ITU Regional Workshop on “Prospects of Smart Water Management (SWM) in Arab Region”
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Standardization Gaps for Smart Water Resources Management

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Outline

Key global water challenges

Influencing factors on urban water management challenges Water management challenges met in developing countries

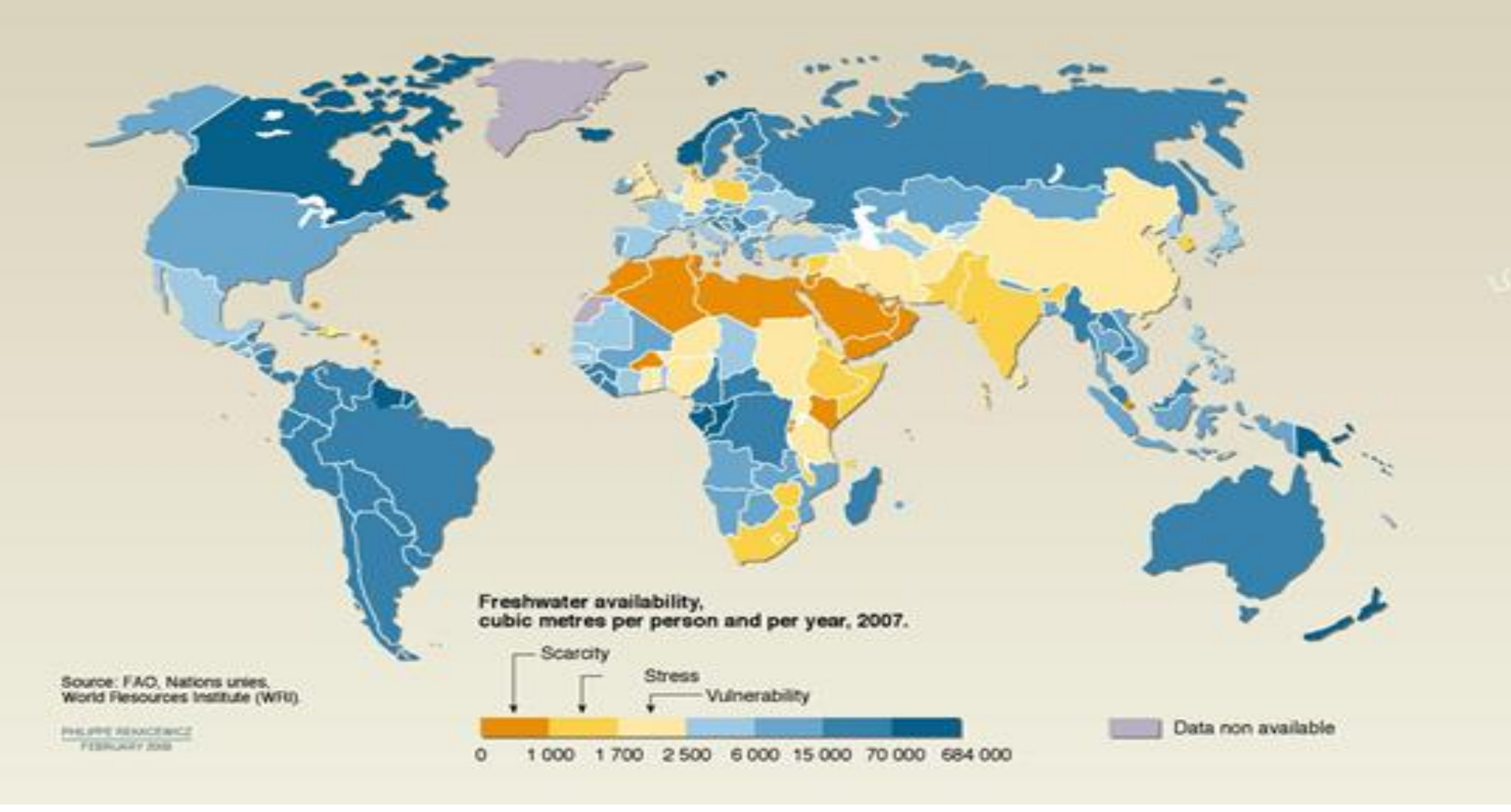
Smart water Management applications, Opportunities

