

REPORT ON THE RESULTS OF THE SURVEY ON
THE IMPACTS OF ACHIEVED RESULTS ON MEMBERS
CONDUCTED IN FEBRUARY-OCTOBER 2012

FULL REPORT



October 2012

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Introduction

A survey on the “Impacts of Achieved Results on Members” was undertaken in February-October 2012. The Members were requested to respond to a questionnaire developed by the EC WG/SOP, which comprised of 129 questions. As of October 2012, a total of 109 NMHSs (58%) had responded. Of these, six started the survey but only responded to a few questions. The response rate per Regional Association (RA) is as follows: RA I (Africa) – 42%; RA II (Asia) – 65%; RA III (South America) – 58%; RA IV (North America, Central America and the Caribbean) – 68%; RA V (South-West Pacific) – 50%; and RA VI (Europe) – 67%.

The NMHSs that submitted responses are Afghanistan; Antigua and Barbuda; Armenia; Austria; Australia; Bahamas; Bahrain; Bangladesh; Barbados; Belarus; Belgium (first question only); Belize; Benin; Bosnia and Herzegovina; Brazil; British Caribbean Territories; Brunei Darussalam; Bulgaria; Burundi; Canada; Chile; China; Congo; Cook Islands; Costa Rica; Cote d’Ivoire; Croatia; Cyprus; Czech Republic; Denmark; Dominica; Dominican Republic; Egypt; El Salvador; Estonia; Finland; France; Gabon; Germany; Greece; Guinea; Guinea-Bissau; Guyana; Honduras; Hong Kong, China; Hungary; Kenya; Indonesia; Iran; Ireland; Israel; Japan; Kazakhstan; Kenya; Kuwait; Kyrgyzstan; Lao People’s Democratic Republic; Latvia; Libya; Lithuania; Luxembourg; Macao, China; Malawi; Malaysia; Maldives; Mauritius; Mexico; Micronesia; Morocco; Mozambique; Myanmar; Netherlands; New Zealand; Nigeria; Oman; Pakistan; Paraguay; Peru; Philippines; Poland; Portugal; Qatar; Republic of Korea; Republic of Uzbekistan; Republic of Moldova; Romania; Russian Federation; Rwanda; Saint Lucia; Singapore; Slovenia; South Africa; Spain; Sri Lanka; Senegal (first few questions); Suriname (first question only); Sweden (first question only); Switzerland; Thailand; The former Yugoslav Republic of Macedonia; The Russian Federation; Trinidad and Tobago; Uganda; United Kingdom of Great Britain and Northern Ireland; United Republic of Tanzania (logged on); United States of America; Uzbekistan; Vanuatu; Venezuela; Yemen; Zambia; and Zimbabwe.

The results, which are presented in the order of questions in the questionnaire, reflect the views of the NMHSs that responded.

Results of the Survey

Expected Result 1:

Enhanced capabilities of Members to deliver and improve access to high quality weather, climate, water and related environmental predictions, information and services in response to users' needs and to enable their use in decision-making by relevant societal sectors.

Key Outcome: Improved access to seamless weather, climate, water, and related-environmental products and services (e.g., warnings, forecasts and supporting information)

KPI: Analyses showing the social and economic benefits of the improved services

56% of 108 respondents have conducted analysis on the social and economic benefits of the services delivered.

Of these, **97%** indicated that the results were used for decision-making in emergency management and the general public; **89%** applied the results in the area of agriculture, **82%** in aviation, and **69%** in the marine industry.

Other key sectors where a considerable portion of respondents have used the results include water, energy, transportation, industry, and tourism. Health, the environment, insurance, defence, mining, and the media were also mentioned.

KPI: NMHSs with regular access to products provided by global and regional centres

As illustrated in Figure 1, **90** respondents out of 102 consider having mostly reliable to highly reliable access to products delivered by WMO Global and Regional Centres. Only 9 NMHSs have indicated intermittent access, and 3 have no access at all.

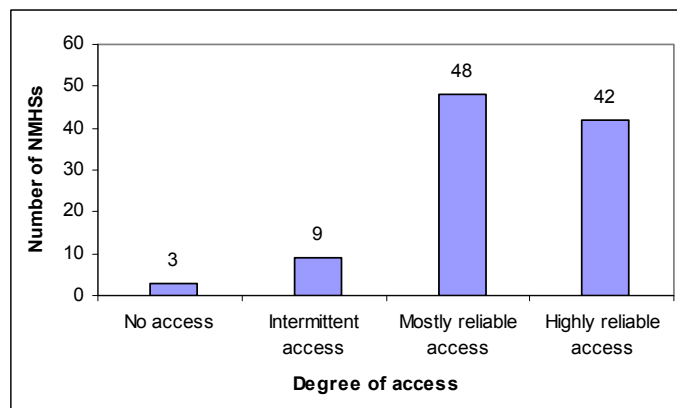


Figure 1: Access to products delivered by WMO Global and Regional Centres shown as number of NMHSs

83% of 100 respondents indicated that the level of access to products provided by global and regional centres improved in the past two years, as indicated on Figure 2.

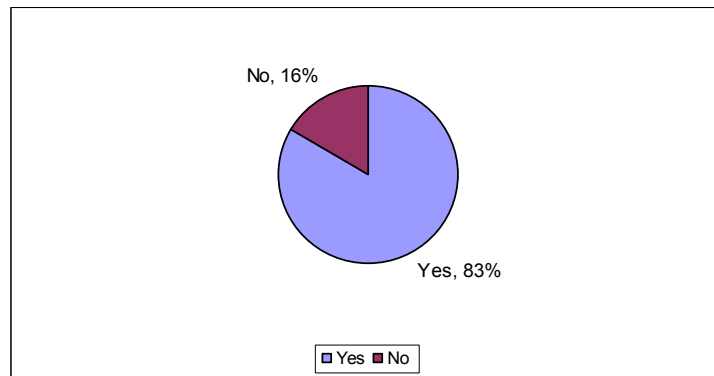


Figure 2: Improvement in level of access to products provided by global and regional centres

As evident from Figure 3, the majority of respondents use the Internet and the WMO World Weather Watch Global Telecommunication System to access data and products, while some NMHSs utilize private or dedicated lines to centres.

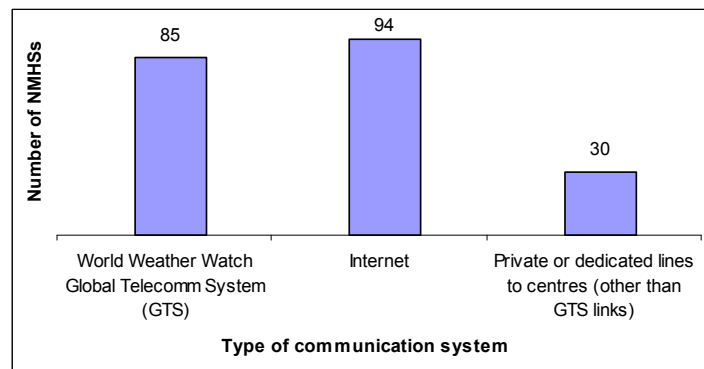


Figure 3: Communication systems used to access data and products

Key Outcome: Delivery of weather, climate, water and related environmental products and services to users' communities is improved

KPI: Increase in users with timely access to an increased number and range of products

68% of 101 respondents have initiated new service delivery to user sectors, mostly in agriculture, marine, energy, transport, aviation, health and the environment. Other sectors mentioned include tourism and recreation, water management, insurance, disaster and emergency management, industry and business, public works and maintenance, media and communications, regional and national governments, education and training, and mobile services. Figure 4 visualizes the above information.

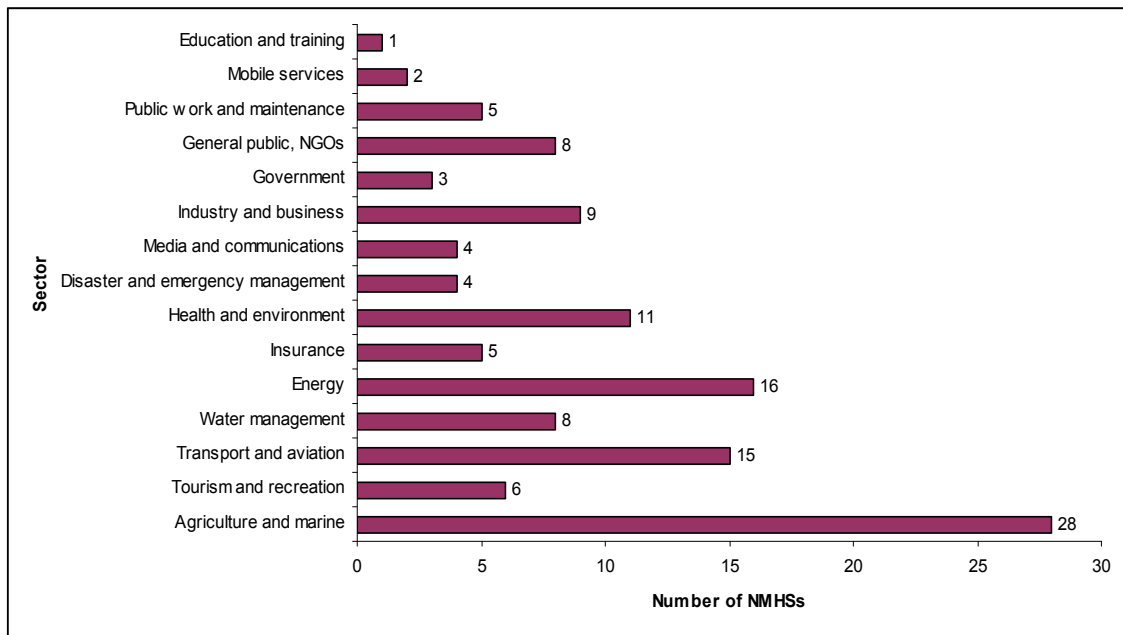


Figure 4: Number of NMHSs that have initiated service delivery to key sectors

72% of 101 respondents indicated that there is an urgent need to develop service delivery capabilities, particularly in the agricultural and marine sectors, as illustrated in Figure 5. Other areas identified include energy, weather forecasting, health and the environment, transport and aviation, etc.

