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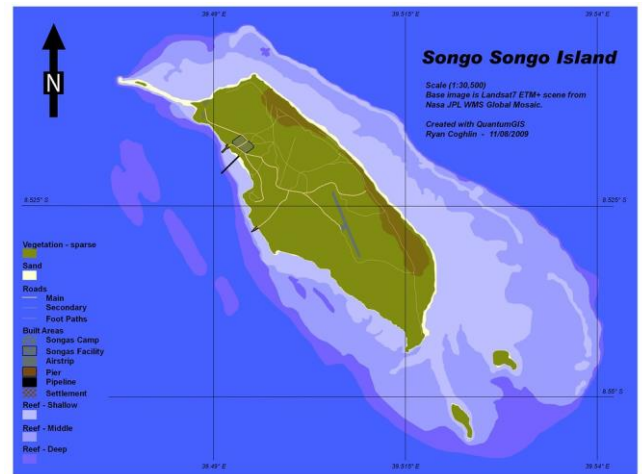
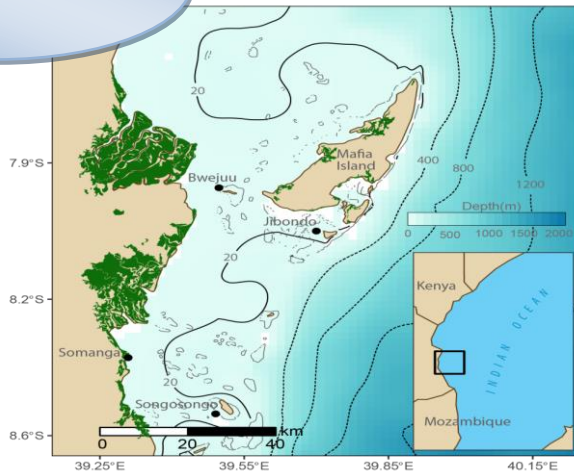
Outcome Story - January-March 2021

The Ice Making Machines – a multi-solutions plant in Songosongo Island!



Songosongo Island, Kilwa district, Lindi, Tanzania

Songosongo Profile



The Songo Songo Archipelago is a remote grouping of small islands off the coast of South East Tanzania located at 8° 34' 18.11" S – 39° 34' 2.27" E to the southwest of the Mafia Islands. It is made up of a collection of five tinier islands surrounded by reefs, namely Fanjove, Nyuni, Ukuza, Dabalijuu and Kiliwani. The Songo Songo Island is located about 24 km from the Tanzanian mainland and 225km South of the commercial capital, Dar es Salaam with 6,608 inhabitants; 3,789 women and 2,819 men.

The Songo Songo Archipelago is ecologically critical and hotspot for wildlife creatures. Bird life is prolific on the islands. From November to March, the island

is the destination of thousands of migratory birds that rest and feed on the island. Sand beaches and palm tree are haven for marine bird species like grey heron ardea cinereal, cattle egret gazette, pied crow corves Albus and many more. Green turtles and some hawksbills visit to nest on the remote, secluded beaches here where they lay their eggs in season.



The ocean teems with brightly coloured fish, butterfly fish, angelfish, damselfish and alike. Sightings in this rich marine world may include grey or black-tip reef sharks, hundreds of dolphins roam the seas and humpback whales pass through on their migrations. An impressive population of corals thrives in the waters. Around Fanjove Islet, intact coral reef stretches for 11km, enabling views of stunning marine landscapes such as underwater pinnacles and gardens of cabbage coral while. The outer islands and reefs extend as much as 29 km offshore in places.

Besides hesitating to introduce BMU in Songosongo in 2013 following WWF awareness and sensitization interventions, the Songo Songo community requested its establishment and executed in 2017 by support of WWF. The BMU became the change agent in conservation towards solutions of other problems. The introduction of Village Community Banks (VICOBA) in 2006 also brought changes in household income.

The fall of blast fishing that ended drastically in 2018 along the Tanzanian coast as a result of joint work of WWF and other stakeholders including the government and introduction of temporary reef closures for octopus fishery resulted into ecological integrity and increase in fisheries productivity in terms of catch and size. Shortage of ice in the island remained to be a prolonged problem leading to poor sea food handling, affecting market of the products and leading to post-harvest losses.



Harvest	Octopus Catch (Kg)	Post-Harvest Loss (Kg)	% Loss
1st Harvest	9,820	3,286	33.5
2nd Harvest	19,935	2,500	12.5
3rd Harvest	14,786	1,356	9.2
4th Harvest	37,599	5,300	14.1
Total Harvest and Average Loss	82,140	12,442	17.3

The baseline report revealed that a few freezers' owners about 70 in the island could not supply enough ice for the catch in Songo Songo, moreover, not all freezers are used for ice making meanwhile the power cut to the residential area has been common taking several days to supply power again. Travelling to the mainland like Kivinje and Somanga about 24 km to look for ice has been expensive and when the ice arrived in the island had already reduced the quality to sustain longer when applied on the catch. Drying the octopus on sun heat was the last solution to try preserving the octopus catch reducing post-harvest loss; however the price of the dried octopus dropped to 50% compared to fresh catch.

Interventions

The ICE MAKING PLANT has been supported by Kigali Cooling Efficiency Project funded by ClimateWorks Foundation through WWF UK. The project is implemented as a pilot at Songosongo Island in Kilwa district aiming at contributing to strengthening sustainable fisheries management and seafood production, access to clean and efficient cooling systems in Tanzania contributing to social impacts on improving the livelihoods of artisanal coastal communities; conservation impacts on preserving fish stocks, restoring marine habitats and lowering greenhouse gases (GHG) emissions associated with cooling.





The installed cooling hub is composed of 4 sets of cooling machine bringing a lot of solutions as per analyzed problems. The machines use a clean, environmentally friend refrigerant namely R290. This is Propane refrigeration that has been used successfully in industrial refrigeration, and is emerging as an increasingly viable alternative for homes and businesses. Propane's operating pressures and temperatures are well suited for use in air conditioning equipment, with a purity of at least 98.5%, moisture content below 10ppm (by weight), a global warming potential (GWP) of 3 and an ozone depletion potential (ODP) of 0. The Environmental Protection Agency (EPA) has listed R-290 as an acceptable refrigerant substitute under its Significant New Alternatives Policy (SNAP), and recently exempted it from the venting prohibition in Section 608 of the Clean Air Act.

One machine has a capacity of producing 350kgs/24hr of ice flakes equivalent to 1,400 kgs (1.4tons) for all the 4 machines from 350lts of water at 15-30°C temperature, though below 20°C is recommended for maximum efficiency. For such output, the machines consume 38.4KWh of power per day equivalent to TShs 13,670.40.

Apart from installation of the ice making machine, other interventions are awareness and sensitization on octopus temporary closures and various capacity building activities for Songo Songo BMU and VICOBA such as training on CHOMOKA Digital platform for operations and data management as well as engaging the community on various studies such as Octopus Value Chain Analysis, Fisheries Improvement Projects (FIP), Knowledge, Attitude and Practice (KAP) Survey, Household Economics Survey (HHSE), assessment of temporary closures on Endangered, Threatened and Protected (ETP) species. The results of the studies are shared back



to the community as feedback. For example, the FIP research has paved a way to development of Octopus Fishery Guideline. Moreover, Songo Songo has become a hub for study visits on community based octopus fishery management hosting various people from other districts like Kigamboni, Mtwara, Mafia and Kibiti as well as neighboring country Kenya

for learning.

In order to sustain the cooling hub operations, about 16 (12 men, 4 women) participants were trained for daily hub management including operations and data collection.

Outcomes

The regular temporary reef closures for octopus fishery have resulted into huge catches some of them have become history for WIO region. When Songo Songo closed temporarily the Minandi and Pwela reefs around Fanjove Islet for the 4th time, the catch was 37 tons in 3 days. It is a recordable catch with bigger sizes of octopus in weights and hence economic value.

Octopus Catch in Songosongo During Opening of Temporary Closure Scheme								
# of cycles since 2018	Total Weight (Kg)						Value Estimates (TShs)	Closed reefs
	1 st Cycle 20.02.2018	2nd Cycle 11.08.2018	3 rd Cycle 23.03.2019	4 th Cycle 29.09.2019	5 th Cycle 07.08.2020	Cumulative		
5	10,821	19,272	14,786	37,599	9,206	91,684	458,420,000	Fanjovi Islet (Minandi & Pwela reefs)



The community has a plan to close temporarily more reefs when they will get one more boat for patrol on the closed reefs as there are other 25 reefs.

These octopus fishery management activities have promoted gender mainstreaming and inclusion during catch and managing the ice making hub where women engage fully in operations and decision making processes.

Fishers and tourist who always dive and do snorkeling witness the habitat restoration in terms of corals and marine biodiversity. Community income increased at household level as a substantial fringe benefit.



"When the date of opening the reef is announced in the village, there is always excitement. Men and women go to collect octopus on the reefs. About 1,500 people participate during the event, where you have to register before. Many people especially women plan in advance on the use of

money that will be as a result of selling the catch. Some plan to purchase corrugated iron sheets, some increase capital in small business or use as a start-up capital for a new business. Meanwhile, some women take loan from VICOBA ready to buy the catch and sell to the agent of the octopus industry". Said Mwadawa who owns a small restaurant in the village.

Existence of BMU at Songo Songo as a change agent in conservation has interested private and government sector agencies (Fanjove-Selous Safari Company and TPDC) who have demonstrated partnership in joining hands to support the conservation work at Songo Songo Island. Three percent (3%) of the income from Fanjove is donated to the local community for social development projects. This is in terms of provision of fuel for boat at TZS 500,000 monthly. A boat and engine was also provided for patrol around Fanjove Island. Already there are visitors planning to establish octopus processing industry at the Island.



On 25th March 2021 a total of fifteen (15) fish collectors and middlemen, fish traders and processors bought 655kgs of ice flakes produced and sold for TZS 131,000 (USD 59.54).

"I have bought 40 Kgs of ice flakes as I do collect fish from various local buyers here in the island. This is good news for people in Songo Songo. The quality of the ice flakes is good and affordable" – Juma Mashuhuri, a local fish trader and collector from Songo Songo Village.

Evidence

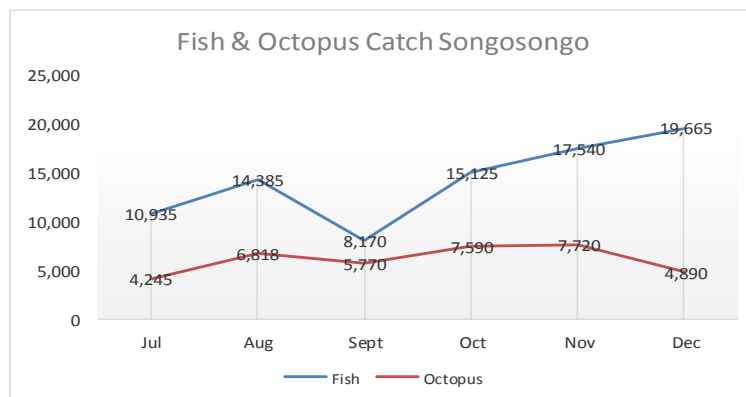
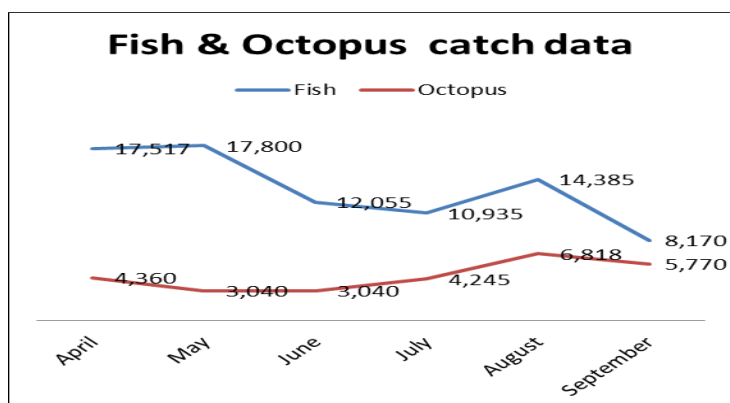
Various evidences demonstrate a difference following various interventions. Community attitude on valuing conservation has increased. Everybody is concerned on patrolling the temporary closed reefs as they know the benefit already that impacts everyone in the village in one way or another.

