Roadmap for the Implementation of a QMS for CLIMATE SERVICES

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

Australian Government
Bureau of Meteorology

Helen Tseros & Bryan Boase
Bureau of Meteorology
20 October 2022

Brief Background

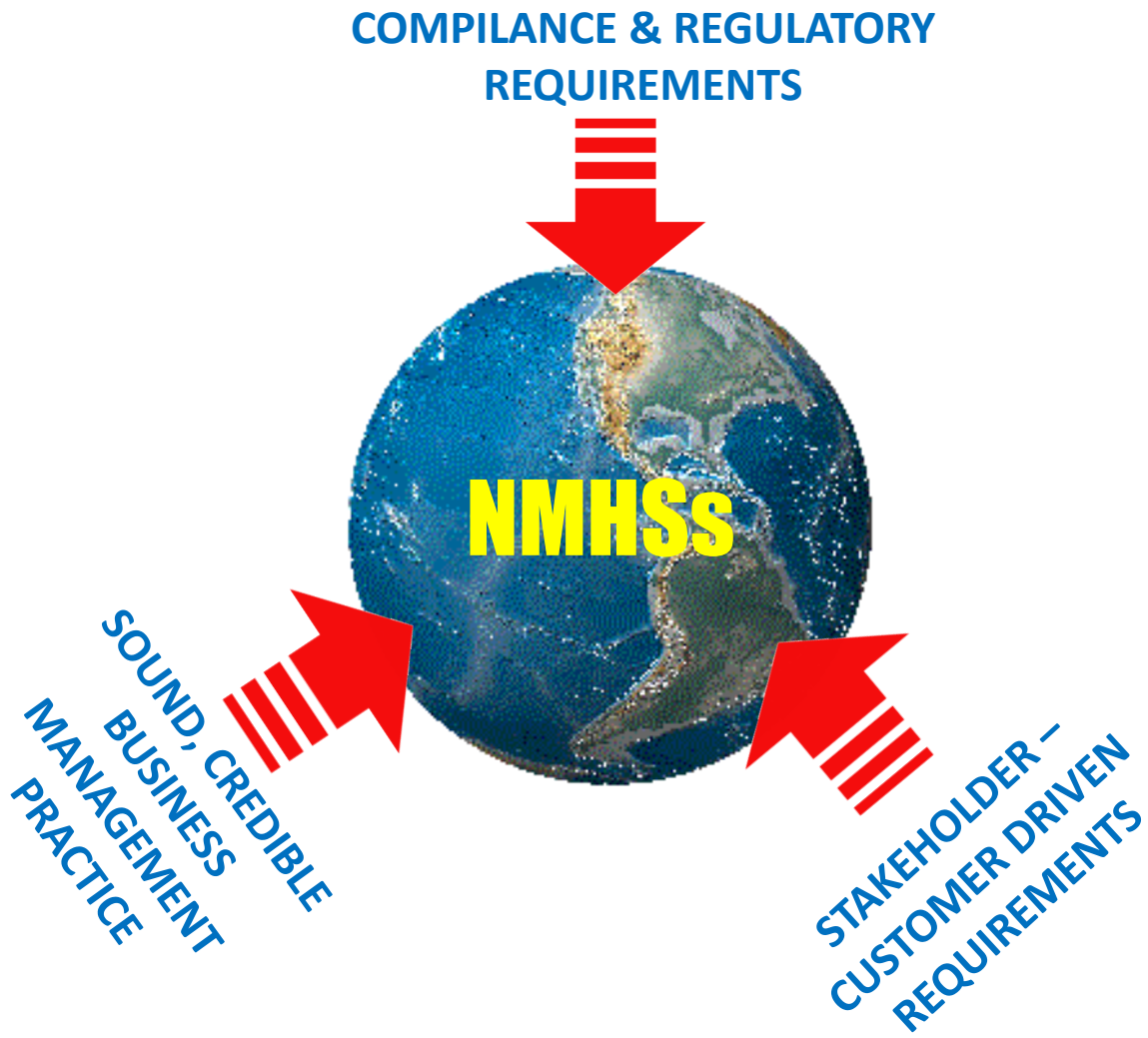
- WMO programmes and activities, are dedicated to ensuring the highest possible quality for all meteorological, climatological, hydrological, marine, and related environmental data, products, and services.

- *Resolution 19 (EC 69) and its Annex* on the WMO Quality Policy Statement recognizes that quality assurance, reliability and consistency of the information and services provided by the adoption of a QMS, is a key success factor to the viability and ongoing sustainability of NMHSs in today's world.

- *Resolution 20 (EC 69) and its Annex to WMO Tech Reg No.49 Vol 1*, Part VII, Quality Management identifies the need to enhance WMO regulatory and guidance material on QM and provides broad guidance on establishing a QMS.

- The development and implementation of a ISO 9001 QMS provides a strong framework that enables the WMO strategic direction as identified in *WMO No. 1129 Strategy for Service Delivery* to be achieved.

Key drivers to adopt a QM approach …



Key Terms of a QMS

- ***Quality management (QM):*** An activity that focuses not only on the quality of the product but also on the means to achieve it through the following primary activities: quality planning, quality control, quality assurance and quality improvement.

- ***Quality management system (QMS):*** a formalised system that provides the organizational structure and documents processes, procedures, and responsibilities to achieve objectives that meet end-user/customer and regulatory/statutory requirements, whilst also pursuing continual improvement.

- ***Quality control (QC):*** the techniques and inspection activities used to ensure quality criteria/requirements are being met prior to the dissemination of a product or the delivery of a service.

- ***Quality assurance (QA):*** the planned and systematic activities implemented within the QMS that can demonstrate and provide confidence that a product or service will meet end user/customer requirements. It also involves the systematic monitoring and evaluation of the processes associated with the generation of a product or service.

