Harnessing renewable energy

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Recent findings from the Global Alliance for the Future of Food reveal that the global agri-food system is responsible for 15% of all fossil-fuel emissions annually, contributing significantly to the deepening climate crisis.

At the same time, more extreme weather events are exacerbating the pressure on water supplies and soil degradation, pushing marginalised farmers to increase expenditure on fuel for water pumping and fossil-fuel-based fertilisers. Geopolitical conflicts in the Middle East and Ukraine are creating additional price spikes and further market turmoil. It"s abundantly clear that more sustainable and efficient systems-oriented interventions are needed.

Regenerative agriculture is increasingly emerging as a solution, aiming to enhance soil quality, preserve water and reduce carbon emissions, which are all essential for ensuring future food security. However, it is often inaccessible and unaffordable, particularly for the more than 600m smallholder farmers worldwide, who are disproportionately affected by the climate crisis and the breakdown of food systems.

Transitioning to regenerative agriculture can reduce reliance on diesel fuel, pesticides, and inorganic fertilisers, thereby increasing resilience to climate change and market volatility. Distributed renewables--products and services that provide affordable and reliable energy to those without access to the electricity grid--are a key enabler of this transition.

Yet several critical barriers still need to be overcome, with many distributed-renewable companies and regenerative-agriculture projects struggling to attract enough capital and support. How can we ensure those smallholder farmers most in need have the tools to transition to regenerative agriculture and protect their livelihoods from the increasingly devastating impacts of the climate crisis?

Regenerative agriculture and renewable-energy-powered technologies have the potential to significantly decrease our dependence on fossil fuels. Realising the combined potential of regenerative agriculture and renewable energy requires financing instruments designed to meet the needs of smallholder farmers.

Financial products that are contextually tailored and affordable give farmers the confidence to invest in regenerative methods. One example is pay-as-you-go modalities for off-grid solar devices, based on remote-metering technology and mobile money networks, which allow farmers to pay for electricity systems in instalments over two to three years.

Yet pay-as-you-go solar providers struggle to get the capital they need to serve the hardest-to-reach communities. Concessional and blended finance vehicles, which use philanthropic and development capital to de-risk the market and unlock private investment, are critical for getting these solution providers off the

ground and growing towards commercial success.

Thousands of promising solution providers are waiting for the international community to step up. S4S Technologies, a 2023 Earthshot winner, is an excellent example of how a detailed understanding of the challenges faced by smallholder farmers has led to increased adoption of renewable-energy technologies.

The company has developed a portable, solar-powered machine that dries vegetables and spices while retaining nutrients. This reduces agricultural waste, a persistent problem in India, where around 30% of products go unconsumed. However, their model also unlocks new value for low-income women farmers by creating localised hubs for surplus produce, enabling participating farmers to increase their incomes by 10-15%.

In addition, technologies like biodigesters are putting regenerative agriculture within reach. Soil erosion and market pressures have forced many smallholder farmers to rely on manufactured fossil-fuel-intensive fertilisers to maintain yields. Biodigesters can reduce reliance on fossil-fuel-intensive fertilisers by creating nutrient-rich bioslurry from organic waste, thereby improving yields, reducing emissions and cutting costs.

These and other regenerative approaches have demonstrated their ability to operate in low-income farming communities effectively and profitably. However, scaling these methods requires more, better-tailored and contextualised support than what investors, international institutions and governments currently provide.

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