The Circular Relationship Between Poverty, Environment, and Economic Development: The Case of Shakshouk Village, Fayoum

Nada Tewfik(✉), Marwa Abdel Latif, and Mohamed Salheen

Ain Shams University, Cairo, Egypt
{nada.samir,m.abdellatif,
Mohamed.salheen}@eng.asu.edu.eg

Abstract. Rural Communities living within Protected Areas (PAs) depend mainly on the natural environment for their livelihoods and tend to be among the poorest in the country; since the degradation of the environment jeopardizes their economic-resource base. Moreover, economic development pressures cause changes in PAs' contexts leading to negative and positive impacts on the environment and people, which then affect the long-term benefits of development. In this regard, an integration between the different themes of Poverty, Environment and Economic Development is crucial – especially when challenges and practices intertwine on ground. With notions of integration starting in the Egyptian context; the case study of Shakshouk village within Qaroun Protected Area in Fayoum is investigated- where the majority of the community is rural poor who live in degraded environments and face continuous development pressures. This paper explores the mutual positive and negative influence existing between Poverty- Environment- Economic Development in order to map the system's dynamics of Shakshouk; using on-site semi structured interviews, observation and building on previous secondary data. It ends by shedding light on a circular relationship existing between Poverty, Environment and Economic Development which has to be considered by decision makers in future sectoral interventions.

Keywords: Poverty · Environment · Economic Development · Shakshouk · Qaroun · Fayoum

1 Introduction

The recent National Biodiversity Strategy and Action Plan of Egypt (NBSAP) envisions that "By 2030, biodiversity in Egypt is valued, mainstreamed, maintained for the good livelihoods and conserved for the sustainable use of future generations" (Ministry of Environment 2016, p. 2). In this vision, Egyptian authorities highlight a shared responsibility among the environment and people. This could be understood since on the one hand, PAs help communities living within or nearby them to maintain their traditional lifestyles, while offering them means to improve their standards of living; in terms of fisheries, water, and other ecosystem services for their consumption or income generation (Fisher et al. 2005; USAID 2006; Ministry of Environment 2016; Allam

G. Bassioni et al. (Eds.): InterSol 2019, LNICST 296, pp. 128–143, 2019.
https://doi.org/10.1007/978-3-030-34863-2_12

2018). On the other hand, people –themselves- should preserve the environment richness to balance between current and future needs (Howarth 1972; Ministry of Environment 2016).

However, despite the great efforts of managing PAs; biodiversity crises still exist and many fragile environments of PAs are threatened and degraded (Carey, Dudley and Stolton 2000; Dudley et al. 2008). Furthermore, it is in such environmentally fragile contexts that rural communities are particularly dependent on natural resources for their livelihoods (Fisher et al. 2005). Lacking access to resources and/or legal control, communities within or near PAs tend to be among the poorest and most marginalized people in the nation (UNESCO 2001; DFID et al. 2002; Barbier 2010). As an action of survival, sometimes these rural poor people worsen the environmental degradation (Fisher et al. 2005). What makes the situation more critical is that places rich in biodiversity with poor communities tend to face economic development pressures as part of modernization trends (EEAA/NCS 2006). These kinds of developments benefit from the place assets and usually pose positive and negative impacts on the environment and people (UNESCO 2001; Fisher et al. 2005). In similar situations, literature shows that achieving sustainability requires the integration of economic, social and environmental aspects (Rosendo and Brown 2004). Accordingly, multidisciplinary approaches need to be incorporated in which concepts of environmental conservation, local community development work hand in hand with economic development objectives (ibid).

2 Methodology

This paper is based on studying the case of Shakshouk Village; a human settlement within Qaroun Protected Area, located directly on Lake Qaroun where direct interaction between human and nature exists. The area of Shakshouk includes different forms of economic development such as tourism-based development, fish and shrimps-based development, and salt extraction industry. This makes it a good case study to understand economic development, environment and poverty linkages.

The research is based on primary and secondary sources. The field work took place between January 2017 and October 2018 where primary data was collected through observation, structured and semi-structured interviews with a range of Fayoum stakeholders. This included conservationists from EEAA, ministry of Environment, and Qaroun protectorate; as well as, developers from industrial companies, touristic resorts, and private companies. The viewpoints of civil society were clarified during on-site meetings, with the fishermen syndicate and Shakshouk local NGO. The secondary sources included online reportages, textual data and maps from national agencies such as the General Organization for Physical Planning (GOPP), Egyptian Environmental Affairs Agency (EEAA), Tourism Development Agency (TDA), General Authority for Fish Resources Development (GAFRD), Fayoum governorate and Shakshouk Local Authority; as well as, international bodies such as Bird Life Inter-national, International Union for Conservation of Nature (IUCN), and United Nations Development Programme (UNDP). It is important to note that results of this study are context specific;

since they are affected by the unique context of place in terms of spatial, political, and socio-economic variations.