- ***ISO 9001 Standard:*** … **????**

ISO 9001 – a stable foundation for management

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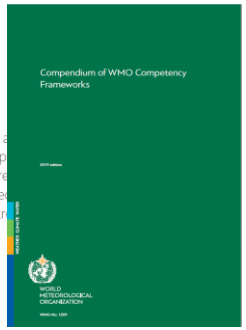
A stable foundation for management …

International Technical Regulations, Specifications, Manuals & Guides

International Training & Standards of Competence

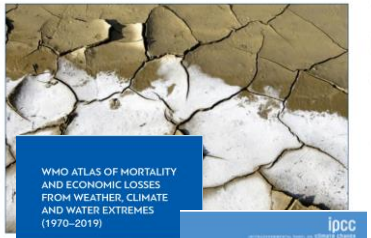


Education and training

Education and training is offered to a
and Hydrological Services in develop
climate and water-related services re
being of their populations and to be
collaborative efforts. This work centr
of human resources.

? ? ? ?

International Management System/Framework?

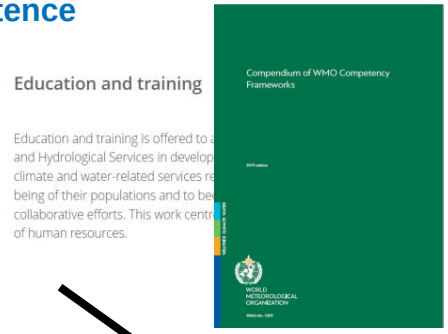


International Research

The way forward …

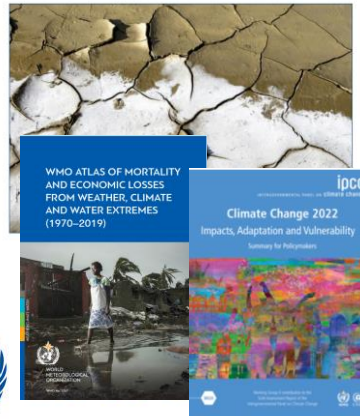
International Technical Regulations, Specifications, Manuals & Guides

International Training & Standards of Competence



Internationally Recognised, Accepted, Consistent & Certifiable Management System

ISO 9001:2015



International Research

ISO 9001:2015 Quality management systems – Requirements

- ISO 9001 is the International Organization for Standardization (ISO) standard that specifies the requirements and the framework for the development of a QMS.

- ISO 9001 is a Standard where organizations can achieve certification of compliance by audit conducted by third party (external) certification organisations.

- Once certification is achieved the QMS is reviewed annually via a surveillance audit and re-certified every three (3) years by audit.

- ISO 9001 should be considered the minimum standard for an organization to achieve.

- **Note:** ISO 9001 it is not the only approach to QM, it is however the most internationally accepted, recognised and the only certifiable management Standard under ISO.

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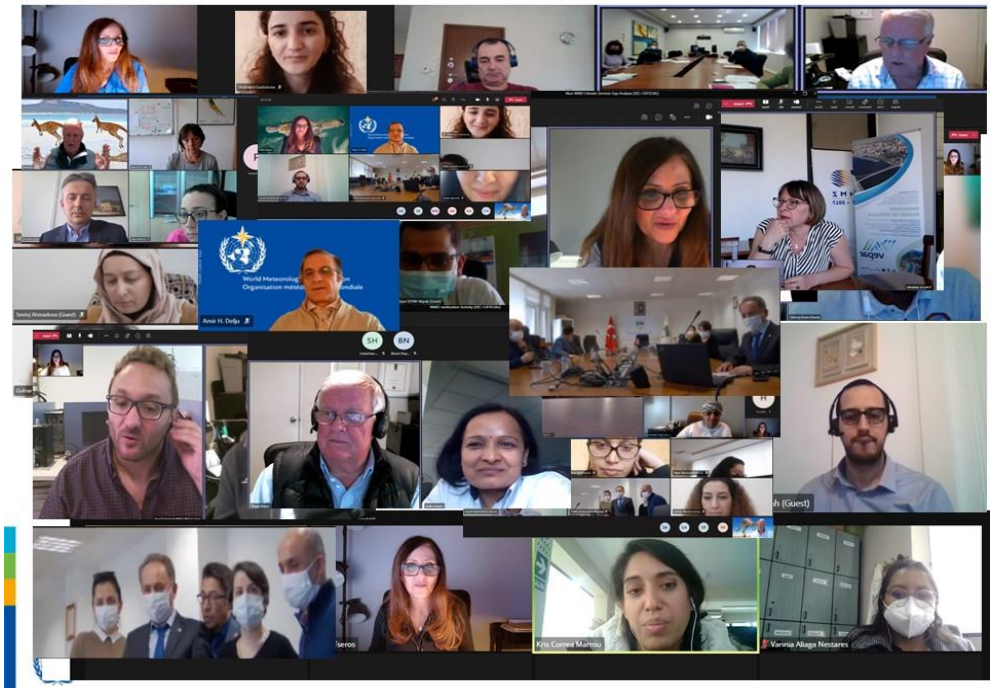
Climate Services Quality Management Activities - online

Part 1: Review and verification of Global Framework for Climate Services (GFCS)

