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Groundwater pollution in Bouira (Algeria): concept and impact on human health

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Abstract

In ALGERIA, increasing demands for safe drinking water and requirements to maintain healthy ecosystems are a real challenge. The objective of this work is to treat this problem over a period of eight years from 1 January 2008 to 31 December 2015 , Based on the use of indicators as tools for evaluating the physical-chemical and bacteriological quality of drinking water and the potential risks to human health in the region of Bouira, Who has known The appearance of many of Water Transmission Diseases. Elaboration of cartography of Water Transmitted Diseases (WTD) over the entire area allowed us to find that the municipalities affected by these diseases are Bouira, Sour El Ghozlen and Lakhdaria. We also noticed an absence of Cholera during the study period, a decrease in cases of typhoid fever, viral hepatitis and irregular distribution of the Collective Food Toxi Infection disease.

Keywords: pollution, groundwater, Water Transmission Diseases, Bouira, cholera.

1. Introduction

Groundwater is the most accessible resource by the individuals who exploit them through the wells. Protection of this resource becomes paramount to avoid the pollution that results mainly from human activity, regardless of natural deterioration related to geological factors.[1]

We are interested in this study by public health and we address this problem in the region of Bouira which has experienced many of Water Transmitted Diseases (WTD). These Diseases can be: amebiasis, campylobactériose , Cholera, enterohaemorrhagic infection, Escherichia coli O157, Giardia, hepatitis A, paratyphoid fever, salmonellosis, shigellosis, typhoid fever and yersiniosis [2] .

We have collect data of different Water Transmitted Diseases (WTD) from this region: Cholera (Ch), typhoid fever (FT), Viral hepatitis (HVA) and collective food poisoning (cfp) on a Period of 7 years from 1 January 2008 to 31 December 2015 in order to be able to map these diseases in the municipalities of this region which is considered to be a high epidemiological risk area [3].

This study makes it possible to list these diseases, according to the causes, we note that during the period from 07 August 2018 to 31 August 2018, the services of the Algerian Ministry of Health registered 03 confirmed cases of cholera in the region of Bouira[4].

2. Material and Methods

Bouira is located in the Northern centre of Algeria in an area of 4456.26 km², consists of 12 Dairas and 45 municipalities, thus representing 0.19% of the national territory with a Population of 820 050 in 2017.

We will address a spatio-temporal study of Water Transmitted Diseases at the department of Bouira, in a period of eight-years ranging from 2008 to 2015 by QGIS Geographic information systems software. This free software will afford us to export the final results in the form of maps by available data.

Water Transmitted Diseases treated in this study are: cholera (Ch), typhoid fever (TF), Viral hepatitis (VHA) and the Collective Food Toxi Infection (CFTI). It is noted that the inhabitants of this department are all concerned by this study except those who have not declared their illnesses.

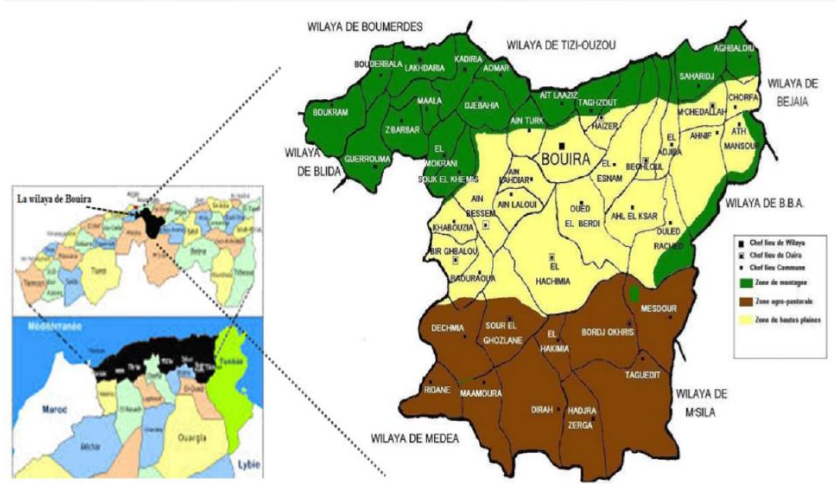


Figure 1: Location map of the department of Bouira.

3. Results and Discussion

Text According to the management of health of Bouira, the cases of the WTD registered durant8 years (from 1 January 2008 to 31 December 2015) are shown in the following diagram (figure 2). figure 03 Shows us the spatial distribution of Water Transmitted Diseases. It should be noted that no cases of cholera are recorded during the period 2008 to 2015. We observe that the most popular municipalities like: Bouira, Lakhdaria, Aghbalou, Sour el Ghozlane and Ain Bessem are the most affected by typhoid fever (TF), Viral hepatitis (VHA) and Collective Food Toxi Infection (CFTI), and they are closest to wadis.

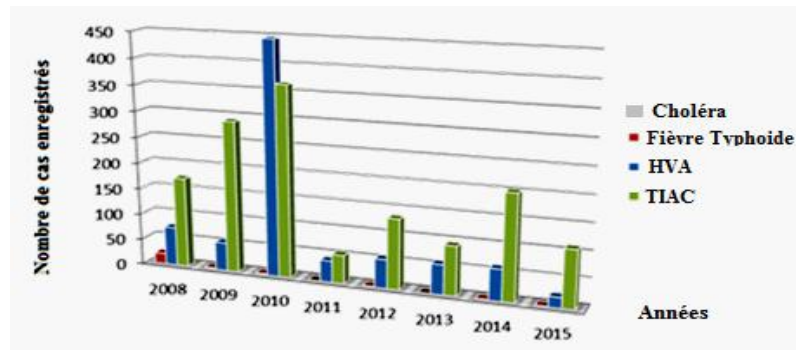


Figure 2 : Evolution of WTD at Bouira between 2008 and 2015 (own elaboration).

