WorldWater

System Dynamics Modeling of World Water Dynamics

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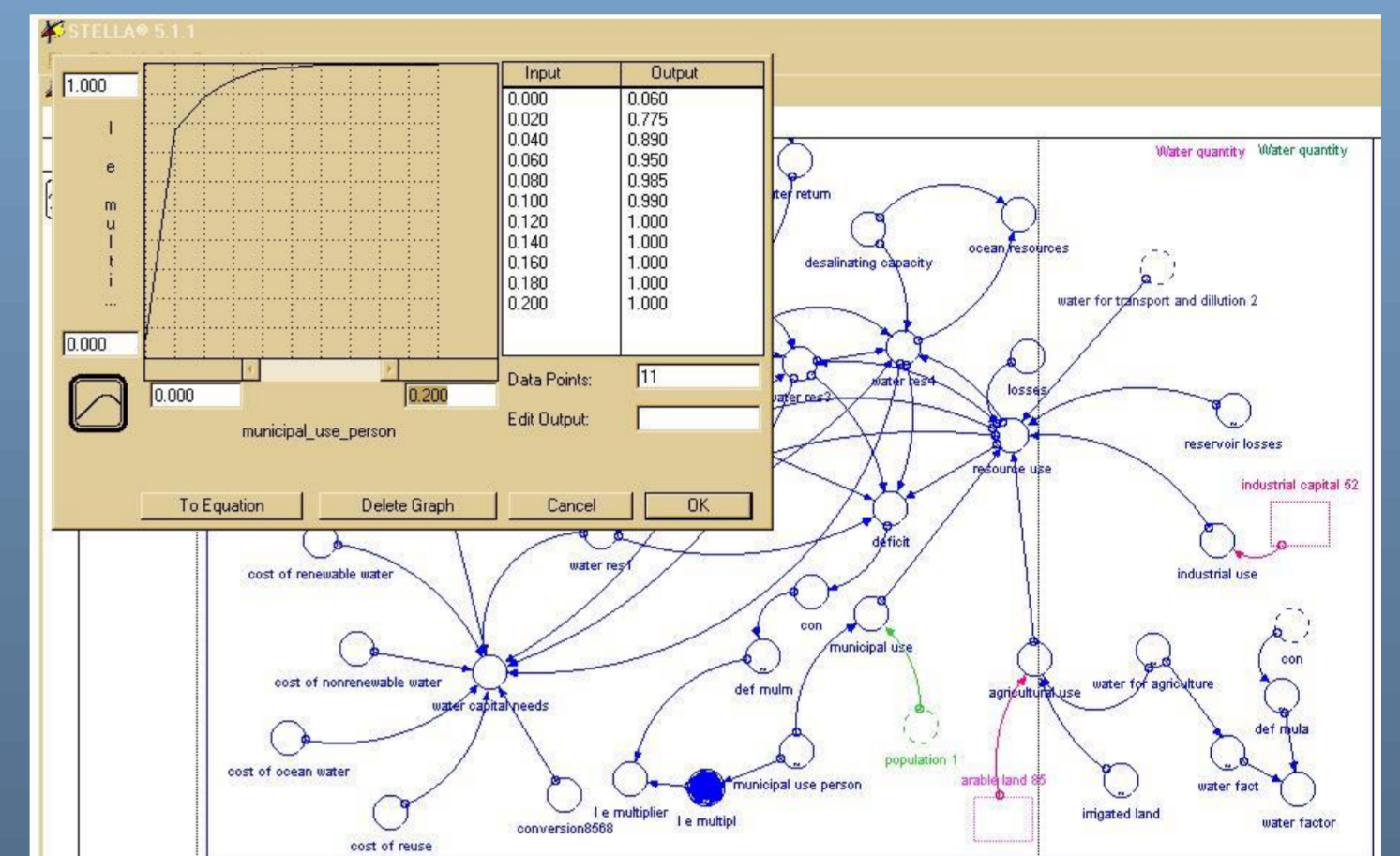
Research Objectives

