WMO REGIONAL ASSOCIATION VI

(EUROPE)

STRATEGIC PLAN

FOR THE ENHANCEMENT OF METEOROLOGICAL AND HYDROLOGICAL SERVICES IN THE REGION

THE TASK TEAM
ON THE RA VI STRATEGIC PLAN AND ACTION PLAN
2007

WMO REGIONAL ASSOCIATION VI (EUROPE)
STRATEGIC PLAN [2008-11]

Version 1.0 – Final Draft

Contents **Page**

Executive Summary 4

1. Introduction 10
2. Purpose 11
3. Situation Analysis 16
4. The RA VI Strategic Plan 20
    4a. Top-Level Objectives and Desired Outcomes 20
    4b. Strategic Thrusts and Expected Results 21
5. Implementation 27
    5a. The RA VI Action Plan 27
    5b. Monitoring and Updating the Action Plan 27

Annex A: RA VI description 28

Annex B: Weather, Water and Climate services in RA VI : status and perspective 47

Annex C: RA VI Action Plan 2008-11 54

RAVI Strategic Plan, Editorial

Daniel K. Keuerleber-Burk,
director of MeteoSwiss, president RAVI

The area of the Regional Association VI (RAVI) of the World Meteorological Organisation (WMO) extends over millions of square kilometres, from Iceland to Kazakhstan and from Spitsbergen to the Levant. There are 50 WMO Members forming the RAVI. Their cultural background is often very different and so are their economic capabilities. The Members operate a number of very advanced hydro-meteorological services. However, the capabilities of the Members are unevenly spread. Too many hydro-meteorological services in Europe are still not in the position to comply adequately with today's needs. It is therefore evident that the RAVI Members' NMHSs and associated institutions should strengthen their cooperation and act together in their task as major contributors to the safety and well being of people, sustainable development and environmental protection. The use of the current potential of hydro-meteorological services and institutions like EUMETSAT and ECMWF should be maximized to bridge the gap in the level of relevant services. In order to address these challenges, the Fourteenth Session of the RAVI (Heidelberg, September 2005) decided to develop a Regional Strategic Plan and an associated Action Plan.

It is clear that the basis for any Regional Strategic Plan should be the Strategic Plan of the World Meteorological Organisation (WMO) approved by the Fifteenth WMO Congress (Geneva, May 2007). The WMO Strategic Plan defines the high-level and long-term objectives and strategies for WMO to effectively develop and coordinate plans and programs for implementation that enable the 188 Members of WMO to collectively perform their key activities. Consequently, this regional strategic document shall focus on the specific needs and requirements within the RAVI and the subsequent objectives and results pursued by the RAVI Members to contribute to the WMO top priorities in the most efficient way.

It was therefore important to include the Members and the WMO Secretariat from the beginning into the development process of the plan. This was achieved through surveys among the Members and several conferences and through close cooperation with the WMO Office for Europe. With this background, the authors of the RAVI Strategic Plan accomplished their extensive analytical work: strengths, weaknesses, opportunities and threats were assessed; needs, issues, and priorities were identified. The result was a number of key drivers and strategic choices, which provide a basis for strategic thrusts and derived expected results.

The RAVI Strategic Plan shall be implemented through a RAVI Action Plan. Annex C of this document provides the principles, the process and the methodologies on which the Action Plan is build upon. The necessary resources are to be mobilized by national governments, by the European Union, the World Bank and other institutions.

However, nothing can be achieved without the devotion of the people who are needed to carry out the actions. I am convinced that those who are addressed with the RAVI Strategic Plan, namely the political decision makers, the directors of the National Hydro-Meteorological Services and the men and women who are directly charged with the implementation, will help and do their best to make the RAVI Strategic Plan a success. I wish to thank all those who gave and will give their support for the continuing development of RAVI.

At this occasion, I also would like to thank the Secretary General of the WMO and the Permanent Representatives with WMO of Czech Republic, Finland, France, Georgia, Russian Federation, Switzerland and United Kingdom for allocate a significant amount of human resources; and I wish to express my special appreciation to the authors of this document who accomplished a pioneering task with the development of the first RAVI Strategic Plan.

31.12.2007, Daniel K. Keuerleber-Burk, President of RAVI

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WMO Regional Association VI (Europe)
Strategic Plan [2008-11]
Executive Summary

What is WMO Regional Association VI and what is its role ?

World Meteorological Organisation Regional Association VI

The World Meteorological Organization (WMO) is the United Nations (UN) specialized agency for weather, water and climate. The WMO's mission is to provide world leadership in expertise and international co-operation 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 societal and economic benefit of all nations.

To support the aims of WMO and the implementation of its global Programmes at the national, sub-regional and regional levels, the WMO has defined a framework of six Regional Associations. The Regional Association VI (RA VI) covers Europe, and includes 50 members (cf. attached map).

The importance of Weather, Climate and Water related issues

There is growing awareness of how everyday life and the sustainable development of society are affected by the weather, climate, water resources and the natural environment. Weather, climate and water information and knowledge are used to influence social and economic decisions everyday including, among others:

- efficient generation of energy;
- safe and efficient transport in the air, on land, on rivers and at sea;
- management of agricultural production and water resources;
- environmental protection and water quality;
- defence, emergency planning and security; and
- development planning.

The majority of natural disasters are associated with weather and water-related hazards, whilst the impacts of some geological and biological types of hazards are also related to the weather or water. In addition, anthropogenic climate change is creating new weather and water related challenges.

The need for international co-operation

Due to the nature of weather, climate and water related events, international co-operation is needed to observe and assess the natural environment conditions, and then forecast and predict their likely developments. Most countries throughout the world have a National Meteorological and/or Hydrological Service (NMHS) which provides observations, forecasts and services related to weather, water, climate and the related environment. The basic purpose of NMHSs is to contribute to the maintenance of conditions for safety, the protection of life and property of the citizens, the sustainable use and the preservation of natural resources, and the reduction of damage from high impact weather, climate and water related events.

The activities of these NMHSs are coordinated internationally through the WMO.

Co-operation and mutual assistance between WMO Members is the key to the organisation's success. WMO's Regional Associations have proven to be useful for managing the co-operation between Members and their NMHSs on a regional basis. This enables global

programmes and activities to be broken down into manageable entities and provides a more practical size for solving common problems and exchanging knowledge and experiences. It also provides a mechanism for enabling a collective voice from WMO with regional groupings such as the European Union and Commonwealth of Independent States (CIS).

The purpose of WMO Regional Association VI

The RA VI Strategic Plan defines the purpose for WMO RA VI:

To coordinate, develop and promote within the Region:

- **the meteorological and hydrological infrastructure; and**
- **expertise on weather, climate, water and the related environment**

to enable its Members' NMHSs and associated institutions to act together as major contributors to:

- **the safety and well being of people;**
- **sustainable development; and**
- **environmental protection**

in the Region and worldwide

Each Member decides how best to use its own capacities, and especially its NMHS to contribute to these outcomes. This Strategic Plan sets out how the Region supports and should improve the overall benefit at the national scale, stressing the collective commitment to:

- maximize the use of current capabilities within the region to meet the evolving needs and requirements;
- improve the capabilities of all RA VI Members to provide services,
- set shared priorities for the Region and show the value added of working together;
- play a world-leading role in the WMO global framework, whilst making best use of that global framework;
- capitalize on and develop existing sub and trans-regional co-operation.

What is the challenge facing WMO RA VI ?

The Strategic Plan and its associated Action Plan aim at responding to an ensemble of factors which affect the design, the definition, the provision, the monitoring and the assessment of weather, climate and water services within RA VI.

It takes into account the current capabilities within the region, and the variation in these capabilities as well as the current level of co-operation within the region. It integrates the external factors such as the trends, developments and evolving needs of Members and society.

Despite their diversity, the RA VI Members converge in identifying common themes, key in orienting the future of the Region, which are summarized as **Key Drivers** and **Strategic Choices** below.

Key Drivers
• Warning of high impact weather to remain the cornerstone of the core mission of NMHSs, requiring an appropriately sustained infrastructure, and a continuous improvement of the associated forecasts; • Need for prevention and mitigation of natural disasters through early warning, and vulnerability assessment; • Ever greater needs, requirements and capabilities to deliver new and further services, especially regarding weather and/or water-sensitive economy, climate change, water resources management and air quality; • General decrease in funding for NMHSs, and/or a requirement to deliver more for the same or less resources in a context of increasing value of weather, water and climate information, leading to more competition for the delivery of commercial services • Need for improvements to the infrastructure, especially in the east of the Region.
Strategic Choices
• Strengthened co-operation within the Region • More exchange of knowledge, know-how and understanding to provide better services • Improved capitalization on Region assets (ECMWF, EUMETSAT, EUMETNET, ICH) • Improved interfaces with user communities • Alliances with new partners, including EU institutions, international organizations or funding agencies.

How will RA VI meet the challenge ?

To meet the challenge, the RA VI Strategic Plan articulates a strategy based upon the Strategic Thrusts introduced in the WMO Strategic Plan. These are:

Service Delivery
This is the primary area for achieving the desired outcomes; the safety and well-being of people, sustainable development and/or environmental protection should be the natural result of weather, climate and water related services. Although the delivery of meteorological and hydrological services is mature within the Region, the Region needs to respond to a more information demanding economy and to global change and its foreseen impacts which are modifying users' requirements for services and the market in which service providers operate.

This will be done by:

- Working together to use best practice and existing capabilities within the Region to make best use of resources and improve services;
- Creating the proper mechanism to measure the RA VI contribution to sustainable development;
- Documenting and measuring the socio-economic benefits of the RA VI activities.

Science and Technology Development and Implementation
In order to provide more comprehensive services to satisfy the needs of end users there is a requirement to increase further the scientific knowledge and technological infrastructure in the Region to meet the requirements for more comprehensive services.

This will be done by:

- Improving understanding of meteorological and hydrological processes and of the requirements of the user community regarding the accuracy and usefulness of the

analysis, forecasts, warnings and risk assessments of meteorological and hydrological related hazards;
- Modernising the RA VI hydrological and meteorological infrastructure, including combining capabilities of NMHSs, regional and sub-regional organizations with those of possible partners;
- Ensuring that the Region develops the most efficient and effective infrastructure to feed into the global WMO system.

Partnership

Working together more effectively both within the Region and with other bodies outside the Region and outside the normal actors of WMO, is a key strategic thrust for the Region. The weather, climate and water communities already necessarily have to work together to exchange necessary data for forecasting, and the pressure of reduced government funding encourages increased collaboration to share resources.

This will be done by:

- Identifying where opportunities for sub-regional co-operation are lacking and promote potential bodies for new partnerships;
- Being the focal point for the WMO link with regional organisations, including the EU, the CIS and regional UN bodies;
- Improving the interactions between persons and institutions from other sectors and disciplines including those in the social sciences, development planning and disaster preparedness communities.

Capacity Building

Underpinning the above is the need for capacity building. The expertise within the Region is not homogeneous and not all Members can contribute as effectively as they would like to the safety and well-being of people, sustainable development and environmental protection. In order to meet the increasing demands for more comprehensive services across the Region to deliver these benefits, there is a need to build capacity so the whole Region can effectively utilize the expertise contained within the world-leading centres, and address the technological gaps that may exist.

This will be done by:

- Assessing the gaps in knowledge and capabilities to meet requirements;
- Setting up the appropriate collective actions/projects to fill the gaps;
- Ensuring that the Region and its NMHSs have the right people with the right skills to achieve their objectives.

Efficient Management and Good Governance

Regional Association VI has limited financial resources through the WMO budget and relies heavily on the goodwill and contributions of volunteers from its Members to deliver its activities. Therefore it is imperative that the Regional Association effectively manages its resources to avoid duplication, and meet the Members' priorities as articulated in the Regional Strategic Plan.

This will be done by:

- Reviewing subsidiary bodies of RA VI and their role in delivering the Strategic Plan;
- Sharing experience, knowledge and capabilities with other Regions to help deliver the WMO Strategic Plan;
- Raising awareness within Europe of the existing WMO System and the social and economic benefits of meteorological, hydrological and related services (or NMHSs) within Europe

What does WMO RA VI need to do ?

Establish an action plan

The Strategic Plan will be implemented through specific objectives written into an Action Plan. Using the 11 Expected Results of WMO as a framework (see annex), the Strategic Plan specifies those Results or outputs which are a priority for RA VI. These outputs fit into the following broad themes:

- Improve existing practice;
- Broaden use of more advanced technologies;
- Join in existing or planned projects;
- Develop new capabilities or products.

The management of the Region will make sure that its working structure facilitate the execution of the Action Plan and ensure the contribution of the Region to the overall objectives of the WMO.

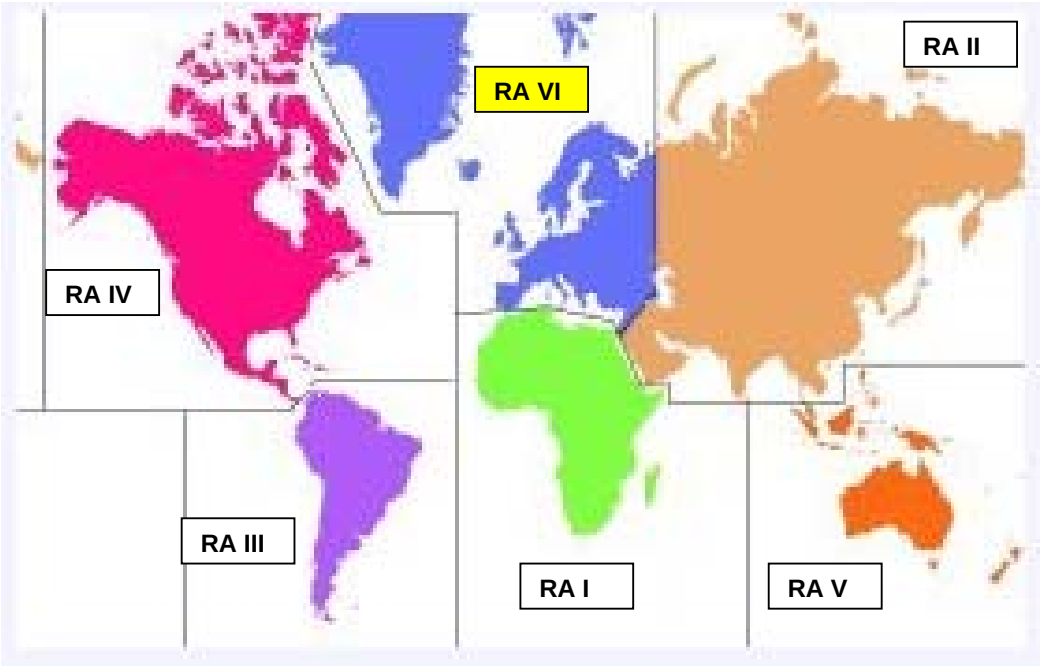
Keep track of society and users' needs

While societies benefit from continuing scientific and technological progress, the full benefit of weather, climate and water forecasts products and services is yet to be realized. Recognizing that people and economies are more vulnerable today is the first step towards developing decision processes that utilize environmental information more effectively. The new WMO strategy, supported by the RA VI one, emphasizes service delivery to improve the interaction between providers and users of weather, climate and water products and services. RA VI is committed to consolidate existing and create when appropriate processes to ensure a fruitful dialogue between the weather, water and climate information providers and users at large as a major ingredient for service quality assessment and improvement and a necessary vehicle for capturing evolving needs and requirements.

Monitor the strategy and report on the actions of RA VI

The purpose is to manage the strategy effectively to ensure that it is a living and dynamic process. Continuous monitoring of the WMO strategic thrusts and initiatives as applied in the RA VI strategic plan, assessing the effectiveness of the implementation strategies, will be carried out. Monitoring and evaluation of the RA VI Plan is the responsibility of its President with the primary assistance of the RA VI management group. An annual performance report will provide an assessment of progress toward the plan's objectives and the ongoing relevance of the strategic initiatives employed. This assessment will be an important input to the strategic planning process and will be used to adjust direction and priorities as required, as well as the Region contribution to the WMO operating and strategic processes.