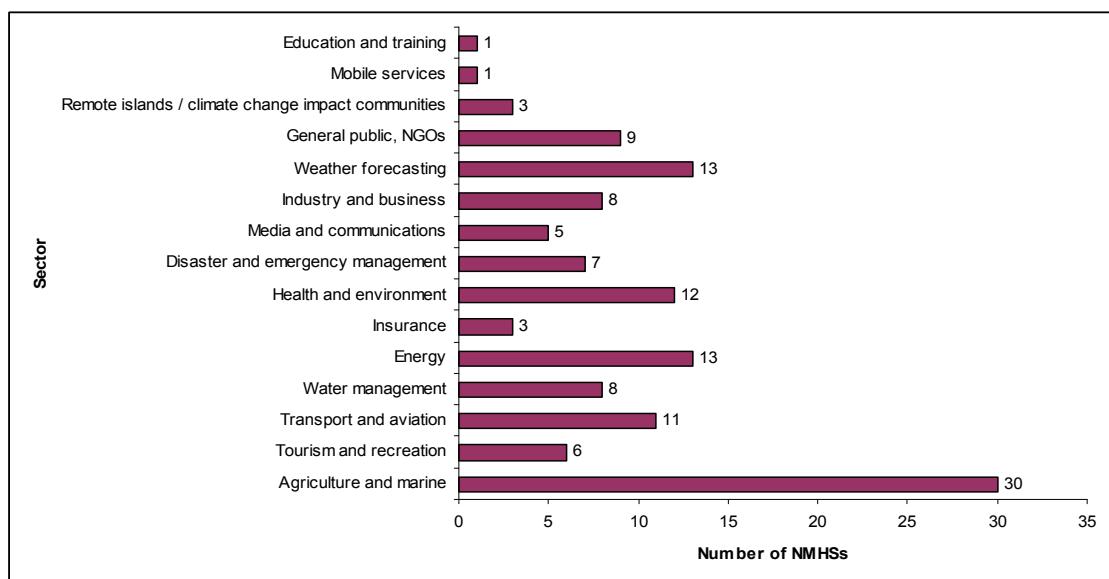


Figure 5: Number of NMHSs that indicated the need to build service capability in each sector

98% of the same number of respondents provide meteorological and related reports or guidance to decision makers by using a variety of communication methods exhibited on Figure 6.

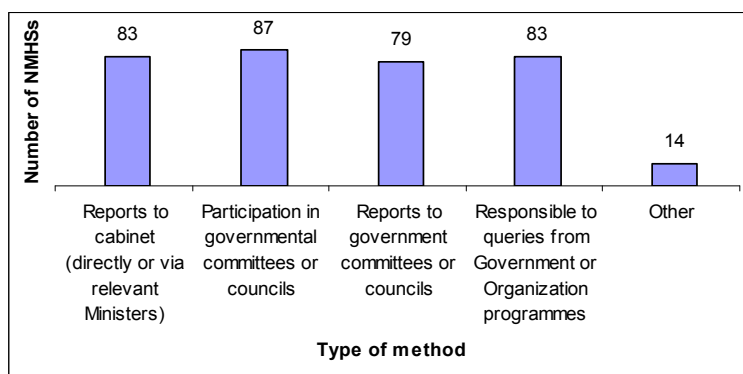


Figure 6: Number of NMHSs using each method to provide meteorological and related reports or guidance to decision makers

53% of the 100 NMHSs that responded to this question indicated significant improvement in responding to users' needs and contributing to decision making as a result of participation in WMO activities in the last two years (see Figure 7). The rest noted little improvement (44%), and only 3% did not register any improvement at all.

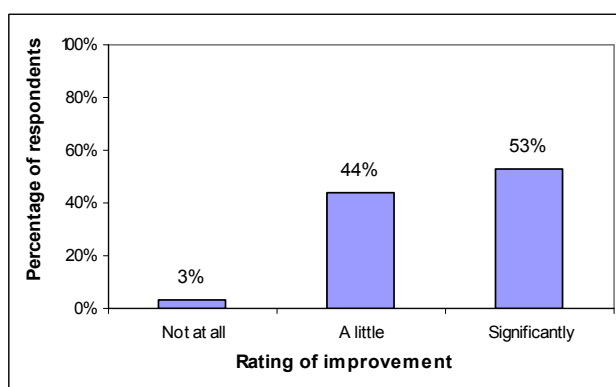


Figure 7: The rating of improvement by NMHSs to respond to users' needs and contribute to decision making as a result of participation in WMO activities in the last two years

Expected Result 2:

Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements.

Key Outcome Multi-hazard early warning systems are implemented

KPI: Increase in the number of NMHSs with multi-hazard early warning systems

69% of 101 respondents have an operational multi-hazard early warning system.

16 multi-hazard early warning systems were established during the period 2008-2011. The first multi-hazard early warning system was established in 1908 by Australia, two in the 1950s-60s, two in the 1970s, three in the 1980s, nine in the 1990s, and 25 between 2000 and 2007.

Floods, heavy rainfall, strong winds, tropical cyclones, typhoons, and tsunamis are the most commonly covered hazards by such systems. Other frequently mentioned include drought, extreme heat and cold, high seas, landslides/mudslides, thunderstorms and lightning, heavy snow and snowstorms, frost, avalanches, hail, fire, earthquakes, fog, etc. The range of hazards covered varies for each NMHS and depends on local factors. Some Members report monitoring health and environmental hazards, such as pollution, radiation, epidemics, food security, hazardous chemicals, nuclear and biological threats.

KPI: Number of NMHSs integrated into national emergency management systems

91% of 101 respondents participate in a national emergency management system, mechanism or platform. Some examples include:

Australia: *“The Bureau of Meteorology is part of the National Emergency Management infrastructure. The body overseeing this infrastructure is the National Emergency Management Committee (NEMC). While the Bureau links into and supports work endorsed by the NEMC (through established sub-committees), this organization is not an official member of the national committee and therefore, does not influence national emergency management policy.”*

Bosnia and Herzegovina: *“Our representatives are members of headquarters for emergency situation and we are sending as many reports as possible.”*

British Caribbean Territories: *“Personnel from the NWS are embedded into the Emergency Operations Centre before and during a hydrometeorological emergency.”*

Czech Republic: *“Participation in national crisis management board, cooperation with central state authorities”*

Lithuania: *“Severe weather warnings and hydrometeorological data are sent to the Fire and Rescue Department”*

Switzerland: *“Uses a Web Based Emergency platform”*

Developing country Members providing disaster risk reduction products and services

89% of 99 respondents provide Disaster Risk Reduction (DRR) products and services.

86% have improved the DRR products and services provided.

85% indicated that the DRR products and services provided have been recognized as effective contributions to the protection of life and property.

Key Outcome National integrated flood management plans are developed

Number of Members establishing flood management plans

84% of 101 respondents have a flood management plan established or under development.

Number of regional hydrological forecasting systems established in transboundary basins

61% were from countries that are part of a transboundary river basin.

70% of the 63 respondents to this question participate in a regional hydrological forecasting system for a transboundary river basin.

New regional hydrological forecasting systems have been established for 34 river basins (see list below by year of establishment) and all the larger basins of Austria and South Africa.

- Early stages of development: Great Lakes / St Lawrence
- 2012: Ganges-Brahmaputra-Meghna, Qom
- 2011: Dráva/Drava, Rába/Raab
- 2010: Carona, Mashhad, Lower Morava, Tuy, Uribante, Xebangfai
- 2000-2009: Bug, Ebro, Gilan, Guadiana, Karoon, Lys, Mano, Molestan, Nam Ngum, Níger, Odra, Rhein, Sambre, Sarre, Segura, Tajo
- 1991-1997: Western Bug, Dnieper, Western Dvina, Johor, Kedah, Kelang, Kelatan, Neman, Pahang.

Expected Result 3:

Enhanced capabilities of NMHSs to produce better weather, climate, water and related environmental information, prediction and warnings to support in particular disaster risk reduction and climate impact and adaptation strategies.

KPI: Number of standardized products (e.g., monthly and seasonal predictions, climate watches) provided by Members

44% of 95 respondents rated the quality of regional and national products as relatively high to very high on a scale of 1-5, as illustrated in Figure 8. A similar proportion of respondents (46%) indicated a rating of 3, while only 9% rated them as of relatively low quality.

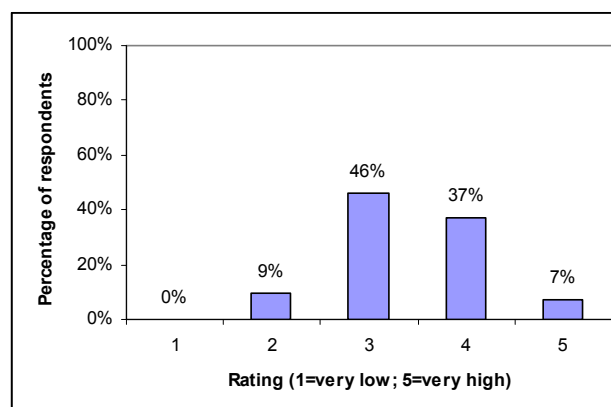


Figure 8: The rating of the quality of regional and national standardized long-range products

Figure 9 presents the number of NMHSs providing monthly predictions, seasonal predictions, climate watch bulletins, and long-term projections at a given frequency.

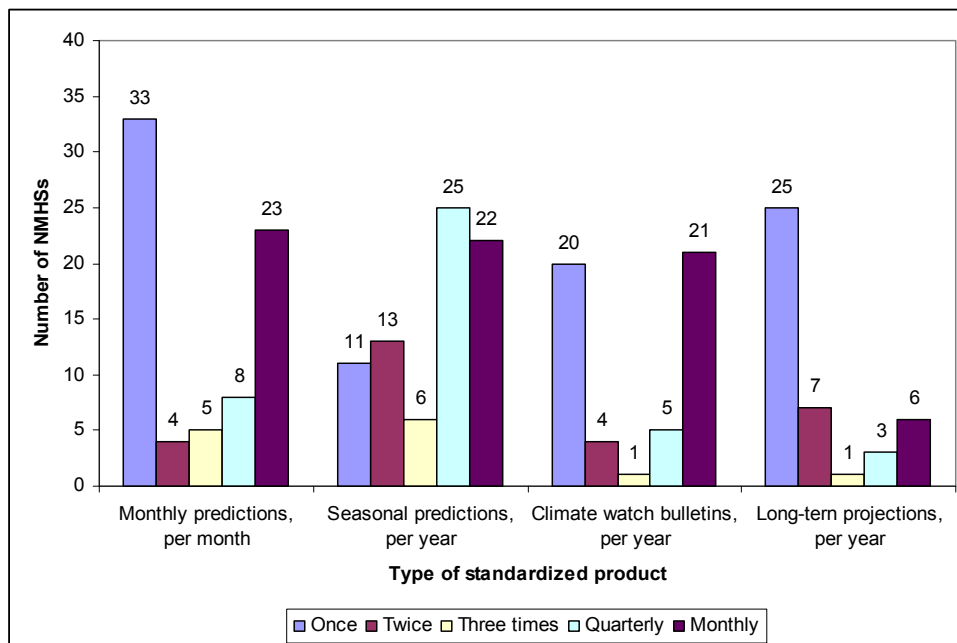


Figure 9: Number of NMHSs providing long-range forecasts and long-term projections at given rates of time

KPI: Number of Members providing standardized products

53% of 98 respondents issue standardized regional or national-scale products including long-range forecasts and long-term projections.

Key Outcome: Climate information and prediction products for climate adaptation and risk management are improved

KPI: Number of operational Regional Climate Centres providing inputs for the National Climate Centres

12% of 99 respondents operate a WMO Regional Climate Centre, of which 62% provide inputs to National Climate Centres (NCCs).

79% of 96 respondents receive products and information from a WMO Regional Climate Centre.

KPI: Number of Members with formal National Climate Centers, accessing global and regional products, using the guidance materials and transmitting climate products for national needs

39% of 99 respondents indicated that a formal NCC or national climate platform/system (NCP) is operational in their country. Of these, 80% pointed out that the NMHS has a specific mandate for the operation of the NCC and/or NCP.

