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## **Water Sanitation in Egypt: A Focus on the Sewage System in Rural Areas**

**Hussein Marei, Ola Kubbara, and Yosra El Lozy**

### **Abstract**

Water supply and sanitation affects, among other things, people's health, life conditions, life expectancy, infant mortality and overall well-being. Hence, it influences people's ability to attain proper education as well as their chances for good employment, productivity, income, standard of living, and overall contribution to the country's growth.

### **Introduction**

Human development must be approached as an end in itself. One of Egypt's drawbacks regarding human development is the environmental problems that it experiences.

Environmental issues can have very harmful and damaging effects on the population; this can lead to destructive consequences and outcomes.

This research paper examines one of the many environmental issues that is negatively impacting the people of rural Egypt, causing deterioration in areas such as health and life expectancy. The paper is focused mainly on the topic of water sanitation and sewage problems in rural areas. The issue of sewage and water sanitation is a global problem that faces many developing countries. However, the concern goes beyond just being an environmental problem. Water supply and sanitation affects, among other things, people's health, life conditions, life expectancy, infant mortality and overall well-being. Hence, it influences their ability to attain proper education as well as their chances for good employment, productivity, income, standard of living, and their overall contribution to the country's growth.

Therefore, the water sanitation and sewage problem should be approached as an issue that is hindering both the development and growth of Egypt and decreasing its chances for enhancing human development.

The paper will examine this topic from a historical background, and from legal and economic perspectives, in order to find out the causes and effects of the issues of concern. The village of Kafr Al-Arbai'n in the city of Benha, a part of rural Lower Egypt, will be taken as a case study. The main goal of the research is to present and illustrate the root causes of the water sanitation and sewage problems in rural Egypt; in addition the paper points out the detrimental effects it has on the human development of Egypt. The paper also highlights the laws and regulations, which have been introduced to deal with the problem and tackles their effectiveness as well as their enforcement mechanisms.

## Background

There are many government-affiliated organizations in Egypt, which over the years have become more and more concerned with combating the various environmental problems it faces. There is the Minister of State for Environmental Affairs (MSEA) who works in collaboration with the Egyptian Environmental Affairs Agency (EEAA)<sup>1</sup>. Together, both these players came up with Law 4 of 1994, which will be discussed later. The law brought into play yet another organization the Environmental Impact Assessment (EIA)<sup>2</sup>. The EIA is an international program, which is adopted by most countries that are

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<sup>1</sup> Nicholas S. Hopkins and Sohair R. Mehanna, "Living with Pollution in Egypt," *Environmentalist* 23, no. 1 (Mar 2003): 19.

<sup>2</sup> Rifaat Abdel Wahaab, "Sustainable Development and Environmental Impact Assessment in Egypt: Historical Assessment," *Environmentalist* 23, no. 1 (Mar 2003): 59.

concerned with environmental problems in their territory. “The aim of the EIA is to ensure that potential problems are foreseen and addressed at an early stage in the projects planning and design”<sup>3</sup>. The EIA has been active in collaboration with the EEAA since 1995<sup>4</sup>. However, it is not very effective because it must work from within the EEAA, which has very limited reach in Egypt and very little assessment of the various environmental problems. The organizations tackle a variety of problems having to do with the environment, yet their actions are often constrained by the government, causing them to be more or less ineffective.

One of the main environmental problems in Egypt, and the focus of this paper, is the sewage problem experienced, especially in rural areas. The Nile provides 97% of the freshwater supply in Egypt<sup>5</sup>. In 1996 Egypt’s population was 61.4 million, 57% of which are rural inhabitants and the rest are urban dwellers<sup>6</sup>. Thus, the rural population in Egypt constitutes more than half of the population. About 90% of that rural population has no access to sewage systems or wastewater treatment facilities<sup>7</sup>. In rural areas, they have a system of unlined latrines into which they dump their waste<sup>8</sup>. A wagon then passes by and picks up the sewage, which is then put in a septic tank and treated in a biological process<sup>9</sup>. One way to deal with the drainage water is to mix it with freshwater from the

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<sup>3</sup> Ibid.

<sup>4</sup> Ibid., 60.

