Preliminary results about the Health Impact of a Water and Sanitation Program in Tangier (Morocco)

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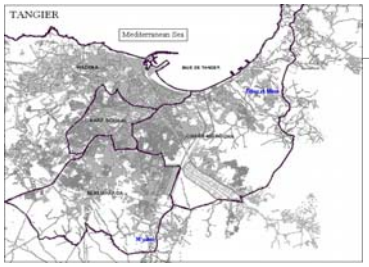
Introduction:

Water and sanitation is one of the primary drivers of public health. Health status is closely related to the quality of drinking water (water-borne diseases), to its scarcity (waterscarce diseases) and to the efficacy of wastewater treatment [1,2].

A very large water program was designed for the 2004-2009 period to improve water supply and sanitation coverage in the urban coastal districts of Tangier (750,000 inhabitants).

At the same time, a longitudinal study was undertaken to assess the health benefit of this program and is ongoing (final study results are expected for 2010).



Methods:

Health impact of the water and sanitation program is assessed through a pre-post methodology. An epidemiological register was implemented in 15 health facilities in order to follow the incidence of three potentially water-related diseases: diarrhoea in children under 5 years, conjunctivitis and skin infections in the overall population.

Simultaneously, twice-yearly surveys were conducted in two pilot districts (Dhar El Mers, Mrabet) which had no water supply other than wells/fountains nor wastewater systems, at the beginning of the study. Every 6 months, 70 households (≈ 400 people) were questioned to qualify water use, hygiene practices, water preservation methods, exposure to sea bathing. Samples of drinking water were also twice a year collected for microbiological analyses .

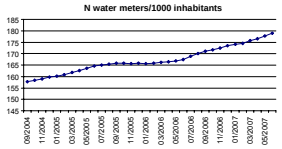
Results:

Available data were collected before and during the implementation of the water supply and waste water system.

Water supply and waste water system progress in the city

If the number of dwellings supplied with water increased steadily over the period, today only 14.2% of Tangiers sewage disposal is still collected due to some delay in the opening of the major city sewage plant and of a drainage channel.

Figure 1: Progress in water supplying (N individual water meters)



Epidemiologic follow-up of water-borne diseases in the whole city

From September 2004 to June 2007, about 11,100 cases of diarrhoea in children (0.3% severe), 2,112 cases of conjunctivitis and 2,016 cases of skin infection (bacterial or fungic infection) were treated in the public health care facilities of Tangier.

Table 1: Population characteristics

	Children diarrhoeas	Conjunctivitis	Skin infections
Cases	11,100	2112	5 773
Average age	18.1 months	17.0 years	17.5 years
Sex (% Male)	55.1%	43.8%	44.1%
Location (% of cases)	Beni Makada (38.3%)	Beni Makada (39.9%)	Charf Moghogha (37.8%)
Access to the beaches of Tangier	8.8%	17.9%	26.3%
No access to drinking water	11.4%	/	/

Following figures present the overall incidence of the selected water-related diseases in the Tangier's area over the time.

Figure 2: Incidence of diarrhoea in children under 5

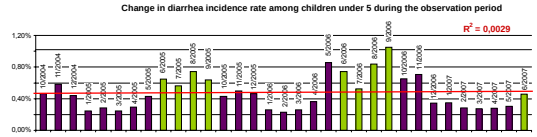


Figure 3: Incidence of conjunctivitis in the overall population

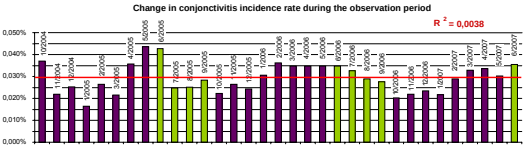
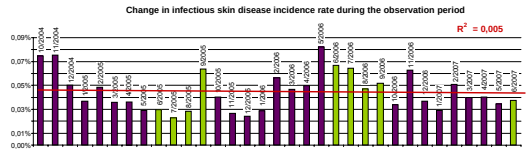


Figure 4: Incidence of skin infections



A clear seasonal effect was observed for diarrhoea with a decrease in winter, whereas conjunctivitis and skin infections seem to be less affected by such effect. No clear progress was made until now.

Investigation in the two pilot districts

- **Drinking water access**

Figure 5: % of household declaring having water-supply difficulties

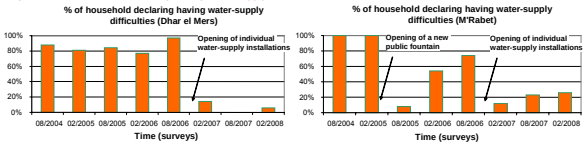
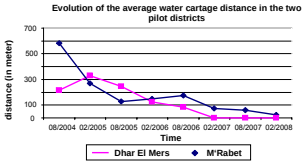


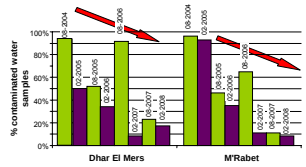
Figure 6: Improvement in the average distance which a person should have to cart water



Water-supply was a major difficulty for the families living in the two pilot districts two years ago. In M'Rabet, opening of a temporary fountain partly improved the situation in the following months. Most households were fully equipped with on tap water supply in early 2007,

- **Drinking water quality**

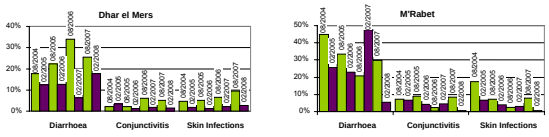
Figure 7: Contamination of drinking water in the two pilot districts



A clear decrease was observed in the two pilot districts in the percentage of contaminated drinking water samples.

- **Water-related diseases**

Figure 8: Incidence of diarrhoea (in children under 5), conjunctivitis and skin infections in 2 pilot districts



Clear improvements in the water-supply in the two pilot districts water were not, until now, associated with a clear decrease of the incidence of diarrhoeas, conjunctivitis and skin infections.

This situation may be related to the fact that sanitation systems are not fully operational in the two districts until now.

Further investigations will be conducted to document changes in hygiene and bathing habits of the population.

Conclusion:

The initial situation of the Tangier area was characterized by a high level of water-related diseases and a poor quality of sea and drinking water. Some indicators had already improved in the pilot areas due to the first actions of the programs (i.e contamination of drinking water).

Anyway, until now, no major changes were observed in the incidence of water-related diseases. Major changes would likely occur only after the end of civil engineering works all over the city, especially those in relation with water sanitation.

References:

1. World Health Organization (WHO) and United Nations Children's Fund (UNICEF) : Global Water and Sanitation assessment 2000 Report. (Rapport sur l'évaluation de la situation mondiale de l'approvisionnement en eau et de l'assainissement en 2000)
2. World Health Organization (WHO) Facts and Figures, Water Sanitation and Hygiene Links to Health, August 2002. http://www.who.int/water_sanitation_health/General/facts and figures.htm

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