3 Shakshouk Village Context: Exploring Community Poverty, Natural Environment and Economic Development

Shakshouk is a village of Ibshway center in Fayoum governorate, 90 km away from Cairo (see Fig. 1) The village lies in the North West of Fayoum Depression, within the boundaries of Qaroun Protected Area (QPA) (Heiba 2012). The population of Shakshouk is estimated to be around 33267 in 2017 (CAPMAS 2017) varying between fishermen, farmers, and other jobs. The village of Shakshouk has a medical unit, two schools, the local authority office, a water stream intersecting the urban fabric, the protectorate management unit, and it is surrounded by agriculture lands.

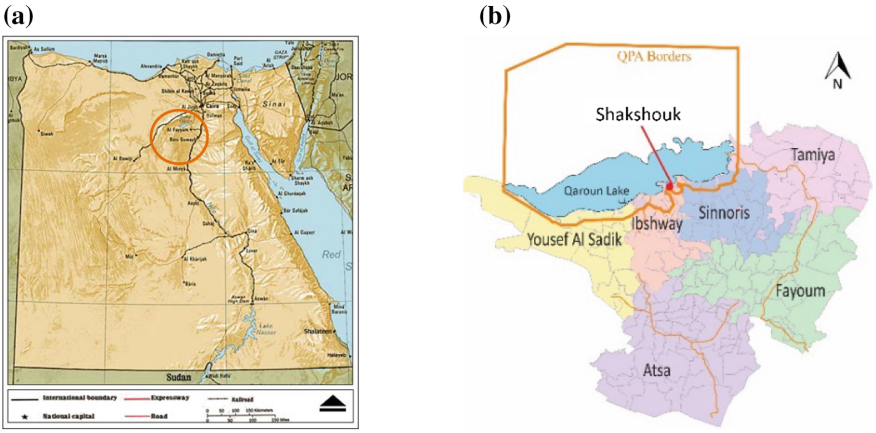

Fig. 1. Maps showing (a) Fayoum Governorate within Egypt, (b) Shakshouk in Ibshway center. Source: (State Information Service 2004)

In order to understand the interrelationships among the three themes of poverty of the local community, natural environment and economic development in the context of Shakshouk Village (see Fig. 2) this section begins by describing each theme separately with regard to the others. Afterwards in the discussion section, mapping the mutual influences among them is pinpointed. In this framework, the environment is explored first; since it is the place hosting the community and development. Other than that, the other themes are explored with no specific order of importance.

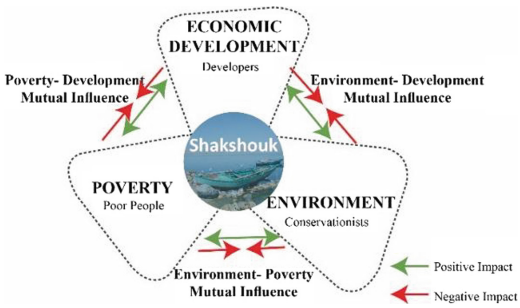

Fig. 2. Diagram illustrating the relationship between poverty, environment and economic development. Source: Authors

3.1 The Status of the Environment in Shakshouk

Shakshouk settlement is located in one of the lowest points of Fayoum depression on the edge of the closed basin of Lake Qaroun (EEAA/NCS 2006; 2007). The village gets water for agriculture from highlands of Fayoum through a number of drains and watercourses. The village receives a small share from the limited amount of irrigation water of Fayoum region (EEAA/NCS 2006; 2007; El-shabrawy and Dumont 2009; AbdelMaaboud 2018). Due to its topography, water that reaches the village is already polluted and highly saline (Shahid et al. 2013; EMISAL 2018). Furthermore, the village suffers from bad quality of water in lake Qaroun. The lake receives around 86% of a mix between untreated domestic, agricultural, and industrial drainage from the whole Fayoum governorate. Since the lake is a closed system, water leaves the lake only through evaporation, hence its water is full of high levels of heavy metals, pesticides and chemicals (EEAA 2008; Hussein et al. 2008; El-Serafy et al. 2014; GAFRD 2016; Heiba 2016; 2018; AbdelMaaboud 2018; EMISAL 2018; Youssef 2018).

As for fauna, Shakshouk is part of Qaroun Protected Area, which was declared in 1989 as a wetland for its importance as a resting place for migratory birds during winter (EEAA/NCS 2006; Shahid et al. 2013). In this regard, QPA is considered an "Important Bird Area" and a part of RAMSAR Convention[1] for its regional and international importance after spotting rare birds species (Hussein *et al.* 2008; AbdelLatib 2009; Heiba 2012; RAMSAR 2012; Heiba 2016; Bird Life 2018). Unfortunately, in winter 1998, numbers of birds' population counted plummeted after the increase of water salinity (EEAA/NCS 2007). Occasionally, hunting violations happen threatening the environment leading to a loss of biodiversity. In 1998 for example, 3000 birds were found dead on the lake's shores victims of poison probably by fish farmers (Afrol 2018; Bird Life 2018); such acts highlight the nature of tension arising between conservationists and rural communities in Fayoum.

