

DRAFT

**WMO Strategic Executive Summary
(Revised 17 March 2010)**

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Executive summary

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- Purpose and context of the WMO Strategic Plan

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INTRODUCTION

Societal benefits of weather, climate and water services

Weather, climate, water and related environmental conditions have and continue to shape the cultures, traditions and development paths of societies worldwide. Though these societies have used weather and climate information over generations, today they benefit from much improved weather, climate, water and related environmental services to protect the safety of life and to mitigate economic losses from extreme events and natural hazards. Current services, based on much improved knowledge of the Earth system, include advances in weather forecasts and warnings, improved climate and hydrologic prediction, and the improved understanding on how weather and climate influence the environment and human activities. These services support activities, such as:

- Agricultural to enhance food production, distribution and storage,
- Management of disease outbreaks to enhance the wellbeing of society,
- Management of water resources systems and of urban settlements,
- Disaster risk reduction and improvement in economic opportunities;
- Air, land and water transport.
- Renewable energy systems such as wind, solar and hydro-power

Recent statistics from the Centre for Research on the Epidemiology of Disasters for the period 1980 to 2007 reveal that, over 90 per cent of the disasters related to natural hazards, 71 per cent of casualties and 78 per cent of economic losses, are caused by weather-, climate- or water-related hazards such as tropical cyclones and storm surges, droughts, floods, or health epidemics and insect infestations..

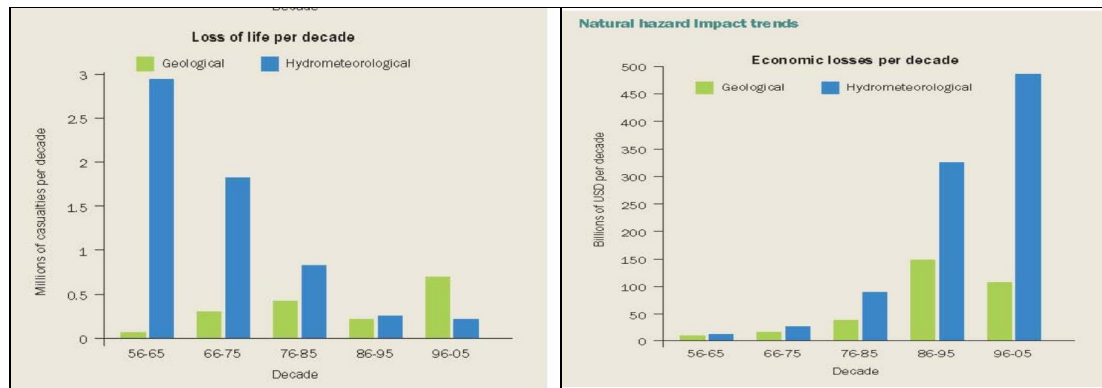


Figure 1a

Figure 1b

Figure 1: Decadal trends in natural hazard impacts over the five last decades showing decreasing loss of life (left panel) and increasing economic losses (right panel) associated with hydrometeorological hazards¹

Improvements in weather and climate services(Figure 2) together with those in communication and response systems have contributed to the reduction in the casualties associated with hydrometeorological hazards during the period 1956-2005, as shown in Figure 1a. The economic losses have, however, increased

¹ Golnaraghi, M, J. Douris, and J.B. Migraine, "Saving Lives Through Early Warning Systems and Emergency Preparedness, Risk Wise, Tutor Rose Publishing, pp 137-141.

markedly (Figure 1b) due to a variety of factors, including increases in property values, and in settlements and economic activities in disaster prone areas such as coastal, river catchments and arid/semi-arid areas. .