Smart water Management challenges

Standardization Gaps for Smart Water Resources

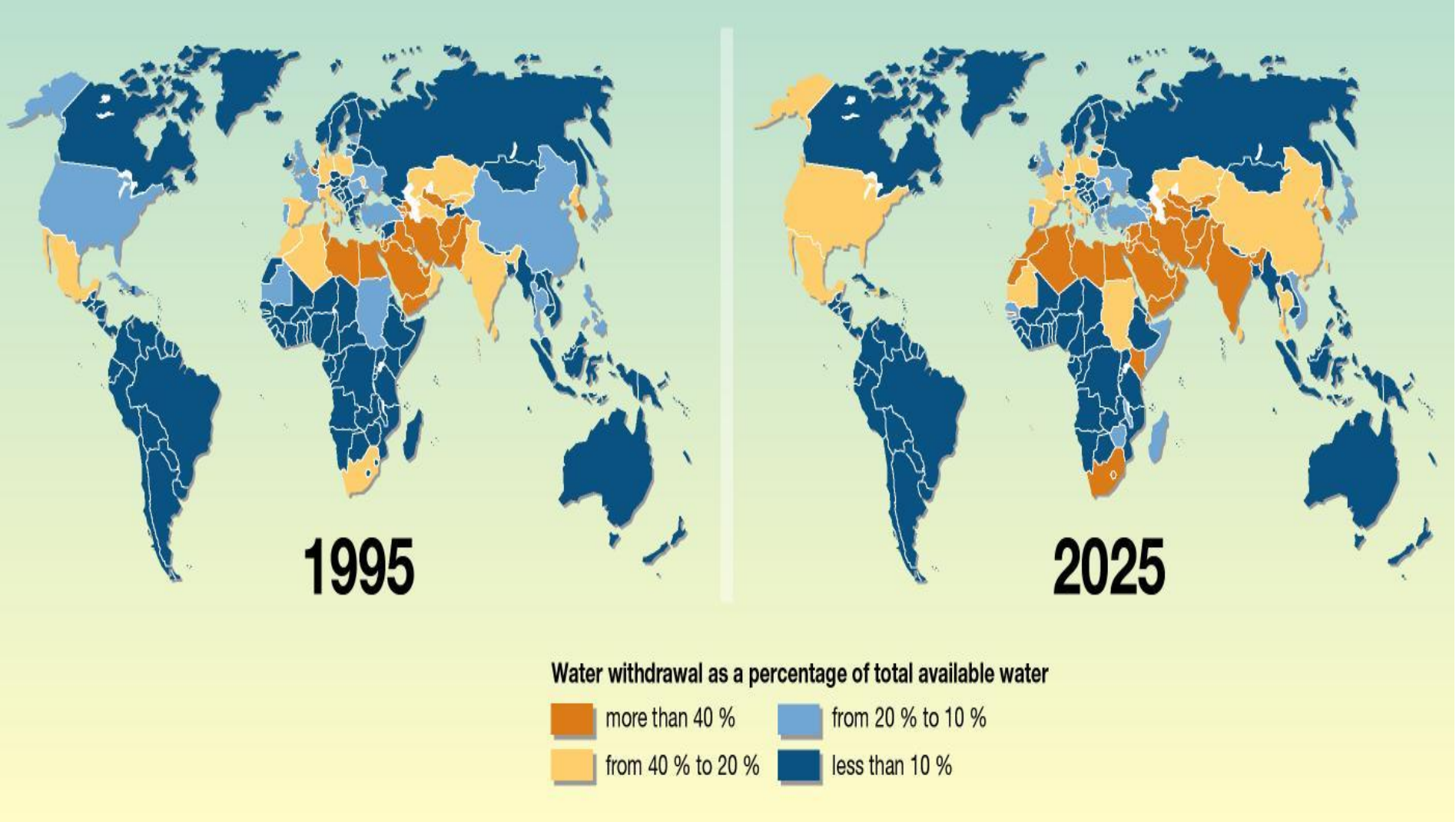
Conclusions

Key global water challenges



One-fifth of the world's population lives under conditions of water scarcity

Key global water challenges



More than 2.8 billion people from 48 countries will face water scarcity problems by 2025

