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Beyond traditional ecological knowledge: Learned information in Forodhani Park

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Beyond Traditional Ecological Knowledge:

Learned Information in Forodhani Park

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Dedication

For Godson

I hope you make the trip back to Zanzibar with your family.

Please take care and stay well.

Upate furaha, wema, na baraka

Abstract

This ethnographic study examines Traditional Ecological Knowledge in Mji Mkongwe (Stone Town), Zanzibar, and how ecological knowledge shared by locals on the island is formed and is shared among locals in a park setting. Using a framework of political ecology, this study specifically highlights ecological pressures of local population growth, global climate change on a local scale, and local economic changes as the key drivers for the creation and cultural importance of Traditional Ecological Knowledge. To discover both the ecological pressures and the examples of Traditional Ecological Knowledge, I conducted semi-structured, open-ended interviews in Forodhani Park, a public park on the coast of Mji Mkongwe. I spoke with 25 local Zanzibaris visiting or living near the park and asked them a set of prepared interview questions that guided a set of follow up questions. The patterns I discovered involving Traditional Ecological Knowledge emphasized a mixture of different themes, including creation of a unique Zanzibari identity and reinforcement of gender-specific and religiously tied ecologically grounded practices. This thesis emphasizes how this knowledge is being shared and normalized in Forodhani Park and the dynamism of Traditional Ecological Knowledge itself.

Introduction and Setting

This thesis is an exploration of Traditional Ecological Knowledge in Forodhani Park, a public seaside park located in Mji Mkongwe (Stone Town), Zanzibar (Figures 1 and 2). I used Traditional Ecological Knowledge as a frame for the discussions I invoked and recorded in Forodhani Park to understand the local, ecological worldviews. During my study, I analyzed the concepts of *wavuvi* and identity, gender and religion as all connected to TEK in Zanzibar. *Wavuvi*, or *mvuvi* (singular), is the Kiswahili term for fishermen. Building on prior research I found through a literature review, I further examine

Figure 1. Location of Tanzania and Zanzibar (Zaman 2015)

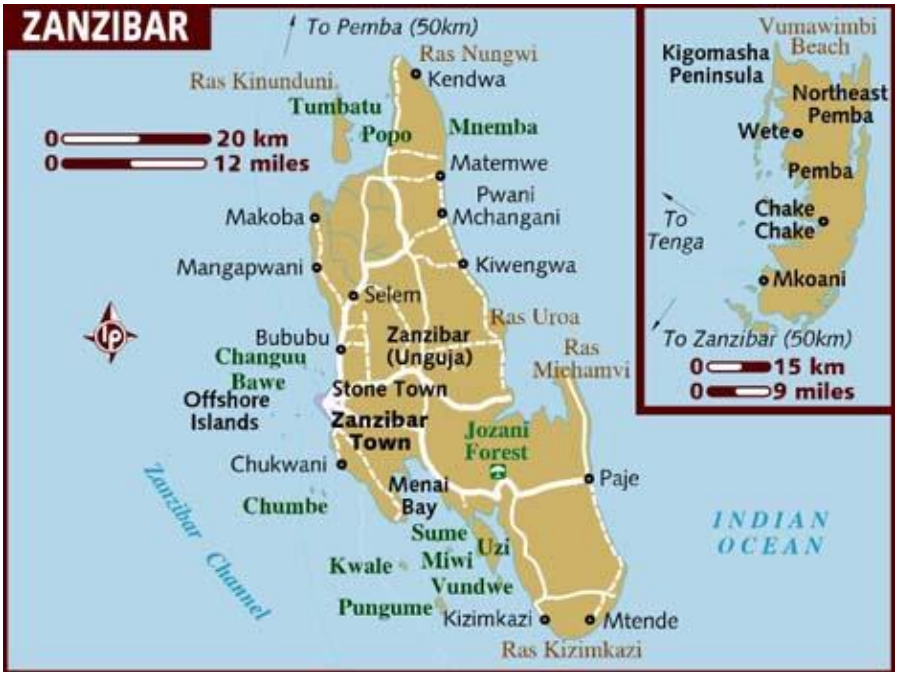

Figure 2. Zanzibar with Mji Mkongwe/Stone Town (Afrodad 2015)

the place *wavuvi* have in the Zanzibari community, the changing influences that are affecting their work, and how adapting to those changes affects TEK.

According to Berkes (1993 p4) TEK is “knowledge held by indigenous cultures about their immediate environment.” It includes information that is “intimate and detailed” about flora, fauna, and the general environmental system in which a human lives. This knowledge is not only “the development and use of appropriate technologies for hunting, fishing, trapping, agriculture, and forestry” but also “includes a "world view" which parallels the scientific discipline of ecology” (Berkes 1993 p4).

This study focuses on the nature of TEK itself as not only a process of knowledge-gathering and sharing that is “acquired by indigenous and local peoples over hundreds or thousands of years through direct contact with the environment” but also as an active and ever changing process that is dramatically affected by relationships of power and environmental use (Rinkevich and Greenwood 2013). To better understand the larger-scale effects of power, I utilize two theses of Political Ecology, Conservation and Control and Degradation and Marginalization, (Robbins 2012) to explain the examples I draw from Forodhani Park conversations and observations.

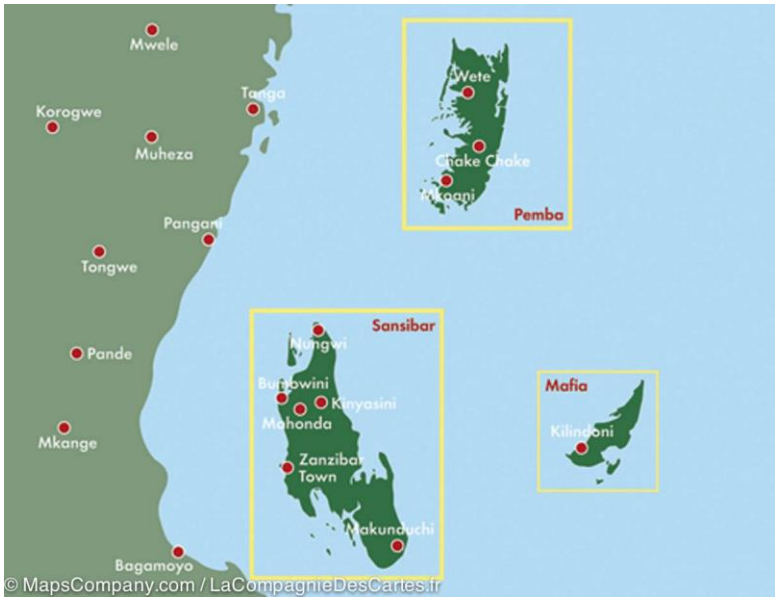

Figure 3. Zanzibar Archipelago (Freytag and Berndt 2016)

Zanzibar includes the two largest islands that make up the Zanzibar Archipelago (figure 3), Unguja and Pemba. Recently, locals have started to refer to Unguja as "Zanzibar Island" or just "Zanzibar," which is why I refer to the singular Unguja as "Zanzibar."

Mji Mkongwe is characterized by small winding streets crowded by concrete buildings full of shops, homes, Mosques, and schools. The streets are only about three feet across in some locations, and range to about five feet across in others. They are crowded with building materials, tourists, shopkeepers and children. Moped and bicycle riders swing around the sharp edges of the buildings, going quickly despite the limited amount of space. Usually more than one person rides on board. Men wearing thobes drive, while women in long black *abayas* or a child in short sleeved tops and pants or skirts may hang on. They swerve around tourists and locals walking down the alleyways. Clothes hang, drying on lines that stretch from buildings on one

Figure 4. Forodhani Park (Mulligan 2015) [cite from where the map came]

side of the street to the other. The shopkeepers sit at the foot of their doors, beckoning at tourists as they pass by.