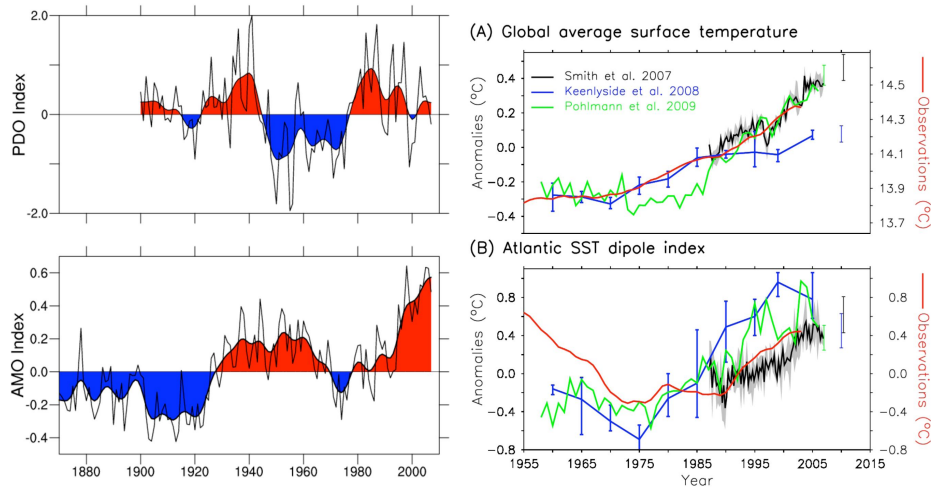


Figure 2: Observed decadal climate variability in the Pacific and Atlantic sector (left) and first attempts to make decadal predictions (right) (Adapted from WMO/TD No-1499).

The warnings formulated from increasingly skilful seasonal forecasts may contribute significantly to the prevention of climate related natural disasters, enhanced productivity in sectors dependent on climate and efficient management of the institutions dependent on weather, water and climate (Georgakakos and Graham 2008). The estimated economic benefits of climate forecasts related to El Nino – Southern Oscillation (ENSO) events at various time scales for the agricultural sector alone range from US\$450 to \$550 million/year (minimum) for world agriculture².

It is discernable from Table 1 that the losses of life, people affected and economic losses (as a percent of GDP) associated with drought during the period 1900-2010, as is observed with other hydrometeorological hazards, are more for the developing countries than for developed countries. This provides a cogent argument for priority improvement in weather, climate, water and related environmental services as well as communications and emergency response activities in developing countries to lessen the burden on their economies.

Table 1. The impacts of droughts sorted by regions for the period 1900 to 2010³

		# of Events	Killed	Total Affected	Damage (000 US\$)
Africa	Drought	259	844143	290866829	5419593
Americas	Drought	116	77	65214341	20696439
Asia	Drought	143	9663389	1597500427	28140159

² Adams, Richard M., Chi-Chung Chen, Bruce A. McCarl, and Rodney F. Weiher. "The Economic Consequences of ENSO Events for Agriculture." *Climate Research* 13: 165-172, 1999. Benefits to agriculture for US are US\$200 - \$300 million/year.

³ Source: "EM-DAT: The OFDA/CRED International Disaster Database www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium .Regions do not represent WMO Regions.

Europe	Drought	37	1200002	15482969	20061309
Oceania	Drought	19	660	8027635	10703000

The Improved services, would enable stakeholders to tackle new and emerging challenges such as enhancing economic development, poverty reduction, food production, health and water availability as formulated in the 2000 Millennium Development Goals (MDGs) and in the Johannesburg Implementation Plan of the World Summit on Sustainable Development (WSSD) as well as in other international agreements. The wmo strategic plan and operating plan seek to meet the following global societal needs

- **Improved protection of life and property (related to impacts of hazardous weather, climate, water and other environmental events and increased safety of transport on land, at sea and in the air);**
- **Poverty alleviation, sustained livelihoods and economic growth (in connection with the Millennium Development Goals) including improved health and social well-being of citizens (related to weather, climate, water and environmental events and influence), and**

Sustainable use of natural resources and improved environmental quality

WMO Strategic Plan 2012-2015

Purpose and Context

Within the framework of the WMO Convention and a set of Global Societal Needs, identified by its 189 Members, WMO is committed to achieving its vision of providing world leadership in expertise and international cooperation in weather, climate, hydrology and water resources, and related environmental issues, and thereby to contribute to the safety and well-being of people throughout the world and to the economic benefit of all nations. Utilizing the capabilities of the National Meteorological and Hydrological Services (NMHSs), WMO will focus its programmes and activities on providing the best possible services to support the safety and wellbeing of its Member countries and their efforts to address global societal needs and environmental issues..

