Water use, income generation and the Verdoorn's law: a dynamic input-output framework to assess water productivity. An application to Castile and León Region (Spain)

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Water is a scarce input necessary for the production of many goods and services and should be managed accordingly. However, water policy has failed to consider water as an economic good and has focused instead in guaranteeing the provision of this resource at subsidized prices. Under this paradigm population growth and the improvement of living standards brought about by development have driven water demand up and the pressures over water resources have escalated. The resulting ever growing water dependency requires a comprehensive assessment of water productivity to establish priorities in the design of strategic actions such as river basin or drought management plans. This paper develops a methodology based on the Hypothetical Extraction Method (HEM) to estimate inter-temporal direct and indirect water productivity values. The method is applied in the Spanish region of Castile and León for the period 2000-2006. The low water productivity found for irrigation water confirms that agriculture has to play a key role in any water saving policy. However, the relevant linkages between agriculture and the rest of the economy, which acts as an indirect water consumer, makes difficult the finding of a permanent and effective solution. The results also show the existence of increasing returns to scale in the manufacturing industry and the service sector which can be regarded as an evidence of the existence of a Verdoorn's Law for water.