Key global water challenges

Physical Water Scarcity

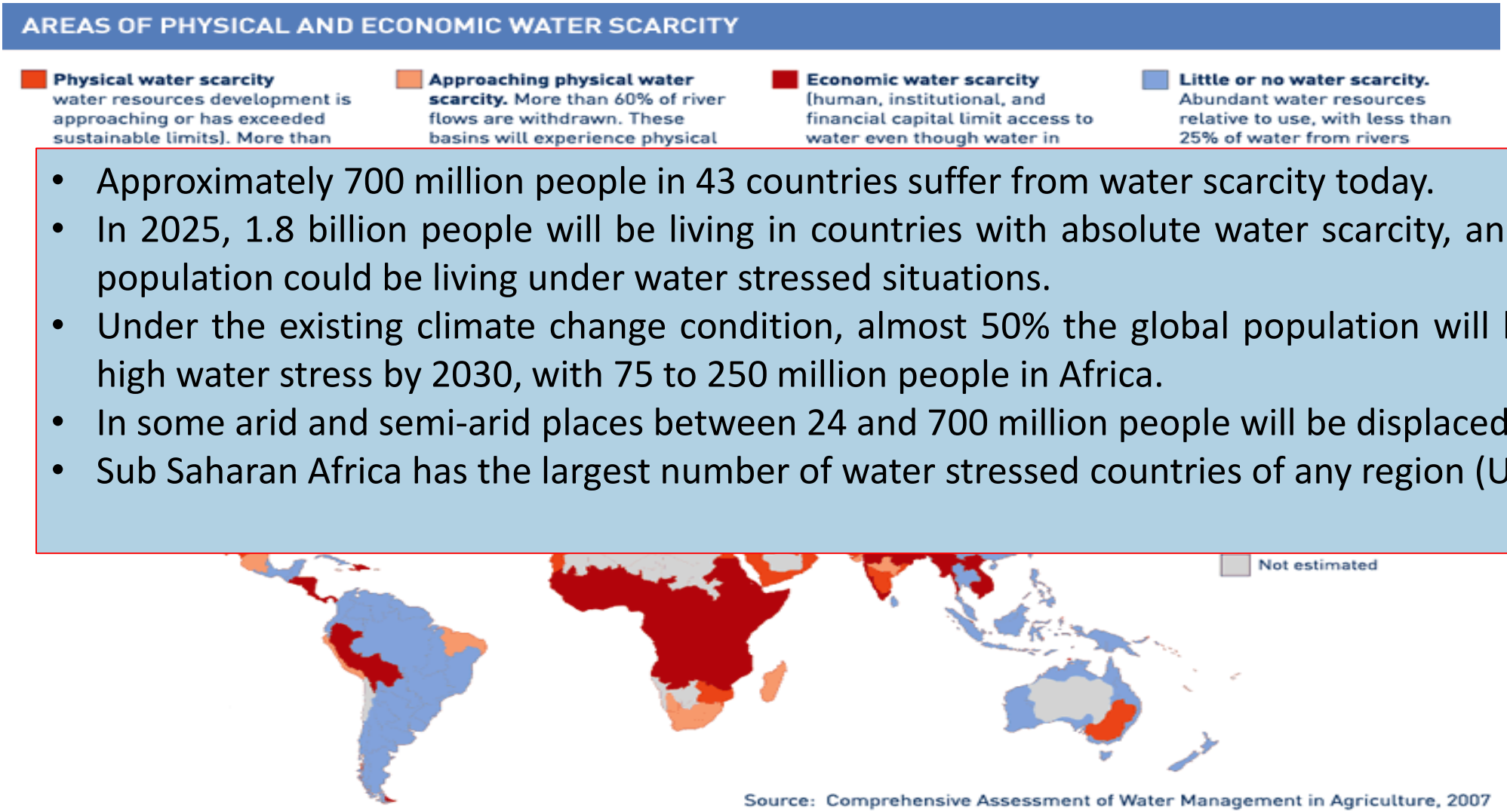
- A condition where there is not enough water to meet demand.
- Most arid regions often suffer from the lack of physical access to water resources.

Economic Water Scarcity

- Mainly induced due to the lack of investment in water resource construction and management to meet the required water demand.
- No enough monetary means to obtain adequate and clean water.

