Social Capital & Water Conservation Behavior in Egypt

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Abstract

Water represents national security issue in Egypt due to population rising, agricultural expansion, industrial development and recently construction of Ethiopian Great Dam. Facing such communal issues is affected by the levels of social capital. The Egyptian government guaranteed water conservation by issuing laws to be officially implemented. This paper examines water conservation strategies as environmentally sustainable commitment of embracing new activities, gaining behavioral norms, and getting used to saving water as unrenewable resource for life.

Social capital is the relationship in which individuals can obtain information, knowledge, and resources through social networks, shared norms and values, and trust. It requires measuring the effect of individual's attitudes based on the above three categories to find sound solutions for changing water saving behaviors. The researchers explored how social capital standards could be carried out by Egyptian youth in an effective manner through conducting 400 questionnaires using 'convenience sample' distributing them among MSA university students measuring the relationship between social capital (individual engagement and participation) and water conservation behavior.

The study found that horizontal social bonding and bridging between family and friends is stronger than vertical linkage of strangers and neighbors' social networks among MSA students. There are weak ties within social capital networks which affect negatively the water conservation behavior. Results also showed that the impact of social capital in shared norms and values reveals less self-sustaining solutions regarding water saving behavior.

Recommendation built on the fact that impact of TV and radio have great influence of more than the demographic orientation (home and friends) in strengthening water conservation behavior regarding sharing knowledge, purpose, and vision. Ironically, students expressed that they did not hear about water saving behavior from university, a fact that needs further initiatives.

Introduction

Water means life to any nation. Water represents a national security issue. Egypt is one of the countries that has a significant water issue due to its rising population, agricultural expansion, industrial development and recently the construction of the Ethiopian Dam. According to the Egyptian website of State Information Service, Egypt's water share estimates 55.5 billion cubic meters in accordance to the 1959 Nile Water Agreement. As well, Egypt is one of the few countries that solely depends on one source of water: The Nile River, as it "supplies about 97% of the annual renewable water resources in Egypt." (Wagdy, 2008)

Facing such communal issue is affected by the rate of social capital in any given society. According to the father of Social Capital Theory, Robert Putnam, community engagement and capacity building initiatives are considered a potential substitute for official solutions (Putnam 2000). Indeed, the Egyptian government introduced internal field and media campaigns "Water… Life"; under the supervision of the Ministry of Housing Utilities & Urban Communities (2019) and other external efforts through interventions (Egypt State Information Service, November 2019) according to various agreements: Declaration of Principles between the Arab Republic of Egypt, the Federal Democratic Republic of Ethiopia and the Republic of the Sudan on the Grand Ethiopian Renaissance Dam Project (GERDP, March 2015) to solve drought and water issues. Despite all of these efforts, engaging

and motivating individuals inside the community for adopting proper water behavior remains the best practice.

In this paper, water conservation strategies will be tackled as environmentally sustainable commitment of embracing new activities, gaining behavioral norms, and getting used to saving water as unrenewable resource for life. The researchers examined how social capital standards, like water conservation behaviors could be carried out by youth in an effective manner.

Water scarcity now and in the future

The Egyptian government initiatives tried to guarantee water conservation by issuing laws to be implemented officially by the government and its minsters. Hence, huge portion of peasants conformed to pay the issued fine, while few others refused; knowing that statistics for water consumption in Egypt reached its higher percentage for water usage in agriculture (85%), followed by industrial use (11%) and finally home utility (only 4%). (Khalifa, 2015).

"Groundwater utilization has been steadily increasing in Egypt for the last twenty years." (Wagdy, 2008) The national water balance sheet strategy for Egypt projected that the country was prone to water shortage by 1995/96; a challenge that was addressed by the authorities making sure to compensate for such shortage by reusing drainage and ground water.

