Renewable energy for agriculture project

Practical ACTION

CONTRACT FARMING AND ACCESS TO ENERGY FOR WOMEN FARMERS IN MALAWI

AUGUST 2023

LEARNING BRIEF

RENEWABLE ENERGY FOR AGRICULTURE PROJECT

CONTRACT FARMING AND ACCESS TO ENERGY FOR WOMEN FARMERS IN MALAWI

Introduction

The Renewable Energy for Agriculture (RE4A) project ran from May 2021 to June 2023 in partnership with Modern Farming Technologies (MFT), a Malawian social enterprise. It was funded by GIZ and the Powering Renewable Energy Opportunities (PREO) Fund, which is supported by the IKEA Foundation and UK Aid. The project tested a contract farming model that enabled access for women farmers to productive use energy (PUE) technologies, improved horticulture, and markets.

This learning brief captures learning that should be of use to Practical Action (PA) programme teams, private sector actors, donors, NGOs, and government bodies interested in the following:

1. Transformative economic development in **off-grid communities**, using **agriculture and energy to empower** farmers and entrepreneurs.
2. **Contract farming business models** that support access to inputs, including PUE technologies, extension services, and markets.
3. **Modern techniques for horticulture**, based on Controlled Environment Agriculture (CEA), that increase productivity and build climate resilience.
4. **PUE technologies** (water pumping and refrigeration) that provide opportunities for farmers and small businesses to increase farm productivity, add value, and raise incomes.

Summary of the key learning points

1. Do not underestimate the potential of informal agricultural markets
2. Uptake of PUE technology, improvements to agricultural production and access to markets are mutually dependent.
3. Four factors that can contribute to women's empowerment are:
   - working in agricultural systems that are appropriate for women;
   - securing access to technology for women;
   - providing individual and organizational capacity support;
   - sensitization of men and local leaders;
   - on women's role in agriculture and income generation?
4. Scale can be achieved in different ways, using different combinations of grants and commercial finance.

Overview and summary

The RE4A project was implemented in Chintetche, in northern Malawi, on the edge of Lake Malawi. It is an area that experiences one dominant wet season spread over four months and high temperatures all year round. It is a predominantly rural area, with one large town, Mzuzu, 50 km away. Prior to the Covid pandemic, the area had several tourist destinations on the shores of Lake Malawi.

The project was implemented by MFT, which has an office and staff in the area. Overall management and donor liaison sat with PA, who worked through MFT and local consultants employed to carry out assessments. The Carbon Trust closely monitored the project as the managing agent for the PREO Fund. Monitoring included the use of a comprehensive set of metrics that covered energy, agriculture business performance, and social impact, and had to be collected monthly and quarterly.

MFT worked with 135 women farmers during the 26 months of the RE4A pilot implementation. The project was designed to test an approach that responded to several regional challenges outlined in Figure 1.

The RE4A project was implemented in Chintetche, northern Malawi

Challenge	RE4A response
Productivity limits of rain-fed agriculture: Traditionally, there is only one growing season a year. This and the increasingly erratic nature of rainfall result in unreliable yields, impeding livelihood diversity and income.	**Irrigated greenhouse farming** has allowed harvests all year round. In order to reduce pressure on soils, planting mediums that include manure and crop residue as well as soil have been developed.
Post-harvest loss: 30% to 50% of produce is lost post-harvest because of poor harvest practice and inadequate storage options.	Good **post-harvest handling** of crops and a **solar cold storage unit** have reduced wastage to a maximum of 10%.
Lack of market access: Inconsistency in yield and produce quality has made it difficult for smallholder farmers to enter more lucrative and reliable formal markets.	**Consistent production** and **improved produce** quality have led to a **reliable supply chain** being developed with local and national customers.
Gender constraints: Women face additional economic barriers including: • **limited access** to land, jobs, and finance; • **time poverty** resulting from the amount of time spent on household duties and care work; • **limited of knowledge** about agriculture and market opportunities. All of these contribute to **restricted involvement in decision-making**.	MFT staff provide women farmers with **training**, access to **farming equipment**, **extension services** and **marketing support**: • **Greenhouse farming** does not require large land areas. • The efficient farming techniques employed allow women to work only **10–15 hours a week**. • The combination of production support with quality farming inputs, access to markets, and a rent-to-own (RTO) scheme enables women to obtain **ownership of productive assets**.
Evidence gaps: There is interest from donors, investors, and governments in PUE technologies but limited information and evidence on what works.	RE4A developed **learning resources** (e.g. business model report solar refrigeration guide) that are open access and have been promoted in the sector.