The WMO occupies a unique “niche” within the international system, in developing an unmatched system of global cooperation in weather, climate, hydrology and related environmental data and services. It has been most effective in facilitating the development of NMHSs in almost all countries of the world. The achievements of WMO include:

- **Free and Unrestricted Exchange of Meteorological and Related Data and Products;** essential for all real time weather , climate, water and related environmental services together with the assessment of the evolution of the climate system;
- **international Standards for Meteorological and Related Observations** ensuring high quality and intercomparability of data – a vital feature for detecting climate change and developing global weather and climate models and related services
- **Capacity Building** - in NMHSs throughout the world;
- **Promoting Science and Technology** – transforming leading edge research into useful products and services;
- **International Leadership** - recognized leader amongst the UN organizations for its capacity to promote the prediction, projection and assessment of the Earth system and environmental problems, and the prediction of its future evolution, stratospheric ozone depletion and climate change.

WMO will continue to rely on its Members, their NMHSs and national scientific institutions; other partners, e.g., ICSU, UNESCO and UNEP, ;other professionals from universities and the private sector; and national financial support to provide the scientific, programmatic and infrastructural support necessary to implement a cost-effective international cooperative system. With global societal needs escalating, future weather, climate, water and related environmental products and services will require significant targeted improvements to:

- Provide user targeted timely, accurate and cost-effective products and services;
- Provide and promote the use of products and services in addressing the challenges of adaptation to climate variability and change;
- Enhance the effectiveness of their services and lower costs by promoting cooperation and partnerships nationally and internationally;
- Enhance the visibility of its Members and their activities by more fully participating in international programmes and conventions; and
- Assist countries in translating commitments, agreed within the framework of global conferences, summits and international conventions, into effective and practical measures.

The Structure of the WMO Strategic Plan 2012-2015

Starting with the three Global Societal Needs (GSNs), the WMO Strategic Plan defines five Organization-wide strategic thrusts (STs) and eight (8) Expected Results (ERs) to achieve its vision (Table 2).

Table 2: Schematic representation of the structure of WMO Strategic Plan 2012-2015

		5 Strategic Thrusts		8 Expected Results	
WMO Strategic Plan 2012-2015	3 Global Societal Needs	1. Improved protection of life and property (related to the impacts of hazardous weather, climate, water and other environmental events and increased safety of transport on land, at sea, and in the air)	Improving Service Quality and Service Delivery	1. Enhanced capabilities of Members to deliver and improve access to high-quality weather, climate and water and related environmental predictions, information and services in response to users' needs and to enable their use in decision-making by all relevant societal sectors	2. Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate and water and related environmental elements
				Advancing Scientific Research and Application as well as Development and Implementation of Technology	3. Enhanced capabilities of NMHSs to produce better weather, climate, and water and related environmental information, predictions and warnings to support in particular climate impact and adaptation strategies
		Strengthening Capacity-building	5. Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and environment science and technology development		6. Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfill their mandates
			Building and Enhancing Partnerships and Cooperation		7. New and strengthened partnerships and cooperation activities to improve NMHSs' performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategies
		2. Poverty alleviation, sustained livelihoods and economic growth (in connection with the Millennium Development Goals) including improved health and social well-being of citizens (related to weather, climate, water and environmental events and influence)		Strengthening Good Governance	
		3. Sustainable use of natural resources and improved environmental quality			

The 8 ERs are further delineated by Key Outcomes (KOs) and their associated key performance indicators to measure the success in achieving the results. The involvement of the WMO Technical Commissions, Regional Associations and the Secretariat in the strategic planning process ensures a focused and coordinated approach across the Organization.