Recently the Minister of Housing Asem el Gazzar reported to Egypt Today that "five drinking water and sanitation projects are being implemented in Cairo; that is expected to add 2.26 million cubic meters to the city's current capacity." (Egypt State Information Service, 2019)

Egyptian laws were issued for regulating planting rice and sugar cane due to their excessive water consumption. Accordingly, the Egyptian government monitored planting rice by satellite to ensure the assertiveness of agricultural banning in some cities all over Egypt; Aswan, Luxor, Qena, Sohag, Assiut, Mina, Beni Suef, Fayoum, New Valley, Giza, Cairo, Qalyubia, Menoufia, Marsa Matrouh, North Sinai, South Sinai, Red Sea and Suez. (Abo El Nour, 2019)

The Ministry of Water Resources & Irrigation (MWRI) issued L.E.3600 penalty for rice planting in banned cities. (Nassar, May, 2019) According to Table 1; only nine cities are allowed to plant rice on 724,000

acres; Dakahlia, Sharkia, Port Said, Damietta, Kafr El-Sheikh, Beheira, Ismailia, Gharbia, Alexandria. (MWRI, monitoring report, 2019)

Table 1: Rice crops planted and suggested areas across Egypt in acres (23 July, 2019)

City	Issued area for planting	Area planted on wastewater	Suggested areas for dry planting	Suggested areas for salted water planting	Real planted areas
Dakahlia	182,500	11,000	50,000	52,000	461,500
Sharkia	127,850	17,000	48,500	35,000	357,400
Port Said	30,000	Zero	Zero	4000	39,100
Damietta	42,000	Zero	1500	2500	58,300
Kafr ElSheikh	189,800	17,000	29,500	41,000	371,700
Beheira	106,650	5000	40,000	40,000	298,000
Ismailia	2750	Zero	1000	1500	12,500
Gharbia	40,600	Zero	29,500	Zero	112,100
Alexandria	2000	Zero	Zero	1000	3500

Social capital and water conservation

Social capital is the relationship in which individuals can obtain information, knowledge, and resources through social networks, shared norms and values, and trust. Studying water conservation in a certain society using social capital standards required measuring the effect of people's attitudes based on the above three categories and finding sound solutions involved changing water saving behaviors.

Social networks are the structural dimension of social capital which determines the pattern of connections and links society members. Its strength or weakness is based on the diversity of ties (bonding, bridging, and linkage), the direction of ties (horizontal and vertical), and the formality of ties (formal and informal). In this research, researchers will study the strength and diversity only of social networks, as shown in Table 2.

Table 2: Measuring levels of social capital strength and diversity and water conservation

Levels of strength & diversity	Strong ties	Weak ties
Horizontal Bonding ties	Friends and families talk about water conservation	Sharing in voluntary projects among friends and families
Horizontal Bridging ties	Colleagues and neighbors talk about water conservation	Sharing in voluntary projects among colleagues & neighbors
Vertical Linkage ties	Strangers talk about water conservation	Sharing in voluntary projects among strangers

Cognitive dimension of social capital can be practically measured in shared norms and values adopted by people in a given society like: shared emotional connection, shared knowledge, shared vision, shared purpose, social support, collective goals, affective bonds, and civic norms. Norms and values lead to self-sustaining solutions to challenges and opportunities like water conservation that makes it less dependent on government laws. In this research, researchers will study the willingness of individuals to embrace water saving behavior, as shown in Table 3.

Table 3: Measuring willingness of people to share norms and values about water saving

Shared norms & values	Willingness for water saving
Shared knowledge	Heard about water saving at home, school & university
Shared vision	Shared water conservation vision between friends and family
Shared purpose	Having chance of working on water saving projects

Trust measurements are classified into two levels; individual's trust in people (general & limited interpersonal trust) and trust in institutions (political, law, and NGOs institutional trust). In order for people to lead a comfortable life, solve their problems and participate in the societal challenges, they need a personal feeling of trust with whom they interact. From the concepts that can be used to measure trust is "general outlook of human nature (evaluations), affective attitude (experiences), a relationship (expectations) and a decision (experiments)." (OECD, 2017) In this research, researchers will examine trust levels depending on the previous four dimensions, as shown in Table 4.