Elaborate wooden doors distinguish the concrete buildings. Some doors are carved with lotuses or seascapes. Others feature a simple golden stud pattern. Most doors are dark, water-durable wood. The concrete is marred with black from the salt in the air. Some buildings have graffiti or murals on the outside, but for the most part the dominant color is off-white. In fact, the most color can be found on the ground, where red and green leachy casings, food wrappers, and plastic covers can be found in the early morning. Puddles of water fill the cracks of the streets, even when it hasn't rained for weeks.

The winding roads lead out to the shore where Forodhani Park sits. It has trees and grass amid the concrete within the stone work. The park adjoins the ocean, so within one view you can see the greenery of the park and the expanse of the Zanzibar Channel. Forodhani Park provides ample sitting space for its visitors. It is bordered by a major tourist section, the Dar es Salaam ferry (which runs multiple times a day), two major historical buildings, and the Zanzibar Channel.

Figure 5 Forodhani Park photo (Heritage Society 2009)

I spent my time in Forodhani Park watching local interactions, speaking to local residents, and working to understand the knowledge my informants chose to share with me.

While here, I interpreted of the information that I observed and was told, specifically focusing on Traditional Ecological Knowledge (TEK).

As a student of Anthropology, I was able to initiate a preliminary study of the relationship between local Zanzibari and their environment in Forodhani Park through recording instances of TEK exchange. I hope this evolving knowledge will be recorded and published to increase awareness and voice for local environmental caretakers, and also highlight the complex relationships and conflicts that locals must negotiate. This is beneficial so that locals can be heard and participate as active partners in creating systems of ecological sustainability, as they have been for generations, that draw on and speak to their cultural beliefs. Locals can also use this information to measure their own environmental impacts and to better understand if a current system of environmental use is still sustainable or not.

We are all locals within our own ecological systems. There are challenges for humans in every environment, and studying TEK can serve everyone. This case study exemplifies the importance of how environmental beliefs and culture are completely entwined, and our ability to be creative and innovate in part results from and responds to ecological pressures from challenges like global climate change or new forms of human consumption. Through better understanding of TEK, we can all strengthen our understanding of human-environmental interaction and the impacts it has on the globe.

Methods and Location

The location of my study, Forodhani Park, is a small urban park in Mji Mkongwe (also known as Stone Town) Zanzibar. This park functions as a gathering area, connecting the island to Tanzania's capital, Dar es Salaam through a ferry system, attracting tourists from around the world, and serving as a community hub for the members of the Zanzabari people on Unguja, or Zanzibar Island. Forodhani Park is only about half a mile at its greatest length, and is directly adjacent to the Zanzibar Channel. It is located next to two historical heritage sites identified by the Zanzibari government: the Old Fort and the House of Wonders. It is a place that is accessible to locals, including fisherman, hoteliers, and tourists. The park is comprised of green lawn spaces, concrete open areas, and concrete bench features (Abdullah and Hassan 2013). It was originally built in 1936, and named "Jubilee Gardens." However, in the 1964 Zanzibari revolution, the Zanzibari government renamed the gardens to "Forodhani," which means "customs" in Kiswahili because of the park's close proximity to the old Zanzibar Customs House. In 2009, the park was overhauled by the Aga Khan Historic Cities program, and more features, like a playground and a new seawall, were added to the original construction (Abdullah and Hassan 2013).

I studied the interactions in Forodhani Park during the summer of 2015 for a month-long time period using multiple methods to acquire data. I did the majority of my study during the daylight hours between 8am to 5pm. The majority of my study was observing park users and interacting using light conversation, and that process accounted for about four hours each day. Interviews generally were an hour, in addition to the observation section. I decided to study during this particular daily timeframe because the park switched uses to a pop-up market around

sunset each night, which catered more to tourists. The park was also easier to access during the day via bus route and my Kiswahili guide was available during those particular hours to assist me with this study.

The primary approach I utilized was participant observation, a practice that includes interacting with the people I was studying and simultaneously taking intensive fieldnotes about my observations. I participated with the Mji Mkongwe community using the connections I gained through my host institute (Institute of Marine Sciences through the University of Dar Es Salaam) and my Kiswahili professor. I began my exploration by talking to Institute of Marine Science's (IMS) university representatives, and then using their connections and friendship to further my reach into the park setting. My Kiswahili guide, Godson Kimaro, was also enormously helpful in this regard. Although he was Tanzanian and not native to Zanzibar, he provided useful insight as to the best strategies to approach people for questioning. Godson's presence also gave me the ability to talk to men in the community within the context of socially acceptable behavior. Godson was able to provide a better bridge across the gender gap than I would have been able to do on my own, and his relationship with me as my teacher was a relatable topic and made people more comfortable with spontaneous conversations at the beginning of the study. With the help of these two connections, IMS and Godson, I was able to participate and communicate with a small-sized community sample, including people representing a range of ages and genders.

During my four-week stay in Zanzibar, I participated in all aspects of everyday life that I feasibly could. Over 90% of Zanzibari people are Muslim, and I tried to model my outward appearance to fit the social norms that the religion and culture dictate. I wore gender-appropriate clothing, like long skirts and sleeved shirts, and I covered my hair with a scarf. These practices

were crucial, especially because my study took place during the month of Ramadan. During Ramadan, devout Muslims who are able-bodied fast from sunrise to sunset. I also refrained from eating or drinking in public during the day to participate in the Zanzibari culture and to avoid appearing rude.

I interviewed many of the people whom I encountered, about 25 total. All the interviews were conducted in Kiswahili and facilitated by Godson. Although I studied Kiswahili (for a month in-country and during my month in Zanzibar) for a total of two and a half months of language training, Godson's facilitation of the interviews was crucial.

Forodhani Park is an area that is used by many demographic groups within Mji Mkongwe. Almost every person I interviewed hailed from different areas on the island, and I intentionally reached out to community members, like women, from whom it was harder to access information. Older women with children tended to not be in the park, but closer to their home or shops. Before I could identify the type of knowledge being spread by the different users within Forodhani Park, I first had to identify who uses the park and how. I relied on observation and questions to organize people I met into different user categories of salespeople, park staff, foreign tourists, and Zanzibari park users by watching their behavior within the park. I used this particular type of categorization so I could determine who was there to use the park for potential knowledge sharing. These categorizations allowed me to follow the patterns of knowledge exchange within the local Zanzibari community.

In addition to participant observation, I took pictures of the landscapes in the park. I did not take any pictures with people because I was working through the Institute of Marine Sciences and I did not have the appropriate approval to acquire photographic images.

I created a series of survey questions that I used to frame my semi-structured interviews and gather information for a DPSIR (Drivers – Pressures – States – Impacts – Responses) analysis that I was expected to complete by the end of my coursework. To provide the framework to understand which questions to ask and for what specifically to look, I utilized an article by Suckall et al. (2013) to understand how certain environmental, social, and economic changes can affect local cultural perception. I used this study and the background knowledge of TEK gained from Fang, Hu, and Lee (2015), Tobisson (1998), and Torre-Castro and Ronnback (2004) to craft questions specific to identifying portions of the DPSIR model and elements of Zanzibari TEK. The survey, reproduced below, was intentionally broad to encourage talking points and more detailed explanations from the park members I interviewed.

The survey analyzes local residents of Mji Mkongwe, and how their livelihoods and beliefs are shaped by their surrounding environment. Question Set One was created to gather demographic data on the survey participant, and will shape other questions further along in the interview. Question Set Two directly relates to the Drivers – Pressures – States – Impacts – Responses model (Suckall et al 2013) to better understand the common challenges faced by the local Mji Mkonwge population and how they choose to mitigate those challenges in their day to day life. Question Set Three asks questions directly related to human-environment interaction that takes place between the individuals and the coastal environment. Question Set Four is directed at gathering information about TEK about the coastal environment, how it is disseminated, and if it is changing. Question Set Five is directed at gathering information about how local knowledge is being used by the residents of Mji Mkongwe and is aimed at measuring how they use this local knowledge in their day-to-day livelihoods.

Institute of Marine Sciences Survey Questions for Locals of Stone Town, Zanzibar
QUESTION SET ONE
1. What is your name?
2. What is your age?
3. Do you have any children? How many?
4. Are you married?

5. What is your occupation?
QUESTION SET TWO
6. What does your day to day schedule look like?
7. What is the biggest challenge you face in your day to day life?
8. If you could improve something about Stone town, what would it be?
9. How has your home life and work changed since the 1990s?
10. Have you responded to these changes? If so, how?
QUESTION SET THREE
11. What do you think are the most important things found on the coast?
12. What places do you visit most on the coast? Why?
13. How do the tides work?
QUESTION SET FOUR
14. How would you rate your knowledge of the ocean?
15. Did you learn about the ocean/coast from schooling? From your parent? Where else?
16. Will your children have the same occupation as you?
QUESTION SET FIVE
17. What type of equipment and methods do you use in your occupation?
18. Does the coastal area around Zanzibar need to be protected or maintained? What particularly?
19. Do you know of any ways you would maintain the coastal environment?

Using the DPSIR model, my survey results, which are discussed below, identified elements of all of the model, including Drivers, Pressures, State Changes, Impacts, and Responses. Two Drivers appeared most significant after the survey were tourism and population growth. A common complaint from locals was the amount of traffic, which could be due to the fact that many interviews took place in front of a busy road near the ferry. Pressures include economic growth within Zanzibar, more employment, change in pace of life (faster), development of new building and roads, and new exchanges of ideas. The State Changes that were most commonly mentioned were new buildings, new hotels, and more trash in the city of Mji Mkongwe. Another notable State Change that was discussed was the creation of Forodhani Park, but that may have

been due to the fact that many of the interviews took place next to the park. Impacts mentioned by the interviewees included relocation, rebuilding and new occupations relating to tourism. The only two Responses that people mentioned utilizing that I gathered from my survey were population movement and “working harder.”

The final approach that I used throughout my research was a Political Ecology framework to provide appropriate contextualized analysis of my research. I referred back to two main political ecology theses of Degradation and Marginalization, and Conservation and Control (Robbins 2012) in the analysis to give my findings a solid background understanding of the power and relationship complexities between humans and their inhabited environmental setting. This focus allows me to expand my understanding of Traditional Ecological Knowledge and focus on the information being spread and the power relationships surrounding that particular local body of knowledge.

Relevant Historical Context

There is a unique Zanzibari identity in relation to a Tanzanian identity, and it is rooted in history and geography. For centuries there have been trade links between Zanzibar and the people of Arabia, Persia, India and as far as China. Based on the range of artifacts and dates, some scholars estimate that this trade was established started as early as the 1st century AD In Zanzibar, locals relied on these trade relations and subsistence fishing and some farming/pastoralism for their livelihoods (Abdullah and Hassan 2004).

The first written account of the Zanzibar Archipelago was recorded by a Greek merchant named Alexander in the 1st century AD. The Greeks came to Zanzibar seeking valuable trade goods like tortoiseshell and ivory (Abdullah and Hassan 2004). Around the same time, Arab and Persian trading ships were also sailing to Zanzibar. The Arabs and Persians traded with the local inhabitants, posited to have migrated from the mainland of the African continent, for these valuable items. Some traders remained as visitors, and thus distinct from "locals," even during their long stays during the monsoon season (Abdullah and Hassan 2004).

During the 3rd and 4th centuries AD, Bantu people, who originated from modern day Nigeria and Cameroon region, started migrating to the East African Coast. They established settlements amidst the locals, sometimes using violence. These settlements eventually became the major trading centers where they traded valuable goods with Arabs (Abdullah and Hassan 2004).

In the 1800s, Zanzibar was overtaken by the Sultanate of Oman, part of the Arab empire. The conquerors made Mji Mkongwe the capital of the Sultan ruler of Oman and Zanzibar. The

Arabs, and the later British, used Zanzibar as a trading hub for the East African Slave trade. Eventually the Sultanate lost control of Zanzibar to British colonial powers. During this time, the British combined together the land they dominated in East Africa into one land they name Tanzania, which included both Tanganyika (mainland) and Zanzibar (Coffman, J. 2015).

Trade and exchange was and is extremely easy for people in Zanzibar due to its position on the Zanzibar Channel, as demonstrated in the island's history. Along the coast of Tanzania proper, this was also the case. However, the interior of Tanzania is more difficult to enter. Beyond the coast, the interior borders rest on land that steeply rises after the low relief of the coast. As an island, Zanzibar is very accessible, which created an opportunity for different historical interactions and conflicts as well as knowledge exchange of technology and ideas (Mahuwi 2015).

Tanzania gained its independence gradually from the British. Tanganyika gained its independence from the British in 1961, and Zanzibar in 1963. In 1964, both the mainland and Zanzibar joined to form the United Republic of Tanganyika and Zanzibar. After the joining, Mji Mkongwe was the theater of the Zanzibar Revolution. This revolution was sparked by heightened tensions between mainland Tanzania and Zanzibar. The conflict was resolved when mainland Tanzania and Zanzibar combined to form Tanzania under the rule of Julius Nyerere, Tanzania's first president. Mji Mkongwe expanded to form Zanzibar City (Mji Mkongwe remains the oldest historic section of the larger city), which kept its role as a capital and government seat for Zanzibar, currently a semi-autonomous part of Tanzania (Abdullah and Hassan 2004).

Zanzibar has a wet and dry season. However, due to global climate change, a new climate pattern has been emerging in that region. The dry season is lasting much longer, and the wet

season is shorter with harder rainfall (Coffman, J. 2015). This makes adjusting to seasonal changes much harder for the locals, especially those who use subsistence agriculture to survive. Even though many Zanzibaris are shifting to other occupations, the "*Kilimo Kwanza*" policy (agriculture first) pushed by the Tanzanian government encourages residents to settle and farm, even on land that is not fertile or water sustainable (Coffman, J. 2015). Many of the fisheries on the island are also under stress, and fishing operations have reached a point of dramatic fish population decline due to the impact of climate change effects on coral reefs, unsustainable fishing practices (like using explosives to fish), and general overharvesting due to population growth on the island (Coffman, J. 2015)

In terms of population growth, the island has a growth rate that surpasses that of mainland Tanzania at about 3%, which indicates rapid population growth on a small island (United Nations 2016). Large families and many children are the cultural norm among both mainlanders and Zanzibaris (Coffman, J. 2015).

In addition to the climate stressors, rapid economic changes are taking place on the island. For example, many Zanzibaris are switching from subsistence fishing and farming to working in the expanding tourism sector. This provides many monetary opportunities for the members of the community, but does not always fit in with their lifestyle or religious practices (Suckall et al 2014). Also, a growing area of the tourism economic sector is hotels which use a lot of potable water, already a scarce resource on Zanzibar. The hotels dig deep into the water table and draw so much water that it causes ocean water to move into the island water supply, salinating and ultimately making the water undrinkable (Suckall et al 2014). There is not a sanitation system in place to accommodate growing tourist appeal which is contributing to water quality and waste issues on the island. Numbers of tourists increased by 43 percent from 1980 to

2002. In 2002, 87,511 people came to the island for tourism (Zanzibar Tourism Statement 2002). Many of the people with whom I spoke mentioned heightened car traffic as previous mentioned in the DPSIR analysis, which reflected the increase of commerce and population in Mji Mkongwe. Ahmed, a man I talked to said that "the roads are being updated because they are too small for people."