<sup>5</sup> Tarik A. Tawfic, “Effective Natural Wastewater Treatment systems in Rural Areas of Egypt,” *The 4<sup>th</sup> International Conference and Exhibition for Environmental Technology, Management and Funding*, Oct 2003 (<http://www.eeaa.gov.eg/English/main/Env2003/Day2/Water/tawfic.clfem.pdf>): 1.

<sup>6</sup> Nicholas S. Hopkins and Sohair R. Mehanna, “Living with Pollution in Egypt,” 19.

<sup>7</sup> Hussein I. Abdel-Shafy and Raouf O. Aly, “Water Issue in Egypt: Resources, Pollution, and Protection Endeavors,” *CEJOEM* 8, no. 1 (2002), ([http://www.fjokk.hu/cejoem/files/Volume8/Vol8No1/CE02\\_1-01.html](http://www.fjokk.hu/cejoem/files/Volume8/Vol8No1/CE02_1-01.html)).

<sup>8</sup> Nicholas S. Hopkins and Sohair R. Mehanna, “Living with Pollution in Egypt,” 21.

<sup>9</sup> Hussein I. Abdel-Shafy and Raouf O. Aly, “Water Issue in Egypt: Resources, Pollution, and Protection Endeavors”.

Nile for irrigation purposes<sup>10</sup>. The polluted water then infiltrates the water table and subjects it to pollution as well<sup>11</sup>. A second way of dealing with the drainage water is to dump it directly into the Nile or indirectly through a municipal sewage system<sup>12</sup>. Either way the waste gets to the Nile and pollutes it. By the time the drainage water is dumped into the Nile it is primarily composed of agricultural drainage water, industrial effluents, and sewage water<sup>13</sup>. According to the World Bank Report of 2005, only 60% of the drainage water is organic and therefore biodegradable<sup>14</sup>. Shafy points out that “the input of sewage along the river reduces the oxygen content especially in the vicinity of big cities”<sup>15</sup>. This pollution and deterioration of the water quality has its effects on health, causing diseases such as typhoid, paratyphoid, infectious hepatitis, and infant diarrhea<sup>16</sup>. There are however many proposed solutions to this problem.

Several suggestions have been brought forth to deal with the problem of wastewater management in Egypt. One proposition was an action plan dealing with solid waste management which would be implemented over two phases<sup>17</sup>. The first phase would cost over 290 million Egyptian pounds while the next phase would cost about L.E. 905 million<sup>18</sup>. The World Bank Report stipulated that a program of integrated solid waste management in both rural and urban areas would cost about L.E. 1.5 billion a

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<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> Tarik A. Tawfic, “Effective Natural Wastewater Treatment systems in Rural Areas of Egypt,” 2.

<sup>14</sup> “Arab Republic of Egypt: Country Environmental Analysis (1992-2002),” *World Bank Report Vol 1 of 1*, Apr 2005 (<http://siteresources.worldbank.org/INTRANETENVIRONMENT/954627-1112970276912/20467129/CEAEgyptFullDoc2005.pdf>).

<sup>15</sup> Hussein I. Abdel-Shafy and Raouf O. Aly, “Water Issue in Egypt: Resources, Pollution, and Protection Endeavors”.

<sup>16</sup> Ibid.

<sup>17</sup> Tarek M. Genena, “From Environmental Planning to Enforcement: A Case Study From Egypt,” *Fourth International Conference on Environmental Compliance and Enforcement*, (<http://www.inece.org/4thvol2/genena.pdf>): 1.