Figure 1 RE4A project responses to regional challenges

The RE4A contract farming model

At the centre of the RE4A project is a contract farming model.

The following diagram summarizes how the model works, with a more detailed analysis of the business model below.

1. The women farmers are members of a single over-arching cooperative, which signs a formal agreement with MFT. The cooperative manages the sale of produce and subsequent income on behalf of its members, allowing problems in production or repayments to be addressed collectively.
2. Women are organized into groups of three farmers,each of which signs a contract with MFT, allowing them to develop their own personal credit history. PUE technologies are then provided by MFT on an RTO basis:
   - One greenhouse and associated irrigation equipment for every three women
   - One solar pump for every five greenhouses
3. Women grow horticulture crops in the greenhouses. MFT provides extension services, such as agricultural training and access to improved farming inputs, including seeds, fertilizer,and harvesting materials.
4. The women sell all grade 1 produce to MFT. MFT deducts RTO payments. The rest of the produce is sold independently to other buyers.
5. The produce is stored in the MFT-owned and -managed solar refrigerator, which maintains produce quality and improves shelf life.
6. MFT sells the produce to several local and national buyers.
7. MFT reinvests all surplus into the establishment of new greenhouses, allowing more women farmers to take up horticulture.

Figure 2 The RE4R contract farming model

The business model

Figure 3 describes the critical elements of the RE4A business model, giving an outline of the key partners and project activities, the value proposition for all stakeholders, customer relationships and segments, key resources, and finances (costs and incomes) to show how the contract farming model is run as a business.

Key partners	Key activities	Value propositions to customers	Customer relationships	Customer segments
Cooperatives: All farmers are members of a cooperative, which helps provide economies of scale and reduces the risk of default on RTO schemes. **Mini grid developer:** The bespoke development of the refrigerated container was carried out in South Africa. It may now be possible to develop such units within Malawi.	**Extension services:** Provided by MFT to farmers, these enable consistent and high-quality produce. **Relationships with customers:** MFT staff develop relationships and negotiate supply contracts with national and local buyers. **Capacity development of cooperatives:** MFT supports training on organizational development, understanding markets, and taking a business approach to farming.	**Farmers (suppliers):** The model helps farmers address multiple constraints (access to finance, training, and markets) at low risk and low cost. The model is suitable for time-poor women because of the small amount of time required for greenhouse farming. **Buyers:** The business provides reliable, regular, and high-quality produce that is unique to the area.	**Formal customers:** MFT does its own market research to identify potential customers and develop relationships with them. **Informal customers:** Traders approach MFT after hearing about the produce through word of mouth. Once customer relationships are established, they require little maintenance because competition is limited.	**Formal markets:** Hotels, supermarkets **Informal markets:** Local traders The prices paid by the different segments are the same, but the amounts sold to each vary from month to month, with between 15–45% going to formal markets. The strategy is to maintain a diversified customer base to reduce vulnerability to changes in market demand.

Key resources

Human: Team of agronomists who can support farmers in a gender-sensitive way. **Physical:** Office, vehicles to allow visits to farmers and customers, refrigerated container. **Intellectual:** The MFT brand is becoming recognized as a guarantee of quality and consistency.

Cost structure

Start-up (capital) costs:

- RTO scheme (working capital) for greenhouses, irrigation pumps, and associated infrastructure;
- refrigerated container.

Fixed costs:

- chill plant salaries;
- extension officer;
- management staff salaries.

