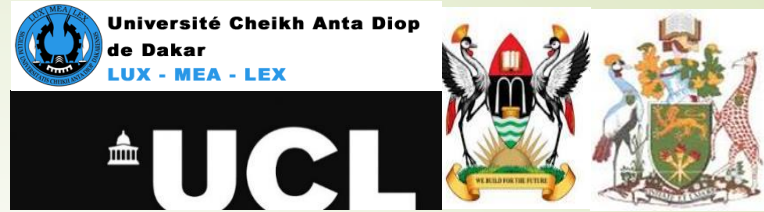


***AfriWatSan: Sustaining Low-cost, Urban
Water Supply and Sanitation Systems in Africa***
www.afriwatsan.org



Groundwater supply and sanitation challenges in developing countries: Case studies from Kenya

Presenter – Dr. Simeon Otieno Dulo

**Co Authors - Prof. Daniel Olago, Dr. Richard Ayah, Mr. Japheth Kanoti, Mr.
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University of Nairobi, Kenya

IAH 2018, Daejeon, Korea - 11th September 2018

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Presentation outline



Enabling legislation



Water supply and
sanitation services



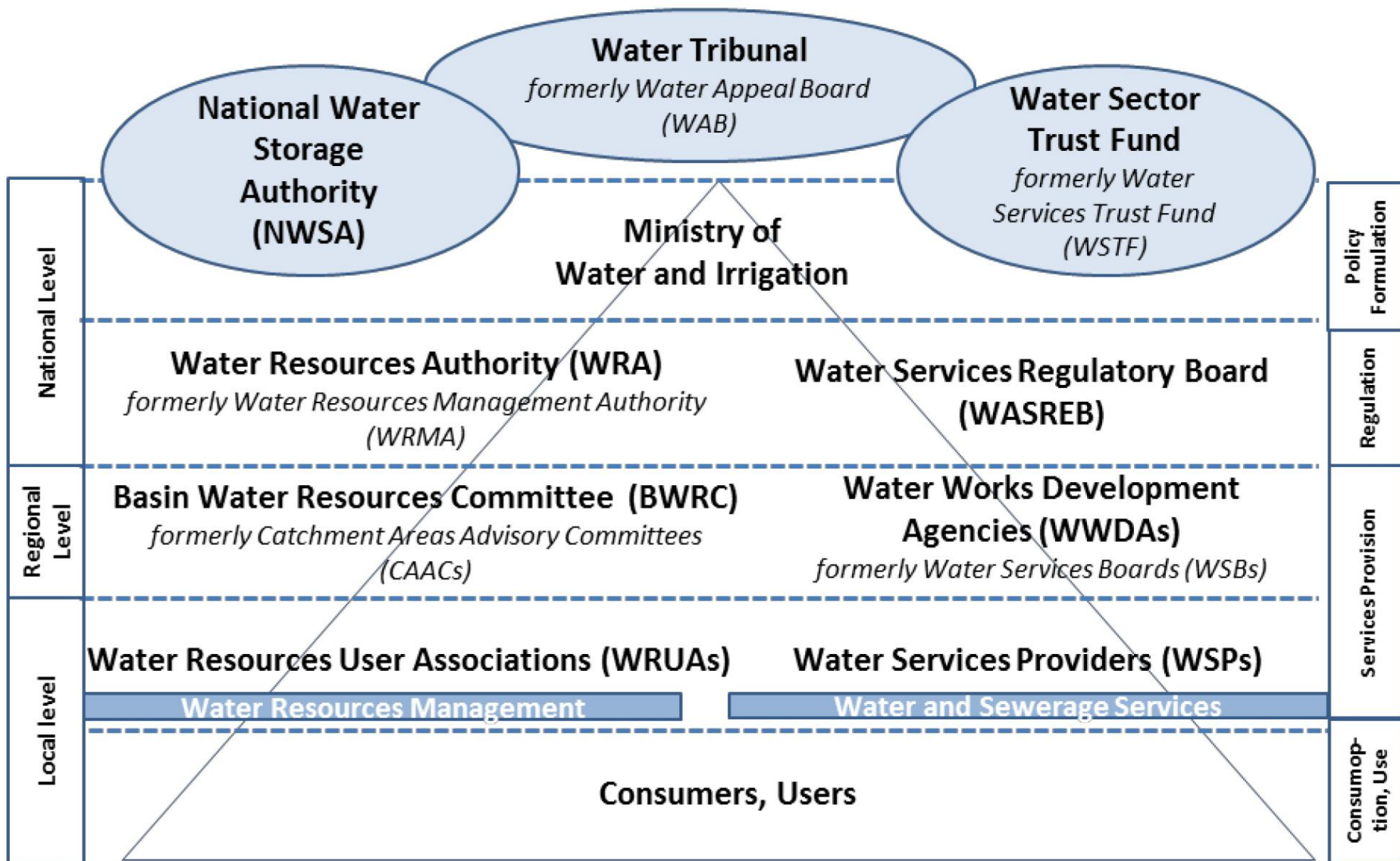
Challenges for water
supply and sanitation



Conclusion



ENABLING LEGISLATION

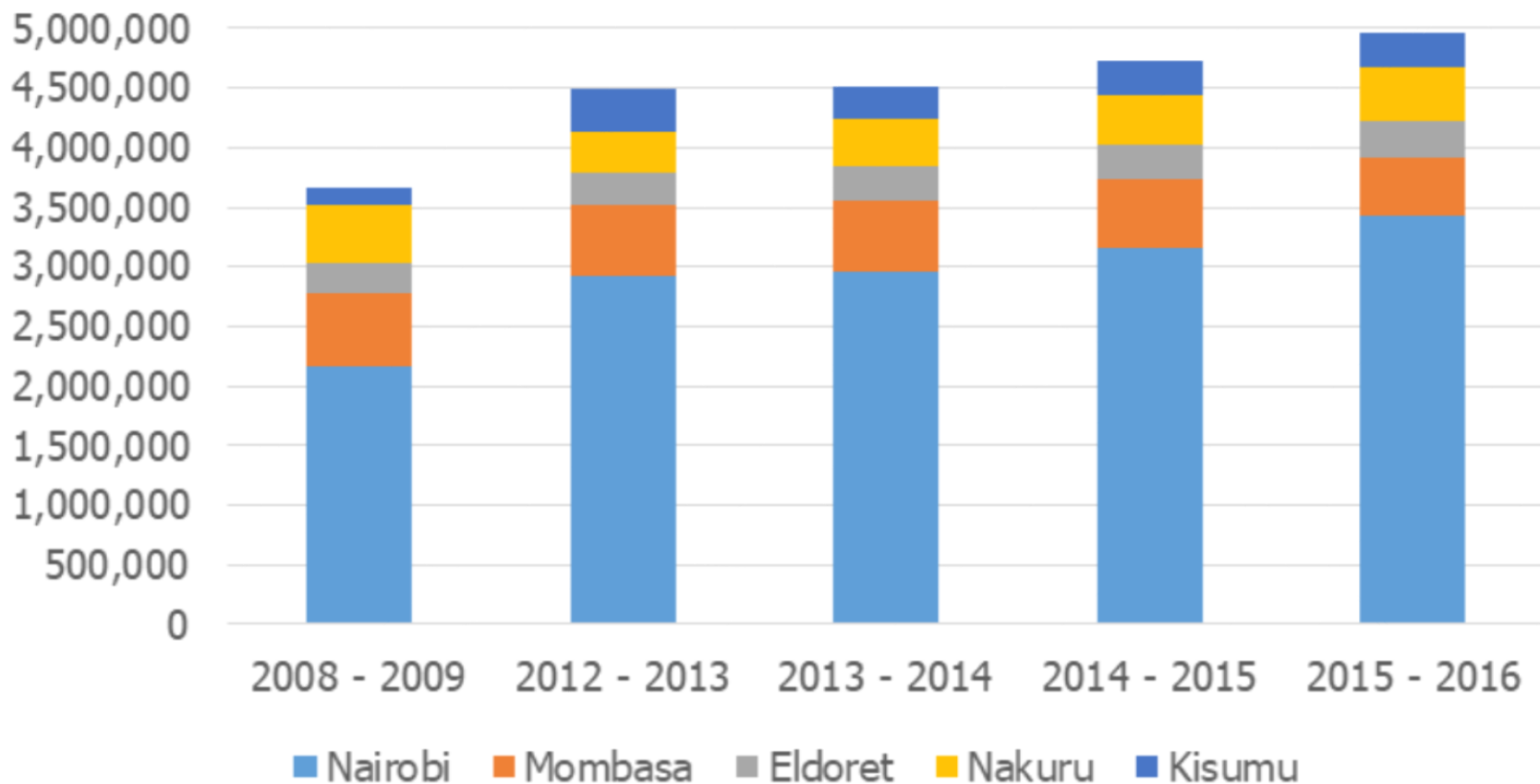


Water Act 2016 - Align the water sector to the devolved structure of government in the Constitution of Kenya of 2010.