<sup>18</sup> Ibid.

year<sup>19</sup>. Obviously, this is quite a costly venture. Solutions to this particular problem have to take into consideration seven main criteria of assessment. The seven criteria are health, ability to reuse water, ecological effects, nuisance control, cultural, operational, and costs<sup>20</sup>. The first criterion, which includes health, looks at how an individual's health will benefit from the solution. The second one looks at the ability to reuse the water and in what manner. The ecological criterion looks at the contribution, which the process would have to the ecological system in general. Basically, this criterion looks at whether there are possible pollutants created as a result of the process. The nuisance criterion looks at effects, such as odor and noise. The cultural aspect looks at whether the solution is compatible with local habits and social practices. The sixth criterion looks at operational aspects while focusing mainly on the skills needed for the process, and whether they are easy to acquire or require advanced training. Finally, the last criterion of cost looks at how costly the project will be. There are two methods of treatment: the conventional and the natural<sup>21</sup>. The conventional treatment does not require a lot of space; therefore it is ideal for urban areas and cities. However, it is very costly and it demands a high level of skill<sup>22</sup>. Another drawback to conventional treatment is that the odor can be really bad if there is not much oxygen available<sup>23</sup>. The natural treatment is very efficient and requires low capital investment<sup>24</sup>. This method of treatment requires a low cost, flat bed of land. It is easy to operate and manage and it is suitable for hot

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<sup>19</sup> “Arab Republic of Egypt: Country Environmental Analysis (1992-2002),” *World Bank Report Vol 1 of I.*

<sup>20</sup> Tarik A. Tawfic, “Effective Natural Wastewater Treatment systems in Rural Areas of Egypt,” 2.

<sup>21</sup> *Ibid.*, 3.

<sup>22</sup> *Ibid.*

<sup>23</sup> *Ibid.*

<sup>24</sup> *Ibid.*, 4.

climates such as Egypt<sup>25</sup>. The only bad thing about it is that it is not applicable to urban areas and the treatment process takes longer. Ultimately, the best system of treatment for Egypt now would be the natural treatment.

## Impact on Human Development

“While clean water is accessible to nearly the whole population, coverage by sewage collection and disposal systems lags behind, in particular the rural areas”<sup>26</sup>. Human development in Egypt should not be regarded as a means to achieve economic growth and development, but rather as an end in itself. The water sanitation and sewage problems in rural Egypt affect many realms that have direct influence on human development. Poverty reduction, education, maternal and child health, infectious disease control and child survival, all depend on safe sanitation<sup>27</sup>. The lack of proper education will lead to unemployment, lower productivity, decreased income and living standards; thus the hindrance of the overall growth of the economy and the country’s development.

The current status of the water sanitation and sewage problem in rural Egypt is mainly due to the increased urbanization. Due to the continuous flow of rural-urban migration, the government has been focusing on building infrastructure and sewage systems in urban areas, while completely neglecting and disregarding the rural areas. The government did not want to spend and invest a lot on the design and infrastructure of new sewage systems in rural areas. Consequently, the rural areas and agglomerations

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<sup>25</sup> Ibid.

<sup>26</sup> “Egypt Human Development Report 2004: Choosing Decentralization for Good Governance,” *United Nations Development Program*, 2004. Commercial Press; Kalyoub, Egypt.

<sup>27</sup> Ibid.

were completely abandoned, which resulted in poor hygiene and sanitation, unhealthy living conditions, high child mortality rates<sup>28</sup>.

There are many aspects that need to be approached, in order to be able to improve the conditions of poor sanitation and sewage systems in rural areas. One of the major factors is the lack of good and efficient coordination and cooperation at the governorate level. However, we have to distinguish between the central and the local levels in terms of tasks and responsibilities. Decisions regarding major investments and infrastructure are determined at the central level. Thus, the central government is the one responsible for financing the projects and programs that should be realized, in order to create an efficient sewage system in rural areas. Moreover, the central government is the one in charge of the allocation of public funding at the local level<sup>29</sup>.

There are also many challenges and responsibilities that face the local government. Firstly, they have to encourage sanitation programs and narrow the gap between water supply and sanitation services with reasonably priced and safe technologies<sup>30</sup>. Secondly, they have to be more involved in the people's complaints and concerns, as they are in more direct contact with them than the central government. They also must make sure that the funds that are given to them by the people or the central government are properly used and distributed on solving the issues at stake. Thirdly, the local authorities must work on promoting and spreading awareness among the local people, as well as giving incentives to the individuals or families that are trying to inform and enlighten others.

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<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

There is also a major role that the local people have to play, in order to achieve progress and success. They have to be willing to give up their old traditions and habits, concerning the disposal of sewage, and adapt themselves to new technologies and ways of dealing with the matter. They have to be ready to learn new techniques and the proper ways of handling the environment.

The central, as well as the local, authorities have to work together and combine their efforts in order to resolve the problem of sanitation as soon as possible. Their policies and legislation have to be consistent and sustainable so as to maintain the progress of long-term projects, such as the implementation of new sewage systems for the rural areas. Furthermore, the authorities at both levels must team up with each other in order to develop awareness campaigns and programs to educate the locals about the destructive consequences of poor waste disposal activities and habits. They have to encourage the rural population to use and adopt new techniques and methods that will enable them to improve the existing critical situation. According to the Egypt Human Development Report of 2004:

“The discharge of untreated wastewater excreta into the environment affects human health and well-being not only by polluting drinking water, but by entry into the food chain; by providing breeding sites for flies and other disease vectors...One of the major complaints among peasants is skin irritation that follows from the contact with the irrigation waters...”<sup>31</sup>

One of the key elements to the progress and development of new technologies and methods in the area of water sanitation and sewage is the degree of women’s involvement and participation in these programs. The local governorates have to try to integrate rural

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<sup>31</sup> Ibid.

women in these crucial environmental issues, as women are the major users of water systems and the ones taking care of their families' health. Thus, they should be engaged in all aspects of the development and maintenance of water and sanitation systems<sup>32</sup>.

Unfortunately, in most of these vital projects and campaigns the voices of rural women are usually unheard and neglected. The majority of the rural women are uneducated, and hence, they are considered not knowledgeable or aware enough of environmental problems and thus cannot contribute to the improvement of the current conditions.

However, women can participate in water and sanitation activities in several different ways; as acceptors or rejecters of technologies according to their knowledge and awareness of water and sanitation issues and how these impact their families; as managers of water supply and sanitation programs; finally, as agents of behavioral change in the use of facilities<sup>33</sup>. Therefore, there is an urgent need of integrating rural women in the realization, planning and monitoring of water and sanitation projects. Women's involvement in environmental issues and concerns is a requirement for the successful implementation and adoption of projects and programs that will resolve these problems. It is important to note that women's role cannot be segregated from the issue of community participation that involves both men and women. Both of them should have an equally important role to play and should be evenly involved in solving environmental problems that are concerning and impacting everyone.

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<sup>32</sup> Marie Assaad et al., "Involving Women in Water and Sanitation Initiatives," *Water International* 19, no. 1 (1994): 113.

<sup>33</sup> *Ibid.*, 115.

## Legal Issues Concerning the Problem

There is a common belief that sustainable development can only be achieved with the existence of strong coordination between authorities (decision-makers) and environmentalists. It is obvious that as the economy gets stronger it will be more able to protect the environment because it would have the ability to fund important environmental services that are usually very costly<sup>34</sup>. There is a clear paradox here since it is generally known that most states that have to deal with severe environmental problems are still developing nations and therefore have to struggle to sustain their economy. Most of these states have access to foreign aid, in order to survive and to provide the population with sufficient basic foodstuffs. Since these countries are unable to support their populations, they would clearly prefer investing their money on immediate needs, rather than funding environmental projects. It seems therefore impossible to have a country where the economy is weak and that is putting the environment on its priority list. However, when it is impossible to provide the basic environmental services, the first non-costly thing to do is to attempt to raise awareness. One can easily assume nowadays that a great percentage of the world population is aware of the dangers caused by pollution but they are unable to act because the authorities do not provide the proper funding<sup>35</sup>.

We want to argue that it is futile to depend solely on people's knowledge of the consequences of pollution; the problem lies in the awareness concerning the laws, as well as their constitutional liberties as citizens to demand their rights to proper sanitation. Many laws were passed in Egypt lately to deal with crucial environmental problems. The

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<sup>34</sup> Rifaat Abdel Wahaab, "Sustainable Development and Environmental Impact Assessment in Egypt: Historical Assessment," 52.

<sup>35</sup> Nicholas S. Hopkins and Sohair R. Mehanna, "Living with Pollution in Egypt," 26.

major drawback is that there are no mechanisms for law enforcement and that the population has not even heard about the most important laws or environmental decisions that could greatly affect their lives in a positive way.