Through observation and feedback following diving and snorkeling at Fanjovi shows the reefs are intact with corals and has been one of the interesting things that tourist want to enjoy at the foreign investor's premises. Sightings in this rich marine world may include grey or black-tip reef shark, whales and turtles. Intact coral reef stretches for 11km around Fanjove, enabling views of stunning marine landscapes such as underwater pinnacles and gardens of cabbage coral. Snorkeling can be from the shore or by boat and diving is from a boat.

Various research reports including Octopus Value Chain Analysis, Octopus Fisheries Improvement Projects (FIP), Knowledge, Attitude and Practice (KAP) Survey, Household Economics Survey (HHSE), assessment of temporary closures on Endangered, Threatened and Protected (ETP) species and Baseline Survey have demonstrated various changes.

Regular records of catch data illustrate increased catch for both octopus and fish soon after opening the reefs. This demonstrates increased integrity of the reefs.

Fig. 1: Fish & Octopus catch April-Dec 2020 for non-closed reefs (Source: Kilwa District)



Before octopus reef fishery opening in August 2020, the charts show there was increasing catch in the closed months June, July up to August. When the reefs are closed they act as breeding sites for neighboring reefs that are not closed hence demonstrating spawning effect. After opening the reef, there was a drop in catch towards September 2020 until the community closed again in September 2020.



Dolphin is amongst the indicator species for friendly habitat integrity as they are moved by disturbed habitats. Presence of dolphins around the island demonstrates such coral reefs integrity. Different dolphin species frequent the waters around Fanjove flocking around boats, and actually it is one of the tourist attractions. Spinner Dolphins and Bottlenose Dolphins are regularly spotted.

The catch [record](#) in the WIO region from a single reef (37 tons within 3 days collection) remain to be the evidence as it has never happened before in the region.

Lesson Learned

Behaviour change is a long term process however; when successful its impact is huge with sustainability potential. Program interventions related to behavior change require perseverance, long-term investment and regular engagement with the target groups. Besides awareness and sensitization, Songo Songo community rejected establishment of the BMU in 2014. Some continuous learning visits supported by WWF to some community members changed the attitude and requested support of establishment of BMU in 2017. Following various benefits in conservation work through BMU as a change agent, today the community is thinking on establishing one more BMU in the village.

Ways Forward & Next Quarter Stories

Business Model: A draft business model has been developed, which will provide guidance on how the Songosongo Cooling Hub is organized, how the revenue will be generated, how it will be used, re-investment and project pay-back period. The only services the community will benefit will be ice and cooling services. The revenue generated is for the business rather than charity because the hub has to pay for the machine operators, sales personnel, repairs, maintenance, replacement of obsolete parts or equipment and re-investment.

The cooling hub will generate revenue from sale of ice and other services related to cooling e.g. hiring ice bins and buckets. The primary income will come from selling ice flakes. The current estimate at full capacity of ice production is 1,400 kgs of ice per 24hours. The current selling price is TZS 1,000 per bucket of 10kgs. There are 140 buckets of ice in 24hours with a value of TZS 140,000 (USD 66.60) per day. Although the cooling hub will receive free power, it will open 2 bank accounts, 1st for operations, to meet current expenditures: mainly wages to operators of the cooling hub. The 2nd will be fixed deposits (specific agreed period) to meet future expenditure including; major repairs, replacement and re-investment. No money from the hub will be used for charities in the village, except the expenditure relate to promotion of good practices in fish handling. The business model (in final stage) gives more details.

Continuous monitoring during hub operations: Lessons from other landing sites and from FETA and other fisheries related agencies will be done to ensure adaptive practices and appropriate measures are embraced by Songosongo community members.

Fundraising: Fundraising to support installment of cold room for preservation and storing ice flakes for maximizing capacity of the machines and considering supporting with one more boat so that Songo Songo community will manage to patrol their increased closed reefs. Also, fundraising will be done to support escalation of the successful piloted project in other areas like Mafia.

 *Next quarter story will be on Whaleshark Conservation in Mafia Island.....>*