Table 4: indicator of well-being for levels of trust among the four broad dimensions

Levels of trust	Dimensions of trust in water conservation issue
Evaluations	Safe feeling of water sufficiency in Egypt
Experiences	Loyalty to the community and trust in their solutions to solve water issues
Expectations	Trust in Egyptian government strategies in saving water
Experiments	Meaningful feeling of water saving issue and actions towards it

Literature Review

There are five types of capitals other than social capital; natural capital (land, water, air, minerals, and forest resources), financial capital (funds, earning, debt and equity financing), manufactured capital (buildings, machinery, and equipment), intellectual capital (patents and copyright, company and brand reputation), and human capital (competencies, skills, expertise and experiences of employees that create company's value). There is a clear bond between social capital and other types, in which relationships between people and groups is an instrument for the development of human capital, facilitator of intellectual capital, and the result of tangible financial and manufactured capital. (OECD, 2017)

In 2009, a study was carried out by Dr. Amal Abdel Rehim from King Saud University, titled, "Attitudes of Saudi University Student towards a Culture of Rationalization of Consumption: An Applied

study," distributed among a determined sample of 550 female students, in which the researcher came out with important findings. One such findings indicated a statistical significance in the relationship between the female student's social background and her knowledge of the culture of rationalizing consumption and practicing this culture. Meanwhile, she found a small role being played by media sources in spreading this culture. Accordingly, based on the theoretical and field study, Dr. Abdel Rehim advocated several recommendations that should be undertaken at the university, community and family levels. These recommendations indicated that there is around definitely a knowledge of (79%) of the culture of rationalization of consumption among the students. This knowledge is related to the economic conditions experienced by the Saudi society during the years 2005 until 2009. Seemingly, the Saudi society suffered from various factors ranging from stock market crash, inflation, skyrocketing prices due to global financial crisis which had its negative repercussions on all aspects of life in the kingdom.

Only 42% of the respondents indicated that they had some knowledge of the culture of rationalization of water consumption through very limited sources of knowledge and that neither had governmental nor non-governmental institutions played an effective role in spreading such culture. The study also implied that a great portion of such knowledge resulted from the family and consequently from the society. Indeed, such culture spread the most in urban society as it estimated (93%) as opposed to rural areas (86%) and nomadic areas (80%). Naturally, the same applies to students dwelling in high-class neighborhoods (85%), rural (72%) and nomadic (75%).

Paradoxically, the study revealed that community institutions were less interested in spreading the culture of water consumption, in general, especially the university and media as only (8%) could be gained from a scientific lecture on the rationalization of water consumption and only (1%) from radio programs and (19%) from reading books. Nevertheless, of the respondents have learned about the concept of water rationalization consumption from TV programs (72%) and (93%) from university professors. Accordingly, coordination between all media and educational institutions was strongly recommended.

Literature on social capital carried out by environmental psychologist McKenzie-Mohr's (1999) highlighted the importance of removing

barriers to sustainable behaviors while considering social norms and the visibility of the action in shaping citizens' behavior. According to Lindstrom and Johnson, social capital is the collective interest of citizens of any given society to adopt a pro-environmental or rather environment-friendly lifestyle. By promoting social capital, citizens will be encouraged to act at a community level and work together in promoting shared benefit on environmental and sustainable initiatives. (Miller, 2000) Yet, fostering environmental sustainability was subject of interest especially in psychological literature as the process deals with how we ought to consider social norms for their impact on environmental behaviors. This can be done by "gaining individual commitment to try a new activity, modeling new norms of behavior and using prompts to remind people to do a particular activity. (McKenzie-Mohr, 2000)

In their research published online titled, "The Impact of Social Capital on Residential Water-Affecting Behaviors in a Drought-Prone Australian Community," Evonne Miller & Laurie Buys (2014) of Queensland University of Technology, Brisbane, Queensland, Australia suggests that "building social capital may foster prevailing visible home water use behaviors; hence, for social capital to foster sustainable behaviors, they must be, or have the capacity to become the norm in the community." While social capital may be an admirable goal, it is important to utilize a social capital approach for the purpose of fostering sustainability by "identifying, understanding, and potentially shifting prevailing community values, behaviors, and norms to ensure that desirable water consumption and usage norms are visible."