Egypt has been through different stages of environmental degradation. In the socialist era, there was a belief that it was impossible to achieve growth and development while protecting the environment because the two did not go together. Wahaab argues that “extensive industrial development during this era resulted in environmental deterioration, as the major thrust was economic growth”<sup>36</sup>. In the following era, that of the open door policy, there was “extensive environmental deterioration in the name of development”<sup>37</sup>. This was due to the economic liberalization and the encouragement of foreign investment that were not concerned with the environment as much as they were concerned with making as much profit as they possibly could. This shows that economic policies have a major role to play in dealing with pollution since most of the foreign companies come to countries like Egypt because of the possibility of disregarding environmental issues as well as the availability of cheap labor. It is thus crucial for Egypt to implement the mechanisms of law enforcement, if it wants to allow foreign investors to work in Egypt without destroying its potential to achieve sustainable development. Citizens and business people should have the necessary knowledge concerning the laws that are passed, especially the ones that affect their health.

In terms of legal literature, there are many laws in Egypt that deal with the environment and specifically with the issue of water sanitation. However, in the past 25 years, there has been a major concern in the Egyptian legislature dealing with the

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<sup>36</sup> Rifaat Abdel Wahaab, “Sustainable Development and Environmental Impact Assessment in Egypt: Historical Assessment,” 53.

<sup>37</sup> Ibid.

protection of water resources in general. In 1982, a law was passed (Law 48/1982) for the protection of the River Nile and its waterways from pollution<sup>38</sup>. During the same year, the Egyptian Environmental Affairs Agency (EEAA) was established to become the main body that is responsible for coordinating environmental policy making in Egypt<sup>39</sup>. In 1992, the EEAA expressed its environmental policy in the following statement: “Egypt adopts an environmental policy that supports sustainable development programs, taking environmental considerations in perspective, and provides a life fit for its citizens”<sup>40</sup>. This statement shows how important it is for citizens to have access to acceptable living standards. The most relevant environmental law for our topic is Law 4/1994<sup>41</sup>. It was formulated by a group of Egyptians that represent both the government as well as NGOs. The main idea behind this law is to fill the gap between different environmental regulations because it seemed that every ministry in Egypt was working independently without communicating with other ministries that want to achieve the same goal. Articles 84 to 101 of Law 4 of 1994, deal with the penalties that will occur to the responsible party in case of breach of the agreement<sup>42</sup>. This was the first Law to include detailed explanations of the consequences of breach. In a way, this law is a positive attempt to force the concerned parties to take the articles of the law seriously.

The main point is not only to ensure that the authorities punish the wrong doers, but also to inform the population that they have a right to act and to demand their protection from diseases caused by environmental degradation. As will be seen in the following case study, the population of rural Egypt is not aware that it can express itself

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<sup>38</sup> Ibid., 51.

<sup>39</sup> Ibid., 52.

<sup>40</sup> Nicholas S. Hopkins and Sohair R. Mehanna, “Living with Pollution in Egypt,” 19.

<sup>41</sup> Law #4 of 1994, *The Egyptian Environmental Affairs Agency*, 1994 (<http://www.eeaa.gov.eg>).

<sup>42</sup> Ibid.

to the authorities because they are scared that the authorities might punish them if they complain. There is a main sense of hopelessness among the rural population due to the fact that they believe that they are ignorant and that only the highly educated people have the capability to communicate with the government. They pointed out, unfortunately, that the educated part of Egyptian society is not concerned with their problems and therefore nothing is being done to improve their terrible situation of not having a sewage infrastructure.

## Case Study

We conducted our case study in the rural village of Kafr el Arbai'n in the province of Benha north of the Nile delta. The purpose of the case study was to investigate the various issues related to water sanitation and sewage systems in the village. We carried out an oral survey, which was broken down into two different sections. The first section dealt with water sources and sanitation. The second section focused on the sewage problem. The participants were of different sexes, age groups, occupations, and educational backgrounds. We assumed that the problems would arise from the water factory that is located in the village. However, we found out that the factory is not a source of any difficulties or problems for the local population or the environment. We were expecting to learn more about the sewage system in rural areas. We were surprised to find out that there was no sewage system in the first place. Moreover, we discovered that there were no issues concerning clean water supply.

