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ANALYZING FUTURE PALESTINIAN WATER ISSUES WITH THE WAS MODEL: I. Water and Infrastructure

Franklin M. Fisher, Annette Huber-Lee,
Karen Assaf, Ammar M. Jarrar,
and
Anan F. Jayyousi

Major Topics

- The WAS Model
- Shadow Values and Scarcity Rents

Part I

3. Results for Palestine without Cooperation

Part II

4. Conflict Resolution: Negotiations and Trade in Water Permits
5. Results for Palestine with Cooperation: the Gains from Trade in Water Permits

Two Caveats

- We use data that were gathered and projections that were made in the late 1990's. Those data and projections need to be updated – as it stands, our findings, while suggestive, should be taken as illustrative of how the WAS methods can be applied to Palestinian issues.

- Our analysis of cooperation (in Part II) implicitly assumes a peaceful environment. Unfortunately, that does not exist today. We do, however, analyze Palestinian water issues both on the assumption that there will not be regional cooperation in water and on the assumption that there will. We believe the contrast to be illuminating.

1. The WAS Model

a. Water Ownership and the Value of Water

b. Why Actual Free Markets Will Not Work

c. The WAS Tool

d. Cost-Benefit Analysis of Infrastructure

e. Multi-year WAS (MYWAS)

2. Shadow Values and Scarcity Rents

- The *shadow value* associated with a constraint shows the rate at which the objective function being maximized would increase if the constraint were loosened.

- The *scarcity rent* of a water source is the shadow value of the water in that source *in situ.*

2. Shadow Values and Scarcity Rents

- The most important shadow values in the WAS model are those of water.
  - The shadow value of water in a district is what an additional cubic meter of water would be worth there if costlessly provided.
- The scarcity rent of water in a water source shows the what an additional cubic meter of water would be worth in that source. It measures scarcity.