MAP of WMO Regional Associations (RA)



Expected Results of WMO

Science and Technology Development and Implementation
I. Enhanced capabilities for Members to produce more accurate weather forecasts and warnings
II. Enhanced capabilities for Members to provide more accurate climate predictions and assessments
III. Enhanced capabilities for Members to provide more accurate hydrological forecasts and assessments
IV. Integration of WMO observing systems
V. Development and implementation of the new WMO information system
Service Delivery
VI. Enhanced capabilities of Members in multi-hazard early warning and disaster preparedness
VII. Enhanced capabilities for Members to provide and use weather, climate, water and environmental applications and services
Partnership
VIII. Broader use of weather, climate and water outputs for decision-making and implementation by Members and partner organizations
Capacity Building
IX. Enhanced capabilities of NMHSs in developing countries, particularly LDCs, to fulfil their mandates on weather, climate and water
Efficient Management and Good Governance
X. Effective and efficient functioning of constituent bodies
XI. Effective and efficient management performance and oversight of the Organization

WMO Regional Association VI (Europe)
Strategic Plan [2008-11]

1. Introduction

Extract from the WMO Strategic Plan [2008-11]

From the routine weather that affects livelihoods and economic decisions everyday to the storms, floods, and droughts, which can affect the very survival of millions of people, weather, climate, water and related environmental issues impact people and the world's economy. Policy makers, professionals and the public alike, use and benefit from environmental forecasts and assessments. Nevertheless, worldwide between 1980 and 2000, over 1.2million people died and more than US$900 billion were spent coping with weather, climate and hydrological phenomena. Much of the impact could have been avoided by pro-active initiatives by governments and people. Loss of livelihoods and financial costs are growing steadily because exposure to environmental hazards is increasing. At the same time, scientific and technological advances are providing tools and opportunities to enable more effective action.

To realize these opportunities requires a vision, a plan, and a strong organizational commitment. The World Meteorological Organization (WMO) Strategic Plan lays out the vision and roadmap whereby its Members build on their achievements and collectively identify their commitments to advance their efforts to address critical societal and development needs of today and the future.

2. Purpose

To realize its strategy, the WMO entrusts its secretariat to implement several programmes ultimately put in practice by the Members, mostly through their National Meteorological and/or Hydrological Services (NMHSs).

The purpose of this Strategic Plan (SP) document is to focus on the specific needs and requirements within the Region "Europe" (see Map 1 in Annex A – named Region Association (RA) VI according to the WMO geographical division), and the subsequent objectives and results pursued by the RA VI Members to contribute to the WMO top priorities in the most efficient way.

The importance of Weather, Climate and Water related issues for sustainable development

There is growing awareness of how everyday life and the sustainable development of society are affected by the weather, climate, water resources and the natural environment. Weather, climate and water information and knowledge are used to influence social and economic decisions everyday including, among others:

- efficient generation of energy;
- safe and efficient transport in the air, on land, and on water;
- management of agricultural production and water resources;
- environmental protection and water quality;
- defence, emergency planning and security; and
- development planning.

The majority of natural disasters are associated with weather and water-related hazards, whilst the impacts of some geological and biological types of hazards are also related to the weather or water (see Box 1). In addition, anthropogenic climate change is creating new weather and water related challenges.

Box 1: Natural Hazards Affecting Regional Association VI

Weather and Water Related Hazards

- Floods
- Droughts
- Wind storms
- Heat waves
- Cold spells
- Mud flows and landslides
- Waves and storm surges
- Avalanches
- Wild Fires

Weather and Water-related Impacts of Biological and Geological Hazards

- Spread of air or waterborne diseases
- Spread and fallout of the ash plume from a volcanic eruption and its effect on climate
- Weather conditions following an earthquake affecting the rescue efforts and the impact on the homeless local population (e.g. due to severe cold weather).

- In August 2002 a 100-year flood caused by over a week of continuous heavy rains ravaged Central and Eastern Europe, killing dozens, dispossessing thousands, and causing damages of billions of euros

- In Russia, a severe cold wave which arrived during January 2006 brought some of the coldest temperatures to the region in decades

- Winter storm Kyrill, which hit Europe on 18 January 2007, led to 47 deaths and damage estimated up to 3.5bn€.

The societal and economic impacts of weather, climate, water and environmental conditions are great – and they are growing. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) states that nearly all European regions are to be negatively affected by future impacts of climate change. These include increased risk of inland flash floods, and more frequent coastal flooding and increased erosion (due to storminess and sea-level rise). For much of Europe, higher temperatures and greater summer drought is expected to reduce water availability and crop production, as well increase health risk due to heat-waves and the frequency of wildfires. In addition, growing urbanization and the expansion of communities into previously uninhabited areas, such as arid zones and flood plains, is increasing the exposure of populations to weather and water-related hazards, noting also that it is often the less developed Members which are most affected by natural disasters.

However, scientific and technological advances are providing tools and opportunities to take more action, and there are new opportunities to increase weather, climate and water information to help governments to improve the safety and wellbeing of their populations, to increase prosperity, enhance security, improve public health, and to improve decision making for end users such as those involved in the transport, energy, agriculture and leisure sectors (see Box 2). There are also new opportunities to use this information to make decisions which will protect the environment for future generations.

Box 2: Example of Socio-Economic Benefit of Meteorological Services

For every 1m/s of wind aircraft can save/cost about 30€/hour in fuel. Therefore, by using detailed wind forecasts, and using/avoiding the strongest winds (jet streams) at high levels airlines can reduce the amount of fuel they need, both saving them considerable amounts of money and reducing pollution.

Governments and people continue to need expert assistance to understand and assess both the effects of routine weather, climate and water conditions and the impacts of extreme events on their societies, and to exploit weather, climate and water information more effectively to realize fully its societal benefit.

The role of the World Meteorological Organization

Due to the nature of weather, climate and water related events, international co-operation is needed to observe and assess the state of the natural environment, and then forecast and predict its likely development. Most countries throughout the world have a National Meteorological and/or Hydrological Service (NMHS) which provides observations, forecasts and services related to weather, water, climate and the related environment. The basic purpose of NMHSs is to contribute to the maintenance of conditions for safety, the protection of life and property of the citizens, the sustainable use and the preservation of natural resources, and the reduction of damage from high impact weather, climate and water related events.

The activities of these NMHSs is coordinated internationally through the World Meteorological Organization, the UN specialized agency for weather, water and climate. The WMO's mission is to provide world leadership in expertise and international co-operation in weather, climate, hydrology and water resources, and related environmental issues, and thereby to contribute to the safety and wellbeing of people throughout the world and to the societal and economic benefit of all nations. Through its activities the WMO aims to contribute to the following outcomes:

- improve the protection of life, livelihoods and property;
- improve the health and wellbeing of citizens;
- increase safety on land, at sea and in the air;
- sustain economic growth in both developed and developing countries; and
- protect natural resources and improve environmental quality.

A more complete description of WMO is given at www.wmo.int.

The role and aims of WMO Regional Association VI

Box 3: The purpose of WMO RA VI

To coordinate, develop and promote within the Region:

- **the meteorological and hydrological infrastructure; and**
- **expertise on weather, climate, water and the related environment**

to enable its Members' NMHSs and associated institutions to act together as major contributors to:

- **the safety and well being of people;**
- **sustainable development; and**
- **environmental protection**

in the Region and worldwide

To support the aims of WMO and the implementation of its global Programmes at the national, sub-regional and regional levels, the WMO has defined a framework of six Regional Associations. The geographical area and countries included in Regional Association VI (RAVI - Europe) are shown in Map 1 in Annex A.

Co-operation and mutual assistance between WMO Members is the key to the organisation's success. WMO's Regional Associations have proven to be useful for managing the co-operation between Members and their NMHSs on a regional basis. This enables global programmes and activities to be broken down into manageable entities and provides a more practical size for solving common problems and exchanging knowledge and experiences. It also provides a mechanism for enabling a collective voice from WMO with regional groupings such as the European Union and Commonwealth of Independent States (CIS).

RAVI has many well-organized and capable NMHSs, including world leading capabilities in meteorological and hydrological observing and forecasting, climate prediction and delivery of services to a wide range of sectors. It also has a number of world-leading institutions where subregional groupings of Members or NMHSs have combined their resources and expertise to improve their collective capabilities (e.g. EUMETSAT, ECMWF and EUMETNET and ICH). However, there lacks a consistent capability across the region, and not all NMHSs in the region are capable of meeting the increasing demands for services.

By coordinating the meteorological and hydrological infrastructure within RA VI, all Members are able to benefit from the strong capabilities which exist within the region. This coordination has already brought significant benefit to RAVI Members, for example by providing a dedicated Regional Meteorological Data Communication Network that acts as a model for other parts of the world, by organising regional workshops to tackle climate-related issues (including the maintenance of the Global Climate Observing System), and by some NMHSs taking on the roles of specific Regional Specialised Meteorological Centres (RSMCs) - providing forecasts to all Members in the region, particularly to support disaster preparedness and mitigation. The benefit of these RSMCs also goes beyond RAVI, providing enhanced capability to other WMO Regions, particularly the less-developed regions of the world such as Africa. A similar network of Regional Climate Centres is being proposed by WMO to provide climate –related data and services to Members in the Region.

The RA VI Strategic Plan

This RAVI Strategic Plan provides a dynamic process to enable the Members of RA VI to progress together to meet the evolving needs of the Region in weather, climate and water and related environmental issues, and to contribute to the delivery of the WMO Strategic Plan for the benefit of all WMO Members. The Plan has been constructed by conducting an analysis of the likely trends, developments and evolving needs of the Region, together with an analysis of the Strengths, Weaknesses, Opportunities and Threats, to identify a set of Strategic Drivers and Choices. These are used to direct the Strategic Thrusts and Expected Results of the WMO Strategic Plan to address the current and future needs of the Region. The Strategic Plan will be implemented through a set of clear actions, described in an RA VI Action Plan.

Overall, through the Strategic Plan, the Members of RA VI will contribute to achieving the following three outcomes, which are likely to correspond to national priorities:

- the safety and well-being of people;
- sustainable development; and
- environmental protection.

Each Member decides how best to use its own capacities, and especially its NMHS to contribute to these outcomes. This Strategic Plan sets out how the Region supports and should improve the overall benefit at the national scale, stressing the collective commitment to:

- maximize the use of current capabilities within the region to meet the evolving needs and requirements;
- strengthen the capabilities of all RA VI Members to provide services,
- set shared priorities for the Region and show the value added of working together;
- play a world-leading role in the WMO global framework, whilst making best use of that global framework;
- capitalize on and develop existing sub and trans-regional co-operation.

Successful implementation of the plan will improve more noticeably :

- preparedness to meet global and regional concerns including warning of high impact weather, climate and water conditions, disaster prevention and mitigation, climate change and water resources management;
- integration of weather, water and climate related activities within the region;
- recognition by governments, decision makers and society of the value of weather, climate and water services, including those provided by the NMHSs;
- links between relevant organizations within the region, including the EU, CIS, NMHSs, International River Basin Commissions, other state authorities, the private sector, academia, users;
- awareness of the benefits of weather, water and climate-related services to all sectors of society;
- use of the capabilities within the region to further support and strengthen the WMO global framework.

3. Situation Analysis of the Region

Current Status, Trends, Developments and Evolving Needs of Members and Society

The Strategic Plan and its associated Action Plan need to respond to an ensemble of factors which affect the design, the definition, the provision, the monitoring and the assessment of weather, climate and water services within RA VI.

It needs to consider the current capabilities within the region, and the variation in these capabilities as well as the current level of co-operation within the region. An analysis of these factors is included in Annex A.

The external factors are considered as the trends, developments and evolving needs of Members and society. A thorough analysis of these is included as Annex B. Not surprisingly, different Members note different trends, developments and needs.

Key Drivers and Strategic Choices

There are some themes which are common throughout many of the Members, which are summarized as **Key Drivers** and **Strategic Choices** in the table below.

Key Drivers
• Confirmed priority of the warning of high impact weather and water phenomena as the cornerstone of the core mission of NMHSs based on an appropriately sustained infrastructure (e.g. for provision of observations, datasets, forecasts, climate information, and associated production, transmissions, archive and access to data systems); • Strong pressure to improve the quality of those forecasts and warnings, especially the usefulness and the relevance for all types of end-users; • Need for prevention and mitigation of natural disasters through early warning, and vulnerability assessment; • Ever greater needs, requirements and capabilities to deliver new and further services, especially regarding weather and/or water-sensitive economy, climate change, water resources management and air quality; • A general decrease in funding for NMHSs, and/or a requirement to deliver more for the same or less resources; • Need for improvements to the infrastructure, especially in the east of the Region. • More competition with private sector service providers and between NMSs themselves for the delivery of commercial services.
Strategic Choices
• Strengthened co-operation within the Region o Building on existing cooperating frameworks (e.g. political or economical) to install sub-regional co-operation (for instance in the Middle East; Caucasus and Balkans countries; trans-boundary rivers Commissions– e.g. Sava) o Building on new co-operation between countries in meteorology and hydrology and with other actors in climate, water and environment sector. o Create conditions to enable researchers from every RA VI Member to join in common projects, in particular those carried out by the European Joint Research Centre (JRC) and similar structures. • More exchange of knowledge, know-how and understanding to provide better services o Facilitate exchange of expertise between Members, including on application of EU directives impacting research and operations related to weather, climate

and water activities;
    - Make better use of existing WMO infrastructure and expertise (e.g. Regional Specialized Meteorological Centres (RSMCs), etc)
    - Improve interfaces with WMO Technical Commissions and UN agencies (UNESCO, UNEP)
- Improved capitalization on Region assets (ECMWF, EUMETSAT, EUMETNET, ICH)
    - Encourage broader membership;
    - Encourage broader use of outputs.
- Improved interfaces with user communities
    - At every stage from education to application, especially in the transport sector, and more specifically with respect to aviation.
- Alliances with new partners, including funding agencies / organizations
    - Exploit opportunities with EU, World Bank etc.

Strengths, Weaknesses, Opportunities and Threats

Similarly, the analysis turned up a number of **Strengths**, **Weaknesses**, **Opportunities** and **Threats** of the Region which were commonly perceived by the Members. These are shown in Diagram below.

