


THE PROJECT REPORT PROPOSES SOME
POSSIBLE INNOVATIONS TO ADDRESS
LIVELIHOOD CHALLENGES IN
MAYUWKWAYUKWA REFUGEE AND
RESETTLEMENT SITE, WESTERN PROVINCE,
ZAMBIA. THIS REPORT IS BASED UPON
EXISTING DOCUMENTS PRODUCED BY UNDP
AND UNHCR, PEER-REVIEWED PUBLISHED
RESEARCH, AND FIELD DATA COLLECTED
DURING JUNE 2019 WITH THE SUPPORT AND
PERMISSION OF THE DEPARTMENT OF
RESETTLEMENT, ZAMBIA AND UNDP.



BACKGROUND

Land degradation, a result of climate change, and the associated food insecurity remain pressing challenges for the community of Mayukwayukwa. Better land management is a key priority. Appropriately modified models of agroforestry and aquaculture practice co-created in partnership with locals, and that draw upon indigenous and local knowledge could provide a blueprint for sustainable adaptation to the particular ecological and socio-economic conditions of Mayukwayukwa.



FOOD DIVERSITY AND SUPPLY

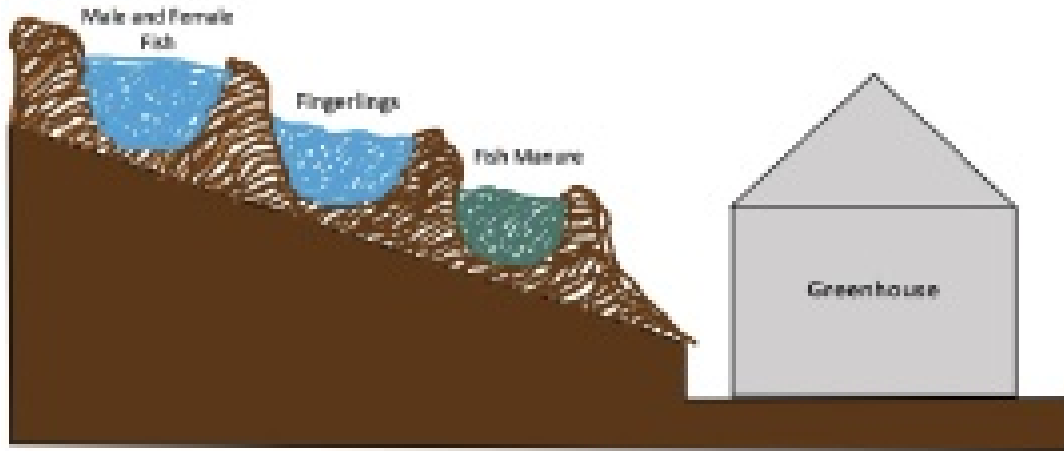
- The supply of fresh fruit and vegetables is inconsistent and the diversity of produce is limited.
 - **market linkages** to and from Mayukwayukwa are poor due to the relative isolation of the settlement
 - lack of a consistent **supply of electricity**.
 - Lack of electricity reduces capacity to store food effectively
 - In the past, the supermarket chain Shoprite had a contract with Mayukwayukwa to supply fresh fruit and vegetables, however the inconsistency of supply and the lack of effective bulking of produce meant the contract was cancelled.
 - Currently there are two greenhouses and approximately 11 fish-ponds.
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FOOD DIVERSITY AND SUPPLY

- Farmers form collectives to gain access to seed and fertiliser
 - This requires the continual purchase of seeds and other external inputs.
 - Farmers want to improve and diversify their crops in order to strengthen subsistence and commercial farming and create a more circular model of agricultural practices that has built-in self-reliant better able to ensure a sustainable agricultural future for Mayukwayukwa.
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Greenhouse Irrigation System