This Strategic Plan, while focused on the financial period 2012–2015, takes into consideration longer term social, economic and technological issues facing the Organization. It also serves as the foundation for the WMO Operating Plan, the Secretariat Implementation Plan and Budget, and the performance monitoring and evaluation activities, which together define the detailed deliverables, performance targets and the allocation of resources to achieve the expected results.

Strategic Thrust 1: Improving Service Quality and Service Delivery

Despite improvements in understanding and the prediction of the global earth system, societies, especially in developing and least developed countries, are still vulnerable to severe weather and extreme climate conditions. Hence, there is much more for WMO to do to assist countries worldwide to benefit from improvements in the quality of weather, climate, water and related environmental services together with their delivery. This requires collaborative efforts involving the providers and users of information to ensure that the needs of the users are integrated in the development of the products and to enhance feedback between the providers and users of information for further improvement.

Strategic Thrust 1 has two Expected Results (**ER1** and **ER2**) (Table 2).

ER1 addresses the rapidly changing paradigm for providing meteorological (weather and climate), hydrological and environmental services that requires service providers to:

- Understand the use of the information in order to tailor the information to the user needs, e.g., through an effective rolling review of client needs for its products and services;
- Integrate weather, climate, water and environmental information and products within a single service. .

ER2 addresses the need for NMHSs to be an integral component of multi-hazard national emergency management system and to work with relevant sectors to develop products and information to support their specific needs for decision-making in responding to extreme climate, water and related environmental events.

Disaster risk reduction is a priority area due to the negative influence of natural disasters on the achievement of the GSNs. Weather, climate and water related disasters continue to result in very high human and economic costs, and displacement of large populations in many countries, particularly in developing and least developed countries. By developing a set of contingency measures based on weather, climate, water and related early warning systems, including environmental information and services, nations can save more lives and reduce economic losses associated with natural disasters

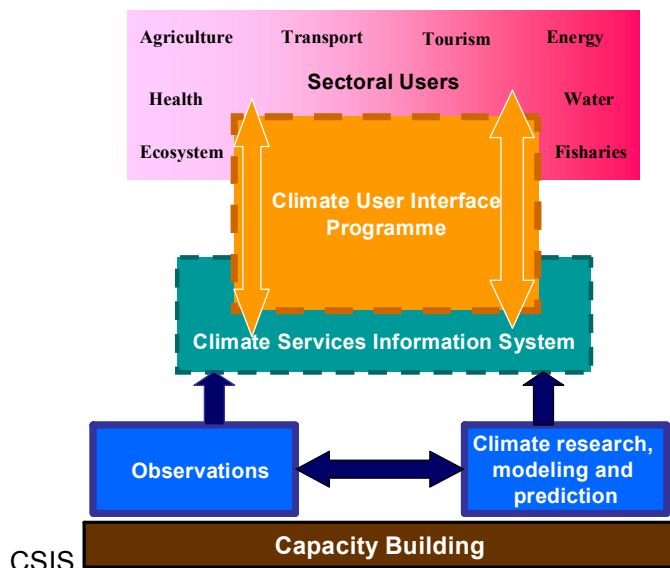
Strategic Thrusts 2: Advancing scientific research and application as well as development and implementation of technology

Past scientific and technical advances have made significant contributions to improving weather, climate, water and related environmental information and services. Further scientific and technical advances are needed to increase the scope, accuracy and lead time of weather, climate, water and related environmental information and services and to enhance the

availability of comprehensive and robust information networks for improving the quality of services to address the many remaining challenges that have been exacerbated by population growth, greater use of marginal land areas, and diversified human activities.

Strategic Thrust 2 has three Expected Results (ER3, ER4 and ER5)(Table 2) together with their key outcomes and performance indicators ,and 3 priority areas for implementation in 2012-2015.

ER3 (Table 2) addresses improvements in long range predictions, and climate and hydrological information and products. The **Global Framework for Climate Services (GFCS)** is a priority under ER3. The Heads of State and Government, Ministers and Heads of Delegations at the World Climate Conference-3(Geneva, Switzerland, 2009) decided to establish a Global Framework for Climate Services (GFCS) “to strengthen the production, availability, delivery and application of science-based climate prediction and services.” The Framework will benefit from and contribute to the achievement of the outcomes of other ERs .



