



Reusing city wastewater in agriculture brings multiple benefits

The benefits of reusing city wastewater for agricultural purposes can far outweigh the costs involved and reduce overall demand for freshwater, according to a recent study. The researchers calculated that the total benefits to agriculture and a city of a reuse project in Spain outweighed the total costs by €9.5million per year.

Increased demand and competition for water is being felt in agriculture, industry and cities. This study weighs up costs and benefits of reusing and exchanging water between farmers and municipalities using an economic framework.

For farmers, the results of the cost-benefit analysis suggests that the added value of using reclaimed water from cities comes from reduced pumping costs of freshwater, for example, from rivers. In addition, farmers can receive a more reliable supply of irrigation water and less fertiliser is needed because wastewater can be rich in nutrients.

For cities, potential benefits arise from the extra availability of freshwater that is not being used by farmers, which saves water extraction, desalination and water treatment costs, in addition to transfer costs from remote water extraction sites.

For the environment, potential benefits include a reduction of contaminants (such as salts and metals) and nutrients released into rivers and coastal waters; reduced freshwater extraction; renewed river flows; conservation of wetlands; and using reclaimed water as a barrier to prevent the intrusion of seawater into aquifers.

Set against these benefits are the costs associated with measures to minimise health risks from reusing wastewater and possible risks to the environment from any contaminants. Other costs include those for building new infrastructure to take the reclaimed water to agricultural areas.

If the potential benefits outweigh the potential costs, the next step is to decide how the costs are to be shared among the different parties involved. If the added value to farmers is low compared with charging them the full costs of the water reclamation, farmers might not want to join the scheme. It might therefore be necessary for the city to pay, as typically, the overall benefits to the city are substantial, especially when cities are faced with water shortages.

To illustrate how water reuse and exchange can be a cost-effective approach to managing water scarcity at the basin level, several schemes were examined by the study. The cost-benefit analysis revealed that one project in the Llobregat Delta in Spain would be feasible with a total water-exchange cost of €5.2million per year. The city would benefit by €14.4million per year from an additional 13 Mm³ (million cubic metres) of freshwater a year released from agricultural use, (saving the same volume of freshwater being extracted from river sources, which also benefits the environment). Farmers' incomes would collectively rise by €351,000 per year in the area as a result of reduced costs of pumping water and fertiliser use. Overall, the benefits were calculated to outweigh the costs by €9.5million per year.

Source: Heinz, I., Salgot M., Mateo-Sagasta Dávila, J. (2011) Evaluating the costs and benefits of water reuse and exchange projects involving cities and farmers. *Water International*. 36 (4): 455-466.

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