

# Review of: "Reducing non-revenue water in Egypt using GIS"

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Potential competing interests: No potential competing interests to declare.

## **Review on Preprint “Reducing non-revenue water in Egypt using GIS” by Zakaria Yehia Ahmed**

Monitoring leaks of any resources related to the life support of residents of populated areas is an extremely urgent task. And the relevance of this task will continue to increase, taking into account the fact that mineral resources are being depleted, technologies for renewable energy sources are developing quite slowly, and people's consumption of resources is increasing with the development of civilization and with the growth in the number of people on the globe. Water is the main resource for human life, so water leaks need to be given increased attention.

The subject of the study is physical water losses due to leaks in pipelines and their connections to water distribution systems.

In the developed multi-factor methodology for reducing UFW rates, it is necessary to emphasize that the installed meters must have built-in digital ports (eg, RS-485, LoRa, GPPRS, etc. – such as Gentos Domestic RS485 Ultrasonic Water Flow Meter F2, SH Lora Wireless Ami Water Meter DN15-25 and another meters) and with Internet connection to allow remote readings and implementation in information and computer accounting systems (ICAS) of utility companies.

Undoubtedly, the presented comprehensive action plan has methodological value. However, the proposed solutions involve a large number of operations that must be done manually. This will not only increase the cost of project implementation due to the involvement of new people and equipment, but will also significantly increase the time interval between the detection of UFW and emergency response measures for physical leaks.

In addition, the presentation on a single map of all small components of the water supply system (valves, fire hydrants, etc.) will reduce the concentration of attention of the operator who carries out visual control on the monitor of the ICAS in question.

Of course, the integration of the GIS application with other ICAS applications will bring fruitful results in the future. However, the authors are absolutely right that in the first place in Section 3. Problem Solution they indicate the need to “Decrease the redundancy of data”.

Therefore, I think it is advisable not to create a detailed square-by-square formation of the considered map, but layer-by-layer - with an enlarged representation of the city's water supply system and further detailing by nodes/components on deeper layers of the ICAS. This will allow for the urgent deployment of a rapid response team to places where

pipes/connections of the water supply system have broken, without wasting time on detailing.

In addition, when forming the necessary teams, I consider it useful to provide a call center group to be able to respond to signals from citizens about accidents and other problems in the water supply system.

In general, I consider the study useful and timely for providing the population with vital resources not only in Egypt, but also in all places where people live. This project deserves to be supported at the state level (and appropriate funding), since the research areas affected (and the structure and location of drinking water supply systems, as well as access to satellite images) are classified as information with limited access and cannot be brought into the purely commercial sphere of activity.

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