3. Results for Palestine without Cooperation

a. Additional Infrastructure

b. Additional Water

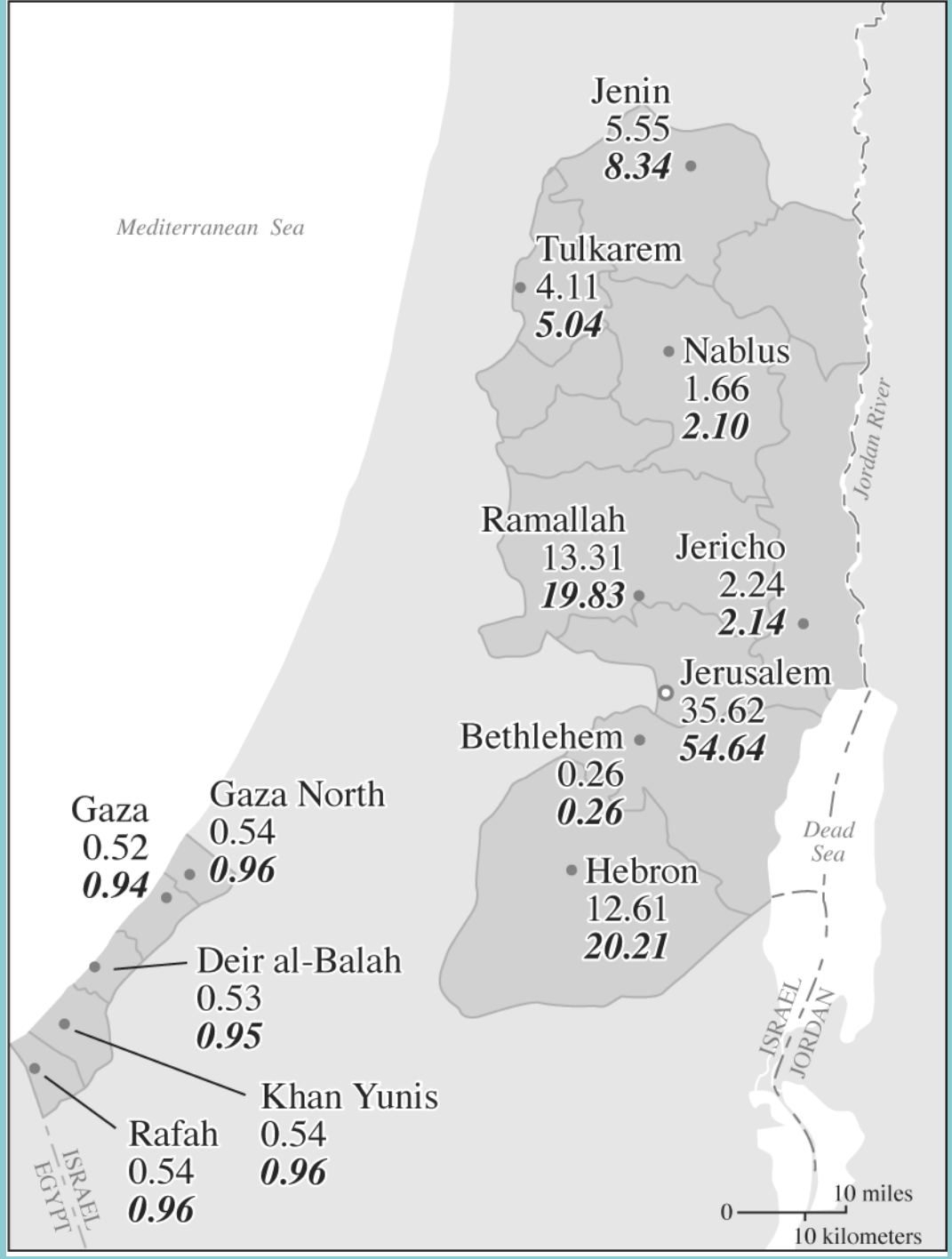

Figure 1:
Shadow Values for 2010 (upper values) and 2020 (lower values

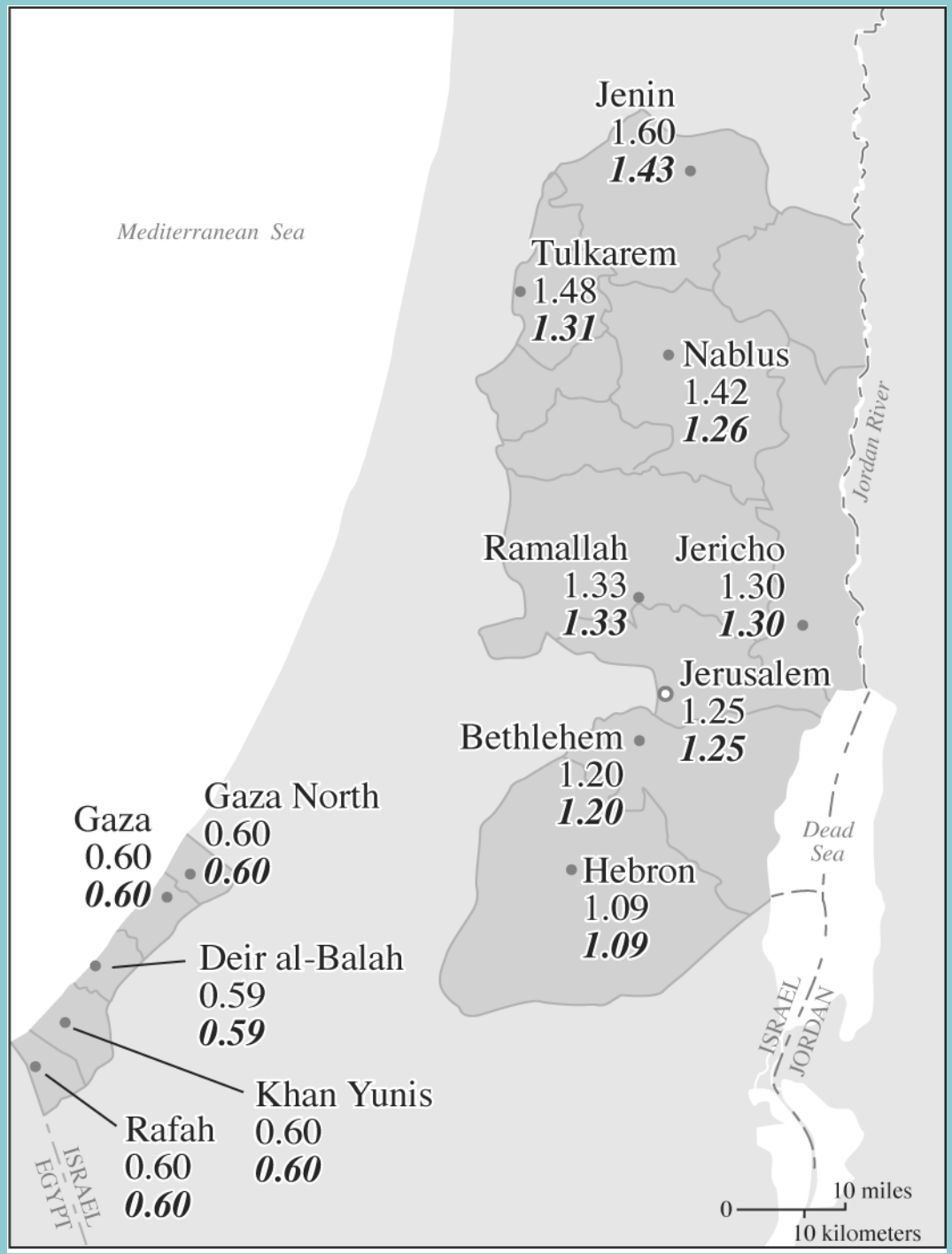

Figure 2

