Take action

## Water authority actions and changes on census-blocks’ attributes

Once the model computes the distance metric for each census-block and the selection procedure is activated, a set of actions are invoked. These actions change specific attributes of the landscape. Here we explain the actions and its consequences on the census-block attributes. Table 2 summarize these actions and the original explanation contained in the matrix input files.

### Maintenance

Maintenance reduces the age of infrastructure system, , proportionally to its effectiveness, formally:

(15)

where is the effectiveness of maintenance.

### New Infrastructure

The provision of new infrastructure influences the proportion of the population in census-block covered with infrastructure system , such that: (16)

where is the effectiveness of the action “new-infrastructure” in providing system to the proportion of houses that lack of coverage, .

In addition, we assumed that when the action new-infrastructure is invoked, the wells in census-block , , with , are replaced by new ones such that

(17)

The new well is located in the same place and inherits the same extraction rate as the old one.

### Water distribution

The action water distribution, is the action of supplying water to areas that had a disruption in the supply of water by the system pipes, . When the water distribution procedure is invoked, a set of census-blocks, defined by the site selection procedure and the budget , are scheduled to receive water by system of “trucks”, , such that the days with water delivered by trucks,, is formally defined as

Another way to represent this would be:

Thus, when the action water distribution,, is taken in a census-block, that is , the number of days water was delivered by trucks is set to the difference between the days with water by pipes and the max number of days in a week (7).

IF water is then distributed to this census-block (), then the total water delivered to the census-block by this mean is then:

### Water extraction

The action water extraction, , represents the yearly increment in the system of wells, . We assume that in each year census-blocks can receive a new well. Thus when the procedure water extraction in invoked, the number of wells per census-block, , increases according to: