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Evaluating the Causes and Consequences of Climate Migration in Morocco

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EVALUATING THE CAUSES AND CONSEQUENCES OF CLIMATE MIGRATION IN MOROCCO



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OCTOBER 13, 2016

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WPI



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An Interactive Qualifying Project Report

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ABSTRACT

Migration caused by climate change has already affected many communities, but has only recently been recognized as a problem. While climate change can cause migration, other factors such as political and socioeconomic issues can also provoke migration. Our goal was to gather research from a variety of sources to determine potential risks and impacts of climate migration on different areas in Morocco. We identified regions that are vulnerable to climate migration. We identified potential strategies for adaptation to climate change.

EXECUTIVE SUMMARY

In the Kingdom of Morocco, the topic of climate change and its consequent effects have only recently begun to gain traction as relevant and imposing social issues. The upcoming 22nd Conference of Parties (COP22), held in Marrakesh from November 7th to the 18th, is a major motivator for this emerging recognition (see logo for COP22, figure 1).



Figure 1: Logo for COP22 (Opportunities for Africans, 2016)

Since Morocco was chosen to host COP22, the country's government has stepped forth as a developing leader in the battle against climate change. There are many well-known consequences of climate change and new ones continue to be identified as its effects worsen. One of these new consequences is the displacement of communities caused by the effects of climate change, known as climate migration. Climate migration has become a relevant social issue, but there is still a lack of awareness about its significances. Without action, parts of Morocco may become increasingly over or under-populated as people seek out depleting resources.

Climate migration is a complex issue that can be alleviated through several different strategies. The difficulty is in choosing which strategy or combination of strategies that will most effectively and efficiently reduce the relocation of people caused by climate change. Morocco is extremely susceptible to climatic issues such as flooding, sea level rise, desertification, water scarcity, and inconsistent weather patterns, as seen below in Figure 2.



Figure 2: Ocean dangerously close to homes in Nador (Photo credit: Muller, 2016)

Therefore, it is important that stakeholders, including NGOs and governmental ministries, collaborate in their efforts to prevent the advancement of climate migration. Ribat al-Fath (RAF) is an NGO located in Rabat, Morocco, and will be participating in COP22. One of the aims of RAF at COP22 is to influence environmental policies on an international level to assist in reducing the global effects of climate change.

This project provides research on the specific cases of climate-induced migration in Morocco to RAF so it can use them to raise awareness at COP22. RAF will use our information to educate stakeholders on the impact of climate change on different Moroccan communities. We have identified areas prone to climatic distress, communities already undergoing climate migration, and reasons why people are migrating away from these regions. We have also identified relevant resources and NGOs in Morocco, interviewed inhabitants of affected communities, and gathered research from online databases. With this report, we aim to raise awareness about the threats of climate migration and facilitate the development of strategies that Moroccan NGOs can implement.

METHODOLOGY

The annual Conference of Parties has a global impact on environmental policies. RAF will be playing a key role in influencing some of those policies this year. In order to give RAF the best compilation of research and findings, we developed three objectives for our project.

Our first objective was to identify and map the baseline threat of climate migration within Morocco. We located areas in Morocco that are experiencing geographical and environmental changes due to climate change by reading a report by the Intergovernmental Panel on Climate Change (IPCC). We identified the provinces of Oujda and Nador as at-risk regions. We then traveled to these areas to conduct interviews and rapid vulnerability assessments (RVA). An RVA is a list of characteristics that can be judged to quickly determine the vulnerabilities of a system. Local translators assisted with interpreting Darija and French so that the interviews could be transcribed in English. Interviews were designed to help us identify the specific risks in these areas, as well as, the social and economic struggles caused by climate change.

We wanted to gain a better understanding of the recourses Morocco already had that could be used to combat climate migration. For our second objective, we interacted with relevant agencies, resources, and organizations to gain this insight. Interviews with these representatives were designed to assess the action being taken to combat climate change and each organization's capacity to further counter climate migration. The interview questions were designed in an open-ended format to allow representative to expand upon their answers to give us a more dynamic idea of what each organization was capable of handling.

Our last objective was to use the data we collected to create a slide presentation that Ribat al-Fath can use as a reference when presenting at COP22. To achieve this objective, we interviewed representatives from NGOs who are involved in the planning process of COP22. Afterwards, we analyzed our data into organized sections of notes. To analyze our data, we categorized interview responses by key words; in a process know as coding. Coding our data would allow us to identify different risks of climate migration in Morocco.

FINDINGS AND DISCUSSION

Through a combination of interviews, focus groups, and research, we identified communities that are at risk of climate migration. We learned that a majority of the officials were well aware of climate change and its effects on the country. With their assistance, we recognized climate threats occurring around the country such as flooding, sea-level rise, desertification,

pollution, and inconsistent weather patterns. Furthermore, through our interactions with these representatives we developed a list of active organizations combating climate change. We discovered how these organizations approach these issues and whether there were any implemented adaptive strategies. Some organizations focused their efforts on migratory statistics rather than climatic issues. These organizations provided data concerning the population of cities and communities to assist in our mapping of potential migratory movements from. Many representatives were assisting in the organization of COP22 and were able to educate us on the organization of the conference and the demographics of those attending the conference (figure 3). We found that the zone RAF presents in is the green zone and it contains all organizations that are not accredited by the United Nations Framework Convention on Climate Change (UNFCCC) containing organizations like youth groups, university organizations and other associations.



Figure 3: Preparatory conference for COP22 held at Ribat al Fath (Photo Credit: Muller, 2016)

Our data showed that provinces in East Morocco such as Oujda and Nador were at risk of climate migration. Oujda suffers from inconsistent weather patterns and desertification, while Nador suffers more from flooding, sea level rise, and pollution. These issues have been making agriculture, one of Morocco's primary industries, increasingly more difficult to manage. Regions located along the coast are prone to climate change as well. With a solid base of information concerning adaptive strategies, we analyzed effective means of combating climate migration. The data we have collected can be used at COP22 to reach out to active participants in Morocco's fight against environmental change. The data was organized into a slide presentation so it can be more easily processed and analyzed.

RECOMMENDATIONS

Through careful analysis of our findings and discussion about the complexities of climate migration, we developed several recommendations for how NGOs can continue to improve the living standards of Moroccan citizens. Morocco has an impressive repertoire of programs and organizations that help fix social, economic, and environmental problems. The country is well aware of issues such as climate change, and is taking the necessary steps to combat it. Newly emerging issues such as climate migration tend to be overshadowed by more publicized problems. More research needs to be conducted to gain a better understanding of climate

migration. Programs need to be created to respond to the findings of these research studies. As organizations and the government continue to become more aware and involved in these complex issues, a knowledge gap grows between the organizations and the people they aim to help. When it comes to solving national and international problems, knowledge is power. With better-informed citizens, Morocco can more effectively improve climatic irregularities. From the interviews we conducted, we found that Moroccan officials and organization members are passionate about securing the wellbeing of their country and people.

We recommend that NGOs and the government continue to educate and empower its citizens to help combat climate change.

We found that many citizens do not take action because they are not aware of the scope of the problem or they believe the government will take care of the problems. While there are organizations that assist citizens in coping with climate change issues, we suggest that on top of these programs, NGOs and the government work to educate citizens on what they can do to directly combat climate change. We also recommend implementing education programs that teach citizens how to be more environmentally conscious of their actions and the ability to teach others these same tactics can go a long way in making immediate differences locally as well as long term differences globally. In the slides we created for Ribat al-Fath, we included a couple of climatic issues affecting other countries in Africa. We hope that through our presentation we can convey relatable material that will incite the participation of more people in the combat against climate change. Education and empowerment are important when combating a complex issue such as climate change, which is why we recommend the implementation of a program to provide both to the public.

We recommend implementing a program that integrates the two following initiatives: to help people adapt to the effects of climate change and to aid climate migrants.

Through our research, we found that there are initiatives in Morocco to aid migrants and initiatives to help people adapt to the effects of climate change. However we failed to identify an organization or project that integrated these two initiatives to specifically combat climate migration. We recommend the creation of a program designed to target problems with the migration of farmers due to climate effects. We also suggest that existing organizations collaborate to create a project covering both the adaptation aspect and the human aspect of climate migration. This would provide farmers with the resources and knowledge to adapt their crops to an increasingly arid landscape.

We recommend that more study be conducted on at-risk areas.

As part of our suggestions, we recommend that the government complete a more in depth study of areas at risk of the effects of climate migration. This study should involve vulnerable populations in different regions of Morocco. These studies can more accurately break down the complexity of climate migration. A better understanding of climate migration means more efficient solutions can be developed.

CONCLUSION

The final factors that influence people to move from their native regions may be a direct or indirect consequence of climate change. Even still, actions must be taken by the government, non governmental organizations, and the citizens of Morocco to help combat the symptoms of climate change that cause people to leave their homes. On a global scale, nations need to work together to target the main problem; human induced climate change. NGOs and the Moroccan government have made significant steps towards helping their people cope with climate change. Some possible next steps towards combating climate migration could be to conduct more detailed studies on at-risk regions and to educate citizens on adaptation and mitigation strategies for climate change. With all these combined efforts, Morocco can work towards providing stable living conditions for all citizens.

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AUTHORSHIP

Each member of the team contributed equally towards the completion of the report and project. All members participated in collecting and analyzing data, interviewing respondents, as well as writing and editing the report and presentations.

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LIST OF ABBREVIATIONS

COP22	22 nd Conference of Parties
RAF	Ribat al-Fath
IPCC	Intergovernmental Panel on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change
INDC	Intended Nationally Determined Contribution
IUCN	International Union for Conservation of Nature
GEF	Global Environmental Facility
NWP	Nairobi Work Programme
PPS	Party for Progress and Socialism
AAA	Adaptation of African Agriculture
MSF	Médecins Sans Frontières
IOM	International Organization for Migration
RVA	Rapid Vulnerability Assessment
ESA	European Space Agency

CHAPTER 1: INTRODUCTION

The effects of climate change, including increased global temperatures, rising sea levels, desertification, drought, an increase in the severity and frequency of natural disasters and numerous other threatening changes in the environment, can no longer be ignored. Developed countries have larger carbon footprints compared to developing countries, but developing countries are often more impacted by the repercussions of climate change (Each Country's Share, 2014). In Morocco, climate changes and sea level rise is projected to threaten or dislocate thousands who live near the shore from their homes (Ldillalène, 2015). Furthermore, water scarcity due to droughts and a decrease in average rainfall is a growing problem in Morocco. There are many strategies being implemented to combat these threats, though more needs to be done to build resilience in vulnerable communities (Blanco, 2015). Without action, parts of Morocco may become increasingly uninhabitable.

The difficulty with combating climate migration is in creating an adaptive system to deal with the issue and in building a network of experts on the topic that can deal with this complex issue. Environmental non-governmental organizations (NGOs), government officials and Moroccan citizens are all stakeholders in this issue. Collaboration from all stakeholders is necessary to implement effective solutions for the impact of climate migration.

Ribat al-Fath (RAF) is an NGO located in Rabat, Morocco that participated in the 22nd Conference of Parties (COP22). COP22, run by the United Nations Framework Convention on Climate Change (UNFCCC), took place in Marrekech from November 7th-18th. RAF participated as one of many organizations concerned with climate change policies on an international level, and part of the effort to aid in the mitigation of climate change disasters. The COP meetings are held annually to discuss policy changes to be put into action that will prevent climate change and find solutions to environmental issues.

The goal of our project was to provide evidence about the specific case of climate migration in Morocco so that Ribat al-Fath could raise awareness at COP22 and engage stakeholders about the impact of climate change on communities. We identified areas prone to climate disasters, communities already undergoing climate-induced migration, and a list of the

specific reasons residents are beginning to migrate from them. We also identified relevant resources and NGOs in Morocco, interviewed inhabitants of affected communities, and gathered research from online databases. With this report, we hope to raise awareness about the threat of climate migration and facilitate in the development of strategies to better Morocco's preparedness.

CHAPTER 2: LITERATURE REVIEW

Morocco's placement in Northern Africa, located both on the coast of the continent and next to the Saharan Desert, makes it prone to a variety of adverse effects of climate change. The decrease in yearly precipitation, desertification and rising sea levels, are among the factors forcing Moroccan people to migrate nationally. Farmers are unwillingly moving because their land is no longer fertile enough to produce crops (Meisenhelter, 2014). People in coastal communities are unwillingly abandoning their homes due to increased flooding in residential and commercial areas. Communities living in close proximity to the desert are forced to move and find larger sources of water because of the decrease in yearly precipitation. These issues are currently occurring in Morocco and are forcing communities to migrate into already highly populated areas, putting a stress on resources in urban areas. The 22nd Conference of Parties aims to emphasize those risks and promote adaptation programs.