Part 2: ISO 9001 Gap Analysis, Findings Report with proposed remedial actions



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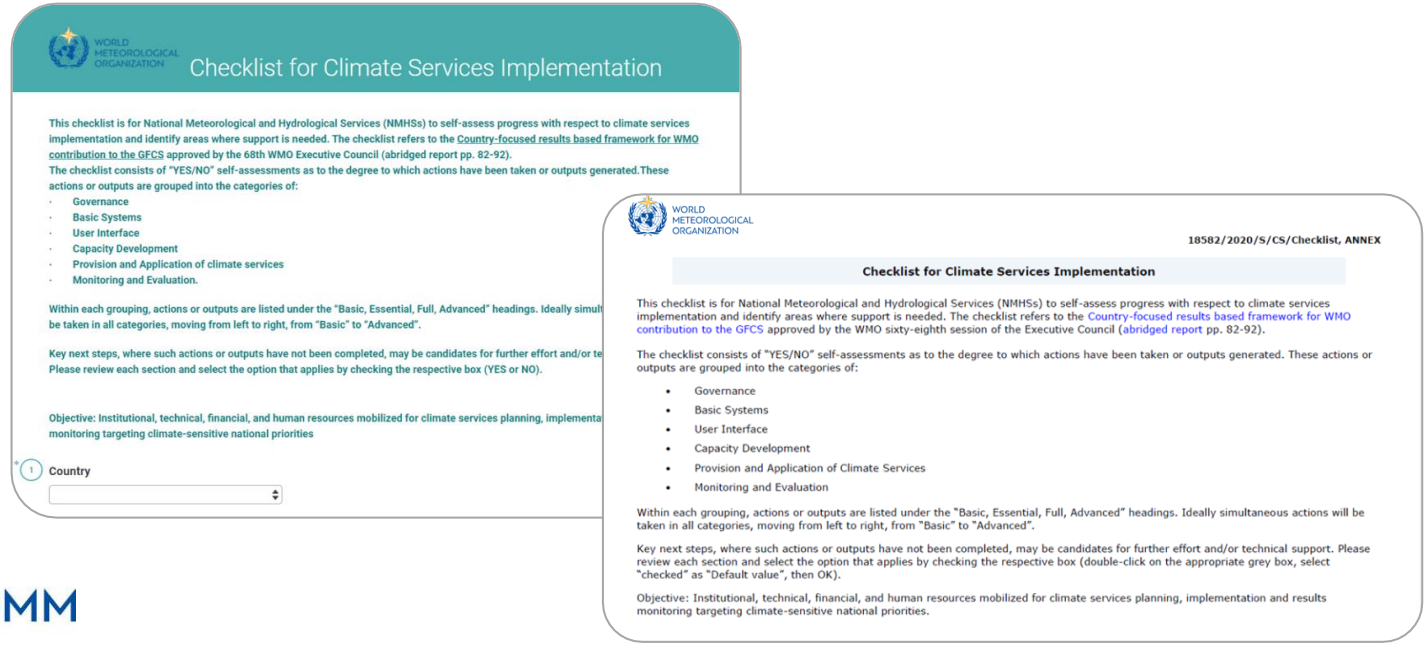
Part 1: Global Framework for Climate Services (GFCS) Checklist

- Verification of the WMO Climate Services Checklist – includes climate service processes, climate data, climate monitoring, climate prediction and service delivery.
- There is a clear and direct relationship between the Checklist and a Climate Services QMS – the Checklist has elements that align with the requirements of an ISO 9001 QMS.
- The Checklist provides a structured and biennial self-audit approach, to evaluating all the key components of an NMHS's climate services program.



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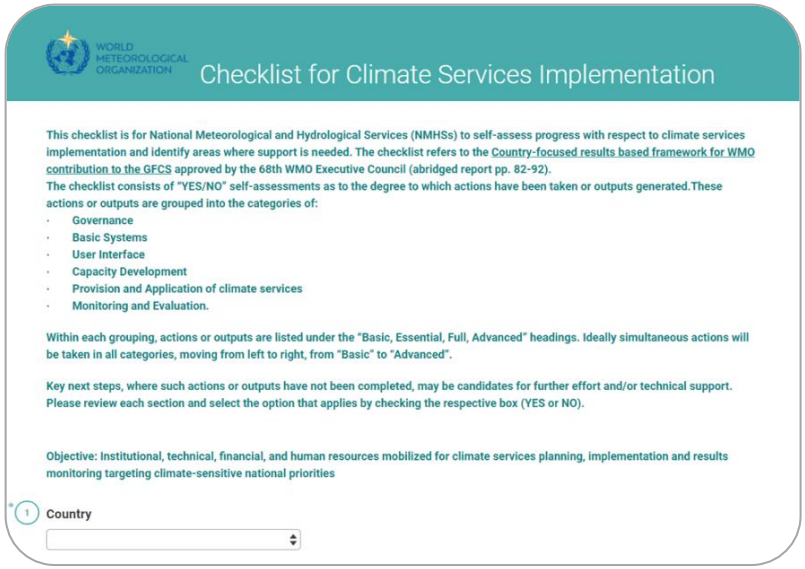
On-line version:



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Checklist for Climate Services Implementation

This checklist is for National Meteorological and Hydrological Services (NMHSs) to self-assess progress with respect to climate services implementation and identify areas where support is needed. The checklist refers to the Country-focused results based framework for WMO contribution to the GFCS approved by the 68th WMO Executive Council (abridged report pp. 82-92).
The checklist consists of "YES/NO" self-assessments as to the degree to which actions have been taken or outputs generated.These actions or outputs are grouped into the categories of:

- Governance
- Basic Systems
- User Interface
- Capacity Development
- Provision and Application of climate services
- Monitoring and Evaluation.

Within each grouping, actions or outputs are listed under the "Basic, Essential, Full, Advanced" headings. Ideally simultaneous actions will be taken in all categories, moving from left to right, from "Basic" to "Advanced".

Key next steps, where such actions or outputs have not been completed, may be candidates for further effort and/or technical support. Please review each section and select the option that applies by checking the respective box (YES or NO).

Objective: Institutional, technical, financial, and human resources mobilized for climate services planning, implementation and results monitoring targeting climate-sensitive national priorities

* 1 Country

Checklist for Climate Services Implementation 2020

#89

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Tuesday, November 30, 2021 3:01:36 AM
Last Modified:	Tuesday, November 30, 2021 4:18:05 AM
Time Spent:	01:16:28
IP Address:	115.84.88.5

Page 1

Q1 Country	Lao People's Democratic Republic
Q2 Nationally Determined Contribution (NDC) to the Paris Agreement	YES
Q3 National Adaptation Plan (NAP)	YES
Q4 National Development Policy or Strategy	YES
Q5 National Disaster Risk Management (DRM) Strategy	YES
Q6 National sectoral policies and strategies (e.g. food security, health, etc.):	YES
Q7 Identifying key stakeholders for improving climate-related outcomes in priority sectors (UIPs - User Interface Platform - focused on GFCS - Global Framework for Climate Services - priorities: health, agriculture and food security, WRM - Water Resource Management, energy, DRM):	YES

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Hard copy version:

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18582/2020/S/CS/Checklist, ANNEX

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Key next steps, where such actions or outputs have not been completed, may be candidates for further effort and/or technical support. Please review each section and select the option that applies by checking the respective box (double-click on the appropriate grey box, select "checked" as "Default value", then OK).