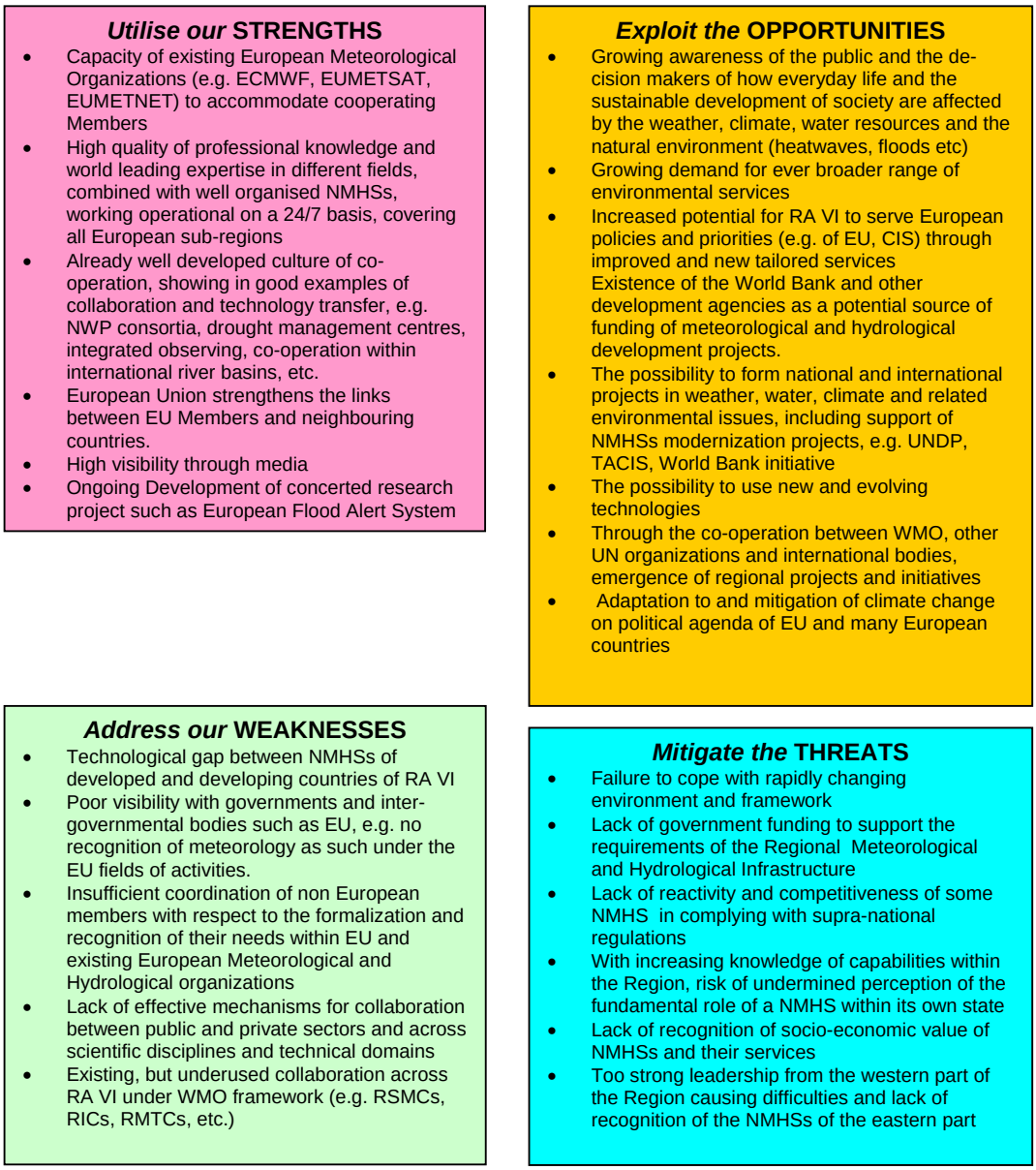


Diagram 1: Strengths, Weaknesses, Opportunities & Threats of the Region

Necessary Action

The key drivers demonstrate an increasing need to prepare for and mitigate the impacts of extreme weather and water related events, and increasing demands for new and improved services for all end-users. The continually improving capabilities of NMHSs enable this challenge to be addressed, but this is within the context of ever greater financial constraints. The choice to be made is to extend the already strong sub-regional co-operation within the Region onto a more regional level, using the NMHSs, RSMCs and other centres of excellence in RA VI to work even more closely together. Co-operation will increase the

effectiveness and efficiency of the meteorological and hydrological infrastructure throughout the region, and will ensure that all parts of the Region can benefit from its world-leading capabilities. Further work will be required to fully exploit the opportunities for funding offered by the European Union and World Bank, and to coordinate the future activities of the Region's hydrometeorological bodies with agencies of the European Union, Commonwealth of Independent States and other groupings (e.g. private sector, academia and users) to fully utilise the capabilities and realise the benefits from the system.

In the following section, this strategic statement is expanded further, within the broader context of the WMO Strategic Plan [2008-11], into a set of strategic thrusts which lead to the Expected Results for the Region.

4. The RA VI Strategic Plan

a. WMO Top-Level Objectives and RA VI Desired Outcomes

The RA VI Purpose Statement (see Box 3) articulates three Desired Outcomes from the Region:

- the safety and well-being of people;
- sustainable development; and
- environmental protection

These interface neatly with the three Top-Level Objectives of the WMO Strategic Plan as shown in the table below:

WMO Top-Level Objective	Region VI Desired Outcome		
	Safety and well-being of people	**Sustainable development**	**Environmental protection**
I. To produce more accurate, timely and reliable forecasts and warnings of weather, climate, water and related environmental elements	Appropriate dissemination, access to and use of weather, climate and water information in civil security, health protection and transport.	Cost decrease of infrastructure protection and maintenance (e.g. better overall design)	Information enabling mitigating action where the impact of weather, climate and water events on an environmental hazard may harm the environment. (e.g. chemical or nuclear release, oil slick, air pollution)
II. To improve the delivery of weather, climate, water and related environmental information and services to the public, governments and other users	Public weather and water services accessible and usable by general public and governments to prevent avoidable damage and losses from weather, climate and water hazards.	Services tailored to enable the exploitation by user groups of weather, climate and water services for social and economic benefit.	Services enabling the use of weather, climate and water information in protection and emergency schemes related to environmental hazards.
III. To provide scientific and technical expertise and advice in support of policy and decision-making and implementation of the agreed international development goals and multilateral agreements	Educating the public and government of the risks associated with weather, climate and water hazards.	Advising user groups on how they can make better use of weather, climate and water information for social and economic benefit.	Providing expert advice to decision-makers on the environmental impacts of weather, climate and water events and of their natural and anthropogenic variability and trends (e.g. climate change)

b. Strategic Thrusts and Expected Results

This section describes the Strategy by which WMO RA VI will endeavour to achieve the top-level objectives and desired outcomes and the results the external community may expect from WMO RA VI. This uses the framework of 5 Strategic Thrusts and 11 Expected Rseults introduced in the WMO Strategic Plan. The Strategic Thrusts are:

- Capacity Building;
- Science and Technology Development and Implementation;
- Service Delivery;
- Partnership; and
- Efficient Management and Good Governance.

The Expected Results of WMO and their relationship with these Strategic Thrusts is shown in the table below.

Science and Technology Development and Implementation
I. Enhanced capabilities for Members to produce more accurate weather forecasts and warnings
II. Enhanced capabilities for Members to provide more accurate climate predictions and assessments
III. Enhanced capabilities for Members to provide more accurate hydrological forecasts and assessments
IV. Integration of WMO observing systems
V. Development and implementation of the new WMO information system
Service Delivery
VI. Enhanced capabilities of Members in multi-hazard early warning and disaster preparedness
VII. Enhanced capabilities for Members to provide and use weather, climate, water and environmental applications and services
Partnership
VIII. Broader use of weather, climate and water outputs for decision-making and implementation by Members and partner organizations
Capacity Building
IX. Enhanced capabilities of NMHSs in developing countries, particularly LDCs, to fulfil their mandates on weather, climate and water[1]
Efficient Management and Good Governance
X. Effective and efficient functioning of constituent bodies
XI. Effective and efficient management performance and oversight of the Organization

These are necessarily broad and encompass all of the outputs of the WMO Members, its Secretariat and Constituent Bodies. They embody several key actions already accounted for and agreed within the missions of NMHSs in the Region, including those carried out within international organisations. The focus of this Plan will be on specifying with greater detail those Results or outputs which are a priority for this Regional Association. These outputs will fit the following broad themes:

- Improve existing practice;
- Broaden use of more advanced technologies;
- Join in existing or planned projects;

[1] Note: As in the Region there are no Least Developed Countries, but there are countries with economy in transition (EIT), this expected result will be focused on enhancing the capabilities of NMHSs in the countries with economy in transition to fulfil their mandate on weather, climate and water.

- Develop new capabilities or products.

Within this section, each Strategic Thrust will be described in more detail with the regional context of how they will support the Region's desired outcomes. We will then describe, in general terms, how this strategic thrust can be implemented in the Region, and finally, the results the external community may expect from WMO RA VI, under the headings of the WMO Expected Results.

Service Delivery

Service Delivery is the primary area for achieving the Desired Outcomes and so is described first; the safety and well-being of people, the security and efficiency of transport and energy production and delivery, sustainable development and/or environmental protection should be the natural result of weather, climate and water related services.

The delivery of meteorological and hydrological services is mature within the Region, but the Region needs to respond to global change and its challenges which are modifying users' requirements for services and the market in which service providers operate. For example, the expectation that climate change will increase the frequency of weather and water related hazards in the Region may require improved early warning services in many Member states, as well as new or more comprehensive services related to environmental protection (e.g. air quality, water resources). Also, Governments and economic sectors will require guidance to respond to a changing climate. Meanwhile, the increased demand from users is leading to a greater involvement of private sector service providers, as well as an expectation for improved services, both providing opportunities for the NMHSs to increase their visibility and improve their effectiveness.

RA VI will address this through:

- Better understanding the requirements of governmental bodies, economic sectors, media and general public,
- Better use of RA VI capabilities, including the quality and completeness of hydrometeorological records for application in development planning and disaster preparedness
- Working together to provide a broader range of sub-regional and regional services
- Working more closely together to implement best practices and optimize the activities of existing capabilities within the Region to improve service production and delivery and the use of resources.
- Creating the proper mechanism to measure the RA VI contribution to sustainable development
- Establishing a monitoring process to capture evolving stakes and challenges and to provide adequate references
- Measuring and documenting the socio-economic benefits of the RA VI activities

And try to achieve the following results:

VI. Enhanced capabilities of Members in multi-hazard early warning and disaster preparedness

- Existence of a Europe–wide early warning system
- Increased number of national and cross-boundary coordinated flood warning and alert systems
- Expanded range of emergency response advisories produced from the region's Regional Specialised Meteorological Centres (RSMCs)

VII. Enhanced capabilities for Members to provide and use weather, climate, water and

environmental applications and services

- Implementation of Quality Management Systems in NMHSs
- Documentation of economical models and their compliance with supranational regulations
- Shared experience of service delivery techniques in public weather, aviation, agricultural, river navigation and marine sectors
- Documentation of socio-economic benefit studies of NMHSs

Science and Technology Development and Implementation

In order to provide more comprehensive services to satisfy the needs of end users - and so provide the benefits to the safety and well-being of people, sustainable development and environmental protection - there is a requirement to increase further the scientific and technological infrastructure in the Region. The Region already has a high level of scientific and technological expertise within world-leading institutions, such as the NMHSs and academia, and in industry. Improved co-operation between Members can help develop the scientific knowledge and technical infrastructure to meet the requirements for more comprehensive services. Such areas include improved quality, range and timeliness of the basic data necessary for the production of weather forecasts, climate predictions and hydrological assessments, whether this be through satellites or ground-based observing; utilising new technologies to improve the timeliness of the exchange of this data; and improved modelling to forecast a greater range of environmental hazards at longer lead times.

RA VI will address this through:

- Improving knowledge of meteorological and hydrological processes and understanding of the requirements of the user community regarding the accuracy and usefulness of the analysis, forecasts, warnings and risk assessments of meteorological and hydrological related hazards and impacts of environmental changes;
- Capitalize on existing infrastructures / organizations in order to better account for and answer to users' requirements, e.g. through the opening or the creation of steering committees gathering all stakeholders
- Modernize the RA VI hydrological and meteorological infrastructure, including by combining capabilities of NMHSs, regional and sub-regional organizations with those of possible partners whenever appropriate
- Preserve and develop the hydrological infrastructure for monitoring quantity and quality of both surface water and groundwater
- Ensure that the Region develops the most efficient and effective infrastructure to feed into the global WMO system
- Ensure that the Region plays its part in the effective operation and delivery of a global multi-hazard early warning system, including disaster preparedness and climate change.

And try to achieve the following results:

I. Enhanced capabilities for Members to produce more accurate weather forecasts and warnings

- Enlarged access and exploitation of ensemble prediction products, now-casting techniques and long-range forecasting products
- Existence of European multi-model ensemble products

II. Enhanced capabilities for Members to provide more accurate climate predictions and assessments

- Use of world-leading capability to develop products and services in support of adaptation strategies and mitigation measures for adverse impacts of climate change
- Participation of RAVI Members in European-wide climate research projects
- Establishment of Regional Climate Centre for RA VI
- Establishment of appropriate capabilities for regional and sub-regional climate monitoring

III. Enhanced capabilities for Members to provide more accurate hydrological forecasts and assessments

- Availability of sufficient and reliable input data (quantity and quality, surface and ground water) and methodologies for hydrological forecast and analysis
- Increased number of NHSs equipped with state of the art methodologies and scientific tools
- Improved capacity building of NHSs for hydrological forecast and analysis production

IV. Integration of WMO observing systems

- Cost effective operation and better supply of good quality data throughout RA VI
- Efficient collaborative network of Regional Instrument Centres in RA VI
- Existing RA VI observation networks recognised as a component of GMES

V. Development and implementation of the new WMO information system

- Reliable dedicated telecommunications of appropriate bandwidth available for all RA VI Members
- Improved data and products exchange for RA VI Members and external users under WIS implementation
- Migration plan, including assistance and advice, to an extended use of Table Driven Code Forms
- Establishment and operation of GISC in RA VI

Partnership

Working together more effectively both within the Region and with other bodies outside the Region and outside the normal actors of WMO, is a key strategic thrust for the Region. The weather, climate and water communities already necessarily have to work together to exchange necessary data for forecasting, and the driver of reducing government funding requires increased collaboration to share resources. Thus, the Region already has well established sub-regional networks (e.g. EUMETNET etc), intergovernmental bodies (e.g. ECMWF, EUMETSAT, ICH etc) as well as informal conferences (e.g. ICWED, ICCED, BALTNET, etc.), but the Region can look to enhance the co-operation between these sub-regional groupings, and also meteorological societies and the private sector, as well as promoting new co-operation where previously none existed. Equally, partnerships can be developed outside the Region to enable others to take advantage of the Region's world-leading expertise. This includes bodies outside WMO such as the EU or World Bank & Regional Development Banks, particularly to ensure that the existing infrastructure is included within any future initiatives or included within development projects.

RA VI will address this through:

- Identifying where opportunities for sub-regional co-operation are lacking and promote potential bodies for new partnerships
- Create the mechanisms to develop the interface and communication with new

potential partners

- Be the focal point for the WMO link with regional organisations, including the EU and its JRC, the CIS and regional UN bodies.
- Expand effective sub-regional framework (e.g. EUMETNET, ICH) to cover RA VI requirements
- Promote co-operation between NMS and NHS, and NMS and operational oceanographic institutions, where they are separated
- Promote co-operation among NHSs and other national bodies which monitor and assess hydrosphere
- Promote regional co-operation among NHSs in international river basins
- Improving the interactions between persons and institutions from other sectors and disciplines including those in the social sciences, development planning and disaster preparedness communities
- Ensure a fruitful dialogue with other WMO Regional Associations and with WMO Technical Commissions
- Secure the relevant participation of NMHSs in the operational implementation of research-funded projects, especially those developed by the JRC like the European Flood Alert System (EFAS)

And try to achieve the following results:

VIII. Broader use of weather, climate and water outputs for decision-making and implementation by Members and partner organizations

- Greater collaboration between NMSs and NHSs, and NMSs and operational oceanographic institutions, on national and international levels mainly where the services are separated
- Involvement of RA VI WG chairs in work of relevant Technical Commissions
- Raise awareness with EU, CIS and regional UN bodies of RA VI capabilities
- Extend knowledge of activities of WMO and NMHSs with other sectors, including those in the social sciences, development planning and disaster preparedness communities
- Greater exploitation of existing funding opportunities from EU, World Bank and others
- Greater involvement of NMHSs in operational implementation of research-funded projects
- Coordination between NHSs and EU to implement water policy and data policy

Capacity Building

Underpinning the above is the need for capacity building. The expertise within the Region is not homogeneous and not all Members can contribute as effectively as they would like to the safety and well-being of people, sustainable development and environmental protection. In order to meet the increasing demands for more comprehensive services across the Region to deliver these benefits, there is a need to build capacity so the whole Region can effectively utilize the expertise contained within the world-leading centres. This can be done by capitalizing on training provided by WMO and Members' training centres, RSMCs and programmes carried out by thematic consortia (e.g. like in NWP by ALADIN, HIRLAM, COSMO, UM community), and to address the technological gaps that may exist. Technology transfer can be facilitated through the sub-regional networks, and other multilateral collaborations. This sharing of best practices should not be limited to technology (or inside the Region), but also tools to strengthen institutional capacity building including management and strategic planning, harmonization with existing standards (e.g. EU, ISO) and quality management.