Studying TEK directly ties into the challenges arising from global climate change, population change, and economic change, and provides a window into adaptation strategies that Zanzibari people are employing to mitigate these challenges, all while taking into consideration the historical context of Zanzibar (Suckall et al. 2014). After identifying these factors, I used the two theses of Degradation and Marginalization, and Conservation and Control from the study of Political Ecology to make sense of the larger context and the power relations between TEK, its users, and the changes to their local environment. What makes this study most important is that these challenges listed above are not unique to Zanzibar. By studying TEK, any place that is facing a challenge as a result of global climate change, population growth, economic changes or other vast changes can be better analyzed through their own context and aided by organizations that work alongside locals to help mitigate issues in a socially appropriate manner (Tobisson 1998).

Literature Review

During my summer research period in Zanzibar I focused on interactions between Forodhani Park users in general, and specifically users not in the park to solicit for goods or services. These people were in Forodhani Park in order to connect with their community and enjoy the park. I separated this specific group from the tourists, merchants and park guards, who were in the park for motivations other than knowledge exchange or recreation. While there, I noticed a pattern of knowledge acquisition involving environmental-specific knowledge during the interactions of the locals. To better understand environmental meaning and environmentally specific knowledge, I looked to definitions of Traditional Ecological Knowledge (TEK) and other applications of an environmental worldview to try to understand how local people develop relationships with each other and with their environment, and what kind of relationships these interactions portray.

TEK refers to environmental knowledge gained over centuries or millennia of direct human interaction in a specific setting. Fang, Hu, and Lee (2015) report collected stories about appropriate hunting techniques in Taiwanese villages. From their research, they described TEK as ecological knowledge both widely culturally accepted and passed through community ties. I started with this definition when I created my survey, and directed questions at understanding how knowledge is spread through families, school systems, and other networks in Mji Mkongwe.

Although TEK is based upon many years' lived experience, it is significant to stress that TEK is ever-changing and evolving, just like the culture and the environment in which TEK is present (Inglis 1993). At its core, Traditional Ecological Knowledge is a particular type of

relationship that humans can have with their environment. Traditional Ecological Knowledge fits into the broader category of environmental knowledge, but emphasizes a deep and inseparable connection between a culture and environment. Without the context of a specific culture or a specific environment, Traditional Ecological Knowledge loses its meaning (Inglis 1993).

To better understand how TEK is both "traditional" and evolving, I looked to literature that highlights the dynamic relationship people have with their environment. One concept, "ecocosmology," introduced by Sheridan (2012), highlights the created relationship humans have with their environments. Sheridan explains the ties between Maasai, a pastoral group that lives in Southern Kenya and Northern Tanzania, and their relationship to water access through the scope of "ecocosmology," which I consider a sub-category within TEK because it follows the traditional definition. Sheridan states that individual Maasai relate the relationship they have with their environment to the relationship they have within their society. When the rain and access to water follows a distinct and recognizable pattern, Sheridan explains that Maasai "link an orderly environment with orderly relationships among people" (p 15). When rain and water access does not follow a larger recognizable pattern, this irregularity is recognizable in the relationship structures amongst people. Ideas of what constitutes an appropriate relationship are changed, and this follows the pattern of environmental stress. Sheridan makes the larger claim that the relationship between human social structures reflects environmental pressures in unconventional, and sometimes hard to detect ways. In this way, "ecocosmology" emphasizes the entrenched nature of TEK as ecological knowledge that binds together cultural and environmental contexts. "Ecocosmology" also provides a way to look at the Zanzibari environmental worldview expressed in TEK and integrate the environmental and cultural pressures Zanzibari people feel on a day-to-day basis.

Torre-Castro and Ronnback (2004) identified traditional knowledge in Chwaka Bay, Zanzibar, through interviews, questionnaires, market data analysis and participant observation. By measuring traditional knowledge, they discovered that there were many "social-ecological links" that have connections to the "welfare of the local population (p. 20)," much like the concept of "ecocosmology". Again, this research emphasizes TEK as a changing knowledge set that is tied to the particular cultural and environmental context of the situation. When the welfare of the locals is under particular environmental stress, TEK accommodates new practices and new socio-economic conditions. This particular study highlights general TEK rather than focusing on a particular population within Chwaka Bay and also emphasizes TEK as a general body of knowledge known by the majority of members in the Chwaka Bay community, not just known by a specific and select few as some TEK. In the Chwaka Bay study, traditional knowledge among fishermen was measured as the group with the highest diversity and dissemination of knowledge. The traditional knowledge that was deemed as the most valuable was about seaweed cultivation and bait collection sites, both geographically tied.

Tobisson (1998) explores the diversity of local knowledge, especially among a specific group of fishermen, also in Chwaka Bay. The author explains the spread of local knowledge of the fishermen, who have a large ecological knowledge base that includes information about "different tidal cycles, seasonal changes in winds and precipitation, and seabed morphology" (p 4). The TEK base is so large that it is able to provide an all-encompassing view of the Chwaka Bay environmental system for the fishermen. Tobisson posits that because TEK is this broad, it allows the fishermen to compare different ecological processes and use their resources to their most "optimal" use. This process highlights the dynamism of TEK and community members' abilities to use their environmental knowledge in an active and specific way to achieve a goal: a

greater fish haul. This particular study emphasizes that TEK is an existing and practiced form of knowledge sharing because it helps solve a problem (in this case increased fishing hauls) and is an understanding of the environmental system that is passed down or created because it is deemed 'useful information.'

Suckall et al. (2013) used surveys and interviews to gather information about different social-environmental practices in Zanzibar. The authors emphasize the specific practices of seaweed farming and fishing, which are highlighted as gendered practices. Fishing in Zanzibar is traditionally explained as a male occupation, whereas the newer practice of seaweed farming is considered a female practice. Suckall et al. use this information to better understand why men in Zanzibar along the coastal area are starting to seaweed farm when it goes against their traditional gender roles. Using the DPSIR model (Drivers-Pressures-State Changes-Impacts-Response) to understand why some individuals deviate from traditional gender roles, the authors are able to pinpoint environmental stressors and directly connect the stressors to Zanzibaris' changing relationships with their environment.

Barclay (2007) emphasizes religions connected to ecological knowledge. In Pemba, Zanzibar, local Imams are using the Koran as formal guidelines to encourage local fishermen to refrain from using explosives or dragnets to fish. Khalid, founding director of Britain-based Islamic Foundation for Ecology and Environmental Sciences (IFEES) explains that "the Koran gives ethical principles on guardianship and relationships with other beings, which can form the ethical foundation for conservation" (p 1). In this particular example, Islam is used as a vector to spread ecological knowledge. This demonstrates that religion is an important component of a Zanzibari worldview, and because TEK is part of the culture, religion can also play into the construction and dissemination of TEK. This particular example also emphasizes that ecological

practice is not only constructed within a particular environmental setting and culture, but is influenced by the outside though dissemination. In this example, IFEES and other conservation organizations influence the ecological practice of the locals by framing their beliefs and agenda in a religiously and culturally connected way. This example highlights the need for my projects such as this to also emphasize the different power structures and belief systems that surround, infuse, and change TEK. To accomplish this, I find Political Ecology as a fitting framework for analyzing my findings.

From Robbins (2012). I draw two specific theses of Political Ecology – Degradation and Marginalization, and Conservation and Control – to understand my findings in a more integrated sense that takes into account the different power structures and voices that influence TEK. Degradation and Marginalization refers to the process through which certain environmental systems "transition to overexploitation on which they depend as a response to state development intervention of increasing integration in regional or global markets" (p.159). This concept is particularly useful because it highlights the impact that larger policy makers have in the lives of less powerful groups. The second thesis, Conservation and Control, is applied when "control of resources and landscapes have been wrested from local producers. This is done through the implementation of efforts to preserve "sustainability," "community," or "nature." Basically this process aids "officials and global interests by disabling local systems from livelihood production or socio-political organization" (p 178).

In my analysis, then, I use an integrated definition of TEK which not only took into account the way TEK spreads from community member to community member (Fang, Hu, and Lee 2015), but also emphasizes intertwined cultural connections with environmental understanding and the ever-changing nature of TEK (Sheirdan 2012) (Inglis 1993). I also am

adding on to the research of Torre-Castro and Ronnback (2004) and Tobisson (1998) by further exploring the relationship of fishermen to Zanzibari TEK in Mji Mkongwe. I also explore the concepts of gender and religion in TEK using the work of Suckall et al. (2013) and the example of Barclay (2007) to provide context to the interactions I witnessed and recorded in Forodhani Park. To analyze my data, I use the work of Suckall et al (2013) and the Political Ecology theses of Degradation and Marginalization and Conservation and Control provided by Robbins (2012) to highlight the local and large scale changes that are happening in Zanzibar and the greater power structures and inequalities that exist in an environmental system.

This research contributes to the TEK body of research in that I completed this project in an urban setting, which is slightly different from the examples mentioned above. I argue that TEK is not restricted to rural settings, and that TEK sharing and acquisition can happen in any urban location, even in a clearly human-created setting like an urban public park. By researching in a city, I was able to explore more general examples of Zanzibari TEK because of the range of people with different stories and cultural understandings with which I was able to interact in the park.

Traditional Ecological Knowledge in the Field

I noticed three main concepts that were connected to TEK as I did research in Forodhani Park: fishermen and identity creation, gender, and religion. The first instance of TEK that matched the patterns noted by Tobisson (1998) and Torre-Castro and Ronnback (2004) was the importance of fishermen or *wavuvi* (*mvuvi* is singular fisherman) in disseminating and being a marker for TEK. I connect the presence of *wavuvi* in TEK to an individual Zanzibari identity. I emphasize how common the range of beliefs surrounding fishermen are, and show how these beliefs are connected to Traditional Ecological Knowledge. I then approach this example of TEK through a political ecology lens, focusing on the larger picture of Zanzibar TEK. I also mention the pattern of gender as produced through TEK, and I briefly touch on religion as spread through TEK.

Wavuvi and the Individual Zanzibari Identity

The first theme I noticed in the social setting of Forodhani Park was the mention of *wavuvi*, or fishermen. Within the majority of the conversations I had with all the people I met and with the interviews I conducted, I noticed *Wavuvi* were highly regarded as experts of ecological knowledge.

Baina, a 60 year old women to whom I talked at the beginning of my research, first highlighted the relationship *wavuvi* had in the community when describing her ancestry. I met

her on my way to Forodhani Park, as she sat on the front stoop of her shop and watched three of her grandchildren playing in the streets. The entire time she spoke, she brought every question back to her family and her six grown children, and often talked about her husband who had passed away two years prior. When describing her childhood in her village, she told me that her family descended from *wavuvi*.

"Many of my relatives were *wavuvi*," she explained. "They used to fish with the Chinese a long time ago in Pemba. My family was called the 'the seller of shark' because we fished for many sharks." Baina shared information on shark preparation, something that was not popularized in the city setting, and is an instance of traditional knowledge, perhaps TEK that was shared through interactions between local Zanzibari and the Chinese.

"There are many ways to prepare the shark," Baina explained. "You can salt them and then sell them. They are good with anything, salad, rice, *ugali*, a variety of foods." Here, my translator Godson looked fascinated, and asked her more questions about seafood preparation she had learned back in the village she lived in as a little girl.

Baina and many others who mentioned *wavuvi* spoke highly of the fishing profession. This is because much like the patterns discovered in Chwaka Bay by Tobisson (1998) and Torre-Castro and Ronnback (2004), *wavuvi* are not only members of the community who spread TEK, but are representative to the locals of TEK itself in Mji Mkongwe.

Another example of fishermen being idolized for their knowledge and place in the Zanzibari identity is seen in a conversation I had with a tour guide operator, Mart, on his day off in the park. Mart is in his twenties and wanted to practice English with me. He was tall and lanky, and dressed in a button down shirt and slacks, like he had just gotten off of work. He told

me he had moved to Mji Mkongwe after living in a coastal village to learn how to work in the hospitality industry. Now he worked as a hotel concierge, and liked his job most because he could practice his English and Italian all the time. When I asked him to explain knowledge he had of the environment, he mentioned that he knew "Just a small amount, not like the *wavuvi*."

To many Forodhani park users, *wavuvi* exemplified very high levels of environmental knowledge and therefore a deep connection to Zanzibar and Zanzibari culture. Torre-Castro and Ronnback (2004) identified *wavuvi* as the group with the highest dissemination of TEK. *Wavuvi* 'understood how to use their environment' according to many of the locals, which confirmed Tobisson's (1998) description of how *wavuvi* are experts at using environmental systems to benefit themselves. Many non-fishermen explained that in comparison to an *mvuvi*, their environmental knowledge was very limited.

Alan, a short, loud hotel guard in in his thirties, said he had gained his knowledge about the ocean and the environment by "learning from society and from my father and from the *wavuvi*. They taught me how to row the boat, how to go on a *dhow* (traditional sailboat), and how to sail." By explaining that fishermen are teachers, Alan and many others in Zanzibar argued that fishermen are the group of people that disseminate the highest levels of TEK, which was addressed in prior literature (Torre-Castro and Ronnback 2004).

Alan was not the only man who expressed that he had learned something from the *wavuvi*. When I asked Mart to explain his self-described limited knowledge, he explained that he understood the flows of the tides from watching the *wavuvi*. He also told me that he knew certain foods cure human ailments, and that "Octopus is very good, better than Viagra for issues with men's reproduction. It's just like milk, dates, and squid soup. I know because the *wavuvi* eat octopus all the time and look at how strong they are."

Zanzibari park goers clarify that *wavuvi*, are extremely knowledgeable about local fare, water conditions, the best local fishing spots, and daily tides. This connection with their natural surroundings and the sheer amount of expertise it takes to be a fisherman in Zanzibar impressed the people with whom I spoke. Mart explained different types of knowledge that *wavuvi* possess, and used them as a symbol for strength and power. Mart also compared the muscle of the *wavuvi* to high sexual potency. This was not an unintentional connection. Many people at Forodhani expressed to me that more children are a sign of a healthy family, which was discussed by Suckall et al. (2013). Mart used this same logic of strength tied to virility to show that *wavuvi* were the creators of strong family units as a result of their extensive knowledge about how to use the environment to 'get strength.' This can be directly related to Tobisson (1998), who noted that strength and resources are a 'use' fishermen can attain from their environment. Mart also explained that he did not have any children of his own yet, but he hoped to get married someday and have many children. *Wavuvi* are TEK experts because they are able to use their environment to attain these masculine cultural ideas (Tobisson 1998).

Wavuvi serve as reminders and teachers of traditional ecological knowledge in their community (Torre-Castro and Ronnback (2004). Mart learned about the tides from watching the *wavuvi* while he was a child and now actively uses this information when he guides people on sea-based tours for his job.