CSIS. Figure 3: Components of the Global Framework for Climate Services

In addition to the pillars of observations, and climate research, modelling and predictions, Climate Services Information System and Climate User Interface Programme are the two new components of the Framework (Figure 3). The progress made and systems developed over the years under the World Climate Programme through Members and their NMHSs will form the foundation for developing the GFCS.

ER 3) addresses WMO activities to make its data, products and services more useful to the society and relevant in day to day decision making. Greater emphasis on sectoral applications, such as those in agriculture, water management and disaster risk reduction, will be essential in future products and services from the NMHSs.

The priority in generating hydrologic information and products will be on enhanced, quality efficiency and effectiveness. Among the initiatives will be to prepare guidance materials to be utilized to increase the capacities of the NMHSs,

particularly in developing and least developed countries, to improve hydrological forecasting, water resources assessment and management, and adaptation to climate variability and change. WMO also will seek to mobilize resources for the improvement of hydrological networks in developing and least developed countries.

ER4(Table 2) addresses improvements in three systems- WIGOS, WIS and a strengthened co-sponsorship Global Observing System for Climate (GCOS) ,which facilitates improvements in the quality of climate data of the total climate system to meet the needs of international, regional and national users of climate data and the derived products.

These activities will support for the observational requirements for the GFCS, Intergovernmental Panel on Climate Change (IPCC), and WMO Member States in their national climate services in various international conventions such as UNFCCC, the UNCCD and the Ozone Convention

The WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) are priority areas under ER4.

Weather, climate, water and related observations, gathered by NMHSs and partners, form the foundations for the delivery of all services provided by NMHSs and for much of the research to improve our understanding of the earth system together with its prediction. The Fifteenth WMO Congress (Cg-XV, May 2007), decided to establish the WMO Integrated Global Observing Systems (WIGOS), a coordinated, comprehensive and sustainable system, to address observational requirements of all WMO programmes and partners, including those of the Global Earth Observation System of Systems (GEOSS) of the Group on Earth Observations(GEO), in the most cost effective way. The WIGOS will enhance observing capabilities, data and product quality, and interoperability among WMO global observing systems (GOS, GAW and WHYCOS) and other WMO co-sponsored observing systems (Figure 4). The goal is to provide improved information and products to support decision-making at all levels.