Variable costs:

- purchase of produce from farmers;
- fuel;
- agricultural inputs (working stock).

Revenue streams

A non-repayable grant was used to support all business costs in the first two years, including the assets that are provided to farmers under the RTO scheme. This was to allow the model to develop with limited risk.

Farmers sell all grade 1 crops to MFT (with RTO payments being deducted). These crops are then sold by MFT.

Revenue from crop sales is dependent on the quantity of produce sold and the market price.

Figure 3 The business canvas outline

Business model: Key points

This is **a one-stop shop model**, with MFT offering an 'end-to-end' service for farmers through the provision of access to PUE technologies, a financing mechanism (the RTO scheme), extension services, and secure markets. In the 'slim' markets found in northern Malawi, this is a valuable function. In more diverse and dynamic markets, it may not be necessary for one business to play this role.

The model is dependent on a functioning and inclusive cooperative

Through **the RTO scheme**, the cooperative rents greenhouses and irrigation equipment from MFT. Twenty-five per cent of the value of crop sales is deducted to cover rent payments. Once the rent payments equal the cost of the equipment, ownership passes to the cooperative and to the individual women farmers. In this model, it is difficult to default, unless a group of women cease producing. If this happens, the cooperative covers the gap and finds other farmers to step in. In over two years, while the project was running, this never happened.

The **cooperative, in its contract**, commits to selling all grade 1 produce to MFT. Inferior produce is sold to other traders directly by the farmers. In return, cooperative members get access to training and ongoing extension services, guaranteed markets, and the RTO scheme. MFT itself sells to formal markets, including local and national supermarkets and the hospitality sector, and local informal traders.

The model is dependent on a functioning and inclusive cooperative, so (despite being a business) MFT supports its **organizational development by providing training** on greenhouse farming, group management, financial literacy, and softer skills such as self-confidence. The cooperative encourages the increased agency of women and greater involvement in community affairs. MFT and the cooperative also actively engaged with men and local leaders to secure their support.

The **financial model has been heavily grant-dependent so far.** This was a donor-funded project to assess the viability of a business and so a grant was used to reduce the risk. The business model was subsequently analysed to understand how different financing arrangements can be used (see Key learning points below).

Focus on the PUE technology

Solar pumps:

FuturePumps SF1 model, purchased from dealers in Malawi

https://futurepump.com/

Solar refrigerator:

A bespoke, 40-foot, insulated shipping container with a solar array and refrigeration, designed and manufactured by African Mini Grids

https://africanminigrids.com/

Figure 4 Solar water pump used to pump water from Lake Malawi to the green houses

Figure 5 Exterior and interior of solar refrigerator.

Impact

Incomes

The analysis of the project demonstrates that a contract farming model like this is a viable strategy for securing access to energy assets for women farmers whilst at the same time providing them with an attractive income. If current levels of production of 15,000 kg a month can be sustained, women will earn a net annual income of 624 Euros from an average of 15 hours a week. This makes up 57% of the living income for an entire household (see https://www.globallivingwage.org/living-wage-benchmarks/rural-malawi). At this level of production, women will complete the RTO payments after 4.5 years and will fully own the assets.

The pumps have a minimum lifetime of 10 years and the greenhouse structures 20 years, but plastic sheeting needs to be replaced every 10 years at a cost of about 200 Euros.

Agricultural practice

Over the period of the project, women improved production and also took a more market-oriented approach on other farms, indicating a spill-over effect from the extension support provided. Women noted improvements to food security, which may have been a result of this. Spill-over effects like this one are an indication that new practices are starting to be embedded. However, there is always a danger that spill-over effects are negative. For instance, commercially oriented agriculture may divert people away from producing food for the household. As a result, this needs constant monitoring.

Over the period of the project, women improved production and also took a more market-oriented approach on other farms

Women's empowerment

Women involved in the project said that they had increased confidence to participate in community activities. This may reflect the positive impact of membership in the cooperative, which provides women with a source of group agency and has been strengthened by its involvement with the project. The potential benefits that accrue from the development of this social capital are an example of broader social impacts enabled by economic initiatives, and are an area that MFT could explore more.