Methodology

Participants in this research were university students aged between 18-22 years old. The researchers used convenient sample of 400 questionnaire distributed among university students from various faculties with the goal of measuring the relationship between social capital (individual engagement and participation) and water conservation behavior and how it may foster an environmentally sustainable water behavior on the individual-level.

Research Questions

1. What is the effect of social capital strength levels and diversity of ties on water conservation behavior?
2. How does the willingness of sharing norms and values affect the impact of social capital on water conservation behavior?
3. How do the four trust levels affect water conservation behavior?

Findings

The questionnaire data collected by researchers, generated charts for students' opinion of three main dimensions of social capital; social networks, shared values & norms, and trust. Three main research questions were explained as follow:

1. What is the effect of social capital strength levels and diversity of ties on water conservation behavior?

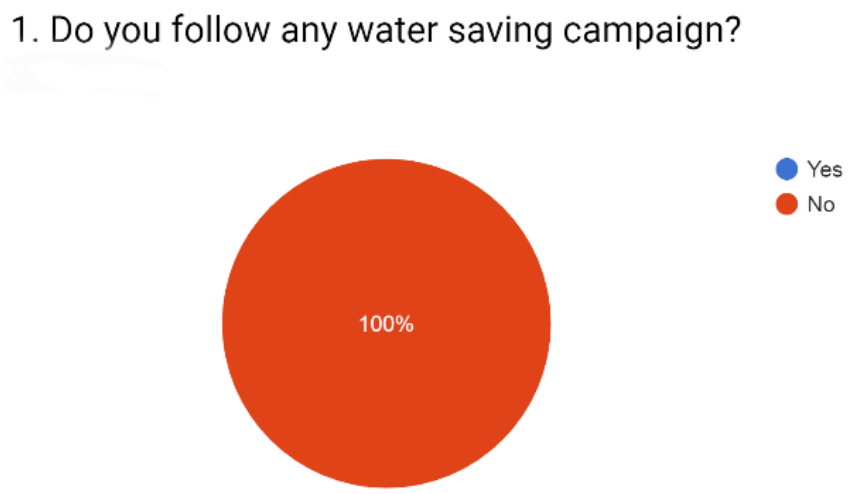

Figure 1. Following water saving campaign

All respondents weren't following any water saving campaigns. These results show that vertical linkage ties are weak between university students as Egyptian citizens and the civil servants. This also indicates that the impact of social capital on social networks is **negative**.

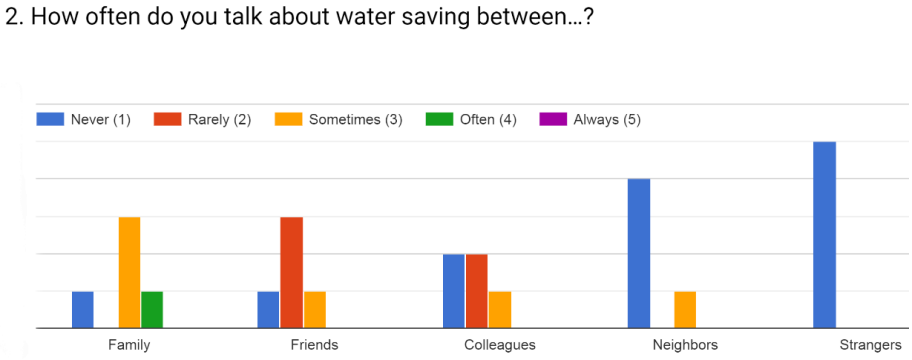

Figure 2. Taking about water saving

None of the respondents stated that they **always** talked about water saving issues between their social networks. Most of the respondents denied alerting strangers against water saving behavior. Though family members sometimes stress the importance of saving water behavior among each other, rarely does friends talk about the issue. The horizontal bonding and bridging between family and friends appears to be strong. This indicates that the impact of social capital in social networks is **positive**.

