

SUSTAINABILITY, COLLABORATION AND UNCERTAINTY: A SCENARIO BASED EVALUATION OF WATER ISSUES FOR DESERT CITIES USING COMPUTER SIMULATION



Manikandan Vijayakumar, Erik Johnston, Rashmi Krishnamurthy, Ajay Vinze
Global Institute of Sustainability, Decision Center for a Desert City, Arizona State University

How sustainability, collaboration and uncertainty are evaluated using a computer simulation model?

The Decision Center for a Desert City (DCDC) supports and conducts climate, water, and decision research. We also develop an interactive multi-user scenario based application which is more mobile and flexible in terms of usability and development to bridge the boundary between stakeholders and policy makers to put our work into hands of those whose concern for a sustainable future of Phoenix.

Our computer interactive application focuses on building a real-time scenario and multi-user interaction to make collaborative decision on policies for water issues.

Version 1.0 of our Decision Game 2012 application model includes:

- 1) Web Application interface focusing on the "Empathy" Scenario
- 2) A platform independent multi-user interactive scenario - Social Goods game
- 3) Flexibility, mobility & access to all platforms

A User Interface of the Simulation model to help player to understand the actual real-time scenario

Water Budgeting For 2012

Role: You are representing the city of Phoenix

Some facts:

	Phoenix	Tempe	Scottsdale	Surprise
Brief Information	Capital and largest city in Arizona, USA. Founded in 1869.	Inner suburb in Phoenix Metropolitan Area, Arizona. Founded in 1894.	Downtown Scottsdale - Desert version of Miami's beach (NYT). Founded in 1951.	Second fastest growing municipality in Phoenix Metropolitan Area. Founded in 1938.
Population	App. 1,445,683	App. 161,719	App. 217,385	App. 115,000
Land Area	516,704 square miles	40.1 square miles	184.0 square miles	69.5 square miles
Water Budget	Being a larger city and capital city with more legal rights has: 100 water units	Being an inner suburb in Phoenix Metropolitan Area has: 85 water units	Being a rich neighborhood in Phoenix Metropolitan Area has: 95 water units	Being a smaller city with less legal rights has: 70 water units

Your Water Budget: 100 units

Water Allocation for 2010

Current Year allocation

Unallocated Budget

RESIDENTIAL ALLOCATION: 0-100 slider

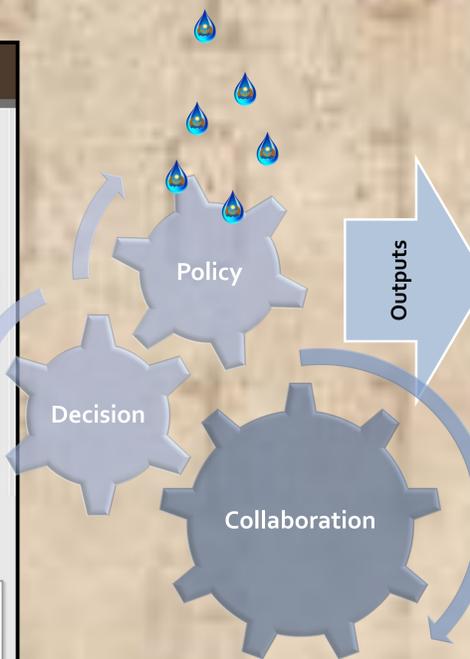
URBAN DEVELOPMENT ALLOCATION: 0-100 slider

INDUSTRIAL ALLOCATION: 0-100 slider

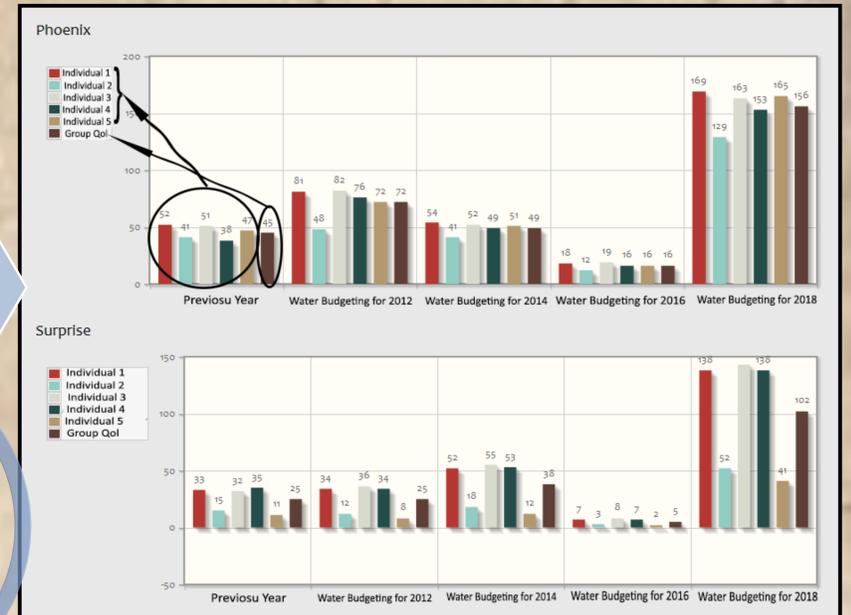
AGRICULTURAL ALLOCATION: 0-100 slider

ENVIRONMENTAL ALLOCATION: 0-100 slider

Submit



Variation in Quality of life identified between an individual and group with respect to their empathy and collaboration



Interface & Access to Decision Game V 1.0 - 2012

<http://suscon.tsc.asu.edu:81>



COMPUTER SIMULATION MODEL APPROACH TO ACHIEVE REAL-TIME SCENARIO EXPERIENCE FOR EFFECTIVE DECISION MAKING

- > Decision Game 2012 version 1.0 simulation model is coded latest Microsoft Technologies for customization and database independency.
- > Made accessible in various platform as a web platform and made adaptable to all media device.
- > User friendliness achieved by more aesthetic and dynamic User Interface for real-time scenario experience.
- > Multi-user interaction in real-time for better communication
- > Narrative story line for each rounds helps user to experience real gaming scenario.
- > Flexibility in module integration.

FOCUSES ON
Policy makers, Stakeholders, Decision makers

RESULT

On running the experiment on a subject of 68 people using the computer simulation model, different variations are identified in Quality of Life result between individual and group

- > Accuracy of result is high on running the experiment on a simulation model rather as a paper document format.
- > Multi-user interaction provides a best outcome
- > Running different rounds for a single scenario model helps to estimate the variations in empathy of a user.
- > Survey helps to determine the individual empathy.
- > The simulation model helps to calculate the quality of life for a particular individual as well as a group to get a different perspective over result.

CONCLUSION

Making right decisions on water issues is one of the main problem faced by policymakers, decision makers and stakeholders in an environment. Applying a state-of-art technology in developing a computer simulation model helps in efficient decision making by better understanding.

ACKNOWLEDGEMENT

This material is based upon work supported by the National Science Foundation under Grant No. SES-0951366 Decision Center for a Desert City II: Urban Climate Adaptation (DCDC). Any opinions, findings and conclusions or recommendation expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF).