Water allocation and planning by using WEAP model in Rwanda

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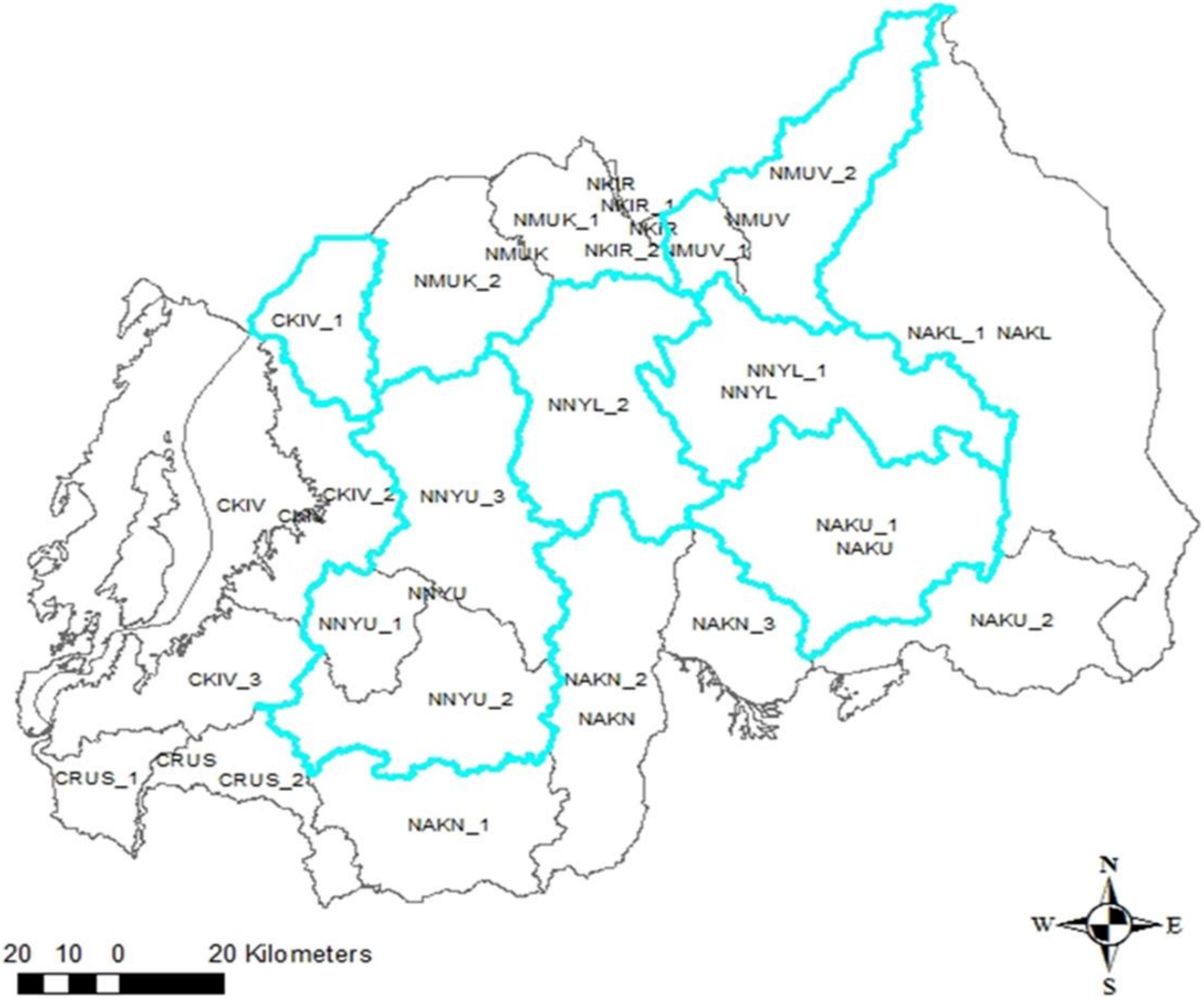
Integrated Water Resources Management

WEAP

- Water Evaluation And Planning System

- WEAP is a software tool for integrated water resources planning
- It is a tools for decision making
- It provides a comprehensive, flexible and user-friendly framework for policy analysis.

Catchments with Water Allocation Models



Baseline, Projections and Alternatives

- **Baseline.**

- The WEAP model was used to set the Baseline that is used to compare with future Projections and Alternatives. This Baseline can be considered as the current situation and was analyzed by using data and information from a ten years period (2006-2015).