KPI: Number of Members interacting with users while providing climate services, through formal mechanisms including National Climate Outlook Forums, in support of adaptation and climate risk management in key socio-economic sectors

The proportion of 97 respondents providing climate services to each sector is presented in Figure 10.

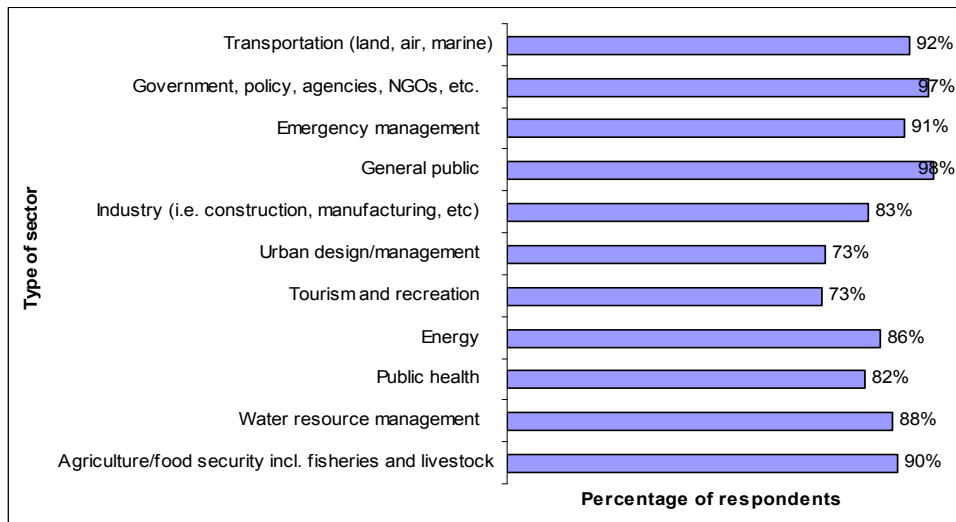


Figure 10: Proportion of respondents providing climate services to key sectors

37% of 98 respondents conduct a national climate outlook forum to disseminate climate outlooks.

KPI Members using best practices for climate adaptation and risk management in key socio-economic sectors

Figure 11 presents the proportion of 94 respondents that indicated that climate information has been used for climate adaptation and risk management in specific sectors during the last two years.

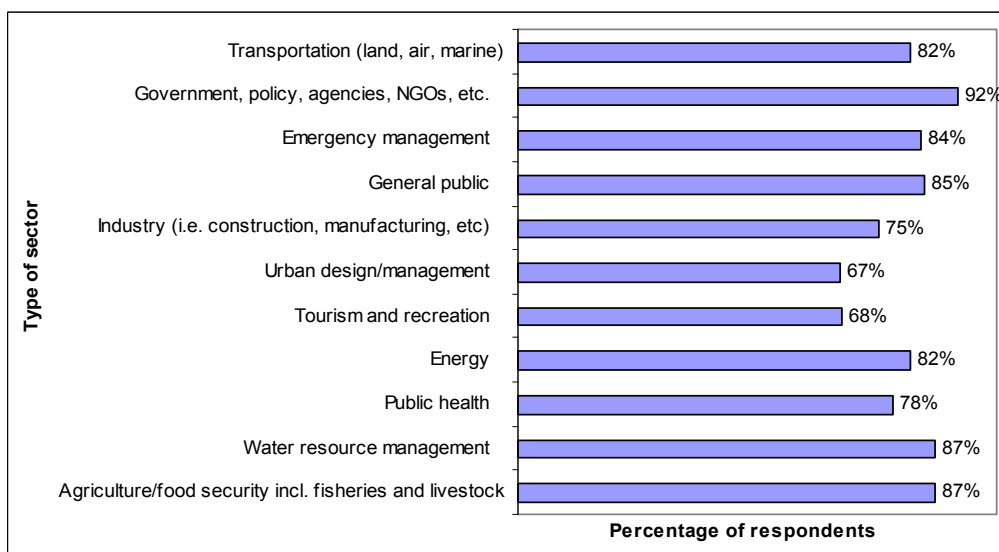


Figure 11: Respondents who indicated that climate information has been used for climate adaptation and risk management in specific sectors

The proportion of 91 respondents that identified various WMO activities as having facilitated their climate risk management and adaptation efforts is presented in Figure 12.

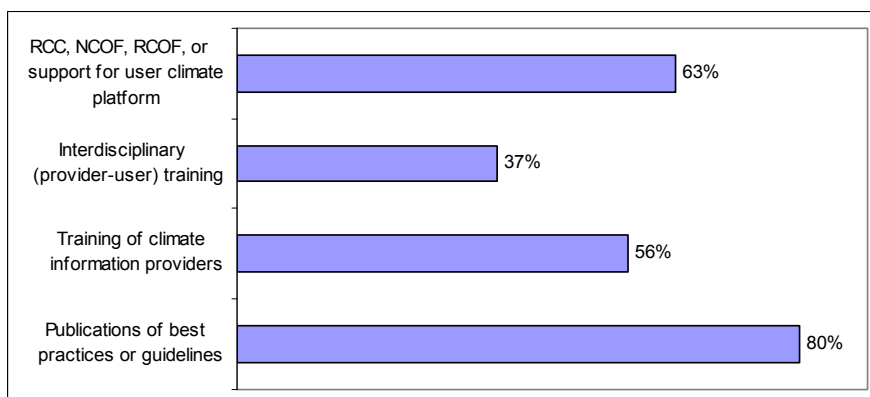


Figure 12: Respondents who identified various WMO activities as having facilitated their climate risk management and adaptation efforts

Key Outcome: Hydrological information and products, including water resource assessments, are improved

KPI Number of Members having established a Quality Management Framework for Hydrology using current guidance materials for hydrology and water resource management

26% of 97 respondents indicated that a Quality Management Framework for Hydrology has been in use at their NMHS for the past two years.

KPI Number of regional hydrological data bases developed in transboundary river basins

23% of 95 respondents developed new regional hydrological databases in the past two years for the following 36 transboundary river basins:

- Congo basin
- Danube
- Drava
- Duero
- Elbe
- Ertis
- Ganges-Brahmaputra-Meghna
- Golok
- Great Lakes / St. Lawrence
- Ili
- Jordan
- Kagera
- Maritsa
- Meuse
- Moselle
- Narva
- Niger
- Nile
- Northeast China River
- Oder
- Odra
- Oubangui sub-basin Red River
- Rhine
- Richelieu River
- Rio Grande
- Sangha sub-basin
- Sava River
- Shu
- Sio Malaba Malaksi catchment
- Soca/Isonzo
- Southeast China River
- Syr Darya
- Talas
- Tobol
- Ural
- Xinjiang
- Yesil
- Zambezi

Expected Result 4:

Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable Earth- and space-based observation systems for weather, climate and hydrological observations, as well as related environmental and space weather observations, based on world standards set by WMO.

Key Outcome: WMO Integrated Global Observing System implementation phase is implemented

KPI Completion of WIGOS milestones according to the WIGOS Implementation Plan

25% of 99 respondents are participating in WIGOS demonstration projects and their rating of improvements in their understanding of the WIGOS concept and benefits is presented in Figure 13.

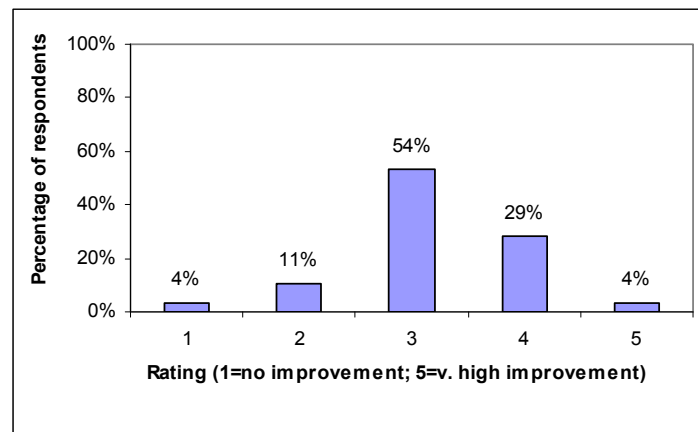


Figure 13: Improvement in understanding of the WIGOS concept and benefits

KPI: Increased availability of observations for users

80% of 97 respondents indicated increase in the availability of observations in the past two years. The following are the key areas where improvement was reported:

- Meteorological observations, including surface observations from Automatic Weather Stations
- Pluviometric observations
- Upper-air (aviation)
- Radar
- Hydrological
- Agrometeorological
- Satellite
- Climate
- Wind
- Seismic
- Other (e.g. snow, ice, soil freezing, sunshine hours, humidity)

Key Outcome: WMO Information System is developed and implemented

KPI: Implementation of WIS by NMHSs with continuous access to observations and products to meet the needs of the NMHSs and national users, and to enhance capabilities of Members to access data and products

33% of 98 respondents implemented some functions of the WIS defined in the *Manual on WMO Information System (WIS)* (WMO-No. 1060), over the past two years. These included:

- Designing metadata, archiving information, climate database management systems (e.g. Clisys, CLIMSOFT, etc.)
- Forecasting products
- Global Information System Centres (GISCs)
- Data Collection or Production Centres (DCPCs)
- Information provision

Of these respondents, **34%** indicated improvement in data access through increased products and observational data.

KPI Enhanced capabilities for data processing and management

36% of 89 respondents who had implemented some WIS functions indicated improvement in data processing and management capabilities.

Key Outcome: Accessible climate observations and climate data archives at the NMHSs and global data centers are increased

KPI: Progress in implementing the Global Climate Observing System is improved

76% of 97 respondents indicated that the national climate user community had access to data archives at national or global climate data centers operated by them.

The majority of 96 respondents rated relatively high the quality of climate observations provided in meeting user needs (Figure 14).

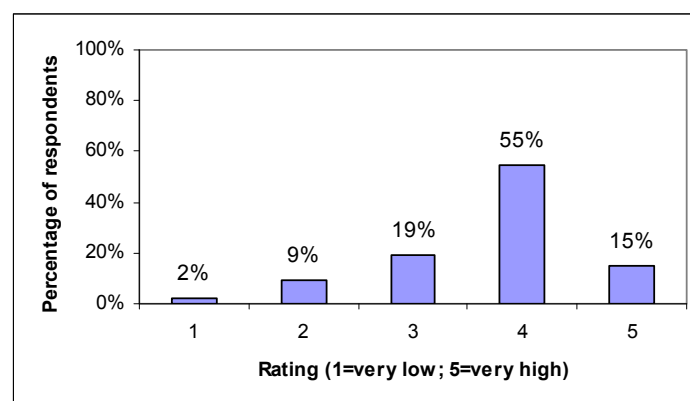


Figure 14: Quality of climate observations provided by NMHSs in meeting user needs

KPI: Increase in projects to rescue and digitize climate data, to improve the use and exchange of high quality climate data sets and to assess the state of the global climate system

35% of 97 respondents benefited from a WMO-coordinated data rescue project.

48% of the same number of respondents indicated that a data rescue project had been carried out in their country during the past two years.

84% indicated that there was a continued need for a data rescue project.

KPI: Number of Members developing and implementing modern climate monitoring systems, including Climate Watch Systems

73% of 96 respondents have a climate monitoring and/or watch systems in use in their country.

Expected Result 5:

Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and the related environmental science and technology development.

Key Outcome: Research in climate prediction/projection to improve the skills of seasonal, decadal, and longer time scales is enhanced

KPI: NMHS in developing and least developed countries contributing to relevant regional and international research initiatives

Of the 63 respondents from developing and least developed countries, **64%** have participated in regional or international climate research initiatives.

KPI Measures of skill and value of climate predictions and projections to national and regional climate services

76% of 97 respondents indicated that their NMHS or another mandated institution in their country produced services based on climate predictions and projections. The level of skills as rated by each NMHS is shown in Figure 15 below.

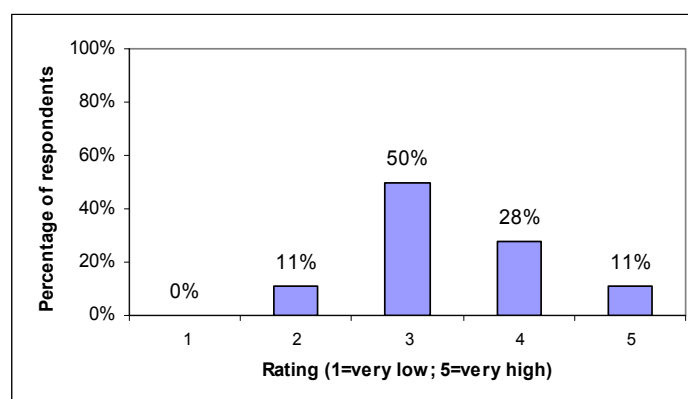


Figure 15: Level of skill of climate predictions and projections as rated by producers

Perceptions of the value of these services, as provided by 90 respondents, are shown in Figure 16.

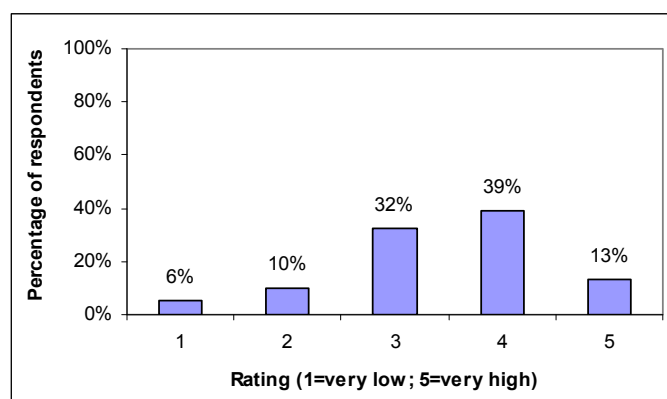


Figure 16: Value of climate predictions and projections as rated by producers

Key Outcome: Research in the prediction of high-impact weather on time scales of hours to seasons is enhanced

KPI: Improvements in the number of internationally coordinated NMHSs in developing and least developed countries contributing to relevant regional and international research initiatives, weather research initiatives and/or forecast demonstration projects completed

39% of the 63 respondents from developing and least developed countries have participated in regional or international research initiatives on high-impact weather or a severe weather forecasting demonstration project in the past two years, and rated their improvement in capabilities as a result of these activities as shown in Figure 17.

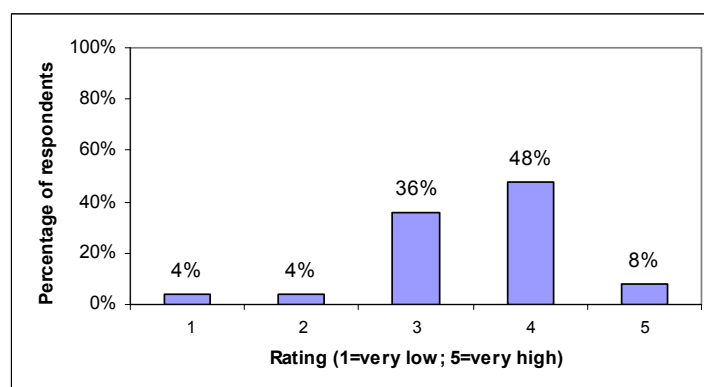


Figure 17: Improvements in capabilities in forecasting high-impact weather

Key Outcome: Atmospheric chemistry observations and assessment meet needs of environmental conventions and policy assessments

KPI: Regular bulletins on global atmospheric chemistry are provided to environmental conventions and policy assessments

As evident from Figure 18, over half of the 93 respondents are satisfied with the timeliness of receiving regular WMO Bulletins, and almost a third believe that they

have been moderately timely. However, 18% are overall unhappy with the timeliness of the bulletins.

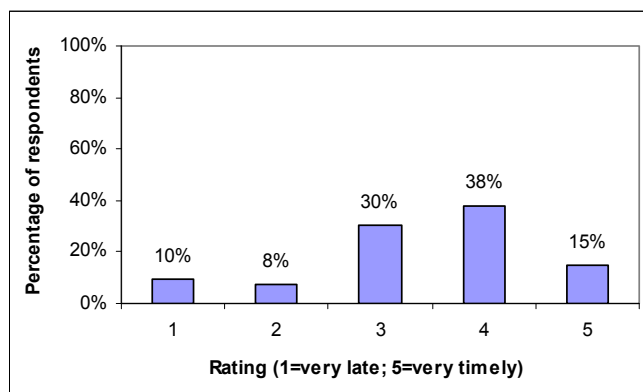


Figure 18: Timeliness in receiving regular WMO Bulletins in the last two years

While 40% of 92 respondents have found the regular Ozone Bulletins ‘useful’ or ‘very useful’ and 28% have rated them ‘moderately useful’, about a third have expressed low confidence in the bulletins’ utility, as presented in Figure 19.

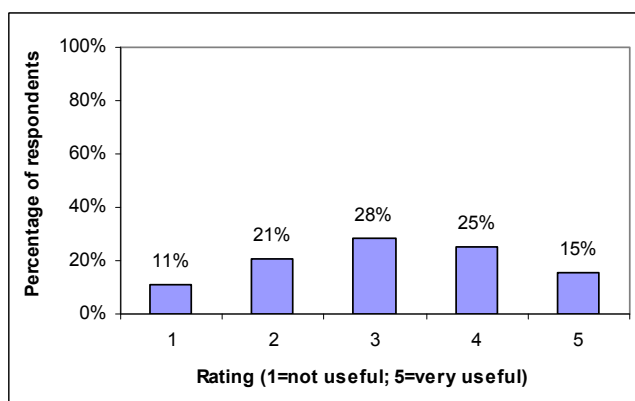


Figure 19: Usefulness of regular Ozone Bulletins to policy makers and the public

KPI: Number of technical reports, measurement guidelines and scientific analyses linking atmospheric chemistry to weather, climate, water and the environment

Figure 20 shows that about two-thirds of the 47 respondents, for whom measurement guidelines and procedures developed in the GAW Programme are applicable, highly appreciate their usefulness in improving the quality of chemical observations. 28% find them moderately useful, while only 9% question their utility.

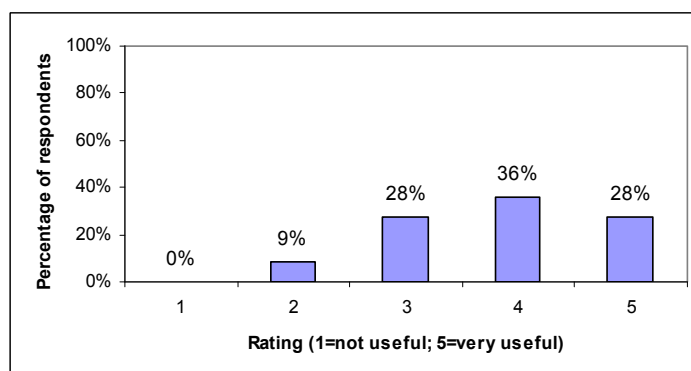


Figure 20: Usefulness of the measurement guidelines and measurement procedures developed in the GAW Programme for improving quality of chemical observations

Figure 21 indicates that the usefulness of Sand-and-Dust storm forecasting systems and their information is highly appreciated by the 22 respondents, with 70% rating them from moderately to very useful.

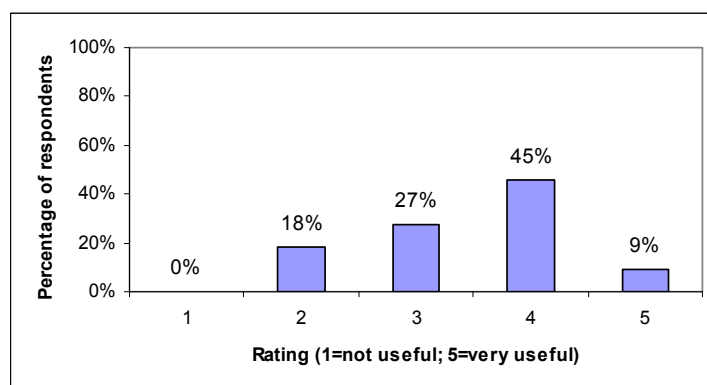


Figure 21: The usefulness of the Sand-and-Dust storm forecasting system and information

The usefulness of the chemical weather activities of GURME is shown in Figure 22. Over 70% of the 27 respondents found them useful to very useful; about a quarter rated them as moderately useful, and only 4% expressed a more negative opinion.

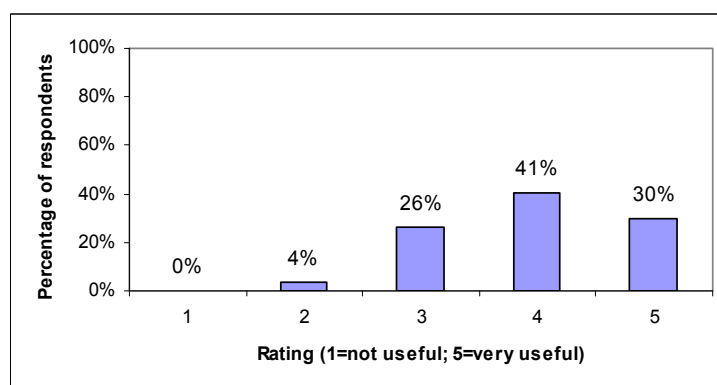


Figure 22: Usefulness of the chemical weather activities of GURME

Key Outcome: Seamless forecasts of weather, climate, water and the environment from months to seasons are developed

KPI: Increase in the implementation of WMO Global Integrated Forecast System by NMHSs

27% of 97 respondents indicated that their NMHS has participated in or benefited from the development or implementation of the Global Integrated Forecast System (GIFS) activity that forms part of THORPEX TIGGE research.