2.1 RIBAT AL-FATH AND ITS INVOLVEMENT AT COP22

Ribat-al-Fath is the NGO we worked with. Ribat-al-Fath, a civil society organization, works toward economic, social, cultural, and environmental development in Rabat and its surrounding regions. Ribat-al-Fath fights for social and environmental progression as a means to mirror that of human development. Funding for this NGO comes from benefactors and donors, as well as partnerships with government agencies. Abdelkrim Bennani is the president of the organization and has 19 paid employees and about 5,000 volunteering members. Ribat Al Fath organizes meetings with other NGOs to contribute to the debate about key issues in Morocco and determine the future of the country (About, 2014).

The Conference of Parties is an annual conference that began in 1995, where both governmental and NGOs come together to discuss environmental issues occurring around the world. The conference lasts 12 days, at the end of which, a global goal to mitigate climate change is decided upon. The goal of COP21 was to elaborate an agreement in order to reduce greenhouse emissions and limit the increase of global temperature. After the COP21, countries make their own Intended Nationally Determined Contribution (INDC) to contribute to the global goal. Morocco's INDC after COP21 involved transitioning from a strong dependence on fossil fuels as an energy source to renewable energy sources.

As the host country, Morocco had an opportunity to influence the organization of COP22. The conference is separated into two zones, the blue zone and the green zone (see Figure 4). The blue zone was reserved for government officials and accredited NGOs. The green zone contained all non-governmental organizations that are not accredited, for example, university groups, small NGOs, associations and researchers (COP22 Marrakech, 2016). The green zone hosted representatives from Moroccan NGOs, including members of Ribat al-Fath.

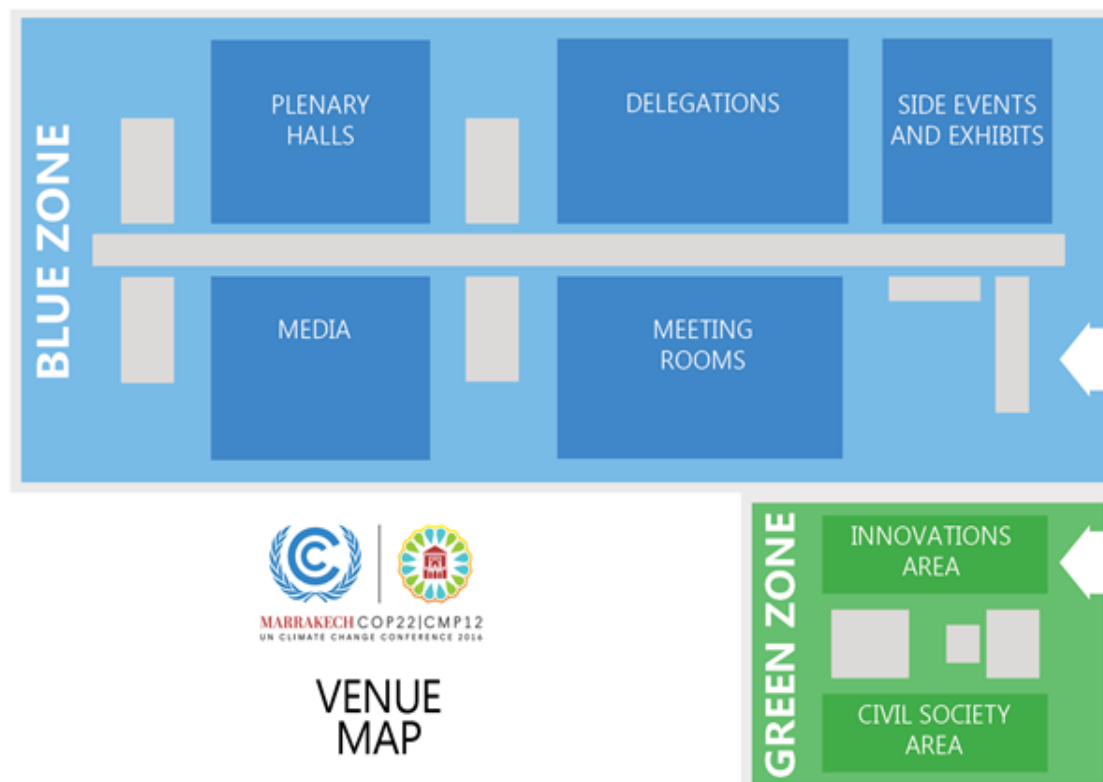


Figure 4: Map of venue hosting COP22: depicts organization of blue and green zones (COP22 Marrakech, 2016).

During the conference, Ribat al-Fath participated in the green zone. In this space, organizations presented their research, innovations and programs in booths. Visitors at the conference walked around and visit presentations. This set-up allowed representatives from different organizations to discuss climate change issues and to collaborate on solutions. Simultaneously, there were presentations put on by various organizations in small amphitheaters located around the green zone that people observe. Representatives from Ribat al-Fath had a

presentation concerning their research and proposed solutions on climate change issues in Morocco.

2.2 CLIMATE CHANGE THREATS IN NORTHEAST MOROCCO

Effects of climate change are observed globally. Africa experiences a severe impact of these effects, with seven out of ten countries at the highest risk to climate change effects found just on the continent (McGeown, 2014). Furthermore, as the IPCC stated in their Assessment Report 5, “almost everywhere in Africa, farming depends entirely on the quality of the rain season, which makes the continent especially vulnerable to climate change” (COP22 Marrakech, 2016). A country’s vulnerability to climate change effects is determined by many factors such as location, food security, source of economy, technological capabilities, and infrastructure (Climate change and lack of food security, 2015). Developing countries are technologically and economically less adept to deal with these effects and so often suffer greater consequences. Since many countries in Africa depend on an agricultural economy, climate changes put the success of agriculture at risk. Hardships caused by climate change often force people to migrate from their homes to more secure areas, nationally and internationally.

The African continent also experiences a range of climate change effects, from droughts and desertification to flooding and shoreline erosion. Floods are the most common disaster plaguing North Africa. For example, a disastrous flood occurred in 2001 in Algeria. The flood left 800 people dead and resulted in an economic loss for the country of \$400 billion. During this tragic event, the government failed to integrate preventive methods as well as emergency response systems against this severe weather pattern (Layachi, 2001). Morocco also suffers from severe effects due to climate change. Residents are starting to be frequently affected by flooding and sea level rise in the northern regions of Morocco. These climate changes throughout the continent have caused a food crisis, exacerbated violent conflict, brought diseases, destroyed homes and altered ecosystems.

Due to Morocco’s geographical location, the country’s environment plays a significant role in the everyday life of people. Being an arid country on the northern coast of Africa makes different regions in Morocco susceptible to very diverse environmental problems. Located both on the coast of the continent and next to the Saharan Desert, makes it very prone to the adverse effects of climate change. The decrease in yearly precipitation induces droughts and desertification, and rising sea levels causing flooding and erosion are factors forcing people to

migrate (Rahoui, n.d.). The forced displacement of people due to effects of climate change is called climate migration. Coastal communities are pressed to abandon homes due to increased flooding in residential and commercial areas. Communities living in close vicinity to the desert are forced to move and find larger sources of water because of the decrease in yearly rain-fall. Furthermore, “experts add that the increased frequency of droughts could significantly diminish the food supply, as was the case in the Horn and South Africa during the 1980s and 1990s” (COP22 Marrakech, 2016). Migrants tend to move into urban areas with high population densities and put an increased strain on resource supplies. (Gromko, 2015). Climate migration could become increasingly disruptive to Moroccan society if not addressed.

The country’s coastline extends for 3,500 km along the Mediterranean Sea and the Atlantic Ocean. More than 60% of Morocco’s population lives in or near to this coastal region and 90% of the country’s industry is based here (Ldlalène, 2015). Climate change puts this area at risk; the low topography of Morocco’s coastline makes it extremely susceptible to accelerated sea-level rise (Snoussi, et al., 2007). Due to this risk, these areas could experience flooding, erosion and the destruction of wetlands (Climate Impacts, n.d.). Some of the communities affected are the provinces of Nador and Berkane that depend on fishing, farming and raising livestock (Tafraouti, 2010). Even with the drought, the rains in these provinces are more frequent and torrential. The climate fluctuations and the dependence of these provinces on agriculture and fishing make them vulnerable to climate migration.

These environmental changes will put the infrastructure and the economy of coastal cities and the safety of inhabitants at risk unless long-term adaptation strategies are enacted. Findings from research on Moroccan coastal areas “indicate that 24% and 59% of the area will be lost by flooding at minimum and maximum inundation levels, respectively. The most severely impacted sectors are expected to be the residential and recreational areas, agricultural land, and the natural ecosystem” (Snoussi et al., 2007). This statistic is a 50-100 year projection if climate change progresses at the same rate and no measures are taken to adapt or combat the effects. Threats to industry, infrastructure and residents put the Moroccan coast at risk to climate migration. If no action is taken, part of the shoreline will disappear, taking people’s homes and forcing them to move.

In addition to rising sea levels, Morocco also suffers from other adverse effects of global warming, including an increase in temperature and decrease in precipitation. A study conducted

on the Eastern Mediterranean coast predicts that “precipitation in North Africa is likely to decrease between 10% and 20%, while temperatures are likely to rise between 2 and 3 °C by 2050” (Snoussi, Ouchani, Niazi, 2008). These drastic changes lead to decreased supplies of potable water and increased difficulty in crop cultivation. Furthermore, temperature rise is correlated with rising sea levels that erode the Moroccan coast.

In the efforts of finding a better life, residents living in climate affected areas are migrating to bigger and more industrialized cities. They tend to move to these cities in hopes of a better education and quality of life. This puts a greater stress on resources and living space in urban areas. The combination of decreasing water supply and strong population growth continues to aggravate the stressed water situation in parts of southern Morocco (Snoussi, et al., 2008). Although water scarcity is not most apparent in Morocco of all African countries, if current trends continue, the issue will become more apparent, and could potentially cause a national crisis. “List of Top Five Global Risks of Highest Concern for the Next 18 Months” in Appendix A shows climate migration as a global concern.

The topic of climate migration is complex. People living in affected areas sometimes do not associate their hardships with environmental changes. While natural disasters are often reason enough for a certain population to migrate to a more habitable area, more often than not, climate change is not the only factor to lead to climate migration. Climate changes can contribute to food insecurity and violent conflict over limited resources. For example, in recent years, Somalia has been plagued with more frequent droughts than it has experienced in years past. With fertile land becoming increasingly scarce, conflict over land ownership is heightening tensions. With weapons being readily available, the common person living in Somalia is put in a hard position. Armed conflict is prevalent, impacting the life of the common citizen. Many Somali citizens have decided to migrate to Kenya, where droughts are less abundant and armed conflict is less apparent. Climate migration is often the product of a variety of different factors, all leading to the same result, a large migratory movement of people from one area to another (Kolmannskog, 2009).

In contrast, citizens are sometimes forced to remain in areas impacted by climate changes because they don't have the proper financial resources to move. In the African country, Burundi, for example, 94% of the working class is employed in agriculture. Farms are rain-fed and the trend of higher mean temperatures, a longer dry season and more concentrated rains in the

country have hurt the economy and livelihood of people. To adapt, farmers often move to cities to pursue a more secure profession. Interviews conducted with a woman living in the Northern province, Kirundo, in Burundi said, “if a drought or flood comes, we will suffer. We have to stay; we have nowhere else to go” (Kolmannskog, 2009). Situations like this make identifying climate change migration more difficult as some citizens may have the need to move, but not the means.

2.2.2 EFFECTS OF CLIMATE CHANGE ON NORTHEAST MOROCCO’S INDUSTRY

With Morocco’s susceptibility to climate change, it would only be logical that we consider the adverse effects it could have on the agricultural industry in the country. In Morocco, agriculture is the most prevalent industry in the country’s economy. Therefore, if the agricultural industry suffers, a major part of the population experiences hardships. Climate change has already started to take its toll on agriculture (Perry, 2015). The southern region of Morocco suffers from desertification. The northeast suffers from irregular weather patterns and flooding. The effects of climate change are crushing the attempts of farmers in one way or another, and without a continuous application of mitigation strategies, it will only worsen.

