

# **It's not Eco-tourism versus Eco-Industry: The Real Reasons Zanzibar May Never Cultivate Algae-Based Bio-fuel**

**Key words:** Environment, Sustainability, Gender , Resource, Energy, Cash-Crop

The world is seized by finding the next clean source of energy. While algae-based bio-fuel has captured the interest of small entrepreneurs and tech-savvy start-ups, it has also garnered the focused attention of the U.S. National Aviation and Space Agency - NASA, and global investment companies such as Goldman Sachs. Yet, Zanzibari women who have been cultivating algae for almost twenty years, and the Zanzibari government which knows the return on the investment, do not seem interested in cultivating algae-based bio-fuel. Exporting algae to East Asian nations for food stock and to Europe for cosmetic use, the Zanzibari algae program was born of a micro-credit project for unemployed local women. It is one of Zanzibar's success stories where local industry has developed a product worthy of international export. Further, the algae program has the support of a range of international agencies and multilateral governments. More compelling than any of these reasons, however, Zanzibaris may be loath to export a product whose demand could make it a 'cash-crop.' Zanzibar's history own history with clove crop production and Tanzania's recent and unsuccessful attempt to turn jatropha into the next bio-fuel has led Zanzibaris to truly value their small, woman-led eco success story.

## **INTRODUCTION:**

In 2001 Michael Klare published *Resource Wars*, where he argued that due to the 'looming threat of shortages,' and 'contested sources of supply,' a new, more intense scramble for natural commodities would emerge, especially in the developing world (Klare 2001, 18-23 ). This dynamic would define not only politics within these countries, but would also the direction of foreign and national security policy among the world's leading global powers(Klare, 218-21). The struggle over water, petroleum, and mineral rights has not only become a source of growing political tensions, but has, in recent decades, provided the study of global conflict with a new focus for its debate.

While the struggle over the 'ownership' or distribution of natural resources may continue to manifest itself as a dominant trend, especially in the developing world, there is a smaller and more tenuous effort to recover, preserve, or renew natural resources. In some instances, even highly 'developed' and wealthy petroleum producing nations, have reflected on past modes of industrial production and trade, even as they develop alternative source of energy (Fahim, 2010). Anticipating a future where petroleum no longer dominates the energy landscape, various Arabian Gulf nations, including the United Arab Emirates, Kuwait and Qatar, have invested millions in research and development of solar powered systems (MacAlister, 2009).

On a less ambitious scale, the government of East African island of Zanzibar has begun encouraging eco-tourism, including the creation of environmentally friendly lodging, promotion of zero-carbon-impact tourist activities, and the world's first ban on production, import, or sale of plastic bags, (Terradaily, 2006) In a parallel, but sometimes contradictory effort, universities in Zanzibar and Dar-Es-Salaam, in cooperation with international aid agencies, have made an effort to promote environmentally friendly industrial and trade activities that additionally provide employment for local residents.

One activity that has been especially successful is a project that employs locals in farming algae for commercial export as cosmetics. This activity has not escaped controversy, especially in quarters that view tourism as central to Zanzibar's economic growth, and eco-farming as a potential threat to that effort. Resource poor and non-industrialized, the Zanzibari government is cultivating tourism as a man-made resource to generate income, and in recent years has promoted ecotourism, to further conservation of the local environment. Thus in Zanzibar, the struggle over resources, is less overt than in most places. Rather this contest manifests itself as a latent tension between those who believe tourism and trade, specifically ecotourism and eco-trade can coexist, and those that believe one 'resource' must prevail over the other.

Though they have not made the leap, Zanzibar's algae-farming corps are poised to reap even greater rewards if they make the conversion from producing high grade algae for export, to growing a grade suitable for bio-fuel. In mainland Tanzania there was an initial surge of enthusiasm when the Tanzanian government brokered a deal between the Tanzanian government and various local and international bio-fuel companies (Alweny,

2008). In 2007 the *Wall Street Journal* introduced the idea of turning jatropha, a tropical shrub, into bio-fuel had seized the attention of numerous investment companies and that Goldman Sacs noted jatropha as 'one of the best candidates' for biofuel production (Barta, 2007). It seemed as if jatropha might be a miracle plant, costing pennies to harvest, but yielding hundreds of millions.