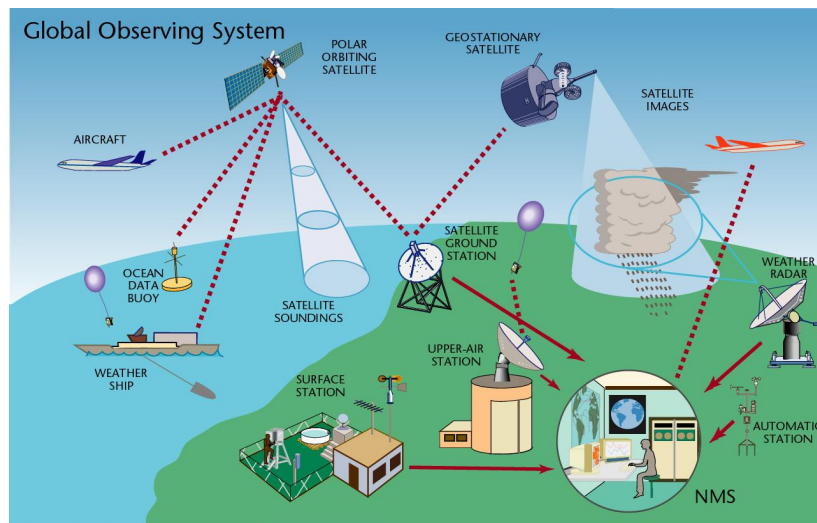


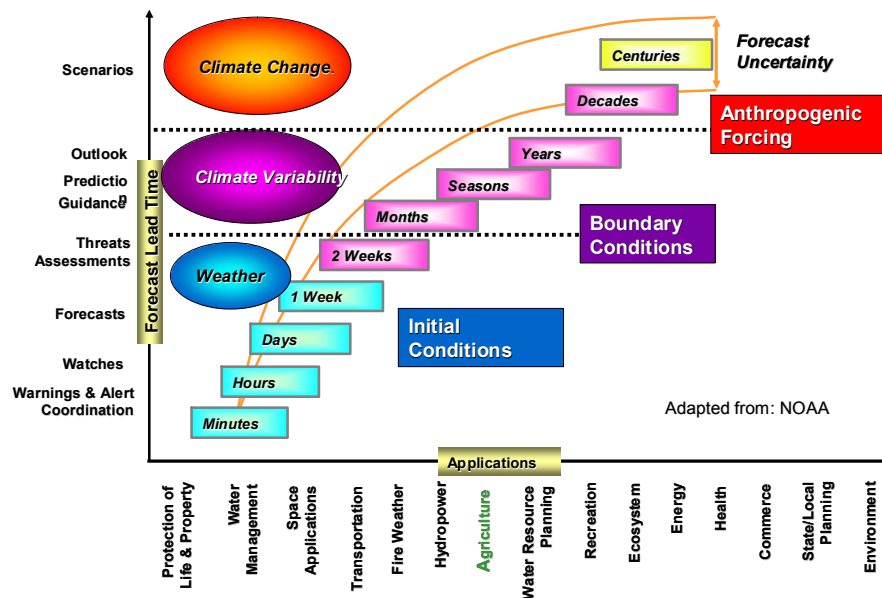
Figure 4: The WMO Global Observing System that form the foundation for establishing WMO Integrated Global Observing System (WIGOS)

The Cg-XV also decided to develop and implement WIS as a pillar of WMO strategy to efficiently manage and move weather, climate water and related environmental information and products in the 21st century. The WIS provides an integrated approach suitable for all WMO Programmes to meet the requirements for routine collection and automated dissemination of observed data and products, as well as data discovery, access and retrieval services for all weather, climate, water and related data produced by centres and Members in the framework of any WMO Programme.

The **ER5** (addresses improvements in prediction of weather and climate, and observations, and the assessments of atmospheric chemistry. Research and application activities will focus on:

Weather, Climate and Water Research, Predictions and Services as a priority area under **ER5**. Future research will follow a balanced (or seamless) approach to weather, climate and water services, including developing forecasts of a broader range of environmental parameters, such as air quality, sand and dust storms, and changes in vegetation, to meet the needs of users and the urgent demands to reduce the vulnerability of communities. Figure 5 showings the challenges of developing ‘seamless’ products and Services, and the available climate information and gaps. The future approach to weather, climate and water research, predictions and services will:

- Take a unified approach over multiple time and spatial scales, including a requirement for the downscaling of climate information.
- Invest in increasingly high-performance computing to accommodate the increasing complexity and detail of models;
- Develop closer linkages between research, operations and users, e.g., through Forecast Demonstration Projects (FDP).



Figure, 5: Schematic diagram showing the challenges of developing ‘seamless’ products and Services, and the available climate information and gaps (Source: NOAA).

Strategic Thrust 3: Strengthening Capacity-Building

The human resource and infrastructure capacity of an NMHS has a significant influence on the quality of services and their delivery including the ability of the users to interpret and integrate the services into decision-making. Despite continued improvements in science and technology, many NMHSs in developing and least developed countries often cannot take advantage of these improvements due to inadequate infrastructure and insufficient skilled personnel. Institutional capacity building is needed to improve ability to conduct targeted research, management, planning and policy development and to develop communication skills to improve their dealings with clients, the media, and their governments.

Strategic Thrust 3 has one expected result (**ER6**), which addresses the need to improve infrastructure and systems operated by NMHSs and human resources with special emphasis on the future developments of multi-hazard warning and response systems and climate services to support the Global Framework for Climate Services.

