



THDC India Ltd.

International Conference on HYDROPOWER AND DAMS DEVELOPMENT FOR WATER AND ENERGY SECURITY – UNDER CHANGING CLIMATE



Central Board of
Irrigation & Power



Indian National Committee
on Large Dams

Keynote address:
Hydropower and dams in a context of water
and food security in a changing climate

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Address plan:

- Energy, water, and food security
- Current and expected trends
- Outlook
- Reflections

Water security

“The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.” *UN-Water, 2013.*

What is Water Security?

"The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability."

Working definition, UN-Water, 2013



Food security

“Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.

World Food Summit, 1996

Ensured when there is a reliable *supply* of food of sufficient quantity and quality.

Dependant on:

- Domestic production
- Food stocks
- Imports
- Food aid

Availability

Ensured when individuals & households have adequate *resources* to obtain appropriate food.

Dependant on:

- Political, economic, social factors
- Equitable distribution
- Markets / infrastructure
- Affordability
- Purchasing power

Access

Food security

“Exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”.

(FAO, 1996)

Dependant on:

- Maintenance of all three pillars over time
- No risk of loss of supply due to economic, political or environmental factors

Stability

Ensured when there is *permanent* and durable access to food.

Utilisation

Dependant on:

- Food safety
- Food quality
- Nutritional knowledge
- Proper preparation
- Clean water / sanitation / healthcare

Ensured when food is nutritious and can be adequately metabolised and *used* by the body.

Energy security

“The uninterrupted availability of energy sources at an affordable price”

Long-term energy security: timely investments to supply energy in line with economic developments and environmental needs.

Short-term energy security: the ability of the energy system to react promptly to sudden changes in the supply-demand balance.”

International Energy Agency

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International Energy Agency

Human right to food

- A fundamental human right
- Recognized in 1948 Universal Declaration of Human Rights
- Enshrined in 1966 International Covenant on Economic, Social and Cultural Rights



The right to adequate food is realized when every man, woman and child, alone and in community with others, has physical and economic access at all times to adequate food or means for its procurement (para. 6).

*General Comment 12
Committee on Economic, Social and Cultural Rights*

Human right to water and sanitation

- A fundamental human right
- Recognized in 1966 International Covenant on Economic, Social and Cultural Rights
- Enshrined on 28 July 2010 by UN General Assembly



“The right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights”. *UN General Assembly, July 2010*

“The right is derived from the right to an adequate standard of living.”
Human Rights Council, Sep 2010



SUSTAINABLE DEVELOPMENT GOALS



SUSTAINABLE DEVELOPMENT GOALS



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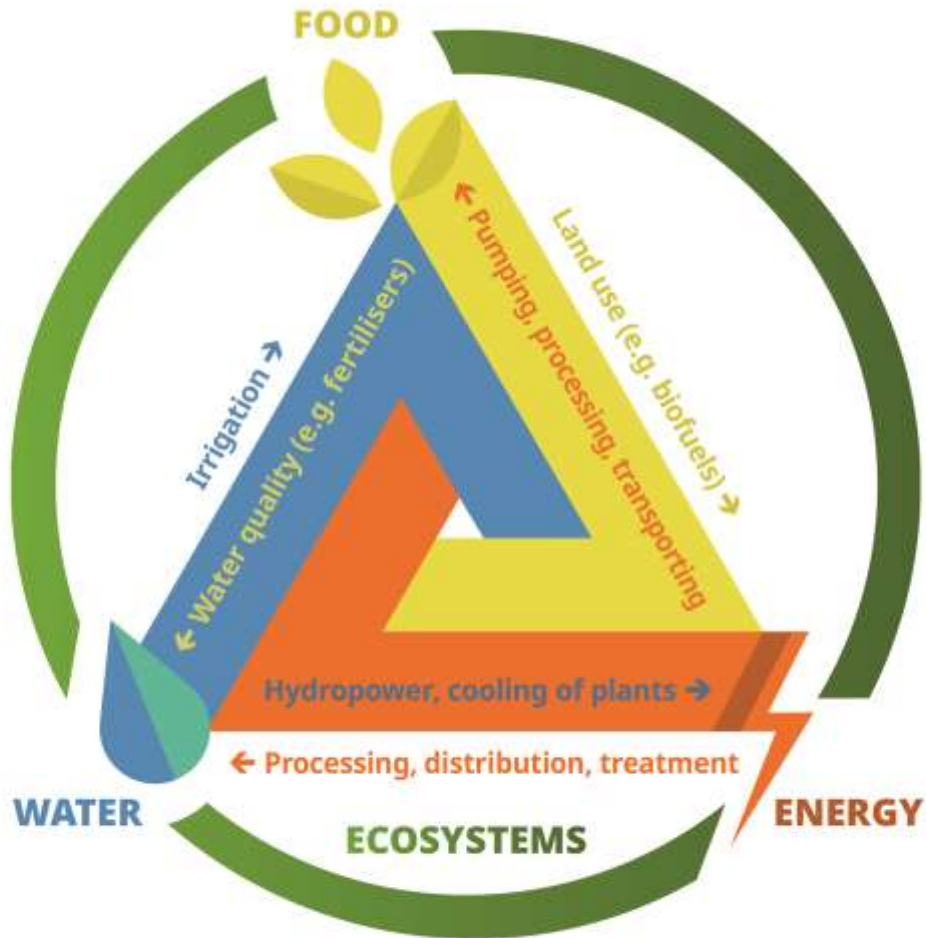
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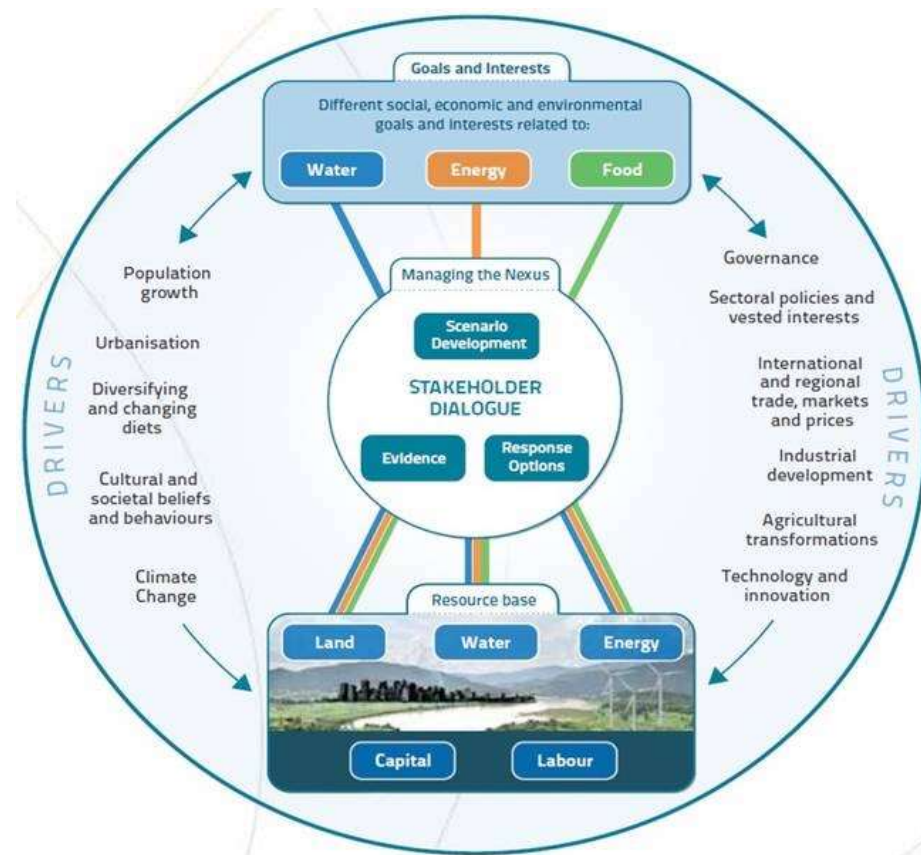
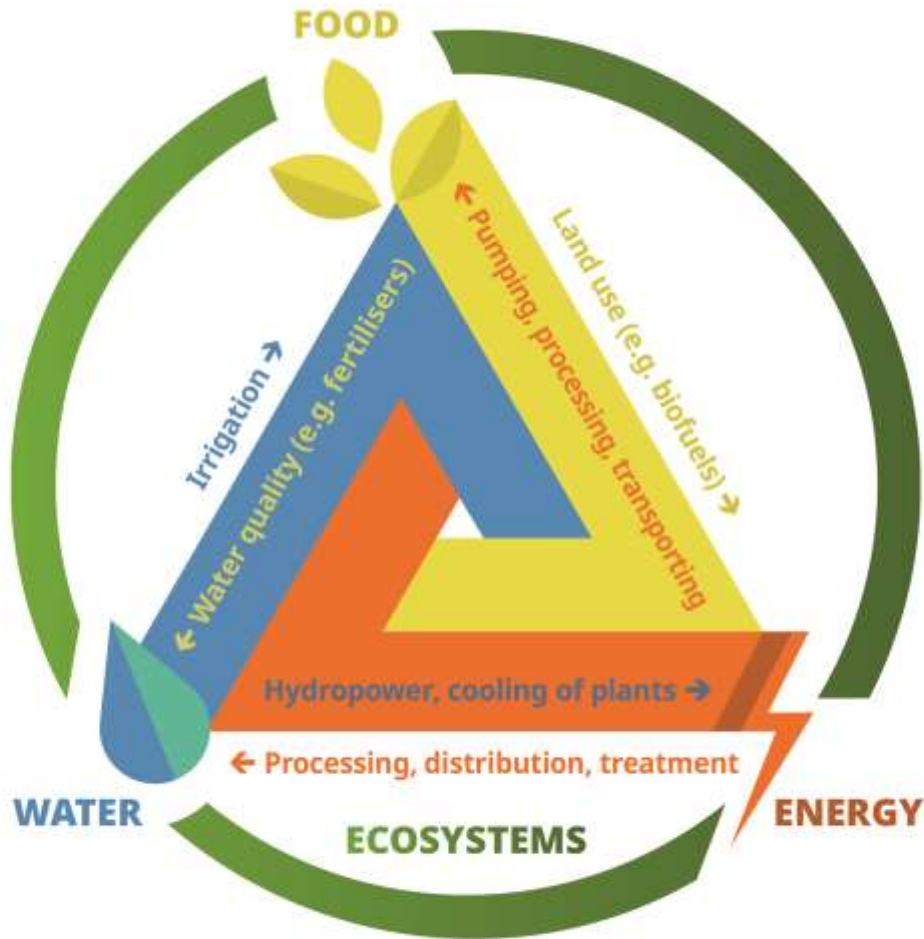
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Current state and trends