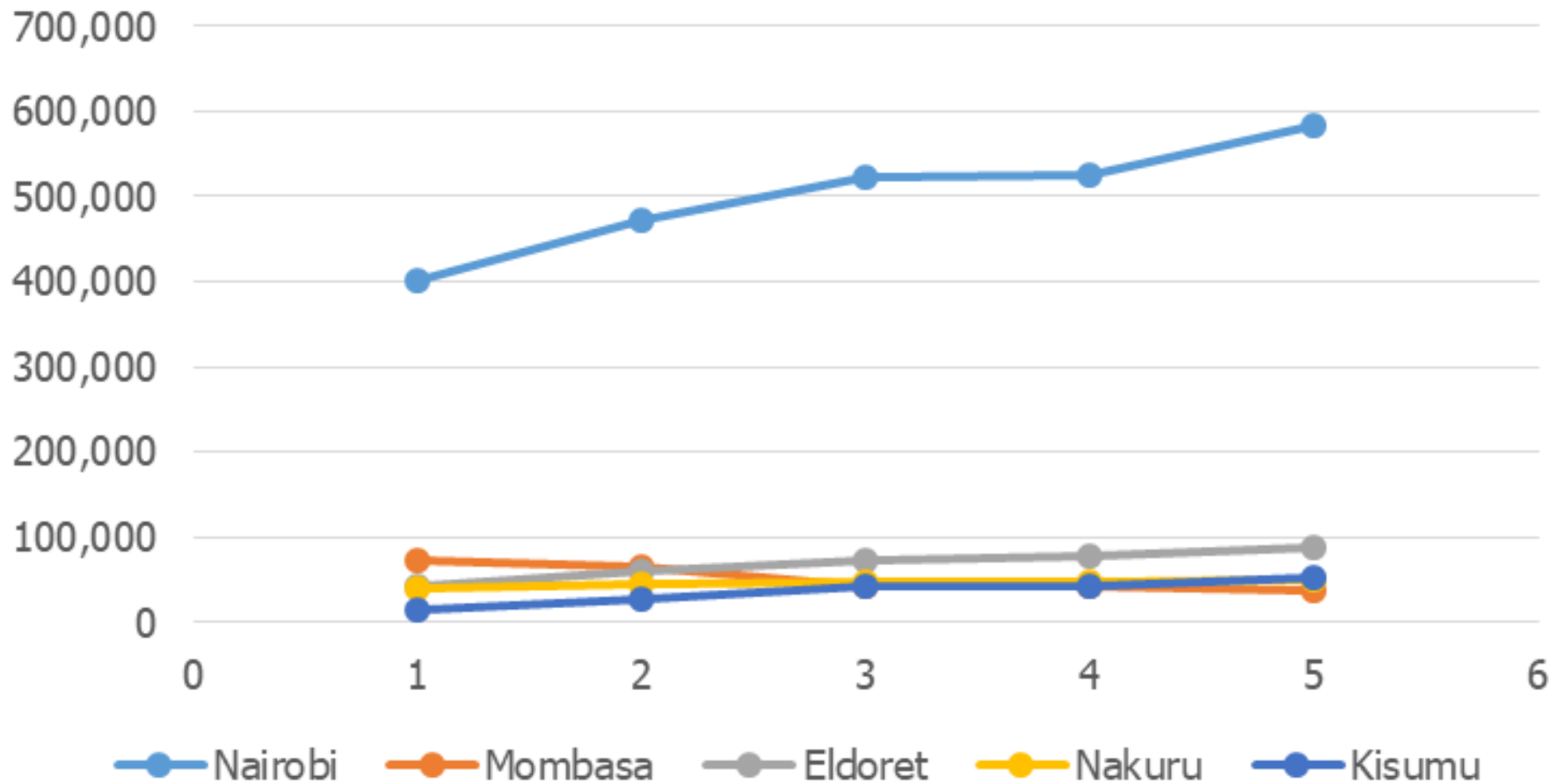


WATER SUPPLY AND SANITATION SERVICES

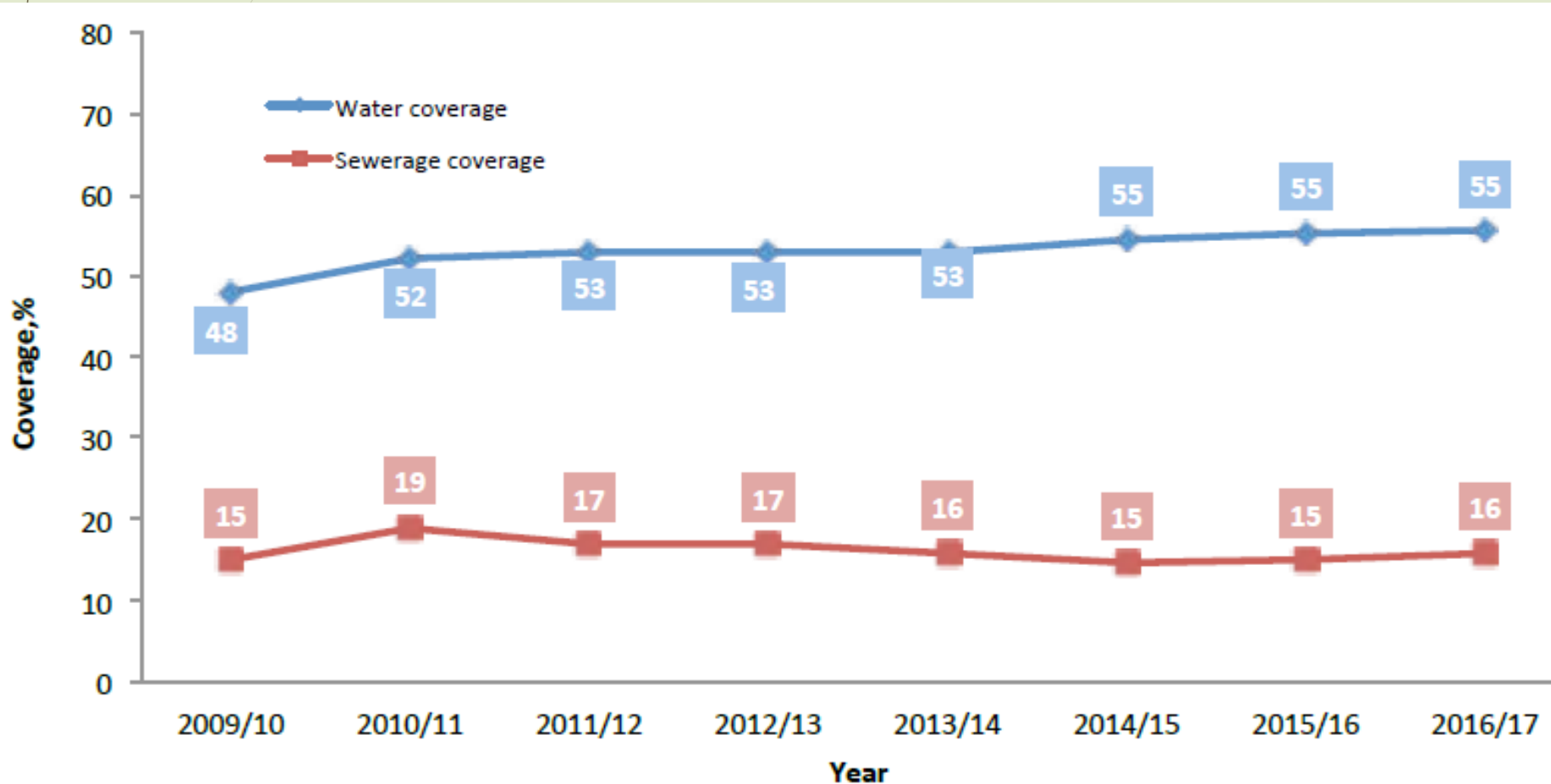
Population Served



Number of Connections



Trends in Water and Sanitation Coverage by the WSPs

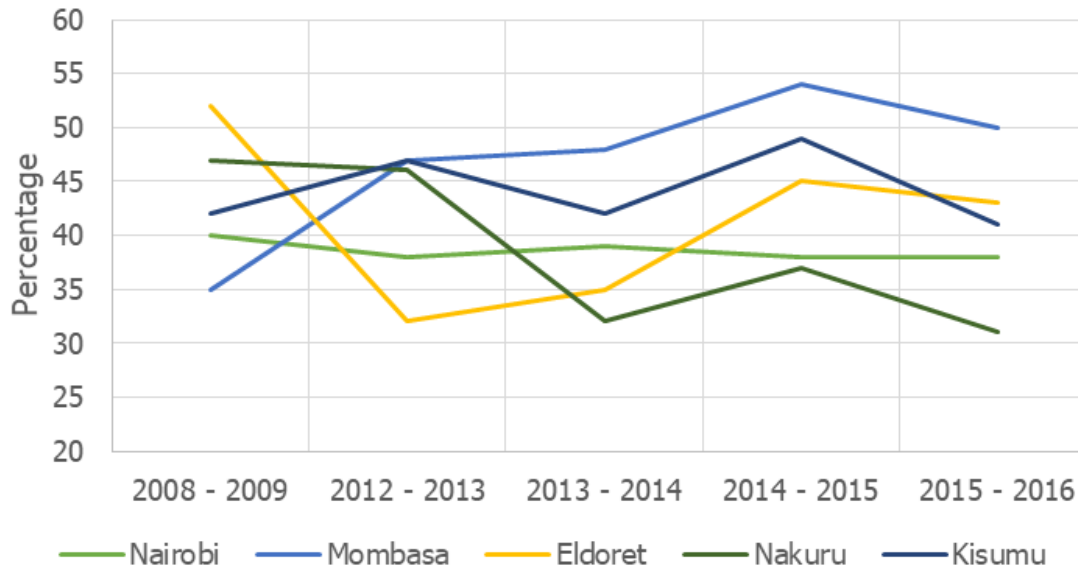


Source: WASREB Impact report No. 10