Despite the growing attention to a chronic, pernicious crisis in world's water resources our ability to correctly assess and predict global water availability, use and balance is still quite limited. An attempt is documented here in modeling global world water resources using system dynamics approach. Water resources sector (quantity and quality) is integrated with five sectors that drive industrial growth: population; agriculture; economy; nonrenewable resources; and persistent pollution. *WorldWater* model is developed on the basis of the last version of World3 model.
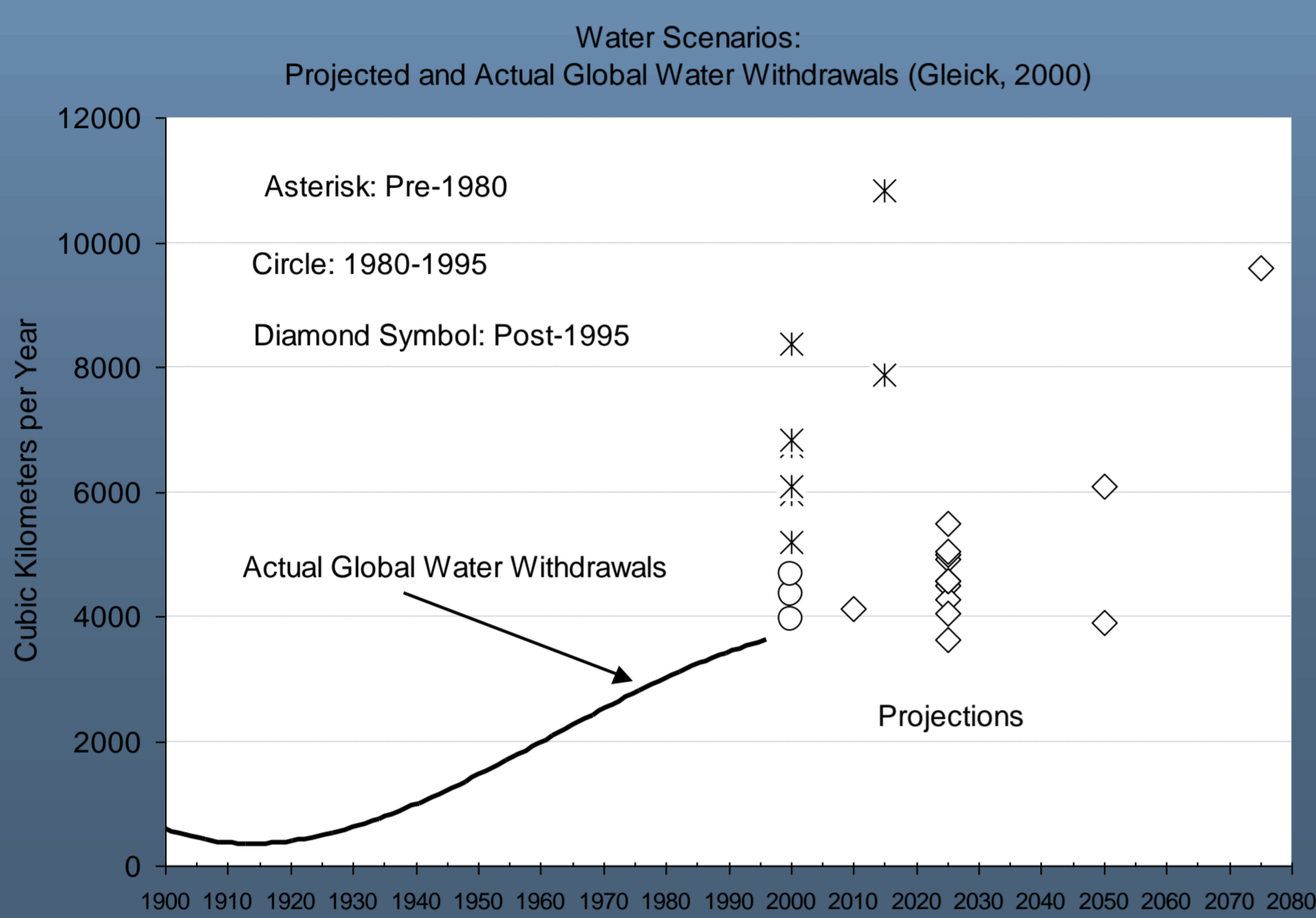
Water For Life

Model Development Principles

1. Hierarchical use of the available resources
2. Renewable surface water resources (42,650 km^3/year)
3. Nonrenewable groundwater (8.4 km^3/year)
4. Water reuse (20 % out of 55% returned to the environment)
5. Desalination (current capacity 4.82 km^3/year)

Object-oriented programming and data input

Water Scenarios:
Projected and Actual Global Water Withdrawals (Gleick, 2000)

Asterisk: Pre-1980

Circle: 1980-1995

Diamond Symbol: Post-1995

Actual Global Water Withdrawals

Projections

Future water projections are variants of current trends and as such are subject to considerable uncertainty. Use of different periods for making predictions results in a high variability in the value of predicted variable.