- The world is off-track in achieving the SDGs.
- Business as usual or gradual change will not deliver.
- Serious decisions will be needed to accelerate progress.

Priorities, synergies, multi-purpose projects.



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Climate change adaptation and mitigation

- Water management is primarily about adaptation.
- Energy is primarily about mitigation.
- Agriculture provides both mitigation and adaptation opportunities.



Climate funding can benefit all three if properly conceived and formulated. Water storage is strategically positioned.



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INTERGOVERNMENTAL PANEL ON climate change

Climate Change 2022

Impacts, Adaptation and Vulnerability

Summary for Policymakers



WGII

Working Group II contribution to the:
Sixth Assessment Report of the
Intergovernmental Panel on Climate Change



Future Adaptation Options and their Feasibility

Land, Ocean and Ecosystems Transition

- SPM.C.2.1 Adaptation to water-related risks and impacts make up the majority of all documented adaptation (high confidence).



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On-farm water management, water storage, soil moisture conservation and irrigation are some of the most common adaptation responses and provide economic, institutional or ecological benefits and reduce vulnerability (high confidence).



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Future Adaptation Options and their Feasibility

Energy System Transition

- SPM.C.2.10 the most feasible adaptation options support infrastructure resilience, reliable power systems and efficient water use for existing and new energy generation systems (very high confidence). Energy generation diversification, including with renewable energy resources and generation that can be decentralised depending on context (e.g., wind, solar, small scale hydroelectric)



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Future Adaptation Options and their Feasibility

Adaptation in Energy and Industrial Sectors

- increasing the efficiency of hydropower plants by up to 10% could offset the impacts of decreased water availability in most regions by mid-century....
- Changing hydropower operation protocol and plant design can be effective adaptation measures, yet may be insufficient to mitigate all future risks related to increased floods and sediment loads.....