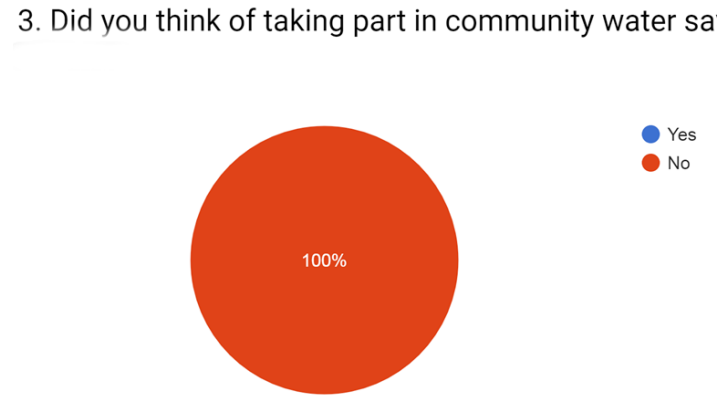

Figure 3. Taking part in community water saving

A staggering negation appeared to be the answer of all respondents to taking part in a community water saving project. This reflects the respondents' passiveness in following or participating in any commu-

nity water saving project. This result shows that vertical linkage ties are absolutely **weak** between university students as Egyptian citizens and the civil servants. Accordingly, it indicates that the impact of social capital in social networks is **fragile**.

2. How does the willingness of sharing norms and values affect the relationship between shared norms and values on water conservation behavior?

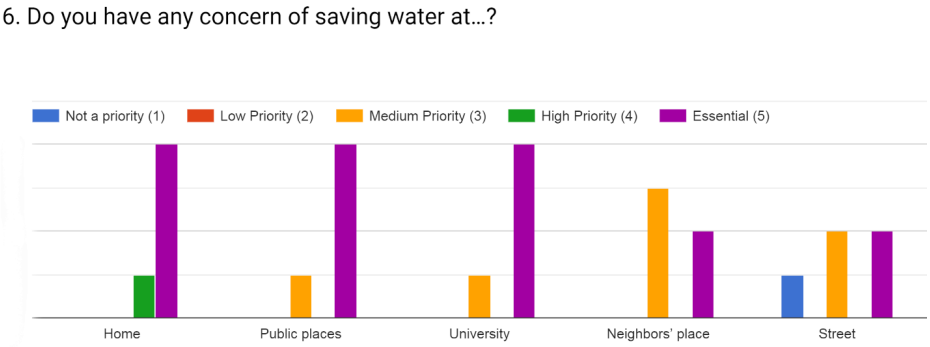

Figure 4. Concern of saving water

Most of the respondents concurred to obtaining shared knowledge of water saving behavior mainly from places like home and university. In a positive sense, students have expressed their high priority concern regarding sharing vision among their colleagues and family. Additionally, and due to urbanization and the lack of solidarity between neighbors, saving water behavior gained medium priority. Meanwhile, students paid no concern to prioritize their willingness for saving water or shared purpose on the street. Results of the above show that the impact of social capital in shared norms and values reveals **less self-sustaining** solutions regarding water saving behavior.

9. Where do you first heard about water saving?

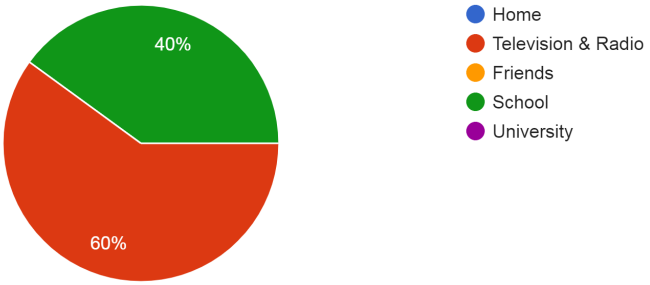

Figure 5. Source of information

Notably, the impact of TV and radio in addition to school appear to have a great influence of spreading shared norms and values among students more than the demographic orientation (home and friends). Ironically, students expressed that they did not hear about water saving behavior from university, a fact that needs further **initiatives**.