In the southern region of Morocco, global warming is causing the expansion of the Saharan desert. This is proving problematic to local farmers, the reason being the aridity of the land. With existing factors such as extreme heat and extremely low precipitation rates already in place, agriculture suffers more as the land becomes less fertile due to increased desertification. This, along with decreased rates of yearly precipitation, is putting a stress on water availability. More water is needed but less is available. These conditions make it difficult for farmers to keep their crops alive, thus decreasing their crop quality and yields. With less and lower quality product to sell, farmers are receiving a lower income, putting them in financial stress. With a decrease in water supply in some areas, some communities are being forced to tap into their groundwater resources, however, without the proper knowledge on how to do so, these communities are both taking too much and polluting what is left (Bouchaou, 2008). Without proper knowledge of the environment and its effects on the groundwater supply, there must be a different source of water to supplement the scarcity of water.

On the other hand, agriculture in the northern coast of Morocco is being negatively affected by seemingly random weather patterns. Usually, there are two seasons in Morocco, summer and winter; the inconsistency of the weather in these regions has communities believing

that those seasons no longer apply to them (Moroccan Climate Change Policy, 2014). With summer symptoms emerging during the winter and vice versa, it is becoming increasingly complicated for farmers to plant their crops. Because of this inconsistency, farmers can no longer adapt as effectively. With no means to predict weather patterns, farmers cannot protect their crops appropriately. Climate change is making agriculture increasingly difficult for big and small farmers. See “Map of Projected impacts to Crop Yields due to Global Temperature Rise” in Appendix A to see the projected decrease in crop yields globally.

2.3 CLIMATE RESILIENCE AND REGIONAL RISK

The intensity at which climate affects a community depends on the region’s sensitivity and adaptive capacity toward climate change. Sensitivity relates to the region’s risk and pertains to the likelihood of threatening climatic events occurring. The region’s adaptive capacity is linked to its climate resilience, or the area’s ability to deal with the destructive repercussions of natural disasters and climate change effects (Gitay, et al., 2011).

Morocco has a number of programs and projects in place to combat the long-term effects of climate change. Projects promoting climate change resilience often involve collaboration with those living in regions sensitive to climate change. This collaboration is essential to implementing strategies that would effectively integrate into a community. The International Union for Conservation of Nature (IUCN) conducted a project called, “Mediterranean Resilience in the face of climate change”, along the Moroccan coast. This project involved educating residents and organizations local to the project area on adaptation strategies pertaining to climate change. Joint participatory action planning among these stakeholders then took part to decide and implement climate change adaptation strategies in communities (IUCN, 2014). The Global Environmental Facility (GEF) also conducted a project to increase the resilience of Moroccan ports to sea level rise and extreme wind and wave conditions caused by climate change. This project focuses on strengthening the infrastructure of ports so that they can withstand flooding and erosion (European Bank, 2016). These projects show that Morocco is aware of the current and impending risks of climate change, and that action is being taken to make the nation more resilient.

2.3.1 EXISTING CLIMATE ADAPTATION INITIATIVES

During COP21, it was decided that countries would make their own plans on how their country would take action to contribute to the global goal to limit global temperature rise to 2°C. Each country would submit an INDC before the next COP, outlining its future goals to mitigate climate change and the steps it will take to reach these goals.

Moroccan officials created and submitted an INDC report in which the Moroccan climate goal is stated and steps to reach that goal are described. The national goal for Morocco is to reduce greenhouse gas emissions by 32% by the year 2030 (Moroccan Secretariat, 2015). The report outlines how the country will target the energy, industrial, agricultural, waste and land-use sectors to implement strategies to reduce greenhouse gas emissions by sector. The major focus is to increase the production and use of renewable energy sources within Morocco; other actions include improving the waste and water recycling systems, and developing policies to support sustainable growth in the agricultural sector. Figure 5 depicts several green energy projects in Morocco. To achieve these goals, “Morocco expects to dedicate at least 15% of its overall investment budgets to adaptation to climate change” (Moroccan Secretariat, 2015) and it has been determined that the country will require additional financial support from outside sources.

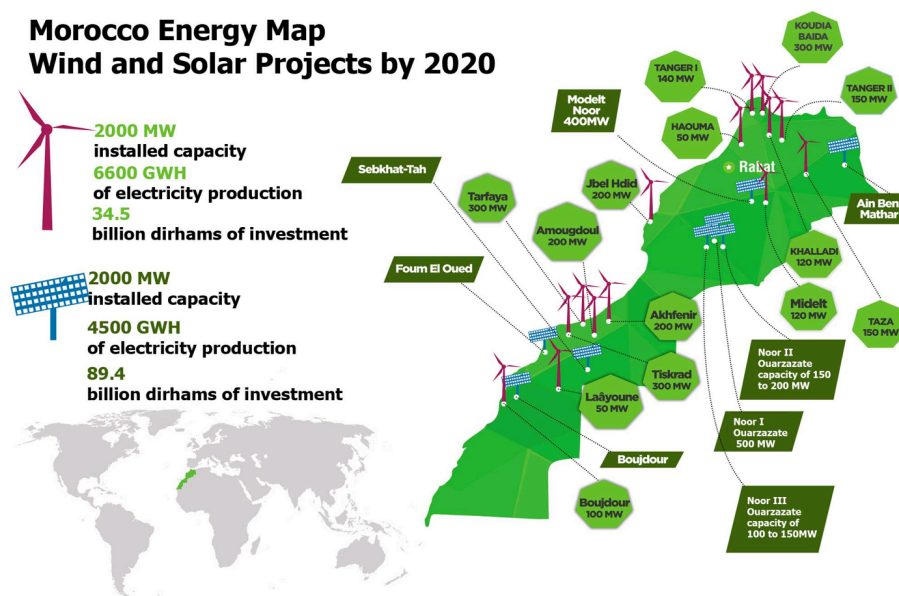


Figure 5: Map of sites Morocco plans to build Sustainable Energy Sources in by the Year 2020 (COP22 Marrakech, 2016)

Since the submittal of the INDC, many of the initiatives mentioned in the report have been made to mitigate the effects of climate change in Morocco. The “Morocco Green Plan,” coordinated by the Ministry of Agriculture and Fisheries, targets the determined actions to strengthen agriculture in Morocco and make its development sustainable. The main objective of the Green Morocco Plan is to support the sustainable management, development and conservation of agricultural water. This plan involves the creation of various irrigation entities to be used for the development of agricultural procedures, developed programs for better water management in agriculture, development reform of the agricultural council, and agricultural training and capacity. This initiative also seeks to protect agriculturally purposed water and conserve energy (Marouki, 2012).

A strategy to strengthen the agricultural sector is to aggregate small farms. This strategy involves a voluntary partnership between farmers and an aggregator who manages and optimizes production on farms with financial and technical skills. Utilizing aggregators benefits individual farmers who may not have these skills and resources on their own (“Ministry of Agriculture,” n.d.). The application of technology aids farmers in adapting to the effects of climate change. Water conservation and strategic use, such as the construction of irrigation infrastructures outlined in the “National Irrigation Water Saving Programme Support Project,” a project in reaction to the Green Morocco Plan, helps agriculture in arid areas by providing a stable water source (Marouki, 2012). This improves the stability of agriculture and increases crop production, thus making farmer revenue more stable. Economic hardship is often a factor that causes farmers to consider migration, so technological resources and a secure income allows them to adapt to climate change effects.

Coastal areas are also at risk to climate change effects leading to climate migration. In hopes to improve access to resources, the Nairobi Work Programme (NWP) was created as a 5-year program with the purpose of primarily assisting developing countries.

“To improve their understanding and assessment of impacts, vulnerability and adaptation to climate change and make informed decisions on practical adaptation actions and measures to respond to climate change on a sound scientific, technical and socio-economic basis, taking into account current and future climate change and variability” (UNFCCC Nairobi, n.d.).

The primary goal is to involve coastal regions that are prone to severe climate effects to benefit from each other's experiences and to develop adaptation plans. The Nairobi program aims to achieve this goal by providing local communities, experts, and government officials with an environment where they can communicate and share their knowledge. Furthermore, this program focuses on creating cost-effective solutions that are centered on the human aspect of the issue. Most of these projects have a huge emphasis on involving stakeholders while working on adaptation programs. An example of one project is a study in sub-Saharan Africa designed to help the health sector adapt to climate change. The World Health Organization (WHO) collaborated with communities in Guinea, Madagascar, Malawi and Zambia to design and implement effective healthcare strategies (UNFCCC Nairobi, n.d.). Through this process, both locals and experts are able to identify options for adaptation. The involvement of community in forming adaptation programs improves the chance that the implemented programs will last.

2.4 RAPID VULNERABILITY ASSESSMENT

Climate migration projections in an area can be evaluated by conducting a vulnerability assessment. This type of study identifies and quantifies vulnerabilities in the system studied. In the case of climate migration, a vulnerability assessment would aim to evaluate the risks caused by climate change that cause people to migrate to or from a region. The study would quantify the risk of climate migration by looking into factors leading to climate induced migration and measuring their prevalence in the area.

A rapid vulnerability assessment has the same purpose as a full-length vulnerability assessment, but is only conducted when research time is limited. A rapid study limits the depth with which a study can be carried out, but when conducted effectively, can still provide valuable data on vulnerability risk in an area. There are three steps in conducting a rapid vulnerability assessment that are relevant to our study on communities (Global Climate Forum et al, 2014).

First, the purpose of the vulnerability assessment must be defined. In the case of climate migration within communities in Morocco, the purpose of an assessment would be to identify the risk that people living in these communities face in terms of climate change effects forcing them to migrate. The next step in conducting a rapid vulnerability assessment is planning the study. The boundaries and approach of the study must be defined. The boundary limits the study size and defines units of measurement. Boundaries are formed based on available financial, human and time resources. The scope of the assessment must be realistic in terms of the resources

available. The size of the study is defined by the system of interest, which is the specific area to be studied. Assessments can be conducted on a global, state, or local level depending on resources. Resources are limiting factors, as it would be impossible for a research team of four people to properly evaluate the risk of flooding in the entire country of Morocco in a month's time. It would be much more practical for four people to conduct a study on the risk of flooding in two communities in a month's time.

Once a reasonable system of interest has been decided upon, a unit of measurement must be defined. A unit of measurement for a vulnerability assessment depends on the system being studied and can be in terms of "socio-economic units (e.g. district, block, village, household, gender group) or natural/ecological units (e.g. river sub-basins, watersheds, agro-climatic zones)" (Global Climate Forum et al, 2014).

The final part of planning involves deciding on an approach for research. The approach can be generalized into two categories: bottom-up or top-down research. A top-down approach is better suited for large-scale research and requires "skilled personnel, access to data, specialized computer software, and knowledge of methodologies that require prior training" (Global Climate Forum et al, 2014). A bottom-up approach is effective in evaluating current vulnerabilities. It requires fewer resources compared to a top-down approach and can involve a wider range of stakeholder. For these reasons, a bottom-up approach to research better suits our resources and skill set. In the study of a system, a bottom-up approach uses methods that gather information about different sub-systems. It is then the researcher's job to synthesize data from the subsystems to form conclusions about the system. Methods of research that fit in this category and that would be relevant methods for our project include interviews, focus group discussions, stakeholder consultation, statistical analysis and transect walks (Global Climate Forum et al, 2014).

The final step is putting the plan into action. The system being studied is assessed using the methods decided upon in the planning process. These methods are used to answer research questions. It is likely that approaches to research will need to be adjusted as gaps and miscommunications in interview questions and other methods are identified (Global Climate Forum et al, 2014). To design a rapid vulnerability assessment geared to analyze the threat of climate migration in coastal communities in Morocco, all of the previous steps mentioned must be taken into account.

2.5 CASE STUDIES: CLIMATE MIGRATION FIELDWORK

Currently about 40% of the world's population lives within 100 km of a coastal line (Percentage of Total Population Living in Coastal Areas). This consequence of climate change threatens developing countries the most. In these emergent countries, the vulnerability of rising sea levels is higher, yet their capacity to adapt is limited. For these developing countries, limited governmental and financial capacity make it difficult for adaptation programs to be effective.

A study, "Climate Change, Migration and Displacement: Two African Case-studies" was done in 2009. This study observed the migration of people in Somalia and in Burundi. The methods of research involved a "desk-study and a field study" (Kolmannskog, 2009). The researchers first gained an understanding of the climates, economy and general lifestyle of people in Somalia and Burundi before traveling to these places and conducting interviews with people living there.

