

Prioritizing Constrained Water Allocations with Agricultural Uncertainty in the West Bank, Palestine



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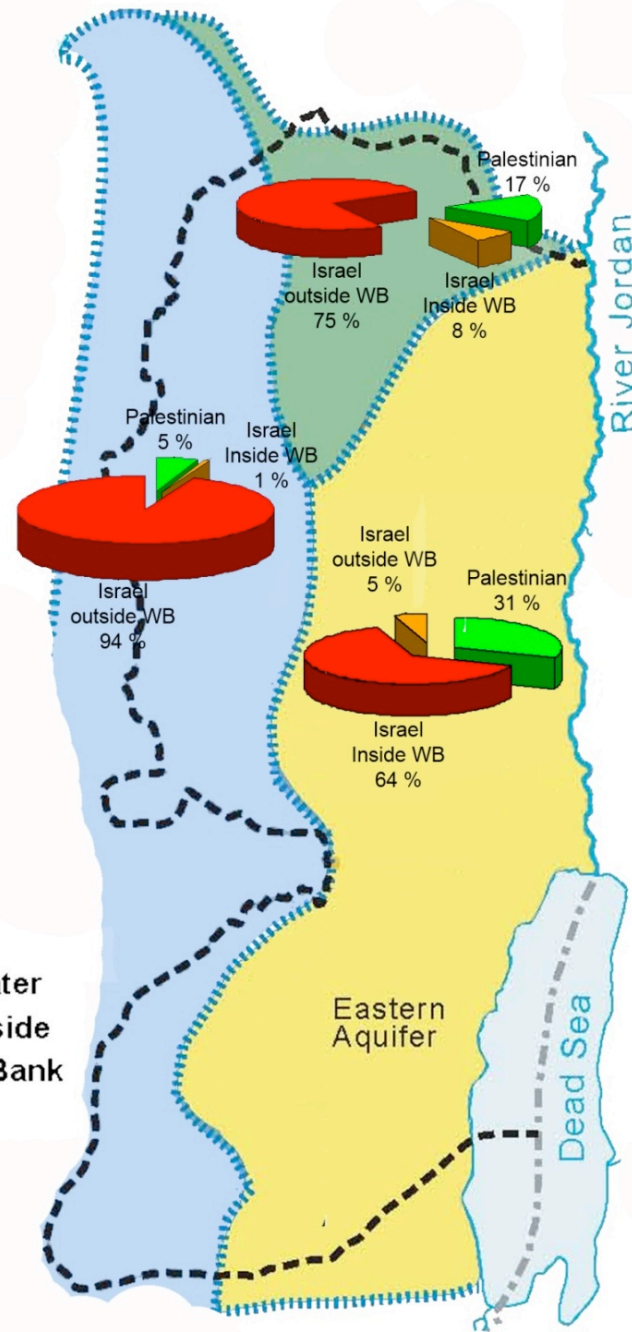
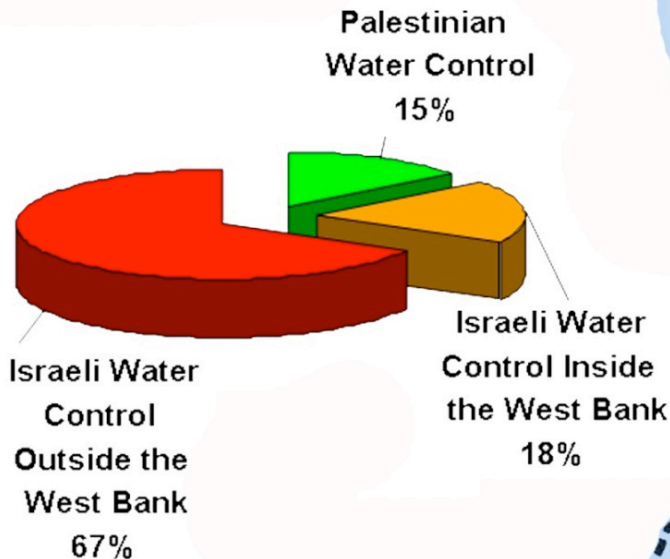
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Tufts