[1] "The Convention on Wetlands, called the RAMSAR Convention, is an intergovernmental treaty providing the framework for national and international cooperation to conserve wetlands". (RAMSAR 2012).

Additionally, the lake had hosted a variety of marine life including more than 10 types of fish and shrimps. The fish from the lake contributed to 65% of fish production in Fayoum governorate in 2009 (Hussein *et al.* 2008; El-shabrawy and Dumont 2009). However, the fish population and fish industry suffered from a dramatic decline (EEAA/NCS 2007; GAFRD 2018; Ramadan 2018) (see Fig. 3). This could be attributed to three main reasons. First is the over exploiting practices of over-fishing and early harvesting of fish fry. Second is the high levels of pollution above permissible limits for fish to exist (Abou El-Gheit et al. 2012; Heiba 2016; Youssef 2018). Third is the presence of the 'Isopoda' parasite that was transported to the lake with fish fry since five years. This parasite caused the death of more than 90% of fish in the lake (GAFRD 2018). The only living species are currently low quality shrimps which are not affected by this parasite and survive the high levels of pollution. These shrimps are usually used for feeding poultry and animals (Youssef 2018).

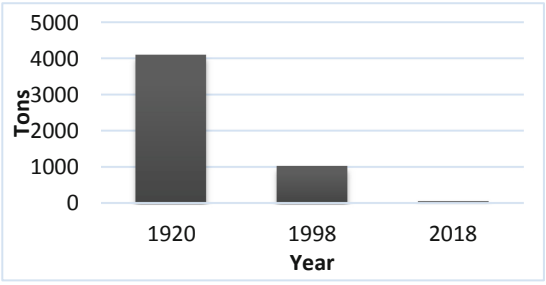

Fig. 3. Chart describing fish productivity in Lake Qaroun Source: Authors after (EEAA/NCS 2007; Ramadan 2018)

As for flora, Lake Qaroun is rich with its flora of unique vegetation growing along some of its shores. This vegetation is a valuable habitat threatened due to pressures on the shores due to human activities (Hussein *et al.* 2008).

As part of the protected area, many actors contribute to environmental conservation in the area of Shakshouk village. This includes the Ministry of State for Environmental Affairs (MSEA) and its executive arm the Egyptian Environmental Affairs Agency (EEAA); especially the Nature Conservation Sector (NCS): the main body responsible for the management of Qaroun Protected Area (EEAA/NCS 2007). Additionally, the General Authority for Fish Resources Development (GAFRD) which is the main body responsible for fish production of the lake. Needless to say, conservationists in the area are not only internal or locally based; but external bodies are also part; such as Bird Life International Agency, RAMSAR, and International Union for Nature Conservation (IUCN).

3.2 The Status of Local Poverty in Shakshouk

This section focuses on the impact of environmental degradation, tough conservation laws and lack of conservation in Shakshouk on the people livelihoods. It highlights how the community suffers from extreme poverty in terms of the multidimensional phenomenon of poverty such as; the lack of education, lack of access to resources, inability to satisfy basic needs, vulnerability to shocks, poor access to sanitation, lack of control over resources, and poor health.

For instance, education and poverty are highly connected in Shakshouk and one leads to the other (Heiba 2016). (CAPMAS 2017) data proves that illiteracy was counted as 48.8%. On one hand, poverty prohibits quite a big number of students from enrolment at schools; and enrolled students (15.5%) leave schools to help parents in gaining money. On the other hand, the lack of education even prohibits Shakshouk's families from enhancing their economic status (Heiba 2016).

In addition, the direct location of the village on the lake without any natural or man-made buffer had a strong impact on people's activities. Almost two thirds of the community used to work in fishery and its supplementary activities (AbdelMaaboud 2018; Ramadan 2018). In this regard, the pollution of the lake jeopardized the main economic-resource base of the locals (NCS/EEAA 2007; Heiba 2012). Despite the fact that boats number increased from 500 in 2009 to 606 in 2018, the price of a boat decreased from 20,000 to 5,000 EGP as a reflection of its return. Nowadays, only few boats are currently working for touristic activities or getting shrimps from the lake (Ramadan 2018) (see Fig. 4). For the past five years, as an environmental conservationist claims, no fish fry was transported to the lake awaiting the diminish of the "Isopoda" parasite (Ramadan 2018). This decision aggravated the situation of fishermen lacking their access to their resource base exacerbating their poverty.

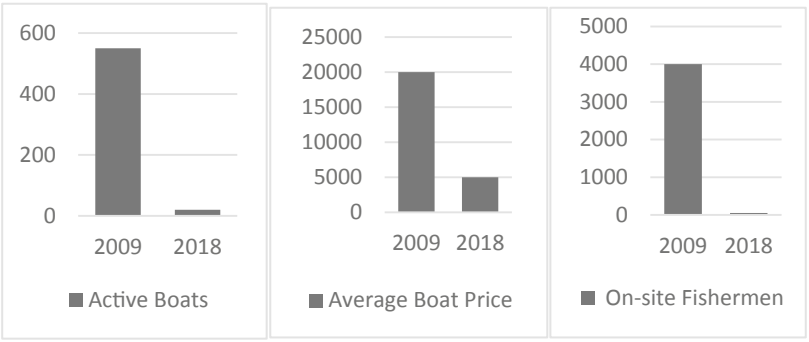

Fig. 4. Fishing between 2009 and 2018. Source: Authors after (El-shabrawy and Dumont 2009; Ramadan 2018)

Furthermore, the community is unable to satisfy its basic needs. This could be attributed to the lack of access to economic-resources coupled with scarcity of irrigation water as well as its pollution. In fact, problems with water quantity and quality

indirectly affects third of Shakshouk's population who are working as farmers; since the low quality of their planted crops provides them with minimum earnings (Heiba 2016; AbdelMaaboud 2018). In order to sustain their livelihoods, few numbers of Shakshouk community work in complementary jobs such as fish farming, animals raise, or handmade pottery and handicrafts (lacking quality and marketing) (Heiba 2012; 2016; AbdelMaaboud 2018).

Additionally, the local community lacks control over resources. Despite the fact that the fishermen are directly affected by the lake's situation, they are not decision makers and suffer from lack of control over these resources. Although the NBSAP highlights on the importance of empowering people to have access to their resources, this is not the situation in Shakshouk (Mahdaly 2018). Furthermore, power struggles exist between actors involved in the lake conservation such as: Ministry of Environment, Ministry of Housing, Ministry of Agriculture, the General authority for Fish resources development, Ministry of Water Resources and Irrigation. "*These stakeholders do not cooperate for better future to the place*", argued the chief of Fishermen in Shakshouk.

Moreover, the community is vulnerable to shocks. The drastic change in economic-base of the community caused shifts in society dynamics. Fishermen migrated to work and left their families in Shakshouk, while women were obliged to work to sustain their livelihoods (Mahdaly 2018). Nowadays, the majority of women help in several economic activities compared to only 1.25% in 2006 (CAPMAS 2006; AbdelMaaboud 2018). They sell fish, feed their poultry, raise animals and peel shrimps in the streets (Youssef 2018). The shrimps are sold to food restaurants and companies, and the shells are sold to companies extracting Chitosan – a chemical extension as an initial component in cosmetics, agriculture, food, textile … etc. (Abdou et al. 2008). Sometimes, women in shrimp peeling sector earn peanut sum of money (25–75 Egyptian piasters/kilo) or shrimp peels to feed their poultry (Heiba 2016; Youssef 2018).

In terms of basic infrastructure, the community has poor access to sanitation. Although 99.8% of Shakshouk families have good access to clean water, Shakshouk's community lacks access to sanitation system (only 1.25% have sewage facility) (CAPMAS 2017). Although sewage pipes and fund have been secured, a problem with land acquisition dedicated as a sewage disposal site stopped the ongoing process (AbdelMaaboud 2018). Consequently, people (96.6%) use trenches which are not regularly cleaned and not properly isolated causing several problems; such as the soil contamination, an increase in underground water level influencing buildings' bases and community's health, and the spread of insects and bad smells (Heiba 2016; CAPMAS 2017).

Due to the high levels of pollution in Shakshouk, the community suffers from many diseases (AbdelMaaboud 2018; Heiba 2018). Lack of sanitation and garbage dissemination lead to hepatitis and kidney diseases (Heiba 2016). In addition, women and kids in direct contact with shrimp peels suffer from respiratory problems, eyes diseases, skin inflammations and bones weakness (AbdelMaaboud, 2018; Heiba 2018). The village includes only one health care unit which lacks doctors and staff (GOPP 2006; Heiba 2016).

3.3 The Status of Economic Development in Shakshouk

This section addresses "economic development" that is generated by economic activities exerted by external actors who are geo-graphically located within the system of Shakshouk; but are implemented by investors not per se locally based. The actors involved in economic development are mainly the Ministry of Agriculture and Land Reclamation, the national Tourism Development Agency (TDA), the Egyptian Salts and Minerals Company (EMISAL), private companies such as Chitosan Egypt, and tourist resorts. In this context, economic development refers to salt extraction industry, shrimp-based industry, and tourism.

Salt extraction industry is one of the largest economic activities on lake Qaroun. The main factories are EMISAL established in 1984 nearby Shakshouk village and future companies in the North shore of the lake (El-shabrawy and Dumont 2009; EMISAL 2018). The salt extraction industry has both positive and negative impacts on the environment and local community. For its positive impacts, it is reported that the salinity of the lake has recently decreased to 35–40 gm/l in 2018 (EMISAL 2018) after reaching to 50 gm/l in 2010 (Hassan 2015). Furthermore, EMISAL claims that it plays an important role in: providing useful kinds of salts for different chemical, food and medical domains and; establishing a leading industrial base in Fayoum. It, additionally, contributes to: enhancing the water quality of the lake; improving the soil quality of surrounding agricultural lands and; raising fund to develop schools, health care unit, or other projects and capacity building initiatives for the local com-munity of Shakshouk (AbdelMaaboud 2018; EMISAL 2018).