RA VI will address this through:

- Assessing the gaps in knowledge and capabilities, especially in observation infrastructure design, operation and sustainability, to meet requirements
- Developing appropriate structures and planning to make best use of the Region's existing capabilities and to establish new structures where appropriate to achieve RA VI objectives
- Setting up the appropriate collective actions/projects to fill the gaps
- Ensuring that the Region and its NMHSs have the right people with the right skills to achieve their objectives
- Share experiences and best practices with other WMO constituent bodies

And try to achieve the following results:

IX. Enhanced capabilities of NMHSs in developing countries, particularly LDCs, to fulfil their mandates on weather, climate and water

- Development of Regional Master Plan to bridge gap between NMHS capabilities in RA VI Members
- Establishment and broad access to e-learning materials
- Greater use of "cooperating" membership within established organisations
- Formation of "twinning" arrangements between developed Members and Members with economies in transition
- Greater involvement in existing training programmes
- Improved documentation (country profiles) of the requirements of countries with economies in transition

Efficient Management and Good Governance

Regional Association VI has limited financial resources through the WMO budget and relies heavily on the goodwill and contributions of volunteers from its Members to deliver its activities. Therefore it is imperative that the Regional Association effectively manages its resources to avoid duplication, and meet the Members' priorities as articulated in the Regional Strategic Plan.

RA VI will address this through:

- Reviewing subsidiary bodies of RA VI and their role in delivering the Strategic Plan
- Ensure reactivity within RA VI to build up common proposals
- Liaise with WMO secretariat to convey adequate information to the other UN bodies on RA VI expertise and capabilities
- Share experience, knowledge and capabilities with other Regions to help deliver the objectives of the WMO Strategic Plan
- Behave as a network thanks to committed contact points
- Work at a more operational level with institutions designated/selected by those bodies to pull up the Region expertise and capabilities to better meet their requirements

And try to achieve the following results:

X. Effective and efficient functioning of constituent bodies

- Effective monitoring of the RAVI Action Plan
- Review of the subsidiary working groups of RA VI
- Review of work plan for RA VI session
- Online report of the RA VI SP and AP monitoring
- Effective update of the Strategic plan in connection with the WMO SP evolution
- Enhanced co-operation between sub-regional organizations

XI. Effective and efficient management performance and oversight of the Organization

- Increased influence of RA VI constituent bodies in dealing with regional related matters

- Intensified and easier access to common resources via electronic means
- Increased use of the INTAD 6 network
- Intensified RA VI-WGH activity : networking of NHSs for contribution to regional initiatives related to water
- Development of documented arguments for ensuring the sustainability of national state-funded structures in charge of meteorological and hydrological safety and basis services

5. Implementation

a. The RA VI Action Plan

The Strategic Plan will be implemented through specific objectives written into the RA VI Action Plan. An introduction to the Action Plan is contained in Annex C of this document which describes not only the specific objectives WMO RA VI will strive to complete, but also the bodies which will be responsible for implementation, the methodologies for prioritisation, and a description of the types of indicators that will be used to measure success.

b. Monitoring and Updating the Action Plan

Keeping track of society and users' needs

While societies benefit from continuing scientific and technological progress, the full benefit of weather, climate and water forecasts, products and services is yet to be realized. Recognizing that people and economies are more vulnerable today is the first step towards developing decision processes that utilize environmental information more effectively. The new WMO strategy, supported by the RA VI one, emphasizes service delivery to improve the interaction between providers and users of weather, climate and water products and services.

Nevertheless, the needs of society and users will continue to evolve as scientific and technological advances create new opportunities for services, and as environmental challenges on society increase, particularly as a result of climate change. In order to remain relevant, RA VI needs to continue to monitor these requirements and be prepared and capable to change its activities to best satisfy the requirements of its Members.

As part of this, RA VI is committed to consolidate existing and create when appropriate processes to ensure a fruitful dialogue between the weather, water and climate information providers and users at large as a major ingredient for service quality assessment and improvement and a necessary vehicle for capturing evolving needs and requirements.

Monitor the strategy and report on the actions of RA VI

The purpose is to manage the strategy effectively to ensure that it is a living and dynamic process. Continuous monitoring of the WMO strategic thrusts and initiatives as applied in the RA VI strategic plan, assessing the effectiveness of the implementation strategies, will be carried out.

Monitoring and evaluation of the RA VI Action Plan is the responsibility of its President with the primary assistance of the RA VI management group. An annual performance report will provide an assessment of progress toward the plan's objectives and the ongoing relevance of the strategic initiatives employed. This assessment will be an important input to the strategic planning process and will be used to adjust direction and priorities as required, as well as the Region contribution to the WMO operating and strategic processes.

Because the Regional Association gathers once every two years, as its quadrennial session and at WMO Congress, there is the opportunity to respond promptly to rapid changes in users' and Members' requirements and ensure that the Strategic Plan and Action Plan remain current and relevant to all stakeholders.

ANNEX A : RA VI description

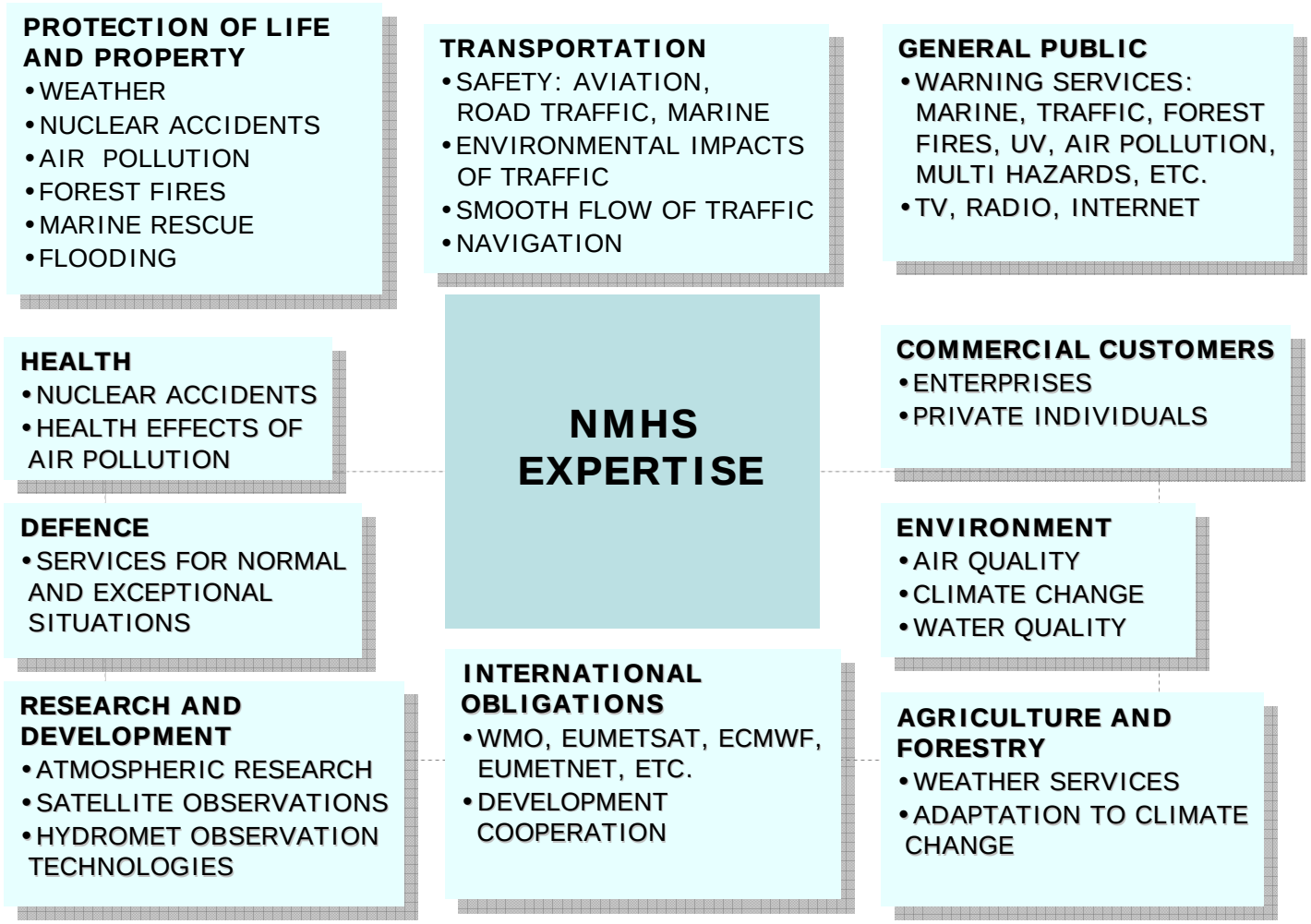
This annex aims at giving a comprehensive picture of the RA VI through various characteristics of their 50 Members. A few key elements are presented, which capture the Members and their NMHSs participation in WMO Programmes, the existing and planned cooperative frameworks at both Members and NMHS level and the existing and envisaged partnerships through which the weather, water and climate issues will be tackled in a more integrated way. It also shows the diversities and capabilities of the region. It gives a picture of the co-operation between the NMHSs in the region to deliver best possible services to the customers.

The situation in the region is described from several angles:
a) a set of cooperating WMO Members supporting WMO programmes, strategies and key objectives, whose governments bear responsibilities toward their citizens, the national economy and the international community, the participation in WMO programmes being one of the mechanism through which they fulfil their obligations and priorities,
b) and the NMHSs which are organized at the national and supra-national scales, to provide the data, products and services required dealing with weather, water and climate issues.
The content also reflects Members characteristics in a global way, and their NMHSs characteristics as a consequence of the former;

The content of the draft ANNEX is a simplified sketch highlighting the main topics to be covered, and the way the content will be documented through tables, graphs and maps.

Map removed from this draft to keep file size down.

National needs for hydrometeorological information



The following table presents the main topics documented in the following paragraphs. It is intended to enabling the reader to capture the link between Members characteristics and the implication for their NMHSs.

Themes	I - Members Context		II - NMHSs Context	
	I.1 - Introduction: -Show commonalities and diversities : geographical, economical, etc - Show existing political framework for co-operations and partnerships' - Show evolving situation		II.1 - Introduction: - Show how NMHSs contribute to national, supra-national, regional, supra-regional, worldwide priorities and challenges - Show how existing co-operations and partnerships help progressing - Show how cooperative framework is strengthening by incorporating more bodies and disciplines	
General context	I.1.1- Common features	- Public duties - Others	II.1.1 - Common features	- Legal status - Basic missions - Others
	I.1.2 - Specificities	- Seismology, vulcanology services (more generally geophysics) - Natural disaster management - Environmental issues - Aeronautic services providers - Defence service providers - Climate policy	II.1.2 - Specificities	- Marine, Oceanography, Hydrology, Air Pollution or not - Size, budget, etc.. - Research, Training - Others
WMO programmes	I.2.1 - World Weather Watch and World Climate Program	- Observation, incl. GCOS, GOOS - Data exchange - Forecasting	II.2.1 - Basic infrastructures	- National, sub-regional, regional and world meteorological centres, in charge of: - Observation network - RSMCs: Cyclones, etc.. - RCCs - WMCs

			- Telecommunication facilities (GISCs in WIS) - Computing resources
I.2.2. - Space	- Remote sensing of environmental conditions - Telecommunications for dissemination of data and products	II.2.2 - Space programmes	- Participation in national programmes - instalment and maintenance of receiving stations
I.2.3 - Disaster Prevention and Mitigation	- Disaster management - Prevention and mitigation	II.2.3 – Climate programmes II.2.4 - Position with respect to national disaster management policies	- Regional activities, part of the WCP, GCOS - Participation in EUMETNET/ECSN and to Climate Centres - Co-operation with other national bodies responsible for disaster management - Hydro and meteorological watch and warnings - Support to rescue operations - Vulnerability and impact studies
I.2.4 - Public Weather Services	- Single voice for warning issue - Co-operation with media, including DPM-related messages - Usability and pertinence of hydro-met products for decision makers, economical players and general public	II.2.5 - Communication	- "User guides" - WMO "sponsored" web sites, including worldweather.organisations
I.2.5 - Applications	- Aviation - Agriculture	II.2.6 - Operational products	- Specific products

		- Marine (with IOC)		
	I.2.6 - Technical co-operation and capacity building	- VCP - Fellowships	II.2.7 - Local implementation	- Maintenance of technical systems - Training courses
	I.2.7 - Hydrology and Water Resources	- Basic systems - Hydrological Forecasting - Water resource assessment - Data analysis	II.2.8 – Local implementation	- HYCOS - HOMS - Guide to Hydrological Practices
	I.2.8 - Research Programmes	- Climate - CLIPS - Weather	II.2.9 - Contribution to Research Programmes	Participation in demonstration projects, show cases, international experiments of the WCRP, AREP, WWRP etc. Examples: THORPEX, IPY, MAP D-PHASE
International framework	I.2.9 – Regional Programmes	Regional Associations with Strategic Plans	II.2.10 – Regional contributions to WMO programmes	Regional Actions Plans
	I.3.1 - Bilateral	- G to G treaties (Flood, civil protection,…) - trans-boundary rivers	II.3.1 - Bilateral	- Purposes: common interest (e.g. trans-boundary pbs), common goals. - Examples (more info needed)
	I.3.2 - Thematic	-Thematic: ECMWF, EUMETSAT - ESA	II.3.2 - "Networking"	- Basic missions: EUMETNET, Meteorological Network of CIS... - Geographical: ICWED, ICCED, …. - Thematic: ECOMET, COST, NWP Consortia; ..

		- International River basins agreements - More info needed (same as EURATOM for instance) Ecology (EMEP)		Contribution to HYCOS projects
Including partnership with other sectors	I.3.3 - Political	- EU, CIS - GEO, - IHP UNESCO	II.3.3 - International representation	▪ ▪ Contribution to the national GEO activities and involvement in GEOSS activities
	I.3.4 - Research and Education	UEG,..	II.3.4 - Thematic	-Connected disciplines: Environmental agencies - Academia - Meteorological Societies(e.g. EMS), - Water research and management - Others
	I.3.5 - Institutional	- SIDS Defence 'e.g. NATO, …) - Aeronautics (e.g. EUROCONTROL,)	II.3 5 - Institutional	- Contribution to WMO Early Warning Centres Demonstration Projects - Defence - Aeronautics - Water management

N-B: The following basic information has been collected from and provided by the RA VI NMHSs. It is available at the WMO Office for Europe.

The following pieces of text illustrate proposed extended information related to individual boxes of the preceding table.

I - Members Context

I.1 - Introduction

National governments bear responsibilities towards their citizens, to the national economy and to the international commitments which the NMHSs contribute to fulfil. In RAVI there are certain clear political and economical differences. RAVI stretches namely from Iceland and Portugal in west to the Russian Federation in east and from Scandinavia in the north to Jordan, Israel and Lebanon in the south. It includes Members with very different political and economical background. Some are part of the European Union, some will stay outside the Union and some are in the process to become Members of EU. The NMHSs of Members of the European Union are bound to Treaties which influence the operation of the NMHSs. There are also still great economical differences between the western and south-eastern part of the region.

I.1.1 – Common features

The whole area includes 50 Member States of which 27 are part of the European Union. The budget for the NMHSs of the 50 countires are together almost 1,9 billion €, including for most of the countries the commitment to the international organisations, but at least for one not. The total number of employees of the NMHSs are together around 75 000. The government funding for the NMHSs varies from around 50 % to full funding. Income from commercial services varies between 0% to 44 % of the funding.

I.1.2 - Specificities

Some of the Members of the region also use the NMHS as the authoritative voice in environmental and climate change issues; most of the NMHS have the duty to provide services for water management, defence, disaster management as well as for aviation and some of the NMHSs are national focal points in GEO (Global Earth Observations). Responsibilities of NHSs differ from country to country. They usually share their activities with other institutions in water management branch. Some of NHSs are focal points in EIONET-Water. This to only explain the wide range of duties of some of the NMHSs.