Blue Planet

Results and Conclusions
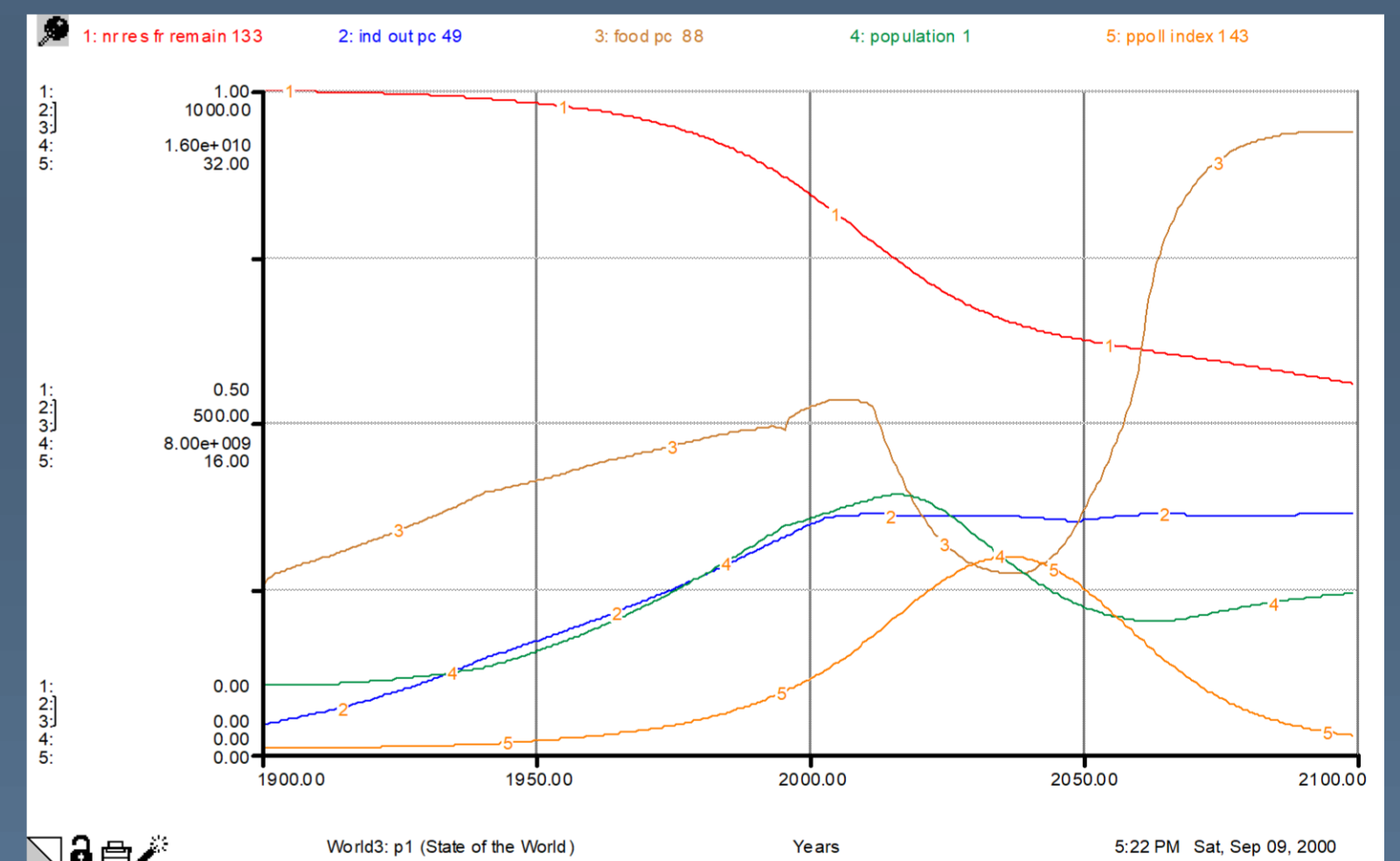
1. Water is one of the limiting factors in global modeling of future world development.
2. Pollution of water is the most important future issue on the global scale.