Objective: Institutional, technical, financial, and human resources mobilized for climate services planning, implementation and results monitoring targeting climate-sensitive national priorities.

5. Has the NMHS in your country undertaken resources reviews of relevant ongoing and planned partner projects by:

   - Consulting lists of planned or ongoing major adaptation (and mitigation) investment programmes (GEF, GCF, Adaptation Fund, PPCR, development banks, RECs): YES ☐ NO ☐
   - Jointly meeting with national government Ministries/Departments and their counterpart(s) major international organizations (UNDP, IFIs, WFP, FAO, WHO etc.) as necessary to articulate NMHS needs to support development decisions: YES ☐ NO ☐
   - Negotiating access to financing from ongoing programmes and/or contributing to the development of new proposals to address identified needs: YES ☐ NO ☐

ISO Clause 7.1

6. Does the NMHS in your country participate in national planning, coordination, information sharing and monitoring structures by:

   - Identifying/establishing/engaging in an appropriate national governance mechanism to ensure coordination for climate services (there may already be one for NDCs, NAPs, DRM, etc.): YES ☐ NO ☐

ISO Clauses 6.1 & 7.4

GFCS verification …

- 14 Members were audited and verified via video conference during 2021/22 …

An example of responses:

PROVISION AND APPLICATION OF CLIMATE SERVICES (19 Questions)			
10. Decision support products and services (established or strengthened)			
Basic	Evidence	**Essential**	Evidence
☐ Data services (unless prohibited under current mandate and legislation): **YES** ☒ NO ☐ ☐ Access remote sensing and reanalysis products (i.e. EUMETCast): **YES** ☒ NO ☐ ☐ Weather forecasting products: **YES** ☒ NO ☐ ☐ Conduct basic climate diagnostics and climate analysis (staff will have some proficiency in climate statistics, or be able to reliably use statistical software (e.g. Climate Database Management System)): **YES** ☒ NO ☐ ☐ Basic statistics (graphs, counts, etc.) on extremes, frequency of occurrence, spatial means for temperature (Max, Min, Mean), precipitation, and possibly relative humidity, evapotranspiration, thunder days, sunshine duration, cyclones, etc., climatological normal: **YES** ☒ NO ☐ ☐ Regularly conduct NCOF sessions: **YES** ☒ NO ☐ ☐ Conduct climate watch programmes and disseminate early warnings: **YES** ☒ NO ☐	1. According to [redacted] [redacted] s 2.Yes 3.Aladin NWP and access to and provision of ECMWF, WMO, DWD forecast fields 4.web products on [redacted] under the section Climate, more are available on [redacted] web page, and reduced on ENG version. Lot of analysis ordered by users, internal list 5. same as 4 6. Twice per year contributing to RCOF activities (SEECOF; [redacted] while NCOF are reduced to team consultations ([redacted] experts covering this topic). 7. We receive regional CWP products and disseminate those. We don't produce national climate watch reports.	☐ Climate monitoring products: **YES** ☒ NO ☐ ☐ Targeted dissemination of climate products to priority sectors (i.e. those based on data; regional and national climate monitoring products if available; seasonal outlooks provided by RCOFs and RCCs): **YES** ☒ NO ☐ ☐ Generic seasonal forecasts: **YES** ☒ NO ☐ ☐ Update/Improve/Develop products and services based on users' feedback and requirements: YES ☐ **NO** ☒	1. Temperature and precipitation anomalies, SPI, station data and maps [redacted] Monthly and annual publications: [redacted] 2.Climate reports to users in sectors of energy production and distribution. 3.Produced but not disseminated publicly. Internal discussion on providing generic sub-seasonal forecasts via [redacted] in future. 4.Occasionaly

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Table 1. Categorization of NMHSs

(Source: Commission for Climatology Guidelines for NMHSs on capacity development for climate services)

Level of service	Weather servicers	Climate services	Hydrology services	Description of capacity needed to achieve service level
Category 1- Basic	➢ Weather observations ➢ Weather Data Management ➢ Interaction with users of weather data and products	➢ Climate observations ➢ Climate Data Management ➢ Interaction with users of climate data and products	➢ Hydrological observations ➢ Hydrological data management ➢ Interaction with users of hydrology data and products	➢ Small network of quality controlled observations ➢ Basic data-processing, archiving and communication systems ➢ Little or no backup / offsite storage, or contingency options ➢ Staff: observers and some meteorologists trained to Basic Instruction Package (BIP) ➢ No 24 /7 operation ➢ Rudimentary Quality Management System ➢ No research and development
Category 2- Essential	➢ Medium-range (synoptic scale) forecasts and warnings ➢ Established links with media and disaster risk reduction (DRR) communities	➢ Seasonal Climate outlooks ➢ Climate monitoring	➢ Hydrological data products for design and operation of water supply structures ➢ Water level and flow monitoring ➢ Short-term flow forecasts (low flows) ➢ Flood forecasting	➢ Able to take and integrate observations from other parties ➢ Well-established protocols for emergencies, backup of data and minimum offsite facilities ➢ Staff: observers and meteorologists trained to BIP standards ➢ 24/7 operation. ➢ Well established quality management system ➢ Able to access most numerical weather prediction data/products from other centres ➢ Small research and development unit ➢ Some partnerships as junior members

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Level of service	Weather servicers	Climate services	Hydrology services	Description of capacity needed to achieve service level
Category 3- Full	➢ Specialized weather products for a wide range of sectors ➢ Well integrated into DRR communities and mature links with media	➢ Specialized climate products ➢ Decadal climate prediction ➢ Long-term climate projections	➢ Seasonal stream flow outlooks ➢ Specialized hydrology products	➢ Advanced observation equipment ➢ Ability to run its own numerical prediction suite ➢ Research and development unit ➢ Well educated/trained staff ➢ Own training group ➢ Developed library and information services ➢ Active partnerships with NMHSs taking a leading role
Category 4- Advanced	➢ Customized weather products ➢ Weather application tools	➢ Customized climate products ➢ Climate application tools	➢ Customized hydrology products ➢ Hydrology application tools	➢ Advanced observations ➢ Leading Research and development team ➢ Well-developed Education and training Unit

Part 2: ISO 9001 Gap Analysis & Findings

ISO 9001:2015 Gap Analysis for WMO Member Climate Services	
WMO Member	
Gap Analysis Commencement Date	
Gap Analysis Completion Date	
Lead Auditors	Bryan Boase and Helen Tseros

1. The *Gap Analysis Tool* is aligned with the *ISO 9001:2015 Quality management systems – Requirements* (Standard).
   The Gap Analysis Tool is divided into seven sections that reflect the contents of the ISO 9001:2015.