WMO Programmes

Through Membership in WMO, Members are part of the programmes of WMO. WMO carries out its work through ten major scientific and technical programmes

:

- ***I.2.1 - The World Weather Watch programme,*** is the backbone of WMO's overall programmes. It combines data-processing centres, observing systems and telecommunication facilities – operated by Members – to make available meteorological and related geophysical information that is needed in order to provide efficient meteorological and hydrological services within the countries. It also includes a Tropical Cyclone Programme encompassing more than 60 countries and an Instruments and Methods of Observation Programme to promote standardization and development of meteorological and related observations.

- ***The World Climate Programme*** promotes better understanding of climate processes through internationally coordinated research and the monitoring of climate variations or changes. It also promotes the application of climate information and services to assist in economic and social planning and development. The research component of the Programme is the joint responsibility of WMO, the International Council for Science (ICSU) and UNESCO's Intergovernmental Oceanographic Commission (IOC). The Climate Impact Assessment and Response Strategies component is coordinated by the United Nations Environment Programme (UNEP).

- ***I.2.2 -*** **The *Space programme*** contributes to the development of the Global Observing System of WWW, as well as to the other WMO-supported Programmes and associated observing systems. It provides data, products and services continuously, from both operational and R&D satellites, and facilitates and promotes their wider availability and meaningful utilization around the globe.

- ***I.2.3 - The Natural Disaster Prevention and Mitigation Programme*****,** is a cross-cutting Major Programme that aims to enhance WMO Members' capacities in disaster risk management by strengthening and integrating the contributions of Members' NMHSs towards improving the safety and well-being of communities. This is achieved through coordination of activities carried out through WMO Programmes, Technical Commissions and Regional Associations as well as the strengthening of strategic partnerships at the national, regional and international levels. The Programme also provides advice and support for mainstreaming NMHSs in national disaster risk planning and WMO's actions in response to disaster situations.

- ***I.2.4 – The Public Weather Services Programme***

- ***I.2.5 - Applications of Meteorology:*** comprises four areas of application of meteorological services and information: public weather services, agricultural meteorology, aeronautical meteorology and marine meteorology and oceanography, and promotes the development of infrastructures and services, which are required in those areas for the benefit of Member countries. The Aeronautical Meteorology component of the Programme maintains close co-operation between WMO and partner organizations – particularly the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA). The Marine Meteorology and Oceanography component of the Programme is closely coordinated with UNESCO's Intergovernmental Oceanographic Commission (IOC) and the International Maritime Organization (IMO).

- **I.2.6 - The Education and Training Programme** holds the key to future development by promoting all efforts in Member countries to ensure that the necessary body of trained meteorologists, hydrologists, engineers and technicians is available. It is closely interrelated with all other major scientific and technical Programmes.

  Technical Co-operation Programme aims at bridging the gap between advanced and developing NMHSs in WMO member countries. WMO assists countries, particularly the Least Developed Countries (LDCs), with the development of appropriate services and infrastructure of significant socio-economic benefit for Members. This is facilitated e.g. by mobilizing resources for development projects from various national and international sources, through the Voluntary Co-operation Programme, by demonstrating the socio-economic value of the Meteorological, Hydrological and related services and by organizing relevant meetings and regional collaboration.

- **I.2.7 - The Hydrology and Water Resources Programme** is concerned with the assessment of the quantity and quality of water resources in order to meet the needs of society, to permit mitigation of water-related hazards, and to maintain or enhance the condition of the global environment. It includes standardization of all aspects of hydrological observations and the organized transfer of hydrological techniques and methods. Methodological support of flood forecasting systems and assessment of climate change impacts on hydrological regime belong to common priority topics. The Programme is closely coordinated with UNESCO's International Hydrological Programme.

- ***I.2.8 - The Atmospheric Research and Environment Programme*** promotes atmospheric research, in particular through the Global Atmosphere Watch (GAW), which integrates monitoring and research activities carried out under the Global Ozone Observing System and the Background Air Pollution Monitoring Network and serves as a system to detect changes in the composition of the atmosphere. The Programme also includes weather-prediction research; a Tropical Meteorology Research Programme relating to studies of monsoons, tropical cyclones, rain-producing tropical weather systems and droughts; and a programme on physics and chemistry of clouds and weather modification.

- ***I.2.9 -*** **The Regional Programme** cuts across the other major WMO Programmes of relevance to the Regions and addresses meteorological, hydrological and other geophysical issues, which are unique to and of common concern to a Region or group of Regions. It provides a framework for the formulation of most of the global WMO Programmes and serves as a mechanism for their implementation at the national, sub-regional and regional levels. In this respect, this document is the reference document presenting the Region VI and its strategy.

International framework

The governments have several different types of international commitments which touch upon responsibilities of the NMHSs. Examples of

international commitments are listed below:

I.3.1 - Bilateral

There exists also some Government to Government treaties, which affect e.g. transboundary rivers, water quality protection, Flood protection and , civil protection., specify cooperation on transboundary rivers between neighbouring countries. They usually contain a set of meteorological and hydrological data, forecasts and warnings to be exchanged during normal and flood situations.

I.3.2 - Thematic

ECMWF: The European Centre for Medium Range Weather Forecasts, (ECMWF) is an intergovernmental organisation supported by 18 European Member States - Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey and the United Kingdom and 10 Cooperating States, Czech Republic, Montenegro, Estonia, Iceland, Croatia, Lithuania, Hungary, Morocco, Romania, Serbia, Slovenia and Slovakia.

Its objectives are **t**he development of numerical methods for medium-range weather forecasting, the preparation of medium-range weather forecasts for distribution to the meteorological services of the Member States, scientific and technical research aimed at improving forecasts and the collection and storage of appropriate meteorological data. In addition, the Centre makes available a proportion of its computing facilities to its Member States for their research, assists in implementing the programmes of the World Meteorological Organisation; provides advanced training to the scientific and technical staff of the Member States in the field of numerical weather prediction and makes the data in its extensive archives available to outside bodies. Each year, an additional course is organised for participants from WMO National Meteorological and Hydrological Services which are not ECMWF Member States or Co-operating States.

EUMETSAT is an intergovernmental organisation created through an international convention agreed by 20 European Member States: Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey and the United Kingdom. These States fund the EUMETSAT programmes and are the principal users of the systems. EUMETSAT also has nine co-operating states: Hungary, Poland, Republic of Serbia and Montenegro, Slovenia, Romania, the Czech Republic and Latvia. Its primary objective is to establish, maintain and exploit European systems of operational meteorological satellites. EUMETSAT is responsible for the launch and operation of the satellites and for delivering satellite data to end users, as well as contributing to the operational monitoring of climate and the detection of global climate change.

ESA: Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe. ESA has 17 Member States. By coordinating the financial and intellectual resources of its members, it can undertake programmes and activities far beyond the scope of any single European country. ESA's job is to draw up the European space programme and

carry it through. The Agency's projects are designed to find out more about the Earth, its immediate space environment, the solar system and the Universe, as well as to develop satellite-based technologies and services, and to promote European industries. ESA also works closely with space organisations outside Europe. ESA's 17 Member States are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. Canada, Hungary and the Czech Republic also participate in some projects under co-operation agreements.

International River Basins Commissions: The commissions are based on multilateral agreements of Members belonging to main international river basins in Europe. IKSR is the commission that coordinates the protection of the Rhine River. KHR (the Commission for Hydrology of the Rhine), in close collaboration with IKSR, serves as the common platform for water resources management and hydrologic research in the Rhine basin. There are other International Commissions that coordinate national efforts to protect the environment in international river basins: IKSD in the Danube river basin, IKSO in the Oder river basin, IKSE in the Elbe river basin, IKSM (the Maas), IKSMS (the Moselle and the Saar) und IGKB (Lake Constance). Recently the commissions are engaged also in flood prevention and mitigation cooperation for implementation of a new EU flood directive.

I.3.3 - Political

EU: The European Union embraces 27 countries and 490 million people, and it deals with a wide range of issues of direct importance for our everyday life. The European Union is based on the rule of law. This means that everything that it does is derived from treaties, which are agreed on voluntarily and democratically by all Member States. Previously signed treaties have been changed and updated to keep up with developments in society. The most recent one, the draft Treaty establishing a Constitution for Europe, aims to replace all the existing Treaties with a single text and is the result of the work done by the Convention on the Future of Europe and an Intergovernmental Conference (IGC). The Constitution was adopted by the Heads of State and Government at the Brussels European Council on 17 and 18 June 2004 and was signed in Rome on 29 October 2004. It needs to be ratified by each Member State, in line with their own constitutional arrangements (i.e. by parliamentary procedure and/or by referendum). The Constitution will not take effect until it has been ratified by all Member States.

GMES is a joint European Commission and ESA initiative to respond to the needs of citizens in Europe to access reliable information on the status of their environment. GMES will mainly support decision-making by both institutional and private actors. Decisions could concern either new regulations to preserve our environment or urgent measures in case of a natural or man–made catastrophes (i.e. floods, forest fires, water pollution). But to take decisions, it is necessary to anticipate, intervene and control. GMES will integrate these functions by assembling the information acquired in a reliable, valid and compatible manner and make them available for user friendly exploitation. The services will be used by environmental agencies, local, regional and national authorities, civil protection organisations, etc. The new observation techniques and analysis of data will permit these actors to better anticipate potential threats, to intervene timely and to increase the efficiency of the intervention.

In 2003 the WMO signed a Memorandum of Understanding with the European Commission. WMO's engagement with the Commission is facilitated through the WMO Office in Brussels (which is co-funded with EUMETNET and ECMWF).

CIS: Meteorological Network of ***CIS*** (Abbreviated as CISMetNet in this document, although there is still no steady English abbreviation) is an East-European counterpart of EUMETNET. CISMetNet unites NHMSs of CIS on the basis of intergovernmental agreements and is coordinated by the Intergovernmental Council on Hydrometeorology (ICH). Main areas of activity in the framework of CISMetNet include coordination of observational network maintenance and development, joint research and capacity building cooperative programs, mutual exchange of hydrometeorological information, including emergency one to ensure the hydrometeorological security within the region. CISMetNet works on the basis of its own long-term Program of development of hydrometeorological activity covering period from 2006 to 2010

GEO: The intergovernmental Group on Earth Observations (GEO) is leading a worldwide effort to build a Global Earth Observation System of Systems (GEOSS) over the next 10 years. GEO is established on a voluntary and legally non-binding basis, with voluntary contributions to support activities. GEOSS will work with and build upon existing regional, national, and international sensor systems to provide comprehensive, coordinated Earth observations from thousands of instruments worldwide, transforming the data they collect into vital information for society. GEOSS will yield a broad range of societal benefits, divided into 9 societal benefit areas including:

Reducing loss of life and property from natural and human-induced disasters.
Understanding environmental factors affecting human health and well-being.
Improving management of energy resources.
Understanding, assessing, predicting, mitigating, and adapting to climate variability and change.
Improving water resource management through better understanding of the water cycle.
Improving weather information, forecasting and warning.
Improving the management and protection of terrestrial, coastal and marine ecosystems.
Supporting sustainable agriculture and combating desertification.

Understanding, monitoring and conserving biodiversity.

I.3.4 - Research and Education

ICSU: The International Council for Science (ICSU) is a non-governmental organization representing a global membership that includes both national scientific bodies (**112 members**) and international scientific unions (**29 members**).

Through this extensive international network, ICSU provides a forum for discussion of issues relevant to policy for international science and the importance of international science for policy issues and undertakes the following core activities:

- Planning and coordinating interdisciplinary research to address major issues of relevance in both science and society;
- Actively advocating for freedom in the conduct of science, promoting equitable access to scientific data and information, and facilitating science education and capacity building;
- Acting as a focus for the exchange of ideas, the communication of scientific information and the development of scientific standards;
- Supporting in excess of 600 scientific conferences, congresses and symposia per year all around the world, as well as the production of a wide range of newsletters, handbooks, learned journals and proceedings.

ICSU also helps create international and regional networks of scientists with similar interests and maintains close working relationships with a number of intergovernmental and non-governmental organizations, especially the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Third World Academy of Sciences (TWAS).

Because of its broad and diverse membership, the Council is increasingly called upon to speak on behalf of the global scientific community and to act as an advisor in matters ranging from ethics to the environment.

EGU

The EGU runs a substantial outreach programme, in order to promote the geosciences and the solar system sciences beyond the scope set by the Constitution and Bylaws of the Union. This includes but is not necessairly restricted to:

- people, institutions,organisations or scientific unions engaged in fields other than geosciences, both within and outside Europe,
- with national or international geosciences societies outside of Europe, to mutual benefit,
- social problems related to geosciences, to decision makers and the non-scientific public, primarily, but not exclusively in Europe,
- International Conferences and Workshops on topics of geosciences with significant socio-economic impact for regions outside of Europe, to be held in and jointly organized with scientists/institutions from these regions.

EGU Outreach Programmes

The EGU Committees for Outreach and for Education currently manage the following programmes:

- Services for the Media [more]
- GIFT – Geosciences Information For Teachers [more]
- Alexander von Humboldt International Conferences [more]
- Joint publications with the American Geophysical Union (AGU)

I.3.5 - Institutional

There are many other international institutions in which meteorology and hydrology is involved, including the International Civil Aviation Organisation (ICAO), International Maritime Organisation (IMO), North Atlantic Treaty Organisation (NATO) to name but a few.

II - NMHS Context

The NMHSs contribute to many national, supra-national, regional, supra-regional and worldwide co operations and partnerships.

II.1.1 – Common features

Ministry of Environment is the most common Ministry under which the NMHSs are, the second most common being the Ministry for Transport and Communications. Around 40 % of the NMHSs are under the Ministry of Environment or Sustainable Development or equivalent, around 15 % under the Ministry of Transport, other common ministries are Ministry of Education and Science and Ministry of Agriculture. A few are also under the Ministry of Defence.

II.1.2 - Specificities

The NMHSs in many countries are carrying out several duties in addition to the basic ones (weather and climate monitoring and forecasting). The activities being: Hydrology, Marine Services, Environmental monitoring, Aeronautical services, Defence, Seismology, Commercial services, Research and Training. National Hydrological Services (NHSs) are entitled in different way in the region. In approximately 50 percent of countries there are common meteorological and hydrological services in one and same institute. In other ones hydrological service is separated institution, in some cases together with other water management activities (research etc.). The scope of NHSs activities differ from country to country. Some of NHSs monitor and assess quantity and quality of water; some deal with water quantity only. In some cases hydrological service is not transparently entitled.

According to replies to a questionnaire concerning activities included in the NMHSs over 90 % have commercial services, 82% research, 80% environmental monitoring, 80% training, 74% marine services, 74 % aeronautical services, 60% hydrological services, 54% services for defence and 20% seismology.

NMHS co-operation in connection with WMO programmes

II.2.1 - Basic infrastructures

The NMHSs have the role as national centres for reception and distribution of meteorological data. Some have also the role of sub-regional and regional centres, in charge of observational networks. The WMCs (World Meteorological Centres)[2] and RSMCs (Regional Specialized Meteorological Centres), providing meteorological products, RCCs, Regional Climate Centres and Telecommunication facilities (GISCs in WIS).