3. How do the four trust levels affect water conservation behavior?

4. Do you trust Egyptian government in saving water strategies?

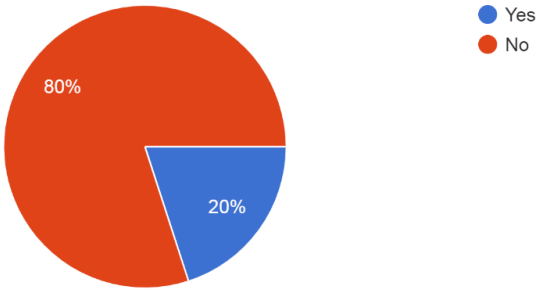

Figure 6. Trust levels affect water conservation behavior

As for the trust dimension, most students' expectations in the

Egyptian government strategies in saving water appeared to be **null**. However, only a limited number of students still had some trust in the Egyptian government. This clearly indicates that the level of trust of students in governmental expectations is relatively **low**.

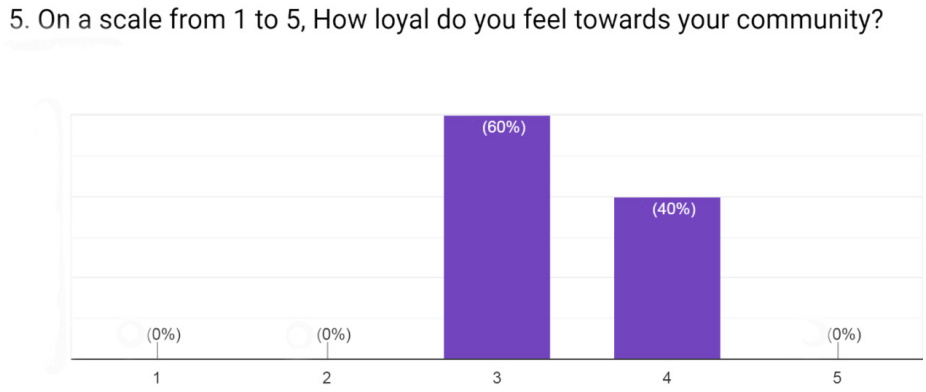

Figure 7. Trust in Egyptian government strategies in saving water

Based on students' experiences, most of them seemed to express their neutrality towards their community with respect to water saving behavior. Eventually, the level of trust in the Egyptian government strategies to solve water issues is somehow **high**.

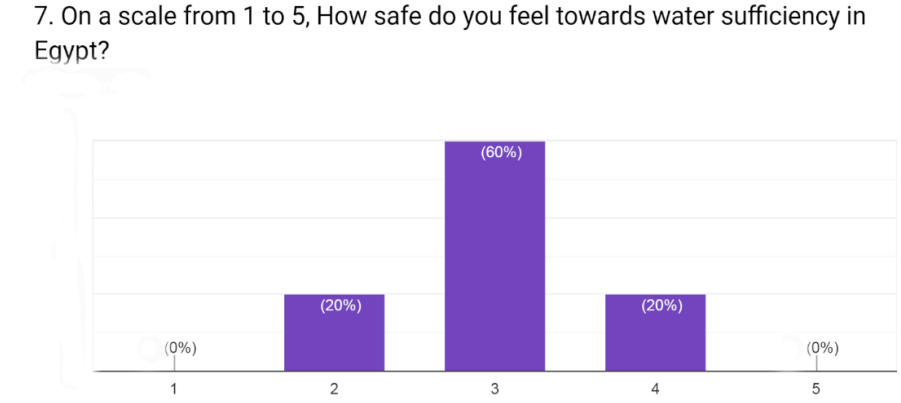

Figure 8. Feeling safe of water sufficiency in Egypt

While most students indicated their neutrality regarding their feeling safe of water sufficiency in Egypt, those who felt secure and insecure equaled. This indicates that the level of trust in the general outlook of human nature towards being safe of water sufficiency is **neutral**.