Physical versus economic scarcity

Key global water challenges

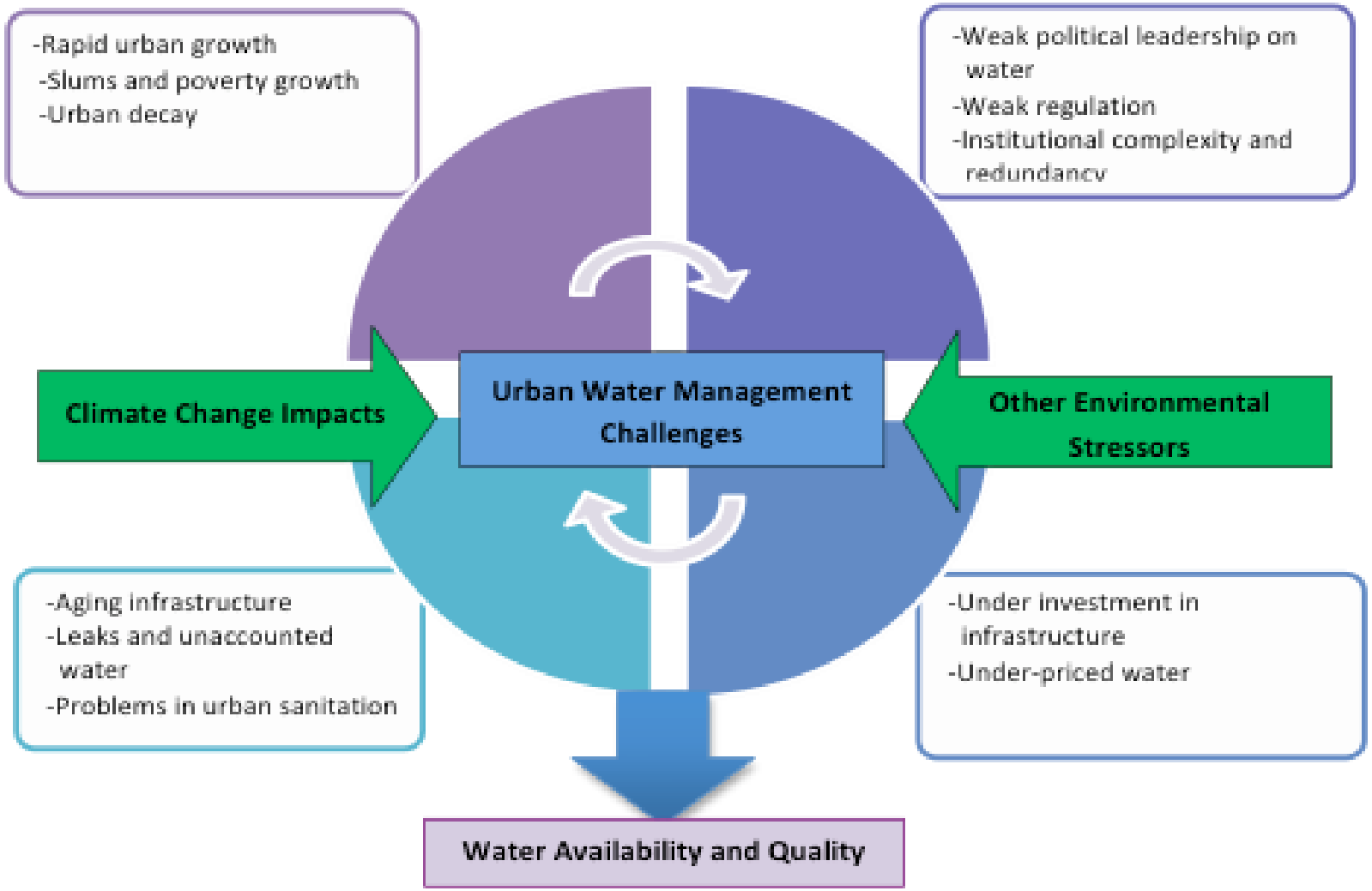


- Approximately 700 million people in 43 countries suffer from water scarcity today.
- In 2025, 1.8 billion people will be living in countries with absolute water scarcity, and 67% of the global population could be living under water stressed situations.
- Under the existing climate change condition, almost 50% the global population will be living in areas of high water stress by 2030, with 75 to 250 million people in Africa.
- In some arid and semi-arid places between 24 and 700 million people will be displaced from their places.
- Sub Saharan Africa has the largest number of water stressed countries of any region (UNDESA, 2013).

Key global water challenges

- Water scarcity and stress
- Climate change
- Rising global population
- Improper water governance and management
- Aging of infrastructure
- Lack of investment

Influencing factors on urban water management challenges



Smart water Management applications

Smart Combined Sewer Overflows: Efficient optimisation is achieved through intelligent management systems.

Source: greatlakes.org

Smart Irrigation and Agriculture: Commercial uses of water can be optimised to ensure sustainable use.

Source: agreenstarlandscape.com

Smart Ultrapure Water: A series of sensors can ensure high water quality and monitor conditions in the system.

Source: organo.co.jp

Smart Wastewater Management: Wastewater can be managed to monitor quality and levels.

Source: usa.siemens.com

Smart Water Supply Management: Water resources and environment can be managed to ensure sufficient supplies and quality.