Water Resources in the West Bank

**All Basins
Water Shared
(Eastern,
Northeastern
and Western)**



* Courtesy of the PWA

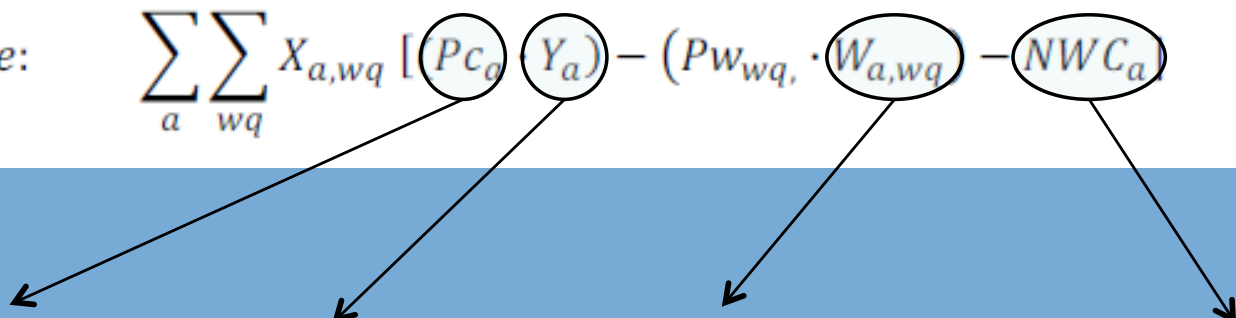
- Severely constrained agricultural system
- Water
- Land
- Markets
- Governance
- Poverty

Responsiveness of Toolsets

- Systems analysis tools used to evaluate how water is allocated are not responsive enough to adequately reflect the true concerns of stakeholders and decision makers
- Water and land constraints, irrigation technologies, efficiency, crop diversification, soil type, and economics are typically included
- Resistance to change, cultural practices, social factors, and uncertainty are more difficult and not typically included yet can strongly influence farm-level decisions

Uncertainty in Decision Influences

Based on AGSM, an existing optimization model

$$\text{Maximize: } \sum_a \sum_{wq} X_{a,wq} [P_{C_a} Y_a] - (P_{W_{wq}} \cdot W_{a,wq} - NWC_a)$$