Nevertheless, the current salt extraction industry poses negative impacts on the environment and people. This includes the location of the factory in an environmentally sensitive area which threatens fish habitats (AbdelMaaboud 2018), the disposal of some impurities back in the lake after salt production process (Youssef 2018). Furthermore, the unclean dump sites of EMISAL company within the village land which influence the health of nearby residents. Moreover, the power of the company jeopardizes the community to raise their concerns (Youssef 2018).

Shrimp-based industries[2] similarly have positive and negative effects on the poor and the environment. Private companies get shrimp peels from Shakshouk's women to extract Chitosan product (Youssef 2018); to be used in several industries, cosmetics, and organic plantation, etc. This reduces the environment pollution -since the shrimp peels are not thrown in Shakshouk's canals or lake Qaroun; in addition to helping women earn more money for their well-being (AbdelMaaboud 2018). In this regard, a dealer from within the community and his wife are responsible for handling women and providing the private companies (i.e. Chitosan.Egypt, Re-shrimp company) with the shrimp peels. (Youssef 2018). In reality, such activities contributed significantly in the income generation for the households especially with the depletion of fishing and men's escalating migration trend. In this regard, women depend -for affording their

[2] Data gathered during a personal interview with Miss. Shahira Youssef, the chief marketing officer from Chitosan Egypt company and a participant in "Social Innovation for Fayoum" workshop: a cooperation between United Nations Development Programme (UNDP) and Misr El Khair foundation.

daily needs- on their income from shrimp peeling (Youssef 2018). However, the fair distribution of the economic benefit is debatable with the activity being controlled by specific dealers. Furthermore, the problem of performing this activity in unclean contexts affected the health status of women and their kids (AbdelMaaboud 2018). Although, Chitosan Egypt tried providing medical insurance for these women. However, Egyptian systems accept providing medical insurance to only employed women with job contracts; and this offer is refused by shrimp dealers since it jeopardizes their authority (Youssef 2018). Hence, the unregulated practices provided unhealthy working conditions, underpaid rates and disconnection from the real poor women; which consequently, contributed to the village multidimensional phenomenon of poverty.

As for tourism - which is an important economic activity in Qaroun Protected area- contributing to the economic growth of poor Shakshouk's communities (Heiba 2016). Many hotels and resorts (i.e. Byoum resort, Panorama Shakshouk Hotel, Auberge hotel… etc.) are concentrated along the southern shore of Lake Qaroun providing their clients with the spiritual and cultural aesthetics of the lake. Nonetheless, the current touristic activities also pose negative impacts on the environment on which they depend, affecting the long term process of development (NCS/EEAA 2007). Firstly, hotels and resorts throw their sewage and wastes in Lake Qaroun through large pipelines (EEAA 2008), which negatively affects the color, quality and smell of the lake; in addition to the indirect impacts on fish production and migratory birds habitats (Heiba 2016; AbdelMaaboud 2018). Secondly, some hotels extended their premises by filling in lake Qaroun which affected the biotic life in the lake. Thirdly, for the sake of horizontal expansion of some resorts, many shores –rich in biodiversity- suffered from erosion and the removal of rich vegetation and birds habitats (EEAA/NCS 2007). Furthermore, hunting violations practices caused loss of biodiversity(NCS/EEAA 2007).

3.4 Shakshouk Between Poverty Reduction Actions and Environmental Conservation Efforts

This section discusses efforts in reducing community poverty and conserving the environment in the context of Shakshouk. Regarding poverty reduction, a number of initiatives were implemented by different entities between 2009 and 2011. This includes the project of Fayoum Agro Organic Development (FAOD) with cooperation with Shakshouk NGO, which focused on minimizing the solid wastes and providing medical care committees to help the community; in addition to educating them handicrafts and potteries during workshops (FAOD 2011). Also, social development projects were implemented by the NCS as a social responsibility towards the poor people of Shakshouk (Heiba 2012). However, the authors argue that these initiatives were short-term projects with neither a clear comprehensive framework for community development nor continuous fund or support.

As for efforts to conserve the environment; several points could be pinpointed. GAFRD decided to stop adding fish fry to the lake till the death of Isopoda parasite under the claim that this decision would eventually increase the fish productivity back to the lake, disregarding the status quo of fishermen (Ramadan 2018). Although NCS

introduced regulations against hunting violations, there has been no proper means for implementation or monitoring. Furthermore, water drainage is not filtered before accessing the lake (Mahdaly 2018). Overall, this sheds light on the apparent lack of an effective integrated management of the protected area.

4 Discussion: Mutual Influences in Shakshouk

This part begins with discussing the mutual influences between poverty in the community and economic development in the case of Shakshouk village. Then, the mutual influences between poverty- environment and environment-development are plotted respectively.

