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## Socio-Economic Assessment of Treated Wastewater Irrigation in Northern Gaza

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### Abstract

The use of treated wastewater in irrigated agriculture has the potential to cover at least a part of the increasing water demand in Gaza Strip. The evaluation of the potentials of this alternative water resource requires a multi-stakeholder analysis, i.e. analyses on different social and managerial levels. The treatment process as a first level includes financial and ecological analyses of different treatment methods. The management as a second level focuses on decisions in water pricing and legislation. The third level is the farming population, where analyses include the current state of resource endowment, with special emphasis on water resources, and the contribution of the resources to the living standard. Another element on this level for investigations are perceptions towards the use of treated wastewater for irrigation and the factors affecting the related decisions. The fourth level comprises the consumers of agricultural products and requires analyses of their level of acceptance of and willingness to pay for products irrigated with treated wastewater. The results of these analyses in Northern Gaza allowed for the set-up of linear programming models for different farming systems classes and the formulation of four scenarios with regard to the probable future use of treated wastewater. These scenarios reflect different levels of treatment quality, capacity, costs, and consumers' reactions. The impact assessment indicated the relevance and importance of including the four levels when designing a regional plan to use treated wastewater in irrigation. Decisions on water prices have to consider the socio-economic situation of the farming population in the setting of water prices, which includes distinctions in pricing according to the specific purpose of treated wastewater use. High prices are economically reasonable and enforceable for irrigation water on hitherto rain fed land, while only lower prices will serve the objective of replacing fresh water. Farmers, who have no own water resources, would accept to use and pay higher prices for treated wastewater compared to farmers who possess wells. The application of this differentiated concept has the potential to facilitate higher adoption rates of using treated wastewater and to generate higher cost-coverage of the water treatment plant.

**Keywords:** Linear programming models, recycled water, regional model