WorldWater Model Structure
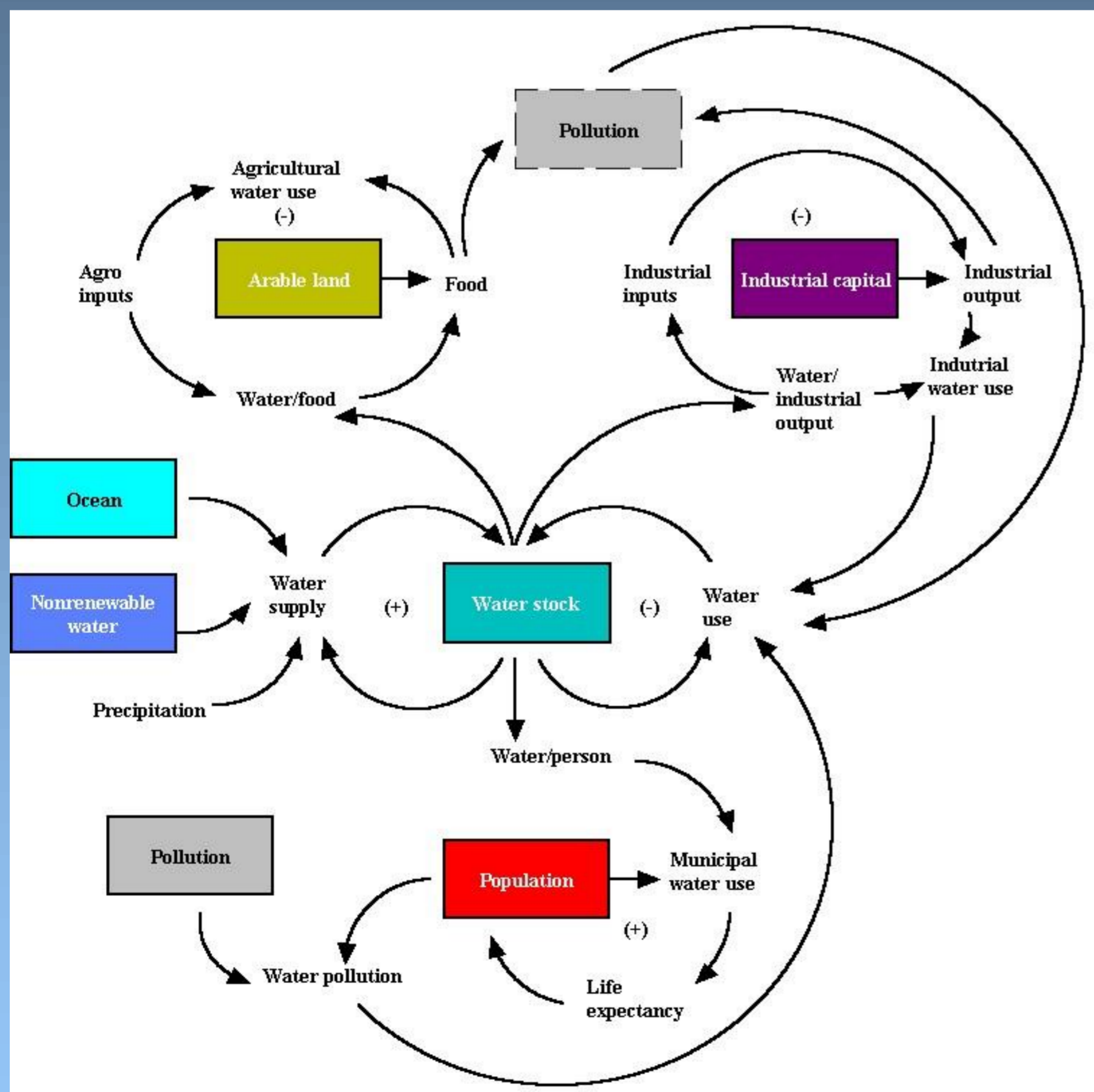
Fish Ladder

Comparison of *WorldWater* results with IHP [2000] (*) and Cosgrove and Rijbersman [2000] (+) static predictions of future water needs for the year 2025.

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Build Back Better