MEET THE ITAP

THE INDEPENDENT TECHNICAL ADVISORY PANEL
OF THE GREEN CLIMATE FUND

22 OCTOBER 2024

GREEN CLIMATE FUND

Water and Climate Change

presented by Marianne Kjellén, iTAP member

ITAP MEMBERS - OCTOBER 2024

Name	Nationality	Start Date
Rey Guarin	Philippines	January 2021
Ricardo Nogueira	United States	January 2021
Caroline Petersen	South Africa	January 2021
Carmenza Robledo Abad	Colombia	January 2023
Ina Hoxha Zaloshnja	Albania	April 2023
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ITAP Coordinator	Alejandra Peña Carballo

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Water and Climate Change

I. **The water cycle and water security**

II. **Climate drivers and their effects**

III. **Adaptation Action**

- Water Conservation: Agricultural Practices, Catchment Management , Aquifer Recharge
- Addressing (Urban) Flooding

IV. **Mitigation Action**

- Water's role in mitigation strategies
- Water "sector" contribution

V. **Efficiency & GCF Priorities**

- Leakage and "Non-Revenue Water"
- GCF Water Security Pathways

I.1

Schematic Water Cycle, with 'blue' and 'green' flows, and sectoral use

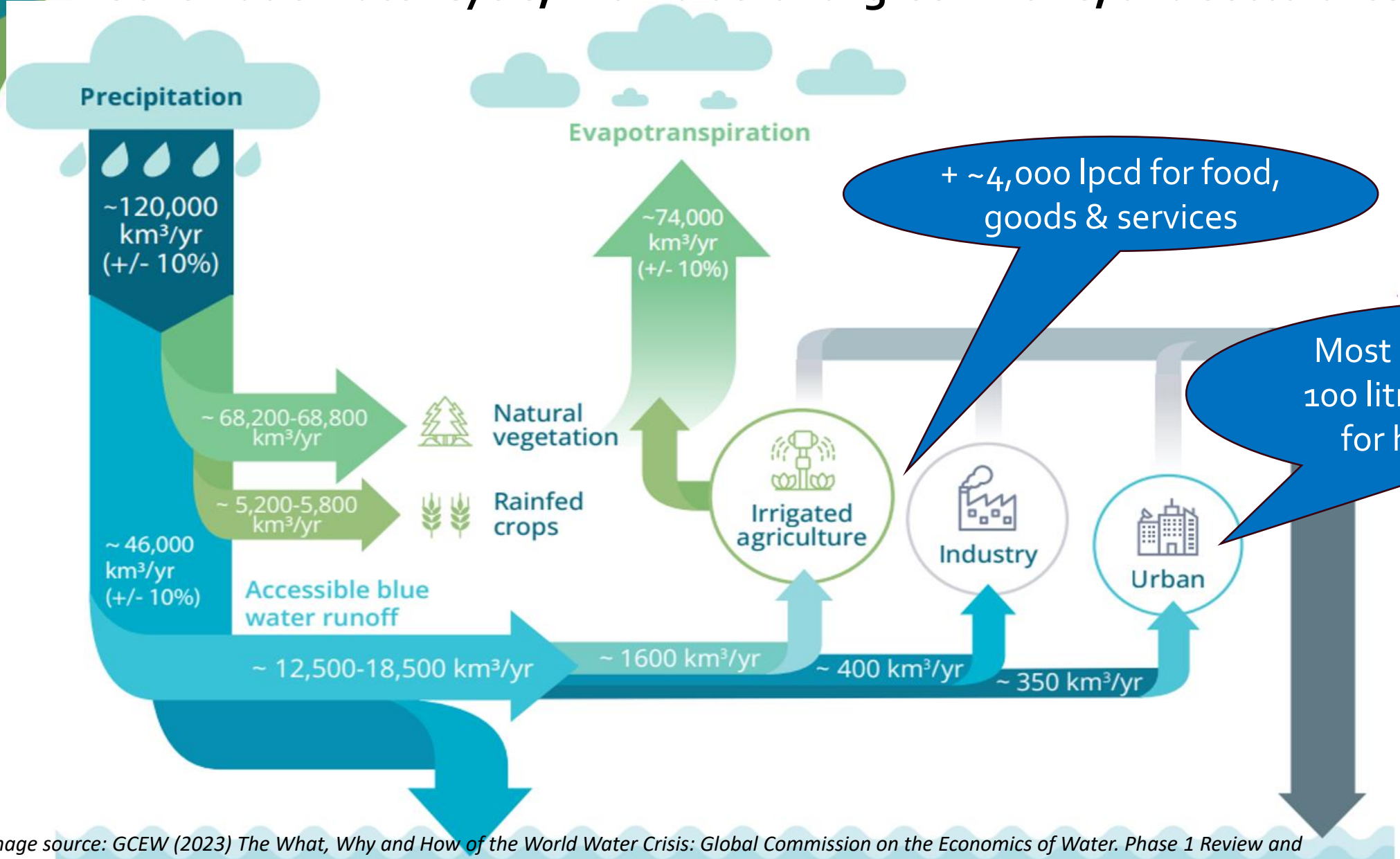


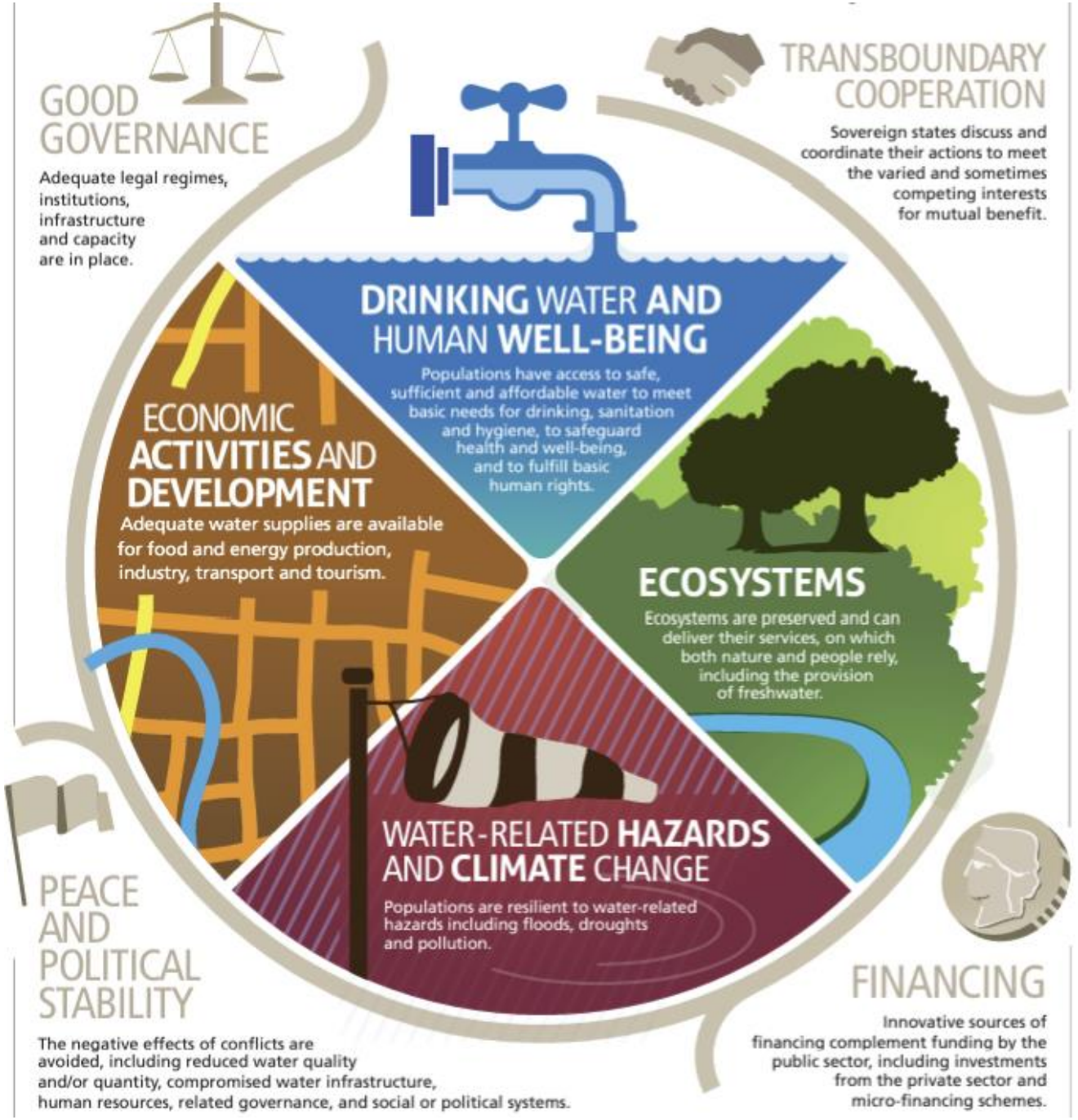
Image source: GCEW (2023) The What, Why and How of the World Water Crisis: Global Commission on the Economics of Water. Phase 1 Review and Findings, Paris.(https://watercommission.org/publication/phase-1-review-and-findings/) Figure 2.2 The water cycle, global water consumption by sector and blue water consumption exceedance (SOURCE: Authors. Details of data sources and calculations provided in Grafton, Krishnaswamy and Revi, 2023)