Crop Price, Yields, Crop Water Req., Input Costs

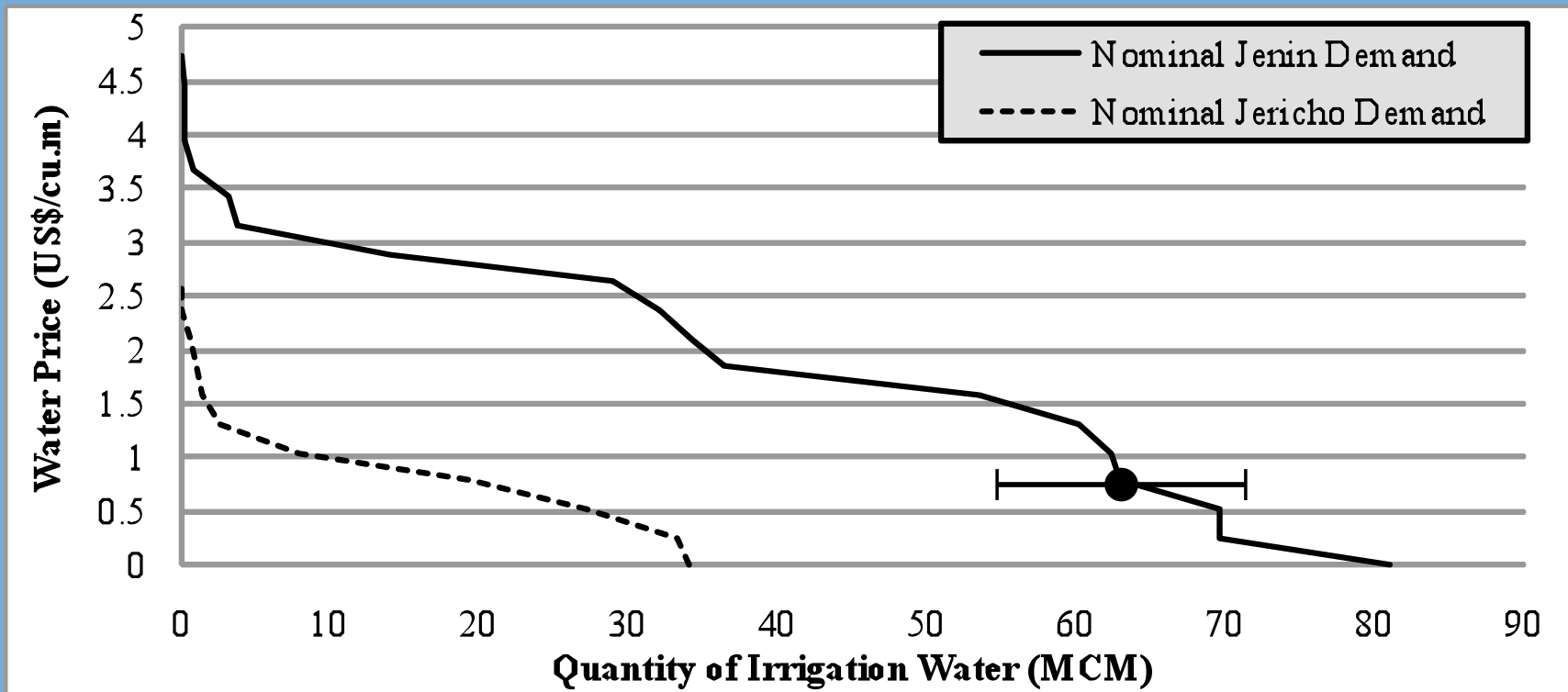
Factors that influence the use of irrigation water are in a constant state of change leading to the variable use of water for agriculture