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Future Adaptation Options and their Feasibility Adaptation in Water, Sanitation and Hygiene (WaSH) Sector

-Supply (source) augmentation, including dams, storage, and rainwater/fog harvesting can increase the supply or reliability of water for drinking, sanitation, and hygiene.....



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Impacts

- with medium evidence and high agreement that hydropower negatively impacts freshwater ecosystems.
- While hydropower reduces emissions relative to fossil fuel-based energy production, hydropower reservoirs are being increasingly associated with GHG emissions caused by submergence and later re-emergence of vegetation under reservoirs....



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Today's agenda

- Impacts of dams, positive and adverse well documented and studied in the 20th century
- Multi-purpose projects
- Safety issues emerging with climate change
- Use of new materials, technology
- Modern design
- **BIG PICTURE**



2021 GLOBAL WATER POLICY REPORT

LISTENING TO NATIONAL WATER LEADERS



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<http://waterpolicygroup.com/index.php/2021-water-policy-report/>



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HIGH LEVEL PANEL

OUTCOMES OF THE GLOBAL WATER POLICY REPORT
2021: LISTENING TO NATIONAL WATER LEADERS
AND
LAUNCH OF THE AFRICA WATER POLICY REPORT



9th WORLD WATER
FORUM | DAKAR 2021

WEDNESDAY 23 MARCH 2022, 13:30-15:00, ROOM 11, EXPO

The Global Water Policy Report 2021 is a world-first comprehensive survey revealing the water management challenges of Ministers, top officials and other national water leaders in 88 countries, representing a combined population of over 6 billion people.

<http://waterpolicygroup.com/index.php/2021-water-policy-report/>



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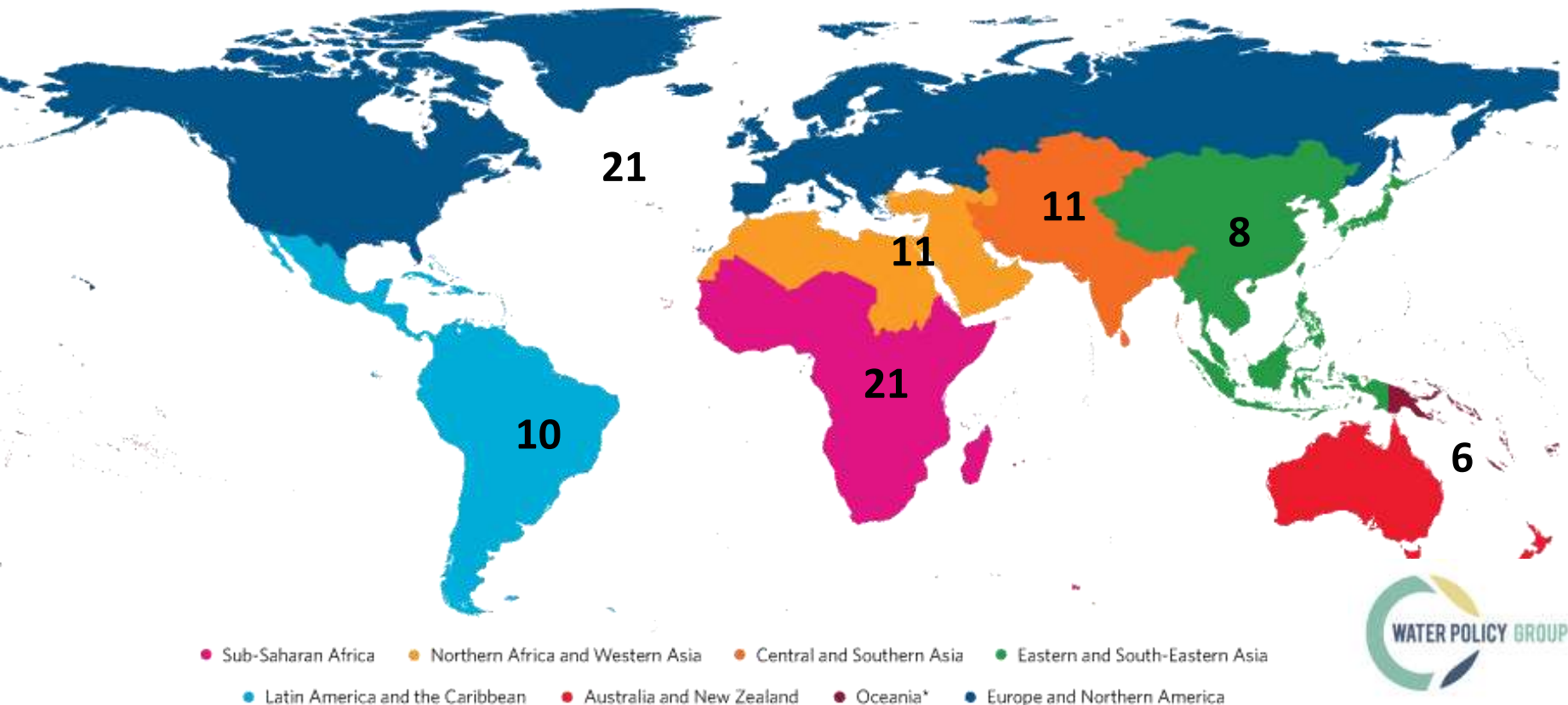


