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POLICY BRIEF

Sea-Level Rise in the Nile Delta: Promoting Adaptation Through Circular Migration

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Introduction

Since the early 2000s, the Intergovernmental Panel on Climate Change (IPCC) has identified the Nile Delta as one of the parts of the world most vulnerable to climate change impacts, including sea-level rise and rising temperatures.[1] The climate crisis is compounding an already difficult situation in the delta: Egypt is experiencing sustained demographic growth, gaining 1 million residents every seven months.[2] The home of half the Egyptian population, the Nile Delta is one of the most populated deltas on the planet, with almost 50 million inhabitants.

Moreover, Egypt's already fragile economy is strongly impacted by inflation since 2016, and especially for the past year. The living and working conditions of local communities — particularly farmers and fishermen in coastal governorates, including Alexandria, Beheira, Kafr el-Sheikh, Daqahliyya, Damietta, and Port-Said — are deteriorating. As climate change impacts intensify, local populations whose livelihoods depend on natural resources are forced to adapt in different ways.[3]

Although the effects of climate change are not yet strong enough to produce large-scale migrations, studies suggest that 6 million people could be displaced — both internally and across borders — by the end of the century as a result of sea-level rise.[4] Migration has been a strategy to cope with crises for a long time in the Nile Delta, and it should be integrated into adaptation plans for the region in the face of climate change.

This brief will delve into the environmental vulnerability of the Nile Delta and how climate change is impacting local communities. It aims at improving circular migration as an adaptation strategy at the local scale.

Methods

The findings and argument of this brief are based on ethnographic fieldwork conducted in Egyptian Arabic with farmers, fishermen, and city dwellers in several areas of the Nile Delta between February 2021 and June 2023. High-risk areas were visited several times. Interviews were conducted with different stakeholders, including experts from the United Nations (UN) and foreign development agencies, members of civil society organizations (CSOs), and researchers in Cairo and Alexandria to understand state-led policies regarding adaptation to climate change.

The Nile Delta Under Environmental Threat

The Nile Delta coastline is particularly vulnerable to the effects of climate change due to rising water. Models show that 25% of the delta could disappear by 2100.[5] Yet "littoralization" — that is, the concentration of economic activities, investments, and populations in coastal regions — is still very prevalent in Egypt, as it is throughout the rest of the world.

For example, Alexandria has almost 7 million inhabitants, making it the biggest city in the Mediterranean region. Thirty-seven percent of the city's buildings are located less than 1 kilometer from the sea.[6] Many of them have already deteriorated, particularly on the seafront, and collapses happen regularly. A sea-level rise of just 50 centimeters could displace 2 million people and result in the loss of 214,000 jobs.[7]

The rest of the coast is not spared: In some rural areas, human density reaches 1,500 inhabitants per square kilometer. The retreat of the coastline, which began with the construction of the Aswan Dam in the 1960s and 1970s, is expected to worsen in the coming years, and rising temperatures caused by climate change are expected to affect local ecosystems and lead to a loss of biodiversity.

The Egyptian government has already taken action to protect human settlements. Through the Egyptian General Authority for Shores Protection, the Ministry of Water Resources and Irrigation is building defense coastal infrastructure along many cities and towns, including Alexandria, Abu Qir, Baltim, and Ras el Bar.[8] However, given the strong carbon impact of cement production, this is not a perfect solution. The protection of one zone also tends to accelerate the erosion of nearby areas.

Even so, where these structures are located, they have undeniably delayed the effects of wave erosion and prevented displacement. International organizations IOs have implemented similar projects. For instance, since 2018, the United Nations Development Program (UNDP) has led the Enhancing Climate Change Adaptation in North Coast and Nile Delta in Egypt project. Funded by the Green Climate Fund, this project aims to prevent further coastal erosion through nature-based solutions, including the restoration of natural sand dunes.

Working and Living Conditions Among Local Populations Are Deteriorating

In rural areas, communities of farmers and fishermen are particularly exposed to the impacts of climate change, both direct and indirect. Climate change is intensifying social, economic, and environmental living conditions already in decline.