Throughout these interactions, I was able to understand that *Wavuvi* are not just teachers and disseminators of Traditional Ecological Knowledge, but they also represent a source of individual Zanzibari heritage (Abdullah and Hassan 2004; Torre-Castro and Ronnback 2004). The practice of fishing is much more common in Zanzibar than on the mainland which makes the presence of *Wavuvi* stand out as something that separates Zanzibar from Tanzania (Mahuwi

2015). *Wavuvi* are also a symbol for strength and power. These pieces of knowledge connected to heritage and respect for the *Wavuvi* were passed down from their parents, their own visuals, or from members inside of their community.

Fishing is not nearly as popular of a profession on the mainland of Tanzania. There, the primary type of subsistence living in pastoralism (which has its own set of complex TEK , ideology, and cultural understanding). In Zanzibar, the presence of fishermen is an indicator of a separation between mainland Tanzania and Zanzibar itself. This is significant because, although politically Zanzibar is part of Tanzania, the general culture on the mainland is vastly different from the culture on the island of Zanzibar (Abdullah and Hassan 2004) TEK is localized and therefore distinctive for different locations on the mainland and in Zanzibar. The presence and importance of *wavuvi* are not only indicators of a distinctly Zanzibari cultural belief, but *wavuvi* themselves serve as a symbol of a unique Zanzibari identity (Torre-Castro and Ronnback 2004). W*avuvi* are important to Zanzibar (and not Tanzania) because of historical differences, geographical differences, and cultural differences between the mainland and Zanzibar. These distinctions can all be connected to the presence of *wavuvi* (Abdullah and Hassan 2004*).*

During one interaction with three men – Alan, Muhammad, and Sunni – I asked them where they learned their knowledge about the ocean. Muhammad, a 40 year-old taxi driver, told me that he did not know how to sail, but he did know "how to get things from the sea." When I asked him to clarify how he got things from the sea, he described collecting bivalves on the shoreline. This prompted Sunni, who said he also collected shoreline creatures, to point out that "the most important part of the ocean is not just fish but *kitoweo"* (roughly translates to *sustenance*).

When I asked these three men where they had learned the environmental knowledge, they all offered answers, *jamii*. This pattern was replicated in many of the conversations I had with locals in Forodhani Park. For example, one man in his sixties Afif, a small-statured security guard who spent his working day sitting along the boating dock area, explained that he learned the skills of "collecting bivalves on the shore" and "how to read the motions of the tides… not from school at all" but from "*jamii*" and "from seeing and knowing."

Some people I talked to did express that they learned information about the sea without the aid of *wavuvi* or their parents. Many mentioned *jamii*, or *society*, as a source of ecological knowledge. This concept of learning from *jamii* emphasizes how completely some TEK is integrated into a culture, it is representative of both general social norms and cultural understanding as well as more specialized and particular knowledge, like best fishing practices. This makes some TEK connected to other general cultural practices and understandings like religion and gender (Inglis 1993). Learning from *jamii* also emphasizes the normal quality of the some knowledge. TEK to people in Forodhani Park was not something they separated out as specifically a more important cultural practice or belief. Some skills learned from *jamii* are ones that 'everyone' knows and knowing that knowledge is part of being Zanzibari (Torre-Castro and Ronnback 2004).

The knowledge taught to locals by fellow locals extended beyond just general knowledge and mostly included hard skills. Afif explained to me the sequence of collecting seaside animals. "When the tide is out, I get octopus, crabs, and shelled animals," he explained as he gestured to represent bivalves. Afif explained that he had learned this knowledge when he was just a boy in Kendwa, a beach village in Zanzibar, watching women working, and example of gendered labor.

I realized that *jamii* is a category that includes everyone in the broader community, including family and people directly tied to a person's social net. All men who mentioned learning how to collect shoreline creatures mentioned *jamii* as their source of knowledge.

The women with whom I spoke also mentioned gaining knowledge from *jamii*; however, they did not mention any connection to bivalve collection. A shop owner, Shina, who was watching over her children quietly mentioned that a neighbor had taught her about *mazow* (translates to different sea products). She said she learned this information from general society and her elementary school back in the village from which she had moved. .

Two weeks after I spoke to Shina, I spoke to another woman, Daanya, a security guard, who mentioned that *jamii* taught her that "the tides are very important for the *micoco*, mangrove trees. This is because when the tides go out, the *micoco* seeds can plant. They fly down to the ground and plant during this time." She gestured in the air with her hands a seed pod flying down and implanting itself in the soil. She then continued, "When the water comes back and the tide comes back, then the mangroves seeds keep growing." She explained that she was in the process of teaching this to her young child.

Knowing normalized TEK learned from *jamii* and being able to explain ecological phenomena as 'learned from *jamii*' is essentially a part of being Zanzibari. In fact, this is just as much a part of Zanzibari identity and TEK as respecting the *wavuvi* and their broad knowledge base. It demonstrates a shared approach to knowledge acquisition about common ecologically based experiences (Torre-Castro and Ronnback 2004).

Challenges to the *Wavuvi*

Some of the people I talked to mentioned that there are fewer *wavuvi* because of the rise in tourism and other available professions; however, no person mentioned that fishing as a profession is in danger. Only one man, Ahmed, a quiet, wrinkled boating tour guide in his fifties, said that *wavuvi* were a detriment to the local fishing society because certain fisherman used explosives to harvest fish from the coral reefs. But even in this slight, Ahmed made sure to clarify that most *wavuvi* are good, just the ones who use explosives are not good for the reefs. It is also important to note that Ahmed's profession of giving island tours depended heavily on the health and aesthetic beauty of the reefs, and that blast fishing in coral reefs was recently banned by the Zanzibari Government (Coffman, J 2015).

This specific example can be analyzed using political ecology, and specifically the thesis of Conservation and Control (Robbins 2012). Control of *wavuvi* behavior started before the new regulation on blast fishing. Certain coastal areas that were once viable fishing spots have slowly been sectioned off by other interests. For example, hotels built on the coast restrict fishing in front of their coastline (Suckall et al. 2013). In addition to this, the Zanzibari government has made efforts to create parks, like Zanzibar's National Jozani Forest. In the forest, fishing and mangrove harvesting are strictly prohibited. Areas once deemed as "appropriate fishing areas" are now protected/conserved areas. This forces the *wavuvi* to fish in smaller areas that are not under the umbrella of conservation. Now, because of these regulations and protections on areas, unprotected areas are being overused at an extremely high rate (Suckall et al. 2013; Robbins 2012).

This competition of differing needs also creates conflict amongst the locals who use these ecological areas in different ways. Those who profit from the tourism industry support the regulations and conservation efforts, such as Ahmed the boating tour guide. Some *wavuvi*, not able to use the areas they once fished, now have to resort to blast fishing to achieve a haul that is large enough in scale to subsist. The tactic of using explosives may achieve the desired harvests for one fishing trip, but the practice is not sustainable because it destroys fish breeding grounds and indiscriminately kills fish, regardless of sexual maturity. Because the areas that fishermen depend on are destroyed, they are marginalized and their quality of life suffers. This destructive fishing method makes even less coastal area available to the fishermen (Robbins 2012).

In addition to the conservation protections on the island, *wavuvi* also have to mitigate the effects of outside fishing groups and forms of pollution. For example, some fishing locations in local Zanzibari waters that had been plentiful for decades are now being overfished by outside entities. In combination with more run-off from growing building developments and expanding cities and increased ocean acidification, the resilience and diversity of different coastal areas is dropping, including the fishing areas that are locally renowned. Because pressures like these are making it more difficult to subsist from the land and water, TEK has to adapt to these larger changes as well (Suckall et al 2013).

