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Water Management and pollution Water pollution: a political, scientific and technical introduction

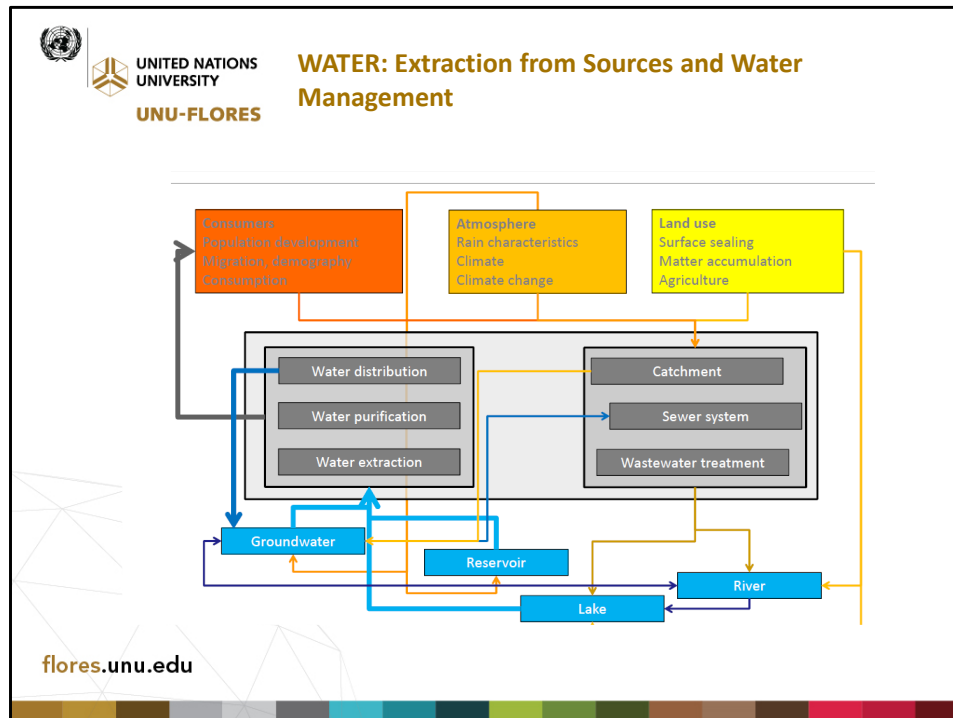


Dr Serena Caucci

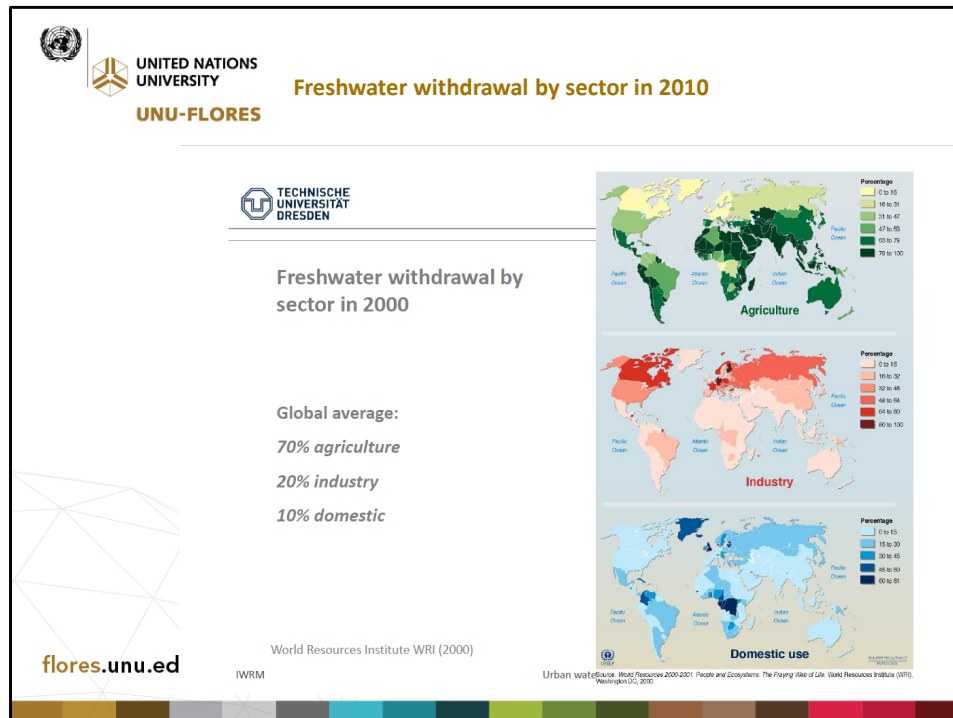
Associate Programme Officer

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Resources

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Water management relies on various ecosystems. It moves from human managed systems to natural retention.



Due to population increase, lot of water has been withdrawn.



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Water consumption is driven by people