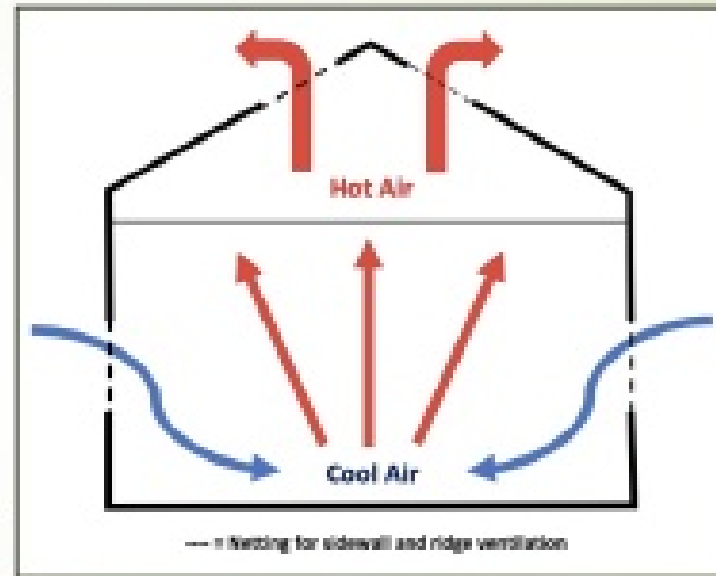
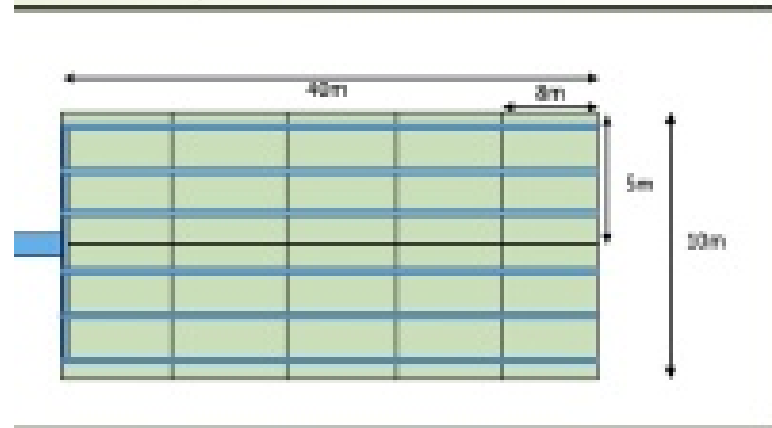


The aquaponics irrigation system is a gravity fed system which requires no electricity to run.

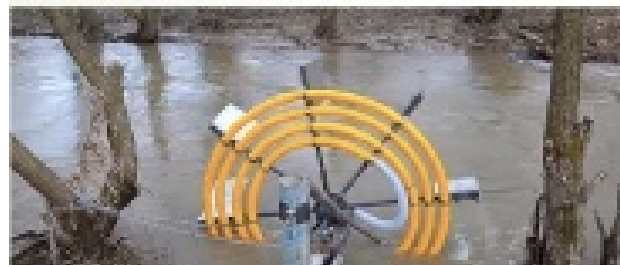
AQUACULTURE

- The Zambian government is encouraging the use of aquaculture
- None, however, are combining the benefits of aquaponics with the increased quantity and quality control provided by growing produce in green houses.

► The Greenhouse



Cost of Greenhouse Structure is approximately 4140K which is \$321.75
This includes the wooden frame, Polyethylene plastic, anti insect nets and the drip lines.