2. The Gap Analysis also integrates a review and update of the status of the 6 categories identified in the WMO Climate Programme, *Checklist for Climate Services Implementation*:
   - Governance
   - Basic Systems
   - User Interface
   - Capacity Development
   - Provision and Application of Climate Services
   - Monitoring and Development

3. A traffic light system is used to highlight the gaps that exist between the requirements of the Sta
   The traffic light system indicates the level of compliance with the specific requirement of the star

	Green - minimum compliance
	Amber - partial compliance
	Red - no compliance

4. A Gap Analysis Findings Report will be provided to the WMO Member and the WMO Secretariat

ISO 9001 GAP ANALYSIS FINDINGS	
COUNTRY	
Scope of Gap Analysis: (Area Being Analysed)	CLIMATE SERVICES
Gap Analysis Completion Date:	
Gap Analysis Conducted by:	
Gap Analysis Participants:	
Notes:	1. These findings represent only those clauses which were either not met or only partially met. 2. The proposed remedial actions are recommended to be taken that identify the gaps that exist between the ISO 9001:2015 Standard and the current management system. Note that the proposed remedial actions are aligned to the corresponding ISO clause. A responsible staff member needs to be assigned to each proposed remedial action together with a projected date to close the gap. The proposed remedial actions should be monitored and tabled at each Quality Management Review Meeting (QMRM) until completed. 3. It should be noted that the gap analysis presents only a broad assessment of the current management system relative to the requirements of ISO 9001:2015. The formal internal audit process will provide in-depth assessments with clearly demonstrated evidence of conformity.

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ISO 9001:2015 Gap Analysis for WMO Member Climate Services	
WMO Member	
Gap Analysis Commencement Date	
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   - Monitoring and Development

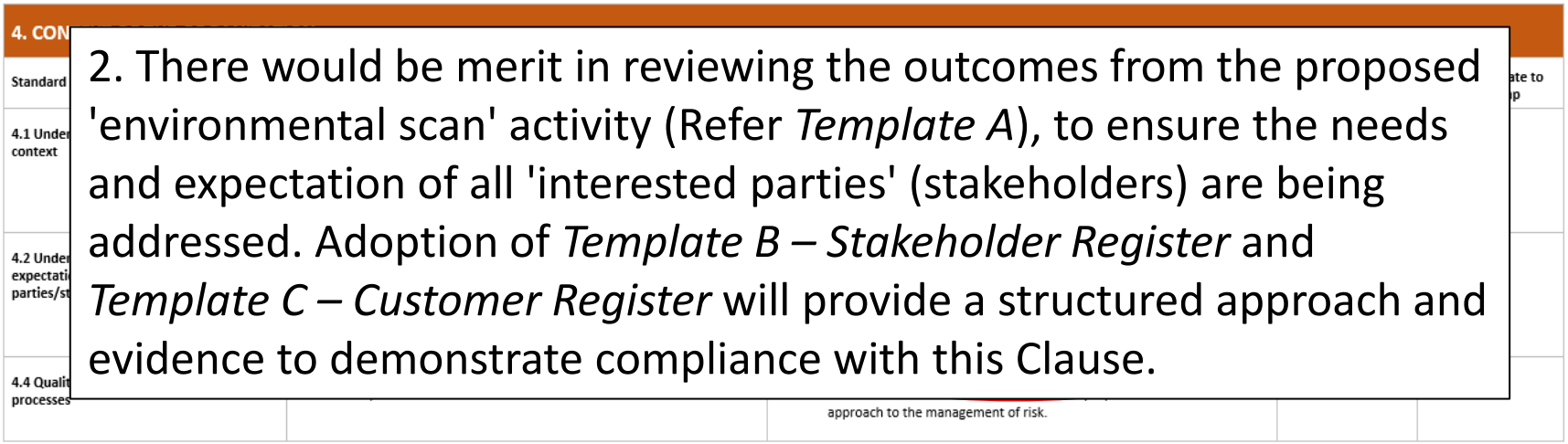
3. A traffic light system is used to highlight the gaps that exist between the requirements of the Standard and your current management system.
   The traffic light system indicates the level of compliance with the specific requirement of the standard.

	Green - minimum compliance
	Amber - partial compliance
	Red - no compliance

4. A Gap Analysis Findings Report will be provided to the WMO Member and the WMO Secretariat at the completion of the analysis.

ISO 9001: 2015 Reference	Questions	Status	Comments/Evidence
4. CONTEXT OF THE ORGANISATION			
4.1 Understanding the organisation and its context	1. Has the external and internal issues that affect your ability to achieve intended results been determined? Values, culture, knowledge and performance of the organization, Legal, technological, competitive, market, cultural, social, and economic environments?		
4.2 Understanding the needs and expectations of interested parties/stakeholders	2. Have all your stakeholder requirements been determined?		
	3. Do you monitor and review stakeholder's needs and if so, what process is used and how frequently is it performed?		
4.3 Determining the scope of the quality management system	4. Has your QMS scope been clearly defined?		
4.4 Quality management system and its processes	5. Have the processes required to deliver your outcomes been determined?		
	6. Have KPIs and methods of measurement been established to ensure the effectiveness of the processes?		
	7. Have the resources required to support each process and their availability been determined?		
	8. Have responsibilities and authorities been determined for all processes?		
	9. Have risks and opportunities been identified?		
	10. Are processes evaluated and improved?		
	11. Is documented information retained to provide confidence that processes are being carried out as planned?		