- Population growth
- Over-proportional growth of population in cities
- Over-proportional increase because of a climate-induced shift from rain-fed to irrigated agriculture !

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Water consumption is driven by people. This has impact on both water quality and quantity.



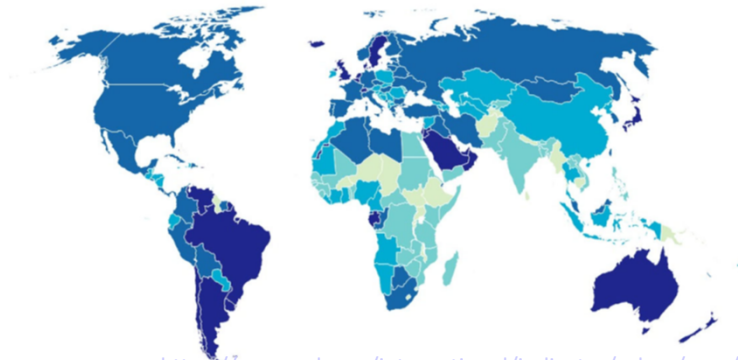
We have areas in the world where the population is increasing enormously which affects water quality and quantity.



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Percent of population living in urban areas (2019)

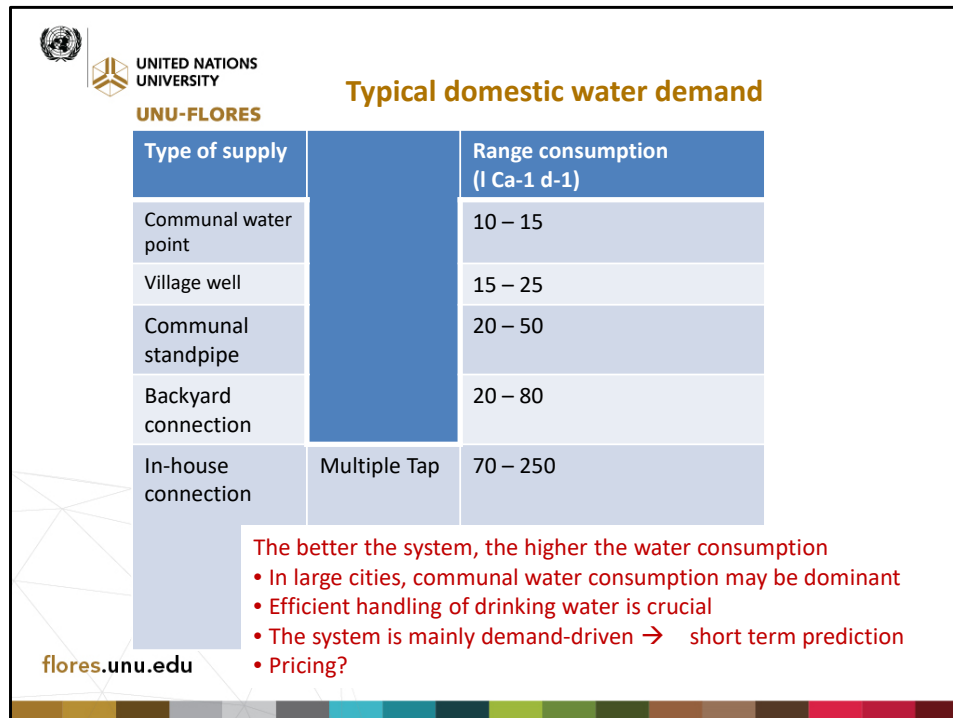
13% - 29% 31% - 47% 48% - 64% 65% - 82% 83% - 100%