Projections

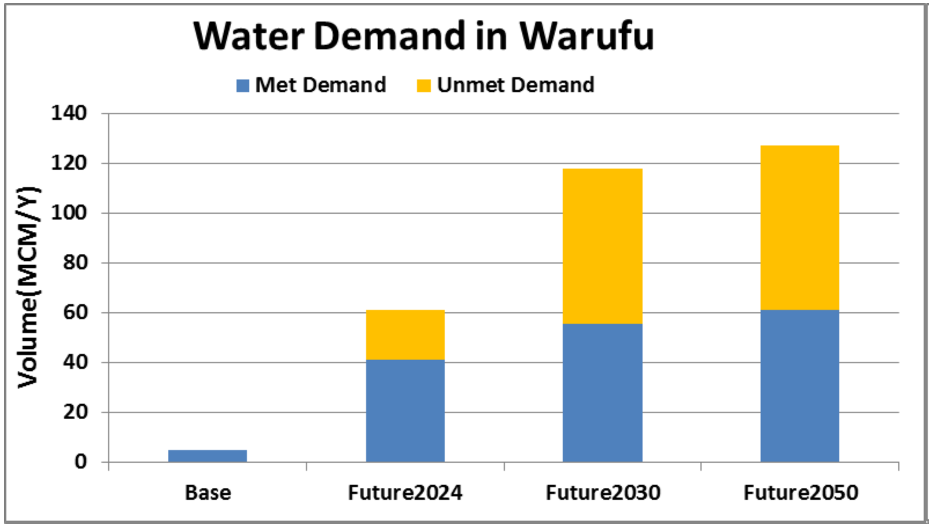
- Projections (sometimes referred to as pathways or storylines) are future scenarios that can be hardly influenced by water planners and decision makers.
- Four different types of Projections were analyzed: climate change, population growth, and macro-economic development.
- For each of these three Projections a total of three time-horizons were considered (2024, 2030 and 2050) as well as a low, medium and high impact projection