KPI Improvement in skill of monthly to seasonal forecasting systems

The proportion of the 95 respondents using monthly and seasonal forecasts from Regional and Global Centres is shown here:

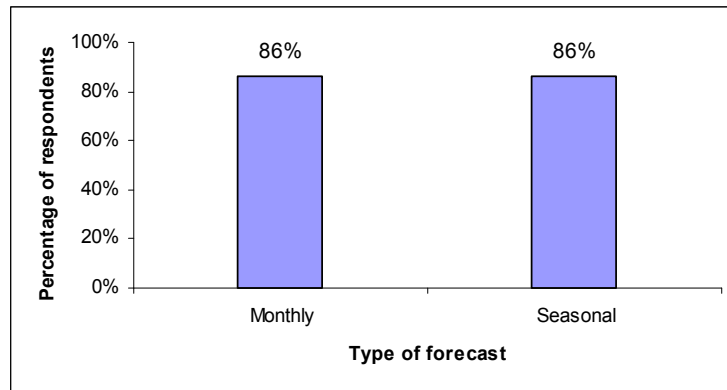


Figure 23: NMHSs using Monthly and Seasonal forecasts from Regional and Global Centres

Of these, more than a third observed considerable improvement in the skill of the products and close to a half registered moderate improvement, as indicated in Figure 24. Only 15% saw little to no improvement.

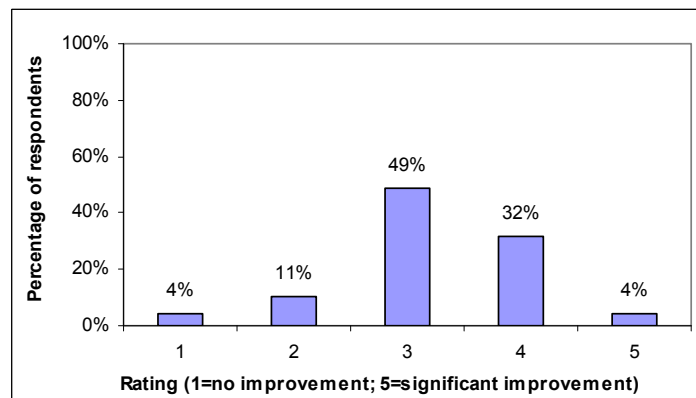


Figure 24: Degree to which the skill of the products has improved in the past two years

Of the 50 NMHSs that reported producing monthly and/or seasonal products, 37% saw considerable to significant improvement in the skill of the products and about a third rated their improvement as moderate (see Figure 25). It should be noted, however, that close to 30% observed little to no improvement.

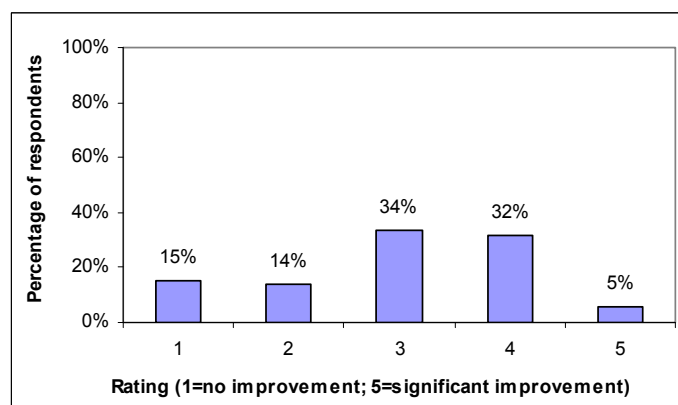


Figure 25: Degree to which the skill of the monthly or seasonal products has improved according to producers

As evident from Figure 26, the majority of the 95 respondents (both users and producers of monthly and seasonal products) believe that their application has considerably increased the value of service delivery to society.

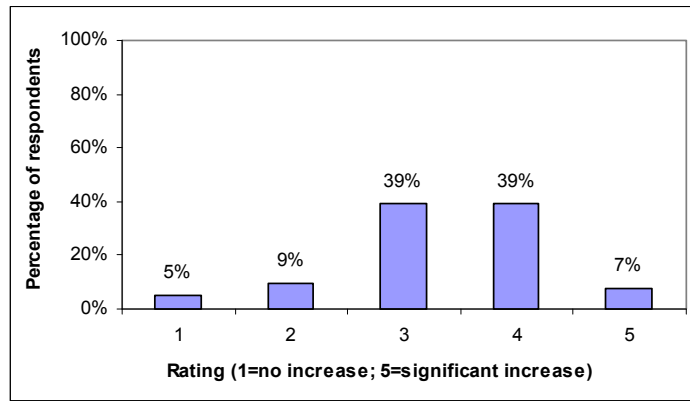


Figure 26: The rating of increase in the value of service delivery through the application of monthly and seasonal products

Key Outcome: Predictions/projections of El Niño/Southern Oscillation (ENSO) and monsoons are improved

KPI: Improvements in the skills of ENSO and monsoon forecasts

Figure 27 presents the proportion of respondents that used ENSO and Monsoon forecasts.

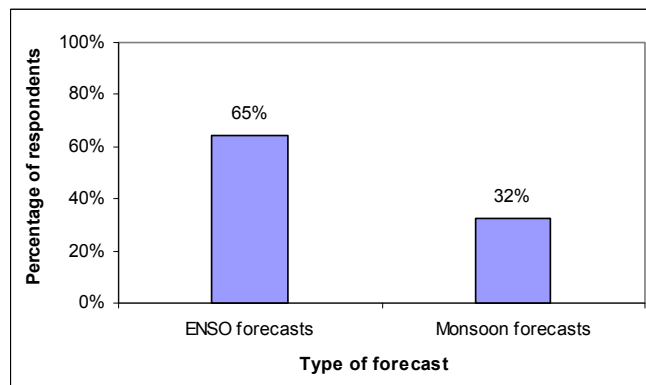


Figure 27: Proportion of NMHSs using ENSO and Monsoon forecasts

Of these, 40% believe that the skill of the forecasts has improved considerably, as shown in Figure 28. A similar proportion (36%) rates their development as 'moderate', while a quarter observe little to no improvement.

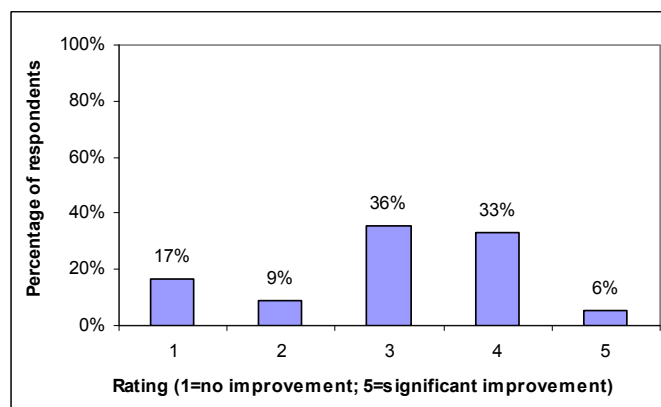


Figure 28: Degree of improvement in skill of ENSO and Monsoon forecasts according to users

The same rating was done by 12 producers of ENSO and Monsoon forecasts, who generally assessed very positively the degree of improvement in skill (see Figure 29).

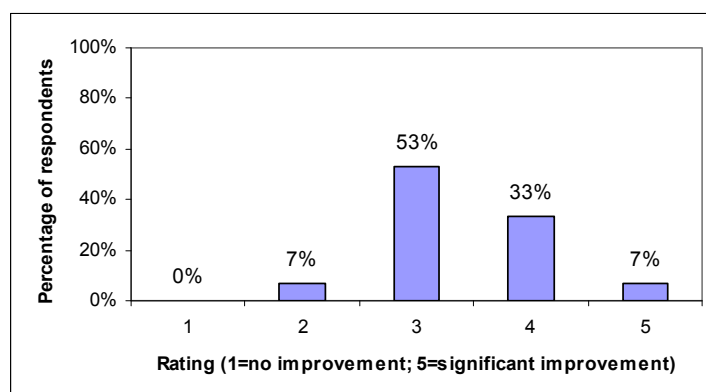


Figure 29: Degree of improvement in skill of ENSO and Monsoon forecasts according to producers

As evidenced by Figure 30, over a third of the 88 users and producers of ENSO and monsoon forecasts believe that the application of these products has considerably contributed to improved service delivery. 39% think that they have somewhat added value to their performance, while over a quarter of respondents do not see a direct link between the above-mentioned forecasts and the value of their service delivery.

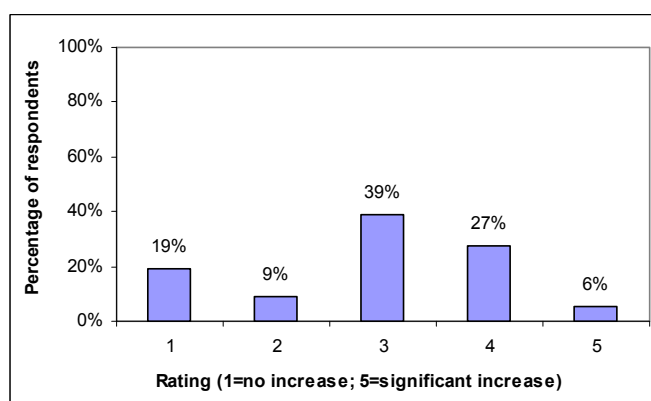


Figure 30: Degree to which the application of ENSO and Monsoon forecasts has increased the value of service delivery by the NMHS to society

KPI: Satisfaction in the predictions/projections of ENSO and monsoons

17 respondents have been producing ENSO and monsoon predictions/projections over the past two years. Twelve of these have received feedback from users regarding their level of satisfaction which is presented in Figure 31 below.

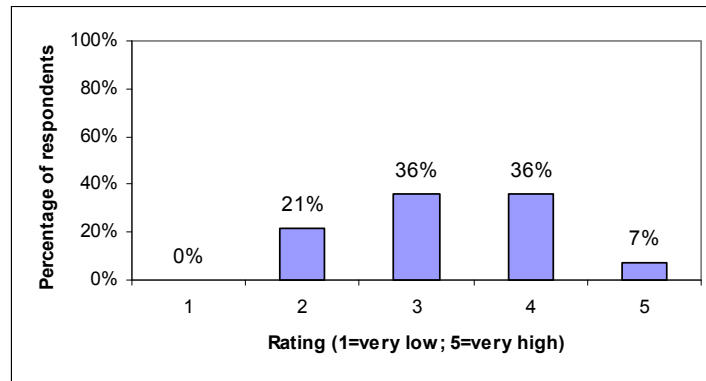


Figure 31: Degree of satisfaction with ENSO and monsoon predictions/projections

Expected Result 6:

Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates.

Key Outcome: NMHSs and Regional Centers are improved, particularly in developing and least developed countries

KPI: Number of NMHSs and WMO Regional Centers with defined roles in national and regional socio-economic development activities, in cooperation with international and regional development agencies

66% of 95 respondents have been involved in national or regional socio-economic development activities in cooperation with international and regional development agencies.

64% of 94 respondents have reported to have a defined role in the National Development Plan. Of these, half have specified the provision of meteorological and climatological data to key socio-economic sectors as their institution's main role, whereas a third have been involved in disaster risk reduction and early warning.

Other functions mentioned include research, formulation and implementation of climate change policy (e.g. strategy, adaptation, and project documentation), and provision of scientific support and advice. Some respondents have also highlighted contribution to poverty alleviation, promotion of sustainable development, development of meteorological infrastructure, involvement in international cooperation, city planning, food security, and pollution observation.

KPI: Number of NMHSs with programmes and networks for collaborating on service delivery at regional levels

68% of 96 respondents have carried out programmes or become part of a network for collaborating on service delivery at the regional level over the past couple of years.