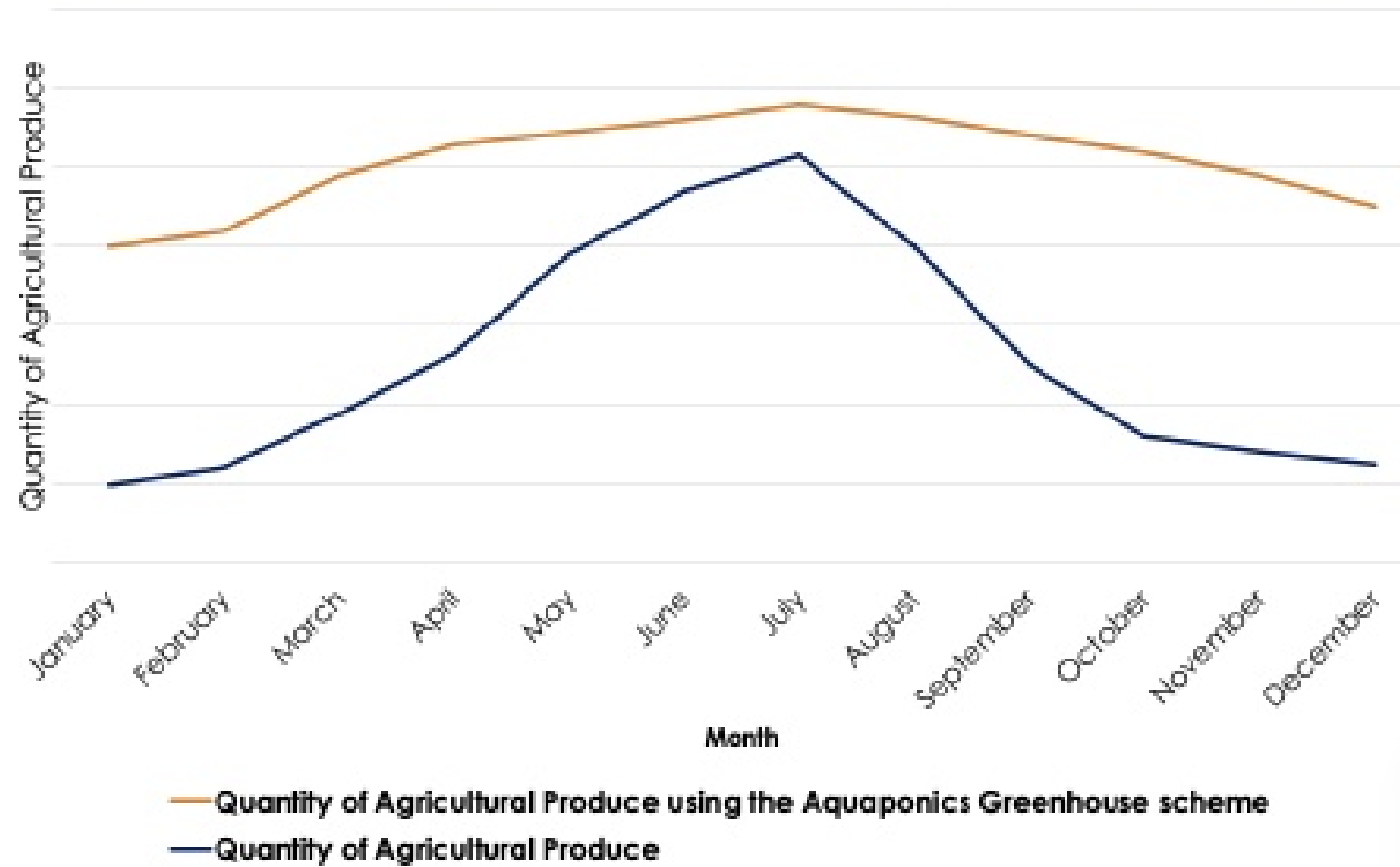
The water in the fish ponds will consistently flow using a water wheel pump installation in the river which is near the fish ponds next to the Bulking Centre.



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- The project considered the introduction of an integrated system of aquaponics and greenhouses
 - to cultivate fresh vegetables and fruits with reduced water consumption,
 - increased pest control and greater biodiversity to improve local health outcomes as well as
 - to increase income generation from increased quantity, quality and consistency of produce
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Quantity of Agricultural Produce in One Year



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- Benefits: An increase in fruit and vegetable diversity and volume using the greenhouse aquaponics system which generates economies of scale to sell to buyers on the national market.
 - Greenhouses allow for consistent production all year around, therefore strengthening food security, moreover increased use of greenhouses has the potential to generate local job and business opportunities and could provide impetus to get more women in business.
 - Fish waste fertiliser reduces the cost and some of the issues around the use of commercial fertilisers.

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- Challenges: There is a time delay in terms of expanding production; fruit and vegetables take time to grow. Value addition activities also increase the time frame on economic returns.
 - The immediate short-term food supply issues will not be addressed until fruit and vegetable production has completed a full cycle.
 - The technology associated with aquaponics and the practice itself is not known in the area (fish-ponds are present but not aquaponics) and so time will be needed to gain local trust and buy in needed for farmers to effectively implement new techniques.
 - If there are weather shocks, for example flash flooding, then the structure may suffer as it can't be moved and protected. Providing basic training in repair may mitigate this.