ISO 9001 GAP ANALYSIS FINDINGS	
COUNTRY	
Scope of Gap Analysis: **(Area Being Analysed)**	CLIMATE SERVICES
Gap Analysis Completion Date:	
Gap Analysis Conducted by:	
Gap Analysis Participants:	
Notes:	1. These findings represent only those clauses which were either not met or only partially met. 2. The proposed remedial actions are recommended to be taken that identify the gaps that exist between the ISO 9001:2015 Standard and the current management system. Note that the proposed remedial actions are aligned to the corresponding ISO clause. A responsible staff member needs to be assigned to each proposed remedial action together with a projected date to close the gap. The proposed remedial actions should be monitored and tabled at each Quality Management Review Meeting (QMRM) until completed. 3. It should be noted that the gap analysis presents only a broad assessment of the current management system relative to the requirements of ISO 9001:2015. The formal internal audit process will provide in-depth assessments with clearly demonstrated evidence of conformity.



2. There would be merit in reviewing the outcomes from the proposed 'environmental scan' activity (Refer *Template A*), to ensure the needs and expectation of all 'interested parties' (stakeholders) are being addressed. Adoption of *Template B – Stakeholder Register* and *Template C – Customer Register* will provide a structured approach and evidence to demonstrate compliance with this Clause.

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Template B

Stakeholder/Interested Parties Register for .....

Notes:

1. A stakeholder is any individual or organisation that can have a negative or positive impact on the QMS, or conversely, any individual or organisation that the QMS can have a negative or positive impact on.
2. Customers are key stakeholders and as such, refer to the 'customer register' that has been established.
3. External providers are also key stakeholders and as such, refer to the 'external providers register' that has been established.

Last updated: DD/MM/YY

Stakeholder / Interested Party Name	Relationship to the QMS	The identified requirements (needs and expectations), and in particular any regulatory and or statutory requirements.	Schedule and methodology for monitoring and reviewing stakeholder	Comments (if applicable)
~~e.g~~: Director, regulatory organisations, our staff, Minister, Govt Ministry, Public Service Commission, unions, professional organisations, media, specific community sectors etc …				

Template C

Customer Register

Last updated: DD/MM/YY

Customer name and location/s	Community Sector/Industry	Products/ Services received	Last Date Customer Requirements Reviewed	Method of Review	Frequency of Review (eg annually, biennially)	Comments (eg potential impact of products/services on customer's operations)
~~Eg~~ *ABC Mining*	*Mining Industry*	*Climate information, TC warning, severe thunderstorm warning, district forecast etc*	*July 2017*	*Industry consultative meeting, customer feedback, direct feedback*	*Formally annually, ad hoc informally*	*TC warnings critical to operations and for staff safety.*

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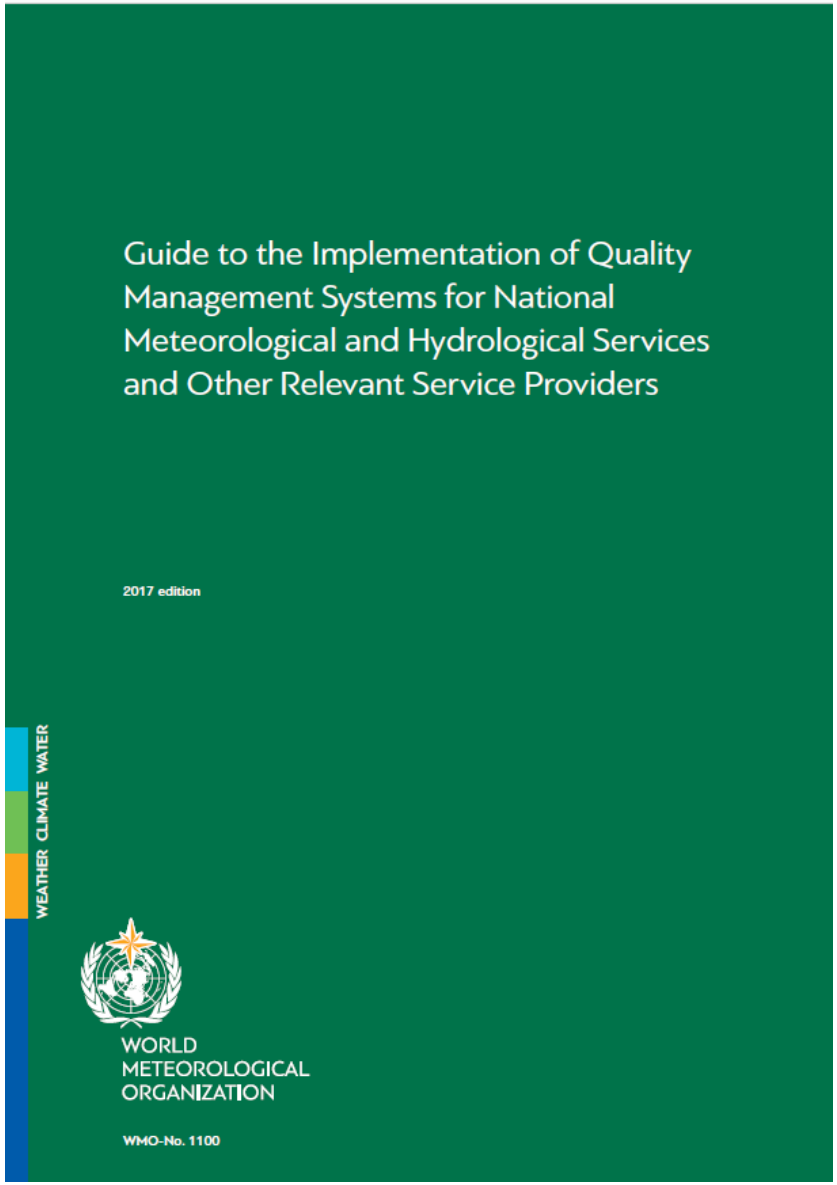
The QM Templates …

WMO No.1100
Guide to the Implementation of Quality Management Systems for National Meteorological and Hydrological Services and Other Relevant Service Providers



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CONTENTS

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QM Auditor Training

- A comprehensive internal audit program is fundamental to the development, implementation, sustainability and viability of a QMS - it underpins the success of a QMS.