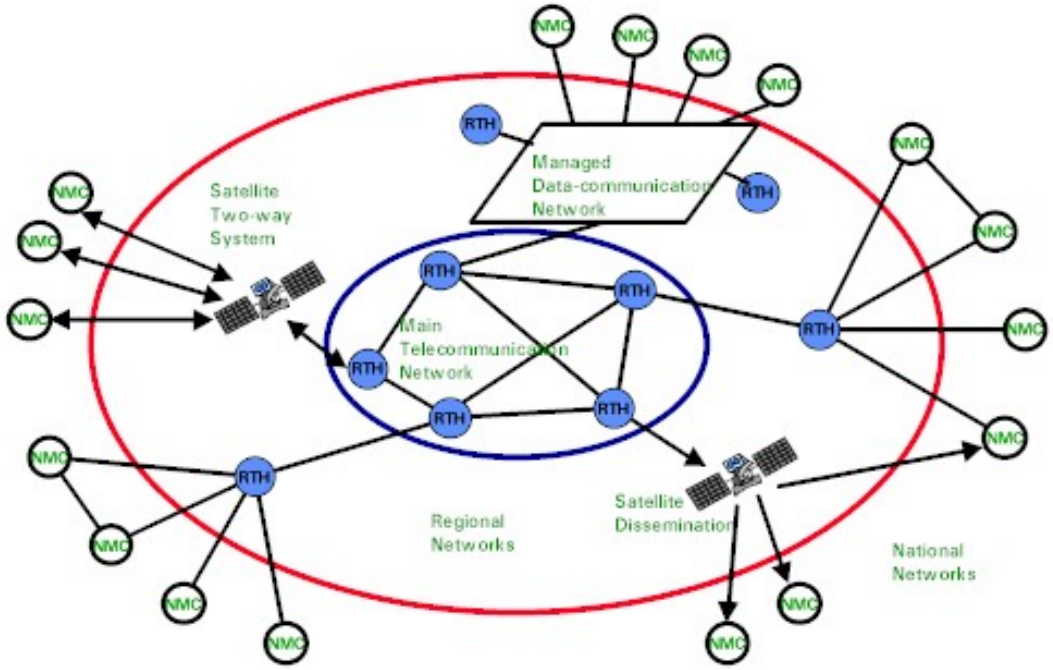


Figure 1 - Structure of the Global Telecommunication System

[2]Capabilities of WMC-Moscow are to be dramatically enhanced after its forthcoming technological modernization supported by the WB

II.2.2 - Space programme
Members co-operate in the context of the EUMETSAT SAF network in order to provide the NMHSs with satellite-derived data, products and services.

II.2.3 – Climate programmes
In order to strengthen and improve Members' capabilities in the climate domain, the following projects and activities of the WCP are tackled on the Regional level: CLIPS (training showcases, networking), CSM (-> co-ordinated climate monitoring activities), DARE, climate applications (climate and human health, climate and tourism etc.). Furthermore Regional activities are run under the umbrella of GCOS. The Members contribute to adaptation strategies and co-operate in the context of ECSN. Centres like the Hadley Centre, GPCC, GCC [...] etc. are run by Members of the Region with benefits for RA VI Members in terms of expertise and services.

II.2 4 - Position with respect to national disaster management policies
The NMHSs are responsible for providing input to the disaster management process. NMHSs provide hydrometeorological information and warnings to the general public and national bodies responsible for disaster management to support the authorities decision making 24/7. It includes among others, Hydro meteorological watch and warnings, support to rescue operations and vulnerability and impact studies.

II.2.5 - Communication
NMHSs provide hydrometeorolgical forecasts and warnings throughout their own websites and internationally coordinated sites, such as Meteoalarm and The WMO Worldwide Weather Information Service. Many NMHSs also provide warnings through their national media

II.2.6 - Operational products
NMHSs produce a wide range of products, such as weather forecasts and warnings for the public and the authorities and tailored products for specific users. Some NMSs in RA VI have a broader responsibility through WMO and other international organisations. These include one of the three World Met Centres in Moscow, one of the two World Area Forecasts Centres for aviation in London, a number of Regional Specialised Meteorological Centres with geographic specialisation (Exeter, Moscow, Offenbach, Rome) and for emergency response (Exeter and Toulouse), Volcanic Ash Advisory Centres for aviation (London & Toulouse) and involvement in the Global Marine and Distress and Security System (GMDSS) .

II.2.7 – National implementation of Technical Co-operation and Capacity Building
Some of the NMHSs in the Region are actively involved in the WMO Technical Cooperation Programme, in particular, the Voluntary Cooperation Programme (VCP). Donor countries meet annually to discuss priorities for the forthcoming year at the Informal Planning Meeting of VCP Donors.

II.2.8 – National implementation of Hydrology and Water Resources Programmes

Research activities in recent years have lead to improve forecasting of hydrological events (floods, draughts) using reliable operational models. The other priority topic of research is climate change evaluation and its possible impact on the water balance and extreme situation occurrence. There are many emerging projects trying to intensify research in the field of hydrology and meteorology. Some examples are:
-TERENO (Terrestrial Observatories in Environmental Research)
-"Patterns in Soil-Vegetation-Atmosphere Systems: monitoring, modelling and data assimilation" (DFG-SFB 32)
-RIMAX (Risk management of extreme flood events)
-KLIWA (Climate change and consequences for water management)
-KLIWAS (Climate change and consequences for inland navigation)
-PAI-OFF (Process modelling and artificial intelligence for online flood forecasting)
Apart from the growing concern for sustainable management education in University courses, a rising number of Summer schools deals with the emerging thematic of meteorology, climate change and consequences for the water balance. Examples are the Summer School of Flood Risk Management (Hamburg), the Floodmaster (International Course Dresden), the International German Summer School of Hydrology (UNESCO-IHP/Bochum), the Deutsch-Chinese Summer School on Water Management (Bremen), the ModObs Summer School on Air-Sea Interaction.

II.2.9 - Contribution to Research Programmes

***THORPEX**:* 25 years after GARP, its successor, THORPEX was established in May 2003 by the Fourteenth World Meteorological Congress (Resolution 12) as a ten-year international global atmospheric research and development programme under the auspices of the WMO Commission for Atmospheric Sciences (CAS). THORPEX is a component programme of the WMO World Weather Research Programme (WWRP).

It was established to reduce and mitigate natural disasters by transforming timely and accurate weather forecasts(1) into specific and definite information in support of decisions(2) that produce the desired societal and economic outcomes(3).

1) Extending the range of skilful weather forecasts to time scales of value in decision-making (up to 14 days) using probabilistic ensemble forecast techniques;
2) Developing accurate and timely weather warnings in a form that can be readily used in decision-making support tools;
3) Assessing the impact of weather forecasts and associated outcomes on the development of mitigation strategies to minimise the impact of natural hazards.

II.2.10 – Regional contribution to WMO Programmes

This document and more specifically its Annex C provides the detailed Actions Plan the Region VI commits to implement to contribute to WMO objectives.

NMHS – co-operation – International framework

One of the strength of the region is the ability and willingness to join forces for common goals. The result is reduced costs for the meteorological infrastructure in the region together with enhancing a critical mass on issues of common interest in meteorology and hydrology.

II.3.1 - Bilateral

Many bilateral agreements exist between the NMHSs to enhance common goals and exchange of know-how. The number of agreements per country varies between a few up to 60 agreements.

II.3.2 - Networking

Especially in Western Europe the NMHSs have grouped together to form networks, which helps the NMHSs to make more efficient management of their collective resources. One important network is the ***EUMETNET***, which is a network grouping of 21 European National Meteorological Services. EUMETNET provides a framework to organise co-operative programmes between the Members in the various fields of basic meteorological activities such as observing systems, data processing, basic forecasting products, research and development, training. Through EUMETNET Programmes, the Members intend to develop their collective capability to serve environment management and climate monitoring and to bring to all European users the best available quality of meteorological information. They will use EUMETNET to make more efficient the management of their collective resources. EUMETNET intends to become an Economic Interest Grouping (EIG)..

In the same spirit, the objective of EUMETSAT SAFs, to which the NMHS are the main contributors, are to undertake, on a distributed basis, the necessary research, development and operational services and products aimed at enhancing the value and use of data for applications, which are a common need of EUMETSAT Member States and Cooperating States.

- The overall objective of a SAF is the provision of operational services, ensuring a cost-effective and synergetic balance between the central and distributed services. The SAF services are an integral part of the overall EUMETSAT operational services.
- There are a number of specific benefits arising from the SAFs, including the improvements of short-range forecasts of high impact weather, better data for aviation, agriculture, sea transport and fishing, better understanding of causes and effects of pollution as well as the depletion of ozone and also the provision of high quality data for climate monitoring.

Meteorological Network of ***CIS*** (Abbreviated as CISMetNet in this document, although there is still no steady English abbreviation) is an East-European counterpart of EUMETNET. CISMetNet unites NHMSs of CIS on the basis of intergovernmental agreements and is coordinated by the Intergovernmental Council on Hydrometeorology. Main areas of activity in the framework of CISMetNet include coordination of observational network maintenance and development, joint research and capacity building cooperative programs, mutual exchange of hydrometeorological

information, including emergency one to ensure the hydrometeorological security within the region. CISMetNet works on the basis of its own long-term Program of development of hydrometeorological activity covering period from 2006 to 2010.

In the same manner but in a smaller scale is also the network of National Meteorological Services in the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) called ***NORDMET***. It is building on the same principles as EUMETNET, it provides a framework to organise co-operative programmes between the Members in various fields of basic meteorological activities. ***BALTMET*** is the network between the NMHSs of Estonia, Latvia, Lithuania and the Nordic countries.

Geographical: The directors of the Western European NMHSs are form an informal group for discussions on policy issues of the region. The meetings are purely informal to their nature, but can result in initiatives like EUMETNET. Usually also common positions for initiatives in the international organisations are discussed. Also the directors of the Central and Eastern Europe NMHSs have a same kind of group for informal discussions on policy issues.

***Thematic*:** ECOMET (the Economic Interest Grouping of the national meteorological services of the European Economic Area) was set up in 1995 to ensure fair competition in the field of meteorological services. Its objectives are to preserve the exchange of free data sets and products between members, help Members maintain and improve infrastructure, expand availability of meteorological information within the ECOMET territory, increase the use and to improve the distribution of data, products and services of the members while maintaining and improving quality and to create the right conditions for members to develop economic activities

HIRLAM*:* The international programme HIRLAM , HIgh Resolution Limited Area Model, is a co-operation of nine NMHSs (the Nordic countries, Estonia, Ireland, the Netherlands and Spain). In addition, there is a research co-operation with Meteo France.
The aim of the Hirlam programme is to develop and maintain a numerical short-range weather forecasting system for operational use by the participating institutes. The programme was initiated in 1985 and has gone through numerous phases in the past two decades. Since 1 January 2006, the programme enters its new phase, HIRLAM-A. The HIRLAM forecast system is now used in routine weather forecasting at DMI, FMI, IMS, KNMI, met.no, INM, and SMHI. The HIRLAM programme is controlled by the HIRLAM council, which consists of the directors of the participating institutes. The programme is managed by the management group. The management group is advised by a Scientific and Technical Advisory Committee.

ALADIN: The concept of the **ALADIN** project was proposed by Météo-France in 1990, with the aim of building a mutually beneficial collaboration with the National Meteorological Services of Central and Eastern Europe. This collaboration was to be in the field of Numerical Weather Prediction (NWP), which provides the basis for the forecasting tools of modern meteorology. The easy to translate acronym (**A**ire **L**imitée **A**daptation dynamique **D**éveloppement **I**nterNational) clearly indicates the major axes of this project:

- to prepare and maintain a NWP system for use on limited geographic areas, this requiring only moderate computing power while allowing a zoom effect with respect to the coupling model ARPEGE;

- to work with small domains and high spatial resolution in mind: the informed assumption here is the important meteorological events at those fine scales (local winds, breezes, thunderstorms lines, ...) are mainly the result of a so-called "dynamical" adaptation to the characteristics of the earth's surface;
- to build from scratch an international top-level NWP tool, in order that all partners may take part in a true NWP development, with the aim that everyone may eventually use the result of the common effort.

About one hundred scientists, from fifteen countries are permanently contributing to the progress of ALADIN NWP system (more than 250 person-years of total work for the first ten years of the project's life) which is now operated every day in fourteen Euro-Mediterranean countries on a huge variety of computing platforms ranging from a PC Cluster under Linux to Vector Computers.

COSMO: The Consortium for Small-Scale Modelling, COSMO, was formed in October 1998 at the regular annual meeting of the German Weather Service with MeteoSwiss. Its general goal is to develop, improve and maintain a non-hydrostatic limited-area atmospheric model, used both for operational and research applications by the members of the consortium. The emphasis is on high-resolution numerical weather prediction by small-scale modelling. The COSMO model is derived of the 'Lokal-Modell' of the German Weather Service with its corresponding data assimilation system.

Current full members are the national weather services of Germany, Greece, Poland, Romania, Switzerland and Italy. A couple of italian regional weather services, some military institutions and many universities are also significantly contributing to COSMO. National hydro-meteorological service of Russia has applied this year. There is no direct financial funding from or to members; however, the partners have the responsibility to contribute actively to the model development by providing at least 2 scientists working in COSMO priority projects.

Two high profile priority projects being started now are (1) the development of a novel ensemble-based data assimilation system for the convective scale, with particular emphasis on convective situations, low stratus conditions and steep orography, and (2) the development of a unified parameterisation of boundary-layer turbulence and shallow non-precipitating convection to improve the coupling between turbulence, convection triggering and radiation. The COSMO model is also used by the CLM community for climate simulations on time scales up to centuries and spatial resolutions between 1 and 50 km.

COST: is one of the longest-running instruments supporting co-operation among scientists and researchers across Europe. COST now has 35 member countries and enables scientists to collaborate in a wide spectrum of activities in research and technology.
COST is an intergovernmental network which is scientifically completely self-sufficient with nine scientific COST Domain Committees formed by some of the most outstanding scientists of the European scientific community. The scientific quality control is the main responsibility of the COST scientific Domain Committees which follow very rigorous evaluation procedures established by the COST Committee of Senior Officials (CSO) involving the mandatory use of external peer reviewers.
COST is based on Actions. These are networks of co-ordinated national research projects in fields, which are of interest to a minimum number of participants (at least 5) from different member states. The Actions are defined by a Memorandum of Understanding (MoU) signed

by the Governments of the COST states wishing to participate in the Action.
The duration of an Action is generally 4 years. The increasing number of COST Actions proves the success of COST within the European Scientific Community. COST is one of the oldest and largest network structures for scientist and approx. 30 000 scientists are co-operating within the frame of COST. COST supports the co-operation of Scientist. Although it does not provide funding for research activities it will fund the co-operation efforts of scientific groups across Europe (mainly traveling costs to meetings, workshop/conference organization costs, dissemination costs, short scientific exchanges of researchers and other instruments).
COST is "bottom up" that means it has no specific targeted research activities and any scientific technical area can be supported by COST. COST is multidisciplinary and supports the widest range of scientific/technical co-operation. COST is international and enables also the participation from laboratories outside the European members.

EUROPEAN METEOROLOGICAL INFRASTRUCTURE (EMI): The European Meteorological Infrastructure is composed by the European National Meteorological Services, members and cooperating members of EUMETNET, jointly with ECMWF and EUMETSAT. Initially a concept used to materialize the structure and the potential of the operational meteorological community across Europe for contributing to the GMES initiative, it has imposed itself as a useful united representation of this community in their relation with all European Institutions.

II.3.3 - International representation

The involvement of NMHS in the representation of their Member state in international organisations is a national decision. However, the Convention of the WMO states that the Director of the NMHS should be the principal delegate to WMO Congress and the Permanent Representative of the Member with WMO.

NMHSs partnerships with other sectors

II.3.4 - Thematic

See 1.3.3

II.3.5 - Institutional

The involvement of NMHSs with other institutions varies on national level. It can include the national environment agency, academia, national meteorological societies, hydrological (water research and management) institutions and many others. The European Meteorological Society (EMS) is a European-wide association of 35 national meteorological societies. The main focus of the EMS is to encourage and support scientific exchange within the European context. There is particular emphasis on enhancing the role of meteorology within the European society, considering how to efficiently and competently inform the European public, and raising awareness about the relevance of the meteorological profession. The main activity of the EMS is its annual meeting, which is one forum for European NMHSs to interact with many of the other meteorological actors across Europe.

There is also an active private meteorological sector in Europe, primarily providing services to commercial fee-paying customers. The

relationships between the private meteorological sector and the NMHSs are variable and somewhat dependent on the individual NMHS's commercial activities. However, in many economic sectors the private sector provider is playing an ever increasing role.

Annex B: ***Weather, Water and Climate services in RA VI : status and perspective***

This annex intends to reflect the perceptions within the Region of key trends and developments, pointing at consolidating and strengthening the kernel of NMHSs activities whilst indicating key areas prone to new and innovative services in which NMHSs will have to play a major role.

It is beyond its scope to provide an extensive analysis of all the factors which may influence the current and future activities of the NMHSs. However, globalization and worldwide spread of information, to name a few, will have a bearing on the evolution of NMHSs and WMO. This is accounted for in the WMO Strategic Plan. These aspects are referred to hereafter when relevant because of their direct impact on the Region strategy.