63% of 97 respondents have carried out programmes or participated in networks on service delivery at the regional level.

Key Outcome: Infrastructure and operational facilities of NMHSs and Regional Centres are improved, particularly in developing and least developed countries

KPI: Number of NMHSs with improvement in infrastructure and operational facilities to address identified deficiencies

92% of 97 NMHSs have implemented or developed improvements to service delivery capacity:

- 99%** in the surface observing network
- 51%** in the upper-air observing network
- 85%** in equipment for meteorological/environmental satellite data
- 92%** in the data-processing/forecasting sector

Communications is another area where several NMHSs report important improvements in terms of web and mobile service delivery, the establishment of a dedicated weather radio, and provision of real-time data. Progress is further reported in the area of local environmental measurement, seasonal forecasting, physical infrastructure (incl. Doppler weather radar acquisition), calibration of equipment, climate services, reception of satellite images, air quality forecasts, aeronautical meteorological services and products, and earthquake monitoring.

KPI: Number of NMHSs with modernized capacities to develop and disseminate products to their customers

Figure 32 shows the number of NMHS using different distribution systems to deliver products and services to users.

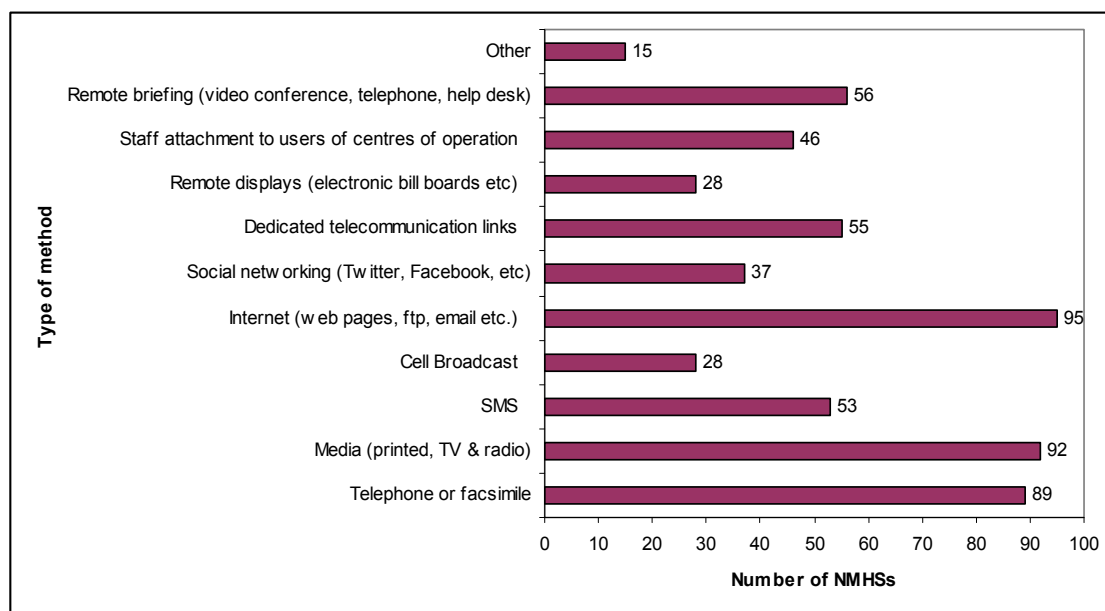


Figure 32: Distribution systems used to deliver products and services to users

KPI: Number of NMHSs with programmes and networks for collaborating on service delivery at regional levels

Key Outcome: Education and Training Development activities at national and regional levels are improved, especially in developing and least developed countries

KPI: The degree to which Members are getting value for money from the WMO Fellowship Programme

In the past two years, **45** NMHSs contributed to or had students under the WMO Fellowship Programme. Of these, over 60% have obtained high to very high value from the programme, 22% think it has been moderately useful, while only 6% rate its value as low to very low, as illustrated in Figure 33 below.

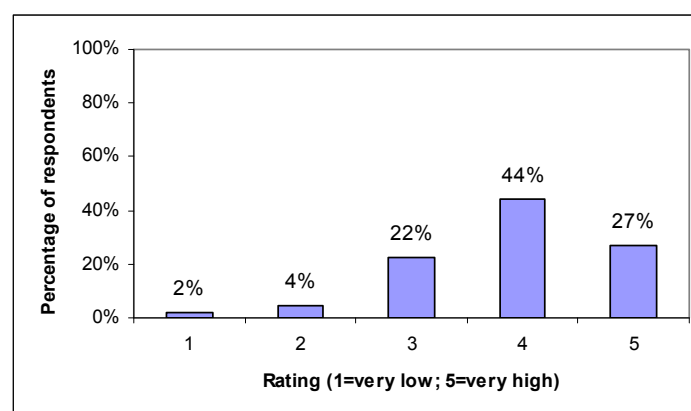


Figure 33: Perceived value obtained from the Fellowship Programme

KPI: The degree to which the RTCs support the regional training demands in particular for students from developing and least developed countries

WMO Regional Training Centre(s) where NMHSs have been sending staff are:

- Region I = 18 (Africa)
- Region II = 36 (Asia)
- Region III = 3 (South America)
- Region IV = 17 (North America, Central America and Caribbean)
- Region V = 8 (South–West Pacific)
- Region VI = 36 (Europe)

Their degree of satisfaction with the RTCs is presented in Figure 34, rated on a scale of 1-5, where 1=very low and 5=very high.

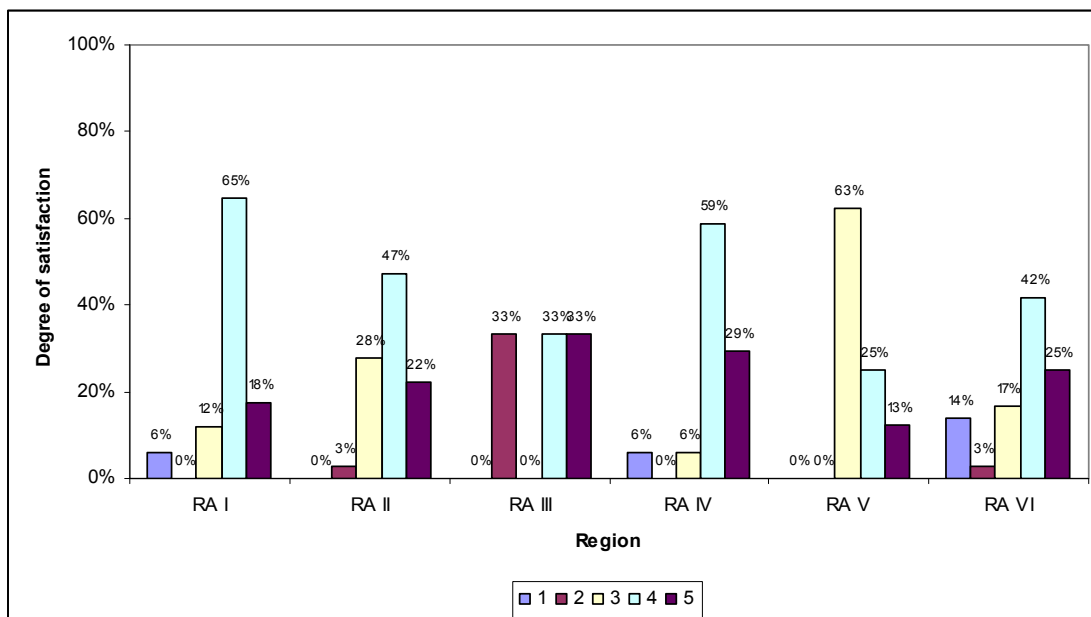


Figure 34: The rating of satisfaction with RTCs in each Region

Expected Result 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 strategic issues.

Key Outcome: WMO leadership and contribution in relevant UN system and other international partners' initiatives and programmes is improved

KPI: Active strategic partnerships with UN and other international organizations supporting priority activities

72% of 96 respondents have implemented projects or activities in partnership with **the** United Nations (UN) and other international organizations over the last two years.¹ The vast majority are realized in cooperation with multilateral partners, including UN organizations, the European Union, and the World Bank. A significant share of activities involves participation of bilateral partners, such as the U.S. Agency for International Development (USAID), the German Organisation for Technical Cooperation (GTZ) or the Japan International Cooperation Agency (JICA), while a few are implemented in partnership with regional organizations, such as the Secretariat of the Pacific Community (SPC), the Inter American Development Bank (IADB) and the

¹ The following is an exhaustive list of the partner organizations mentioned: ACIAR, AECI, ASEAN, AuSAID, CAREC Project, CMA, Danube Commission, DIFD, European Commission, ECMWF, ESA, EU, EUMETSAT, EUMETNET, FAO, GEF, GEOSS SEOCA Project, GTZ, Hellenic National Met Service, IADB, IAEA, ICAO, ICARDA, ICRSAT, IMD, IPCC, ISDR, JICA, JMA, JRC, KMI, KNMI, KOICA, NOAA, RIMES, Slovakia Hydromet Institute, SOPAC, Southeast Europe Programme, SPC, SPREP, UCAR US, UNDP, UNEP, UN-ESCAP, UNESCO/IOC, UNFCCC, UNISDR, University of the South Pacific, USAID, World Bank

European Centre for Medium-Range Weather Forecasts (ECMWF). Only 3 respondents mention direct collaboration with universities and research institutes.

63% of the 96 NMHSs that responded are actively contributing to the work of the IPCC. Of these, 82% do so by nominating and supporting authors and review editors and 93% by contributing to government/expert review of IPCC reports.

Key Outcome: Public, decision-makers and other stakeholders are increasingly aware of key WMO and NMHSs issues, activities and priorities through enhanced communication

KPI: Percentage of target audiences indicating utilization of WMO materials and increased awareness

According to 97 respondents, there is a high level of utilization of WMO materials (e.g. technical reports, guidelines) among NMHS staff, as evidenced by Figure 35.

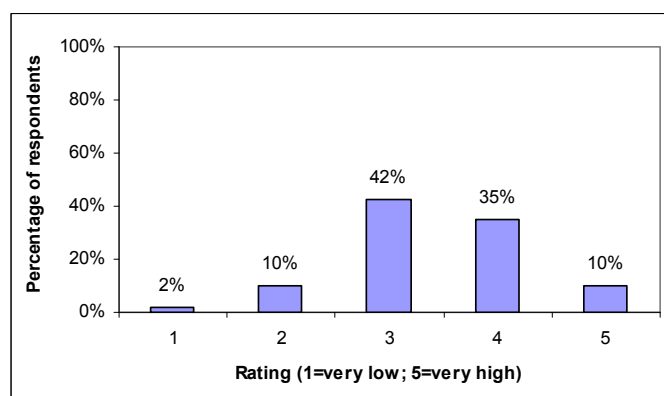


Figure 35: Level of utilization of WMO materials (e.g. technical reports, guidelines) among NMHS staff

KPI: NMHSs trained in communication

51% of the 96 NMHSs that responded have participated in training activities in communication.

90% indicated that training in communication helped them improve service delivery activities, as evident from Figure 36.