- **Capacity building** is a priority area in ER6 since it is critical for improving the NMHSs' capabilities, capacities and involvement with users in other governmental organizations, civil society, private sector and intergovernmental groupings. The main objectives of this priority area are to: Give particular attention to the capacity development needs of NMHSs in developing countries, Least Developed Countries and Small Islands Developing States to address specific issues such as forecaster qualifications for aviation meteorology, the GFCS and disaster risk reduction;
- Increase awareness on the socio-economic benefits of the products and services provided by the NMHSs and regional centres, including their contribution to the achievement of the Millennium Development Goals;
- Assist NMHSs managers with tools for building effective communication with governments, policy- and decision-makers, and development partners;
- Continuously assess and address NMHS training needs, including professional training and development, technical training, project development and management training;
- Expand the number of strategic partnerships with internal and external stakeholders;
- Support the above initiatives through enhanced Resource Mobilization.

Success in these efforts, especially by developing and least developed countries, will require cooperative efforts with Members, and international and regional partners to mobilize resources from multiple extrabudgetary sources.

Strategic Thrust 4: Building and enhancing partnerships and cooperation

The complexity of the Earth system and the interconnections between weather, water, climate and related environmental processes and hazards are increasingly challenging the scientific and financial capacity of WMO to improve the quality and accuracy of information and products. No single government or agency has the necessary resources to address all the challenges on its own. Consequently, the Organization's success depends on its ability to partner effectively with internal stakeholders and external organizations in addressing the GSNs.

The partnership strategic thrust is important to:

- Heighten understanding and use of WMO's environmental information and service capabilities by the United Nations system, Member countries, and international and national organizations, e.g., in implementing the GFCS and other initiatives;
- Enhance partnerships with other major international scientific organizations due to the increasing complexity and multi-disciplinary of the basic science issues required to provide improved products and services.
- Enhance WMO's ability to increase the scope of its information and products and to develop and sustain service improvements by leveraging the capabilities of partners. Further the responsiveness of Member's agencies to emerging requirements is expected to increase by this cooperation;
- Broaden partnerships between developed, developing and least developed countries involving relevant national agencies, e.g., with emergency management agencies.; and
- Maintain a proactive role in ensuring a coherent, science-based approach within the United Nations system and among other stakeholders to implement environmental conventions, including outcomes of World Summits and follow-up to all relevant United Nations Conventions.

Strategic Thrust 4 (Table 2) has one expected result (ER 7), which addresses the need to enhance cooperation and partnerships among national and international institutions to achieve the shared objectives.

Strategic Thrust 5: Strengthening good governance

Good governance promotes open and transparent processes, efficient and effective use of resources and equitable treatment of all parties. Explicit efficiency goals are needed to accelerate the pace of improvements within the currently achievable resources.

This strategic thrust aims to improve management of WMO as a whole by:

- Improving the efficiency and effectiveness of its governing and constituent bodies;
- Promoting open and transparent business processes, efficient and effective use of resources and equitable treatment of all parties;
- Enhancing the efficiency of the WMO Secretariat;
- Ensuring the integrity of WMO management systems, e.g., communications;
- Improving the connection between its strategic initiatives and Programmes and Budget, through results-based management systems and practices;
- Conducting a comprehensive review of its structure, programmes and priorities and implementing the findings thereof.

Strategic Thrust 5 has one expected result (**ER 8**), which addresses the need to improve the efficiency and effectiveness of the Organization.

The management priority is focused on improving the efficiency, effectiveness and transparency of the programmatic and financial management of the organization. This includes developing a visionary Strategic Plan, a clear and effective WMO

Operating Plan and an efficient and transparent Secretariat Implementation Plan and Budget for the Financial Period 2012 – 2015 together with a monitoring and evaluation system. It will also enhance the effectiveness and efficiency in service delivery.