However, once Tanzanian citizens, and rice farmers in particular, learned that in order to produce jatropha based bio-fuel their government would move them off their land a 'fire-storm' erupted halting plans indefinitely, (Mande, 2009). As of June 2011 the Tanzanian government has still not resolved the problem. Meanwhile, the United Nations Food and Agriculture Organization (FAO) released a report stating that Tanzania, along with Kenya and Peru were at risking national food security at the expense of biofuel (Business Times, 2011). Some of the same concerns surround corn use for ethanol production (Carter and Miller, 2007). However, unlike either corn based ethanol or jatropha based bio-fuel, algae does not compete for land that could be used for food. It only requires coastal water, and producers of algae bio-fuel have even shown that it can be 'grown' in man-made vats (Savage, 2011).

So if algae is not jatropha, why aren't Zanzibari women, the primary algae growers, joining the bio-fuel revolution? Perhaps their reticence is a reflection of the legacy of cash crops in Zanzibar, the perilous new role women bread-winners face in a ever-more conservative society, and finally the knowledge that remaining 'small' independent masters of their own national resource may serve them better than becoming big but dependent on the vagaries of the global market.

Resource distribution is a function of the complexity of historical political dynamics and modern economic realities. East African society, is by definition a multicultural, and thus inherently complex. Zanzibari society is further complicated by a diverse colonial order that included Portuguese, Omani and British control over a now defunct cash-crop clove industry. Current politics is characterized by two important trends. The first is a profound and lasting conflict between the island's two major political parties for control over the organs of the state. While a second, more subtle tension is characterized by the efforts of Islamic political elements seeking a more significant role in a government dominated by a Socialist leaning political party, a party with historic ties to Tanzania's late Julius Nyerere.

As such, understanding Zanzibar's current political program as it concerns ecofriendly resource policy, requires a brief examination of (1) the history of modern African development, as it relates to East African politics, (2) the complementary sometimes conflicting influences of patriarchy and matriarchy on Zanzibari clan culture, (3) the role of modern party politics on the Zanzibari economy, and finally (4) the impact these historical and contemporary influences have on present economic realities, namely the government imperative to simultaneously promote both eco-trade and eco-tourism, in a nation otherwise bereft of 'natural' resource commodities.

## **REVISITING THE HISTORY OF DEVELOPMENT AND THE CASE OF ZANZIBAR**

One of the paradoxes of sub-Saharan Africa is that many of its nations, having never experienced the industrial revolution, and having missed out on the benefits of industrialization, are nonetheless experiencing many of its hardships (Arrighi, 2001-02: 469-76). Entire fields of study, including modernization theory and the strong versus

weak state debate, are among various schools of thought which have attempted to explain this paradox (Sunkel, 1969 and Dos Santos 1971).

Africa seems to be destined to remain largely an agrarian society, while suffering from many of the economic dislocations and political difficulties that define life in technologically-advanced Western nations. Beyond this, a large segment of African populations suffer from a level of communal and individual deprivation that is rarely seen in the North.

In the colonial era, Africa existed primarily as a domain which energized economic development but yet could not act to enrich itself. In the post-colonial era, attempts by East Africans to develop their economies through nationalization and infrastructure schemes have had mixed results.

However, far beyond the threshold of any set of problematic development policies, a variety of complex political cleavages such as fractious tribal or ethnic affiliations, as well as the tendency of many sub-Saharan governments to endure military or authoritarian rule make power-sharing very difficult. This in turn, rendered many African governments unstable. In East Africa, as in other regions of sub-Saharan Africa, certain 'ethnic' or communal populations are favored by the ruling clique. Often groups disfavored by the state are compelled to work in the shadows of power, subsisting in the informal economy.