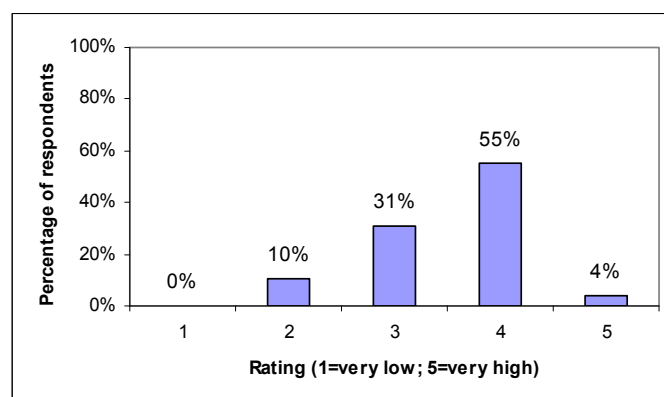


Figure 36: Level of improvement in service delivery as a result of training in communication

42% of 95 respondents have implemented their own training in communication.

Expected Result 8:

An effective and efficient Organization.

Key Outcome: Effective and efficient WMO Congress and Executive Council

KPI: Member satisfaction with documentation for Cg, EC and its working groups

The wide majority of the 94 respondents to this question rated the presentation of Congress documents as 'clear' to 'very clear', as shown in Figure 37.

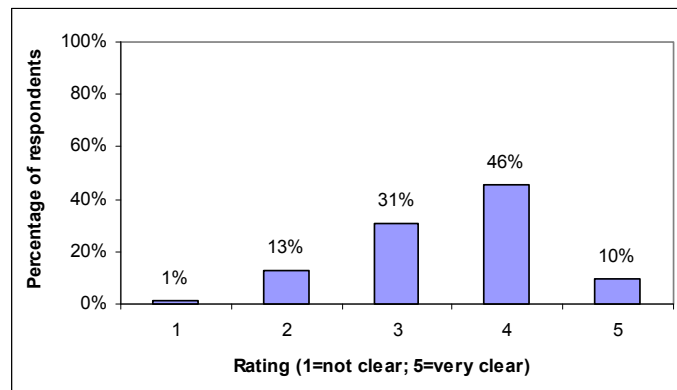


Figure 37: The rating of clarity in presentation of subject matter in Congress documents

They are split with regard to the length of the Congress documents. While half of 93 respondents consider them to be just right, over 40% find them long or even too long, as indicated on Figure 38. Only 11% consider them to be somewhat short or too short.

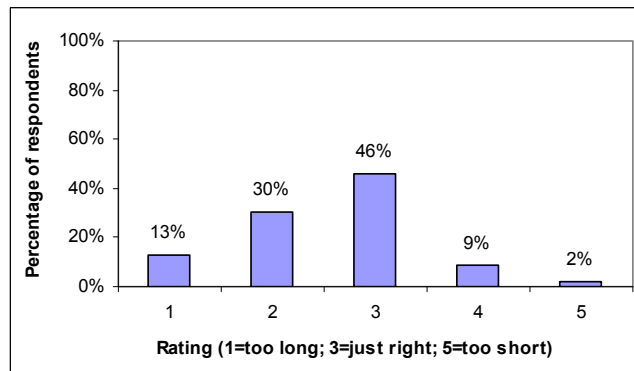


Figure 38: Length of Congress documents

Close to 60% of the 31 respondents who attend meetings of the WMO Executive Council (EC) rated the documents as clear to very clear (see Figure 39); 28% rated them as moderately clear, while 13% were unhappy with their clarity.

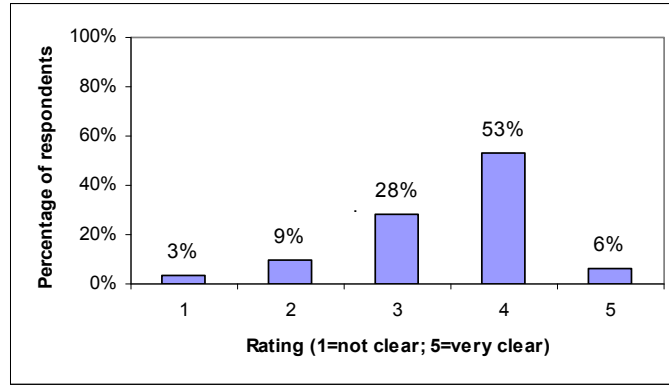


Figure 39: Clarity in presentation of the subject matter in EC documents

Regarding the length of the EC documents, over half of the 82 respondents indicated it is 'just right,' though a sizeable portion (37%) have rated them as relatively long or too long, as shown on Figure 40. Only a tenth of respondents think that they are too short.

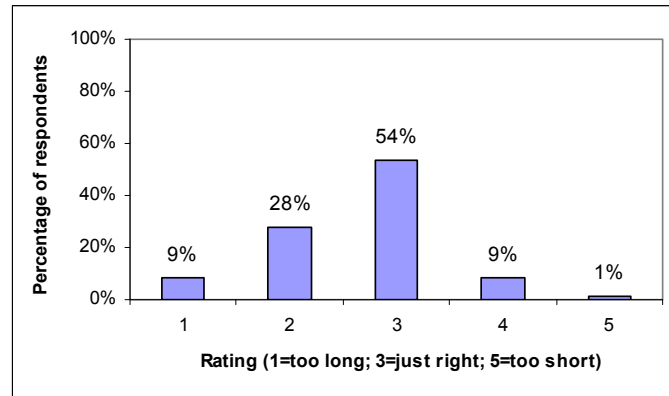


Figure 40: Length of EC documents

Key Outcome: Effective and efficient constituent bodies (RAs and TCs)

KPI: Member satisfaction with constituent body documentation

Regarding the meetings of technical commissions, the majority of the 94 respondents are happy with the clarity in presentation of the subject matter in the TC documents, as presented in Figure 41.

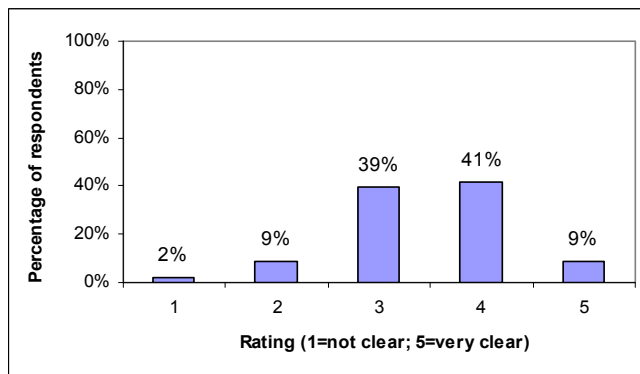


Figure 41: Clarity of the subject matter in documents for TC meetings

There is a split between respondents who find the length of the documents to be 'just right' and those considering them rather long, as presented in Figure 42. Almost half of the 93 respondents are content with the length of TC documents, whereas 37% find them relatively long to too long.

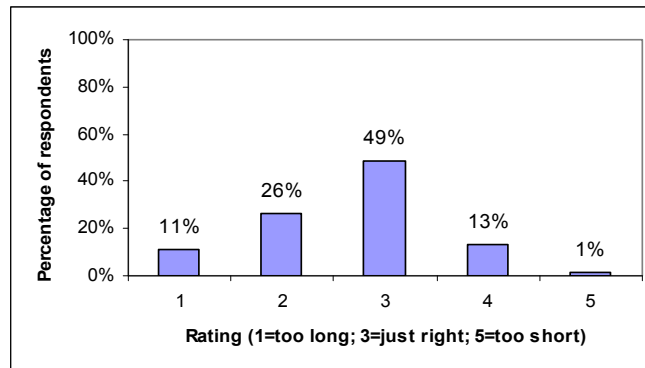


Figure 42: Length of documents for TC meetings

With regard to regional association meetings, the majority of the 92 respondents find the documents to be quite clear, as indicated in Figure 43.

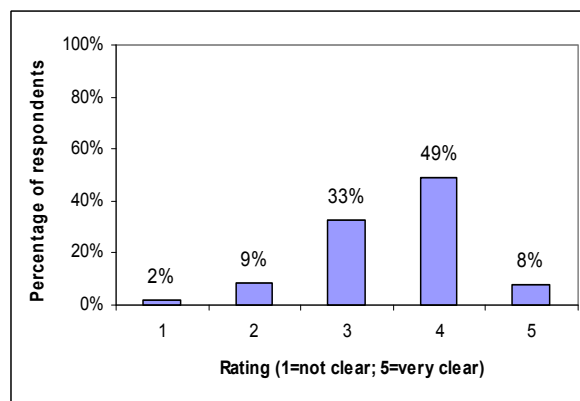


Figure 43: Clarity of the subject matter in documents for RA meetings

The RA view on the length of the documents is shown in Figure 44. Over half of the 93 respondents find the documents for RA meetings to be of the right length; over a quarter see them as rather long, whereas close to 20% find them somewhat short.

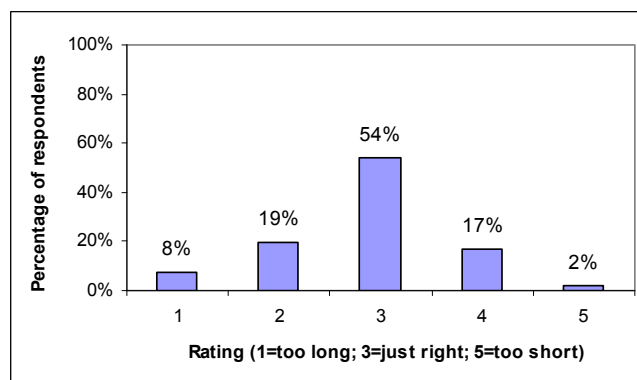


Figure 44: Length of the documents for regional association meetings

KPI: Member satisfaction with constituent body supporting services (interpretation, conferences services and facilities)

As evident from Figure 45, the vast majority of the 92 respondents are very satisfied with the interpretation services provided at constituent body meetings.

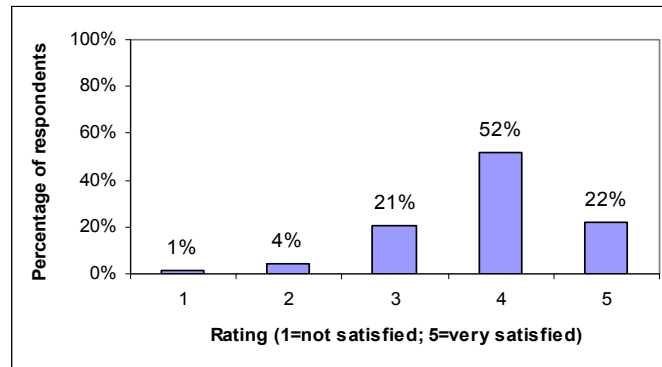


Figure 45: Satisfaction with interpretation services

The respondents were equally happy with the conference services (see Figure 46), with no level of discontent expressed in this respect.