Note: Subject to Land, Water, Crop Mix Constraints

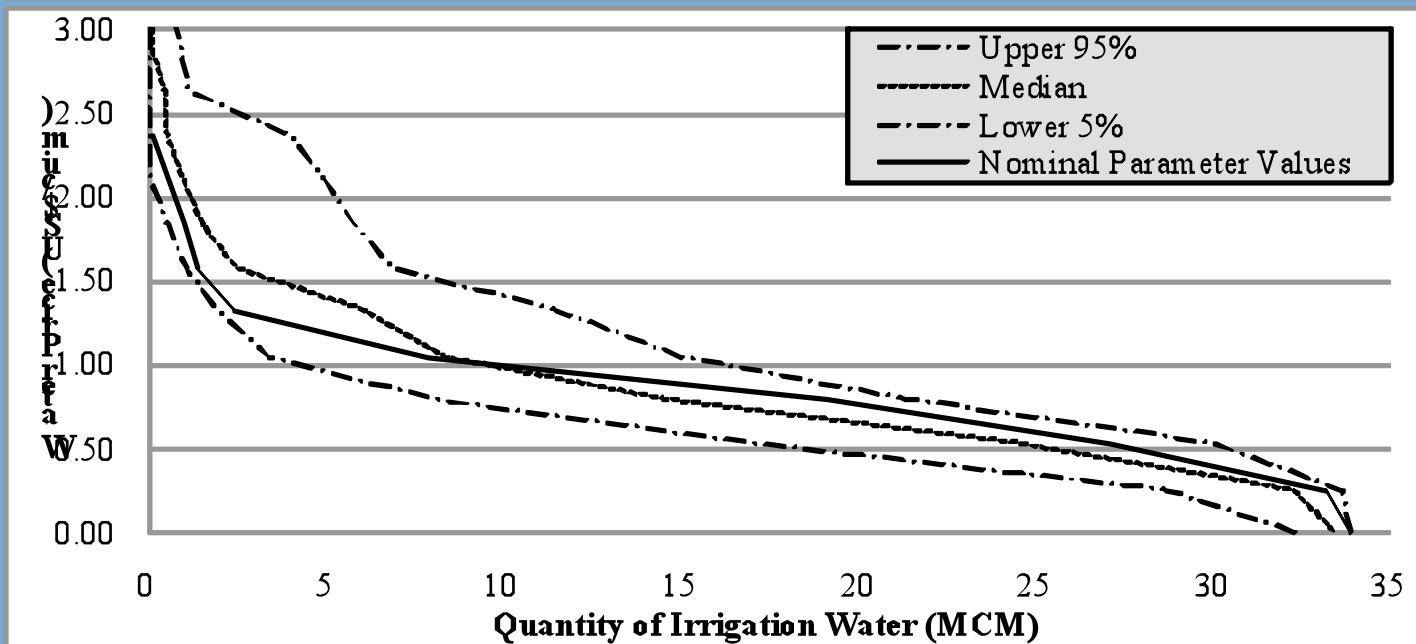
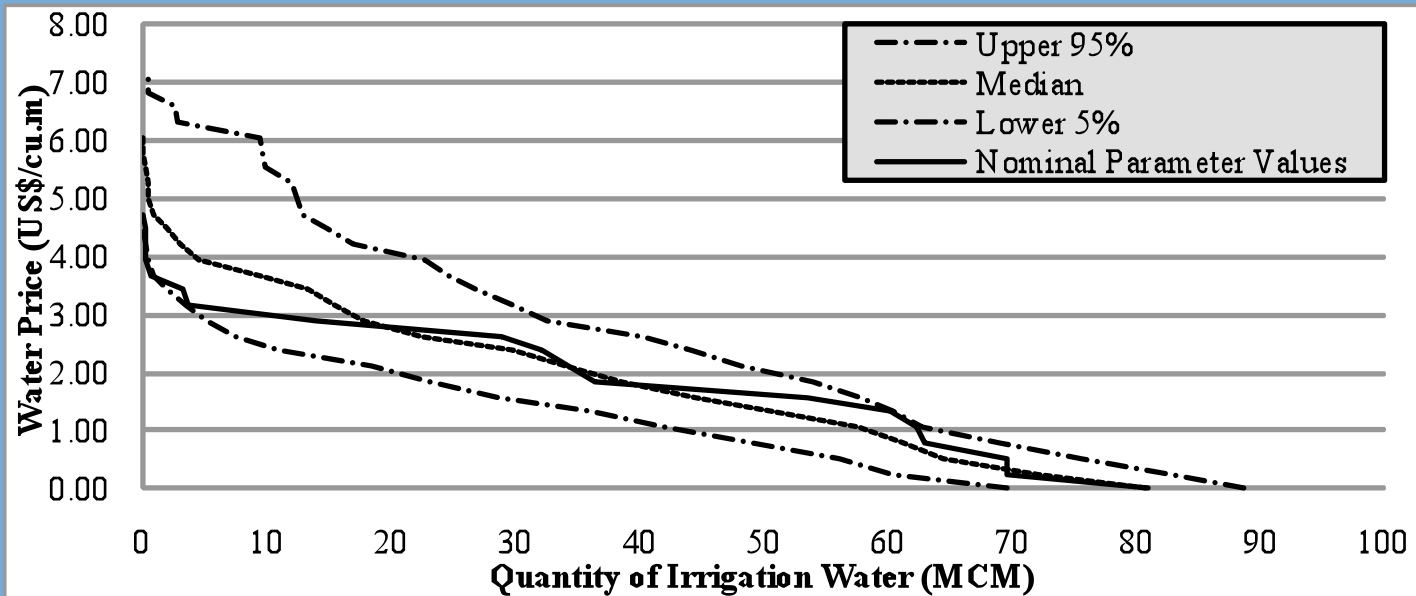
Irrigation Water Demand