For the sake of clarity, the analysis distinguishes between facts (evidence connected to or revealing a matter of interest or concern), impacts (actual or potential, direct or indirect, consequences of the facts) and causes (roots and reasons for the previous facts). The analysis leads to proposals of ways forward, which, combined with the subsequent analysis of the evolving needs and demand for services from Members and the society as a whole, shape the strategic aims the Region should pursue.

N-B: The following analysis is mostly based on a questionnaire distributed in March 2006. The replies by the RA VI NMHSs are available at the UK Met Office. The parts of text between "" are quoted from them.

a. Demands of weather, water, climate and related environmental information and services

In this first section, the explicit or implicit demands of customers of services in the domains of weather, climate and water are analyzed with a view to provide clear guidance to establishing the strategic aims for the Region.

A "service" might contain various human, technical, financial, administrative elements, without covering all end-to-end aspects, including data policy and re-distribution and usage conditions.

"The requests for new services are increasing every day." There is a wide variety of new services which could be offered by NMHSs across the Region. "There is a demand on the development of more timely and precise early warning services for hazardous weather phenomena". Others include seasonal and long-range forecasts, regional climate scenarios, environmental services, health services including air, water quality, UV and bird flu, climate change, tourism, energy and mobile phone/Internet services.

"It is a clear trend that the concern for the environment increases." But it is also obvious that the ENVIRONMENT is a broad concept, and that the role, responsibilities and thus financing of NMHSs in this domain are diverse. However, a consensus emerges that the NMHSs can and must provide a "contribution to the sustainable development by means of proactive maintenance and development of the monitoring and alert system", especially "reliable information for the authorities".

This presents both a change in requirements for individual NMHSs, and a collective challenge in the way NMHSs should work together. A prerequisite is the need for capacity building in the Region, to improve the infrastructure:
"The efforts to bridge the gap between the rich and the poor NMHSs must be one of the

future priorities of the RAVI. For that purpose there should be a close co-operation between the WMO and the EU, the World Bank and other possible donators." Economic pressures for further efficiencies and rationalisation is noted. Improved collaboration within the Region is seen as an evolving need, including better sub-regional co-operation, better co-operation with other organisations (including better access to European organisations' products or membership) and the need to lobby on some issues as a coherent voice.
By and large, there exists a collective willingness to make the Region VI exemplary not only in delivering the required services within its own boundaries but in supporting other regions worldwide.

analysis	Questionnaire verbatim
Facts: • Increased and publicized impact of natural disasters • Increasing awareness of air and water quality/pollution reality and impacts • Existing global and European initiatives as well as EU directives regarding environmental issues (e.g. GEOSS, GMES or Water Framework Directive) • Enlarging debate on the evidences and possible impacts of climate change • Non decreasing energy needs and requirement for a diversification of energy sources • More pressure on water supplies, land use, marine resources • Demand for developing NMHSs to provide a similar level of services than the one achieved in more developed NMHSs. • Underused existing infrastructure (e.g. observations) and knowledge, as well as still under-optimized infrastructure at Regional level, despite on-going projects to tackle the issue (e.g. EUMETNET and CISMetNet programmes)	"High levels of pollution require an expansion in the scope of monitoring of air and water." "On the European level, [the growing concern for the environment] has meant the starting of programmes like GMES." "Growing demand for data that are not measured today".
Impacts: • Need for increased monitoring (of all the above), including monitoring on hydrological and ecological status of water bodies • Need for better scientific understanding of causes and impacts • Need to communicate to public and decision-makers in order to better adapt to the demands of end-users • Need for new and better products, including advanced warning of likelihood of an event, to be updated closer to event. • Demand from users in a broader range of application areas and for products better tailored to their needs (e.g. more based on impacts of weather, water & climate), e.g. improved forecasts or advice and services	"More effective backing of WMO and NMHSs in global and regional conventions." "Generalization of the sustainable development concept: increasing importance of the scenarios of climate change and of their implications in the definition of the public policies, combined consideration of the economic, social and environmental criteria in regulation setting, risk management, decision making and performance evaluation."

• Development of improved spatial-resolution and extended time range (from nowcasting to long-range) forecasts and new approaches to designing and delivering products (e.g. probabilistic forecast based on customer-oriented thresholds) • Need for quality management systems • Need for products to improve climate adaptation policies Causes: • Evolving vulnerability induced by socio-economic and environmental changes • Implementation of international treaties and EU directives on climate change, pollution, water quality etc. • Increasing scientific capability (e.g. skill in long-range forecasting, very high resolution) creating demand • Lack of a co-ordinated approach to assessing the capabilities and needs of the Region to understand, evaluate and respond to the evolving needs	"The result of the various summits that give rise to the Millennium Development Goals, the WWSD and WCDR-2 conclusions and the establishment of GEO."

Ways forward:

- Improve the capabilities of RA VI Members to provide services related to nowcasting, long-range forecasting to assess vulnerability to climate variability and change, and to develop appropriate plans for mitigation and adaptation, capitalizing on world-leading capabilities and best practices within the Region
- Improve knowledge and understanding of applications areas through collaboration with other organizations or by bringing in appropriate skills and competences
- Improve the capabilities and co-ordination of RA VI Members to provide early warnings for a broad range of environmental hazards
- Better co-operate in areas of common concern in particular between developed and developing NMHSs of the Region to improve capability to provide services in a broader range of application areas (e.g. drought management, climate change investigations, water management etc)
- Collaborate more closely with existing national, global and regional ecological institutions, e.g. European Environment Agency
- Exchange knowledge on quality management systems between NMHSs
- Create a coordinated approach in the Region regarding:

1. Alignment of the Region with WMO initiatives e.g. cross-cutting programmes, socio-economic benefits
2. Awareness of NMHSs' capabilities and remits
3. Response to the evolving needs, e.g. plans to improve infrastructure, ongoing understanding of needs, etc
4. Exchange of information across the Region (e.g. development of the INTAD-6 network)

b. External factors affecting services delivery

In the second section, these external factors are analyzed with respect to three axes: technological developments and advances in science, economic pressures, commercialization and competition..

- **Technological developments and Advances in Science:**

It is beyond doubt that technical developments and advances in sciences are key in many respects due to:

- increased capabilities to observe basic and new parameters at a high time and space resolution, more permanently and with a broader geographical coverage with more and more automated devices,
- improved speed, reliability and scope of data transmission,
- accelerated data processing in the field of data analysis and assimilation, numerical forecasts, post-processing and production of both generic and tailored products and their distribution.

"These developments would be one of the main driving forces that will influence WMO and NMHSs to develop faster their systems with the aim to achieve better work."
This progress must satisfy a very large spectrum of requirements. In particular, "an important element is still development, adaptation and implementation of more effective numerical prediction models for operational needs, in particular, forecasting temperature, precipitation and severe weather warnings for the short term in high resolution."
There is a very broad agreement that "research remains a cornerstone for understanding and refining the accuracy of forecasts with longer lead-time for issuing reliable warnings."

The following table captures the main elements to take into account in identifying some of the strategic aims for the Region. "Join efforts" can be considered as the motto for moving forward in the Region.

analysis	Questionnaire verbatim
Facts: • Regional contrasted evolving state of current infrastructure and knowledge (observations, telecoms), of data processing, (NWP, computing), of service delivery capacity • Existing high-level of scientific skills in the Region • Existing world leading capabilities within Region, through co-operation of some countries in the Region (ECMWF, EUMETSAT, EUMETNET, NWP consortia, Technical Co-operation – SRO(E) etc) • On-going scientific and technological progress, not necessarily carrying through to operations (e.g. calibration of instruments and data quality control) • Widening of access to information (Internet, mobiles, etc..) Impacts: • New costing of maintenance and renewal of equipments in a world of ceaseless changing technology • Differentiating levels of service throughout the region • Increasing need for training/human	"Rapid economic growth in the majority of countries in this region necessitates modernization and technical re-equipping of the NMHSs, and also the introduction of the latest technologies and methods of observing, assessment and forecasting." "Making use of new technology for delivery of services (e.g. internet, multimedia and mobile technology)." "Technical gap among developed and less developed countries will be increasing."

resource development • Enlarging ways to communicate (service delivery) with users Causes: • Increasing demands from all type of users for products better tailored to their needs • General expectation for more rapid access to hazard warnings • Insufficient mastering of the transition to more automation when focusing on short term costs reduction	

Ways forward:
- Co-operate better between science community, NMHSs and different disciplines (weather, water, climate and related environmental sciences)
- Link better with EU-funded science programmes
- Make a better use of Information Technology, for instance improving the communication infrastructure (both between NMHSs and to users)
- Increase the capability for training
- Broaden the co-operation within the Region (e.g. improving access to ECMWF and EUMETSAT products, improving access to EFAS products throughout the Region)
- Strengthen the technical co-operation within the Region
- Exploit better the resource mobilization opportunities (e.g. EU, World Bank)
- Utilize more scientific knowledge to work better with users to meet their requirements

- **Economic pressures:**

The economic pressures that impact on the provision of services by NHMSs do not just come from limitations to their direct financing, but also from broader sources, such as competition in a more and more interconnected economy.
Many Members mentioned the wider context of the "world energetic crisis: the continuous rise of oil price is a fact enhancing the search of alternative energy sources, specially the renewable ones. Therefore, WMO and the Members should contribute with the necessary information".
Others remind that "the safety of life and protection property is important for all countries and especially for the sustainability of emerging economies", and that "in the last year, dependence of country economy on weather and climate raised significantly".
In this respect, "there is a very important regional pressure in order to improve the quality of severe weather forecasts". Furthermore, "economic pressure will mean that meteorological data will become more important".
NMHSs' perception of the economic pressures, and reasons and ways to act for the Region in the future are summarized below.

analysis	Questionnaire verbatim
Facts: • General decrease of public funding • Increasing demands on public expenditure (health, education etc) • Increasing governmental expectation	"Necessary coexistence of various economic models for the N(H)MSs, related to the obligation imposed on some not to intervene in the competitive field and on others to finance a proportion of the renewal of their infrastructures by commercial profits in order

for both efficiency and savings (more with less) in public funded institutions Impacts: • Less easy to obtain funds for the weather, water and climate community • More competition between state or public agencies for getting government funding. • Increasingly difficult to cover cost of basic infrastructure • More demanding to provide adequate services Causes: • Governments moving away from funding the delivery of public goods • Growing tendency towards market led economy and cost recovery in the provision of public services	to reduce the part of financing covered by the taxpayer. " "Funding absence for update and radiosondes procurement." "Financial constraints make difficult employment of highly qualified personnel, necessary to implement advanced technologies and their development." "NMHSs are not considered as part of the social "industry."

Ways forward:
- Enhance the usage of hydrometeorological services as instrumental in the general economy
- Show the socio-economic benefit of investment in the provision of weather, water and climate related services, to sources of funds and decision makers (e.g. government, EU), and in partnership with users
- Work together to share resources and reduce unnecessary redundancies
- Work together to improve services (allowing everyone to make best use of capabilities within the region)
- "Establish alliances with new partners"

- **Commercialization and competition:**

The strongest single trend observed is a greater level of competition with the private sector, and also between NMHSs themselves. The effect on each NMHS is different due to the national context, so accordingly, commercialization and competition could be seen as opportunities or threats. Many NMHSs are in a transition phase regarding their involvement in commercial activities, some wanting to do more, and others having to more or less limit this type of activities. In most cases, the NMHSs do not have the levers to create desirable changes of their working environment – for instance to correct the "lack of effective mechanisms for collaboration between private and state departments within hydrometeorology" - which would imply political and legal decisions.
The examples of a collective or at least a coordinated approach within the Region regarding this challenge are very few. ECOMET stands out as a unique structure. One of its objectives is to accommodate the paradoxical situation which could raise from the fact that "too much focus on commercial functions of the NMHSs could be an obstacle for international co-operation in certain areas (the core of the NMHSs cooperate, the commercial arms of the NMHSs compete with other)".

A set of shared trans-regional elements about the commercialization and competition emerge and lead to several ideas to move forward in the Region.

analysis	Questionnaire verbatim
Facts: • Some governments expecting their NMHSs to provide commercial services under various commercial data policy schemes • More services being provided on a commercial basis • Existing EU single economic area in which competition policy demands a level playing field • Increasing competition for aviation met service provision with SES • Coexisting privately and publicly owned commercial service providers • For the foreseeable future, commercial activities still depending on a publicly funded basic infrastructure	"EU legislation continues to constrain the public sector, offering more opportunity for private weather services"
Impacts: • Increasing separation of core and commercial roles within EU member states • Increasing need to develop competencies (transparent accounting, ISO9001) • Sustaining a commercial service at the quality required difficult for NMHSs not necessarily well equipped • Undertaking commercial activity without an understanding of the market and the true costs more and more risky for NMHSs	"The presence of powerful service providers and research centres obtaining the basic information from the NMHSs, mimicking their core production, may be a source of confusion for the general public and can spoil their image" "Private companies are pushing us to improve the quality of the products and services"
Causes: • Inability for some NMHSs to assess the true and individual cost of various services • Inability for some NMHSs to receive the funding for those services because of the national governance framework (funds retained by parent ministry)	

Ways forward:
- Provide guidance to NMHSs on how to undertake commercial activity in a sustainable way (understanding the market, charging true costs, being more customer oriented)
- Promote the development of new products and services for commercial activity
- Raise awareness of the importance of a publicly funded basic infrastructure required to support commercial activities
- Add something related to better access and knowledge to data and products (e.g. ECOMET type)

- “Further harmonize and simplify the European data policy of NMHSs”

ANNEX C

Introduction to the Action Plan supporting the WMO RA VI Strategic Plan

The WMO Regional Association (RA) VI Strategic Plan will be implemented through the RA VI Action Plan. Each action is relevant to the Strategic Plan and is expected to be achievable by mobilizing foreseen resources and within an agreed time frame. A body or an individual will be responsible for delivering and reporting on obtained results, for documenting achievements and difficulties, and for proposing corrective measures if needed.

This annex provides an introduction to this Action Plan. It documents the principles, the process and the methodologies on which the Action Plan is build upon.

This annex will be supplemented by a detailed version of the Action Plan, aimed at serving as an internal reference and framework document for the actors in charge of the implementation.

a. Responsible Bodies

The Strategic Plan and Action Plan have been thought of as living documents. The external environment changes rapidly and new challenges and opportunities appear all the time. The Regional Association must be flexible enough in the implementation of its Action Plan to ensure that these new challenges can be met quickly when they arise. This is why, at its 2005 XIVth Session, the Regional Association established a Management Group chaired by the President and consisting of experienced Permanent Representatives to represent the whole Region. The RA VI Management Group has a key role to play in delivering the Strategic Plan. It is expected to be responsible for:

- Setting and reviewing the overall framework for the Strategic Plan;
- Monitoring the progress of the Action Plan, and amending or updating the objectives as appropriate;
- Ensuring the working groups and rapporteurs have the necessary support to achieve their mandates; and
- Ensuring the Regional Association has the right set of working groups and rapporteurs to deliver the Strategic Plan.

The main implementers of the Action Plan are the Members of RA VI themselves. The activities of the Regional Association and so the success of its Strategic Plan will be very dependent on the willingness of the Members to make available the time and effort of their experts to help implementing the Action Plan. This cannot be mandated on the Members by the Regional Association, but part of the purpose of this Strategic Plan is to ensure that the activities of the Regional Association are relevant to their needs.