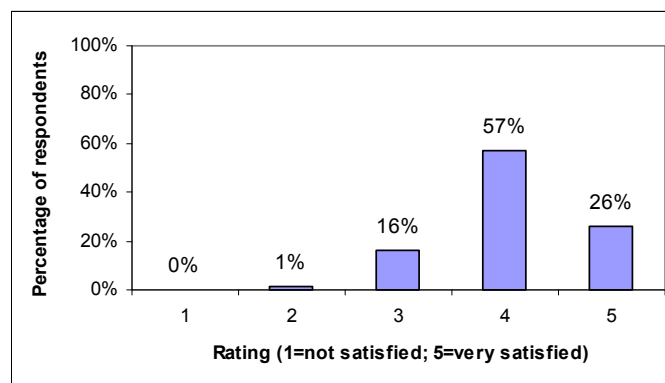


Figure 46: Satisfaction with conference services

85% of 91 respondents have also rated highly the conference facilities provided for constituent body meetings, as illustrated by Figure 47.

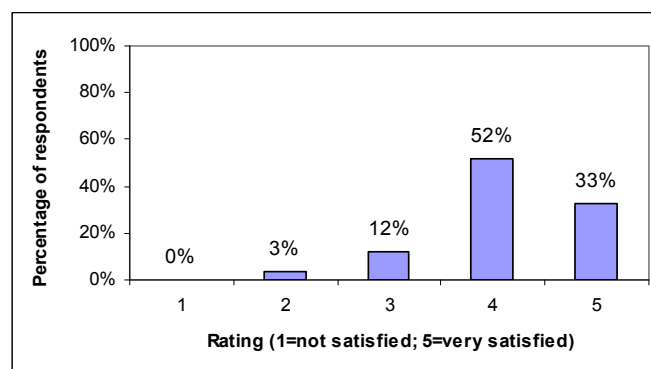


Figure 47: Satisfaction with conference facilities

Overall, three-quarters of the 91 respondents highly appreciated the usefulness of WMO services and activities, as presented in Figure 48. Only 5% expressed dissatisfaction.

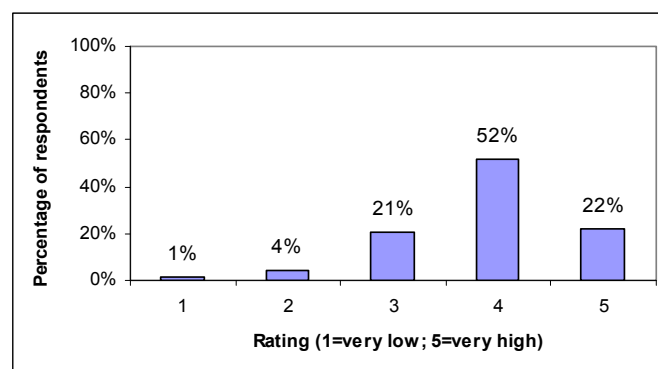


Figure 48: Usefulness of WMO services and activities to each NMHS over the last two years

WMO Services and Activities

Areas in which WMO activities and services have been beneficial

- Education, training and fellowships are by far the WMO activities and services that respondents indicated as most beneficial. This includes workshops, study tours, education grants, e-learning, etc.

Other WMO activities and services indicated to be of benefit include:

- Provision of technical support (including equipment, software, tools, expertise and the Voluntary Cooperation Programme);
- Data collection and exchange;
- Standardization and provision of guidelines, procedures, manuals and other publications.

The role of regional centres and several WMO Programmes, such as the Aeronautical Meteorology Programme, QMS, DRR, the Severe Weather Forecasting Demonstration Project (SWFDP), the World Weather Research Programme (WWRP), the Tropical Cyclone Programme (TCP), and WIS, have also been indicated to be of benefit.

The role of WMO as convener and sponsor of meetings/conferences has also been stressed as well as its function as a platform for cooperation with donors and among NMHSs.

The provision of climate services (e.g. GFCS) and meteorological services (e.g. PWS, Meteoalarm, information materials, coordination of data and seasonal forecasts) are two other aspects that have been mentioned as beneficial.

Ability to respond to users' needs and contribute to decision making

Overall, over half of the 93 respondents have indicated significant improvement in their ability to respond to users' needs and contribute to decision making through participation in WMO activities, as evident from Figure 49. Over 40% have registered minor improvements, while only 4% do not assign any credit to WMO for their capacity development.

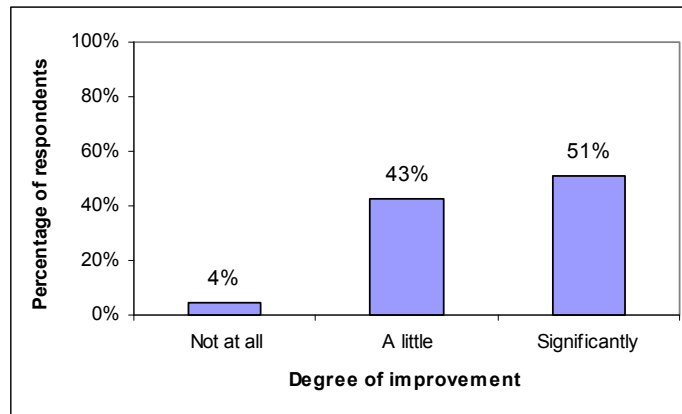


Figure 49: Improvement by NMHSs in their ability to respond to users' needs and to contribute to decision makers through participation in WMO activities

Major successes from leveraging off WMO activity in changing influence on decision makers or users of services

- Capacity building and technology transfer are the two areas where respondents indicated the highest level of achievement, followed by communication to the public, the development of guidelines and tools, and early warning.
- Several respondents indicated elevated international status and improved reputation due to WMO's authority on the science of meteorology and hydrology.
- Strengthened cooperation and partnerships is another area considered successful.
- Events, such as the World Meteorological Day or the annual presentation of the Status of the Global Climate report, were also indicated to have raised the Organization's profile and functioned as a vital platform to reach out to decision-makers and the general public.

The following are a few highlights of achievements mentioned:

Belarus: *“With the support of WMO, a DAWBEE satellite data reception complex was installed in the national hydrometeorological centre, which allows receiving data from the geostationary meteorological satellite (MSG EUMETSAT).”*

Bangladesh: *“WMO membership since 1973 has been giving leverage to the Bangladesh Meteorological Department. Chronologically in 1970, 1991, 2007 and 2009 till now, BMD is successful in minimizing the life loss from tropical cyclones from six digits to three digits.”*

British Caribbean Territories: *“Government's recent downsizing came to the NMHSs in the British Caribbean Territories. However, after highlighting the specialized nature of Met staff training, and the many WMO activities offered in the areas of capacity development and technology transfer for the benefit of society – usually at no or very little cost to the government but to the benefit of many stakeholders and government decision makers – the NMHSs were allowed to retain the annual budget and all staff.”*

Guyana: *“Via WMO VCP we got support from UK Met Office to provide some training in TV weather three years ago. It was the first “modernized” weather forecast being presented, and feedback and interest have been good.”*

Hong Kong, China: *“The meteorological service to ATM (MSTA) project has heightened the profile of the possible contribution of aviation weather services to air traffic management within the aviation community. ATM now sees the benefits of the various proposed projects and collaborative decision making.”*

Hungary: *“We participated in the establishment of a National Climate Strategy.”*

Ireland: *“Information and knowledge provided through attendance at WMO meetings assisted us greatly in contributing to the development of the Emergency Management community in our country.”*

Kenya: *“WMO Met Day has made decision makers realize the significance of weather in various activities.”*

The Netherlands: *“The use of data from the WAFS on the Icelandic volcanic ash eruption situation in 2010 was a major success in the KMNI service provided to the Dutch aviation sector. The decision making process for opening/closing the Schiphol FIR depended heavily on this information.”*

Malawi: *“Through awareness and education on the economic importance of using met information, such as seasonal and daily forecasts, there is more demand for met information from users and decision makers. There is more demand for weather stations and training in weather observations.”*

Qatar: *“The establishment of a new WMO RTC and the proposed DCPC and Gulf Marine Centre elevated our profile and international status.”*

Services and programme activities in need of improvement

The majority of respondents indicated the highest need for improvement in the following three areas:

- Training and capacity building (including fellowships and distance learning)
- Observations
- Climate forecasting and prediction services, including GFCS and WCP

Other areas identified for improvement include:

- Infrastructure development
- Data exchange, management, rescue, and processing
- Quality Management Systems
- Regional priorities
- Scientific research (climate, weather and health impact, socio-economic benefits)
- Numerical weather prediction, forecasting and climate modelling, nowcasting
- Standards, methodological guidance, calibration of instruments
- Extreme weather event prediction (including early warning systems, drought indices, dust and sand storm, etc.)
- Public weather services
- Hydrological services, including flood risk assessments

Some respondents stressed the need to improve long-term forecasting, agrometeorological services, marine meteorological services, disaster risk reduction, communication (both with the general public and the private sector), the WMO Space Programme, and the Tropical Cyclone Programme.

Better coordination among the various constituent bodies was also mentioned, especially between TCs and RAs and within the Secretariat. One respondent suggested rethinking the structure of TCs, while another one proposed the formation of joint technical committees made up of representatives of the international organizations responsible for each sector.

Several respondents underlined the need for improved efficiency and effectiveness in terms of information exchange on planned activities between WMO and Members, shorter meetings, more focused and concise documentation, rationalization of the number and types of meetings, stronger emphasis on concrete actions as opposed to document refinement, etc. One respondent suggested that the RA sessions take place every two years rather than every four.

Areas in which highest improvements were made over the past two years

The highest improvements have been made in the areas listed below (ordered from most to least frequently appearing in respondents' answers):

- Observation networks
- Weather forecasting for the general public
- Communications (including media relations, websites, social network, smartphones, bulletins and education materials for the general public)
- Human capacity development
- Early warning systems and crisis management
- Infrastructure development and technology transfer
- Climate products and services
- Data acquisition, rescue, digitization, modernization of data processing and dissemination
- Partnerships, stakeholder engagement, and resource mobilization

Some respondents have also indicated improvements in the field of standardization and model development, aviation weather services, numerical weather prediction, forecasts (both short-term and long-term), QMS, and additional service delivery for agriculture, tourism or the insurance sector.

In addition, progress has been registered in terms of research, studies and reports; marine meteorology; agrometeorological services; hydrometeorological services, and institutional development, including improved cost-efficiency and the creation of a National Weather Service in the British Caribbean Territory.

Areas in which more development is needed

Almost half of respondents have identified the following three areas as in greatest need of further improvement:

- Human capacity development
- Climate services, including climate predictions and climate monitoring
- Modernization of the observation network

Other areas frequently appearing in respondents' answers are:

- Infrastructure and technology transfer
- Data exchange, rescue and archiving
- Medium and long-term forecasting
- User-focused weather services, including for the health sector, and adaptation of production and services for different socio-economic sectors and government departments
- Instrument calibration, forecasting models, methods and standards
- Other forecasts, such as for heavy rain, volcanic ash, dust and sand storms, urban air, regional forecasts, chemical forecasting, probabilistic forecasting
- Early warning systems, hazard mapping, flood forecasting
- Research, including studies on the socio-economic benefits, agricultural meteorology, marine meteorology, health, etc.

Some respondents have also indicated the need to improve hydrometeorological services, communication and marketing, numerical weather prediction, marine meteorology, QMS, and agrometeorology.

In terms of institutional development, further efforts are required in resource mobilization, project development, and internal auditing.

Finally, a few respondents have highlighted the need for future development in the areas of real-time observations, aeronautical meteorology, space weather, legislation, and the programme for LDCs.