Jenin and Jericho

Maximize:
$$\sum_a \sum_{wq} X_{a,wq} [(P_{c_a} \cdot Y_a) - (P_{w_{wq}} \cdot W_{a,wq}) - NWC_a]$$

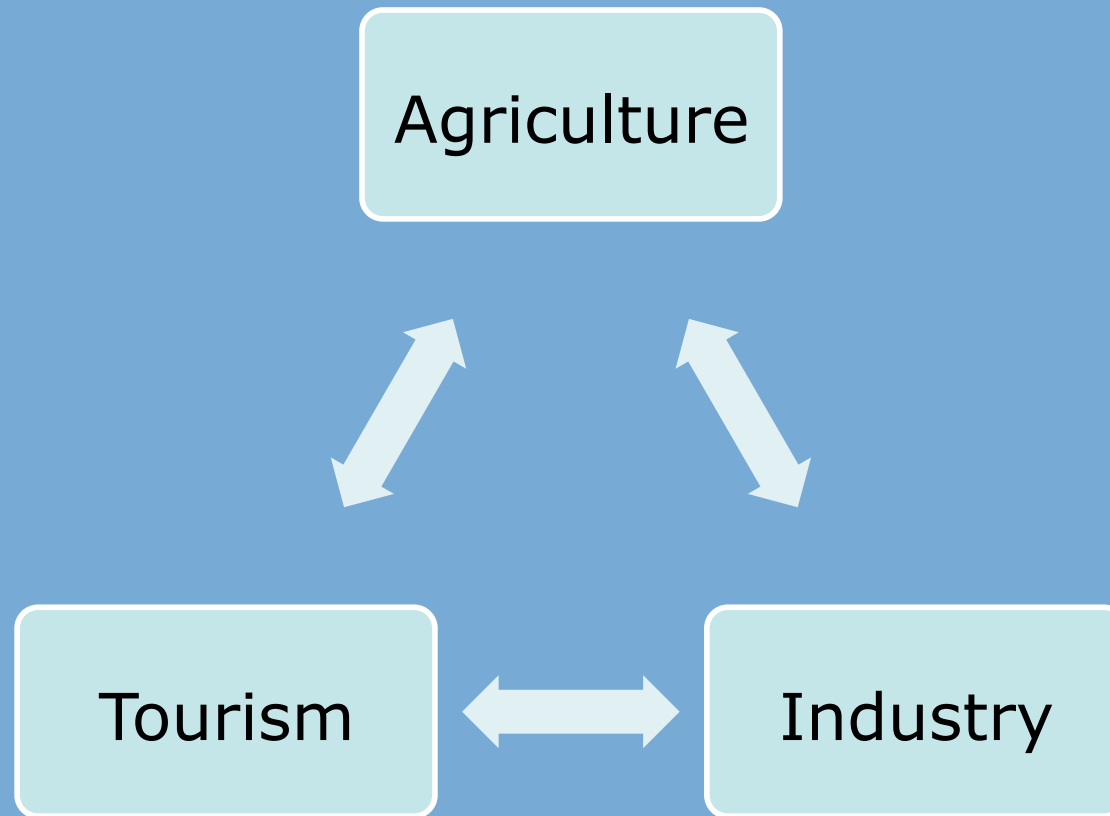


Bounded Irrigation Water Demand



Water Allocations in the West Bank

How can uncertainty help make decisions that maximize net benefits in a general allocation model of the West Bank



Limitations

- No capital costs included
- Alternate Sources of water such as treated wastewater not included
- Many other factors that influence farmer decision making are not included

Acknowledgments

WEP



MoA



PWA



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Franklin Fisher and many more!

My fellow WSSSers

Tufts

Questions?