The study observed a cycle of migration and determined that war conflict in combination with climate change is a main reason that people move. As noted in the study, there is an "indirect link between drought and displacement through conflict...drought exacerbates the conflict by increasing competition over fertile land and resources" (Kolmannskog, 2009). Because of this, people tend to move to avoid violent conflict and also to seek more prosperous land.

The case of migration in Burundi shows similarities with migration in Somalia. Climate change in Burundi includes the trend of a higher mean temperature, longer dry seasons and heavier and more concentrated rains. Also having an agricultural economy, these changes have a large impact on people's livelihood. It is observed that "droughts and environmental degradation exacerbate land conflicts" (Kolmannskog, 2009) and that violent conflict leads to the displacement of people. Interviews with residents in the area were used to gather data in this study. A simple interviewing process can provide both personal and analytical responses, allowing the collection of scientific and anecdotal data. In this case, interview questions pertained "to the displacement dynamic and protection needs and responses" (Kolmannskog, 2009).

Reading this study has illustrated the layered dimension of climate migration. A challenge with climate migration studies is drawing a direct correlation between climate change and the reason that people are migrating. There are many factors involved in the migration of

people from their homes. In both studies, climate change appears to be an indirect cause of migration. Droughts cause food insecurity, water scarcity, and conflict over remaining fertile land, all reasons for migration. War also accelerates the degradation of land, amplifying the effects of climate change forcing people to move. It was also observed that some people were forced to remain in depleted lands because they were too poor to relocate. Climate migration is a problem that has scientific, social and economic causes.

2.6 EFFECTIVE PRESENTATION DESIGN

To build an archive of materials for COP22, we wanted to understand how best to communicate our findings to an intellectual community of climate experts. Effectively communicating the research conducted in a study is just as important as the content behind research. In many cases, the goal of research is to increase the depth of knowledge on a subject in order to find a solution to an existing problem. So, communicating research must be done persuasively and in an engaging manner in order to gather support.

For example, there are many ways to design a slide presentation. In a review of slide presentations found to be effective conveyors of research, the examples were found to share common design features. These aspects have to do with the visual layout of and the relay of content in the presentation.

The visual layout of the presentation includes the layout of slides, color use, and the arrangement of images and info graphics. Examples of slides from an effective presentation are provided in Figure 3. Effective presentations were observed to maintain a consistent design from slide to slide. This means that each slide has the same font, color scheme and a similar themed layout. The slides in Figure 6 exemplify these characteristics. The background, text and images are all presented in grey, teal and orange, and each slide uses the same font. The layout of the slides are also consistent; on each slide, a large number creates a focal point, an illustration supports the main point, and key words are in a larger font and bolder color compared to smaller details (10 Powerful Body Language Tips, 2013).



Figure 6: Slides demonstrating an effective presentation

The minimalistic design utilized in these slides allows the viewer to easily process the information presented and doesn't distract from the presenter. Each slide has one focus, or key point. This helps the audience focus on one point at a time and prevents them from reading ahead and getting distracted from what the presenter is saying. The text is large and bold making it easy to read, and key points stand out in larger font size and varying colors. The illustrations are simple and easy to interpret, effectively backing each main point. Utilizing the aforementioned techniques, a presentation can help ensure the main points of the research are conveyed to an audience.

2.7 SUMMARY

Our initial research has given us a greater understanding of the causes and effects of climate migration in Morocco. We have identified geographic features such as close proximity to the desert or the ocean that put a community at risk of destructive climate changes. We have identified gaps in research concerning this subject in directly correlating climate change with human migration. We aim to conduct our own case studies on Moroccan communities vulnerable to climate migration and to draw a direct correlation between the effects of climate change and human migration.

CHAPTER 3: METHODOLOGY

The topic of climate migration is an important topic that Ribat al-Fath and other Moroccan NGOs want to bring to discussion as a major issue at COP22. However, little research has been done to directly correlate climate change to human migration in Morocco. The goal of our project is compile a report on the threat of climate migration for Ribat al-Fath to use at COP22. Ribat al-Fath will use the report as part of their presentation at COP22 to raise awareness about the threat of climate migration in Morocco. To meet this goal, we have developed 3 objectives:

1. Identify and map the baseline and project the threat of climate migration within Morocco
2. Interact with relevant agencies, resources, and organizations that could respond to this threat
3. Design a presentation on climate migration, vulnerability and resilience in Morocco that will be featured during the COP22 Conference.

The strategies used to achieve each objective are outlined in greater detail below.

3.1. IDENTIFY AND MAP THE PROJECTED THREAT OF CLIMATE MIGRATION IN MOROCCO

We mapped the threat of climate migration in Morocco using data from reports by the Intergovernmental Panel on Climate Change (IPCC). We were able located areas in Morocco that are experiencing geographical and environmental changes due to climate change.

We identified the provinces of Oujda and Nador as at risk regions. We visited the communities to conduct site assessments and a rapid vulnerability assessment in each location. In a rapid vulnerability assessment, the system being studied is assessed using the methods decided upon in the planning process. These methods are used to answer research questions. It is likely that approaches to research will need to be adjusted as gaps and miscommunications in interview questions and other methods are identified (Global Climate Forum et al., 2014).

To conduct a rapid vulnerability assessment, we conducted face-to-face interviews with experts and representatives from NGOs who are involved in combating climate migration and aiding refugees as well as residents with no expertise on the subject. See Appendix B for our travel schedule. This allowed us to gather interview responses from a range of individuals who were knowledgeable of climate affects in Morocco We conducted eight face-to-face interviews with representatives and residents. The interviews were conducted in offices, in cafes and

restaurants, and in one case, at the subject's home. These interviews were designed to help us to identify the specific risks in these areas as well as the social and economic effects due to climate change. Some interviews were conducted with individual representatives and others involved small group interviews of no more than three interviewees. Local translators assisted with Darija Arabic and French and the interviews were transcribed into English. We started interviews by introducing ourselves and giving a brief overview of our project objectives. We let the subjects know that we're performing research for Ribat al-Fath to use at COP22. With permission, we recorded the audio of these interviews, allowing us to later go back and listen and make sure we didn't miss important points. This allowed us to give our full attention during the interviews. During interviews, the four of us took turns asking questions from the interview guide. Two of our group took notes in notebooks on responses to questions. Having two people rather than one take notes allowed us to cover the topics discussed in the interview more thoroughly.

From residents in the areas, we sought anecdotal data and personal experiences about their observations of climate changes and any ways that these changes have affected their livelihood. From NGOs and experts, we sought personal anecdotes as well as scientific data about current and projected climate change in the Oujda and Nador provinces. All subjects were also asked to rely their knowledge on government programs in effect to help the areas adapt to climate change. We used open-ended questions during our interviews. This allowed interviewees more freedom to share relevant knowledge that they had on the topic of climate migration that our questions may not have covered.

We also documented each site, by taking pictures and videos of infrastructure damaged or at risk to climate change effects. Based on areas mentioned in interviews or tours given by residents, we visited coastal and agricultural sites to observe firsthand the effects of and the strategies implemented to adapt to climate change.

Throughout our interviewing process, a variety of recurring themes emerged when referencing the Oujda province. These themes were all various instances of climate change and its effects on the province as a whole, many of which could easily provoke a series of climate migration. Most interviewees easily listed a couple of climatic changes occurring in the province including microclimates and inconsistent weather patterns, as well as desertification. Furthermore, we were given insight as to how these climatic trends affect the local population.

With interviewees ranging from government officials to college students, we observed a perspective that was much more closer to home than we were.

3.2 INTERACT WITH RELEVANT AGENCIES, RESOURCES, AND ORGANIZATIONS

We identified a list of organizations that deal with climate migration, with assistance from RAF and online searches for NGOs, which focus on climate migration. Some of the organizations that we interviewed about climate change and its effects in the regions are also involved in programs aimed to help Morocco adapt to climate change. In these cases, we interviewed these organizations on both topics. We conducted six face-to-face interviews with organizations or individuals with knowledge on programs and resources that are or can be used to combat climate migration. Interviews were conducted in each organization's office or workplace. Interviews conducted with members from the Party for Progress and Socialism (PPS) and with administration from the Institute for Renewable Energy and Efficiency in Oujda involved small focus groups. Other interviews were conducted with individuals. Local translators assisted with Darija Arabic and French and the interviews were translated into English. We briefed interviewees on the objectives of our project and our collaboration with Ribat al-Fath. With permission, we recorded the audio of the interviews. During interviews, the four of us alternated asking questions from the interview guide. We followed the same note-taking procedure that we used in the interviews discussed previously.

Interviews with these organizations were designed to assess the action being taken in the face of climate migration and each organization's capacity to further combat the issue. We interviewed scientific, political, educational, governmental, social and financial organizations. Each organization had different expertise, and so we tailored our questionnaire to fit their area of knowledge. We used open-ended interviews as a method to obtain more detailed information on climate migration. The open-ended format allowed our interviewees to elaborate on issues and share experiences and knowledge that they felt was relevant to climate migration. The complete interview guide for representatives of organizations can be found in Appendix C. The complete interview guide for residents can be found in Appendix D.

Furthermore, we visited the Ministry of Foreign Affairs, in which we observed the participation of several delegates involved in a Pre-COP meeting that was being held there. (see Figure 7).



Figure 7: COP22 Flags on the Rabat Ministry of Foreign Affairs Building (Photo credit: Muller, 2016)

3.3 DESIGNING A PRESENTATION FOR COP22

Using data collected from our case study of the two communities at risk of climate migration and our assessment of the organizations with potential to address climate migration issues, we have created a presentation containing different climatic issues currently effecting Morocco, Burundi and Somalia, that Ribat al-Fath can pull information from when designing their presentation for COP22. The research that we do and the presentation that we create will be geared towards the audience at COP22. In order to do this in the most effective manner, we must know the procedure and setup of, and the participants in this year's COP. To achieve this, we have interviewed representatives from NGOs who are involved in the planning process of COP22.

3.4 DATA ANALYSIS

In our interview process, notes were taken on paper and on laptops and audio was recorded. The first step in analyzing our data was to organize notes in one place. We took pictures of notes taken on paper and uploaded these along with notes taken on laptops and audio recordings to a team shared folder on Google Drive. Separate folders were created to organize note sets by interview. This created a personal database of the data collected in our research. We could then systematically analyze our data.

To analyze our data, we manually coded interview responses into categories representing major themes in the data. We had already realized themes in responses during the interview process, and so we designated these themes as codes under which we could categorize the data. See Appendix F for a list of themes. The codes were framed to satisfy the objectives of our research. We read through notes and listened to audio recordings and summarized responses to interview questions into the themes that we established as codes.

CHAPTER 4: FINDINGS AND DISCUSSION

This chapter highlights the results of our work organized by objective. In this section we will identify the trends of climate migration in Morocco, the readiness of organizations in Morocco to combat climate change, and efficient methods in which to present our data.

1. IDENTIFY AND MAP THE PROJECTED THREAT OF CLIMATE MIGRATION IN MOROCCO

Throughout our interviewing process, a variety of recurring themes emerged when referencing the Oujda province. These themes were all various instances of climate change and its effects on the province as a whole, many of which could easily provoke a series of climate migration. Most interviewees easily listed a couple of climatic changes occurring in the province including microclimates and inconsistent weather patterns, as well as desertification. Furthermore, we gained insight as to how these climatic trends affect the local population. With interviewees ranging from government officials to college students, we observed a perspective that was much more intimate to the area. See appendix E for list of interviewees.

According to our respondents we found that most agricultural areas in Oujda are located near the coast. These rural areas suffer from desertification and inconsistent weather patterns. Many of these responders confirmed that desertification was starting to be a more predominant problem around this area. Other interviewees do not find the desertification problem as alarming due to the proximity to the Atlas Mountains. This mountain range acts as a natural barrier between the northwest and southeast regions and prevents the desertification effects to spread throughout the entire country. Additionally, our informants indicated that while some regions suffer from severe droughts, others are plagued by flooding and inundations. Due to these severe climate fluctuations, people from rural areas are leaving their farms and their agricultural lifestyles in order to find better opportunities in more cities.