WMO Operating PlanThe WMO Operating Plan translates the strategic thrusts, expected results and key outcomes described in the Strategic Plan into specific initiatives and projects, which are needed to address the global societal needs and achieve the expected results. The WMO Operating Plan is comprehensive in that it distinguishes the contribution of WMO Members, technical commissions, regional associations and the Secretariat. Starting with the Key Outcomes, it specifies the deliverables; activities and performance metrics to assess progress in achievement of the expected results and encompass the activities of the 7 WMO Technical Commissions and the 6 Regional Associations. It forms the basis for WMO-wide Monitoring and Evaluation.

Secretariat Implementation Plan and Budget –identifies specific activities, initiatives, and the resources that the Secretariat, working with regional associations and technical commissions, requires to implement the activities that lead to achieving the key outcomes and expected results.

The end result is a results-based budget for the Secretariat together with the implementation plan containing the following items:

- A logical framework for informed budgetary decision-making, which provides the expected results, deliverables, activities and performance indicators, together with the required resources;
- Resource justification by results, which is designed to optimize the use of resources and improve the Secretariat's responsiveness to meet Members' needs;
- Incorporation into the budgetary decision-making process of performance measures gauging progress towards key performance targets against allocated resources.

The Secretariat Implementation Plan and Budget is submitted in a different document (*add web-link once approved*) and is approved by Congress.

Monitoring and Evaluation –are tools to measure the performance of the Organization and the implementation of its Strategic Plan. Monitoring and evaluation also contribute to identifying good practices and lessons learned with respect to implementation as well as policy, strategy and programmatic design that will inform the next phase of strategic planning. They provide information for ensuring the continuing effectiveness and relevance of the WMO Programmes. The evaluation results are important inputs to the strategic planning process and are used to adjust strategic direction and priorities, if required.

Whereas monitoring is an ongoing function, annual evaluations are conducted and results are reported to the constituent bodies of WMO, in particular the Executive Council.

The M&E procedures and practices are defined in the WMO Monitoring and Evaluation System. Monitoring and evaluation of the implementation of the WMO

Operating Plan and Secretarial Budget is the joint responsibility of WMO constituent bodies, Members and the Secretariat.

CONCLUSION

Significant progress in improving the quality, timeliness and utility of weather, climate, water and related environmental predictions and assessments has resulted from the cooperation of all nations in sharing observations of the Earth system from the local to the global scale, coupled with advances in data assimilation techniques and numerical models. This interdependence of countries is the principal reason d'être for the establishment of WMO, since WMO provides an effective forum for establishing observational and data quality standards, for promoting the exchange of data and the transfer of technology, and for sharing knowledge related to research, products and services.

Despite these improvements more societies are increasingly vulnerable to natural hazards, while national economies are becoming more sensitive to climate variability and change as evidenced by the greater frequency and intensity of climate extreme events. The full benefit from continuing scientific and technological progress is yet to be realized.

WMO is focusing its strategic direction for the period 2012-2015 on five Strategic Thrusts that address the Global Societal Needs. Its Strategic Plan under-scores the importance of improving the interaction between providers and users of weather, climate, water and related environmental products and services. Within the Strategic Thrusts and eight Expected Results are five priority areas:

- Disaster Risk Reduction
- Global Framework for Climate Services
- Implementation of the WMO Integrated Global Observing System
- Advancing Seamless Weather, Climate, Water and related Environmental Prediction
- Capacity Building

Advancing these priorities offers great potential for improving the weather, climate, water and related environmental products and services offered by the NMHSs, for enhancing WMO and its Members contribution to global initiatives, and for strengthening the capacities and involvement of all Members within their countries and in regional and global activities, especially those in developing and least developed countries.

The Plan emphasizes capacity-building and partnerships as an effective way to optimize resources to achieve internationally agreed development goals and to reduce the risks to development from natural disasters and climate change. Finally the Organization will focus on efficient management and good governance to achieve its objectives.

This Strategic Plan provides a clear way forward for the Organization to address the critical global societal needs, agreed upon by Members. More information about WMO and its strategic planning process is available on its website 'www.wmo.int'