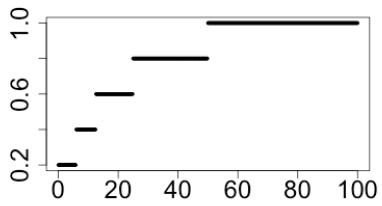
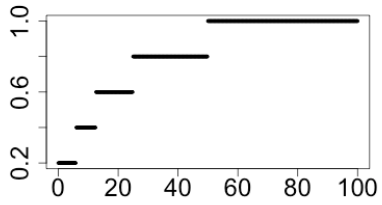
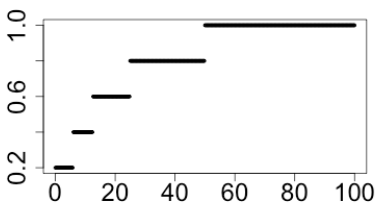
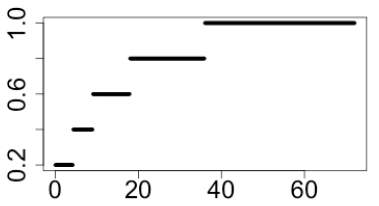
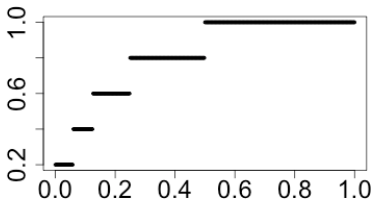
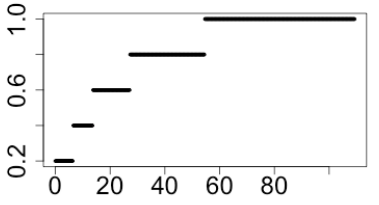
Normalize criteria values

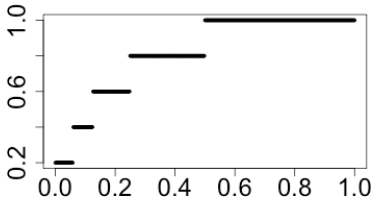
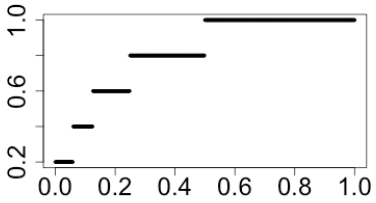
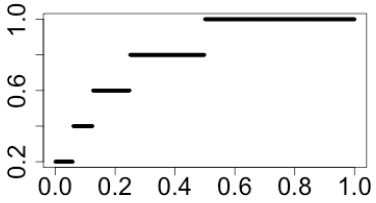
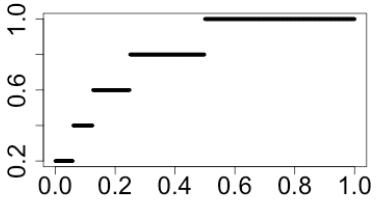
(Residents)

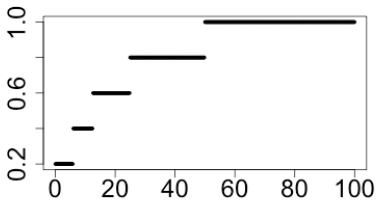
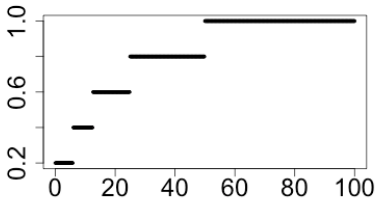
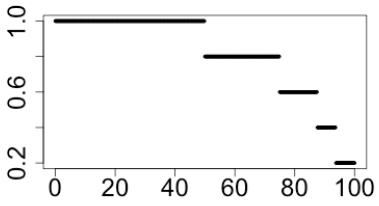
Attributes were rescaled to normalized scores using value functions. Some criteria are associated to different value functions depending on the action.

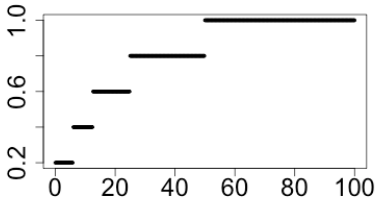
* All actions: Captación de agua, compra de agua, movilizaciones, acción colectiva, modificación de vivienda.

Criteria	Actions	Value function
Crecimiento urbano	*	
Contaminación de agua	*	

Obstrucción de alcantarillas	*	
Salud?	*	
Escasez de agua	*	
Inundaciones	*	
Agua insuficiente	*	

Desviación de agua	*	
Falta de infraestructura	Acción colectiva	
Falta de infraestructura	Modificación de vivienda	
Falta de infraestructura	Captación de agua, compra de agua, movilizaciones	
Infraestructura insuficiente	Acción colectiva	
Infraestructura	Modificación de vivienda	

insuficiente		
Infraestructura insuficiente	Compra de agua	
Infraestructura insuficiente	Captación de agua, Movilizaciones	
Desperdicio de agua	*	
Eficacia del servicio	Acción colectiva	
Eficacia del servicio	Modificación de vivienda	

Eficacia del servicio	Captación de agua, compra de agua, movilizaciones	

This procedure standardizes each criteria using normalization functions. This procedures is needed to evaluate the distance to the ideal point of each census-block related to each action k, and system v. This procedure is called every cycle of decision. The information will define the vectors of criteria and will update their representation in a standardize scale using the procedure report "value function". This steps is critical to quantify relationships between condition of the attributes in the landscape (e.g., age, capacity, etc) and the perceived response by agents. Formally this procedure takes the following notation:

$$x_{ijvt}^{k} = f\left(A_{ijt}, \varrho\right), \quad (3)$$

Where x_{ijvt}^{k} is the perceived magnitude of stimulus defined by the state of attribute i in census-block j at time t, A_{ijt}. Parameter ϱ refers to the constant fraction (ref). Function $f()$ is often represented by a logarithmic function:

$x_{ijvt}^{k} = \varrho \log A_{ijt}$

However, in the current version of this model, the function $f()$ is implemented using a set of cutoff ϱ_{ivc}^{k}, such that

$$x_{ijvt}^{k} = \begin{cases} 1 & \text{if} \quad A_{ijt} > \varrho_{iv4}^{k}\widetilde{A}_{\iota} \\ 0.8 & \text{if} \quad \varrho_{iv4}^{k}\widetilde{A}_{\iota} > A_{ijt} > \varrho_{iv3}^{k}\widetilde{A}_{\iota} \\ 0.6 & \text{if} \quad \varrho_{iv3}^{k}\widetilde{A}_{\iota} > A_{ijt} > \varrho_{iv2}^{k}\widetilde{A}_{\iota} \\ 0.4 & \text{if} \quad \varrho_{iv2}^{k}\widetilde{A}_{\iota} > A_{ijt} > \varrho_{iv1}^{k}\widetilde{A}_{\iota} \\ 0.2 & \text{if} \quad \varrho_{iv1}^{k}\widetilde{A}_{\iota} < A_{ijt} \end{cases} \quad (4)$$

Where $\varrho_{z}$are canonical cut-off, that follow the Weber-Fechner progression {0.5,0.25 0.125,0.0625} for increasing functions and {0.937,0.875 0.725,0.5} for decreasing

functions. Parameter $\widetilde{A}_{\iota}$ represents the maximum value of the attribute, A_{ijt}, which will set the range of the value function.

In the current version of the model, this procedure is called in the context of actions, which are called in the context of the census-block.