<https://www.prb.org/international/indicator/urban/map/country>

56 % of global population lives in urban areas!
(World Population Data Sheet, 2019)

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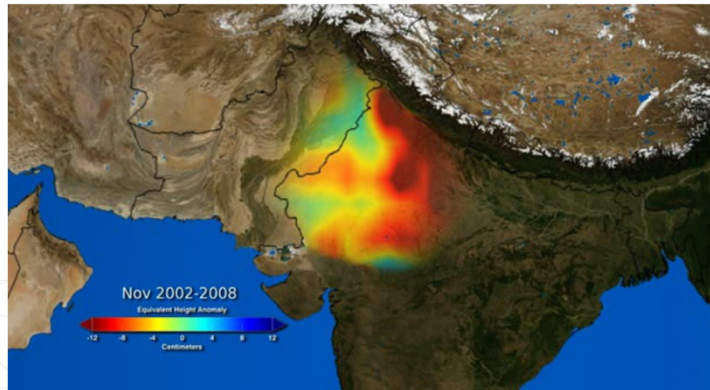
The better we have system to extract and distribute water, the higher is the distribution.



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Groundwater depletion in North-West India



Gradient in centimeters per year (up to 33 cm/a)

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<http://www.jpl.nasa.gov/news/news.cfm?release=2009-124>

This is the case of India which shows water depletion. The reservoir is depleted.



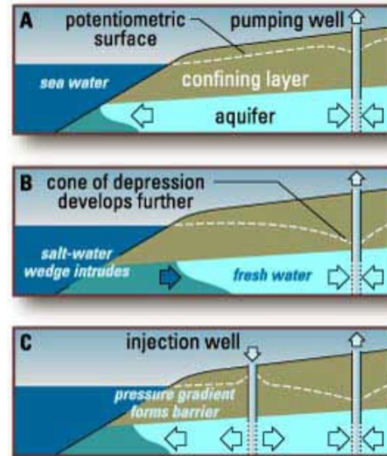
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Salt water intrusion

Extraction from a cold horizon, with
low organics and nutrients
concentration

Degrees of freedom diminish



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<http://kanat.jsc.vsc.edu/student/spatafora/setup.htm>

Inbalance between ground water and salty water.



