**General Model Description**

The model simulates the decision-making process of the water authorities and residents (hereafter “actors”), and its effect on the spatial distribution of socio-hydrological vulnerability in Mexico City. The model operates at the scale of a census block and it is fed by census blocks geographical attributes which correpond to each of the criteria defined by the actors. Each actor is represented in the model as an agent that modifies the census blocks geographical attributes. Census blocks attributes are modified by the decisions taken by the agents and through four submodels: water supply, flooding, gastrointestinal diseases and subsidence.

**Decision-making process**

Census block attributes are modified by the decisions taken by the agents. These decisions are the result of a process that involves the normalization of attributes by a given value function and the calcuation of a metric (“distance to ideal point”) for each action. In the case of water authorities, a site selection technique based on the calculated metrics is used. The rational behind this site selection technique is to optimize the “benefit”, that is, the selection of the best set of actions for the best set of sites. Residents, on the other hand, identify the highest calculated metric in order to implement an action. Once the decisions are taken, the attributes of the census blocks are dinamically updated.

Note1: Complement with equations

Note2: Complement with a glossary

**Model submodels**

Water supply: this submodel simulates water scarcity measured as the number of days without water within each census block. Input data comes from a survey carried out at the municipality level. The calculation is made by fitting a Poisson distribution to the data and then use this distribution to obtain a probability that each census block will experience one or more days without water. Andres: we need u toexplain datails

Flooding: this submodel simulates the probabilty of flooding given the amount of precipitation observed in a census block. These probabilities were derived from a bayesian approach in which categories of obseved frequencies and total precipitation were used to characterize the census blocks.

Gastrointestinal diseases: this submodel simulates the probabilty of gastrointestinal diseases as a function of the spatial distribution of the driver variables. Andres: we need u toexplain datails

Subsidence: this submodel is based on the idea that more subground water extraction leads to more subsidence (this is a simplification of the goal submodel)

Nata: hay que tener consistencia entre los términos usados en el diagrama y el texto

Nota: mostrar en el diagrama las diferentes escalas temporales y los loops

Nota: el diagrama debe incluir los 4 steps que están en esta descripción

Glosario

Census block attribute – Geographical information that can or not be a criteria value

Criteria value – a census block attribute used decision process

Normalized score – a criteria value rescaled by a value function. It ranges between 0 and 1

Value Function –

Actor –

Agent – a representation of the actor in the model

Action – an activity resulted from a decision making process

Site selection – an optimization technique

**Diagram items**

**Calculate distances to ideal states**

The departure of the criteria values from the ideal state in census block *j* (is calculated as

where is the weight for action *k*, is weigth for criteria *i*, is the normalized score for criteria *i* in census block *j*, and determines the aggregation type Luis help

**Normalize criteria values**