Aside from ethnicity, another segment of the African population often excluded from access to state wealth and power, is women. There has been a tendency of international aid agencies and local governments to overlook some of the needs of women, particularly working women, when promoting economic planning in East Africa

(Nelson, 1979). Howard Handelman argues that during the years 1975–85 when the United Nations celebrated its 'Decade for Women,' international aid agencies and global South government officials made an effort to rectify past oversights. These agencies developed programs that promoted healthcare and education along with agricultural production that would address the needs of working women and their families, especially where policies of national governments fell short (Handelmann, 2000: 82-84).

In Zanzibar following its 1964 revolution, political leaders of the nation's lone political party, promoted Pan-African Socialism, whose agenda ran counter to many of those promoted by many of the large international financial institutions. In recent years, conservative political movements have emerged shunning both socialism and 'foreign' intervention. Many of these elements have, in recent years supported the establishment of Sharia law, which among other stipulations, encourages women to dress and behave modestly. As is the case throughout North and Northeastern Africa, in Zanzibar this conservatism encourages women to lead sheltered lives, getting married at an early age, often foregoing professional pursuits (UNHCR 2004, Mernissi 1992, Caplan 1995). Meanwhile other political norms—liberal and perhaps more ancient—continue to subtly promote women's participation in the governance and in the economy without restriction to occupation or status. So in Zanzibar, as elsewhere in Afro-Arab nations, scholars find that in many African societies maternal ancestry, an matri-focal enterprise, continues to inform national identity—and is at least as important as patriarchal lineage in determining social and political relations.

A review of literature in the field of African Women's studies reveals that post-colonial society is a complex mix of matriarchic and patriarchic political arrangements,

some of which existed before colonialism and others which reflect new and continually evolving patterns of modern social relations. Many of Africa's post-colonial governments are patriarchic thereby promote male leadership and 'conservative' social ideals, even as they tolerate the influence of more 'liberal' matriarchal political norms (Amadiume, 1997). Beginning in the 1960s onwards, scholars of African society began a tentative study of social constructions in modern African life. In 1961 D. Schneider and K. Gough published *Matrilineal Kinship* where they revealed important information about the existence of matrilineal forms of social organization in Africa. Subsequent studies, including Alice Schlegel's *Male Dominance and Female Autonomy* and Rosaldo and Pamphere's *Women, Culture and Society*, have also contributed to a fuller picture of African family life.

These innovative studies were not exhaustive by the late 1980s, a group of scholars, most notably Cheik Anta Diop and Iffi Amadiume, made the case that much of what had been written about African matrilineal arrangements treated the topic as an interesting, if not superfluous legacy of antiquity; a phenomenon which did little to explain public power-sharing, or predict unique economic trends such as female sea-weed farmers in nations that have a strain of conservative Islamic leadership in well-appointed positions, (Diop 1989 and Amadiume 1997).

In nations with a dual heritage such as Zanzibar, where the two dominant groups, the Swahili and Shirazi trace both patrilineal and matrilineal descent, women have been able to maintain influence over the informal sectors of the economy. Among the Shirazi there is a sub-group known as the Hadimu, who live on the southeast coast of Zanzibar island. The Hadimu identify themselves through a kinship group called the *ukoo*. An



*ukoo* consists of all the male and female descendants of a common great grandfather, and is a social arrangement adopted and now common to most Zanzibaris, whether they call themselves Shirazi or Swahili,(Middleton, 1992).

Agricultural work within the *ukoo* differed between genders: men would plant the palm trees and women would harvest and shuck the coconuts. The entire *ukoo* would thrive from the local sale and export of coconuts and coconut products. However, the entire *ukoo* suffered when tourism increased in the early 1990s, and hotels began to purchase coastal land from the government, forcing the Hadimu to remove their trees,(Wallevik and Jiddawi 1999, 535-50). When the tourist industry looked as if it might provide a means of income, the men of the *ukoo* reverted to fishing, which in Zanzibar is a squarely male occupation. Men provided local catch for the hotels, while the women of the *ukoo* thought they might engage in crafts and services around the tourism industry.