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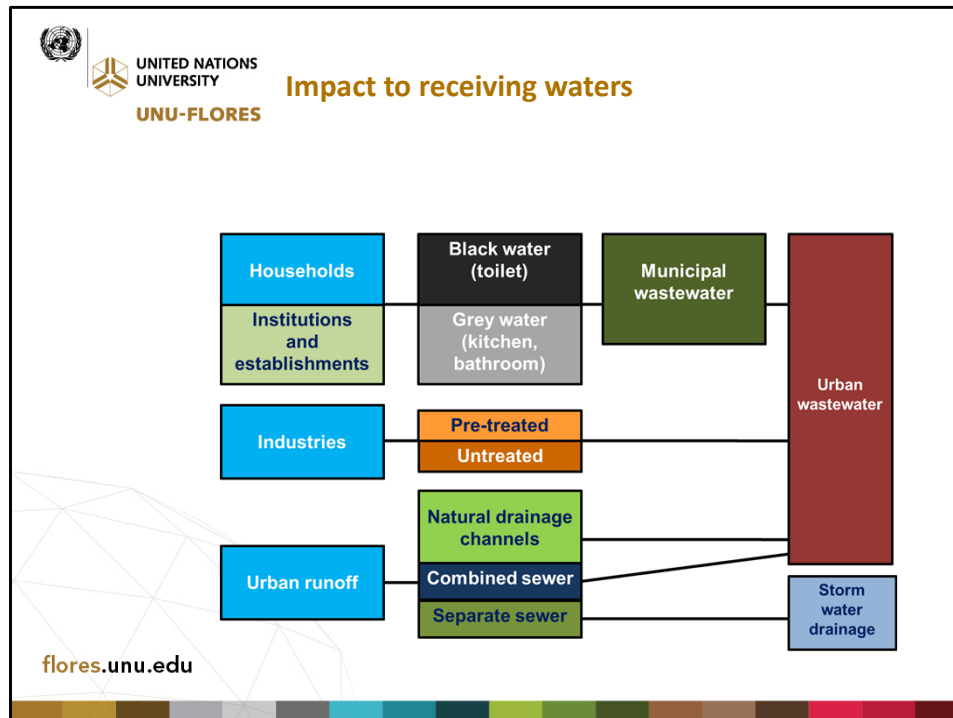
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Urban Flooding

Fluvial flooding	Pluvial flooding
Large scale rain events	Small scale rain events
Rather high intensity for the duration	Extreme intensity
Large scale flooding by rivers (and ev. groundwaters)	Local flooding by locally surcharging drainage system
River level may cause backwater effects to sewers	Combined water, i.e. diluted sewage may be the flooding fluid ☹️ hygienic risk!

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Water mangement affect also ecosystems.



It is important to distinguish the type of water we are dealing with.



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Grey water

- ▣ Grey water is all of the wastewater that drains out of washing machine, sinks and bathtub or shower; everything coming out of households except the toilet water.
- ▣ Separating grey water from black water and tapping its reuse potential could be an ideal strategy for urban wastewater management
- ▣ Grey water availability
- ▣ Land area suitable for irrigation garden plants
- ▣ Identification of right kind of plants etc.
- ▣ Regulations: municipal bye-laws

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The quality of grey and black water can be treated together.



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Agriculture wastewater

- ▣ **Non-point Source Pollution:** Sediment, Pesticide, Nutrient run-off
- ▣ **Point Source Pollution:** Animal waste, piggery waste, silage liquor, daily farming waste, slaughtering waste, vegetable washing

AND

- ▣ Including biological waste from hospitals

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Different types of agriculture wastewater. The management might be also different.



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Why bother about wastewater?

- ❑ Wastewater (raw, diluted or treated) is a resource of increasing global importance, particularly in urban and peri-urban areas due to **growing wastewater volumes**
- ❑ Without proper management, wastewater use poses **serious risks to human health and the environment**
- ❑ With proper management, wastewater use can contribute significantly to **sustaining livelihoods**, food security and the quality of the environment
- ❑ Wastewater already **irrigates approximately 49 million acres** of cropland, and
- ❑ **10 percent of the world's population would starve** if they didn't have access to food grown that way

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Waste water is a large volume of water that reaches the environment and presents risks.

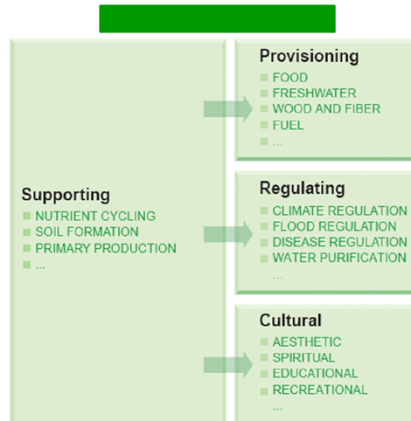


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Water Management and ecosystem services