Comparison of Conveyance-Recycling-Desalination Scenario,

2010 (lower values)

and

2020 (upper values)

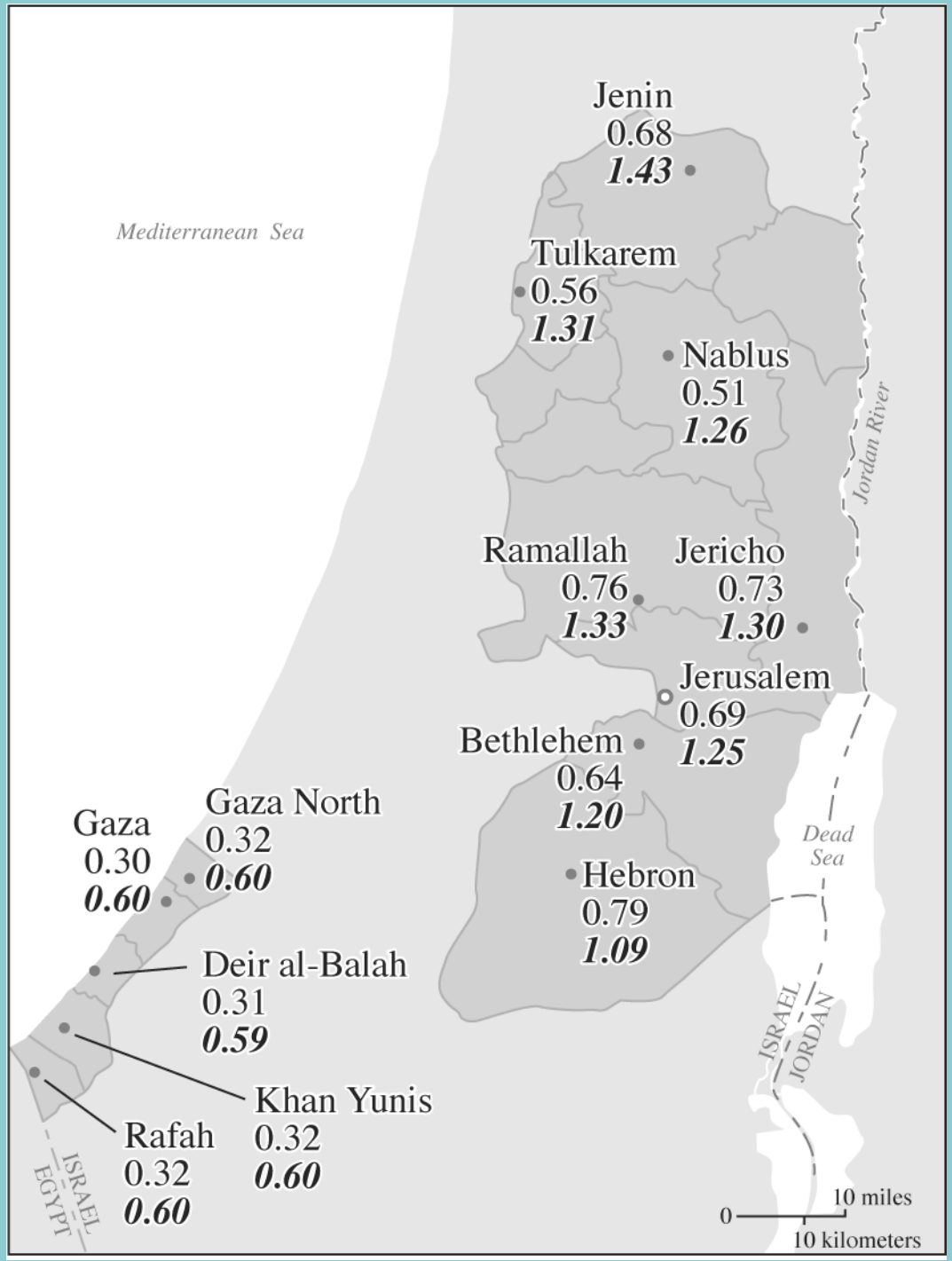

Figure 3
Comparison of Full-Infrastructure Scenario with (upper values) and without (lower values) Double the Quantity from the Mountain Aquifer, 2010

