

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

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**Potential competing interests:** No potential competing interests to declare.

## General Recommendation:

The first general suggestion is to write in the third person, use past tense, and employ the active voice. Additionally, here are some constructive suggestions to enhance the text:

## Clarity in the Introduction:

Consider simplifying the definition of UFW to make it more accessible to non-specialized readers.

Expand the explanation of physical and non-physical losses to ensure readers clearly understand the various categories.

## Connection between Introduction and Problem Formulation:

Ensure a smooth transition between the introduction and problem formulation, highlighting how UFW directly affects utility companies in Egypt.

## Problem Formulation:

Delve into the reasons behind the companies' inability to recover total expenses. What specific financial challenges do they face?

Provide specific examples of how UFW negatively impacts utility companies' operations and budgets.

## Research Objectives:

Expand the objectives section, emphasizing how the proposed methodology will address specific challenges identified in the problem formulation.

## Methodology:

Provide a brief description of why these specific steps in the methodology were chosen. How do they relate to the specific challenges faced by utility companies in Egypt?

Consider adding an introductory paragraph linking the methodology to the research objectives.

## Timeline and Pilot Zone Selection:

Explain in more detail the criteria used to select the pilot zone. What factors were considered, and why are they relevant?

Break down the timeline into specific steps to provide a clearer understanding of the implementation process.

## Pilot Area:

Consider providing a brief context on the importance of Luxor for the study, highlighting its antiquity and historical

relevance.

Detail how the selected boundaries ensure the study's effectiveness in leak detection.

#### Map Creation:

The explanation of data conversion from AutoCAD to GIS is clear. However, briefly highlight why ArcGIS was chosen and how it contributes to the study's objectives.

#### Data Modeling:

Explain why the pilot area was divided into specific grids. How does this facilitate data collection and analysis?

Provide a brief description of the created database and how it links to the UFW study. What specific information was collected, and how is the database structured?

#### Satellite Images:

Ensure that figures related to satellite images are available and well-labeled.

Highlight the importance of satellite images in map preparation and how they facilitate the identification of key elements.

#### Analysis and Statistics:

Detail the data collection process in the field more specifically. How is measurement accuracy ensured, and distances verified?

In the statistics section, provide a brief interpretation of the results presented in Figure 4. What preliminary conclusions can be drawn from these statistics?

#### Problem Solution:

Explain in more detail how the formation of specific teams addresses the challenges identified in the research. How does each team contribute to the overall problem solution?

Ensure that the points listed under "Problem Solution" are more clearly structured for improved readability.

#### GIS Links:

##### Table of Water Customers:

Consider adding a brief explanation of what each meter status means and how they are classified.

#### Reduction of UFW Percentage by Commercial Activities:

Provide a brief description of how the reduction in the UFW percentage was specifically achieved through commercial activities.

Consider breaking down the steps taken by the commercial sector to improve reader understanding.

#### Consumption Analysis:

Provide a clear interpretation of the results in Table 3. How does average consumption relate to the reduction in the UFW percentage?

#### Results Explanation:

In the section "Given that the 1727 meters include...", provide a brief explanation of how the conclusion is reached that the decrease in the UFW percentage will not be affected by the replaced meters' calculations.

Ensure that calculations and conclusions are presented logically and are easy to follow.

#### Clarity in Conclusions:

Ensure to provide a brief explanation of how the reduction of 32.2% due to leak repairs and 4.5% due to commercial activities was achieved. This will help readers better understand the results.

#### Comparison with the City of Luxor:

Provide more details on how the 30.2% reduction in Luxor was calculated and why the current UFW percentage in the city is 20%. This will help contextualize and understand the magnitude of the improvement.

#### Presentation of Percentages:

Ensure that the formula used to calculate the current UFW percentage in the pilot area is clearly explained. This will help readers follow the logic of the reduction.

#### Recommendations:

##### Detailed Explanation of Recommendations:

Provide more detailed explanations of how each recommendation will contribute to UFW reduction. This will provide a clearer understanding of practical implementation.

#### Handheld Device in Meter Reading:

Provide information on how the implementation of handheld devices will reduce errors in meter readings and how they compare to manual methods.

#### Installation of New Meters:

Explain why the installation of new meters is crucial to reducing unmetered connections and how this issue will be addressed.

#### Incentive System:

Detail the type of incentive system suggested for Luxor's staff and how it is expected to impact UFW reduction.

#### Bulk Meters:

Explain how the installation of bulk meters at water treatment plants will improve the accuracy of water production and contribute to UFW reduction.

#### Orientation for Commercial Sector Staff:

Specify key topics and areas that will be addressed during the orientation of commercial sector staff.

#### Implementation of Illegal Connections Policy:

Provide details on the illegal connections policy and how it plans to be implemented with the collaboration of the 12 individuals with legal authority.

**Study Replication:**

Explain the importance of replicating the study in all Luxor districts and how the attached program was selected for this purpose.

**Increasing Staff:**

Provide justification for the increase in staff and how each specific department will contribute to the success of the study's replication.