We found a similar pattern of diversity of perceptions in Nador, and there we could understand how climate change affected Morocco north of the Atlas Mountains. While Nador does not suffer from desertification and other climatic issues that the southeast faces, it is not free of its own unique climate change consequences. One of Nador's major issues is inundation caused by rainwater runoff coming from the surrounding volcanic mountains. Nador is a relatively flat city located in a valley. The volcanic material of the mountains does not readily

absorb water. When it rains in Nador, all of the rain from the mountains runs off into the city causing widespread flooding throughout the city of Nador.

With its close proximity to the Mediterranean Sea, sea level rise is another concern for the Nador province. Nador is only about three or four meters above sea level; therefore, inundation from sea level rise is not an immediate concern, but there is concern that it will be a problem in the future. For now, the Marchica lagoon provides limited protection for the city.

Bouchnan Rachid works for the Nador Province Government as an environmental administrator. He was a part of a team that used isotope identification techniques to determine contamination sources in Nador's groundwater supplies. His background in environmental work allowed him to share important information about climate change in the region he has lived in his whole life. In Mr. Bouchnan's analysis, farming has become more industrialized and farmers who sell locally find it difficult to compete with industrial farmers who can export larger amounts of produce. The increased competition in agriculture along with the changing weather patterns has caused farmers to rely on fertilizers for better crop yields. Irrigation runoff from these farms subsequently contaminates the groundwater surrounding the farms. This polluted groundwater is used in Nador in homes. The water contains high levels of nitrates and phosphates. The toxicity of the water along with the decrease in rainfall means that the water that Nador communities use is unhealthy and sparse.

During our interviews with experts and residents on the topic of climate migration, we gained insight on regional living conditions, and certain governmental programs that are being implemented to improve the quality of life. For now, there are programs that provide additional housing in urbanized areas for large groups of people moving from underdeveloped regions. The need for this program is evidence enough that Morocco is pressured by internal migration. Although the government has such projects in place, there is still concern for saturation and poor living conditions in older communities on the outer edges of the cities. As with any overpopulated urbanized area, some of the cities and communities suffer from lack of jobs for the new residents. This unemployment leads to an increase in violence and crime that is more difficult to control with current government and police resources. Even still, the government is working to provide suitable and safe housing for migrating residents, and also incentivizing people in rural areas to stay where they are by providing the necessary resources for adequate living conditions.

2. INTERACT WITH RELEVANT AGENCIES, RESOURCES, AND ORGANIZATIONS

When asked about adaptation programs implemented, respondents mentioned programs and organizations that target the effects of climate change and prepare for social issues that could stem from these effects. A number of interviewees mentioned COP22 being hosted in Morocco to be a large motivation for these projects. Organizations take action by providing aid to agriculture, implementing and investing in renewable energy, providing aid to migrants, implementing climate change mitigation strategies and raising awareness on the topic of climate change effects promoting environmentally friendly behaviors. These initiatives are outlined in table 1 below:

Table 1: List of Organizations and Programs that are Actively Targeting Climate Change Effects

Type of program	Organization/project	Purpose
Aid to agriculture	Green Morocco (Enacted in 2008)	Strengthening the agricultural sector by adapting to climate change by improving water conservation technologies
	Credit agricole	Aids and educates farmers about getting loans. Gives farmers loans at low, fixed interest rates.
	Adaptation of African Agriculture (AAA)	Educate farmers on adaptation strategies to combat climate change
Renewable energy	Institut de Formation aux Métiers des Energies Renouvelables et de l'Efficacité Énergétique (Institute in Oujda)	Trains students in the construction and implementation of renewable energies
	Noor Power Station project	Construction of the largest solar plant in the world in the Sahara Desert
	Desertec	Has a project with Union of Europe leading to the future export of renewable energy to Europe
	Centre Regional	Finance solar investment projects.

	D'investissement de la Region de L'oriental (solar investment company)	
	Ain Beni Mathar integrated thermo solar combined cycle power plant	A project implemented by Centre Regional D'investissement de la Region de L'oriental creating a renewable energy power plant
Aid to migrants	Moroccan Organization for Human Rights	Assists migrants by advocating for their human rights
	Doctors Without Borders (MSF) in Morocco	Provides medical and humanitarian assistance and advocates for better access to healthcare for migrants
	Job relocation for government workers	Government provides job security for relocated government workers
	International Organization for Migration (IOM)	Provides humanitarian assistance to migrants in Morocco and helps migrants with relocation and assimilation into their new societies
	Construction of affordable housing in cities	Government project providing relocation for migrants
	Construction of city on higher ground near Nador	Government plan providing relocation in the case of inundation in Nador
Mitigating desertification	Planting trees in South-East Morocco	To combat desertification
Raise awareness about climate change and climate migration	Parti du Progres et du socialisme (Moroccan political party)	Organize conferences every month/two months to bring awareness to people of long-term & short-term climate change
	Alternatives for Children and Youth Association	Raise awareness on respect for environment through conferences, workshops and thematic camping
Environmentally friendly practices	European Space Agency (ESA)	Implemented a system in Morocco that recycles water
	Ban on plastic bags	Government placed a ban on the use of plastic bags in shopping

In addition to compiling this list of organizations and programs, we analyzed the distribution of their resources they. By determining the type of aid these resources provide, we created a pie chart that accurately describes the distribution of attention toward certain societal issues. Thus, we are able to identify the issues that seem most focused on in Morocco.

3. DESIGN A PRESENTATION ON CLIMATE MIGRATION, VULNERABILITY AND RESILIENCE IN MOROCCO

Most of the officials and experts we interviewed were either familiar with the COP or actively participating in it. From governmental organizations to NGOs, and universities to associations, nearly all the respondents had some sort of affiliation with the conference. These participants assisted in our development of an efficient and impactful presentation.

To prepare for the conference, we needed to understand the target audience. According to the UNFCCC website, “it is provisionally estimated that approximately 15,000 delegates from Parties and observer organizations will be registered for COP 22/CMP 12” (United Nations Framework, n.d.). While these 15,000 delegates will not be completely centralized in the green zone, this still means that our observer pool will be extremely diverse. Furthermore, we found that in our participating zone, the green zone, exist two major spaces: a space reserved for public-private partnerships and another reserved for civil societies. Within the space reserved for civil societies exist several thematic areas such as: “youth, gender, territories and sustainable development, agriculture, universities and scientific research, environment, and migration”. The King of Morocco also referred to the COP in a speech addressed to the general population. He said, “As the first COP to be convened after the Paris Agreement, COP22 will be a litmus test for climate diplomacy. Nothing short of world leaders’ collective commitment to give concrete substance to the Agreement, through ambitious, tangible actions and decisions, will keep global temperature increase below 2°C” (COP22 Marrakech, 2016). With the provided information above, we have enough data to assess our audience and appeal to them in our presentation. See Appendix G for photographs of our presentation. Furthermore, we also put a lot of effort into the aesthetic appeal of our presentation. We researched and found that there is a proper etiquette that goes into creating an appropriate presentation. Between font sizes, the contrast of the text from the background, and web safe colors we had plenty of strategies to implement when creating our deliverable for Ribat al Fath.

Along with demographical data, we also obtained valuable information on the focuses and objectives of COP22 in Marrakech, the most important being a focus on African participation and collaboration. We learned from an organizer for the National Council for Human rights, that African NGOs aren't as connected as they should be. He stated that there is a lack of unity due to issues like funding, language barriers, and poor networking. He stated that this year's COP is an excellent opportunity to network African NGOs that would otherwise have never heard of each other. Similarly, in a statement made by Salaheddine Mezouar, the president of COP22, this year's conference will be an,

“Opportunity to make the voices of the most vulnerable countries to climate change heard, in particular African countries and island states. It is urgent to act on these issues linked to stability and security” (COP22 Marrakech, 2016).

However, there will be a substantial effort put into networking amongst international organizations as well. According to another of our sources, African NGO's struggle to find the funding to implement innovative climate mitigation strategies, and part of the solution could be finding large international organizations outside of Africa that could assist in this domain. That is why there will be a substantial effort devoted to assure that African NGOs be put in contact with international organizations willing to fund these strategies. Driss Yazami, the head of the civil society zones for COP22, stated that,

“Even if the historic responsibilities and future effects are not equally shared, we must act together. The urgency of climate change requires that we all rediscover universalism” (COP22 Marrakech, 2016).

This quote perfectly expresses that the conflict against climate change is a universal issue that requires the effort and assistance of everyone in the world.

2. DISCUSSION

Based on the data we received from our sources, it is apparent that there may be a threat of climate migration Morocco will face in the next 50 years. Our case studies at Nador and Oujda indicated that these provinces that are at risk from suffering from climate migration, based on

projections for climate change along the coast. Compounded by issues such as desertification, flooding, water scarcity and seemingly random weather patterns, people living in these regions will have more incentive to migrate.

Water toxicity along with the decrease in rainfall has exposed the Nador community to additional risks due to poor water quality. The state of groundwater in Nador is a result of a combination of primary and secondary climate change issues. Lack of rainfall to replenish groundwater is a primary result of climate change. While the contamination from fertilizers used to increase crop yield is a secondary effect of climate change. This combination of issues adds a level of complexity to implementing solutions to help residents receive adequate levels of healthy water.

With all the risks stated in this section, communities living in Nador have more than enough incentive to migrate away from the province in search of a more stable living situation. While some issues, such as flooding from rainwater runoff is a current motive for migration, without the steady implementation of mitigation strategies, issues such as sea level rise and the contamination of water of sources will cause massive migratory movements in the near future.

Another one of our destinations for gathering information on potential climate change risks was the province of Oujda. The East is greatly affected by emerging microclimates, especially those communities that are agriculturally dependent. Without the ability to accurately predict weather patterns, farmers cannot effectively adapt their agricultural methods to their crops. Furthermore, certain crops that are highly dependent on certain weather cannot be grown if the climate is constantly changing. The region already relies on irrigation to distribute water to agricultural areas (see figure 8, below).



Figure 8: Irrigation Systems in the Oujda Province (Photo Credit: Muller, 2016)

This issue has the potential to cause climate migration. The more agriculture struggles to exist in these areas, the more incentive there will be for this group of people to migrate in search of better opportunity such as more dependable jobs and more promising land. Between inconsistent weather patterns and the risk of sea level rise related inundations, farmers and other coastal communities have all the incentive to migrate to a more suitable area.

We also learned from our sources that the south of the Oujda province already suffers heavily from desertification. Due to the lack of people, already arid land becomes drier as fewer people are present to care for it. As the area becomes more arid, those residing in the desert regions can no longer support themselves on their land alone. While the government has already implemented mitigation strategies in these desert areas, the lack of resources is incentive enough for those living there now to migrate. The more people that migrate now, the harder it will be for those that choose to stay, thus, continuing to incentivize those remaining, to migrate.

It is important to note the role of the Atlas Mountain range on existing population patterns, and also on the climate change induced. The range assists in the complete isolation of a portion of the population in Morocco. According to Khalil, the oriental and middle south regions located next to the Atlas Mountains suffer heavily from desertification and a lack of water. The mountains also act as a natural boundary preventing desertification from spreading to the northwest, thus leaving the southeast ostracized in this situation. Thus, many living on the “wrong side” of the Atlas Mountains are incentivized to move to the other side in search of better opportunity. Communities suffering from extreme effects of climate change are being motivated

to migrate, and if mitigation strategies aren't reinforced, the issue of climate migration will only grow worse.

While we may have identified potential root causes of climate migration, it is still important to recognize that it is an extremely complex issue. Knowing the causes is not enough; knowing how the causes of climate change will affect communities is key. With the data we received we identified direct and indirect causes of climate migration.

Direct causes of climate migration are climate threats that are immediate such as flooding and inundations. The reason being that the consequences of flooding are much more immediate. In provinces such as Nador, topographically speaking, the area is very low and flat. In the occurrence of a flood, there are large regions that become inundated, damaged, and uninhabitable, thus immediately forcing the displacement of any resident that resides there. The larger the portion of displaced persons, the more immediate the need for housing and shelter. If the city of Nador becomes unable to combat the negative consequences of flooding, the number of displaced residents will be too high to support within this province alone. This will force the migration of those displaced persons to a different region of the country.

On the other hand, there are climatic changes that indirectly influence climate migration. For example, issues like desertification, sea level rise, and unpredictable weather patterns all indirectly influence the migration of large groups of people. Desertification and inconsistent weather directly influence agriculture. With the desert expanding into already arid agricultural areas, and strange weather affecting the quality of harvest for certain farmers, being agriculturally dependent is becoming more and more difficult in these regions. Therefore, this group of people is incentivized to find land in areas that are more supportive of an agriculturally dependent lifestyle. Thus, indirectly instigating an instance of climate migration. Furthermore, in different regions there exist the consistent of sea level rise. Due to the very gradual rate at which the sea level rises, often times, it is easier to ignore the impending danger of this issue. Unlike flooding, the impact of the rising sea level won't make itself apparent for another several years, thus, it is hard to quantify the threat of what could happen when the sea level reaches a certain point, especially in areas like Nador. The impending danger of the issue, however, is prominent enough to influence the movement of a portion of the population in certain areas and awareness of the issue is only just starting to be spread. Being able to recognize the factors causing climate migration is important, but now the next step would be to raise awareness on the issue.

Conference such as COP22 already aid in raising awareness of climate issues. The Moroccan government is investing a lot of resources towards mitigating climate changes and its effects. Past COPs and the upcoming COP22 are huge motivators for climate change action. As a response to COP21, Morocco created its INDC as an action plan to mitigate greenhouse gas emissions. As mentioned earlier, Morocco’s INDC report states “Morocco expects to dedicate at least 15% of its overall investment budgets to adaptation to climate change” (Moroccan Secretariat, 2015). From the list of organizations and programs working on climate change issues we realize that a response to this report has been to implement a number of programs focused on being more environmentally friendly and self-sustainable energy-wise.

Morocco wants to set a good example of environmental consciousness to prepare for hosting COP22 in Marrakech. The country has the capacity, resources and knowledge to target climate change issues. The challenge is in choosing how to allocate these resources. Though there are numerous national and local programs designed to combat the effects of climate change and to aid migrants, there was no mention of an organization working specifically to aid climate migrants in Morocco. Figure 9 is a pie chart illustrating the distribution of organizations and programs working on varying problems related to climate change and were created by analyzing the list of organizations gathered.

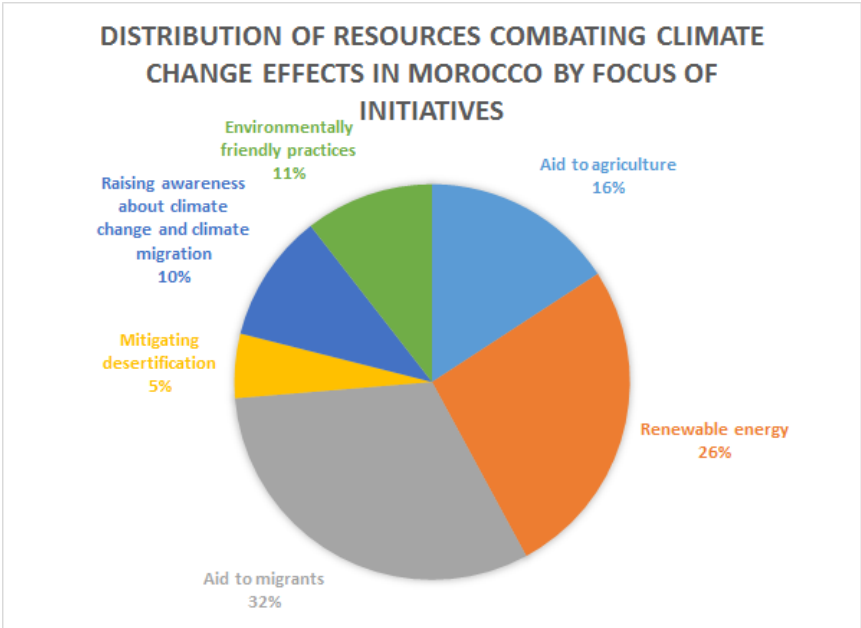


Figure 9: Pie Chart of Resource Distribution, by Organization, Towards Combating Climate Change

The problem of climate migration involves both migrants and strategies to adapt to climate changes. This chart shows there are programs involved in both topics, but there aren't programs that integrate the two to target the specific problem of climate migration.

Programs exist that aid migrants and refugees in Morocco and programs exist that aim to mitigate the environmental effects of climate change on society.

Organizations providing aid to migrants either don't differentiate migrants by their reason for migration or only deal with migrants for specific reasons. Programs that we encountered in our research such as Medicines Sans Frontiers (MSF) provide aid to migrants by helping migrants access healthcare services like vaccinations and treatment of lesions and trauma. Though climate migrants in Morocco could use this resource if needed, the program is geared towards conflict refugees from countries in Sub-Saharan Africa. Climate migration does not imply health risks such as lesions and trauma, therefore, this program isn't extremely effective in targeting challenges that climate migrants face, however health problems are not ruled out. A program designed to aid climate migrants would be able to effectively target the specific challenges that these people face.

Programs that aim to mitigate the environmental effects of climate change on society fail to target the human aspect of the problem of climate migration. Though a program like the Adaptation of African Agriculture educates farmers on adaptation strategies to combat desertification and water scarcity, the program doesn't help farmers prepare for the event in which their land becomes unfarmable and they are forced to relocate. A program covering both the adaptation aspect and the human aspect of climate migration would provide farmers with the resources and knowledge to adapt their crops to an increasingly arid landscape. It would also identify uncultivated fertile land for farming and would be able to send farmers forced to relocate to these areas. A program like this targets both the environmental aspect and the human aspect of climate migration.

The list of programs gathered through interviews can be categorized into two groups. Programs designed to help areas adapt to the effects of climate change, thus aiming to prevent migration of people from the areas, and programs designed to help people relocate. From responses, we gathered that programs designed to help areas adapt target gradual effects of climate change, such as desertification, water scarcity and sea-level rise. Programs that help

people relocate usually deal with people moving due to more sudden threats like flooding. We noticed that adaptation programs are often large-scale; they focus on investments in technologies, environmental efforts and sustainable developments for society as a whole. For example, planting trees to combat the impending threat of desertification is an environmental initiative that makes the area more resilient to the effects of climate change. Relocation programs are often more individualized and aid people directly by providing them with resources to transport to and assimilate into new societies. An example of this is job security for relocated government workers that directly assist migrants in making a new life in a new place. Figure 10 illustrates the division of organizations and programs from the gathered list into their strategies for targeting climate change effects.

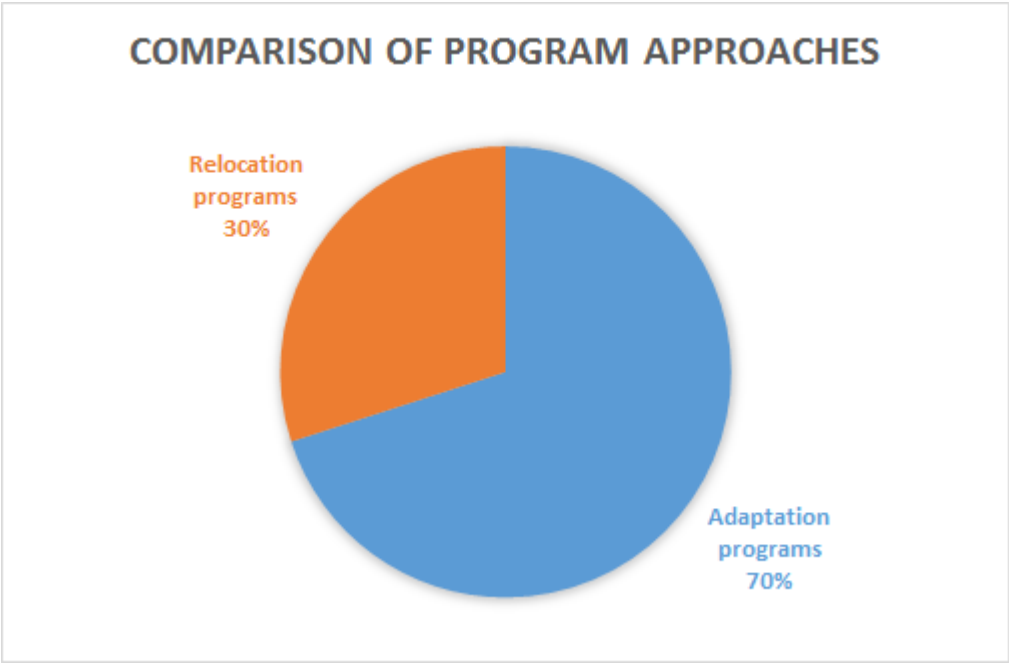


Figure 10: Comparison of Program Approaches

From this, we realize that there are a far greater number of programs designed to help Morocco adapt to the effects climate change. This shows forward thinking; the majority of adaptation programs are involved in creating future sources of implementing renewable energy.

Climate migration and the multitude of problems that result from it mean that there is no simple solution. The Moroccan Government has begun to recognize the complexity of the issue and has responded accordingly however there is still much left to be desired. It understands that

no matter what programs are put in place, people will still move into cities to seek refuge and stability. The programs that improve housing outside the cities help to provide safe living spaces for the people who will inevitably move there. A stronger focus for the government is to incentivize people to stay in the rural areas. Morocco cannot function with cities alone. The country needs farmers, fishers, and other rural workers to provide for its people and to provide income for the country. The government provides resources to help people adapt to climate change in their rural homes. With these dynamic programs, it appears on the surface that the government has effectively solved its climate migration issues. However, some of these programs only address the symptoms of climate change rather than the problem itself. The government can provide resources to help its people adapt to changes, but that does not stop these changes from continuing to occur. The climate will continue to grow more hostile making rural life more difficult. The government will have to provide more resources to the people who stay and provide more urban housing for the increasing number of people who move away from rural areas. These solutions now appear to be temporary fixes to a much larger problem.

It is difficult to determine just how large the problem is. Often people underestimate climate change problems. While comparing all the answers of our interviews, we notice some disparity from some informants. These responders were at some point of disbelief about the consequences of sea level rising and flooding. This skepticism from part of locals and some government officials puts them at a higher risk of suffering harsher consequences. For example, some interviewees from the PPS claimed that rising sea levels are not an emerging risk for the population living along the coast. Also, some current and previous residents along this coastal area, state not having been at risk of flooding. This was the case of a former resident of the province of Nador, Khalil who affirms of not having been at risk of this phenomenon. Yet, we were provided with facts and information that contradicts their perception. An Oujda professor had previously confirmed that these coastal areas are in fact at risk of inundations due to sea-level rise. Therefore, this shows the underestimating effect of an unchanging factor around this area. Furthermore, we noticed that there is a minimal amount of interest in climate change amongst organizations in Nador. People have some consciousness about the environment, but no one is extremely concerned in combating climate change. They also believe that due to a natural border-protecting coast, they will not be drastically affected by any harsh condition.

Another factor that contributes to the underestimation of existing risks is the government's adaptive programs. Some of these programs include implementation of housing, eradication of plastic bags and provision of funds to pursue an agricultural lifestyle. Consequently, these adaptive actions are a sign that climate issues are starting to be a matter of attention for the government. At the same time, this shows how the government acknowledges climate issues and climate migration through its programs. Even though these governmental actions have good intentions towards the effects of the climate change, people are relying on the government's reaction and are losing sight of the overarching problem. Therefore, we feel as though a present lack of education on the reasoning behind these adaptive programs has made people less aware of the real problem. Without the capacity to accept and realize this dormant problem, they are at a higher risk to not be prepared towards a bigger issue.

Responses indicated that projects mitigating long-term climate changes are lower priority to projects dealing with sudden disasters such as earthquakes. In Nador there is the plan to build a city on higher ground near the current city to protect Nador from inundation, but there is a shortage of money for implementing the plans. The long-term aspect of sea-level rise puts this project at low priority for funding. In contrast, the Moroccan government has implemented regulations on the construction in Nador so that buildings can withstand earthquakes. This low level of urgency in dealing with the long-term effects of climate change on a community indicates that thought on future climate migration isn't a priority.

Even with this generally low sense of urgency, the COP aims to discuss as many aspects of climate change as possible. Using demographical information about the conference, organizations can more effectively create presentations that target the audience. As previously stated in our findings, the green zone is comprised of two major sections that are then made up of several even smaller sub-sections (refer back to findings section for a more detailed list of sections). The audience will be extremely diverse, meaning organizations must present their research and ideas in a way that appeals to everyone in order to be effective. To do this, presentations have to appeal to the general interests of the conference. This year's COP has been dubbed the "action COP;" there will be an abundance of outgoing efforts to network African organizations with each other as well as with other international organizations. A presentation that appeals to the idea of a unified Africa will appeal to a majority of COP22 participants. To do

so, it could be effective to include instances of climate migration in African countries other than Morocco, thus uniting efforts and making our presentation applicable to a larger demographic.