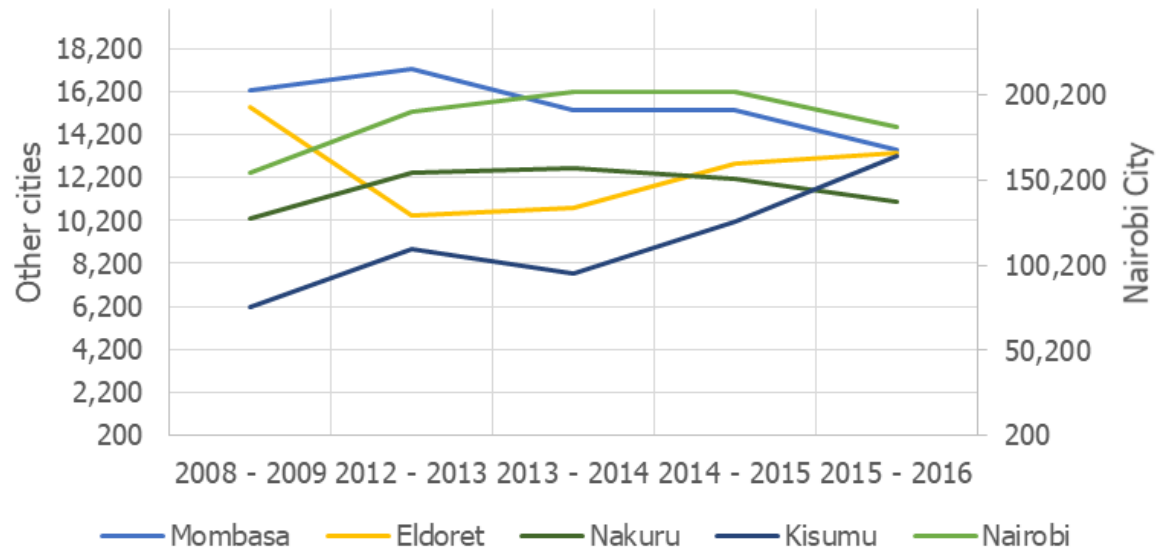
Overall Performance of the Water Sector

Key Performance Indicators	2014/15	2015/16	2016/17	Trend
Water Coverage, %	55	55	55	Constant
Drinking Water Quality, %	92	94	94	Constant
Hours of Supply, hrs/day	18	17	14	Down
Non-Revenue Water, %	43	43	42	Up
Metering Ratio, %	90	91	93	Up
Staff Productivity, Staff per 1000 Connections	7	7	7	Constant
Personnel Expenditure as % of O & M Costs, %	42	45	46	Down
Revenue Collection Efficiency, %	96	96	100	Up
O & M Cost Coverage, %	99	100	102	Up
Sewerage, %	15	15	16	Up