4.1 Poverty-Development Mutual Influence

The interrelationships between community and developers could lead to win-win relationship. On the one hand, rural poor communities provide and sustain manpower for such economic development projects. Additionally, the communities could supply raw materials –shrimp peels for example– that is useful for these developers' industries. On the other hand, these developers guarantee the community monthly shares, earnings and job opportunities; or indirectly affect them by offering funds, tool, trainings, etc. to increase economic growth of their settlement. In the case of Shakshouk, salt production factories helped in the schools and houses renovation, in addition to, the agricultural lands' soil and water improvement. Such actions helped the community minimize their poverty to a certain level; in terms of satisfying some of their basic needs.

However, the poor community-developers' relationship is not always smooth. Many stories during field work and secondary data reveal tensions between them. This happens sometimes because of disputes on developers' land pieces left unclean polluting the environment where people live, or affecting the soil which they use. Other times, the factories themselves throw sewage and impurities that negatively affects Lake Qaroun's water quality which in return affects people's natural resource base. As a way to face these disputes, poor people protest, manipulate, libel or spread rumors on these development agencies among the town affecting negatively their businesses. Since these investors have a big authority on the place's economy and the upper hand in many decisions, communities suffer from a lack of freedom of expression as a projection of rural poverty (Youssef 2018) (see Fig. 5).

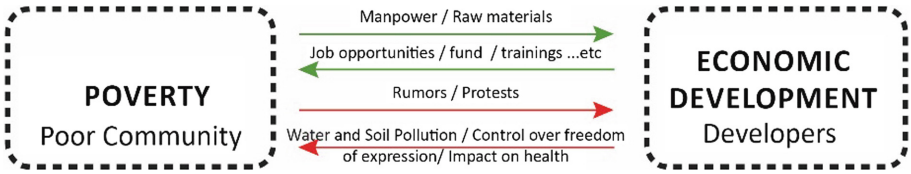

Fig. 5. A diagram summarizing the mutual influence key points between Poverty and Economic-Development. Source: Authors

4.2 Poverty-Environment Mutual Influence

As previously mentioned, the environment guarantees a good base for poor livelihoods, by providing the ecosystem services such as fisheries, water, birds, landscape aesthetics, on which they depend. In this regard, conservationists' efforts in protecting these resources doesn't benefit only the national or global communities; but has – definitely- a positive impact on local people nearby. Nevertheless, conservation actions, or policies could worsen local poverty when excluding people from the resources, and when finding that reducing people poverty is outside of conservationists' core business.

In the case of Shakshouk, before the fish death crisis, pro-environment agencies; such as GAFRD, Shakshouk NGO, had several tensions with the fishermen after catching them over exploiting the fish resources by using nets with tiny holes harvesting fish fry before reproduction. Several campaigns were organized by the NCS with cooperation of Shakshouk NGO refusing this action that threatens the environment. Accordingly, to face this challenge of over-exploitation, some fishermen accepted the regulations in protecting their environment while others refused to listen to this moral and social pressure. Furthermore, it is worth to highlight the recent efforts of NCS who cooperated with the NGO to minimize people's local poverty by providing other opportunities, such as handicrafts, pottery, etc. to take away pressures on the environment. This shows that initiatives from conservation agencies in Shakshouk have some impacts on the community poverty, despite being small scale.

Another tension exists on ground when people do not respect the rules and regulations prohibiting from hunting migratory birds. This situation is aggravated when hunters arrange to come up with manmade lakes or fish farms to attract these migratory birds far from the protectorate boundaries to hunt and sell them to interested external parties. This highlights questions on the management effectiveness of conservationists outside the protectorate's boundaries. Moreover, fish farmers' unwatched behaviors threaten the population of birds and could lead to their mass death.

Moreover, rural communities which have no sanitation systems and throw their wastes and sewage in lake Qaroun severely affect the water quality of the lake by polluting it and changing its quality. Additionally, human behavior during the agriculture process and the usage of pesticides and fertilizers has a negative impact on the soil salinity as well as on the water quality. This provides the perfect environment for parasites reproduction threatening the resource base of fishing, and affects the long term benefits of the environment itself. Once the ecosystem is negatively affected, it jeopardizes the community the other way around making vicious circle of impacts. In this regard, people themselves leave the place and migrate, leaving their families behind searching for non-polluted environments to practice their jobs (see Fig. 6).

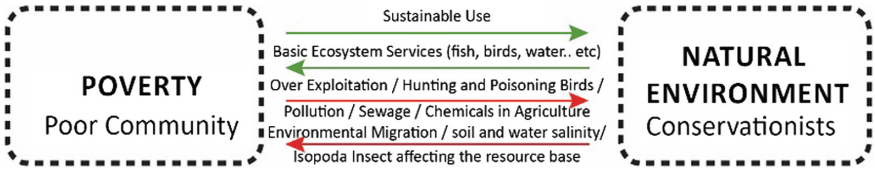

Fig. 6. A diagram summarizing the mutual influence key points between Poverty and Environment. Source: Authors

4.3 Environment-Development Mutual Influence

Being the source of water, fishes, birds, salts, and shrimps, the environment offers the developers the incentive to develop their economies. Moreover, the aesthetical value of the place motivates the tourism industry. Similarly, the economic development itself affects positively the environment; this exists in Shakshouk when salt production industries minimize the salinity level of the lake balancing the salinity load of agricultural drainage. Furthermore, shrimp based industries minimized the village canals' pollution by making use of these wastes. However, the relationship between the environment and economic development is not always a win-win situation. The development projects sometimes break the rules and throw their wastes and sewage in the lake affecting its biodiversity. Moreover, the location of large scale factories and extension of tourist resorts on the lake's shores influence the fish production, vegetation, and birds' habitats of the place. This negative influence on the environment obviously affects the on-going economic development; since polluting the environment affects the quality of tourism, agriculture and shrimp-based industries (see Fig. 7).