The occupations reserved for women who work in hotels as domestics, and as this work is gendered, it was usually not as well-paid as 'family bread-winner' occupations. Along with domestic household work, Zanzibari women also work as cooks or nannies(Sharpe, 1984). Occasionally, craft work, which intrigues tourists, is time-consuming and while it might produce supplemental money, it often does not generate enough income to support a family. If as in past years, the tourists stop visiting the island because of political violence, that revenue stream may completely disappear. In fact, women in Zanzibar find that employment in the tourism industry is often proscribed by village *sheha* or chieftain. Zanzibari chieftains, express a general unease with the fact that

Zanzibari women, working in hotels as hostesses, waitresses, or as other staff, will be exposed to the 'permissive' dress and behavior of western tourists, (Harrison 1992).

Thus, Zanzibari women, like many women in contemporary northeastern Africa and the Middle East, find themselves between the 'rock' of political conservatism and the 'hard place' of economic deprivation. In Zanzibar, as elsewhere, Islamic conservatism often develops below the state level and bubbles up, whereas development of the economy is largely the purview of state authority. If certain sectors of the population are lucky, state wealth may reach the most needy.

The 'state' in several East African nations is often unable to provide for the employment or welfare of all its citizens, and as mentioned before, women often rely on creating employment for themselves in the informal sector. In the era of colonialism, women's work was often unpaid and in many cases, undocumented. This was especially true in the years before decline of the clove plantation, and the establishment of a modern state in Zanzibar. In modern era, where international aid is tied to a nation's commitment to women's development, women's work, whether income-generating or not, is more carefully documented.

## **A BRIEF HISTORY OF ZANZIBAR AND ZANZIBARI POLITICS**

Invaded by the Portuguese in the 17<sup>th</sup> century, ruled by Oman in the 18<sup>th</sup> and 19<sup>th</sup> centuries, and absorbed by the British crown as a protectorate in late 19<sup>th</sup> century, Zanzibar did not gain colonial independence until 1964. Zanzibar's 1964 revolution was the culmination of various factors, but the most immediate catalyst was the unwillingness of the colonial government to accede to Swahili demands regarding greater political and economic participation in matters of the state. The British protectorate, established in

1890 promoted Omani sultans and its 'Arab' clients, as official rulers of the economic and political organs of the state. This arrangement allowed the British government to convert Zanzibar's Bantu, Shirazi and Swahili subsistence farming land into sprawling, 'Arab'-controlled clove plantations, where 'non-Arabs' worked as share-croppers on land they previously owned,(Debusman and Arnold, 1996).

This share-cropping system, considered to be bitterly unfair by a large section of Zanzibari society created a very profitable cash crop, and even more lucrative tax scheme for the British colonial government which was the direct beneficiary. In the 1950s, the political landscape began to change when working class Swahili and Bantu leaders began to articulate their political demands by establishing the Afro-Shirazi Party (ASP). The British government continued to support the elite Arab Zanzibar Nationalist Party (ZNP), even when the ZN P, and the Z PPP, a sister dubbed the Zanzibar and Pemba People's Party created a coalition to deny ASP majority seats in parliament in the 1959 and 1961 elections. As a result of these recent disappointments, as well as other long term political frustrations, the ASP led a two day revolution in January of 1964.

In the years after revolution, the market for Zanzibari cloves all but evaporated, as clove producers from Southeast Asia were able to provide a larger supply of high quality cloves at a more competitive price, (Sanders, 2005). Meanwhile, the Swahili government created a program of land redistribution so that Zanzibaris could return to subsistence farming. Whenever possible, enterprising Zanzibaris tried to augment their incomes by developing small products for local sale or export. Thus the changes in the Zanzibari economy have in some ways made a complete circle. In the 18<sup>th</sup> century Zanzibaris were engaged in subsistence work, farming and fishing. In the meantime, a few intrepid sea-

farers of varied foreign backgrounds, found Zanzibar an interesting tourist harbor, where they stopped on the way to other far-flung locations. In the early 20<sup>th</sup> Zanzibar became a plantation economy. While in the years after the decline of the clove economy, Zanzibaris returned to subsistence farming and fishing, even as they tried to expand opportunity through tourism and trade.

