Calculate distances to ideal points

An assessment of the prioritarian census-blocks for investment is obtained through multicriteria evaluation of the distance of each census-block from an “ideal point” or utopian state, defined a set of decision criteria and how relatively important those criteria are for the decition makers. Formally we calculate a distance , such that:

where is the distance to the ideal point of census-block j with respect to decision and system ; is the criterion weight of criterion related to system ; is the normalize value in a census-block of the attribute corresponding to criterion with respect to infrastructure system and decision ; is the departure of an alternative from the ideal point for a criterion; , , , and are indices for criteria, census-blocks, action, time and infrastructure system, respectively. In Equation 1, the standardized score, , represents a judgment about the importance of an observable stimulus (census-block attribute value) for the water authority’s decision.

Given that the variables representing the criteria are continuous and interval- and ratio-scaled, these scores are obtained by means of value functions (Beinat 1997), which transform the natural scale of a criterion to a [0, 1] value scale (1 represents the most undesirable state and 0 the most desirable state).