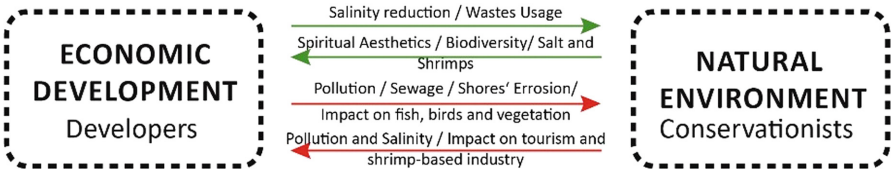

Fig. 7. A diagram summarizing the mutual influence key points between Economic Development and Environment. Source: Authors

5 Results and Conclusion

5.1 Results: The Circular Relationship in Shakshouk

The review of Shakshouk village portraits some relationships between community poverty, environmental conditions, and economic development. This could be observed when both the people and the development affect/are affected by the environment;

which in return affects people's well-being exacerbating their poverty, and negatively affects the on-going process of this development. This circular relationship highlights the idea of the cumulative chain effect each theme has on the others (see Fig. 8).

Fig. 8. A diagram illustrating the circular relationship between the environmental conditions, community poverty, and the economic development. Source: Authors

This section connects the three to establish the dynamic circular relationships among them. For example, poor access to sanitation leave the community with no other option except throwing their sewage in the lake without treatment. This has affected the water quality, increased its salinity, and polluted the environment; which in return threatened tourism and shrimp-based industry affecting the quality of product they deliver. Moreover, the extensive usage of chemicals in the agriculture process by the poor community, in addition to the industrial sewage by developers worsened the environmental conditions of soil and water. A high degree of pollution, an increase in water salinity, a high percentage of heavy metals were the suitable environment for parasites causing fish death. This situation made the community lack their access to resource base and migrate. On the other hand, the continuous process of extracting salt will eventually improve the water quality of the lake; impacting positively the fish and shrimps' productivity and would secure poor communities in satisfying their basic needs. Similarly, the shrimp-based industries that make use of shrimp shells –reducing canals pollution- affects generally the context of the village which would lead to better health conditions if magnified (see Fig. 9). This circular relationship draws a special attention to a continuous loop of strong impacts endlessly affecting each other.

Fig. 9. Examples for the possible interrelationships forming the circular relationship among Poverty, environment and Economic development.

5.2 Conclusion

The purpose of this study is to explore the dynamics of development of poor communities within protected areas, with particular focus on the interrelationships among the community poverty, the natural environment and economic development. These three themes are mutually interlinked affecting and being affected by each other and the circular relationship is generally complex and context specific. Based on the empirical study of the case of Shakshouk village that is part of Qaroun Protectorate, the current conditions of the village could be understood in the light of negative social, environmental and economic forces that have exerted pressure over a prolonged time period as well as the reinforced loop of negative interrelationships among these forces. Within this understanding, conserving the natural environment of Shakshouk is important to the alleviation of long-term poverty; and the on-going process of development.

This research throws light on the gravity of dealing in sectorial manner neglecting the interrelationships between the different themes. This could be explained in light of

the fact that development plans for each theme have been commonly addressed in isolation; and authorities are only minding their mandate without considering the interrelationships. Therefore, the interlinkages among the different themes need to be addressed in an integrated approach, to create synergies and maximize social, economic and environmental outcomes. It is also important to be aware that trade-offs would sometimes define the best possible (however imperfect) outcome to achieve a sustainable development in the area.