Unregulated discharge of wastewater undermines biological diversity, natural resilience and the capacity of the planet to provide fundamental ecosystem services, impacting both rural and urban populations and affecting sectors from health, industry, agriculture, fisheries and tourism



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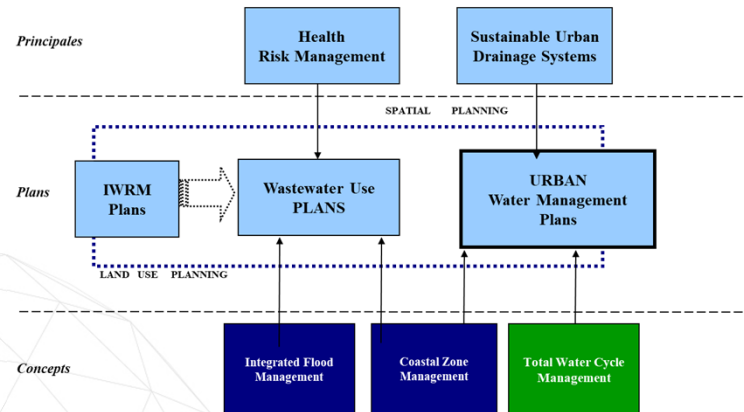
Pollution is not going directly through water but also through the land (soil) and accumulates through the course of time. Water management is essential for many systems including cultural.



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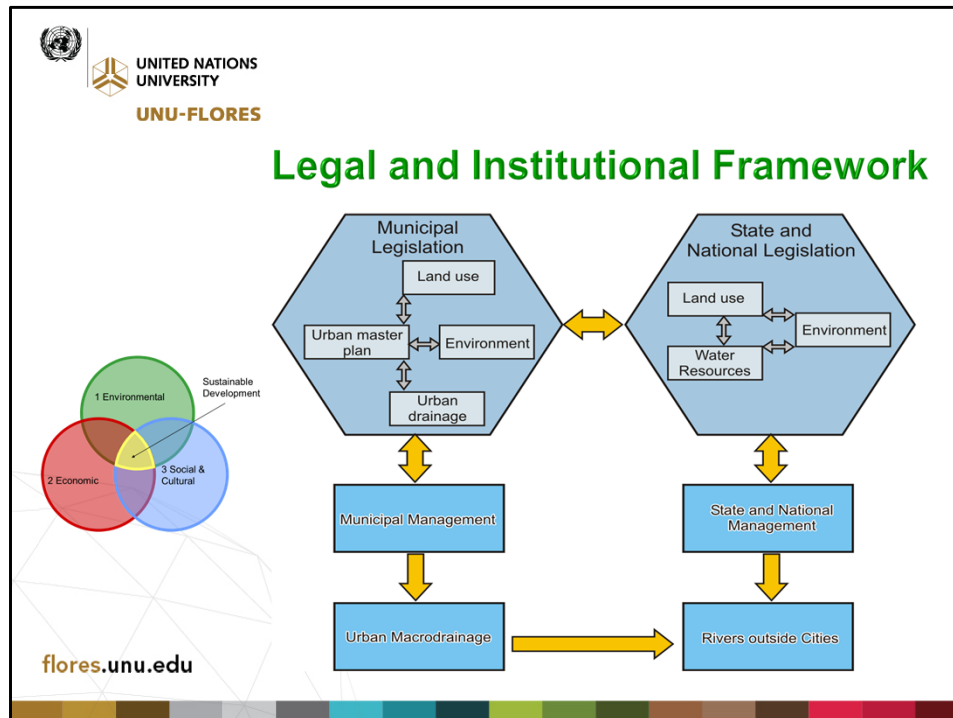
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Need for integration of policies



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The need for policies encompasses all areas of sustainability. The policies need to be integrated into flexible networks.



You might see how the legal and institutional framework play important role.



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Thank You

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