For the past five years, farmers in the Nile Delta have observed changes including temperature variations, seasonal shifts, and the spread of pests. Seawater intrusions kill palm trees in the Rosetta area and fruit trees in other coastal areas. In Damietta, a guava cultivator explained that he will be forced to abandon his farm if conditions worsen. Local adaptation strategies, such as scattering sand on the fields, are not enough anymore.

Land is becoming less and less fertile. Some interviewees said that certain crops are particularly threatened, such as mangoes, olives, and tomatoes, as well as alfalfa, pushing farmers to buy dry livestock forage. To cope with the negative effects on agricultural production, farmers must use more fertilizers and pesticides. This increases their production costs and further pollutes the land.

Meanwhile, fishermen report that as sea storms intensify and become more frequent, their work is becoming more dangerous. In addition to the dangers posed by sea storms, fishermen suffer from the loss of biodiversity caused by pollution on the Nile, the lakes, and the marine areas. One of the fishermen interviewed noted: "Of course the lake is different now. Many things have changed. Water quality has changed because of pollution and wastewater discharges, and this has an impact on fish." All fishermen interviewed described a drop in production and income, which they linked to environmental degradation.

Public authorities, development agencies, and UN agencies have moved to compensate for losses and promote the resilience of local communities. For example, the government-led Haya Karima (A Decent Life) development program, launched in 2018, aims to improve infrastructure and services, as well as promote local entrepreneurship for 4,500 rural villages throughout the country. European development agencies are also active in the area. The German Agency for International Cooperation (GIZ) leads capacity-building projects in Edku and Abu Qir aimed at improving living conditions and creating local jobs. Despite these efforts, government stakeholders recognize that climate action at the local levels lack coordination, and since CSOs tend to focus on urban settings, they rarely reach these remote areas.

For the Nile Delta, Migration Is Not a New Strategy

Following reductions in income related to climate change impacts, migrations from the Nile Delta have already begun. However, it is important to recognize that migration as an adaptation strategy is not new and did not begin with climate change. Historically, migration has been a way of coping with environmental degradation.[9] For decades, populations in the Nile Delta have relied on multiple economic activities as well as mobility to diversify and increase their income.[10]

"Circular migration," or the temporary and repetitive migration between home and host areas, is the most common migration pattern in Egypt. Although statistics are not available on internal migration in Egypt, and circular migration is not included in the census, empirical observations and academic studies show that circular migration is a widespread model, particularly since Cairo is a megacity that draws most of the migration in the country.[11] In Egypt, men commonly live in cities and work in sales, catering, or construction to provide for their families in the countryside. Most of the men interviewed who worked in Cairo visited their wives and children every three months. This model of migration is repeated internationally, with people moving back and forth between Egypt and host countries.[12]

Indeed, international migration and remittances (money that migrants send home) are also a strategy for coping with deteriorating living conditions. The international migration of Egyptians is not new. Since the 1970s, Egyptian men, and sometimes their families, have migrated to the Gulf Cooperation Council (GCC) countries, as well as to Europe. Today, nearly 10% of Egyptians — that is, 10 million people — live abroad. In the face of intensifying climate change impacts and increasingly difficult living and working conditions, we can expect migration between Egypt and the Gulf countries to rise in the coming years.

Further, the fieldwork for this brief found that some fishermen are already making full use of circular migration at various levels to offset the effects of environmental degradation. This is the case of one man interviewed and his colleagues, some of them relatives, who now work as fishermen in Kuwait.[13] They send money back to their families in the village and come back to Egypt every seven months.

If this migration dynamic becomes even more widespread in the years to come, relevant stakeholders — that is local governments, IOs, and nongovernmental organizations (NGOs) — will need to prepare to ensure that it is an effective adaptation strategy. To that end, a change of narrative is needed: Migration can be seen as a strategy for adapting to climate change impacts, rather than a public issue to be dealt with.

