Mathematical model for the arrangement and the cleaning of the river basin and surroundings of the river sandy grounds to its passage by the city of Salta (Argentina)

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The province of Salta is located the Northwest of Argentina in the border with Bolivia, Chile and Paraguay. Its Capital is the city of Salta that concentrates half of the inhabitants of the province and has grown to 600000 hab., from a small active Spanish town well founded in 1583. The city is crossed by the Arenales River descending from close mountains at North, source of water and end of sewers. But with actual growing it has become a focus of infection and of remarkable unhealthiness. It is necessary to undertake a plan for the recovery of the river, directed to the attainment of the well-being and to improve the life's quality of the Community. The fundamental idea of the plan is to obtain an ordering of the river basin and an integral management of the channel and its surroundings, including the cleaning out. The improvement of the water's quality, the healthiness of the surroundings and the improvement of the environment, must go hand by hand with the development of sport activities, of relaxation, tourism, establishment of breeding grounds, kitchen gardens, micro enterprises with clean production and other actions that contribute to their benefit by the society, that being a basic factor for their care and sustainable use.

The present pollution is organic, chemical, industrial, domestic, due to the disposition of sweepings and sewer effluents that affects not only the flora and small fauna, destroying the biodiversity, but also to the health of people living in their margins. Within the plan it will be necessary to consider, besides hydric and environmental cleaning and the prevention of floods, the planning of the extraction of aggregates, the infrastructure and consolidation of margins works and the arrangement of all the river basin. It will be necessary to consider the public intervention at state, provincial and local level, and the private intervention. In the model it has been necessary to include the sub-model corresponding to the election of the entity to be the optimal instrument to reach the proposed objectives, giving an answer to the social, environmental and economic requirements. For that the authors have used multi-criteria decision methods to qualify and select alternatives, and for the programming of their implementation.

In the model the authors have contemplated the short, average and long term actions. They conform a Pareto-optimal alternative which secures the ordering, integral and suitable management of the basin of the Arenales River, focusing on its passage by the city of Salta.

Some references:
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