The first section of our survey looked at the water supply, and sanitation with regards to it. We were informed that water is derived from aqueducts located 90 meters below the surface. The water is then filtered and goes to a tank located 60 meters above

surface level. The quantity of water is able to sustain from 3,000 to 5,000 people. Clean water is being supplied to all kinds of houses including mud brick houses, red brick houses, and construction built houses. However, we found out there is no serious problem concerning clean water supply and there were no direct complaints concerning this issue. The only problem that they face is that they share the water with a nearby village. Therefore, water scarcity exists to a degree, which then induces certain actions from the members of the village. For example, rural women are pressured to wash their clothes in the polluted canal, because they need the small amount of water available for cooking and bathing.

The second section of our survey deals with the serious sewage problem that is prevalent in the area. All of the participants stated that there is no sewage system infrastructure in the village. To our surprise all of them expressed this problem with a very natural attitude, as if this is a natural circumstance. The local people deal with the disposal system, as aforementioned in the earlier section where a septic tank is used to dispose of the waste. What we learned was that the wagon that comes to take the wastewater does not come regularly and sometimes not at all. This results in the flooding of the streets with wastewater. Of course, this causes the various diseases that are attributed to the problem as mentioned earlier. The most apparent diseases that affect children include flu, severe colds, diarrhea, and skin irritation. Furthermore, we found out that the women in the village are more aware of these diseases. Despite this fact, women are not integrated in any actions that are taken to improve the situation and are not involved in the decision making process.

We asked the people why they did not complain about the various problems they have experienced. Most of the answers that we got were filled with attitudes of hopelessness and apathy. One of the educated participants informed us that he and other locals have collected a good sum of money from people who support families and they gave it to the local authorities to improve the situation. Surprisingly, six years after this act nothing has been done. Another participant without formal education expressed that he is but a simple person and nothing he can do can change the current situation. The elderly person we talked to, mentioned that “An educated person should go and complain but we as simple people do not have the capability to do so”. Yet another young participant said “To whom would I complain, and who would listen to me”. This implies that the people feel that they are simple, repressed, and that their voices will not be heard under any circumstances. This is a feeling echoed by many of the participants, which suggests that the government is inducing the lack of confidence in the people, their faith and belief in the efficiency of their government. When we tried to make the participants more aware of situation so that they can express their concerns to the relevant authorities their response was mostly passive and they did not pay heed to the information we gave them.

From the above information, one can see the relation between the research and the case study. There is an obvious relationship where the sanitation problem was described in rural Egypt and how we found it in the village. With regards to development the research showed the many diseases and the inability of women to participate. Again that was quite evident in our case study. The real shock comes when you assess the legal issues. From our research we discovered a lot of laws and regulations, which were

passed and are stated above. The stunning aspect is that most of the laws are not even implemented in the area. So the legal framework is available yet not applied. It was really interesting to compare both our research and the case study and examine the correlations we found. It turns out that most of our research supported our case study as we expected.

## Prospects and Conclusions

To conclude, the problems of water sanitation and sewage in rural areas are causing many challenges and difficulties for the local population, which affects their lives and living conditions. We realized based on our case study, that it is not enough for the locals to know and be aware of environmental problems, they must be informed of their constitutional liberties, in order to be able to demand their rights of change and improvement of living conditions. From the development perspective, Egypt cannot be economically developed if it does not concentrate on human development, as a goal in itself. Rural areas, in particular, have to be focused upon, in order to develop the conditions of water sanitation and sewage. The central government should provide the rural areas with the same care and concern, just like the urban areas. There should be a more efficient monitoring system that detects the problems at an early stage and analyzes them thoroughly, to provide the most proper solutions. This monitoring system should cover all areas in Egypt, with a focus on rural areas, and should act independently, while reporting back to the EEAA on a regular basis. The improvement of the sewage system is the first step towards the betterment of water sanitation in Egypt. This particular issue should be prioritized on the government's agenda.