References

AbdelLatib, W.: Status and trends of selected important bird areas in Egypt, pp.0–22 (2009)
AbdelMaaboud, E.: CEO of Shakshouk NGO, Personal Interview, Interviewed by: Nada Samir, April 2018
Abdou, E.S., Nagy, K.S.A., Elsabee, M.Z.: Extraction and characterization of chitin and chitosan from local sources. Bioresour. Technol. **99**(5), 1359–1367 (2008). https://doi.org/10.1016/j.biortech.2007.01.051
Abou El-Gheit, E.N., Abdo, M.H., Mahmoud, S.A.: Impacts of blooming phenomenon on water quality and fishes in Qarun lake, Egypt. Int. J. Environ. Sci. Eng. **3**, 11–23 (2012)
Afrol: Local group makes mark at Egypt's Lake Qarun (2018). http://www.afrol.com/articles/34229. Accessed 6 Oct 2018
Allam, K., Egyptian Environmental Affairs Agency (EEAA): Personal Interview, Interviewed by: Nada Samir, February 2018
Barbier, E.B.: Poverty, development, and environment **15**(6), 635–660 (2010)
Bird Life: Bird Life International (2018). http://datazone.birdlife.org/site/factsheet/lake-qarun-protected-area-iba-egypt. Accessed 3 Oct 2018
CAPMAS: Statistics for Shakshouk (2006)
CAPMAS: CAPMAS Statistics, Fayoum Governorate, Shakshouk (2017)
Carey, C., Dudley, N., Stolton, S.: Squandering paradise? The importance and vulnerability of the World's protected areas, pp. 1–232. WWF-World Wide Fund for Nature (2000)
DFID et al.: Linking Poverty Reduction and Environmental Management: Policy Challenges and Opportunities (2002)
Dudley, N., et al.: Safety net: protected areas and poverty reduction (2008)
EEAA/NCS: Protected Areas of Egypt : Towards the Future', Development, p. 58 (2006)
EEAA/NCS: Qaroun Protected Area Management Plan (2007)
EEAA: Highlighted Environmental Action Plan Fayoum Governorate (2008)
El-shabrawy, G.M., Dumont, H.J.: The Fayum Depression and Its Lakes, The Nile: Origin, Environments, Limnology and Human Use (2009). https://doi.org/10.1007/978-1-4020-9726-3_6
El-Serafy, S.S., et al.: Qarun Lake fisheries?: fishing gears, species composition and catch per unit effort. Egypt. J. Aquat. Biol. Fish. **18**(2), 39–49 (2014). https://doi.org/10.12816/0011075
EMISAL: The Egyptian Salts and Minerals Company in Fayoum (2018). www.emisalsalts.com
Fisher, R.J., et al.: Poverty and Conservation: Landscapes, People and Power. International Union for Conservation of Nature and Natural Resources (IUCN), Gland, Switzerland and Cambridge (2005)
GAFRD: General Authority for Fish Resources Development - Ministry of Agriculture (2016). http://www.gafrd.org. Accessed 1 Oct 2018

GAFRD: General Authority for Fish Resources Development Fact Sheet (2018). www.gafrd.org. Accessed 3 Oct. 2018

GOPP: Master Plan for Shakshouk Village (2006)

Hassan, R.M.A.: Ecosystem restoration using maintenance dredging in Lake Qarun, Egypt. J. Am. Sci. **11**(12), 55–65 (2015). http://www.jofamericanscience.org

Heiba, A.: Evaluation of Social Development Programmes in Qaroun Protectorate. Ain Shams University (2012)

Heiba, A.: Social and physical problems that hinder tourism in Qaroun reserve. A comparative Study for variety of patterns. Faculty of Tourism and Hotels - Fayoum University (2016)

Heiba, A.: Director of Qaroun Protected Area, Personal Interview, Interviewed by Nada Samir, April 2018

Howarth, R.B.: Sustainability, Well-Being, and Economic Growth, pp. 32–39 (1972)

Hussein, H., et al.: Pollution monitoring for Lake Qarun. Adv. Environ. Biol. **2**(2), 70–80 (2008). https://doi.org/10.1046/j.1439-0426.2003.00456.x

Mahdaly, A.A.: CEO of Shakshouk Local Authority, Personal Interview, Interviewed by Nada Samir, April 2018

Ministry of Environment: Egyptian Biodiversity Strategy and Action Plan, 2015–2030 (2016)

NCS/EEAA: The State of Qaroun Protected Area: An Evaluation of Management Effectiveness, Cairo (2007)

Ramadan, S.: Chief of Fishermen, Personal Interview, Interviewed by Nada Samir, April 2018

RAMSAR: RAMSAR Egyptian Sites (2012). https://www.ramsar.org/countries/egypt?page=4. Accessed 6 Oct 2018

Rosendo, S., Brown, K.: The limits to integration : critical issues in integrated conservation. In: The Commons in an Age of Global Transition: Challenges, Risks and Opportunities, the Tenth Biennial Conference of the International Association for the Study of Common Property, pp. 1–28 (2004). https://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/482/Rosendo_Limits_040823_Paper207.pdf?sequence=1%5Cn%5Ct

Shahid, S.A., Abdelfattah, M.A., Taha, F.K.: Developments in Soil Salinity Assessment and Reclamation: Innovative Thinking and Use of Marginal Soil and Water Resources in Irrigated Agriculture, pp. 1–808. Springer, Heidelberg (2013). https://doi.org/10.1007/978-94-007-5684-7

State Information Service: Map of Egypt (2004)

UNESCO: Poverty, environment and development: studies of four countries in the Asia Pacific Region. UNESCO Principal Regional Office for Asia and the Pacific. Regional Unit for Social and Human Sciences in Asia and the Pacific (2001)

USAID: Issues in Poverty Reduction and Natural Resource Management, October 2006

Youssef, S.: Chief Marketing Officer, Personal Interview, Interviewed by Nada Samir, September 2018