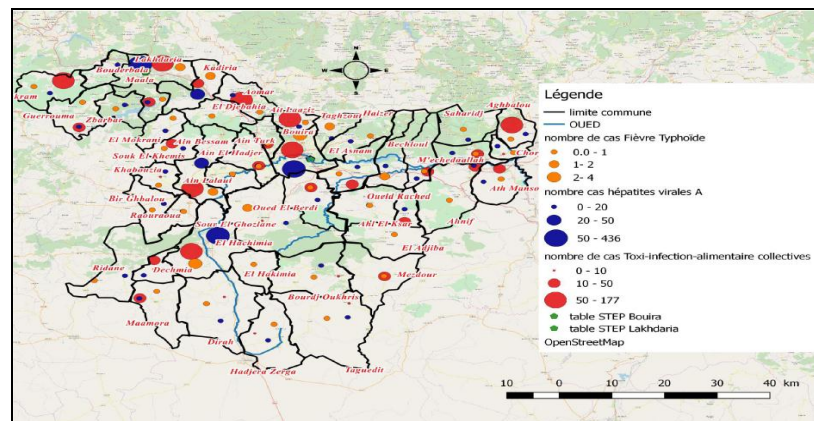


Figure 3 : Areas affected by diseases (FT, HVA, TIAC) in Bouira between 2008 and 2015. (own élaboration)

3.1 Correlation between the number of black spots and the WTD :

According to Figure 4, we note that the municipalities that have cases of black spots in sewers have registered the largest number of the WTD like: Ain Bessam, Sour El Ghozlen, Bouira, and Lakhdaria.

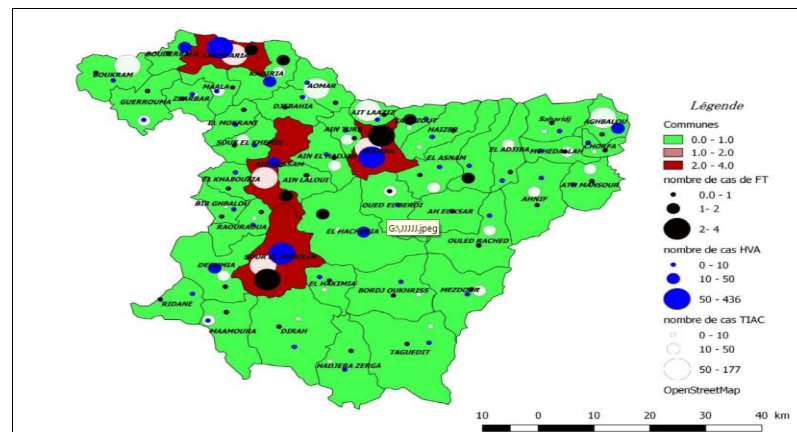


Figure 4 : Impact of black spots on WTD in Bouira.

3-2 correlation between irrigated areas by wadis and WTD :

Using of contaminated water of wadis for irrigation causes a great risk to health. Pathogens can be transmitted to humans when they consuming crops irrigated by these waters. Figure 5 shows us the strong correlation between the distribution of WTD and irrigated areas by wadis in the region of Bouira.

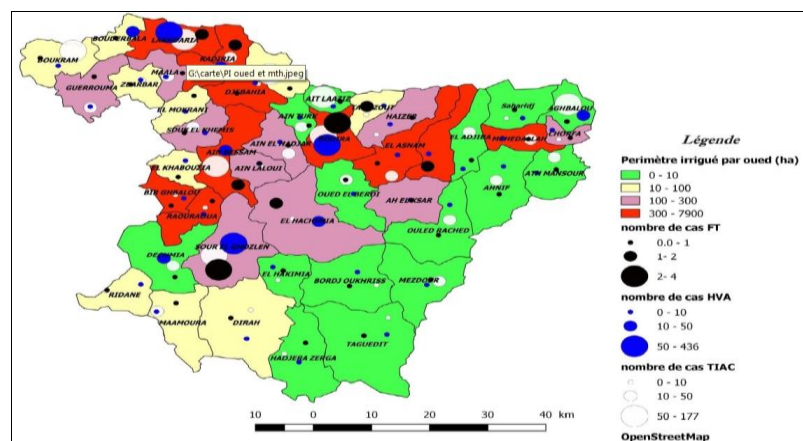


Figure 5 : impact of irrigated areas by wadis on WTD in Bouira.

4. Conclusion

Through our study, it is apparent that Water Transmitted Diseases are mainly due to the poor bacteriological quality of drinking water. The municipalities more affected by these diseases are the most populous like: Bouira, Sour El Ghozlen et Lakhdaria ,Ain bessem, aghbalou. These WTD are caused by: the connection of drinking water with that of wastewater through black spots, irrigation of agricultural areas by Wadis, individual wells and natural water sources that present the absence of disinfection. These diseases affect children and older people much more.

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