After discussing *wavuvi* with many individuals, I saw an *mvuvi* scaling the outside of the sea wall in the park as I was sitting on the sea wall while talking to Mart and Godson. He used his mouth to hold the handle of a bucket carrying small fishes, and tossed the bucket over the wall once he reached the top. He was wearing wet blue jeans and a white t-shirt. Mart spoke to him mid-conversation and told him me that I should speak with ‘an expert.’ Once I made sure the fish wouldn’t go bad, we sat down together and Jyea explained how he became an *mvuvi*. I asked

him about his relationship to the park and to tell me about his own sense of knowledge about natural features.

Jyea spoke most about his two young children, comparing their lives to his own. I asked him if he was teaching them about the ocean and his occupation. Jyea answered that he did not want his children to become *wavuvi*, and that he had only minimally taught his children. While I was talking to Jyea, another fisherman, Abaan, scaled the seawall and sat alongside Jyea during this conversation. Abaan was significantly older than Jyea, and stated that his children are all grown. He also focused on the differences between his grown children and himself, including their occupations, and said that "Some are in the army, some are teachers. None fish. I'm happy with them."

Uvuvi, or fishing, as an occupation is not the highest paying or most secure position in Zanzibar (Suckall et al. 2013). Once, being a fisherman meant a relatively stable harvest each year, and the men who chose to work in this profession were able to provide for their families. However, with the rise of more intensive fishing practices, more *wavuvi* have had to switch occupations (Suckall et al. 2013). Local fishery collapse caused by outside fishing rigs overfishing in Zanzibar local waters, and destruction of coral reefs have led to a massive shortage of fish. Hauls are getting smaller every passing year, and some *wavuvi* have resorted to seaweed farming to provide enough money to support their family system (Tobisson 2013).

This practice of switching professions is not seen as a positive change in Zanzibar, as seaweed farming is a highly gendered practice, in the realm of women. *Wavuvi* who switch to farming seaweed are seen as 'too weak' or 'not brave enough' to be real *wavuvi* (Suckall et al. 2013). Seaweed farming is also extremely labor-intensive. It requires the farmer to hunch over the crop and haul large bags of harvest in to shore during harvest. This back-breaking labor is a

day-long process, and requires the full attention of the farmer. For all of the work that it requires, seaweed farming is also not particularly profitable (Suckall et al. 2013). Seaweed farming also is not the kindest practice to the environment. It requires many wooden poles, which locals often gather and cut down from endangered mangroves that grow along the shore in Zanzibar. Every two to three years, the poles that hold the farm and ground the seaweed to the shore must be replaced, which leads to more coastal deforestation (Tobisson 2013). Taking this into account, *wavuvi* who switch from fishing and into farming seaweed lose their status and their Zanzibari identity as providers. They no longer demonstrate their ecological knowledge or teach their community through letting people watch them practice their profession as *wavuvi*.

This process of seaweed farming can also be analyzed using the Political Ecology thesis of Degradation and Marginalization. As more *wavuvi* move from fishing to seaweed farming, they cut down more mangroves which weakens the soil and erodes the coastline (Suckall et al. 2013). This creates an environment that is worse for growing seaweed, which produces less profit overall, further marginalizing the *wavuvi*. This destruction also affects the shellfish collecting along the shoreline, referenced in my conversations with the locals in Forodhani Park. With the increase in seaweed farming for both men and women, more shoreline is planted with seaweed farms, which leaves less space for wildlife to grow and mature in the shoreline. This creates a decline in shoreline creatures, limiting harvest, and further marginalizing the people who depend upon those creatures to survive.

Other *wavuvi* have tried to continue their work along the shore by collecting the smaller fish, bivalves, and creatures that live in the shallow tidal waters. This practice of collecting is also considered women's work, and men who switch into this particular position compete directly with women who had been working in that particular coastal area (Suckall et al. 2013).

These men impact their environment with the overharvesting of the tidal resources. Traditionally, the act of collection is mutually beneficial with *wavuvi*. Women who collect smaller creatures are able to sell them to *wavuvi* as bait for larger oceanic catches. Without *wavuvi*, the process of women selling their collection of smaller tidal sea creatures to the men is broken (Tobisson 2013).

Although positive knowledge about *wavuvi* is being passed down as TEK, the occupation of being a *wavuvi* is not being passed down as readily as referenced in my interviews, and this is probably due to the rough conditions *wavuvi* now face with growing ecological and social changes. There has been a dramatic change in the transmission of TEK, such as men practicing shellfish gathering and growing seaweed (Suckall et all 2013). As the *wavuvi* are further separated from their livelihoods, they are marginalized from their fishing areas and also face competition on a larger scale. They are also marginalized within society because they are no longer identified as TEK experts.

Gender and Religion in TEK

Swimming is a very popular learned skill in Zanzibar, and some people were very excited to tell me they could swim. One woman named Shiva and I connected immediately. She was about the same age as me and also a student. She was very short and very energetic. When talking about activities she likes to do, she proudly told me that she knew how to swim. She was taught by her brother, who said to her that "the tides tell you when it is the right time to swim." I explained to her that my father taught me how to swim, and that I loved swimming as well. Shiva

was excited that more girls were getting in the water. “Some girls don’t know how, but I do” she repeated several times. As emphasized by Shiva, TEK is a gendered process, but is also adapting. Some skills, such as shoreline collection and seaweed farming are traditionally women’s activities in Zanzibar, but are changing to accommodate a changing environment (Suckall et al. 2013).

This gendered split can also be related to the religious practices in Zanzibar, an important consideration of Zanzibari culture for considering fieldwork. The island is 90% Muslim, and everyday life on the island is profoundly shaped by this religion. Every day, 5 times a day, Muslims are called to prayer with a call from a local Mosque. In Zanzibar, this call consists of a man on a loudspeaker speak-singing lines from the Quran, which are piped into the alleyways with speakers from the mosques. During this time, devout Muslim men are called away from their jobs and must return to their mosques to do their prayer, which involves repetition and prostrated movements. Devout Muslim women are encouraged to go home to pray (Jiddawi, N. 2015).

An extremely sacred holiday for Muslims is holy month of Ramadan, during which the majority of my project took place. Throughout this month, Muslims are encouraged to fast from sunrise to sunset, about a 12-hour stretch in Zanzibar given its equatorial latitude. Muslims are also encouraged to wear loose fitting clothing and not to drink alcohol. Only the elderly, children, and menstruating/pregnant women are excused from fasting. Whether or not you participate in the fast, consuming food in public during this time is not acceptable. Because I completed my field study during this holy month, my perception and experience of Mji Mkongwe were dramatically influenced by Ramadan. This month of religious observance is finalized by a four day celebration called Eid. During Eid the fast is broken and people flood into

the streets for large parties. For the first time since Ramadan began, women wear makeup and trade their black *abaya* for more colorful options. The children wear new clothing and are encouraged to visit family members to receive small celebration gifts (Jiddawi , N. 2015).

In one conversation about religion, Rayman, a man in his late teens dressed in a white thobe, explained how he learned how to behave during Ramadan from his brother. Rayman was the second child in a family of five, and was, like Shiva, going to school in Mji Mkongwe. In regards to both Ramadan and swimming, Rayman told that his older brother taught him how to swim and the cultural and religious rules about not swimming during Ramadan. During Ramadan, practitioners are not allowed to drink any water during the daytime fast. For Rayman, this meant swimming was restricted, as well, because you could not completely control the salt water entering into your mouth during swimming. When I asked him about his future aspirations, he told me that he wanted to eventually teach "all of this" to his children. This exemplifies how TEK is confined to the environmental realm, but is a subset of general traditional knowledge. Religion is not TEK, but influences social norms that are understood in other contexts within that particular culture, which therefore influences TEK (Inglis 1993).