Source: treehugger.com

Source: precisionmeters.co.za

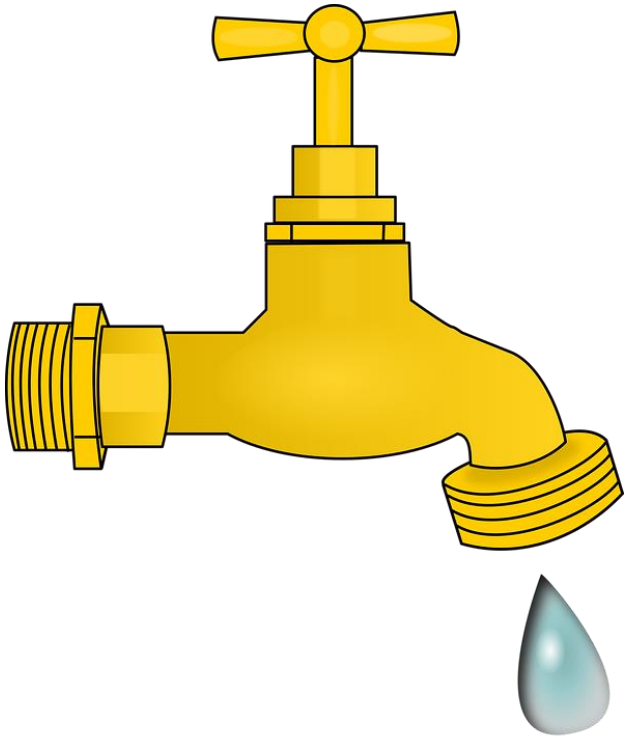
Smart Water Distribution Management: Water in utility grids can be monitored to optimise distribution and asset management.

Source: Google Images

- SWM seeks to promote the sustainable coordinated development and management of water resources through the integration of ICT products, tools and solutions such as:
  - Sensors, smart meters, smart pipes
  - GIS
  - Cloud computing
  - SCADA
  - Web based communication

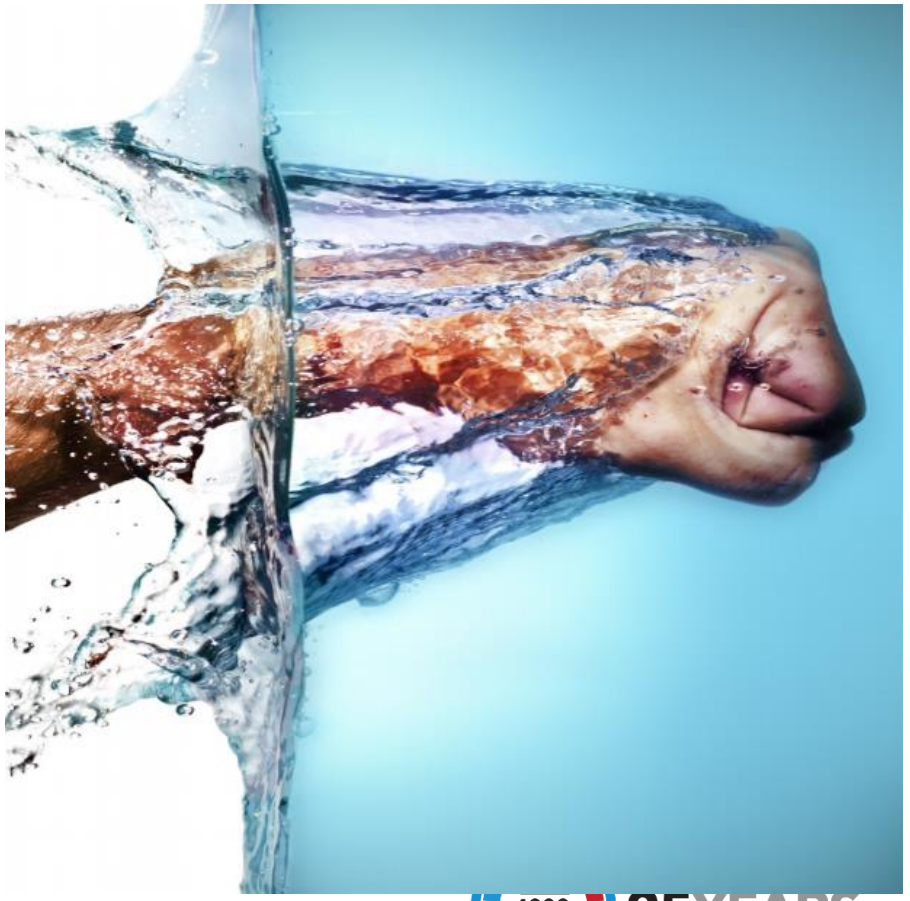
Smart water Management – opportunities

- ICT use in smart water management has a wide application and a clear set of benefits, such as:
  - Real time monitoring and improve water access
  - Save energy and operational costs
  - Reduce nonrevenue water
  - Good water quality and reliability