After a decade of negligible tourist trade, tourists began to return to Zanzibar beginning in the late 1970s and early 1980s. However the tranquil conditions that made Zanzibar a tourist haven were short-lived. Just as it looked like tourism might be the island's primary source of income generation, Zanzibar's highly fractionalized political system, beset with cleavages, became even more unstable, and erupted into violence by the early 1990s (Hughes, 2003). The sporadic violence of the early 1990s was a significant reversal of fortune, as tourism to the largest of the islands, Unguja, grew almost twenty percent between the years 1982 and 1992 (Madeweya, 1994). By the mid to late 1990s, during a period of relative calm, the national government decided the time was ripe to establish a specific program focused on developing tourism. The government encouraged local and international businessmen to establish a variety of hotels and advertised Zanzibar as a quiet, tropical island ideally suited for those wishing to visit the Indian Ocean on a budget.

Small crafts artisans developed mementos for sale, and a few tourists came, but as soon as latent political difficulties manifested themselves, Zanzibar's tourism industry suffered. For several days after elections in November 2005, the Civic United Front (CUF), an opposition party to that of re-elected President Karume's Chama Cha Mapinduzi, marched in the streets. The CUF crowd met at one of the most historic

regions of Zanzibar called 'stone town,' a city built in the late medieval era. Despite the rarified setting, the rally turned nasty when government forces met the crowd with rubber bullets, and tear gas. Ultimately several CUF supporters were injured and five were killed,(Planz 2005). In addition to clashes between partisans between the CUF and the CCM over electoral political, another concern emerged at the rally. The appearance of Islamic 'militants' at the stone town and other political events led the governments of Britain, Canada, and the United States that Al-Qaeda might pose a threat to Zanzibar, and to tourist security in particular,(CNN 2005). Thus, tourist travel brisk in some years was practically non-existent in others. Ultimately, a group of Zanzibari women, concerned that political tensions would continue to disrupt tourism, sought a source of income independent of government sponsorship and resistant to political turmoil.

## **THE ALGAE FARMING PROJECT**

Professor Kosi Mshigeni of the University of Dar-es-Salaam (USDM) began two seaweed pilot projects in 1984, one called Fundo on Pemba island and the other called Fumba on Unguja, Zanzibar, island,(U N EP/FAO 2008). Research toward commercial, albeit environmentally responsible, production of seaweed began two years later. Four years after that, in 1990, two private firms, the Zanea Seaweed Company and the Zanzibar Agro-Seaweed Company (Zanzcol) began commercial farming of seaweed, an industry where women would become the primary farmers and dominated the production of commercial algae for export.

In 1992, the government of Zanzibar recognized that urban expansion, the growth of commercial fisheries, and a surge in tourism led to an increase in the navigation of coral reefs, accompanied by a perceptible increase in waste disposed off of Zanzibar's

coastal waters. If commercial seaweed farming was going to be a viable economic enterprise, it would have to find a space among two competing industries: commercial fisheries and an emerging tourist industry promoted by the government.

### **THE ZANZIBAR GOVERNMENT TAKES THE LEAD**

Commercial fishing has always been one of the industries in Zanzibar that was fairly self-sustaining. Before, during, and after the revolution, especially in years of declining commercial agriculture, commercial fishing was an area of growth. However, indigenous fishing techniques and over-fishing have caused damage to Zanzibar's coral reefs and have led to low fish production and reproduction (Crawford and Shalli, 2010).

In an effort to address this problem, the Zanzibari government established a fishery policy that included the creation of four conservation<sup>3</sup> parks.<sup>4</sup> The conservation parks were the government's initial and tenuous foray into the realm of natural resource management and community based conservation. The development model used for Zanzibar's parks was designed by the governments of Tanzania, Zanzibar, and various international aid agencies (Levine 2007).