There was an increase in the numbers of women saving money, indicating greater resilience. The increase in saving was not as high as expected, but this may be because most women had significant unmet needs that required finance.

> **The significance of owning assets for women**
>
> *"Knowing that I will own the greenhouse and the pumps just makes me feel happy. Other women who've recently signed onto the project feel the same; we're all committed to the pay-back period because we've never owned equipment or assets. The project is a life-changing one, which needs to be sustained."*
>
> *Lydia Phiri, single mother of 5, one of the leaders of the cooperative*

Since participating in dialogue about the programme and the role of women in greenhouse farming, men seem to be playing a more significant role in some household tasks. Further research is needed to confirm this and to clarify if this is a temporary result or if it reflects a deeper change in gender attitudes.

Note that all of these conclusions are tentative and further study is required to explore these issues systematically and identify causal pathways.

Key learning points

The links between markets, productivity, and PUE

The RE4A experience demonstrates critical inter-relationships between three variables:

- access to PUE technology;
- agricultural productivity;
- access to markets.

They all support each other (see Figure 6) and the absence of one will make the others difficult to achieve. If there is no access to markets or if there is no improvement to agricultural productivity, farmers will not be able to make enough money to pay for PUE assets. Likewise, if there is no access to PUE assets, the opportunities to increase productivity will be more limited and so on.

In all cases, cooperation between providers of energy, finance, farmer support and market access will increase the likelihood that there is sufficient confidence for services to be provided

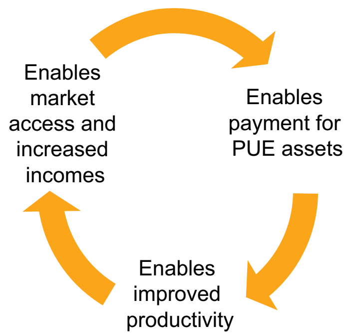

Figure 6 Inter-relationship between access to PUE technology, agricultural productivity, and access to markets

In the slim markets found in northern Malawi, the one-stop shop model provided by MFT enables all three to be achieved. In other contexts, where markets are more vibrant and there are more market actors, different models that are not as dependent on one actor may be more viable. But in all cases, cooperation between providers of energy, finance, farmer support, and market access will increase the likelihood that there is sufficient confidence for services to be provided.

Financing solar irrigation and horticulture

Analysis of the finances indicates that the level of income obtained by farmers is sufficient for them to get commercial funding for purchasing the equipment. A loan value of 784 Euros per farmer would cover the pumps, irrigation equipment, and greenhouses. If this was provided as a four-year loan with an APR of 17.3 % (current rate in Malawi), the famers could keep up with the repayments and still make an annual income of 518 Euros, assuming the productivity figures from December 2022 were maintained. However, the presence of productivity support for farmers and market access arrangements may be essential to give finance institutions confidence to agree to loans. MFT has started work on such arrangements with finance organizations.

An RTO model like this can potentially also pave the way for women to access finance by allowing them to develop a credit history. If other projects adopt a similar approach, it might be possible to more comprehensively assess the viability of this as a stepping stone for women to access finance and identify what else might be needed.

An RTO model like this can potentially also pave the way for women to access finance by allowing them to develop a credit history

The importance of informal markets

The project design was based on the assumptions that lucrative markets, such as supermarket chains, were key to the project's success and that a chill plant was needed to ensure access to these markets. Relationships with supermarket chains were developed, but other formal markets, such as the tourist sector, did not materialize to the expected degree. This was partly a result of their slow recovery following the Covid pandemic. In contrast, informal market traders had proved less vulnerable and bounced back quicker in the aftermath of the pandemic, thereby coming to dominate the purchase of produce.

The size of informal markets and their resilience suggest that they are a valuable customer segment for this business model. Developing effective ways of assessing the potential of often hidden informal markets will be important for future initiatives like this.

Designing a refrigeration initiative

The shift in the pattern of buyers to more informal ones influenced the use of the chill plant. Informal traders visited on a regular, daily basis to buy produce, meaning that it did not need to stay in the chill plant for very long. Consequently, the chill plant was only being used at about 25% capacity (although maximum production had not yet been reached). This has challenged the assumption regarding the necessity of the chill plant, or a chill plant of this size.

The viability of commercial funding for chill plants is also doubtful. The analysis shows that, if a five-year loan for the full 91,000 Euros required is provided with an APR of 17.3%, the business will still have a net 67,000 Euro loss at the end of five years. Even if the APR is reduced to 5% (very unrealistic), it will still have a net loss of over 37,000 Euros at the end of five years.

A smaller chill plant may well be more practical and more investment-worthy. If reductions in the size of the chill plant led to a cost reduction of 50%, a net profit could be made within a year and a half under the loan conditions described above (assuming the chill plant was sufficiently large to store the level of output produced).

This shows that the turn-over rate at which produce stays in the chill plant is a critical variable. Therefore, market intelligence is needed on the likely frequency of produce collection and not just on the anticipated total production and total demand. Along with this analysis on cost and capacity, refrigeration of perishable produce proved to have significantly maintained quality and shelf-life, which subsequently increased the crop's market value and reduced post-harvest loss.

Achieving scale

This initiative could be scaled up in two ways:

1. **Reinvesting traditional grant funding**
   For a traditional grant funder, a business like this provides opportunities for the reinvestment of finance within a commercially viable business, with options to scale up and to contribute significantly to the local economy. The current data suggests that, over a period of four years, the RTO repayments and produce sales are sufficient to double the number of farmers in the project through an expansion in the RTO scheme. This would result in 270 farmers and their families benefitting and over 470,000 Euros being brought into the local economy through increases in farmer incomes – a return on the original grant investment of 141%.
2. **Using limited grants to catalyse business development**
   An alternative strategy is to use smaller grants to kickstart multiple businesses. Assuming alternative financing is found for the chill plant and alternative financing arrangements are in place for the pumps and greenhouses, each business could be kickstarted with a working capital of just under 24,000 Euros. Businesses would break even within two years, when production reaches 15,000 kg of tomatoes. The learning from this project should enable higher production to be achieved more quickly in the future, which means this performance could be improved further.
   While this model does not allow for the reinvestment of grant money, it allows for an increase in the number of businesses, which itself could lead to greater levels of innovation and more development across other parts of the value chain.

Women's empowerment

The experience of RE4A illustrates four critical ingredients for achieving women's economic empowerment through agriculture (see Figure 7). This is not to suggest that these are the only ingredients needed, but that they are illustrated well in this project.

1. **Working in agricultural systems that overcome constraints experienced by women**

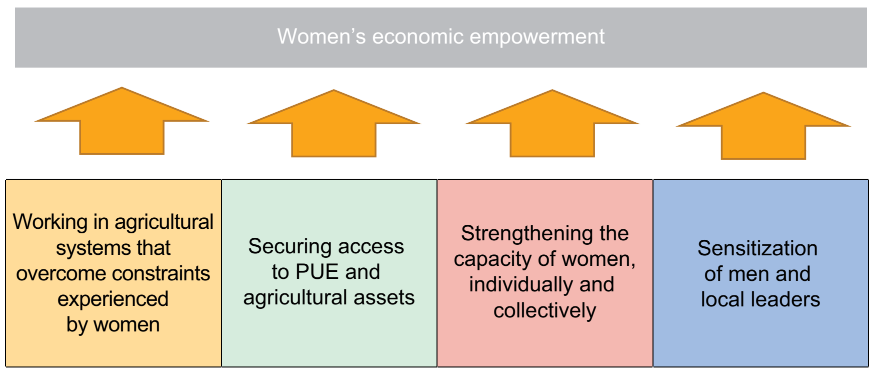

Figure 7 Four ingredients for women's economic empowerment

Greenhouse-based horticulture requires only a small amount of land and a small amount of time to generate a high amount of revenue. This overcomes two of the major constraints affecting women: time poverty and access to land.

