

## **USING GEOGRAPHIC INFORMATION SYSTEMS IN TRACKING THE RELATION BETWEEN WATER POVERTY & DEVELOPMENT INDICES**

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As the water sector in Egypt plays huge effort and faces great challenge to sustain enough water for the rapidly increasing population, however still safe drinking water represents a critical constrain for development, on which, without progressive work development would be impossible.

Internationally: Egypt is a medium human development country ranking 115 with HDI = 0.680\*

Nationally: 6,847,500 people have no access to safe drinking water. \*90,000 Citizen\*\*and 17,000 Child\*\*\* die each year due to water related diseases.

Referring to the previous figures, accessibility to piped water as a human right is not that important in Egypt, moreover it doesn't consider quality or quantity of accessible water.

Here comes the objective of this paper: To examine the impact of water poverty quantitatively and qualitatively on the Human Development Index (HDI) in Egypt.

The Hypothesis made is that:

There is a direct relation between water poverty, public health, human productivity and the overall medium country profile.

Reaching to such result must pass through:

- Clarifying the conflict in defining some keywords like: Piped water, water poverty, and water accessibility according to governmental definitions and individual perceptions based on field interviews and surveys in urban and rural areas in Egypt.
- Tracking the relationship between rates of water accessibility and each of human health, individual productivity, and the final human development index in Egypt.

Case Study: According to the United Nations human development report /Egypt 2003:

DarEsalam district was the poorest district in Egypt in Human Development Index = 0.529 with percentage of total households without access to piped water 70.9 % and highest percentage of population suffering from kidneys failure diseases because of polluted drinking water .

Domiat district ranked the richest in Human Development Index = 0.708 with percentage of total households without access to piped water 0.77 %

By Using ArcGIS: as a tool that relates information to geographical location and overlapping layers in order to achieve a comprehensive analysis of data: rates of districts of Egypt was tracked in some indicators like, human development index (HDI), gross domestic production (GDP) ,water accessibility rates , maternal mortality, literacy rate, unemployment rates, water related diseases:

An impact of water poverty quantitatively and qualitatively on the overall country achievement can be clearly noticed.

Conclusion:

Water poverty may be not the only factor affecting human productivity, however it is one of the most critical factors, since on quantitative and qualitative basis: water affects human health, which by its turn affects his mental and physical capabilities and abilities, moreover it may cause him certain disabilities, which will certainly limit his productivity leading to delaying the country overall profile on the international level. Which will certainly need deeper analysis to support effective decision making based on Geographic information systems analysis. And this what the paper will present.

## **DISCHARGE ESTIMATION BY CONTINUOUS MEASUREMENT OF WATER VELOCITY**

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Accurate discharge estimation is crucial for an efficient river basin management and especially for flood forecasting and issuing warnings related to possible extreme flood events. The traditional way of estimating the discharge in hydrological practice is to measure the water stage and to convert the recorded water stage values into discharge by using the single-valued rating curve, which is a relationship between the stage and discharge derived from direct measurements of discharge, which are done at convenient times with measurements of flow velocities at different points over the gauging cross section, and hence the discharge values of the rating curve for the extreme events are usually extrapolated by using different mathematical methods and are not directly measured. By using the Starflow ultrasonic Doppler instrument we recorded the actual relation between the water stage and the flow velocity at the occurrence of flood waves. Unsteadiness in the water stage – water velocity relation causes the trajectory of the flood event to

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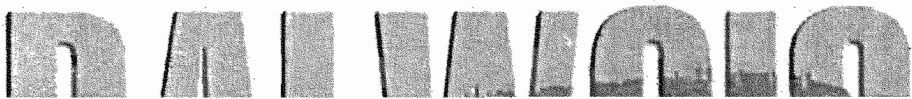
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