- It is essential that the personnel performing audits are appropriately qualified as auditors to ensure the audit process and its value and credibility will not be compromised.

- The WMO Competency Framework provides the benchmark for the development of an appropriate standard for auditors that should be aligned with the International Register of Certificated Auditors (IRCA).

- There are two(2) key auditor training courses:
  - Management Systems Auditing (Internal Auditor); and
  - Lead Auditor

Management Systems Auditing (Internal Auditor) Course

- The successful completion of this course is considered the minimum qualification to be a member of an auditing team performing audits within their own organization/NMHS.

- Provides auditing skills, knowledge and an understanding of:

  - ISO 9001
  - Quality Management Systems
  - Quality concepts
  - Audit process
  - Auditing the ISO 9001 Standard
  - Organisational context
  - Leadership and commitment
  - Quality planning
  - Support and resources
  - Operational planning and control
  - Quality performance evaluation
  - Quality improvement

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Lead Auditor Course

- The successful completion is essential to leading an audit team performing audits within their own NMHS or another NMHS.

- Provides comprehensive training in the theory and practice of leading a QMS audit based on ISO 9001 and within the ISO 19011:2018 *Guidelines for auditing management systems*

- Also provides a practical understanding of the responsibilities, techniques and methodologies required to effectively lead a QMS audit including:

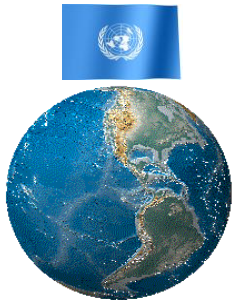
    - Managing an Audit Program
    - Audit planning and preparation
    - Performing the Audit – including practical exercises for participants
    - Reporting Audit Outcomes
    - Quality Management Concepts
    - Establishing the context of an organization
    - Leadership

Additional notes applicable to auditor courses …

- The Management Systems Auditing course is a prerequisite to the Lead Auditor course.
- Successful completion of the Lead Auditor course requires a 70% pass mark via a written examination for recognition under IRCA.
- Both courses are modules that contribute to a Diploma of Quality Auditing should that pathway be pursued.
- Only ISO accredited Lead Auditors employed by an accredited certification organization, can provide ISO 9001 Certification. Refer to the International Accreditation Forum (IAF) web site for a list of certification organisations.

Quality management auditor training providers

- It is essential that the providers of the Management Systems Auditing and Lead Auditor training courses are formally registered or certified with a national training organization.
- It is important that the courses are delivered to a high standard and one that enables participants and their NMHSs to grow their QM skills and capacity of their organization.
- All auditor training shall/should be underpinned by *ISO 19011:2018 Guidelines for auditing management systems*.
- All trainers should be qualified Lead Auditors with extensive auditing experience in their own right.
- All certificates issued to participants shall/should have international recognition.



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Completed – ISO 9001 Demystified Training & Management Systems Auditing Training (All online)

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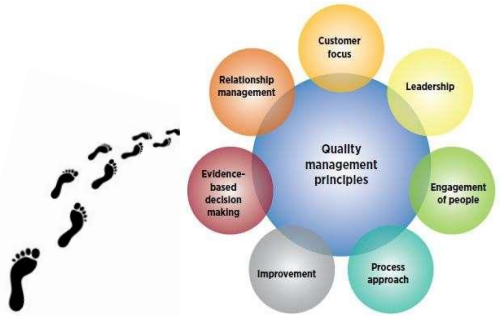
Online Training Workshops 2021/22 – to date



ISO 9001 Demystified and introduction to developing & implementing a QMS

- 2 Workshops conducted in English, with one having partial translation into Russian
- Total participants: 28
- Participants were from WMO Region: RAVI