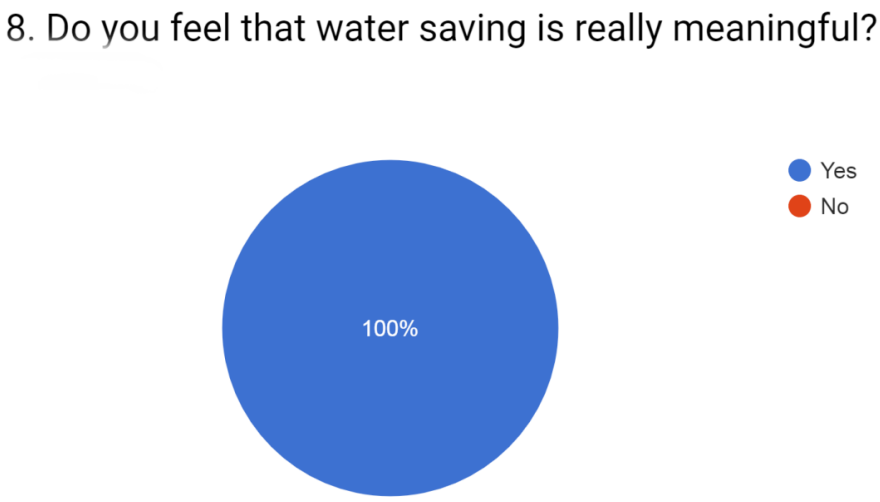

Figure 9. Water saving meaningful

On an experimental level, students appeared to share very good ideas in saving water behavior, yet they lack the proper avenues in taking practical actions. This indicates students' **positive attitudes** towards their well-being.

Recommendations

1. There is an important need for strengthening social capital on social networks water saving strategies.
2. There is a dire need for carrying out campaigns between university students as Egyptian citizens and the civil servants.
3. There is a strong need to prioritize the willingness of students to share water saving norms and values with neighbors and on the street.
4. There is an essential need to devise self-sustaining solutions by students for the purpose of water saving behavior.
5. There is a robust need to develop the level of trust between the Egyptian government and students by reaching out through creating more

than one official channel.

6. There is a solid need to invest in students' willingness and capabilities in cultivating and fostering enthusiasm and spirit of good will regarding water saving behavior.

7. There is a crucial need to engage students on the individual level to foster an environmentally sustainable water saving behavior.

8. There is an imperative need to work with UN affiliates; such as FAO in implementing projects dealing with water saving behavior.

9. There is a key need to use the fear appeal in alerting people of the dangers resulting from less-self-sustaining water behavior.

10. There is a vital need to conduct further research on the role of NGOs in developing social capital measurement on water saving behavior.

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Appendix: questionnaire

1. Do you follow any water saving campaign? **(Social Networks)**

a. Yes (mention) ……
b. No

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
Family					
Friends					
Colleagues					
Neighbors					
Strangers					

How often do you talk about water saving between…? **(Social Networks)**

2. Did you think of taking part in community water saving project? **(Social Networks)**

a. Yes (mention) ……
b. No

3. Do you trust Egyptian government in saving water strategies? **(Trust)**

a. Yes

b. No

4. On a scale from 1 to 5, How loyal do you feel towards your community? **(Trust)**

Very untrue of me (1)	untrue of me (2)	Neutral (3)	true of me (4)	Very true of me (5)

5. Do you have any concern of saving water at…? **(Shared norms)**

	Not a priority (1)	Low Priority (2)	Medium Priority (3)	High Priority (4)	Essential (5)
Home					
Public places					
University					
Neighbors' place					
Street					

Very much insufficient (1)	insufficient (2)	Neutral (3)	sufficient (4)	Very much sufficient (5)

6. Do you feel that water saving is really meaningful? **(Trust)**

a. Yes

b. No (why)……

7. Where do you first heard about water saving? **(Shared norms)**

a. Home
b. Television & Radio
c. Friends
d. School
e. University

8. If you had the chance to work on water saving project, what will it be? **(Shared norms)**