CHAPTER 5: RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

In addition to the slide archive that we created for Ribat Al-Fath to use at COP22, we developed several recommendations that we believe could potentially assist NGOs in continuing to improve the living standards of Moroccan citizens. Morocco has an impressive repertoire of programs and organizations that help fix social, economic, and environmental problems. The country is well aware of issues such as climate change, and is taking the necessary steps to combat it. Newly emerging issues such as climate migration tend to be overshadowed by more publicized problems. More research needs to be conducted to gain a better understanding of climate migration. Programs need to be created to respond to the findings of these research studies. As organizations and the government continue to become more aware and involved in these complex issues, a knowledge gap grows between the organizations and the people they aim to help.

1. WE RECOMMEND THAT NGOs AND THE GOVERNMENT SHOULD EDUCATE AND EMPOWER ITS CITIZENS TO HELP COMBAT CLIMATE CHANGE.

Throughout our experience, we noticed that NGOs and governmental departments do an excellent job of planning and enacting programs to help Moroccan citizens cope with climate change issues. While such programs are essential to the wellbeing of the community, we suggest that on top of these programs, NGOs and the government work to educate citizens on what they can do to combat climate change. As we conducted interviews with various people from different backgrounds, we observed that citizens, for one reason or another, do not do much to help mitigate climate change. We found that many citizens do not take action because they are not properly educated or they believe the government will take care of the problems.

Climate change mitigation techniques are not always as intuitive as they may seem. Often times such techniques need to be formally taught in order to be effective. Education programs that teach citizens how to be eco-friendly and how to teach others these same tactics can go a long way to making immediate differences locally and long term differences globally.

The large number of existing and piloting programs that aim to combat climate change and assist citizens also affect people's desire to be more environmentally conscientious. People that are educated on the topics may feel that the government and NGOs are doing an antiquated job controlling climatic issues and that they cannot make a noticeable difference by themselves.

Those who are not as informed may feel that it is unnecessary to educate themselves on the topics for the same reasons mentioned previously. Both groups of people must be empowered to know that they can make a significant difference and taught how to do so. Climate change mitigation works best when everyone is working together towards a common goal.

2. WE RECOMMEND IMPLEMENTING A PROGRAM THAT INTEGRATES THE TWO FOLLOWING INITIATIVES: TO HELP PEOPLE ADAPT TO THE EFFECTS OF CLIMATE CHANGE AND TO AID CLIMATE MIGRANTS.

Through our research, we found that there are initiatives in Morocco to aid migrants and initiatives to help people adapt to the effects of climate change. However we failed to identify an organization or project that integrated these two initiatives to specifically combat climate migration. Another conclusion that we drew from our research was that agriculture is especially vulnerable to desertification and irregular weather patterns and that economic hardships caused by a decreased ability to farm is a cause of climate migration.

There are no programs specifically aiding farmers with relocation and adaptation. If forced to move to cities, farmers are forced to give up farming. Because agriculture is a large part of the Moroccan economy and livelihood of people, a program designed to target problems with the migration of farmers due to climate effects is an important project for Morocco.

We suggest that existing organizations collaborate to create a project covering both the adaptation aspect and the human aspect of climate migration. This would provide farmers with the resources and knowledge to adapt their crops to an increasingly arid landscape and would also identify available fertile land for farming and would be able to send farmers, forced to relocate, to these areas. A program like this targets both the environmental aspect and the human aspect of climate migration.

We have identified organizations that have the potential to do this. The government, for example, has initiatives involving both adaptation and migration. One aspect of the Green Morocco Plan developed by the ministry of agriculture is to make the agriculture sector more resilient to climate change by improving and implementing water conservation technologies to capitalize on limited water resources. There are also programs by the government providing job relocation for workers, and constructing new living space for migrants.

If these programs were to be combined, the government could provide a kind of job relocation for farmers by constructing housing in rural areas and designing these complexes with

agricultural adaptation resources and strategies. This program could still target existing farming with adaptation strategies to combat the effects of climate change, but would also provide farmers with an area to migrate to and still make a living in agriculture.

3. WE RECOMMEND THAT NGOs AND THE GOVERNMENT CONDUCT MORE EXTENSIVE STUDIES ON AT-RISK AREAS.

As part of our suggestions, we would recommend the government to realize a more in depth study. While analyzing the government's actions towards climate issues, we identify two contrasting responses. One of the government's responses promotes migration by securing housing, while the other incentivizes returning to farms by providing funds. As a consequence of the implementation of both programs, the government is spending extra money and little is done to mitigate the causes of this problems. Therefore, the government should realize a further study, in order to invest in programs that will directly tackle this issue.

The government's study would provide a clearer idea of the existing risks in vulnerable areas. At the same time, this study should involve vulnerable populations and government officials. By engaging the people of these affected areas, locals would become more conscious of the dormant risks. Additionally, challenges that we encounter like small samples or language limitations would be minimized with a more extensive study. Since this study would have taken throughout a larger period of time, the government would be able to gather a larger sample. Besides, there would not be any miscommunication or misunderstanding, as a result of the study team's ability to master French and Arabic. With all this information they would be able to obtain a better quality of results. As positive results of this study, the government would be able to elaborate more efficient adaptation and mitigation programs.

The government's investment in a study to develop adaptation and mitigation plans would bring favorable results. They would be able to bring more progress to communities affected by climate issues. Additionally, the government would be able to create different adaptation methods according to various possible scenarios. Therefore, the government's understanding of certain weather patterns, risks and vulnerability of the population would help government officials plan efficient programs.

CONCLUSION

Research conducted in the rapid vulnerability assessment has helped to identify the climate threats in the Nador and Oujda provinces that put the regions at risk to climate migration. The research also gave insight into projects implemented by the organizations designed to mitigate and adapt to these climate threats. Climate change in northeast Morocco is causing desertification, droughts, flooding, earthquakes and erratic weather patterns that make living in the regions difficult. It's important to recognize how these changes are affecting society so that steps can be taken to help people adapt rather than migrate. The questions used to gather data in our study are geared for representatives of organizations working on climate change topics. The design of questions aims to gather anecdotal data through the telling of personal experiences, along with scientific data on the effects of climate changes in the regions studied. In reflection of the challenges encountered in our research, recommendations were made on conducting a more organized and extensive study. People in regions that are at risk to the effects of climate change need resources from outside sources to help them effectively adapt. This study helps to identify the specific factors that put society at risk to climate migration and the adaptation projects in effect. The Moroccan government has realized the seriousness of the effects of climate change on society, but this urgent perception of climate change isn't as present in citizens of the regions studied.

The study conducted assessed two communities in northeast Morocco on the threats of climate migration. This represents a small portion of all of Morocco. A more in-depth study on the communities of Nador and Oujda would be useful in further identifying characteristics that put the communities at risk to climate migration. Most regions in Morocco experience climate change risks that threaten the livelihood of people, and so this study can be expanded to assess other areas. The first step to adapting to climate changes is recognizing its effects in a community. Projects can then be planned and implemented to mitigate or adapt to these effects. Government aid in rural regions of Morocco has helped people adapt to climate changes that otherwise would have forced them to move. Each region of Morocco experiences different climate hardships, so the clearer the risks of climate change on a community are, the more effective aid can be provided to help with adaptation and mitigation processes.

Climate change is a global problem and is by no means an issue that Morocco should solely take responsibility to combat. Much of the effects that Morocco faces are a result of

pollution from industrialized countries such as China and the United States. These two countries are the number one and two producers of greenhouse gases in the world, respectively. Even still, Morocco must work on an international level to begin to mitigate climate change. The twenty-second conference of parties is exemplary of Morocco's desire to be a leader in international climate change suppression. In the long run, only international change can truly solve the climate migration issues within Morocco. Ideally, in the distant future, international efforts will make programs, such as the ones providing resources to rural citizens of Morocco, unnecessary. A stabilized climate, in turn, will stabilize rural and urban living in Morocco and eliminate migration directly or indirectly caused by climate change.

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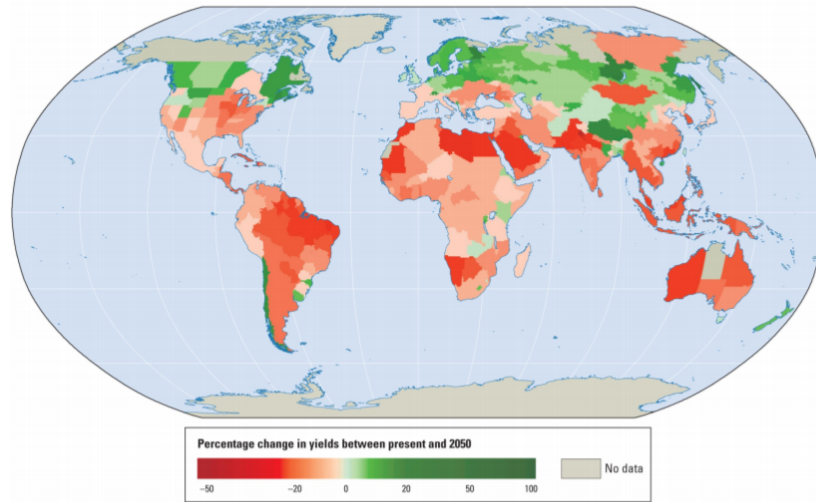
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APPENDICES

APPENDIX A: RELEVANT GRAPHICS

Figure 3.2.1: Projected Impacts on Crop Yields in a 3°C Warmer World

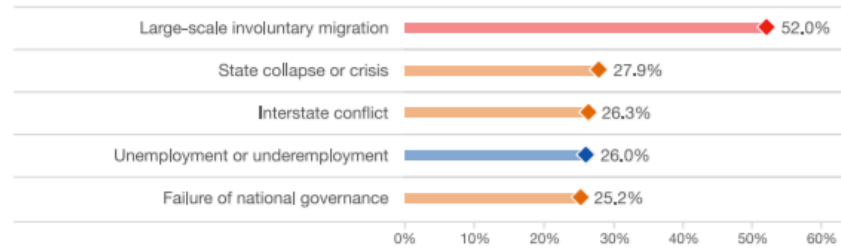


Source: WRI 2013.

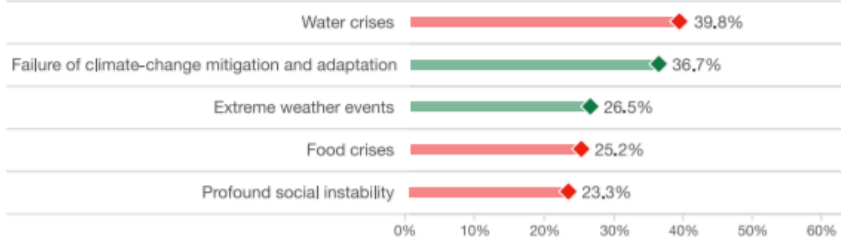
Note: -50% change = half as productive in 2050 as in 2015; +100% change = twice as productive in 2050 as in 2015.