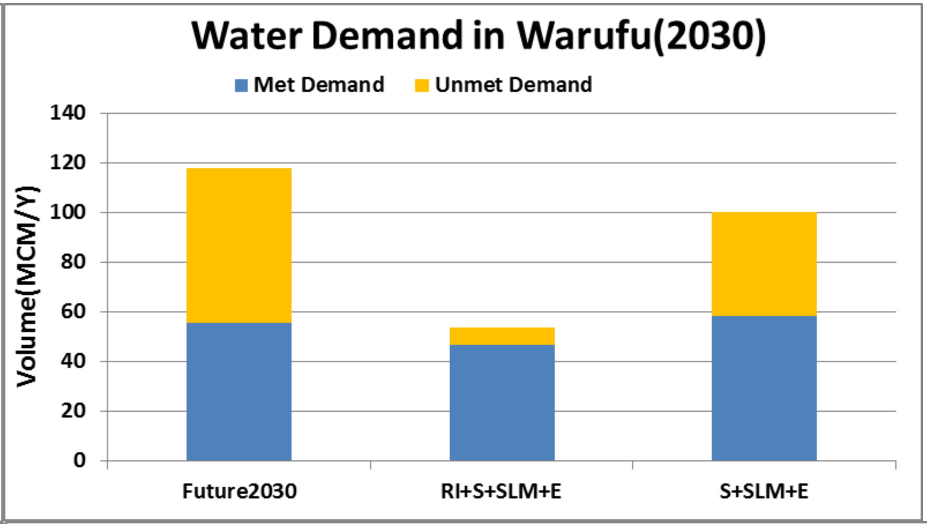
Alternatives

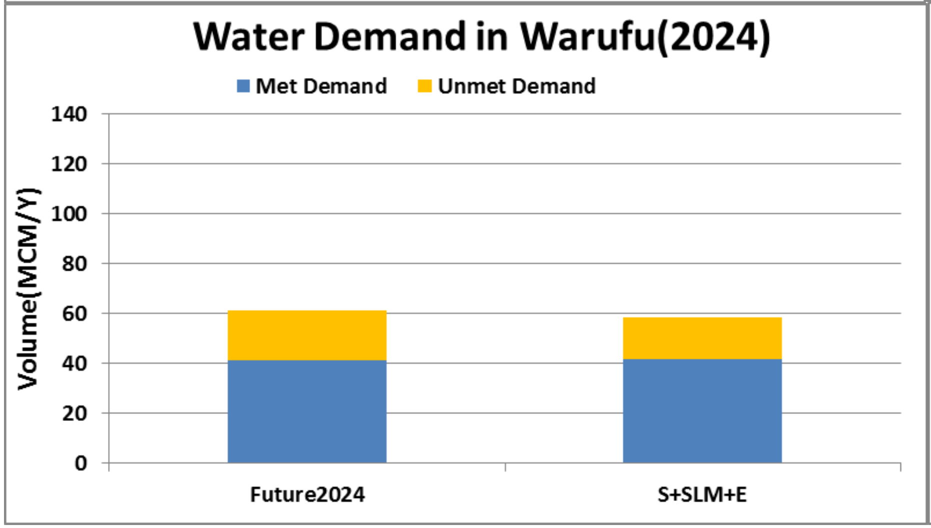
- In contrast to the Projections as described above are the so-called Alternatives. Alternatives (sometimes referred to as interventions, adaptations, or implementation scenarios) are decisions initiated by policymakers and implemented by water managers that will optimize water resources management.
- Examples are constructing reservoirs, training farmers, irrigation planning, erosion control, watershed conservation, amongst many others.
- The Alternatives (interventions) are evaluated for different options for each three time horizons.

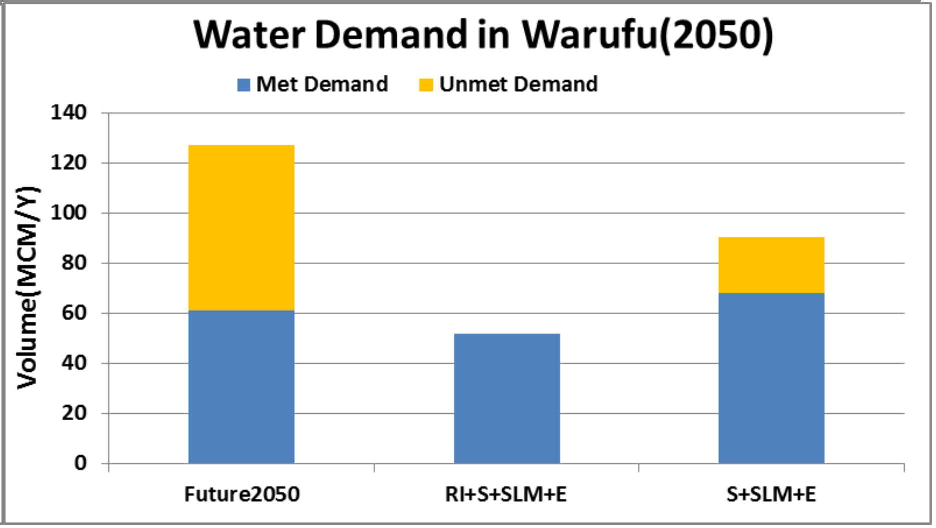
Alternatives	Potential Storage per capita (m3/cap)	Irrigation (IMP implementation) (%)	Irrigation water use efficiency (%)	Domestic water use efficiency (%)	Industry water use efficiency (%)
1. Autonomous development (Future medium)	2024: current 2030: current 2050: current	2024: 50% 2030: 100% 2050: 100%	BAU	BAU	BAU
2. Water storage increase (S)	2024: current 2030: (50%) 2050: (100% of RWRMP)	As (1)	BAU	BAU	BAU
3. Water storage increase + increase in water use efficiency (S+E)	As (2)	As (1)	2024: 5% 2030: 15% 2050: 30%	2024: 10% 2030: 15% 2050: 20%	2024: 5% 2030: 10% 2050: 20%
4. Reduced Irrigation + water storage increase and water use efficiency increase (RI+S+E)	As (3)	5024: 50% 2030: 50% 2050: 50%	As (3)	As (3)	As (3)

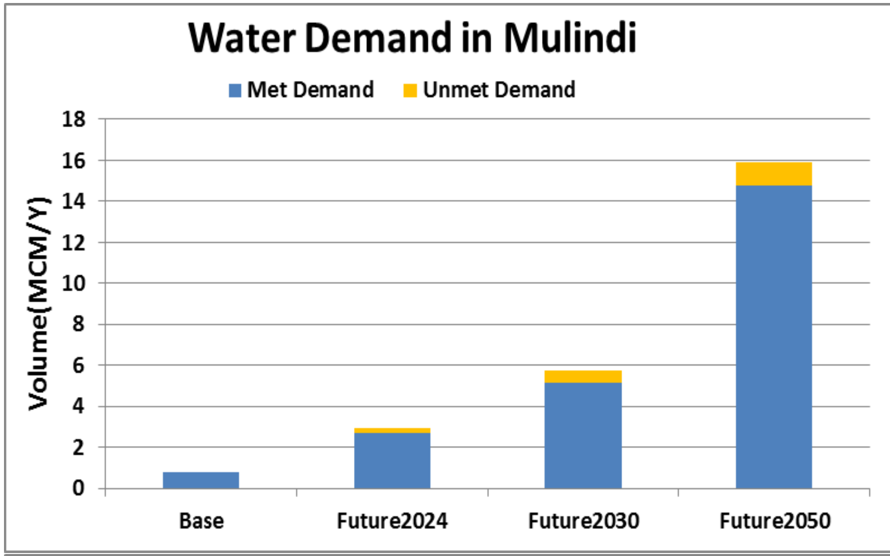
MUVUMBA CATCHMENT
(eg: Warufu and Mulindi subcatchments)