WATER SECURITY

*"The **capacity** of a population to **safeguard sustainable access…**"*

(UN-Water, 2013)
https://www.unwater.org/sites/default/files/app/uploads/2017/05/unwater_poster_Oct2013.pdf

Climate resilience – the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate



Global Climate Change and Water Security – Drivers (I)

❖ Climatic Drivers (IPCC, Caretta *et al.* 2022)

- ➢ A warmer atmosphere holds more moisture, increasing global and regional mean precipitation, and more extreme precipitation
  - ▪ Precipitation patterns have shifted worldwide
  - ▪ Changing patterns of soil moisture worldwide
- ➢ Warming increases glacier melt and is affecting seasonality of river flows
  - ▪ mountain glaciers, land ice and snow cover shrinking

❖ WMO State of Global Water Resources in 2023 confirms

- ➢ **Glaciers suffer largest mass loss in 50 years**
- ➢ **2023 was driest year for global rivers in 33 years**

Caretta *et al* (2022) Water. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. pp. 551–712, Cambridge University Press,, Cambridge, UK and New York, NY, USA. (https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-4/) (doi:10.1017/9781009325844.006.).*

https://wmo.int/publication-series/state-of-global-water-resources-2023

Global Climate Change and Water Security – Drivers (II)

https://commons.wikimedia.org/wiki/File:Diesel_pump_irrigation.jpg

❖ Non-Climatic / Direct Human Interventions

- Land use/cover change
- Dams and large-scale inter-basin transfers
- **Abstraction of surface water and groundwater**
  - **groundwater storage has declined**, due to the intensification of groundwater-fed irrigation
  - **low-lying coastal aquifers** have increased salinity, due to land use change, reduced stream flows, rising sea levels and increased storm surge inundation

Caretta *et al* (2022)

Global Climate Change and Water Security – Impacts

- Irrigated agriculture
  (A quarter of all croplands are irrigated, providing one third of global calorie production)
  - two-thirds experience "blue water" scarcity at least one month per year, and
  - more than one third up to five months per year – mostly in drought-prone areas in low-income countries
- Livestock affected by
  - changing seasonality
  - increasing frequency of drought high temperatures
  - vector-borne diseases and parasites
  - reduced availability and nutritional value of forage and feed crops
- Subsistence farmers face highest risk of food insecurity

Caretta *et al* (2022)

Adaptation Action…

- Water Conservation: Agricultural Practices, Catchment Management , Aquifer Recharge
- Addressing (Urban) Flooding

half-moons, or **demi-lunes**, designed to improve water retention, combat soil erosion, and rehabilitate degraded land in arid and semi-arid environments.

Photo from: https://www.siani.se/blog/re-greening-sahel-anneli-sundin/

Successful (studied) adaptation action:

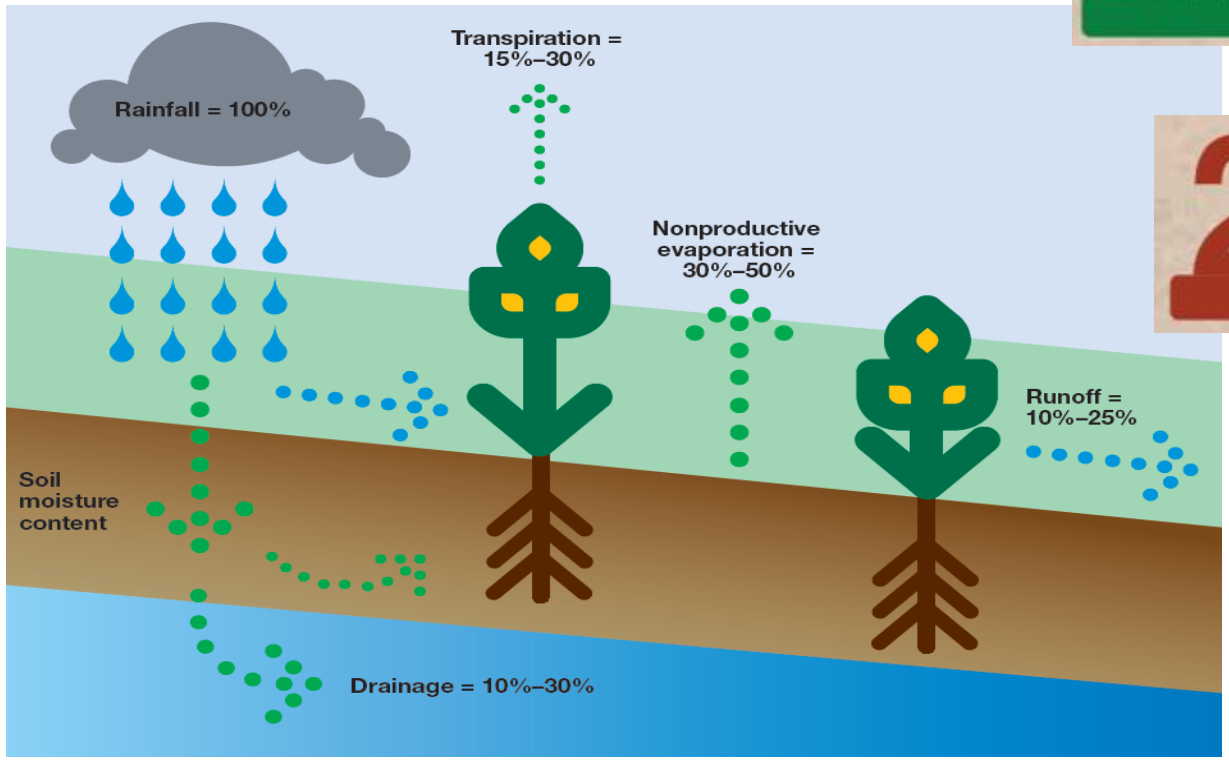
- Improved crop varieties and agronomic practices
- Changes in cropping patterns and crop systems
- Migration and off-farm diversification
- Water and soil moisture conservation
- …

Caretta *et al* (2022)

Adaptation Action…

CONSERVATION AGRICULTURE

Get more water to transpire thru plants – producing biomass and improving soil conditions – and reduce evaporation and runoff



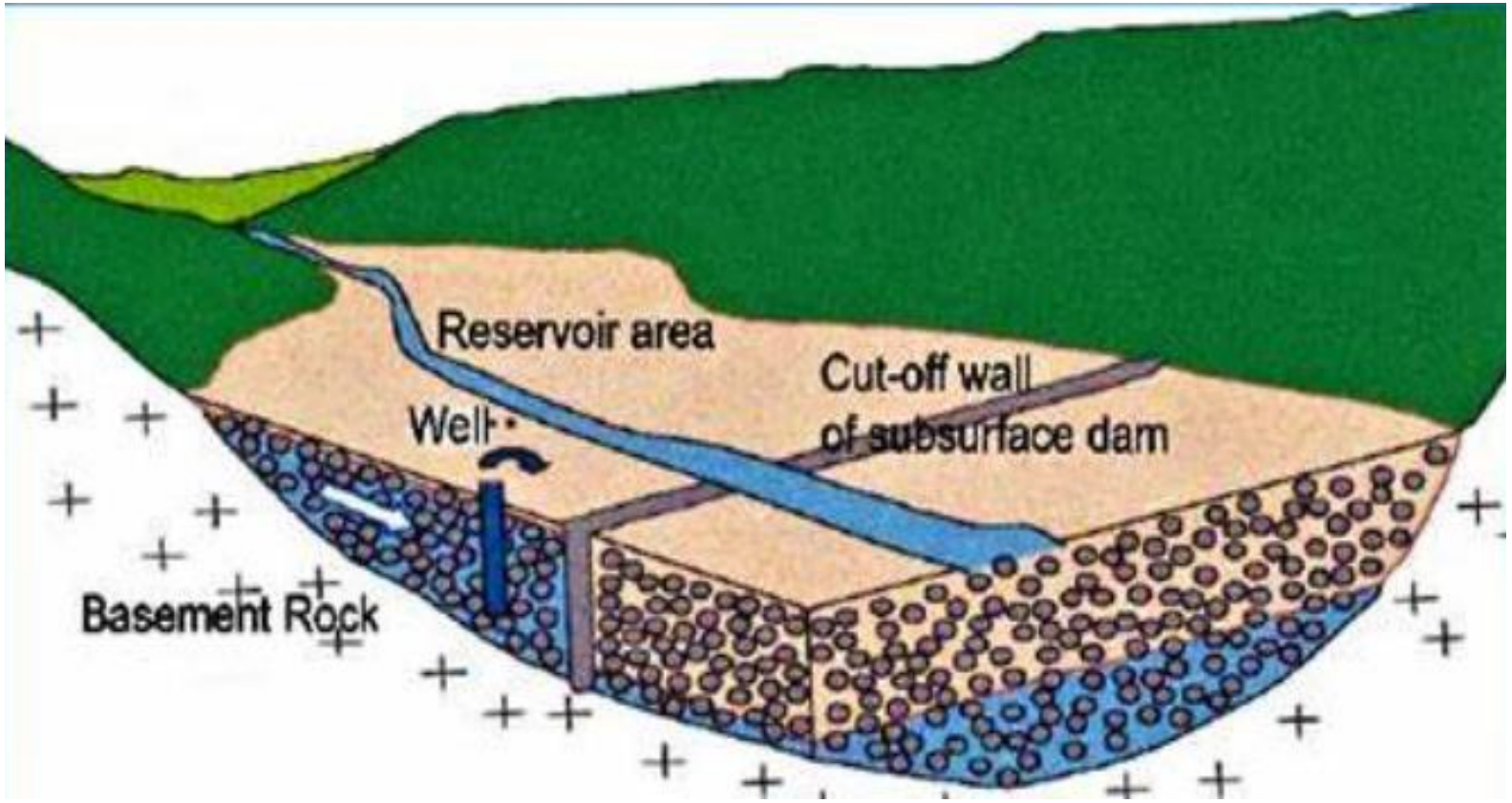
https://www.fao.org/conservation-agriculture/en/

Rockström *et al.* (2007) Managing Water in Rainfed Agriculture. pp. 315-352.
Fig. 8.5: **Rainfall partitioning in the semiarid tropics indicating rainfall losses from the farm scale through drainage, surface runoff, and nonproductive evaporation**

Adaptation Action…

- Contour Trenches
- Soak Pits
- Floodwater Spreading
- Recharge Basins (Infiltration Basins)
- Check Dams (& Sand Dams)
- Percolation Tanks
- Recharge Trenches
- Recharge Shafts
- Injection Wells (Artificial Recharge Wells)

MANAGED GROUNDWATER RECHARGE



Adaptation Action…

By Hitesh vip - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=20202684

REDUCING EVAPORATION BY COVERING IRRIGATION CANALS

Adaptation Action… Agrivoltaics

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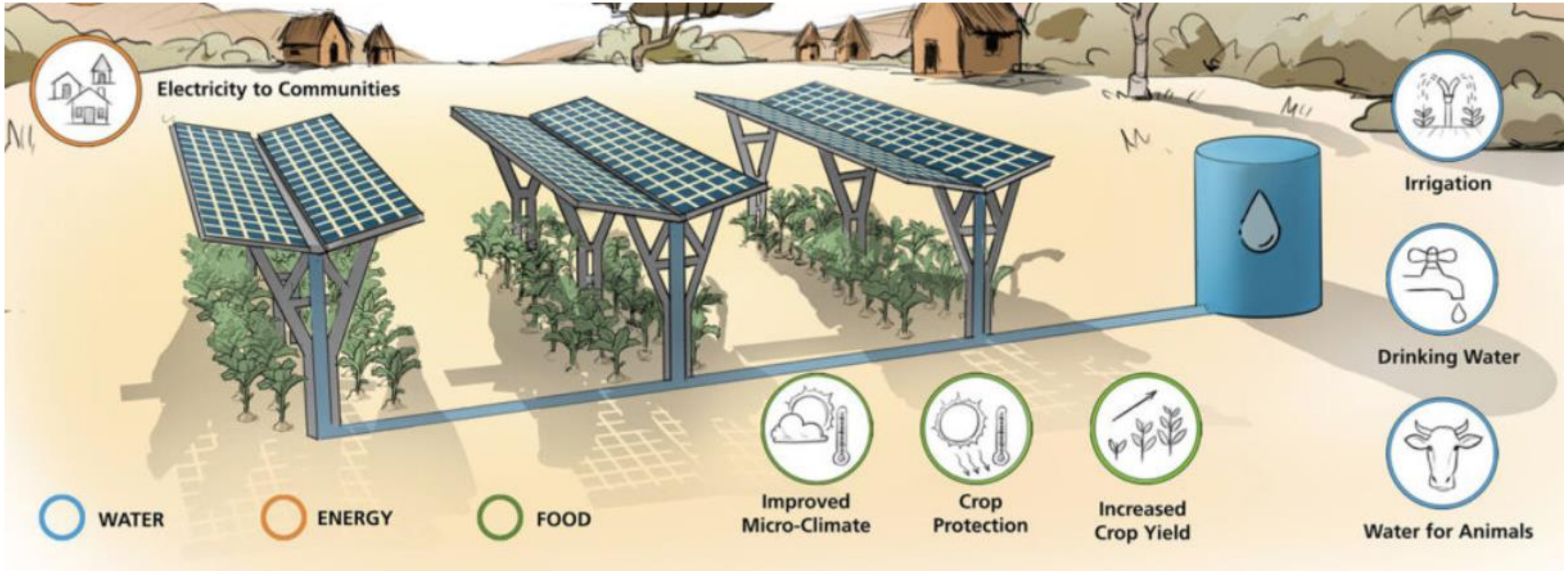
REDUCING WATER NEEDS BY SHADING CROPS



https://www.maysunsolar.com/blog-agrivoltaics-how-solar-panels-are-changing-agriculture/

Adaptation Action… (urban flooding exacerbated by climate change)

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INTEGRATED URBAN WATER RESOURCES / FLOOD MANAGEMENT

The sponge city not only cleans up the water but creates a habitat for the biomass. And these advantages both make it a way to "adapt and mitigate". This is "just one example of how the sponge city can contribute to public welfare and benefit the planet."

https://www.turenscape.com/en/news/detail/459.html

E.g. Sponge Cities (making 'room-for-the-river')

- A **"Sponge City"** is designed to mimic natural processes, allowing urban areas to absorb, store, and purify rainwater, much like a sponge soaks up water

Adaptation Action… (flooding exacerbated by climate change)

Early warning systems

Ensuring that everyone is protected from hazardous weather, water, or climate events through early warning systems **and anticipatory action**

https://www.un.org/en/climatechange/early-warnings-for-all

IV.1

Mitigation…

- Water's role in mitigation strategies
- Water "sector" contribution

WATER DEPENDENCY OF LOW-EMISSION / RENEWABLE ENERGY

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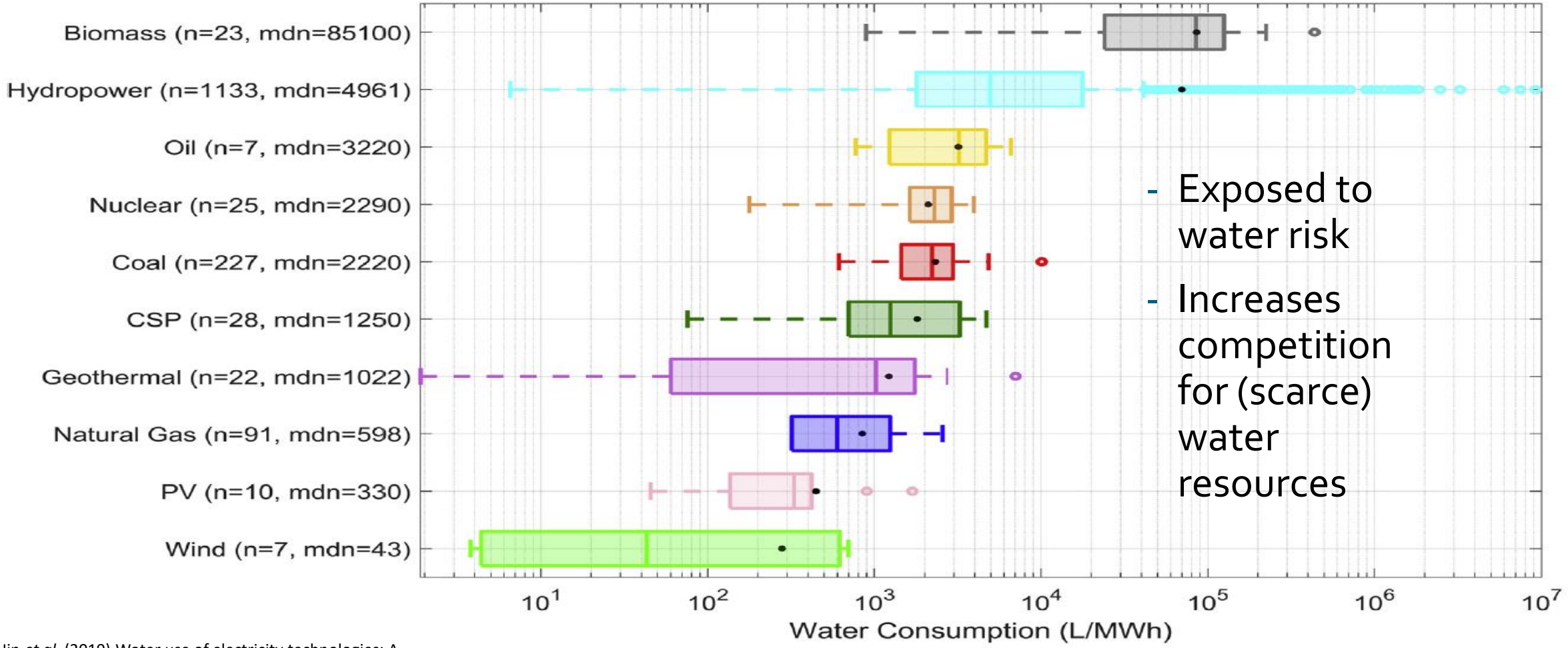


- Exposed to water risk
- Increases competition for (scarce) water resources

Range and median estimate of water use for electricity production by type measured in litres of water per megawatt hour of electricity produced

Image from Jin *et al.* (2019) Water use of electricity technologies: A global meta-analysis. *Renewable and Sustainable Energy Reviews 115, 109391. (https://doi.org/10.1016/j.rser.2019.109391), Fig 1:* Blue water consumption over the life cycle across energy generation types

Mitigation…

- Water's role in mitigation strategies

CARBON IN FRESHWATER ECOSYSTEMS

Freshwater ecosystems – rivers, lakes, wetlands – have generally been considered as carbon neutral or carbon sinks.

Disturbance => Risk of those systems becoming net sources of GHG emissions.

Reservoirs

- Release GHG from the decomposition of flooded organic material - drawdown areas are hotspots for CO_2 emissions!
- Emissions highest in the first 10 to 20 years after impoundment - newly formed reservoirs emit 3-10 times more GHG than natural lakes

Sources:

- *The Essential Drop to Reach Net-Zero: Unpacking Freshwater's Role in Climate Change Mitigation (2022) produced by SIWI, SRC, PIK, UNDP and GIZ.*
- *https://www.hydropower.org/factsheets/greenhouse-gas-emissions*
- *https://en.wikipedia.org/wiki/Katse_Dam*

Mitigation…

- Water's role in mitigation strategies

FLOODED RICE PADDY FIELDS ACCOUNT FOR 12% OF GLOBAL ANTHROPOGENIC METHANE EMISSIONS.

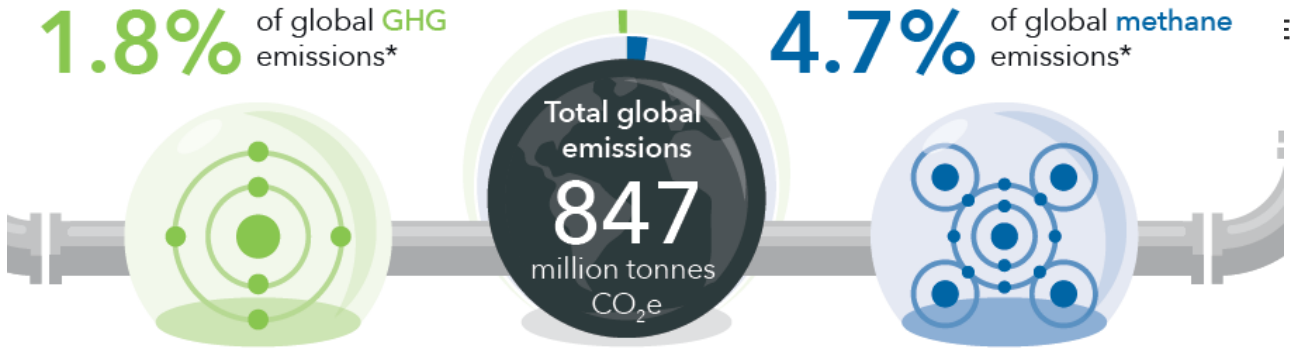
- Improved water management practices, including alternate wetting and drying, can reduce methane production substantially (by 15–88%)
- It can also improve water-use efficiency (but not necessarily increase yields)

Sources:

- *The Essential Drop to Reach Net-Zero: Unpacking Freshwater's Role in Climate Change Mitigation (2022) produced by SIWI, SRC, PIK, UNDP and GIZ.*
- *https://www.adb.org/news/events/how-can-we-incentivize-reducing-methane-emission-rice-farming-asia*

Mitigation…

MITIGATION POTENTIAL OF THE WATER SECTOR



The urgent issue

Methane makes up

37%

of water infrastructu emissions

- Methane's global warming potential is tripled in the short term, but research is lacking in

The long-term battle

Nitrous oxide represents

32%

of emissions from sewe wastewater treatment

- N_2O is **300 times** more potent than CO_2 - utilities cannot

The overlooked challenge

Onsite sanitation produces

31%

of water infrastructure's emissions

- Complicated service chains are ineffective, driving up emissions from unemptied

The low-hanging fruit

Energy use from fossil fuels generates

52%

of water infrastructure's emissions

- Energy use can be slashed by optimising pumps, aeration and harnessing digital tools to streamline networks
- Utilities can produce green energy for themselves, their cities and the grid

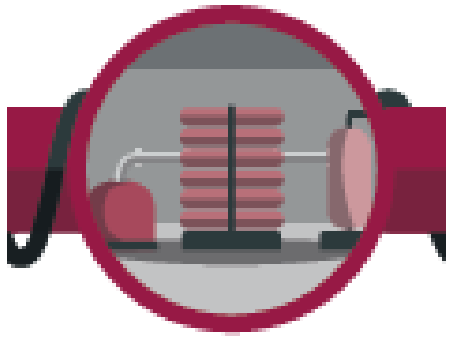
Lutkin, T., Gordon, E., Chater, J., Thompson, K. & Mouret, S. (2022) *Mapping water's carbon footprint. Our net zero future hinges on wastewater. (https://www.globalwaterintel.com/water-without-carbon)*

Mitigation…

MITIGATION POTENTIAL OF THE WATER SECTOR

- ***Reduce energy demand!***

Desalination



Pumps

(for water distribution and collection)

- Replace old pumps
- Optimize pumping
- Smart metering

Aeration

(adding air to facilitate biological treatment)

- Smart /real-time adjustments
- More primary removal of BOD

Sludge belt drying

(dewatering sludge)

- Solar drying
- Low-temperature dryers

The low-hanging fruit

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(© GlobalWaterIntel.com, Media Analytics Ltd, sponsored by Xylem and Cambi)

V.1

Efficiency…

ADAPTATION & MITIGATION POTENTIAL OF THE WATER SECTOR

- ***Reduce water losses!***

  - Global leakage in water distribution estimated at ~ 30%.
  - In some areas, as high as 40%-50% of the supplied water