Map of projected impacts to crop yields in a warmer world (The Global Risk Report, 2016)

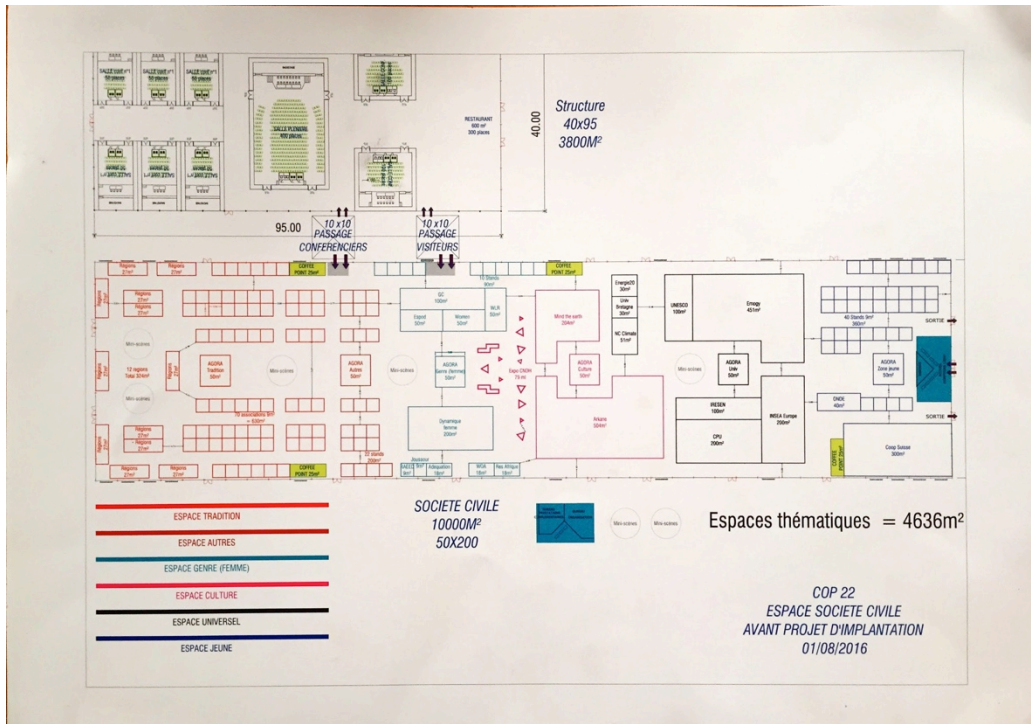
For the next 18 months



For the next 10 years



List of top five global risks for both the next 18 months and 10 years (The Global Risk Report, 2016)



Old Example Draft of Green Zone at COP22 (Photo credit: Muller, 2016)



Image used on Cover Page: Floods in Rbat, Souss-Massa-Draa, Morocco in 2010 (Credit: Mhobl; <https://www.flickr.com/photos/87106931@N00/>)

APPENDIX B: PROGRAM FOR OUR TRIP TO OUJDA AND NADOR

PROGRAMME DES ETUDIANTS AMERICAINS

Du lundi 19 septembre au jeudi 29 septembre 2016

DATE	LIEU	ENCADRANTS	CCORDONNEES
Lundi 19 au Mardi 20 à 12h	COP22	Abdelaghani Berdi	0664661750
Mardi 20 à 15h	Centre experimentation	Mme Hafida Ben Salah	0662387002 mesdroits@hotmail.fr
Mercredi 21 à 16h	PreCOP RAF	Zaimi Abdellatif	0661440808 abdelzaimi@gmail.com
Mercredi 21 soir	Départ à Oujda par train		
Jeudi 22, Vendredi 23	Oujda et région	Association Neama Mme Rim Kerzazi Mme Kamelia M Abderrahim Ben Ali Abdellallah Bel Houari	0662 387002 nnimassociation@gmail.com 0642332981 06 65 82 96 66 06 76 03 40 09 / 06 61 84 02 91
Samedi 24	Aklim et Berkane	Mohammed Khammoussi Mme Naziha Ben Abdallah	06 40 87 38 56 06 10 85 98 15
Dimanche 25 Lundi 26	Nador	M Rachid	06 63 46 66 37
Mardi 27	Retour à Rabat		

APPENDIX C: INTERVIEW GUIDE FOR CONDUCTING INTERVIEWS WITH NGO'S REPRESENTATIVES AND GOVERNMENT OFFICIALS IN THE COMMUNITIES OF BERKANE AND NADOR

System: humans in Nador and Berkane

Basic Information

What is your organization's involvement with climate migration?

Local knowledge/awareness of climate change effects?

Do you think the climate has changed over time?

If so, what changes have you noticed?

Has the shoreline/lagoon changed over the years?

What caused these changes?

Have you noticed any changes in your livelihood due to changes in shoreline/lagoons?

What kind of climate changes or natural disasters do you think are most likely to affect Nador/Berkane?

Do you feel at risk (long term/short term) due to climate changes?

What kind of risks do you associate with flooding?

Association of climate change with its effects?

Does climate change affect your livelihood?

How exposed is the system to the impacts of climate change?

Have you ever been at risk of flooding?

Did you suffer damages? (building damage, food/clothing loss, crop/livestock damage)

Have you noticed a change in the sea-level over the years?

Have you had any issues with the rising sea-level?

Have you noticed a change in the frequency or intensity of rainfall over the years?

Have you had any issues with a lack in rainfall?

Have there been any issues with a lack of drinking water?

How close are agricultural areas to the coast?

How close to the coast do you live?

Is the system subject to existing stress?

Have you ever had a food shortage or shortage of certain types of food?

If so, what caused this? What kind of food? Coping mechanisms?

How would buildings in Berkane and Nador stand up to a flood? (are they raised above ground, structurally sound?)

Will climate change cause the demand for a resource to exceed its supply?

Does flooding affect the fishing and agricultural industry in the area?

Does flooding/shoreline erosion affect the agricultural industry in the area?

Are the systems associated with this planning area already able to accommodate changes in climate?

If a major flood occurred, is there a plan to relocate or give local people assistance?

Where would they be relocated and why?

Is there a system to forewarn in the case of a flood?

Conversely, are there barriers to a system's ability to accommodate changes in climate?

Are there adequate resources to relocate people in the event that climate change effects threaten their livelihood?

Are the systems associated with this planning area already stressed in ways that will limit their ability to accommodate changes in climate?

Do people in threatened areas have the financial means to move?

APPENDIX D: INTERVIEW GUIDE FOR CONDUCTING INTERVIEWS WITH LOCAL PEOPLE
IN THE COMMUNITIES OF BERKANE AND NADOR

System: humans in Nador and Berkane

Demographics

What is your profession?

Do you live in this community?

How long have you lived here?

Local knowledge/awareness of climate change effects?

Do you think the climate has changed over time?

If so, what changes have you noticed?

Has the shoreline/lagoon changed over the years?

What caused these changes?

Have you noticed any changes in your livelihood due to changes in shoreline/lagoons?

What kind of climate changes or natural disasters do you think are most likely to affect Nador/Berkane?

Do you feel at risk (long term/short term) due to climate changes?

What kind of risks do you associate with flooding?

Association of climate change with its effects?

Does climate change affect your livelihood?

How severely would your livelihood be impacted by a flood?

How exposed is the system to the impacts of climate change?

Have you ever been at risk of flooding?

Did you suffer damages? (building damage, food/clothing loss, crop/livestock damage)

Have you had any issues with the rising sea-level?

Have you had any issues with a lack in rainfall?

Has there been any issues with a lack of drinking water?

[Depending on profession] How has the weather affected your harvests in the last 4 years?

What kind of farming do you do? (agriculture/livestock)

How close are agricultural areas to the coast?

How close to the coast do you live?

Is the system subject to existing stress?

Have you ever had a food shortage or shortage of certain types of food?

If so, what caused this? What kind of food? Coping mechanisms?

Have you ever been financially stressed?

How would your home stand up to a flood? (is it raised above ground, structurally sound?)

Will climate change cause the demand for a resource to exceed its supply?

Does flooding affect the fishing industry in the area?

What kind of foods do you eat?

Where do you get your food? (grown by yourself, purchased from local vendors, purchased from larger stores?)

Does flooding/shoreline erosion affect the agricultural industry in the area?

Are the systems associated with this planning area already able to accommodate changes in climate?

If a major flood occurred, what is your plan of action?

Where would you relocate?

How would you travel to your new location? (foot, boat, car, train, bus?)

Would you have forewarning in the case of a flood?

Conversely, are there barriers to a system's ability to accommodate changes in climate?

If flooding threatened your home, would you be able to migrate to safety?

Do you have the financial means to relocate if a natural disaster were to threaten you?

APPENDIX E: LIST OF INTERVIEWEES

Abdelhadi Bennis

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Khalil

Mohhamed I University Student

Mohamed Sabri

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Administrator
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Pr. Ali El Bachiri

President

Association Marocaine pour l'Action de Developpement

Professor at Mohhamed I University

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Bouchman Rachid

Environmental Administrator

Nador Province Government

Mohamed El Mallali

Org inisasint alternatives pour l'enfant el les j cunbs

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Oussawa Sabri

Centra d'Ivestisseuel de Nador

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APPENDIX F: MANUAL CODING OF INTERVIEW RESPONSES

Themes found through coding interview responses

We conducted 12 interviews and through coding the responses, noticed themes.

Themes

Risks identified in Oujda province

Risks identified in Nador province

Evidence of migration

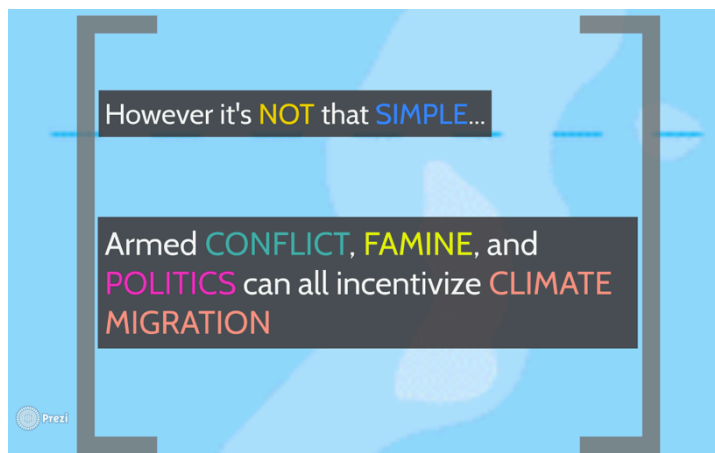
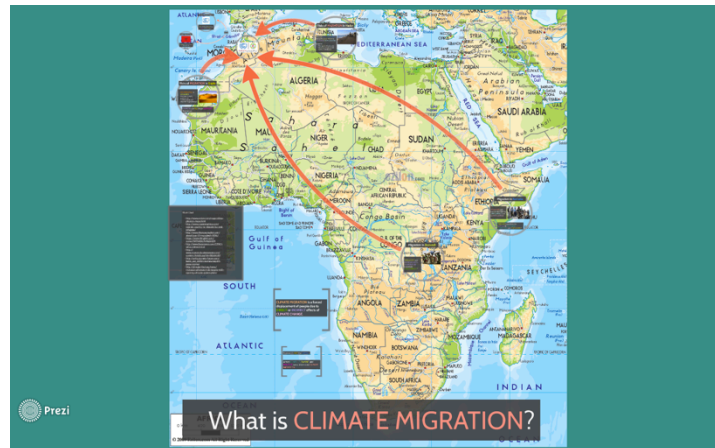
Adaptation programs

People's denial that climate change is an issue/ low risk perception

Miscellaneous

Observations

APPENDIX G: PHOTOGRAPHS OF RAF PRESENTATION



Migration in Burundi

"DROUGHTS and ENVIRONMENTAL DEGRADATION exacerbate LAND CONFLICT"

Map labels: R. OF THE CONGO, BURUNDI, RWANDA, TANZANIA, Lake Mwanza, Lake Tanganyika, Lake Rukwa, Lake Mweru, Mbeya, Tabora, Bujumbura, Kananga, Kasanga, Kasai, Ankuru.

Migration in Somalia

MIGRATION cycle was DETERMINED by WAR CONFLICT and CLIMATE CHANGE

"DROUGHT exacerbates the CONFLICT by INCREASING COMPETITION over FERTILE LAND"

Map labels: ETHIOPIA, SOMALIA, KENYA, EQUATOR, Kismayo, Jubba, Juba, SHU.

Risks of MIGRATION in Oujda

- DESERTIFICATION & DROUGHTS
- Decrease in yearly precipitation
- Contamination and depletion of groundwater

FARMERS can NO longer SUPPORT themselves

Map labels: Las Palmas, Oujda, WEST SAHARA, E.I.H., Makteir.

Risks of MIGRATION in Nador

Morocco's **LOW TOPOGRAPHY** leaves the **COAST PRONE** to **FLOODING & SEA-LEVEL RISE**

EFFECTS:

- Damage to infrastructure
- Economy of coastal cities
- Safety of inhabitants

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MARRAKECH COP22|CMP12
UN CLIMATE CHANGE CONFERENCE 2016

© Prezi

What is being done to
COMBAT CLIMATE
CHANGE and **CLIMATE**
MIGRATION?

© Prezi

Green Morocco Plan



GOAL: support the sustainable **MANAGEMENT**, **DEVELOPMENT** and **CONSERVATION** of **AGRICULTURAL WATER**.

The Nairobi Work Program



GOAL: To assist developing countries in **UNDERSTANDING** and **ADAPTING** to the **IMPACTS** of **CLIMATE CHANGE**

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- <http://climate-liid.org/news/morocco-advances-indc-targets-with-opening-of-solar-power-plant/>