Smart water management challenges

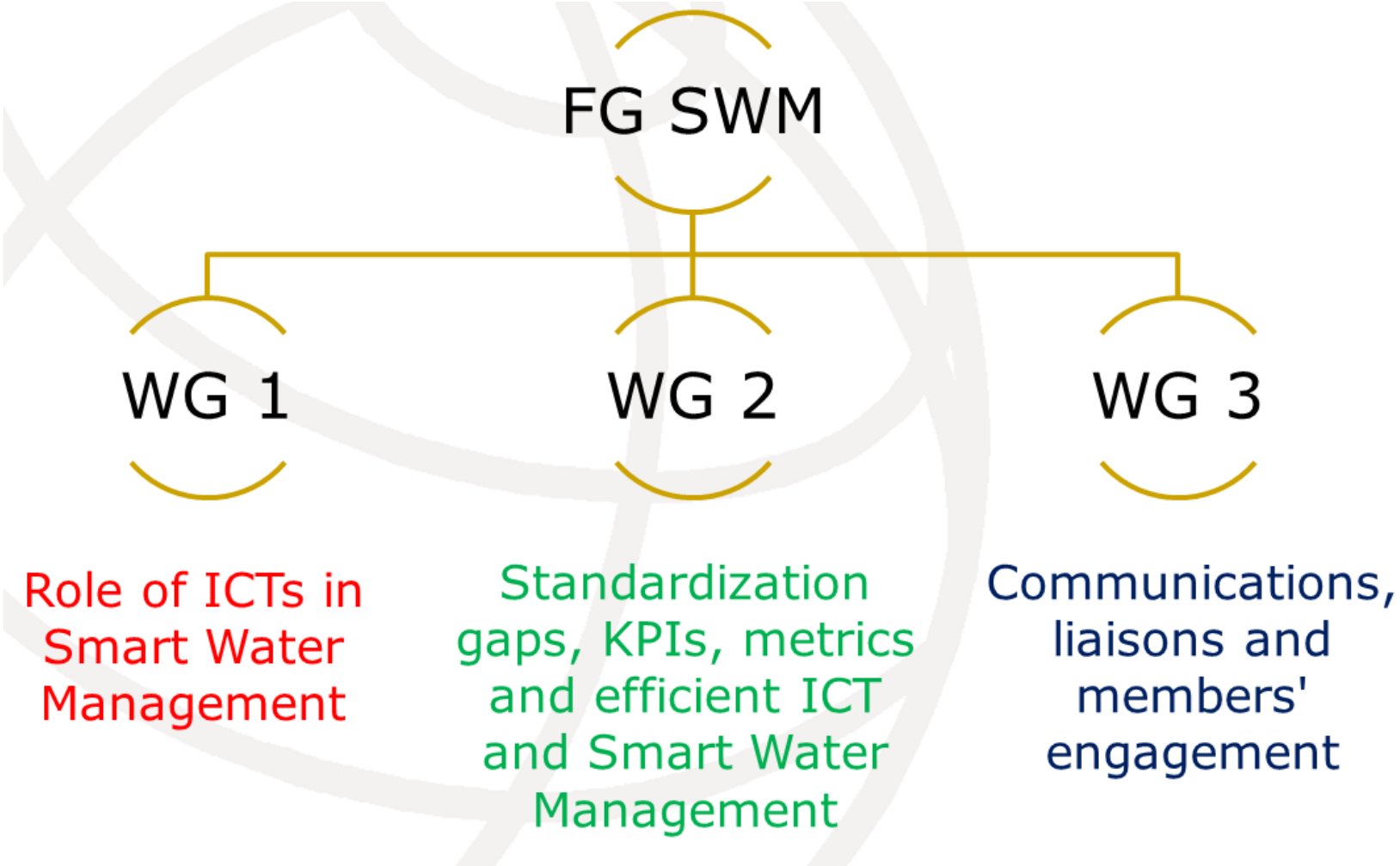
- Current challenges to implementation of SWM in countries include a lack of:
  - Standardization
  - Policies
  - ICT governance
  - Incentives/funding
  - Awareness