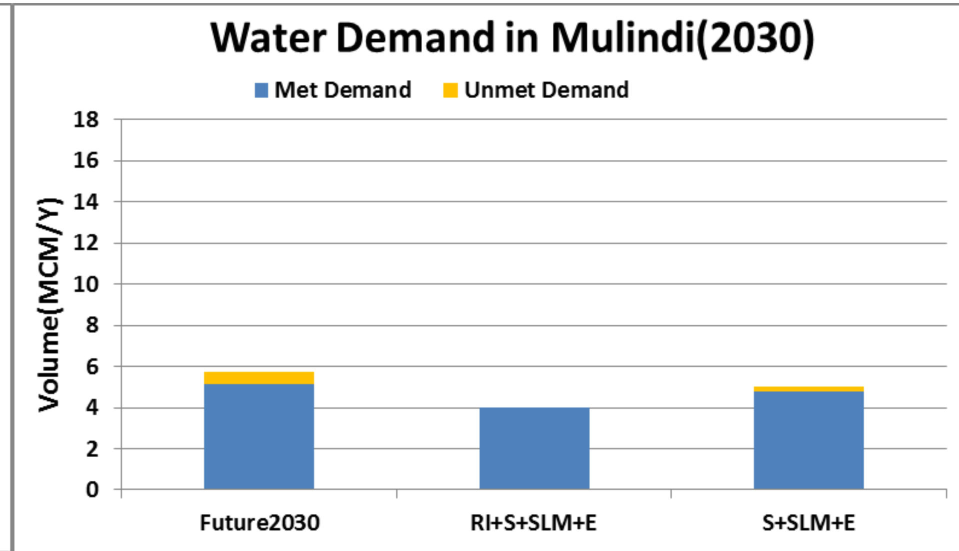


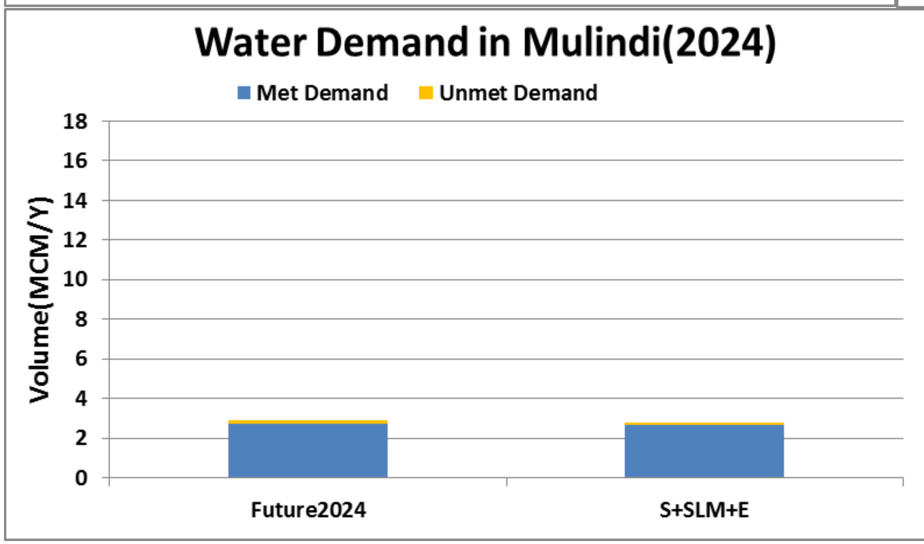


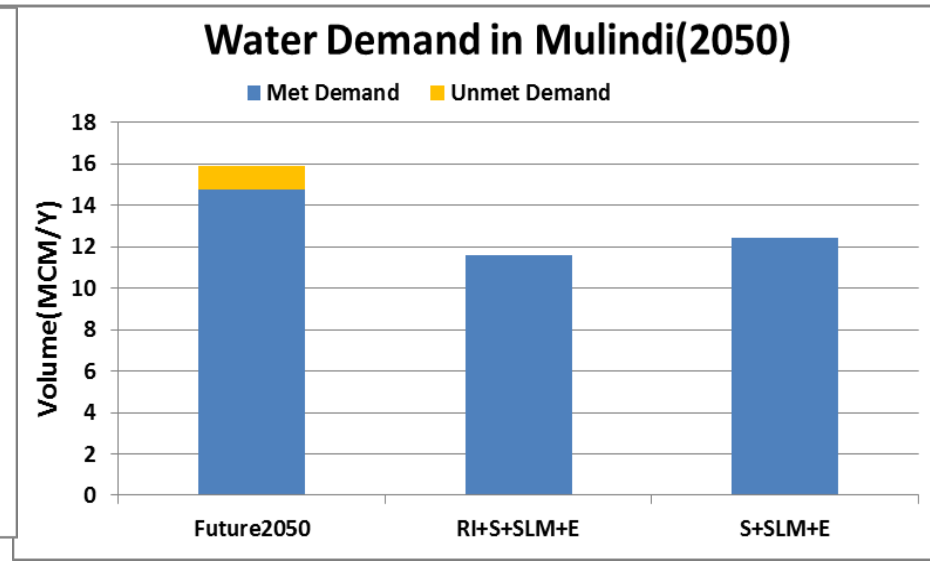





Water Demand in Mulindi
Met Demand
Unmet Demand
Volume(MCM/Y)
0
2
4
6
8
10
12
14
16
18
Base
Future2024
Future2030
Future2050


Water Demand in Mulindi(2030)
Met Demand
Unmet Demand
Volume(MCM/Y)
0
2
4
6
8
10
12
14
16
18
Future2030
RI+S+SLM+E
S+SLM+E


Water Demand in Mulindi(2024)
Met Demand
Unmet Demand
Volume(MCM/Y)
0
2
4
6
8
10
12
14
16
18
Future2024
S+SLM+E


Water Demand in Mulindi(2050)
Met Demand
Unmet Demand
Volume(MCM/Y)
0
2
4
6
8
10
12
14
16
18
Future2050
RI+S+SLM+E
S+SLM+E

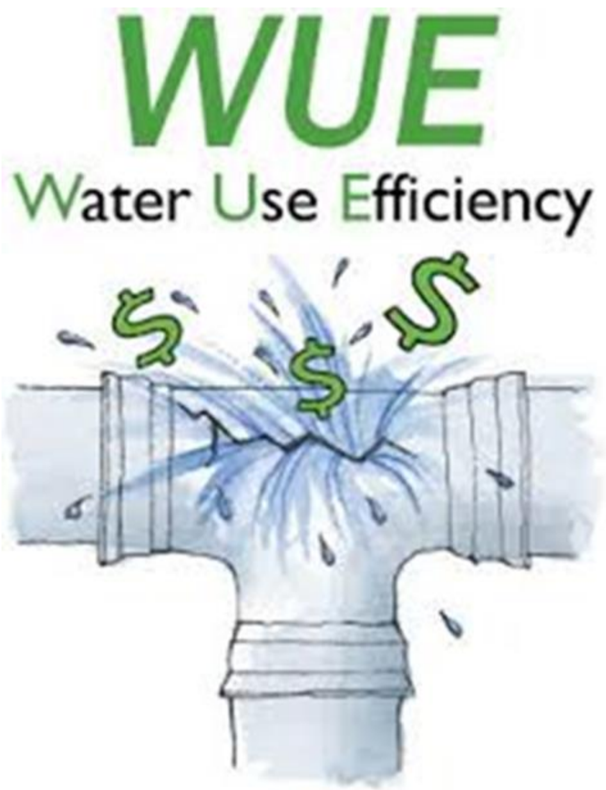
- **Note that**;

- In several sub-catchments, unmet demand reduces towards 2050, thanks to higher water use efficiencies and increased water storage.
- Irrigation development in all sub-catchments needs to go hand in hand with storage development and efficiency improvements.
- Speeding up development of storage and efficiency improvement, helps to avoid unmet water demand in 2024, 2030.

Conclusion and Recommendations

- There should be speeding up of water storage development and water use efficiency at least 30% in irrigation; 20% in domestic and industry by year 2030.

Some examples



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Thank you very much