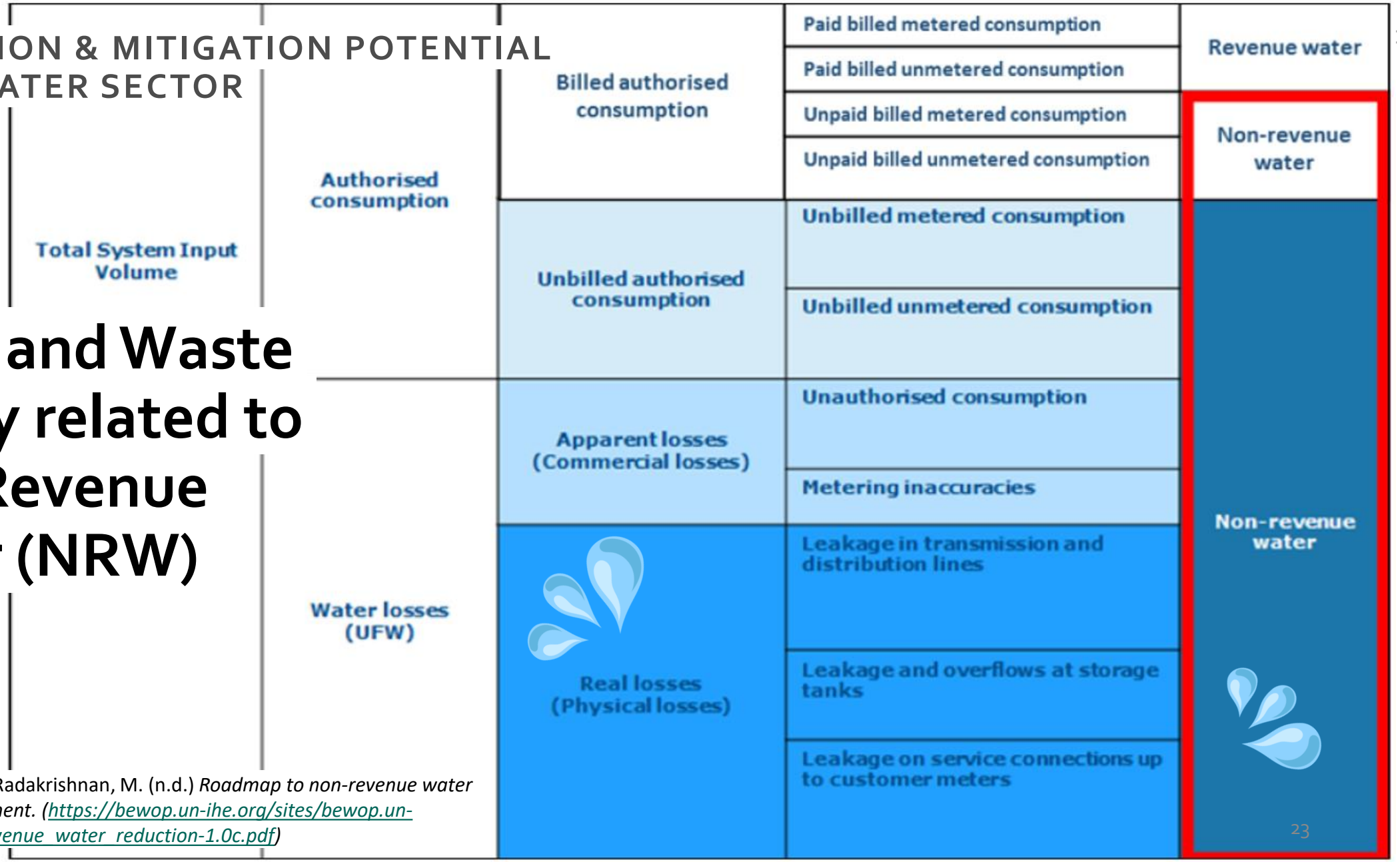
Sources:

- Alsaydalani, M. (2024) Hydraulic Modelling for Leakage Reduction in Water Distribution Systems Through Pressure Control. *The Open Civil Engineering Journal 18. (10.2174/0118741495289971240112101323).*
- https://www.veolia.com/en/planetlive/detecting-water-leaks-reduce-potable-water-loss

V.2

Efficiency…

ADAPTATION & MITIGATION POTENTIAL OF THE WATER SECTOR

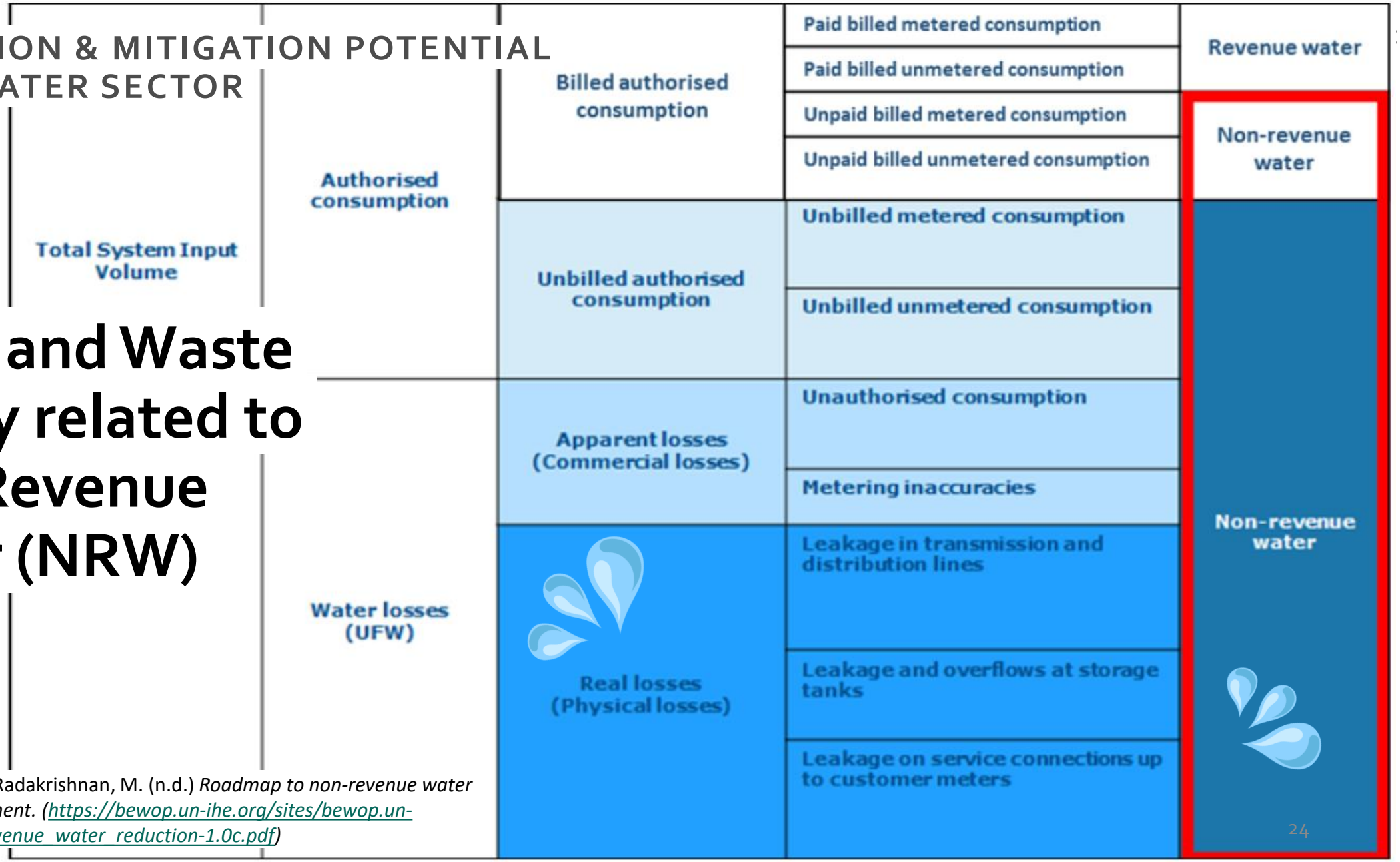


Leaks and Waste closely related to Non-Revenue Water (NRW)

Image from Faber, S. & Radakrishnan, M. (n.d.) *Roadmap to non-revenue water reduction and management. (https://bewop.un-ihe.org/sites/bewop.un-ihe.org/files/01_non-revenue_water_reduction-1.0c.pdf)*

Efficiency…

ADAPTATION & MITIGATION POTENTIAL OF THE WATER SECTOR

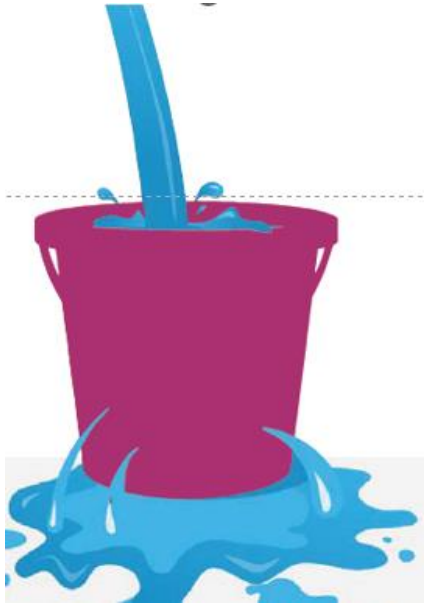


Leaks and Waste closely related to Non-Revenue Water (NRW)

Image from Faber, S. & Radakrishnan, M. (n.d.) *Roadmap to non-revenue water reduction and management. (https://bewop.un-ihe.org/sites/bewop.un-ihe.org/files/01_non-revenue_water_reduction-1.0c.pdf)*

V.4

Efficiency...



