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## Carbon Footprint of Water Use in Agriculture

Strategies for Emissions Reduction and Carbon Credit  
Generation

“life from Water” foundation

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# Outline

1. Introduction
2. Understanding the Carbon Footprint of Water Use
3. Strategies for Emissions Reduction
4. Carbon Credit Generation for Small Farmers
5. Integrated Approach for Egypt
6. Call to Action
7. Inspiring Success Stories



# Introduction

## Addressing Challenges for Small Farmers



### Water Scarcity

Reduced Nile flow, exacerbated by changing rainfall patterns and increasing evaporation rates, directly impacts the water available for agriculture.



### Temperature Variability

Increased temperatures can reduce crop yields and alter planting seasons.



### Rising Sea Levels

Coastal areas, including the productive Nile Delta, are at risk of inundation and increased soil salinity.



### Pests and Diseases

Warmer climates can lead to the spread of pests and diseases that negatively affect crops.



### Decreased Crop Yields

Changes in precipitation and temperature can lead to reduced productivity for staple crops.



# Understanding the Carbon Footprint of Water Use



## What is Carbon Footprint?

- **Definition:** Total amount of greenhouse gases (GHGs) produced directly and indirectly by activities, expressed in terms of CO2 equivalent.
- **How it's measured:** SCOPE 1, 2, 3
- **Importance in the context of global warming**



# Understanding the Carbon Footprint of Water Use



## Carbon Footprint Contributions from Small Farms

- **Water Use and Pumping**

Using electricity to pump water for irrigation can increase the carbon footprint if the electricity comes from fossil fuels.

- **Waste Management**

Inefficient waste management, especially of organic matter like crop residues or manure, can result in methane emissions.

- **Machinery and Fuel**

The use of tractors, harvesters, and other machinery consumes fossil fuels, contributing to greenhouse gas (GHG) emissions.

- **Livestock Emissions**

Ruminant animals, like cows, produce methane during digestion, which is a potent GHG. Small-scale livestock farms contribute to this, though typically less than industrial-scale operations.

- **Fertilizers and Pesticides**

Synthetic fertilizers, especially those based on nitrogen, release nitrous oxide (a potent greenhouse gas) when applied to fields. The production and transportation of both fertilizers and pesticides also have carbon footprints.



# Understanding the Carbon Footprint of Water Use



## Impact of Carbon Footprint on Small Farmers

- **Vulnerable to Climate Change**

The accumulated global carbon footprint, which includes contributions from various sectors, results in climate change. This poses direct threats to small farmers, such as changing weather patterns, unpredictable rainfall, and increased frequency of extreme events.

- **Resource Scarcity**

As water becomes scarcer due to climate change, irrigation-dependent farms could face reduced water allocations.



# Understanding the Carbon Footprint of Water Use

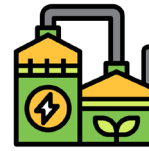


reduce emissions and enhance irrigation efficiency.



## Efficient Machinery

Using fuel-efficient machinery or transitioning to renewable energy sources for operations can reduce GHG emissions.



## Biogas Production

Manure from livestock can be used to produce biogas, turning a potential methane source into a renewable energy resource.



## Pipe and Infrastructure Maintenance:

Regular maintenance ensures no leaks or obstructions in the irrigation infrastructure, which could otherwise lead to wastage and unnecessary pumping.



## Water Conservation

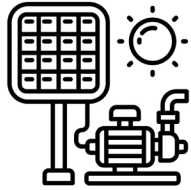
Water-saving techniques, like drip irrigation, reduce the energy needed for water pumping.





# Strategies for Emissions Reduction

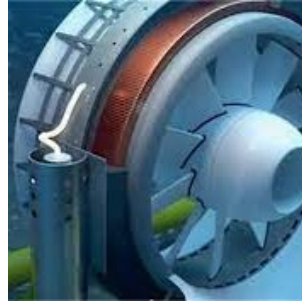
Empowering Small Farmers Through Renewables



## Solar-Powered Pumps

**Description:** Instead of diesel-powered or grid-dependent pumps, using solar energy to power irrigation can be efficient and clean.

**Emission Impact:** Solar pumps produce zero emissions at the point of use, reducing irrigation's carbon footprint.



## Hydrokinetic Pumps

These pumps are powered by the flow of water in rivers or streams and can be used where such water sources are nearby. They convert the kinetic energy of flowing water into pumping action.



## Wind-Powered Pumps

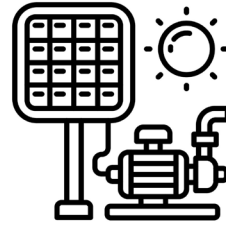
In areas with consistent wind, windmills can be a viable option to pump groundwater for irrigation. This clean energy source reduces reliance on fossil fuels.





# Strategies for Emissions Reduction

Empowering Small Farmers Through Renewables



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# Carbon Credit Generation for Small Farmers



## • Understanding Carbon Credits

- A carbon credit represents removing or avoiding one metric ton of carbon dioxide equivalent (CO<sub>2</sub>e) from the atmosphere. They can be sold on various carbon markets, with buyers typically being entities that need to offset their emissions.

## • Implementation of Sustainable Irrigation

- Adopting practices like drip irrigation, solar-powered pumps, and rainwater harvesting not only conserves water but also reduces the energy usage related to irrigation. Less energy consumed, primarily if sourced from fossil fuels, means reduced emissions.

