy developed nations, with state of the art scientific and technical capabilities, modern technologies and well developed, consistently funded, infrastructures, and the many less fortunate countries that have inadequate financial and other resources, poorly developed and maintained infrastructures, and limited technical and scientific expertise. Despite these differences, however, the above Common Gap Areas encapsulate the general requirements of all NMHS in seeking to provide optimal support to disaster risk reduction. Only the emphasis on individual aspects varies between countries.

At the most fundamental level, the provision of truly effective hydrometeorological support for disaster risk reduction within a country depends on the existence of:

- **A national disaster risk management system that fully integrates and utilizes the early warning and other relevant capacities of its National Meteorological and Hydrological Service;**

and

- **An NMHS that possesses the infrastructure, resources, and scientific and technical internal expertise to provide state of the art meteorological and hydrological support for disaster risk reduction and has a real focus on the delivery of services to that priority area, including an understanding of the stakeholders' needs and a willingness to tailor its outputs to meet those needs.**

The first of the above elements requires a well-informed disaster management community that clearly understands the contributions that a capable NMHS can make to the prevention and mitigation of disasters. It also requires a disaster risk reduction system that can accommodate and utilize to good effect the data, information, products and services supplied by the NMHS. The second, equally essential, element requires that NMHSs develop and maintain the internal infrastructures and scientific and technical capacities to produce and deliver those products and services that turn potential contributions or support into reality. Meeting these fundamental requirements is dependent on ongoing investments in infrastructure, training and capacity development within NMHSs, combined with the development and maintenance of close collaboration and coordination with key partners in the disaster risk reduction community. It also requires that constant emphasis is placed on ensuring stakeholder and public awareness and understanding of NMHS warnings and other products and how to utilize these products to minimize risks.

For the NMHSs in the developed countries that operate from a solid funding and capacity base, responding to the preceding challenges will involve a modest strengthening of emphasis or increase in focus on disaster risk reduction. Where less well-developed and funded NMHSs are concerned, however, significant enhancements will often need to be made to internal infrastructure and scientific and technical capacities in parallel with the sharpening of focus on disaster risk reduction. Investments in the development of NMHSs capacity and infrastructures will, moreover, need to be matched by the provision of adequate continuing funding if the enhanced capabilities to support disaster risk reduction are to be sustained over the long term.

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