The creation of conservation parks reduced some of the fishing area for local fishermen, and argued that the international agencies co-sponsoring the parks. This was especially true in the Fumba village, where the Zanzibari government and international agencies ignored an existing and indigenous system of protecting the dwindling coral reefs, and the environment more broadly. The government imposed a bureaucratic top-down program which was neither accepted by locals nor successful in its task of reducing illegal fishing (Levine, 2007).

As park conservation controversy began to brew, the Zanzibari government, specifically Mr. M. Nassor, Director of the Fisheries Department, as well as Mr. Abdulrahman Issa and Asha Khatib of the Department of the Ministry, among others, took the lead in an initiative supporting environmentally friendly seaweed farming industry (UNEP/FAO 1996). A variety of multilateral and international organizations, including various agencies of the United Nations, as well as the Zanzibari government have provided grants to seaweed farmers to induce them to pursue seaweed farming, rather than stripping coral reefs or cutting Mangrove trees for wood. While communities near the four conservation parks, and fishermen continue to complain that they were left out of discussions regarding the creation of the parks, authorities establishing seaweed farms chose to include affected parties in their decision-making, most notably, Zanzibari women, (Levine 2007).

Seaweed farming is unique because in addition to being an environmentally responsible trade, or eco-trade, it is an economic activity where, by some estimates, ninety per cent of its participants are women, (Msuya 1999). It is exceptional because, in the highly gendered world of female seaweed farming and male commercial fishing, women earn in two months what it takes men to earn in six months or more, (Ngowi 2005 and Soekawa 2010). Seaweed farming has 'stimulated the demand for other goods and services' and women who are particularly successful hire additional help, join 'saving' or micro-credit clubs, and send more of their children to school, (UNEP/FAO 2000).

The economic clout of women in seaweed farming has given them a voice in government policy. As of 2000, Zanzibar's Department of Environment has made women's access to coastal waters for seaweed farming on par with men's access to bays

for commercial fishing (UNEP/FAO 2000). The government has also focused on creating a water tenure system to make ownership of seaweed plots legal and has negotiated on behalf of women seeking a fair price with seaweed companies for their harvest. At the urging of an increasing population of seaweed farmers, the government has even considered ensuring the tourist industry—the island's largest source of national income, does not negatively impact Zanzibar's sea-weed farms, (Levine 2007).

Since the growth of the seaweed industry, seaweed farmers have emerged as a well-defined, articulate and powerful interest group. This stands in stark contrast with the relative decline of commercial fishers. As a result, local perceptions of what type of tourism, and environmentally friendly tourism have changed. When the government decided to create an agenda for eco-tourism with conservation tours including the water parks and the world heritage stone city site, it decided to promote small guesthouses, which occupy less ocean front property than large hotels.

Seaweed farmers were a natural ally. Even as the government turns toward environmentally friendly policies where tourism is concerned, in many cases the government is still beholden to the more traditional players in the tourism industry and must bow to large hotel chains wishing to develop beaches. Unfortunately these are the very landscapes where seaweed farms are already in operation. In many instances the government has insisted these hotels compensate sea-weed farmers when asking them to relocate. Meanwhile, large hotels, sea-weed farmers and commercial fishermen compete for contested space at the shore, where docking space is limited.

Space on the tiny island of Zanzibar is limited and space on its shores is highly contested. As yet, the eco-tourism in Zanzibar is a work in progress and certainly not as



well-articulated as programs in neighboring countries. However, wherever there is a question of environmental protection or rehabilitation, Zanzibari women seem to be a central force working as agents of change. Before sea-weed farming was a significant factor in women's employment, The Zanzibar Women's Corporation (ZAWCO), created in 1992 was helping villages solve environmental and economic problems. ZAWCO has enjoyed over 15 years of success, creating clean water and latrine systems to address the government's difficulty containing raw sewage, (Zawco, 2010).

