

EXTENDED ABSTRACT

POTABLE WATER CONSUMPTION IN THE TOURIST COASTAL MUNICIPALITIES IN THE REGION OF MURCIA

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1. INTRODUCTION

Gössling (2001) stated that tourism made a high consumption of water and that this could be a problem in those areas where water was scarce. Vera (2006), Rico (2007), Baños *et al.* (2010) and other researchers agree that ensuring the availability of water is the greatest challenge facing these tourist areas. In areas of high density and concentrated or compact population, less land use translates into less per capita water consumption; in areas of low urban density, with the presence of chalets, garden areas and swimming pools, there is usually a greater consumption of water (Rico-Amorós *et al.*, 2009; Hof and Schmitt, 2011; Deyà and Tirado, 2011; Gabarda *et al.*, 2015; Morote, Hernández and Rico, 2016). This is also linked to another idea: the individual's own spending, conditioned by their economic situation and their habits of use and savings. Gössling *et al.* (2015) showed that tourists tended to consume more water than the local population. This reinforces the idea of the urgent need to attend to water supply studies in environments with a shortage of this resource, especially if a marked tourist activity takes place in them.

The coastline of the Region of Murcia corresponds to municipalities such as San Pedro del Pinatar, San Javier, Los Alcázares, Cartagena, La Unión, Mazarrón, Águilas and a small portion of the term of Lorca (district of Ramonete). It features a semi-arid climate with a large number of sunny days, high luminosity and insolation. It is an ideal space to develop tourist activity, mainly the combination of sun and beach, since the mild temperatures and the absence of rainfall favor the interest of tourists in this coastal

space. In this way, the Mar Menor and its surroundings represent the largest tourist destination on the Costa Cálida, with La Manga del Mar Menor being the one that acquires the greatest importance in terms of the volume of tourists in the summer months. The municipalities of Mazarrón and Águilas are configured as secondary tourist destinations, with less tourist capacity and majority national origin, although in Mazarrón there is also residential tourism with notable British origin, located in urbanizations such as Camposol or Mazarrón Country Club. On the coast of the municipality of La Unión there is hardly any tourist activity, since the few kilometers are occupied by the district of Portmán, whose bay was filled with mining waste, and is currently in the process of environmental regeneration, and the town is in demographic decline. For its part, the coast of Lorca is little exploited from the tourist point of view, in a less anthropized environment and without transport infrastructure that allows the arrival of tourists on a massive scale. However, these same climate conditions are unfavorable to ensure the sustainability of water resources, essential to sustain tourism. The reason is that the drought becomes structural and the absence of permanent sheets of water poses serious problems to guarantee the supply of water to a population that, moreover, increases extraordinarily when these resources are even scarcer: in summer. Taking these premises into account, it is for this reason that it is of great interest to know how the work of supplying water to spaces of these characteristics is carried out, and in which the tourism sector is an activity of marked importance in the economy and regional development. The objective of this article is to evaluate the water consumption of the tourist municipalities on the coast of the Region of Murcia, taking into account the volume of water supplied and the origin of the resource, in order to identify proposals for improvement that help the sustainability of tourism in the Region of Murcia.

2. METHODOLOGY

This is a regional study, qualitative and quantitative research. The data comes from the statistics provided by the Mancomunidad de Canales del Taibilla, as well as those obtained through interviews and requests to the different water supply entities and municipalities. Regarding the differentiation between “high water” and “low water”, this distinction refers to the collection or production of water and delivery to the distribution entities, in the first case; and to the supply of water to customers, in the second. The difference between one volume and another is expressed by the performance, that is, the volume of water that has been delivered satisfactorily; while the rest constitute network losses, water that has been lost along the way. The seasonality index is expressed as the ratio between the month of highest consumption and the month of lowest consumption, expressed as a percentage. This article has not considered the study of the municipalities of Lorca and La Unión, due to the fact that there is hardly any tourist use in their coastal strip, and their inclusion would mean a distortion of the study of water consumption in tourist coastal municipalities of the Region. In addition, it should be noted that, in the case of La Manga del Mar Menor, it belongs to two different municipalities: Cartagena and San Javier; and where the water supply to La Manga is carried out in a differentiated way both in one and in the other.