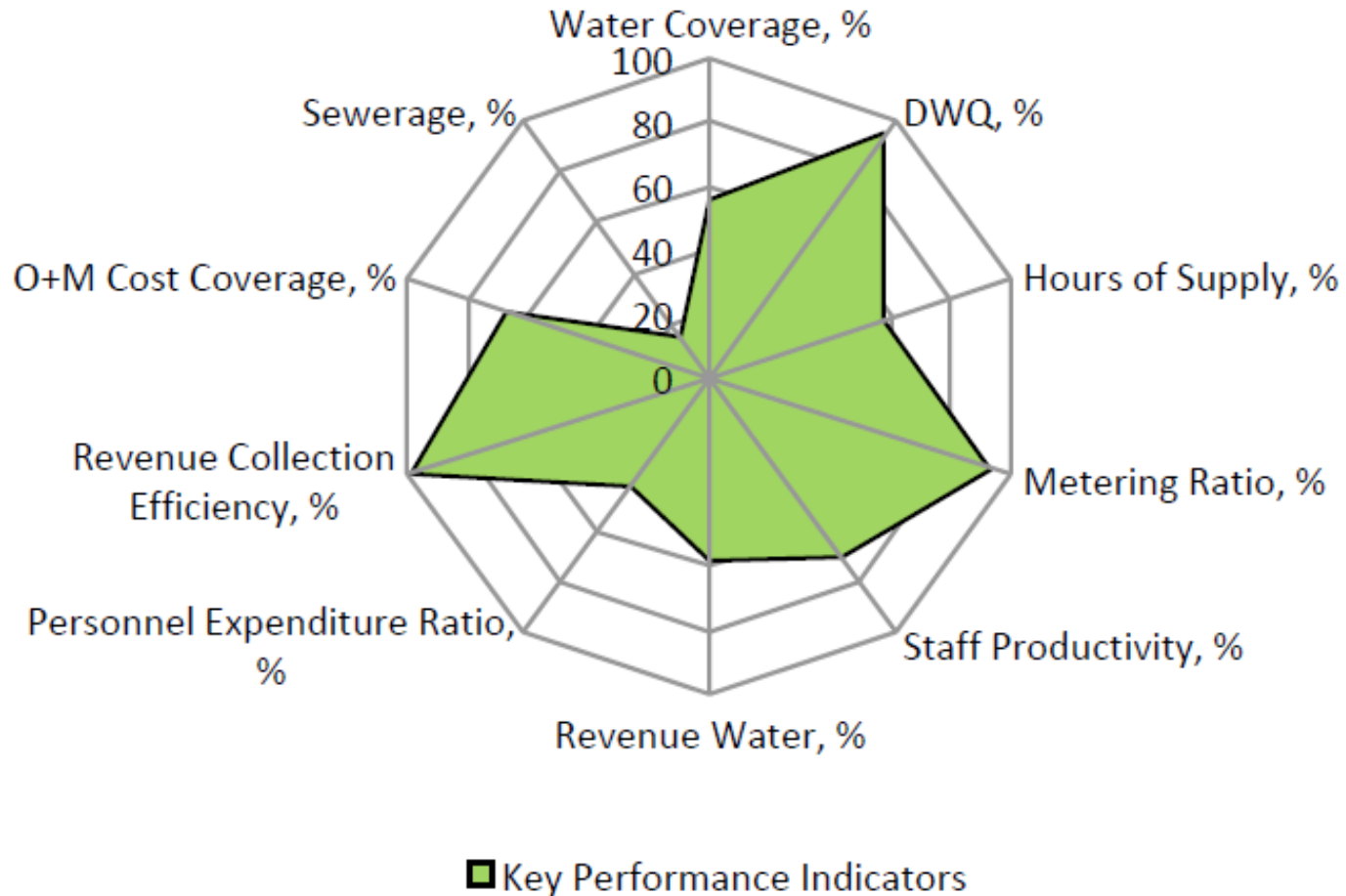
Non Revenue Water



Water Production in 000 CUM



Overall Performance of the Water Sector 2016/17





CHALLENGES FOR WATER SUPPLY AND SANITATION





Health impacts of water supply and sanitation

In October/November 1997 cholera outbreak northwest Kisumu

From 2000 to 2006, cases were reported each year ranging from 1157 to 816 except for 2002, with 291 cases.

Also considered in this study is the **conjunctive use of surface and groundwater** and how it relates to sanitation technology and health.

Water supply and sanitation **in unplanned** urban settlements in developing countries requires innovative thinking as it **impacts on** livelihood sectors such as the food and energy.

Water Supply Coverage

(Only 15 % GW and 43 % risk)