Smart water Management standardisation gaps

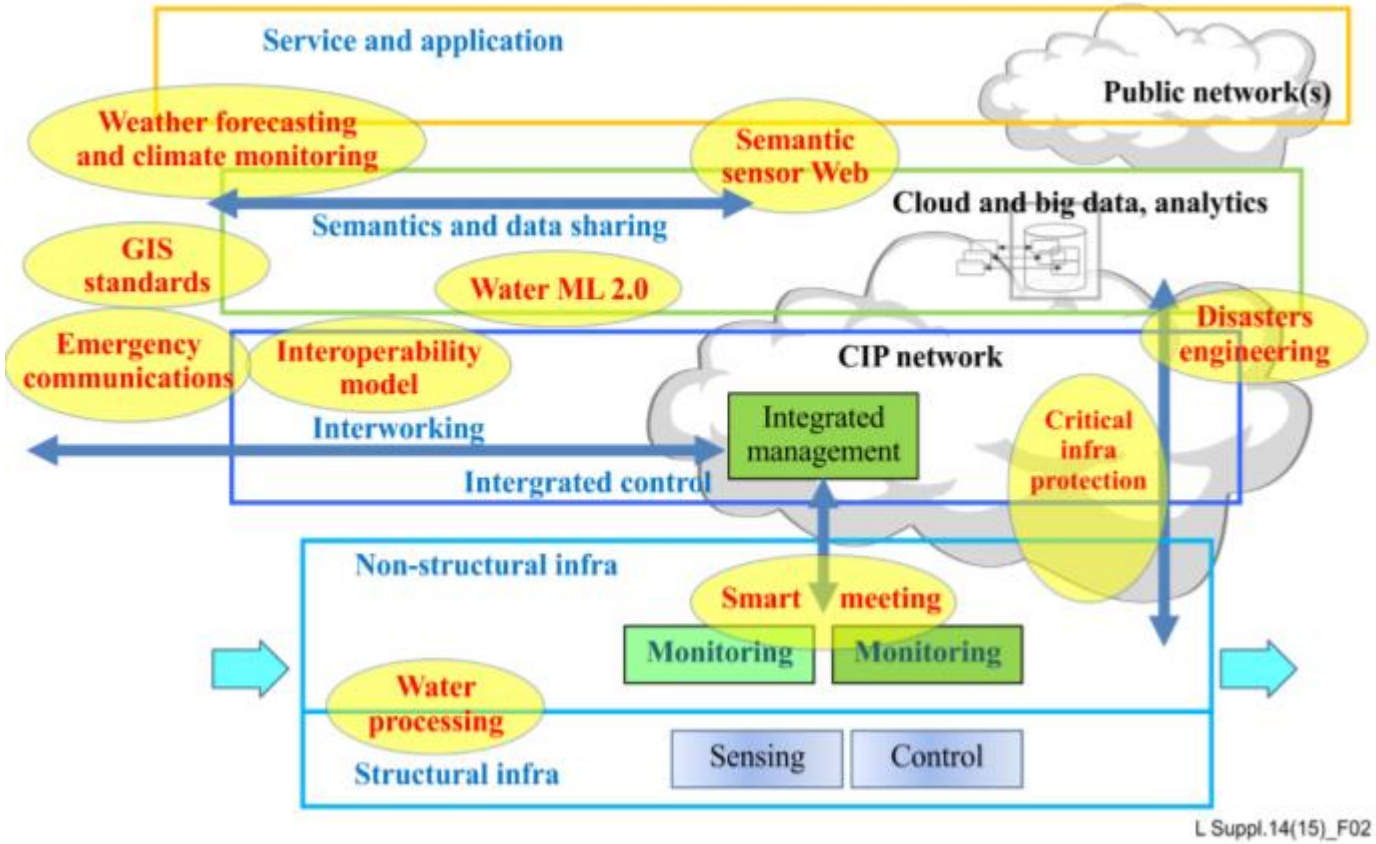
- Main issues contributing to standardisation gaps
  - Lack of information about methodologies on measuring water demand and supply for domestic and economic sectors;
  - Inconsistency on the amount of water that could be saved from use of ICTs. Therefore, a common methodology for assessing the impact of ICTs on water consumption in agriculture and production of goods is necessary.
  - Improve the overall water use efficiency to minimize the losses in the system and distribute the available water for agriculture in an equitable way;
  - Need for common data format for data collected from various sources (e.g. rivers, utility networks, weather, etc.)

Bridging the Standardization Gap – ITU FG SWM Structure



Standardization Gaps for Smart Water Resources

- "What kind of standardization activities are to be collected and reviewed for the study of gaps for Smart Water Management?“
  - List of standardization domains identified in smart water management:
    - Weather forecasting and climate monitoring;
    - Water ML2.0;
    - Semantic sensor Web;
    - GIS standards;
    - Emergency communications;
    - Interoperability model;
    - Critical infrastructure protection and disaster engineering;
    - Smart metering;
    - Water processing



Architectural categories	Technical area	SDOs involved in the area	The SDO's documents or activities	Document/activities' objectives	Standardization types related to the documents/activities					Standardization issues (gaps) related to the area
					Pre	Req	Arc	Pro	Other (s)	
Service and application	Weather forecasting and climate monitoring	WMO	HWRP (programmes)	Help assessment of quantity and quality of water resource	O	O	O		Progr-ammes	This programme includes the standardization of various aspects of hydrological observation and organized transfer of technology for enabling hydrological services. It provides basic system aspect and hydrology, forecasting, and resource management. This contents would be a good reference for developing service and system requirement on smart water management
			WIS (information system)	Collection and dissemination of water data	O	O			System	This system provides a good practice of water data collection and dissemination. It will impact the data sharing standardization