Migration Can Be Successful Adaptation — Or Maladaptation

At present, migratory strategies are not being fully leveraged to enable the sustainability of local communities and territories. This stems from a lack of awareness around the long-term effects of climate change. Although people on the ground notice and experience the transformation of their environment, they often do not relate them to global climate change, instead considering them temporary or seasonal. Many fishermen and farmers use the same expression: "There's something about the weather." This lack of awareness is reflected in households' investment strategies. Unaware that some of their lands and economic activities are no longer sustainable, they continue to invest in them. Remittances are often used to build houses along the coastline. The landscape of the Nile Delta is marked by brick houses under construction, some of which are just a few dozen meters from the shore. Though efficient in the short term, migration and remittances could lead to maladaptation, increasing vulnerability in the long term.[14]

A similar dynamic can be found in the agriculture sector. Remittances are used to buy fertilizers — which only prove effective in the short term. These resources could be redirected toward new agricultural techniques or crops that need less water, or are more resistant to salt or high temperatures.

Indeed, migration and remittances could enable long-term resilience. However, amid challenges such as inflation (the annual urban inflation rate reached 38% in September 2023) and other economic issues facing Egypt, it is unlikely that local communities will invest money from migration in sustainable strategies without the support of local and international government stakeholders.

Policy Recommendations

To ensure the resilience of coastal areas in the Nile Delta and maximize the benefits of migration as adaptation, the following recommendations are put forward:

1. **Continue to build infrastructure** to protect the coastline and shield existing human settlements. Although not perfect, as mentioned above, they ensure safety in the short and middle terms.
2. **Streamline coordination** between various stakeholders, especially at the local level. Coordination is particularly necessary when it comes to water-related issues, which fall within the domains of various governmental and nongovernmental institutions. Avoid overlap between the different levels of government and connect the various development agencies with government and UN players.
3. **Raise awareness in local communities** by providing information about ongoing, irreversible impacts of climate change and the short- and long-term consequences for their livelihoods. Promote dialogue between experts, civil society, beneficiaries, and academia. Civil society actors can act as intermediaries on the ground, as well as through workshops organized in universities.

   These actions can be reinforced with government campaigns implemented at the governorate level, but also more locally at the "markaz" level. School curricula are also an essential tool for informing people about the effects of climate change. Educating children about the changing environment can have a spillover effect on their parents' behavior.[15]
4. **Support the role of CSOs.** Expand their scope of action beyond urban settings to reach the most vulnerable communities. Raise awareness about climate change and promote good practices for adaptation and the reinvestment of remittances. The first step would be to identify contacts in the countryside. Joint action between NGOs in Cairo, which often have more resources, and local NGOs in other areas could be useful.
5. **Train key individuals both in and out of target communities** to raise awareness regarding the effects of climate change and promote new ways of using remittances for long-term resilience. Select both men and women who are well integrated into their communities and active in the agricultural sector to take part in expert training workshops. They can then act as intermediaries with their communities.

   In 2017, the Food and Agriculture Organization of the United Nations implemented a Training of Trainers (ToT) program in palm groves in the Egyptian oases. This could be extended to other agricultural activities in the Nile Delta. In this way, fishermen, farmers' unions, and agricultural cooperatives could be more systematically mobilized.
6. **Promote sustainability programs** such as the Sustainable Agriculture Investments and Livelihoods (SAIL) project, led by the International Fund for Agricultural Development (IFAD) and the Ministry of Agriculture. SAIL helps small farmers adapt to a changing environment, and promotes micro-investment in smart agriculture.

Moreover, the International Organization for Migration (IOM) could play a pivotal role. Since 2015, a division of IOM has been dedicated to climate-induced migration. This office could work to build the capacity of relevant stakeholders to improve adaptability to climate change. IOM's national and regional offices are well established in Cairo, and their programs could help achieve their Migration, Environment and Climate Change (MECC) priorities in the Middle East and North Africa region. In addition to promoting circular migration, policymakers should work to strengthen people's ability to stay on their original lands.

Notes

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