In September 2006, various environmental groups and a number of concerned women seaweed farmers, as well as members of ZAWCO, urged Zanzibar's parliament to implement a ban on plastic bags. The Zanzibari government long concerned about rampant pollution of fresh water by human waste, as well as pollution of the coastal sea waters, had not implemented many formal policies concerning clean water. Meanwhile, plastic bags had become a real threat to marine life, to the health of coral reefs, and to algae farming, (Bright, 2000). In response to consistent pressure throughout the fall of 2006, the Zanzibari government implemented a ban a mere two months after women brought attention to the issue. Zanzibar was the first nation to impose such a ban and in subsequent months and years, was joined by other countries.

### **CONSERVATION, TOURISM, AND ECONOMIC EMPOWERMENT: A CONVERGENCE?**

East Africa is haven to a variety of tourists from a range of socio-economic backgrounds. In recent years, there has been an increase in the number of tourists who consider themselves environmental conservationists and seek a vacation that will reflect these interests and concerns. Thus far, Kenya and Uganda are the leading countries in the

region sponsoring well-articulated efforts to promote environmentally sensitive tourism, or eco-tourism.

In Maasai Mara, the Rift Valley home of the Maasai tribe, activities for tourists include nature walks, bush dinners, and game drives, which all involve observation of animals and nature without disrupting the environment. Furnishings in lodges are made of indigenous material, made by indigenous craft artists, many of whom are women. The material used includes deadwood and renewable products that are easily dismantled and which are fully degradable. Solar energy is used extensively for lighting and cooking, and camp officials recycle guest water to feed vegetation, composting of garbage, and planting of trees,(Ecotourism Kenya, 2010).

In Uganda, eco-tourism is promoted as the primary, perhaps only, means of visiting national parks. Eco-tourists are given a range of activities including mountain biking, bird and butterfly watching, visits to national forests and exposure to environmental education and research centers. As with the Maasai Mara of Kenya, crafts are provided by local women, who make their goods from local renewable resources. Eco-tourists visiting Uganda's park system are encouraged to reduce their carbon foot-print, by bringing a tent and providing their own food.

In Zanzibar, where eco-tourism is not as well-articulated as in Uganda or Kenya, the government only recently began providing visitors with environmentally-friendly food, lodging, and entertainment as alternatives to more conventional forms of tourism. Conventional hotels are still the dominant feature of the local tourist industry and, as of 2009, Zanzibar's state-sponsored program for eco-tourism is less than 10 years old, and thus relatively young endeavor. Whether the government is able to convince local hotels

and tourist industries to move to environmentally sensitive strategies either through tax or other monetary incentives may depend on the ability of the Department of Environment to make eco-tourism attractive to women seaweed farmers, commercial fishermen and to local hotel developers.

Since the time of the revolution in 1964, the government of Zanzibar has shown a willingness to protect the land-use rights of its citizens, while neglecting, until recently, similar attention to legislation regarding water use. It may be up to the women seaweed farmers to influence the government to draft a legal framework that addresses not only water park conservation and commercial fishing, but also to formulate policy that promotes water sharing, access to beaches, while addressing the interests of sea farmers. It seems certain that if Zanzibari eco-tourism really 'took-off,' then using coastal waters to expand algae cultivation from cosmetic grade export to the quantities required for biofuel would pose a challenge. Given the uncertainties of Zanzibar's tourist industry, and the international support for algae farming, it seems in the end, Zanzibari sea-weed farmers may enjoy prolonged job security.

#### **EXPANDING OR REFINING SEAW EED PRO DU CTIO N**

Seaweed farming is one of the industries identified by the United Nations University as deserving a 'zero emission' designation, (Mshignei 2010). Once an industry receives a rating of 'zero emissions,' it becomes an attractive prospect for international investment including international partnerships with private firms, multinational corporations, and public-private development projects. The U.S. Department of Energy is in the process of assisting both India and Argentina in developing clean energy technologies; meanwhile the government of Japan, a producer,

exporter, and importer of seaweed and seaweed products, has sponsored a UN forum promoting 'new energy' and 'zero emission' global development (Zero Emission Forum, 2010). As such, efforts by women to involve their families in extended farming projects have been and should continue to be encouraged by the government of Zanzibar. Recently, there have been efforts led by Dr. Flower Msuya, facilitator of the Seaweed Cluster initiative, to develop a line of seaweed products such as soap and toiletries. Sold to local and regional tourists, these products may raise more money than selling bulk raw seaweed to export companies (Msuya, 2010).