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		GEO	GEOSS/CEOS (portal service)	Water domain resource discovery	O	O			Service	Incorporating this service into SWM is to be a mandate
		NASA	GLDAS (service)	Global soil moisture map	O	O			Service	Incorporating this service into SWM is to be a mandate
	Geographical Information System	OGC	GML / ISO 19136:2007	language to express geographical features				O		Together with WML, this standard will contribute general interoperability of SWM
Big data, semantics and data sharing	Water ML	OGC/ISO	Water ML 2.0 part 1, ISO 19156	Water data sharing /inter-operability	O	O	O	O		So far this standard is the best practice to provide interoperability of water systems
		WIRADA	WDTF	Water data sharing /inter-operability	O	O	O	O		Cooperating WaterML2.0
	Semantics Sensor Web, and platforms	OGC	SWE	Enable sensors applications via the Web	O	O	O	O		Connecting sensor data to Web service will give versatility to utilize sensor's context in an application
		IETF	GEOPRIV	URI for geographic location	O	O	O	O		The representations of location in Internet

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										protocols will make advances in location based smart service
		W3C	RDF/OWL	Resource description/ Web ontology	O	O	O	O		Applying this dominant description method to water management would be one of biggest challenge to make it smart.
		WatERP/ FP7	Semantics platform	Water management with sematic data	O	O	O			It will link different management tools through a specific SOA-MAS architecture; via web
Integrated control and interworking	Emergency Communication	ITU	WRC646 / Narrowband PPDR	Use of TETRA & P25	O	O	O			Emergency communication is crucial for government and humanitarian aid agencies involved in rescue operations, medical assistance and rehabilitation. For SWM, emergency communication should be provided to assist control and supervisory system of water management, and to assists disaster
		ITU-R WP5A	Broadband PPDR M.2015 M.2009 M.2219	Frequency Technology IMT based PPDR		O O O	O			
		IEEE	802.16	Direct communication between terminals	O	O				

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			GRIDMAN							management related to water
		OMA	POC	PTT over cellular		O	O	O		
		3GPP	PS-LTE	D2D(device to device), ProSe (Proximity based service), GCSE (Group communication), IOPS (isolated E-UTRAN for public safety), MCPTT(mission critical PTT)	O	O	O	O		
	Disaster Engineering and Critical Infrastructure protection	NIST	SP-800-53 SP-800-82	Information security for industry network, SCADA & industrial control system security	O O	O O	O O			These standards, regulation, and guidelines are indispensable to design, implement, and operate the critical infrastructure and its network . SWM system should be realized as a CIP by applying this technology.
		NERC	CIP 001-4 ~009-4	Reliability/ Security measures for CIP	O	O	O			
		NRC	10CFR 73.54 & RG5.71	Cyber security for CIP	O	O	O			
		ISA	ISA-99 FR1~FR7	Industrial control security	O	O				

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		ISO	IWA6:2008	ISO International Workshop Agreement: Crisis situations						This agreement should be considered for SWM in conjunction with emergency telecommunication
	Interoperability Model	NIST/SGIP	PAP	Identifying priority issues & action plan for interoperability of smart grid	O	O				This plan and catalogue of standards are urgently required to develop in the standardization of SWM by identifying actors and domains in it
		ITU-T	Report on ICTs and smart water management	Categorization of stakeholders	O					This paper can be utilized to identify stakeholders in SWM, to develop actor model of it.
Water management Infrastructure	Smart metering, AMI	CEN (OMS/FIG AWA/KN X/ZVEI)	EN13757	Data transmission between smart meter and data concentrator.		O	O	O		Since AMI and AMR would be a kind of essential tools in SWM, this standards should be incorporated in the catalogue of standards
	Water processing	ISO/IEC	TC 5	Ferrous metal pipes & metallic fittings		O				These industrial standards are considered as the

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			TC23/SC18	Tractors and machinery for agriculture and forestry		O				underlying technology of SWM
			TC30	Measurement of fluid flow in closed conduits		O				
			TC113	Hydrometry		O				
			TC138	Plastics pipes, fittings and valves for the transport of fluids		O				
			TC147	Water quality		O				
			TC153	Valves		O				
			TC207/SC5	Environmental management		O				
			TC211	Geographic information/ Geometrics		O				
			TC 282	Reusing the water resources		O				
			PC253	Treated wastewater reuse for irrigation		O				

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			TC224	Service activities relating to drinking water supply systems and wastewater systems – Quality criteria of the service and performance indicators		O				

Pre: Pre-standard: Study on Eco-system, Use cases, Feasibility, etc.
Req: User requirement, System requirement
Arc: Architecture
Pro: Protocol

Conclusion

- Smart water management is a viable option for sustainable water management in the face of water scarcity and climate change.
- Without stakeholder buy in and proper collaboration by the relevant sectors proper implementation will be unattainable.
- Bring your contributions to address the standardisation gaps of smart water management.

Thank You