3. RESULTS

The MCT is the agency in charge of providing drinking water to the municipalities studied in this article. Currently, the MCT is supplied from four main sources: the Taibilla River, which in the last ten years (2011-2020) represents an average percentage of the total supplied of 28.61%; The Tagus – Segura Aqueduct, which observes an average of 42.55%; the resources named as “Other waters”, which include transfers of rights and water extracted from drought wells, are testimonial and only used in situations of need: their average for the period is 2.36%; and last, desalination seems to fluctuate more since its production depends on the situation of availability of resources and its average is 26.48%.

The evolution of water consumption is uneven according to municipalities: in the last five years it has increased progressively in Mazarrón, while it has decreased in San Pedro del Pinatar and Los Alcázares. Those of Cartagena and San Javier practically maintain similar figures, and Águilas, after marking a minimum in 2018, has increased its consumption, standing above the level of 2016. These trends must be analyzed taking into account several factors. On the one hand, demographic growth. In this aspect, the population has increased in all the municipalities: Los Alcázares, 8.51%; Mazarrón, 6.95%; San Pedro del Pinatar 5.16%; San Javier, 4.24%; Águilas, 2.93%; Cartagena, 0.63%. It is necessary to take into account other factors such as the number of tourist visitors, since they are individuals who consume water, but they are not reflected in the municipal demographic statistics. In this regard, it is unavoidable to point out the impact of the covid-19 pandemic, which in the transition from 2019 to 2020 has been reduced by: City of Cartagena, reduction of 64.87%; La Manga, 79.61%; Rest of Mar Menor, 74%; Mazarrón, 94.10%; Águilas, 86.87%.

Taking into account the data on distributed water in 2020 and the registered population, the figures show a per capita consumption of: San Pedro del Pinatar, 70.94 m³/person; San Javier, 114.02; Los Alcázares, 82.40; Cartagena, 107.10; Mazarrón, 90.93; Águilas, 72.17. There is an indicator that can identify points of improvement in resource efficiency and constitute a priority in supply: the performance of the distribution entity. Performance exceeds 80% in Cartagena, Águilas, Los Alcázares and San Javier, while it barely exceeds 60% in Mazarrón. This supposes a margin of improvement for each municipality, since by reducing the volumes of water losses, it is possible to reduce consumption. This performance in the distribution network depends on the actions of the company, which can undertake improvements and renovation of the network (strongly affected by the construction material of the pipes, their age and their state of conservation), implementation of sectorization and remote control for the identification of leaks, or other mechanisms that help reduce water leaks or losses.

The Seasonality Index makes it possible to quantify seasonal consumption in each municipality, obtained by dividing the month with the highest consumption by the month with the lowest. This index has been made taking into account the average of the years 2016 to 2020, to avoid distortion caused by the impact of the covid-19 pandemic. The highest values correspond to the spaces with the greatest presence of tourists, in both parts of La Manga del Mar Menor. It is followed by Los Alcázares and Mazarrón, with values greater than 2. The lowest seasonality corresponds to Cartagena, since it is where

the majority of the population resides throughout the year, and its tourism is less seasonal as it houses resources of historical-cultural heritage.

4. CONCLUSIONS

Tourism planning regarding water must go through the incentive of saving on water: undertaking saving tools in the facilities, adapting garden spaces to native plant varieties, promoting rainwater harvesting (and land management) as a resource and means to avoid extreme events of floods, to support on the continuity of water recycling and the use of reclaimed water within urban water's portfolio. This leads us to reflect on the need to diversify the sources of water supply, derived from a growing awareness to face the risks derived from climate change and the increase in population in coastal areas. In the area of study, the supply of resources is highly diversified: with contributions from the basin, external contributions from other basins, and those produced through desalination. The former have been variable due to the circumstances that the climate presents, although they must be maintained as long as these climatic and environmental conditions allow it. The transferred waters constitute an indispensable resource for the society of this space: for agricultural and tourist activities, and for human consumption itself; and must be governed by resource availability parameters, maintaining operation when the hydrological system allows it. Desalination has been configured as a tool that allows the activity to be supported when surface resources are scarce, with sufficient installed capacity but which must be reviewed in order to meet future demands: in years of drought, the competition of desalinated water between the human and agricultural consumption has increased. The need to improve its performance should not be forgotten, with regard to the production of the resource with a reduction in energy expenditure and a smaller environmental footprint, as well as the minimization of the impact on the marine space. Similarly, this influences the cost of desalinated water that its users must pay. Although the recycling of wastewater reaches very high percentages in the Region of Murcia, it should continue to be extended to all Sewage Treatment Plants and to undertake potable reuse projects, directly or indirectly.

Efficient consumption of the resource must be achieved: there is no better supply of the resource than the resource that is not wasted.