The most important actors to help Members in implementing of action Plan will be the working groups and rapporteurs of the Association, and the WMO Secretariat (Regional

Office for Europe and the Joint WMO/EUMETNET/ECMWF Office in Brussels). Both sets of actors will be responsible for:

- Reporting progress against the Action Plan objectives they are responsible for to the RA VI Management Group;
- Recommending changes or additions to the Action Plan objectives to the Management Group as changing circumstances dictate.

b. Review of the Strategic Plan and Action Plan

To maintain the engagement of the Members in the Strategic Plan, it is necessary to regularly involve them in its implementation reviews . Fortunately, the timetable for the constituent body sessions of WMO enable the Members of RA VI to meet together every second year – at WMO Congress and at the Regional Association session. It is proposed that the Members review and update the Strategic Plan and Action Plan at these meetings, with a four-year outlook. Thus Members can ensure that the Plan remains relevant to their needs.

c. Implementation of Actions

In order to carry out the monitoring and governance process described above, a few actions will concern the functioning of the constituent bodies of the RA VI, with a view to improve their ability to provide effective oversight and management performance of the Regional Association.
The Regional Association is committed to pursue the objectives described under the Strategic Thrust of Efficient Management and Good Governance (cf. Expected Results X and XI in section 4b of the main part of the Strategic Plan).

d. Priorities

The demonstration of the value of the Strategic Plan has to come from an efficient, documented and well reported execution of the actions implemented in support of the WMO Expected Results. This global effort assumes that several prerequisite are consolidated. Referring to the monitoring aspect, two types of priorities need to be considered.

Firstly, the Region is committed to have a sustainable monitoring and reporting process. In view of the modernization of this practice within WMO, and particularly within the Region Association context[3], it is compulsory to give priorities to:

- Establish a reference state with respect to the various components of the Region : a first attempt to create a database on synthetic country profiles has been carried out by the ROE, and has been used as the basic information of the RA VI description (Annex A of the Strategic Plan);
- Create and manage a change plan to enrol all RA VI Members in the new paradigm this Strategic Plan aims at.

Secondly, based on the above rationale, the different ways forward and the perceived

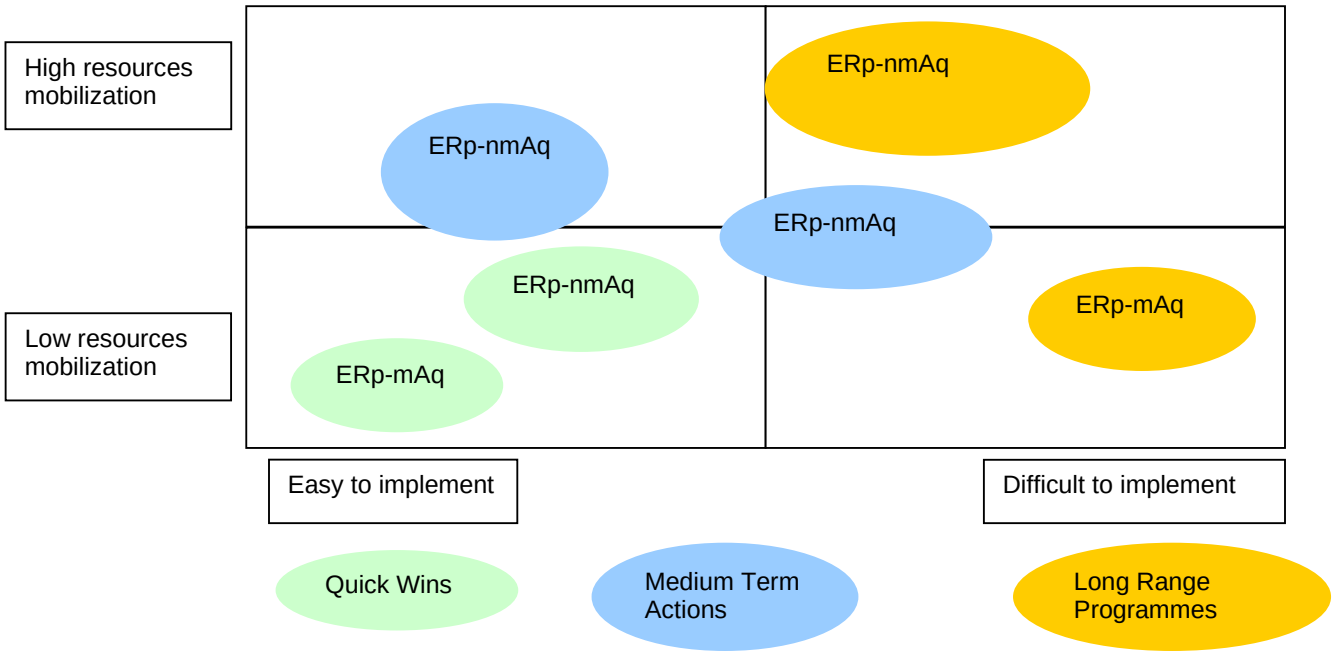
[3] The well established reporting practice activates the Technical Commissions and Programmes lines much more than the Region Association ones.

sources or means of progress, individual actions have to be classified and ranked according to a common set of very few criteria.

As a start, a simple approach will be implemented, using a set of three criteria – based on a qualitative estimate in a first phase, prone to a more quantitative evaluation in a second phase - to characterising each action:

- Easiness to implement
- Level of resources to mobilize (investments of all kinds : human, technical, financial)
- Return on investment

The following graph provides a rational basis to separate quick wins (QW)), medium term actions (MTA) to be based on the specification and set up of a proper planning, and long range programmes (LRP) requiring a much thorough evaluation.



Caption:

Activities are marked according to a possible nomenclature ERp-nmAq with the areas of the ellipses proportional to the return on investment:
ERp: Expected Result n° p
n : Theme number (1: Improve existing practice; 2: Broaden use of more advanced technologies; 3 : Join in existing or planned projects; 4 : Develop new capabilities and products)
m : sub-result number
q: number of an action contributing to the ERp-nm sub-result

It is expected that this approach to priorities selection and global appreciation of the actions portfolio would be used more at a working level, namely by each Working Group or Expert Team in charge of implementing the Action Plan. However, should this be used in a systematic way at this working level, this approach could ease the way RA VI should present its ambitions, objectives and priorities when reporting on its contribution to the WMO Strategic Plan.

e. Key Performance Indicators and Targets

The monitoring of and reporting on the realization of the Strategic Plan and Action Plan aim at providing to the various stakeholders confidence, visibility and control on the progress achieved.
Each of the WMO Expected Results I to XI is associated with Key Performance Indicators (KPI) documenting the progress towards a target which aims to show, at a strategic level, how successful the WMO is implementing its Strategic Plan. Similarly, the Regional Association has to identify its targets and KPI, preferably consistent and in line with the WMO ones.

It is worth recalling that WMO has decided to adopt well recognized standards, namely to have SMART[4] objectives and those targets should be:

- indicative, not exhaustive;
- based on existing, baseline data
- symbolic
- justifiable; and
- foreseen to be relevant and stable measures.

A tentative classification of individual result/output with respect to the four broad themes:

- Improve existing practice
- Broaden use of more advanced technologies;
- Join in existing or planned projects;
- Develop new capabilities or products.

has been worked out to provide a global framework. This intends to harmonize the target and KPI for each individual result/output as described in the next table.

Due to the differences of situations and priorities across the region, specific indicators (e.g. for some sub-regions for instance) will to have to be dedicated to monitor the progress of the action plan implementation.

The full tentative expansion of the triplets “Expected Result / Target / Indicator” will have to be worked out by the each responsible Working Group or Expert Team in charge of the implementation.

Theme and type result/output	**Generic target**	**Applicable indicator**
Improve existing practice		

[4] SMART stands for :
S : Specific
M : Measurable
A : Achievable
R : Relevant
T : Timebound

o Documentation and quality control of provided products and used methodologies	Appropriate level of available documentation and control with respect to the overall production of the Region	Number or percentage of documented productions and methodologies
o Generalization of recognized best practices	Appropriate number of Members/NMHSs using those best practices across the Region	Number or percentage of Members/NMHSs with successful implementation of such practices
Broaden use of more advanced technologies		
o Automation of NMHS production	Existence of monitored development plans with documented investment and realization objectives	Percentage of those plans realized
o Use of state-of-the-art products and tools	Appropriate number of Members/NMHSs using those products and tools across the Region	Number or percentage of Members/NMHSs with successful use of those products and tools
Join in existing or planned projects		
o Membership or cooperation with sub-regional organizations	Full application across the Region of the possibilities offered by such organizations status	Percentage of the full application achieved
o Participation in projects dedicated to improve the core NMHS activities	Appropriate increase of Members/NMHSs putting in practice those project results with respect to a 2008 reference	Percentage of this target achieved
o Participation in multi-disciplinary projects	Existence of a coordinated action plan within the Region with documented objectives and timetable	Percentage of the plan achieved
Develop new capabilities or products		
o Individual physical assets	Appropriate number and/or adequate distribution across the Region	Number of such assets or delta of number of such assets or percentage of the Region possessing or having access to such assets
o Human development	Appropriate level or increase of trained staff in application of a regional educational programme	Percentage of the programme achieved
o Production development	Appropriate level or increase of new products and services available within the Region in application of a regional development programme	Percentage of the programme achieved
o Regional organizational development	Existence of a roadmap of expected collaborations and/or partnerships with planned meetings/milestones	Percentage of signed agreements, held meetings, successfully passed milestones with respect to

		the roadmap

f. High level Action Plan

This Annex of the Strategic Plan provides a high level and synthetic view of the type of actions the Region is committed to implement.

A detailed Action Plan will complement it and is aimed at remaining an internal working document to be used as a reference framework for monitoring and reporting within the RA VI management and implementation structures.

ER1: Enhanced capabilities for Members to produce more accurate weather forecasts and warning
o ***Encourage and facilitate the use of and training in Limited Area Models and their products*** o ***Encourage the greater use and understanding of ensemble prediction products within the Region*** o ***Facilitate the exchange and development of nowcasting skills and techniques*** o ***Enhance cooperation between RAVI Members and Euro-THORPEX***

ER2: Enhanced capabilities for Members to provide more accurate climate predictions and assessments
o ***Establish Regional Climate Centres (RCCs), including detailed specifications of their scope and remit and for the services and products they will provide to meet Members' needs.*** o ***Support the establishment of specialized sub-Regional Centres where Members identify a need (e.g. Drought Monitoring Centre in Slovenia, CLIPS Mediterranean and Caucasus Centres, South-Eastern Sub-regional Climate Change Centre in Serbia, North EurAsia Regional Climate Centre (NEACC) of CIS, etc)*** o ***Capitalize on the all competences across the Region, especially using the networking structure of WMO, to provide expert regional and sub-regional climate products***

ER3: Enhanced capabilities for Members to provide more accurate hydrological forecasts and assessments
o ***Review the needs and capabilities for flood forecasting within the Region – including consideration of relevant EU directives, regional initiatives such as the European Flood Alert System, EU initiative on Climate and Water, and existing cooperation between NMHSs*** o ***Propose mechanisms for improvements, including sharing of capabilities, of the exchange of flood warnings within trans-boundary river basins in RA VI*** o ***Assist at the development of pilot projects on early warnings, with close cooperation of countries in Europe which share river basins, following the example of the Sava river*** o ***Review the needs and capabilities for hydrological design data estimation and water resources assessment, including consideration of the future climate change influence*** o ***Enhance the (inter-) calibration of hydrological instruments, with the support when appropriate of the RICs*** o ***Facilitate the participation of hydrology communities within the THORPEX project to improve knowledge and feedback on the needs and use of hydrological models.***

ER4: Integration of WMO observing systems

- ***Develop the concept and programme for the integration of WMO observing systems in the Region***
- ***Facilitate the sustainable development in the Region of worldwide agreed reference networks (like GCOS) and promote their recognition as GEOSS components***
- ***Monitor the operations of ground reference networks (e.g RBSN, RBCN, GAW, etc) and the needs for their adaptation, taking into account of continuously improved performance of observations from space and other means of direct or indirect measurement techniques.***

ER5: Development and implementation of the new WMO information system

- ***Improve current technology in the Region's existing component of the GTS***
- ***Develop, put into operation and provide manuals and training on the components of the WIS in RAVI.***
- ***Exploit EUMETCast as a means for information exchange throughout RAVI***

ER6: Enhanced capabilities of Members in multi-hazard early warning and disaster preparedness

- ***Encourage the greater exchange, harmonisation and integration of early warnings for weather and water hazards***
- ***Facilitate the exchange of knowledge on disaster prevention and mitigation between NMHSs through the organisation of and their participation in TECO (e.g. proposed Regional TEchnical COnference on the Role of NMHSs in prevention and mitigation of natural hazards impact, 9-10 October 2008, Chisinau, Moldova) and organize relevant training events***
- ***Facilitate the involvement of Members' NMHSs in national and European-level natural disaster and risk reduction platforms***
- ***Provide guidelines to data policy groups to ensure that data policies do not prevent the swift transfer of data and services in emergency events***

ER7: Enhanced capabilities for Members to provide and use weather, water climate and environmental applications and services

- **Review and analyse the evolution of the service provision to air navigation in the region, in particular the tendency to trans-boundary service provision. Provide all round guidelines and best practices in this domain, including Met cost allocation principles, how to fully contribute to the meteorological safety of air navigation; interoperability with air navigation systems; and new emerging meteorological services to air navigation.**
- ***Provide guidance on improvement of existing and development of new services (e.g air quality, health) in all economic weather-sensitive sectors, through cooperation and training initiatives and exchange of best practices (e.g. Adriatic, Black Sea Marine Centres, etc ..)***
- ***Share and undertake socio-economic studies demonstrating the benefits for Members of the meteorological, climatological and hydrological infrastructure and information***
- ***Encourage and enhance participation, with an active involvement of their NMHSs, of Members in scientific assessment (e.g. IPCC) and research (e.g. THORPEX) programmes***

ER8: Broader use of weather, water and climate related outputs for decision-making and implementation by Members and partner organisations

- ***Promote close collaboration with the EU to maximise the development and use of services using the RA VI infrastructure at large, including national, sub-regional and regional capabilities (e.g. ECMWF, EUMETSAT, EUMETNET, CIS, specialized Centres – RMSCs, RCCs, … -), especially regarding climate change, disaster risk reduction and hazard early warnings***
- ***Consolidate information on GMES to enable all RA VI Members to make the best contribution to and of use of GMES services.***
- ***Coordinate a proactive participation of RA VI Members in relevant meetings (e.g. on climate change, disaster risk reduction and hazard early warnings) as part of an outreach programme (e.g. Regional Climate Outlook Forum) that will help partner organizations to use weather, water and climate data and services more effectively.***

ER9: Enhanced capabilities of NMHSs in countries with "economy in transition", to fulfil their mandates on weather, climate and water

- ***Use WMO Voluntary Cooperation and Education and Training Programmes to facilitate twinning frameworks that will enable the transfer of capability within the Region, concentrating on those services with greatest needs.***
- ***Use and contribute to WMO/WB/ISDR SE European NMHS Feasibility Study & other projects to enhance capabilities of developing country Members and Members with "economy in transition"***
- ***Explore and use EU programmes (e.g. EU neighbouring, INTERREG, EU Water Initiative) and EUMETNET + CIS/ICH programmes to transfer knowledge and technologies to NMHSs of developing country Members and Members with "economy in transition"***
- ***Utilise RA VI capabilities and specialized Centres to provide good exchange of information between developing country Members and Members with "economy in transition"***
- ***Promote a regional network of national training centres taking into account the whole RAVI needs and increasing international cooperation between NMHSs***

ER 10: Effective and efficient functioning of constituent bodies

- ***Ensure the alignment of tasks, meetings and agendas of the various bodies contributing to the RA VI Strategic Plan in order to rationalize and lighten the overall time and finance resources spent in implementing and delivering the Expected Results (e.g. between CCl, CIMO and CBS)***
- ***Establish relationship between RA VI bodies and Regional international organizations***
- ***Ensure good communication within INTAD-6, especially in relation with sub-regional meetings (e.g. ICWED, ICEED, BALTNET, etc)***

ER 11: Effective and efficient management performance and oversight of the region

- ***Ensure a close collaboration between the Permanent Representatives with WMO (including their hydrological advisors) and an adequately staffed Regional Office for Europe within the WMO secretariat in order to serve the needs of RA VI Members, especially the ones with "economy in transition", with a view to take the best profit of the work carried out in WMO Programmes and Technical Commissions and to facilitate the delivery of quality services throughout the Region, especially by their NMHSs.***