Another example of religion associated TEK that came up in an interview was with Shan, a man about 40 years old, who interrupted one of my interviews with a younger man to mention the ability to read "the tides controlled by the moon cycles." When I asked Shan where he learned this knowledge, he said that "you have to watch the moon to understand this, just like in Islam." Islam follows the lunar calendar, which is also used as a tidal measure by the *wavuvi* to better understand tidal patterns. When I asked him where he had learned this knowledge, he mentioned that he learned these lessons by "being a member in society" and from specifically "his father." He said that the tidal lessons "are not taught in the Mosque, but are reinforced by

the religious presence" on the island. Again, this example of religion and TEK intertwine with one another to create cultural beliefs and practices dynamically connected to the local environment (Inglis1993).

Adapting TEK and Social Norms

One conversation I had with five 17 year old classmates (all women), after joking about school and travel, became very serious when I asked what the girls would change if they could. One responded by saying, "We need to change the [old] buildings and we also need to change the culture. Both need to modernize."

When asked to go further on the subject, one girl asked, "Should we start wearing short shorts?" which was followed by lots of laughter, as they were all dressed in head to toe black *abayas*. After the group settled, the first began to speak again. "No" said the first, "we need to look at bridewealth, and female inheritance. We need to change those things. They must change."

The girl, Mara, was a student in the process of learning how to type and work on computers. Mara also emphasized ecological changes such as garbage disposal and lack of trees that she saw in need of improvement, but she did not separate these from the social changes she also saw as important. In Mara's example, TEK is actively adapting, directly connected with social pressures and change (Inglis 1993). Just like the people before her, she also mentioned that the only way that these changes she addressed could occur is if the information was spread through *jamii*, or in other words, normalized (Torre-Castro and Ronnback 2003).

This pattern of TEK connected with the feeling of 'needing to change' was especially prevalent whenever I discussed the specific ecological concerns of the people I interviewed. Many were happy to discuss strategies they had learned from others to cope with the economic, ecological and social changes to which they were forced to adapt.

I discussed this with a man in his late fifties named Omar. He was sitting in Forodhani Park, talking to another man he had just met at the park that morning. I asked Omar if he knew of ways to improve his own environment, and he told me about a skill he had learned from a member of the Zanzibar community. Omar mentioned that "Because of tourism, we now have to not cut down the mangroves." He followed up that statement with "Now we make bee hives in the mangroves…they give extra security for the trees so people will not cut them down [at Jozani Forest]. Also they give honey, which we make money from."

When I asked who profits from this financial system, he emphasized that "all of us in the village make the money from the bees. We sell this honey to a middleman who then sells it to a tourist." After having success with this, he mentioned that "the neighboring village [also] has this project and we shared the idea with them." The act of beekeeping is not a new practice, but the adaptation of this practice to form a livelihood does demonstrate a social shift and an adaptation of TEK.

Omar was proud to share this information with me, and the man next to him looked interested. Even after my conversation had ended, Omar and his new friend spoke about the bees and the regulations surrounding the mangroves as I left them, absorbed into this conversation full of possibilities and problem solving.

The mangrove-bee knowledge is ecological; however, it is not exactly 'traditional' because it does not belong to any specific community and it has not been passed down through ties within one community. However, by sharing this information in the Forodhani Park setting, the people with these innovations are able to get confirmation from other members of outside communities that their points are valid, and this adaptive knowledge might become TEK. The ideas that formed economic diversification opportunities often generated the most discussion between members of different communities who used the park.

In a final interview in Forodhani, I asked Muhammad why he enjoyed coming to the park. Muhammad actively goes to the park every day after work, and comes specifically to talk to others. He said that "the environment here [in Forodhani] is very nice and it is good to go here to get different views." When I followed up with a question of what views he meant, he explained that he meant "different views from people. Social interactions just like this." Although not all social interactions are TEK, those involving sharing knowledge about the *wavuvi*, environmentally gendered and religious practices, and adaptations strategies for environmental changes are TEK. This highlights the process of sharing 'useful' or culturally important environmental knowledge as TEK (Tobisson 1998).

A 15 year-old student named Maab who was visiting Mji Mkowgwe with her three friends had a short and precise answer, "Plant more trees!" As she spoke, her three friends nodded in agreement. Halfway through talking about trees all four of the girls quieted down immediately and started giggling because they saw their teacher from their village.

Both Baina and Daina, two women with whom I spoke about their families, said they would "clean and pick up garbage." Muhammad mentioned that "Zanzibar has peace and love but has a lot of trash" and that he would "teach others" to stop throwing this on the ground.

Muhammad advocated teaching others through action, or using the process of normalizing new behaviors. He demonstrated by throwing his trash into one of the cylindrical black receptacles in the park. In this particular interaction, Muhammad demonstrated the power of learning through *jamii* and how *jamii* enforces community awareness and accountability amongst its members. Muhammad mentioned that the trash receptacles themselves were relatively new but people used them most of the time. He said "It would be a good improvement to have more [trash cans]."

Alan also mentioned that trash was an issue in the park and in the city in general. He specifically noted that that the problem extended beyond just the area, and was an issue with the social environment as well. His solution was to become "socially cleaner – in regards to habits." He explained that he would "give out the knowledge about this." Again, Alan also referenced teaching through general society as a solution to the trash in the park, which highlights the importance of *jamii* and visually learning from others.

Because so many people identified 'trash' as an environmental disrupter in Forodhani, this proper disposal of trash might represent TEK that is adapting to fit an urbanizing environment. Daanya, the security guard, mentioned, "I think people need to be just educated about the environment. The ocean, zebras, the roads. The educating is how I would improve the environment." She then went on to emphasize that this education can come from *jamii*. When I asked how she planned to accomplish this, she said, "We need more gardens like this. Here is too small now because there are so many people, so we need even more spaces like this doesn't have to be in school, but just within society, like this [referencing our talk]."

The examples of improvements from Daanya and Alanare both reference TEK. However, in these cases, the ecological knowledge for maintaining their environment is not founded in specific community practices shared from a community member to a community

member, but is spread as a socially normalized practice through general society, which crosses the boundaries of individual communities due to the metropolitan nature of Forodhani Park.

TEK exists as a connection between power, the *wavuvi* identity, religion, and social behavior. If the *wavuvi* changed their behavior, or some other authority figure adjusted to the ideas and practices with garbage, this would create a new source of TEK and environmental practice. In Pemba, Zanzibar, local Imams are using the Koran as a formal guideline to encourage local fishermen to stop using blast fishing or dragnets to fish. Religion can also play into the construction and dissemination of TEK (Barclay 2007). In this case, Islam is used to spread ecological knowledge; new behavior surrounding garbage disposal can become the social norm, which will expand TEK as well.

Conclusion

TEK refers to a body of knowledge that develops and changes over time, and TEK occurs where locals interact with their environments, not just in Zanzibar. Most importantly, TEK gives voice to locals because it highlights what they consider important and value within their own environment, which, in turn, emphasizes the dynamism that is TEK. As a student of Anthropology, I made the conscious decision throughout my study to focus on populations and topics that may otherwise go unstudied by other students, and I continued this practice when writing this thesis. As knowledge and literature surrounding the effects of human communities on their environment grows, such as the decline of species diversity or the rate of mangrove harvest, so should knowledge about specific cultural understandings of localized environments to ensure that these changes do not go without local community recognition and understanding.

TEK goes beyond 'traditional' because it is not a stagnant process. In Forodhani Park this is shown through a mixture of TEK themes: *wavuvi* and the Zanzibari identity; gender-specific ecological practices; and the incorporation of religion into TEK. Throughout this study, these specific markers pointed to a pattern of changing beliefs, the need for new practices, and the re-creation of social norms that are integrated into TEK. I hope that the study of this topic will continue, and that future researchers will continue to spotlight the most important voices in the changing TEK landscape – the locals.

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