If the movement to use seaweed as a bio-fuel gains prominence, the sea-farming women in Zanzibar may have found a lasting source of sustainable income. Algae grow faster and yields more energy than corn or soybeans (Walton, 2009). As previously mentioned, seaweed farming is a nearly zero emission industry, and by some estimates as much as ninety per cent of algae weight is captured carbon dioxide (Walton, 2009). It is a clean, cheap, and abundant form of bio-fuel. If Zanzibari scientists, specifically Professors Kosi Mshigeni, who was the ACO founder of the seaweed farming project, and Dr. Flower Msuya, who now works directly with the current generation of farmers, are able to develop their own brand of production, the rewards of algae farms could truly improve the lives of all its citizens.

Is Algae farming going to enjoy the acclaim of Wangari Maathai's tree planting or the Grameen banking system? In other words, will algae farming enjoy international recognition as a 'best practice' worthy of replication? Only time will tell, but algae farming appears to have all the markings of a developing world best practice. As of 2008, several U.S. companies applied for patents to produce algae-to-oil bio-fuels. In July

2009, U.S. Exxon Mobile Corporation announced a \$300 million partnership with California-based algae- bio-fuel producer, Synthetic Genomics Inc. and, in 2008, venture capitalists in Miami invested \$176 million in algae-oil production in Miami, Florida.<sup>61</sup> So far, Zanzibar's seaweed farmers economic negotiations with its government are limited to securing an arrangement with local guesthouses as an environmentally-friendly alternative to luxury hotels, while sharing the beaches with local fishermen and tourists.

Meanwhile, the effort to promote sea-weed farming, while accommodating tourists, as well as the efforts of ZADCO to clean Zanzibar's waterways, and the combined efforts of ZADCO and seaweed farmers to ban plastic bags indicates that women are at the center of an emerging trend in Zanzibar—the effort to promote environmentally responsible, eco-tourism and eco-trade. Zanzibar's government expects to have an eco-tourism plan in place within the next 5 to 10 years. It will be interesting to see if Zanzibari women, who are now the center of Zanzibar's nascent eco-friendly policies with regard to eco-trade, will continue to influence decision making should the government turn its full attention to eco-tourism, or even further, decides to develop algae as a bio-fuel industry.

#### **CONCLUSION:**

In recent history, Zanzibar produced and exported cloves, a cash-crop, as the mainstay of the national economy. Today, Zanzibar's government, emulating other luxurious Indian Ocean destinations, hopes to develop eco-tourism as a source of national income. Owing to continued political tensions, Zanzibari eco-trade in seaweed may be a more reliable and lucrative venture than focusing exclusively on eco-tourism. Further, the success of seaweed export in garnering international attention and support is due to its ability to promote fair trade, women's participation, and ecological conservation. Should revenue generation ever lead the Zanzibari government to turn toward producing seaweed bio-fuel, the island nation may develop a secure and permanent source of income. However successful, such a venture may negatively impact women, and as a result it seems that mainland countries will continue, for now to spin algae into fuel. Bio-fuel production is a new source of petroleum and is therefore 'big business.' Turning seaweed farming into bio-fuel production may convert a successful micro-credit project into a large and

unwieldy cash-crop scheme. Ultimately Zanzibar's colonial history casts a long shadow over its past and current economic policy. Where anything resembling a 'cash crop' is concerned the government and the citizenry approach with caution. Ultimately Zanzibaris may stay true to themselves. Their small island market may remain a 'small' producer of algae and leave the bio-fuel production to others.

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