## • Carbon Auditing and Verification

- Before they can sell carbon credits, farmers must demonstrate real, verifiable emissions reductions before they can sell carbon credits. This requires monitoring and reporting changes in practices and collecting data on the resultant energy savings and emissions reductions.
- Third-party verification is crucial. Accredited entities can assess a farm's emissions reduction achievements and validate them.

## • Access to Carbon Markets

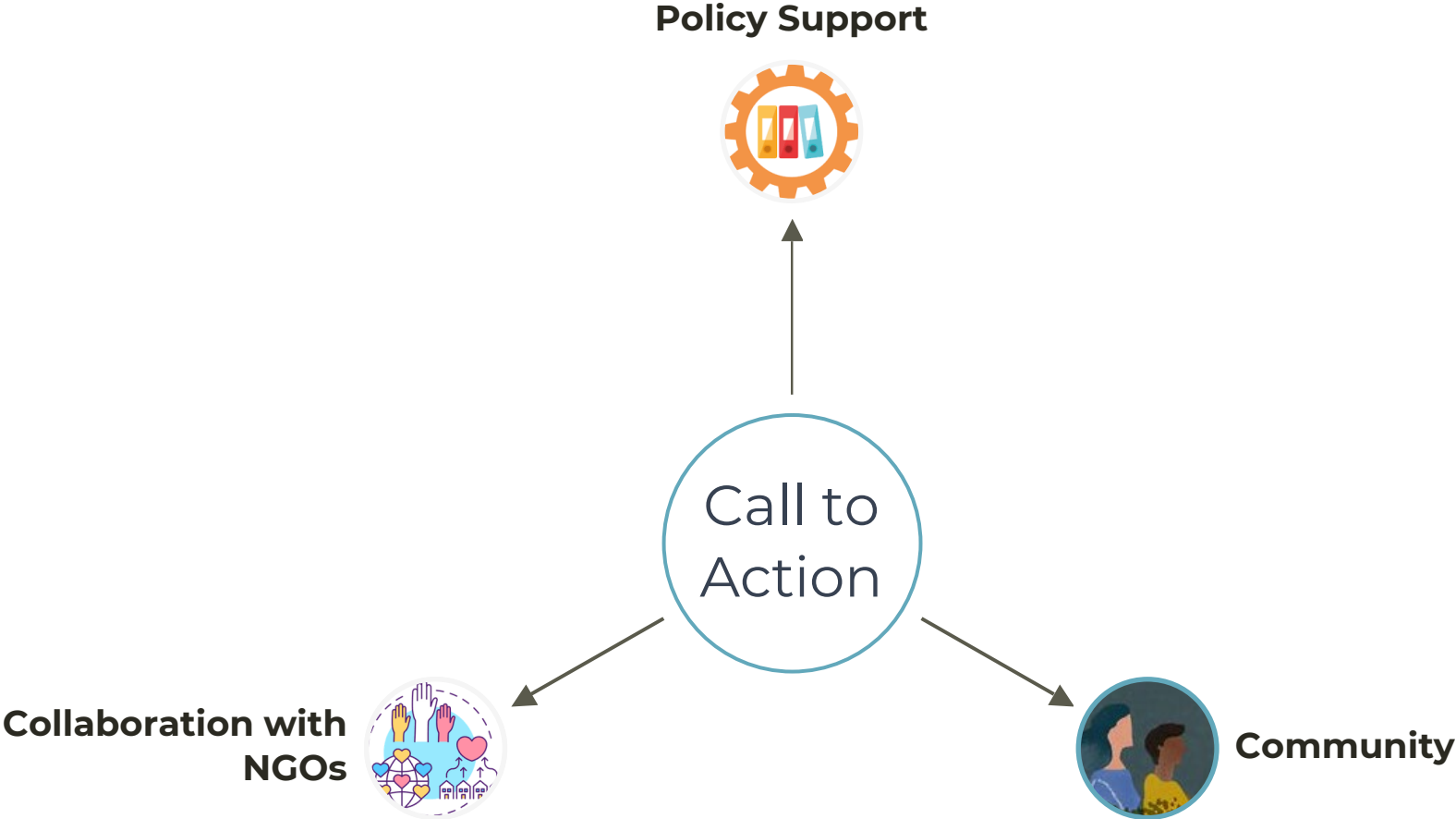
- Small farmers might face challenges accessing international carbon markets directly due to the complexities involved. Forming cooperatives or working through intermediaries can help pool resources, share knowledge, and more effectively engage with the market.

## • Reinvestment of Profits

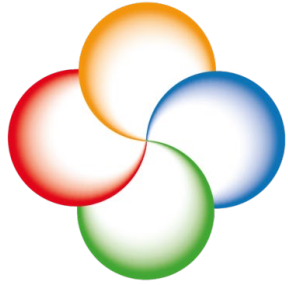
- The profits earned from selling carbon credits can be reinvested into the farm to enhance sustainable practices further, buy more efficient equipment, or even expand operations.
- It can also be used to fund training and education, ensuring that the farm remains up-to-date with the latest sustainable techniques.



# Small Farmers' Resilience and Growth



# Inspiring Success Stories



## Economy of Love



**SEKEM**

## SEKEM - A Model of Sustainability

SEKEM's commitment to sustainability empowers small farmers, leading to enhanced profitability and environmental stewardship.



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*Thank you for  
your attention*

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