2. **Securing access to technology**
The RTO approach has allowed women to gain access to PUE and agricultural technology. The technology is small-scale, affordable, and relatively simple to use and maintain.

3. **Strengthening the capacity of women individually and collectively**
The project strengthened the capacity of women at an organizational and an individual level. The establishment of the cooperative provided women with a voice and enabled them to access services. In addition, individual women improved their financial literacy and agricultural skills. The impact survey also reported an increase in confidence levels, which can be attributed to both of these.
Further analysis is needed to assess the impact of the cooperative on the agency of the women.

4. **Sensitization of men and local leaders**
Often, when sectors that women are involved in become more lucrative, men step in and take over activities and assets. Involving men and community leaders in ongoing consultations was an important factor in stopping this from happening.
There were tentative indications of behaviour changes in household roles and gender attitudes, with men taking on more non-traditional roles than before. However, these are deep-rooted issues and RE4A was only a short project. MFT will need to give more attention to these aspects as the years progress.
The potential of the model to be replicated by other businesses and to generate more positive change for women could be strengthened if there was a clear business case for targeting of women farmers. One could argue that women are more reliable when working in a collaborative way and are better horticultural farmers, but further clarification is needed on this.

The establishment of the cooperative provided women with a voice and enabled them to access services

Regenerative agriculture

Although not its focus, the project provided some pointers on how to become more regenerative in greenhouse farming:

1. **Water management**
As examples such as Lake Naivasha in Kenya have shown, large-scale irrigation for horticulture can have a negative impact on the quality and quantity of local water resources and thus on other users. While the size of the greenhouses in the RE4A project did not have an impact on the overall water balance in the area, any significant scaling up of this initiative needs to be part of integrated water management plans of the local government, and take into account available resources and other users.
2. **Substitutes for soil**
Greenhouse crops are grown in sacks. Traditionally, these have been full of soil from the local area. A number of problems are associated with this approach:

    - It can contribute to local soil erosion.
    - Low fertility soils affect production.
    - Soils that harbour diseases and pests can be brought into the greenhouse.

To avoid these problems and to create a more circular system, MFT has been testing the use of different crop-growing mediums, including a mix of manure, soil, and crop residues. Under the PREO grant, machinery was purchased to mix these materials at large scale.

There are other opportunities in the local area to develop this approach further, including through the use of vermiculture.

3. **Organic pest control**
   Successful trials were carried out using pest traps (e.g. sticky traps) for pest control instead of pesticides.

Other resources

Blog: Using contract farming to support access to renewable energy for women farmers in Malawi https://sun-connect.org/using-contract-farming-to-support-access-to-renewable-energy-for-women-farmers-in-malawi

Blog Article: Hot houses and cool work set to reduce harvest loss in Malawi https://practicalaction.org/news-media/2021/07/07/hot-houses-and-cool-work-set-to-reduce-harvest-loss-in-malawi

Blog Article: Changing Chintheche: Energy access for Malawian farmers https://practicalaction.org/news-media/2022/11/28/changing-chintheche-how-renewable-energy-is-working-for-malawian-farmers

Blog Article: Modern farming technologies: Increasing income and redeeming time for women famers in Malawi https://practicalaction.org/news-media/2023/01/17/how-modern-farming-technologies-areincreasing-income-and-redeeming-time-for-women-farmers-and-their-families/

Blog Article: Off-grid success: Solar chilling fuels Malawi produce supply chain https://practicalaction.org/news-media/2023/06/19/off-grid-success-solar-chilling-fuels-malawis-produce-supply-chain/

Blog Article: Solar refrigeration: Chilling tomatoes to win markets in Malawi https://practicalaction.org/news-media/2022/11/30/chilling-tomatoes-to-win-market-how-staff-at-modern-farming-technologies-are-using-solar-chilling-units-to-transform-livelihoods

Open Access Resources:

Business Model Report

Increasing income and redeeming time for women farmers in northern Malawi

The following is a blog article from the Practical Action website, documenting the lives of some of the women farmers involved in the RE4A project.