Online Training Workshops 2021/22 – to date

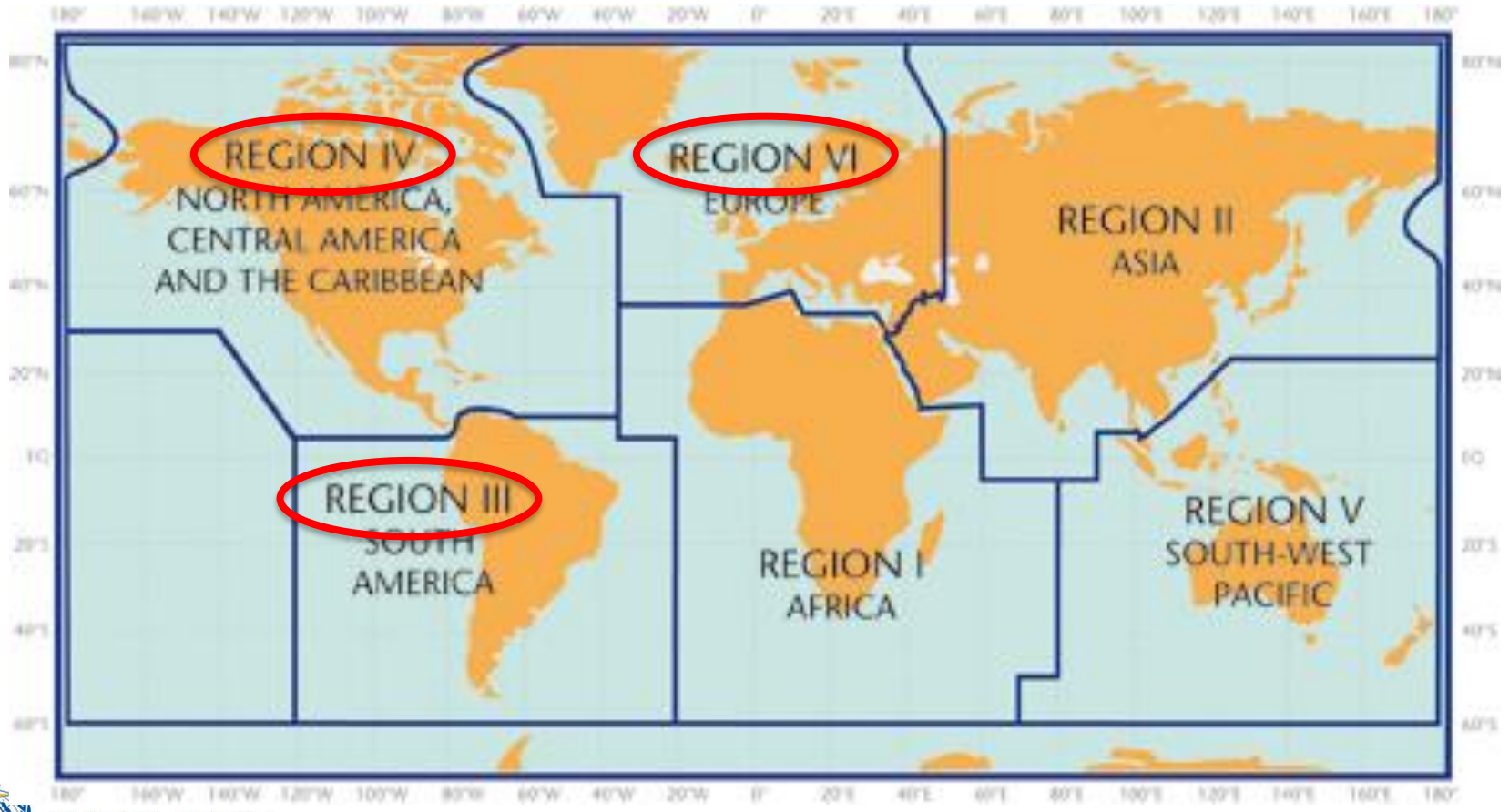
Management Systems Auditing Workshops

- 3 Workshops conducted in English with one of them translated into French
- Total participants registered: 43
- Participants were from the following WMO Regions: RAI, RAII, RAV and RAVI

On-line Management Systems Auditing Workshops for remainder of 2022:

01 – 04 November 2022: RAVI
28 Nov – 02 Dec 2022: RAIII & RAIV

- **Note:** maximum of 16 participants per online course



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Lead Auditor Training

To be conducted face-to-face only

- To be conducted face-to face in English and other languages depending on availability of funding and interpreter services.
- Potential participants selected will be identified from those who have successfully completed the Management Systems Auditing workshop/course/training.
- Participants will be selected on the basis of having demonstrated the underpinning character traits required of auditors.
- Dates and locations in 2023 TBA.

CQI | IRCA

CERTIFIED COURSE

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Climate Services QM Roadmap - Development & Implementation

Options:

Three (3) options under consideration:

1. Develop and implement a QMS for NMHS Climate Services within an ISO 9001 framework to achieve Certification of Compliance.

2. Develop a Joint ISO -WMO Climate Services Standard based on the ISO 9001 Standard format to achieve Certification of Compliance.

3. Develop a stand-alone WMO Climate Services Standard as a key component of an overarching ISO 9001 QMS – WMO Certification.

Option 1: ISO 9001 QMS Framework

ISO 9001 Quality management systems – Requirements Standard is used to manage the overall management function relevant to the delivery of climate services.

- Growing experience within the WMO community combined with *WMO No. 1100 Guide to the Implementation of Quality Management Systems for National Meteorological and Hydrological Services and Other Relevant Service Providers* provides a solid foundation on which to build.

- *Certification* of compliance is achieved through an accredited third party/external certification body.

- ***Challenge:*** Lack of experienced "third party/external" auditors with knowledge of climate services.

- ***Opportunity:*** The third party/external bodies "may consider" utilizing WMO trained Lead Auditors (IRCA recognised), as subject matter/specialist experts to assist with audits. Note: There may be additional costs to the organization being audited.

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Option 2: Joint ISO/WMO Climate Services Standard

Development and implementation of a *Joint ISO – WMO Climate Services Standard* based on the ISO 9001 format with a specific focus on Climate Services – Practices & Procedures as per Tech Reg 49 Vol I and guides such as WMO No-100 and WMO No-1221 Note: WMO is an ISO recognized Standardization body.

- *Certification* achieved through accredited third party/external certification body
- ***Challenge:*** Lack of experienced third party/external auditors with knowledge of climate services.
- ***Opportunity:*** The third party/external bodies "may consider" utilizing WMO trained Lead Auditors (IRCA recognised), as subject matter/specialist experts to assist with audits. Note: There may be additional costs to the organization being audited.

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Option 3: Independent WMO Climate Services Standard

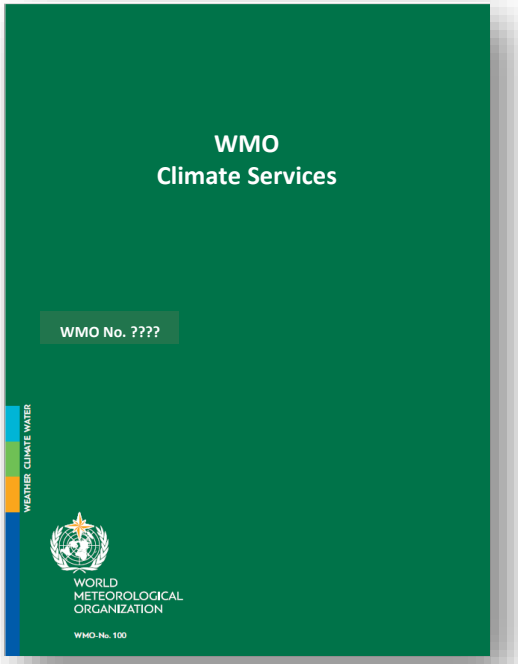
- Develop and publish an in-house (WMO), technical standard for *WMO Climate Services* that would be integrated with ISO 9001.

- ***Certification:*** achieved through a WMO "certification process" utilizing WMO trained Lead Auditors as climate subject matter/specialist experts within and between the WMO Regions.

- ***Challenges:***

  - Lack of experienced third party/external auditors with knowledge of climate services.

  - Ensuring WMO Member staff "appointed" as lead auditors, are appropriately trained and qualified to IRCA standards as a minimum.



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WEATHER CLIMATE WATER
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Thank you, Merci

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