REDUCING FOOD WASTE AND IMPROVING STORAGE FOR MARKET

- There is a lack of accessible cold storage facilities
- The result – approx. 40% of fresh produce goes to waste and farmers and market stalls experience reduced profit.
- Access to cold storage maintains the nutritional value and the shelf life of produce.
- One proposed solution is to implement a cold storage facility at the Bulking Centre which could house cold storage units run on solar power. This would allow for the storing of fresh produce in the fridge compartment, therefore increasing longevity from 1-2 days up to a maximum of 21 days (3 weeks). This would reduce waste and increase the potential for bulking.



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POSSIBLE SOLUTION

- One proposed solution is to implement a cold storage facility at the Bulking Centre which could house cold storage units run on solar power. This would allow for the storing of fresh produce in the fridge compartment, therefore increasing longevity from 1-2 days up to a maximum of 21 days (3 weeks). This would reduce waste and increase the potential for bulking.

Drying techniques might also be explored; **the solar drying method** uses indirect solar radiation to dry produce and has been used in Mayukwayukwa before. Mangos, for example, are abundant during the rainy season but without a preservation method much of the fruit is wasted.



ENHANCING HONEY PRODUCTION THROUGH VALUE ADDITION

- Beekeeping has been an income-generating activity in Zambia for centuries because Zambia has the perfect climate and forestry for the honey production. Promoting beekeeping could act as an incentive for sustainable forest management whilst providing the people with business opportunities.
- There are around 30 to 40 bee-keepers in Mayukwayukwa who are generating subsistence level income from honey production. There is an opportunity to add value to their honey with improved beekeeping methods and effective high standard processing of the honey, thus enabling the honey to be sold at higher market prices.

CHALLENGES

- The bee-keepers face a lack of market linkages as a result of a lack of access to quality control mechanisms and certification which would allow keepers to expand their market reach and gain higher prices for their honey. Honey produced in Mayukwayukwa is typically mixed with water to raise the volume produced reducing the quality. Sometimes the larvae are harvested with the honey itself, resulting in a bitter taste to the honey. Additionally, due to the lack of good processing machines impurities in the honey can compound quality issues. Such honey is not acceptable to commercial buyers, who require proof of the quality of the honey as well as food handler licenses both of which can be difficult for a local beekeeper to obtain.
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CHALLENGES

- The traditional methods of honey farming use a bark hive made from the bark of a tree. This sort of hive yields of 3 to 5kg honey per season. The bark hive requires a tree to be logged although these same trees are needed to attract and feed the bees.
 - The processing of the honey used by bee-keepers is the crush and strain method, which extracts the honey from the honeycomb using a box honey press. Often these presses have large gaps in them which allows a lot more of the honeycomb to end up in the honey which increases the time needed to strain and reduces the purity of the honey.
 - In addition, some keepers unintentionally remove larvae along with the honey which has an impact on the taste of the honey. Beevern, the manufacturer of Mutanda honey visited during the field work might be considered a useful local model of practice that could be adapted to meet the local conditions of Mayukwayukwa. Moreover, the University of Zambia (UNZA) helped with the testing of Mukanda honey to enable this producer to create a world-class product. UNZA uses the USDA grading system.
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POSSIBLE WAYS FORWARD...

- Top Bar hives produces a yield of 15 to 18kg of honey per season and are made of pine wood which is more sustainable than indigenous trees. It is noted that this would be an initial cost that bee-keepers would otherwise not have to bear in using local trees.
 - A cylindrical honey press is more efficient in filtering out wax and other impurities compared to the box honey press. A strainer, settler tanks and refractometers, all of which involve minimal technical know-how would also be needed to produce high quality honey more easily.
 - Certification (kw200) can be achieved through systematic inspections carried out by ZABS which then supplies a licence to apply the ZABS mark to honey produced. ZABS is internationally recognised and will increase market reach. Re-certification is required every year. Trained processors might be employed to test honey on site to ensure quality before being taken to the Bulking Centre for packaging and distribution.
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