One year after the launch of the PREO-funded RE4A project, two farmers, Lydia Phiri and Jane Mwase, shared their life experiences both before and after signing on the project.

Lydia, a single mother of four children, is the head of her household and sole provider. Until June 2021, she and her family depended on cassava, maize, and rice farming – common staple crops widely farmed by smallholder farmers and sold to vendors who largely dictate the market price. The hot and highly unpredictable weather along the lake shores meant that Lydia could only farm during the rainy season, and sales from her harvest often left her short of meeting the cost of living for her young family.

Struggling financially, Lydia explained, 'As a single parent, I often had no choice but to spend most of my income on my family. Buying farming inputs like fertilizer and getting extension services became nearly impossible. With limited farm inputs, no marketing skills, and a lack of knowledge about alternative farming methods, navigating harvest cycles was problematic. I signed on to the project as early as 2021 because I wanted to change my circumstances and life. I needed money.'

Women who sign on to the project in farmer groups leverage the benefits of greenhouse farming and PUE technologies, which allow them to:

- grow tomatoes in greenhouses;
- grow crops all year round and generate more income;
- increase production levels in a pest and disease-controlled environment;
- reduce the amount of work that would otherwise be done by an individual farmer;
- benefit from irrigation technology, which has made farming efficient, and chilling technology, which has added value to their produce.

Lydia and Jane noted that working in a controlled environment has simplified farm management. With polytunnels, farmers can spend less time on pest control, which is done occasionally or, in some cases, not at all.

With more time on her hands, Jane, a mother of three, has been able to take on entrepreneurial ventures in the last couple of months. She explained, 'In our designated women groups, we work in shifts of three farmers per greenhouse, and so far, our model is working just fine. Every week I spend 14 hours on the farm; 1 hour in the morning and 1 hour in the afternoon. Household income has significantly increased, and with more time to invest in business, my decision-making and entrepreneurial skills have also improved.'

All 45 greenhouses in Nkhata Bay are now functional, with 135 women engaged in income-generating activities. All farmers received training on modern crop growing and post-harvest management. To date, the women produce between 100 kg to 1,000 kg of tomatoes per week.

Figure 8 Tomato farmers who own and work in the greenhouses with crop grown in sacks

Figure 9 Checking the produce

Figure 10 Solar water pump used to pump water from Lake Malawi to the greenhouses

The integration of renewable energy technologies and modern farming techniques has helped farmers respond to the changing climate. Agriculture experts at MFT are constantly working with farmers to adopt innovative climate-resilient approaches. Jane remarked, 'The temperatures by the lake are relatively high, so we often use shade nets to reduce temperatures in the greenhouse and solar pumps to obtain water from the lake. The only major challenge we've faced is closely related to our difficulty with the local climate.' MFT's continued effort means the farmers have easy access to extension services, contributing to project sustainability.

In closing, both Lydia and Jane expressed that the project's highlight has been the RTO scheme, which allows farmers to retain the equipment after a set pay-back period.

Lydia says, 'I enrolled in the project to make more money to support my family, but I have gained much more over the last couple of months. I've gotten the chance to learn how improved farming works; making manure, planting other types of crops, tomato trellising and de-suckering, pest and disease management, and how to use a solar irrigation pump – which I will one day own. Knowing that I will own the greenhouse and the pumps just makes me feel happy. Other women who've recently signed onto the project feel the same, and we're all committed to the pay-back period because we've never owned equipment or assets.'

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About Practical Action

We are an international development organization putting ingenious ideas to work so people in poverty can change their world. Our vision is for a world that works better for everyone.

We help people find solutions to some of the world's toughest problems, including challenges made worse by catastrophic climate change and persistent gender inequality.

We believe in the power of small to change the big picture. And that together we can take practical action to build futures free from poverty.

Big change starts small

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