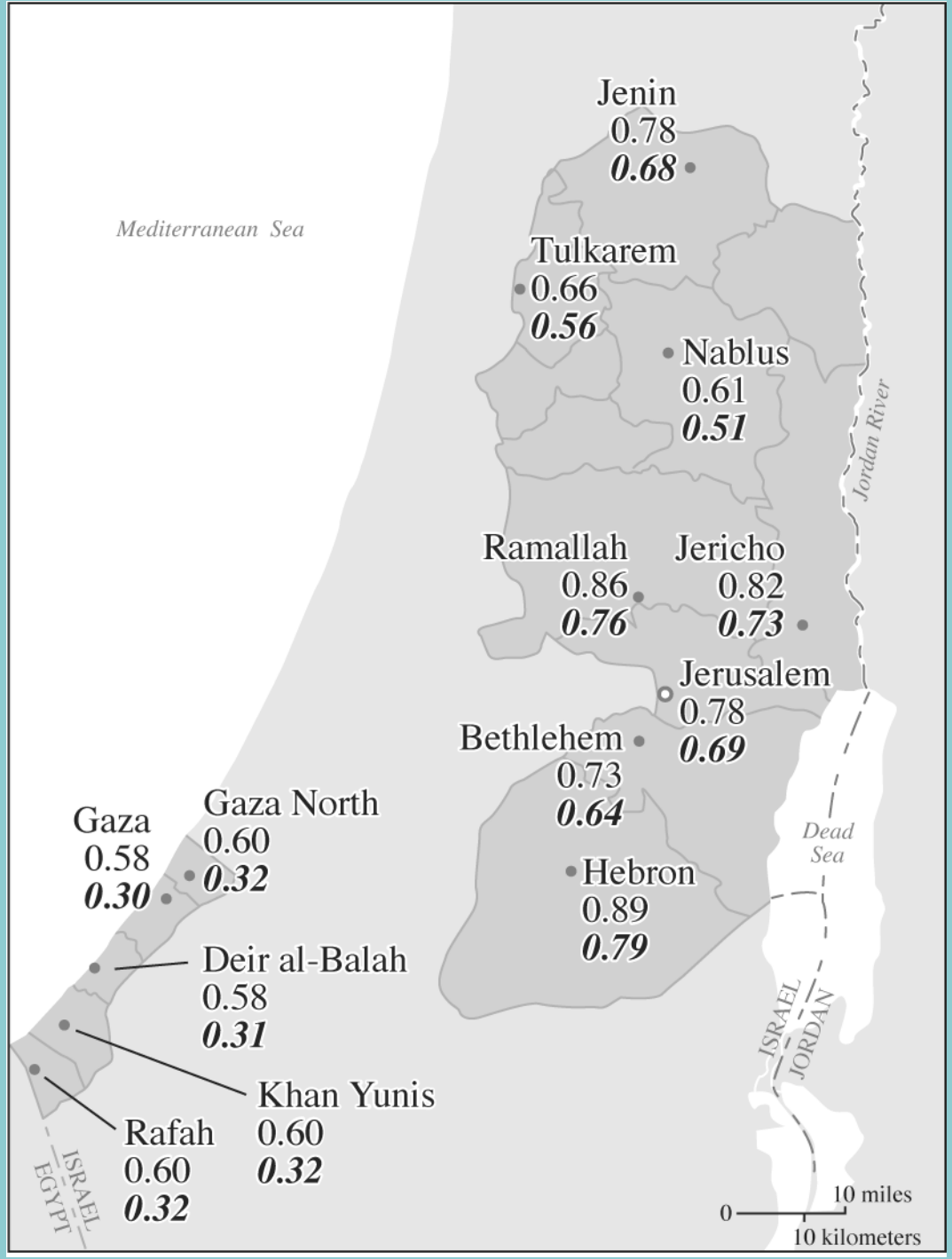

Figure 4
Comparison of Full-Infrastructure Scenario with Double the Quantity of Water from the Mountain Aquifer
2010 (lower values)
and
2020 (upper values)

Conclusion

Our results suggest that Palestine has much to gain from the use of a WAS model, both for its own domestic planning purposes and (as shown in Part II), should that day come, even more from regional cooperation. We believe that an effort should be undertaken to update and expand the existing model and put it to use for Palestine.