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Survey's geographical coverage – United Nations Regions



Notes: * Oceania* refers to Oceania excluding Australia and New Zealand throughout the publication.



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Water Risks and Challenges



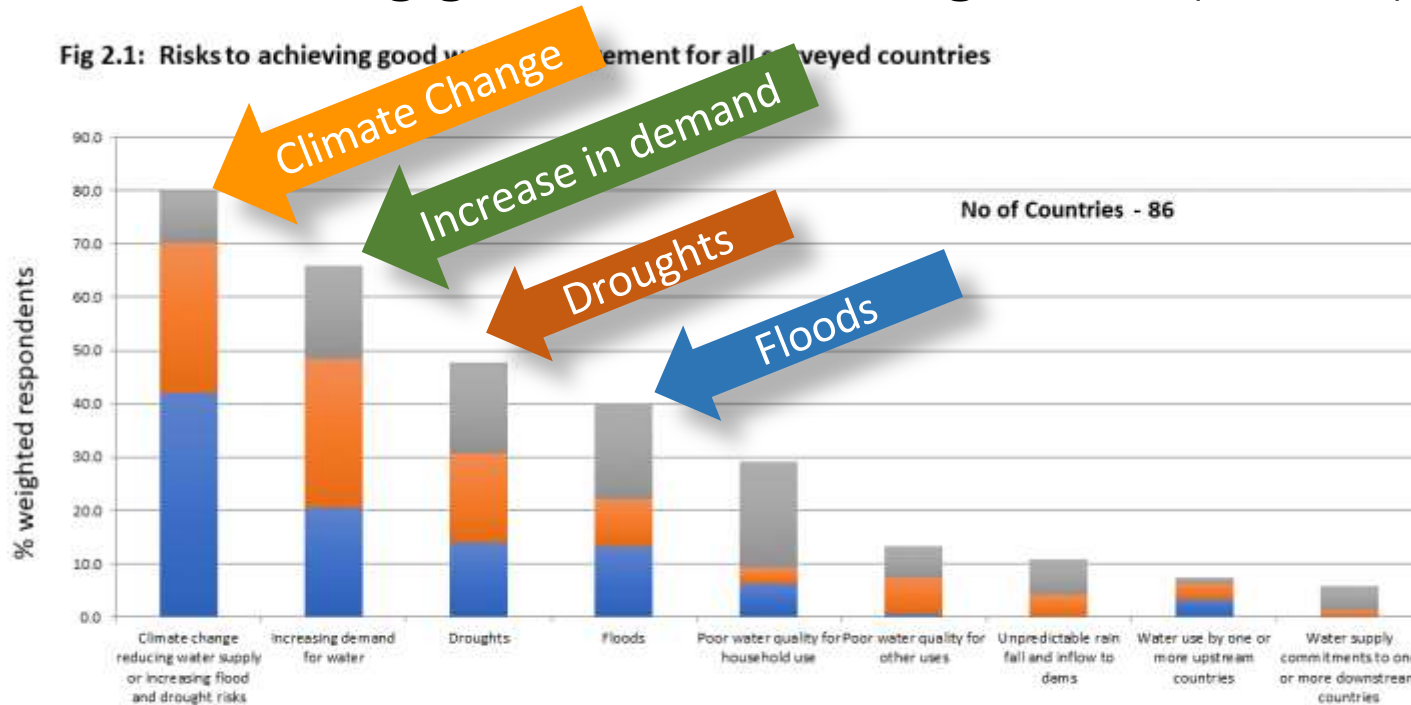
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Risks to achieving good water management (Global)