Non-Revenue Water (NRW)

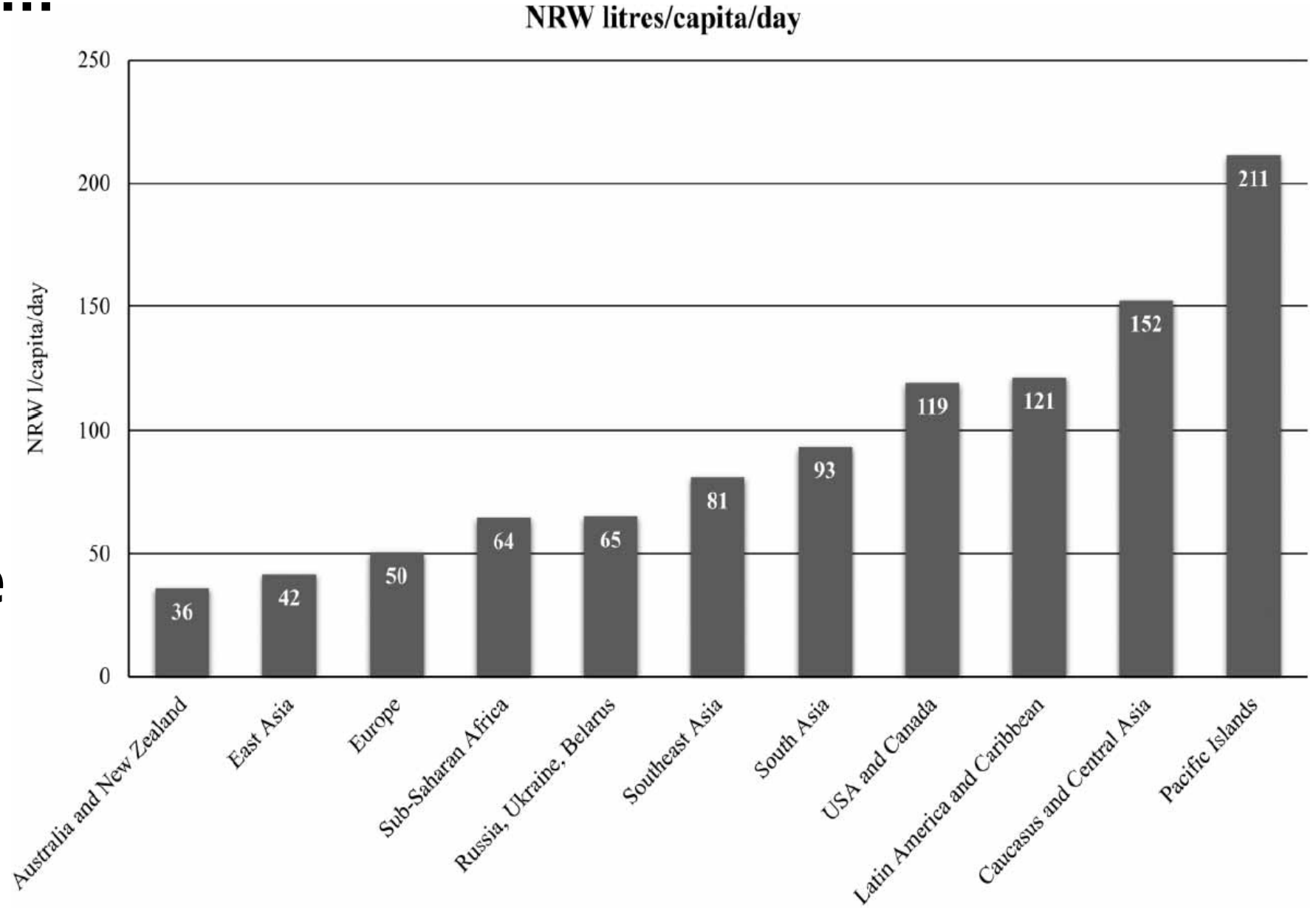


Figure 1 | Regional NRW levels.

Liemberger, R. & Wyatt, A. (2018) Quantifying the global non-revenue water problem. *Water Science and Technology: Water Supply 19, ws2018129.*

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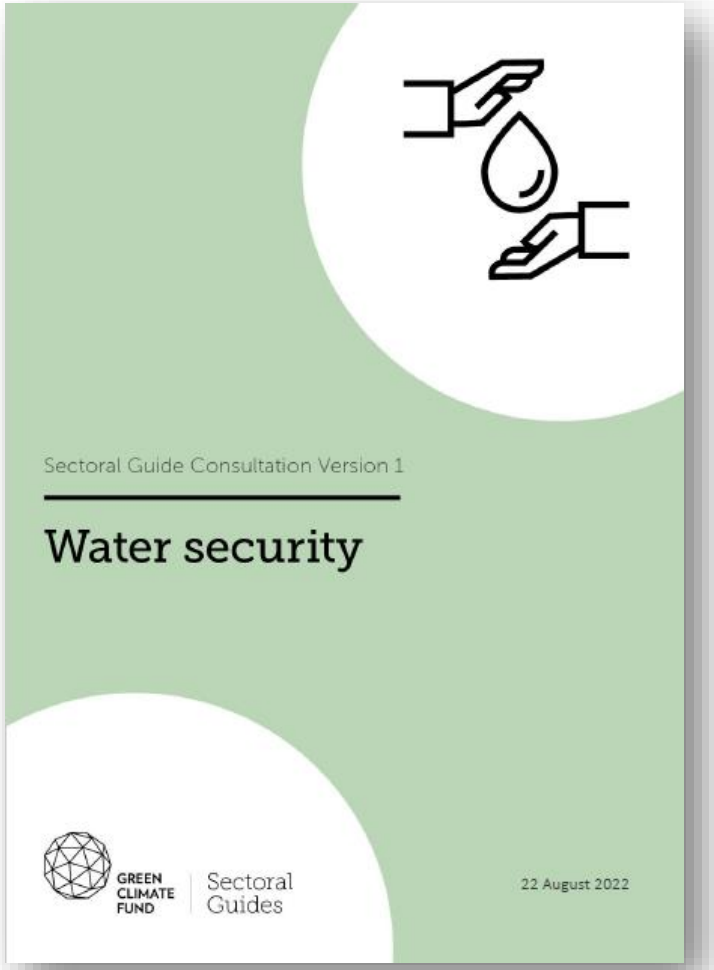
Demand management…



"…making better use of existing water supplies before attempting to increase water production further…"

"…can be applied anywhere with strong gains in urban and rural areas, buildings, agriculture, and industry through water conservation…"

…paradigm-shifting pathways

https://www.greenclimate.fund/document/sectoral-guide-water-security

V.6

Funding priorities (GCF guide on Water Security)

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Paradigm-shifting Pathways for
Water Security and Climate Resilience

- Water conservation, efficiency and reuse
- Hydrological observation, forecasting & risk assessment
- Integrated water management & SDG 6
- Ecosystems Based Adaptation
- Climate resilient WASH
- Community Knowledge

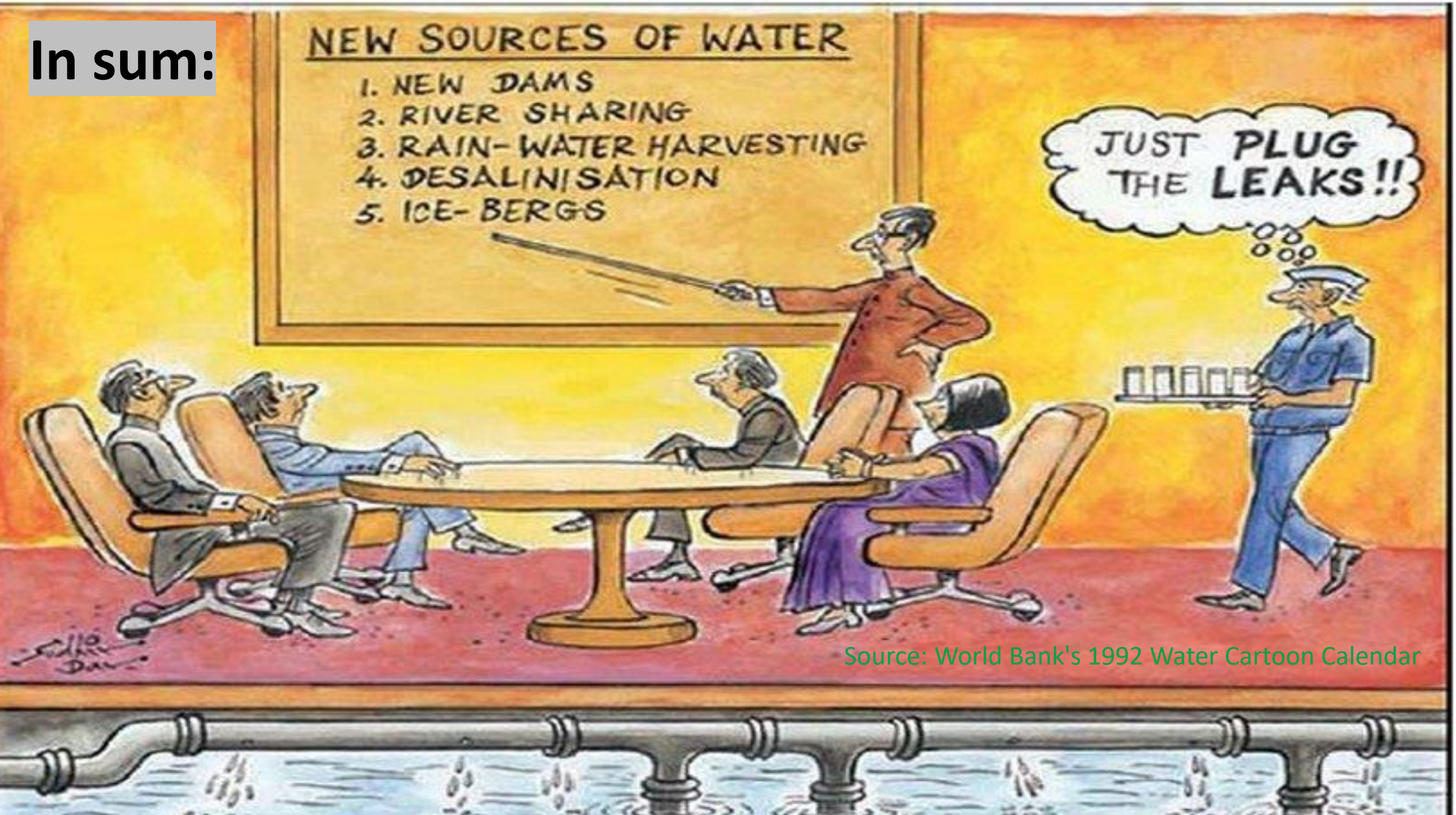
PRACTICAL GUIDELINES FOR DESIGNING CLIMATE-RESILIENT SANITATION PROJECTS

Call for Public Inputs: Annex III | Water Security Sectoral Guide
https://www.greenclimate.fund/document/call-public-inputs-annex-iii-water-security-sectoral-guide - until 30 October!

bfakhruddin@gcfund.org

https://www.greenclimate.fund/document/sectoral-guide-water-security

In sum:



Source: World Bank's 1992 Water Cartoon Calendar

Thank you!

Marianne Kjellén mkjellen@gcfund.org
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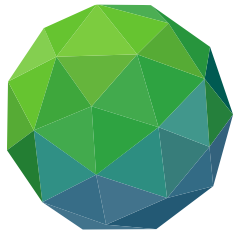

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Additional slides on

iTAP Role and Process

WHO WE ARE..

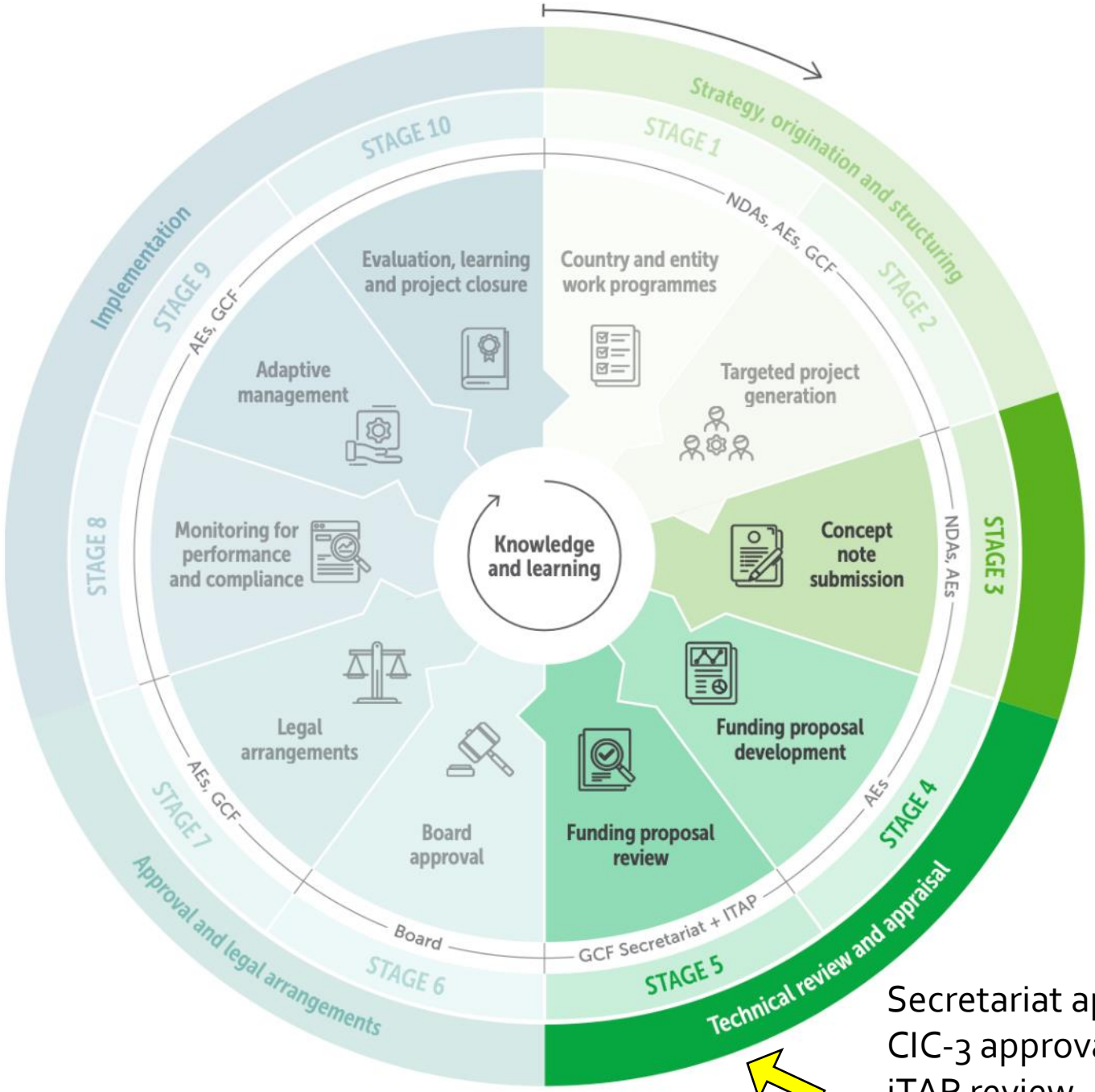
- The independent Technical Advisory Panel (iTAP) is a ten-person panel of independent experts who work approximately 50% of their time advising the GCF
- Based on the GCF Board's decision in 2014 (B.07/03) our role is "*to provide an independent technical assessment of and advice on funding proposals for the Board*"*
- Each iTAP member is selected by the Investment Committee through a competitive process for endorsement by the Board, for a period of three years.
- The Panel has balanced representation between developing and developed countries, with gender balance, and with collective expertise covering a range of specialties related to adaptation, mitigation, the private sector, financing, and development and implementation of projects in developing countries.
- The Panel is accountable to the Board through its Investment Committee

*Terms of reference approved in Decision B.09/10 and revised by Decision B.25/09

WHAT WE DO 1…

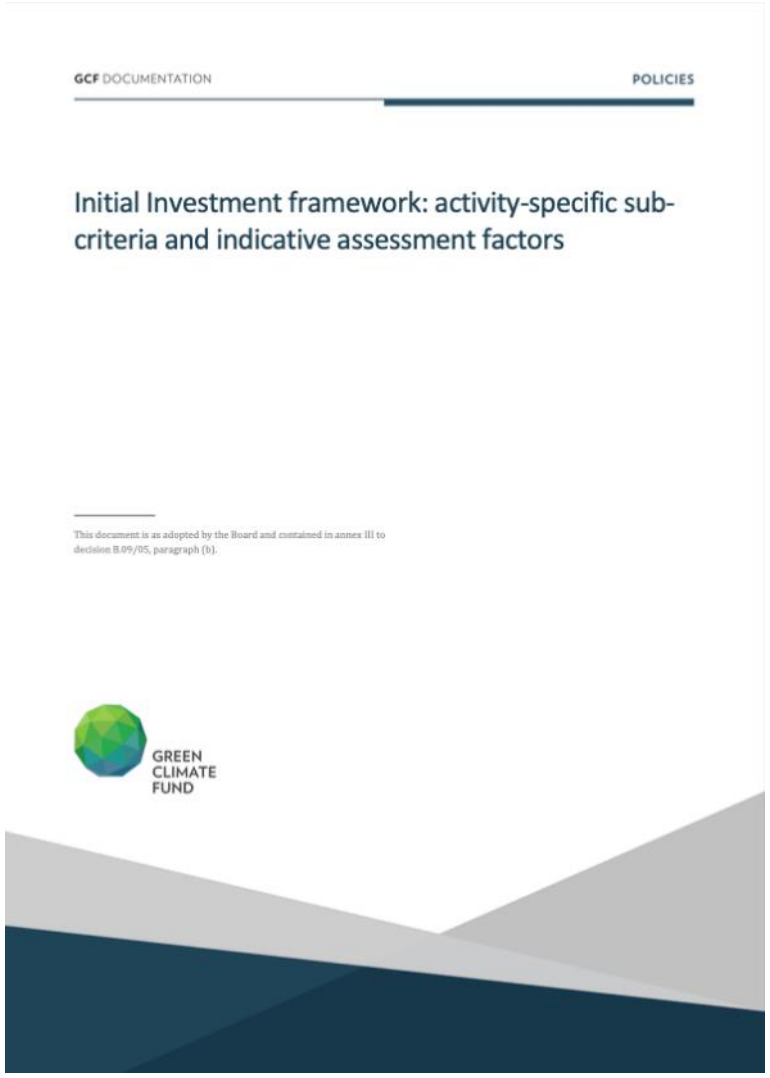
- An Accredited Entity (AE) submits a full and final Funding Proposal (FP) package with all annexes to the Secretariat.
- Only once the Secretariat has assessed that the FP is ready, does it submit the package to iTAP for our review
- A 2-4 iTAP review team assesses the FP against the CGF's Six Investment Criteria and provides a written assessment report of 6-12 pages
- During the review process, the review team poses written and verbal questions to the AE to get further clarity where needed
- iTAP's assessments for PAP proposals are written by the lead reviewer, with input from a second reviewer and one/two peer reviewers, while SAP assessments are written by the lead reviewer, with input from a second reviewer. All FPs undergo a brief discussion by the whole Panel

