Ariel Aviram
Progress report: first semester 2020/21

Evaluation and examination of the geopolitical and social structure for implementing water technologies in developing societies in Sub-Saharan Africa How can the barriers be circumvented?

Introduction

Background: Worldwide water crisis is a severe issue that humanity is facing throughout this century. This water governance caused by the combined effects of population growth and demographic changes, aside with climate change, water source contamination, depletion, and the ways we mismanage water[1]. The many aspects of the water crisis are proving extremely difficult for many governments to confront it effectively. Therefore, one of the World Water Assessment Program (WWAP), founded in 2000, helps governments develop and implement their national water management plans[2]. Management plans include the technological aspects of water, sanitation, and hygiene (WASH) services improvements and social, political, and economic aspects that should be considered when implementing the technologies in the communities.

Water and Humanity: Water is a cross-cutting issue which directly linked to many aspects of human life. Access to clean water directly influence poverty eradication, education, gender, and environmental sustainability. Water significance to humanity concisely presented in the first world water development report (WWDR) from 2003: *the symptom and the cause of the world water crisis is poverty of a large percentage of the world's population*, therefore g*iving the poor better access to better-managed water can make a big contribution to poverty eradication.* This connection between safe access to water and socio-economic development is highly significant. Access to safe water and proper sanitary conditions are essential variables that give the population the physical and mental capacity to develop outside the vicious and endless cycle of life in poverty[3]. In this sense, without access to water, even the most basic economic well-being cannot exist.

The problem and examples: Understanding the linking described above encouraging efforts and capital that has been invested in impoverished communities in sub-Saharan Africa over recent decades. As part of these efforts, many significant water and engineering projects have been carried out to improve access to safe water by bringing different water technologies and knowledge to that region. But technologies and solutions by themselves are not enough. There are many examples in the literature of local-level implementation attempts of water technologies that failed to achieve their goals. In most cases, the technologies and knowledge imported to provide the local people's basic conditions were not absorbed. The provision of the basic needs remained a personal and community survival burden[5]. The

reasons for the development of barriers to adopting technologies and knowledge among these communities may lie in the/ socio-cultural gaps between Westerners and developing communities[6]. Technological interventions such as access to water for a remote village are expected to improve living conditions for the community members, but also to abolish old traditions and customs and create a dramatic change in the familiar and safe social and political local environment. In 25 sub-Saharan African countries, UNICEF's study estimated that women spent 16 million hours collecting water each day[7]. In these communities, women have served in the traditional role of collecting water for generations.

External technological water intervention, such as drilling a new water-well nearby the village, is expected to solve a severe water scarcity but parallelly to affect, permanently, the entire social fabric. Such changes involve concerns about the survival of the existing and recognized social structure[5]. As presented above, despite the enormous efforts of the companies, organizations, and NGO's to suggest appropriate and relevant, real solutions to improve local water supplies and to prevent the local severe water scarcity, it is mostly failed due to the socio-cultural gaps between good-will Westerners and the local developing communities[6]. However, the alarming situation in Sub-Saharan Africa is that only 27% of the population have access to safe drinking water.

The research gap:

According to our best knowledge, those enormous efforts done by many and various good-will organizations did not involve multidisciplinary work and did not take any socio-economical barrier into consideration while trying to contribute their WT and knowledge. Usually, the collaboration is done by scientists using the same thinking methods; for example, many projects were done by engineers and scientists from life and exact sciences to achieve technological thinking methods from the humanities and social sciences. However, very rarely, the two sides of disciplines' (culture and technology), are merging their thinking methods in a mutual research project to achieve a real well-adopted, and sustainable change. Achieving water access in developing countries is a tremendous challenge for many organizations. This proposed study assumes that the main reasons for these challenges and the failure to implement WTs relate to geopolitical, cultural, and local society structure, which poses barriers to implementing any scientific technologies.

Research focus: The focus of this research is to figure the appropriate ways to circumvent geopolitical, cultural, and social barriers, as this understanding is a significant key for finding the right ways to circumvent them in order to implement WTs. For the first year, the field study will be conducted in Tanzania in collaboration with Innovation Africa (IA). During the field study, we will examine how water drilling projects affect African societies and whether the interventions that were done by IA encountered

some barriers. This field study has a unique contribution to this research as it gives the opportunity to investigate the communities along a process of technology implementation. The study will also explore whether social, cultural, or geopolitical barriers affect the project implementation and success.

Progress report - first semester

During the first semester of the year 2020/21, the student participated in the MA Developing Countries research program of Tel Aviv University. As part of the program, various courses were taken to complete the Socio-economic, Technological, and cultural aspects needed to conduct the field research planned for the summer. For example, Technology for Sustainable Development, Society and Sustainable Development, Project Design, Implementation, and other additional courses are required to understand the research structure and statistical aspects.

In parallel with the academic aspects, collaborations were formed with SID Israel and IA NGOs to conduct joint research. As part of the partnership with IA, we are planned to fly to Tanzania in early February for three weeks to get to know the villages, communities, and IA staff working there. This trip's primary purpose is to prepare for the field research carried out during the summer. In the first phase of the study, we will want to understand the socio-economic effects caused by IA interventions. During the trip, we will visit the different villages and select several interventions at different stages in which we will want to focus on research in the summer: *Stage 1* - Communities before the well-drilling phase (preliminary assessment). *Stage 2* - Communities in which intervention was carried out several months ago. *Stage 3* - Communities in which intervention was carried out a year or more ago.

Work plan for the spring-summer seamstress and next year

1) A review of the scientific literature for what had been done in this field to date.
2) Building a database of projects regarding WTs implementation in Africa that have been tested, have been carried out so far, and that is planned to be implemented by Innovation Africa.
3) Defining project success parameters.
4) Definition indicators of geopolitical and social change
5) Examine IA implementation models.
6) Travel and live in Africa for several months to follow up on and document previously implemented projects and examine current and future projects.
7) Analysis of the projects which already carried out.
8) Analysis of planned projects.
9) Writing a summary report.

A continues work

This research should be the first stage for long-term work in implementing WTs for WASH improvements in developing countries. Learning in deeply the IA strategy to implement groundwater wells and assessing the geopolitical, cultural, and social barriers that may stop the technology's adsorption and examine their succession is tremendously essential. It will promote our barriers understanding and sharp and indicate the strategy and model that should be taken and adopted during the implementation of WTs in developing countries.

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