Fig 2.1: Risks to achieving good water management for all surveyed countries



Note – Blue indicates percentage of weighted responses ranked 1st
 Orange indicates percentage of weighted responses ranked 2nd
 Grey percentage of weighted responses ranked 3rd





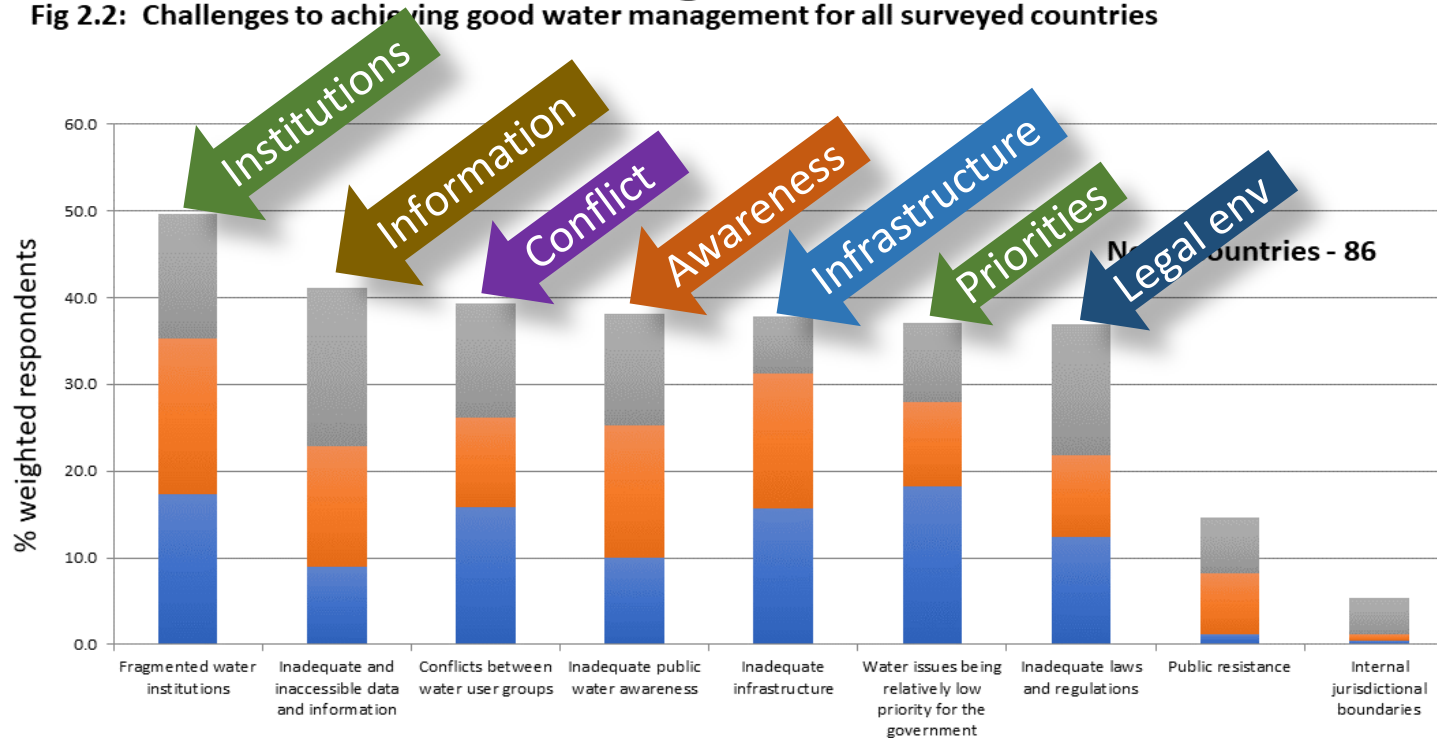
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The Challenges (Global)

Fig 2.2: Challenges to achieving good water management for all surveyed countries



Note – Blue indicates percentage of weighted responses ranked 1st
 Orange indicates percentage of weighted responses ranked 2nd
 Grey percentage of weighted responses ranked 3rd