Where ITAP's review fits into the GCF cycle



Secretariat appraisal and CIC-3 approval, followed by iTAP review

iTAP ASSESSES AGAINST GCF's "ACTIVITY-SPECIFIC CRITERIA"



Decision B.09/05 Annex III

GCF's six Investment Criteria

and 24 Sub-Criteria

CRITERION	DEFINITION	SUB-CRITERIA
Impact potential	Potential of the project/ programme to contribute to the achievement of the Fund's objectives and result areas	• Mitigation impact • Adaptation impact
Paradigm shift potential	Degree to which the proposed activity can catalyse impact beyond a one-off project or programme investment	• Potential for scaling-up, replication and overall contribution to global low-carbon development pathways consistent with a temperature increase of less than 2 °C • Potential for knowledge and learning • Contribution to the creation of an enabling environment • Contribution to the regulatory framework and policies • Overall contribution to climate-resilient development pathways consistent with a country's climate change adaptation strategies and plans
Sustainable development potential	Wider benefits and priorities	• Environmental co-benefits • Social co-benefits • Economic co-benefits • Gender-transformative development impact
Needs of the recipient	Vulnerability and financing needs of the beneficiary country and population	• Vulnerability of the country • Vulnerable groups and gender aspects • Level of economic and social development of the country and the affected population • Absence of alternative sources of financing • Need for strengthening institutions and implementation capacity
Country ownership	Beneficiary country ownership of and capacity to implement a funded project/programme (policies, climate strategies and institutions)	• Existence of a national climate strategy • Coherence with existing policies • Capacity of implementing entities, intermediaries or executing entities to deliver • Engagement with civil society organizations and other relevant stakeholders
Efficiency and effectiveness	Economic and, if appropriate, financial soundness of the programme/project	• Cost-effectiveness and efficiency regarding financial and non-financial aspects • Amount of co-financing • Programme/project financial viability and other financial indicators • Industry best practices

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WHAT WE DO 2…

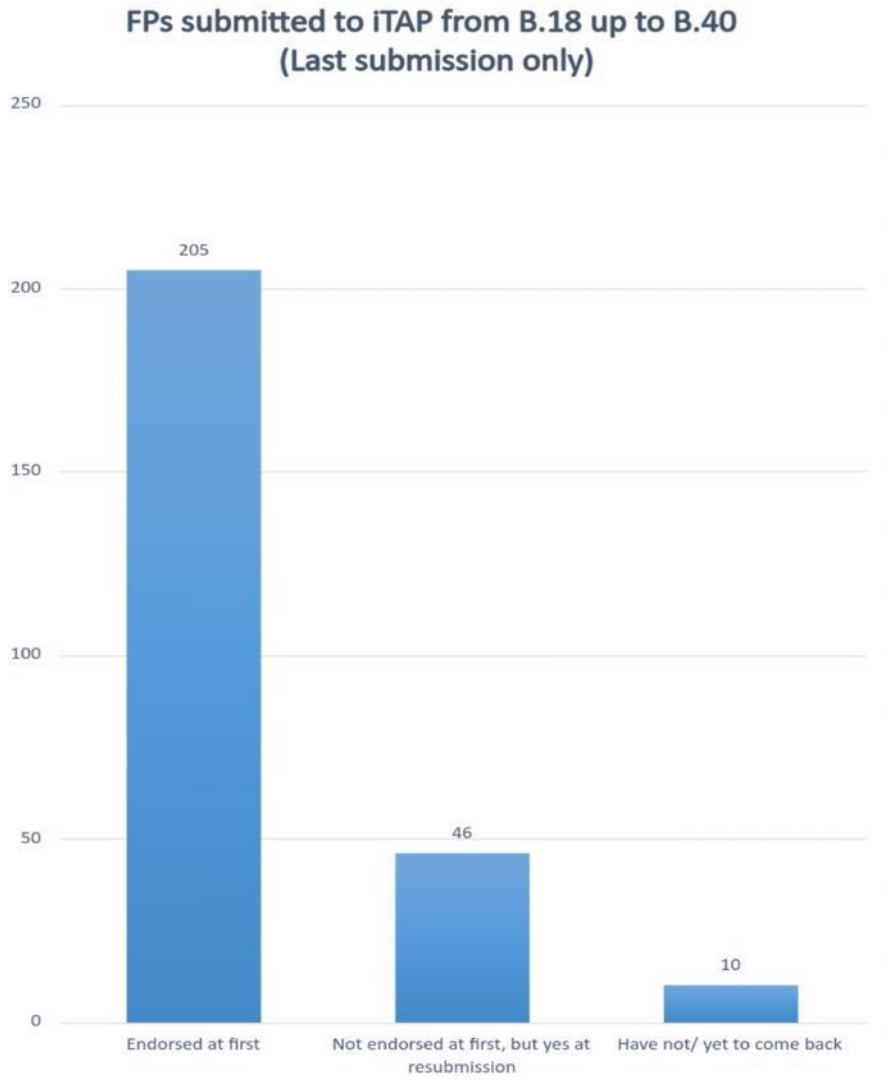
- Each iTAP assessment report concludes with: 1) "iTAP recommends that the Board approve the FP"; 2) "iTAP recommends that the Board approve the FP with the following condition/s"; or 3) "iTAP does not recommend that the Board approve the FP"
- Following a technical session where Board Members and Advisors also get to pose written and verbal questions to AEs, the Board meeting considers all the FPs that were recommended for approval (or "endorsed")
- The Board makes the final decision whether to approve a Funding Proposal, and whether to impose any conditions (its own and/or those suggested by iTAP)
- For non-endorsed projects, iTAP's assessment reports are shared with the relevant AEs and National Designated Authorities (NDAs)
- iTAP assessments for non-endorsed projects are also shared confidentially with Board Members and their Advisors (through a Limited Distribution Document)

WHAT WE DO 3…

- AEs whose projects are not endorsed may request a meeting with the iTAP review team to get further clarity on areas where the assessment indicated there was not a good fit with one or more of the GCF's Investment Criteria

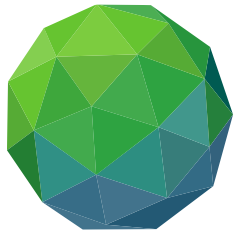
- The AE and NDA usually decide to resubmit a project not endorsed the first time, having strengthened its fit with the Investment Criteria, at a subsequent Board meeting

- From B.18 to B.40, of all 261 FPs (last submission only) submitted to iTAP:
  - 205 were endorsed first time **(79%)**
  - 46 were endorsed at resubmission **(17%)**
  - 10 have not / not yet come back **(4%)**



EVOLUTION OF ITAP'S ROLE

- From B.11 to B.17 iTAP provided assessments of ALL FPs, reflecting on their fit with the six GCF Investment Criteria, and presented the assessments (positive or negative) to the Board for discussion and decision
- This led to lengthy and difficult discussions on FPs in the Board meetings
- Through Decision B.17/09, the Board asked the Secretariat NOT to bring proposals to the Board until they were deemed ready by BOTH the Secretariat and iTAP
- This led to the current model where iTAP is conducting a late-stage assessment, sometimes perceived as "quality control"
- This role was not of iTAP's choosing, but was given to iTAP by the Board.
- Terms of reference are being presented by the Investment Committee to the Board at B.40 for a review of iTAP, whose role could change in future.



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