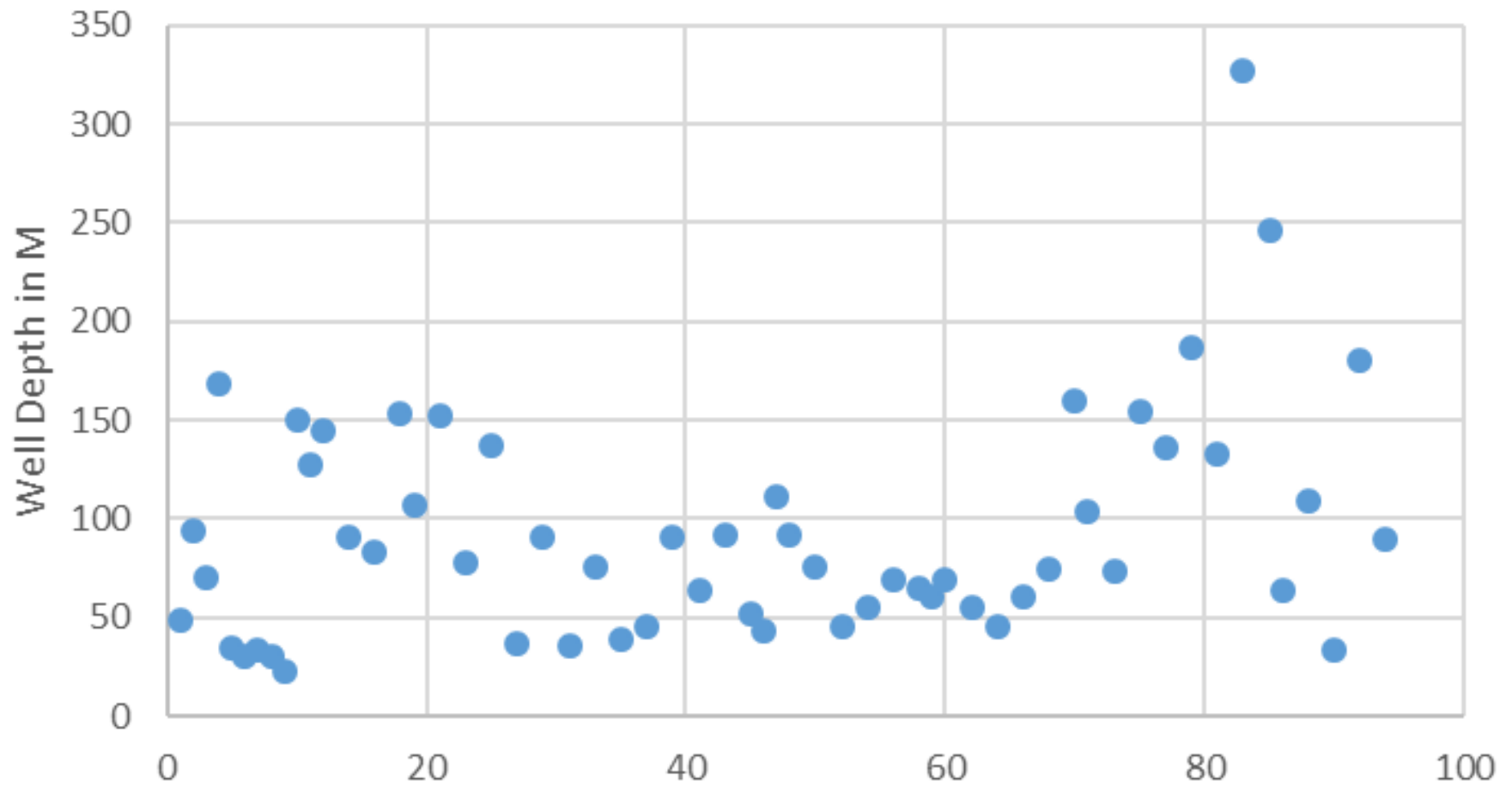
Improved Water Source	% Population	Unimproved Water Source	% Population
Individual connections	21	Lake or dam	4
Yard tap	28	Water vendors	26
Piped Neighbor's	3		
Protected shallow well and springs	8	Unprotected shallow well and springs	7
Roof catchment	5		
Total	65		35

Sanitation Coverage – (84 % GW risk)

Improved Sanitation Source	% Population	Unimproved Sanitation Source	% Population
Flush toilets (sewer)	16	Neighbor's toilet	4
Flush toilet (Septic tanks)	14	Public toilet	1
VIPs	7	None	1
Pit latrines	54	Unknown	3
Total	91		9

Source: LVSWSB

Variation in Well Depths in Kisumu Suburbs





Shallow wells

**Extreme
danger to all**



Shallow wells

Typical Spring Head Conditions





Typical Spring Head Conditions



IMPROVED INFRASTRUCTURE



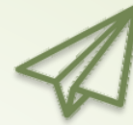
Conclusion

Policies and strategies

- ▶ Focusing on providing water and sanitation services in peri-urban areas and informal settlements.
- ▶ The Delegated Management Model is a good example of how to improve the water supply
- ▶ Rehabilitating water and sanitation infrastructure and
- ▶ Establishing a good monitoring system to quickly identify infrastructure needing repair.
- ▶ Improving revenue collection by reducing the number of illegal connections, enforcing penalties and updating the computer database.



Technology strategies



Setting up waste digesters, especially in slum areas. This will reduce the cost of waste collection, provide biogas for cooking and create jobs.



Developing solid waste collection, particularly in peri-urban areas, and promoting recycling.



Technology and strategies



To improve water and sanitation services:

- Advocating for the construction of Urine Diversion Dehydration Toilets (UDDTs) and latrines connected to septic tanks in informal settlements,
- Discouraging the construction of pit latrines that do not conform to city planning codes.
- Promoting the development of boreholes and other community water projects in the peri-urban areas, where it is expensive to promote piped water from the utility company.



THANK YOU