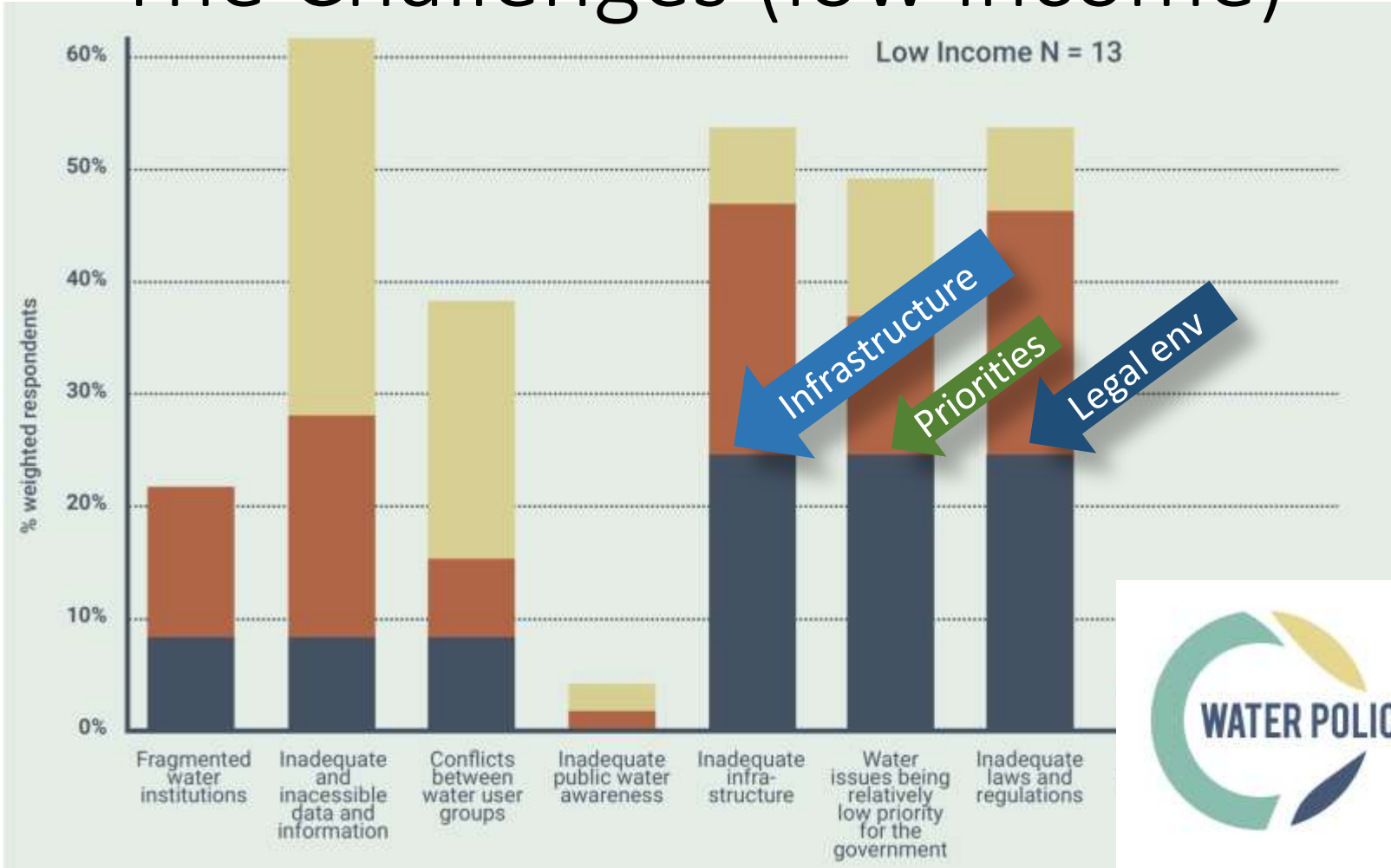


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The Challenges (low income)





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Reflections

- It is all about interlinkages and the bigger picture in the 21st century.
- The need for water storage is more relevant than ever in the 21st century.
- The food, energy, and water security benefits of water storage present both synergies and trade-offs.
- Water storage > dams > big dams
- We are much better equipped now than in 20th century and have learned from it.
- The solutions that include big dams can and should incorporate all options, hard and soft, and all benefits (to humans, economy, environment)



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Thank you!

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