AI for Earth Grantee Profile
Peace Parks Foundation
Conservation Farming App

Summary

For many years, conservation farming has been taught and implemented in marginal areas of trans-frontier conservation areas in southern Africa. The Peace Parks Foundation is extending these practices on a larger scale by offering mobile devices with a custom app that helps farmers learn the methodology and measure the process.

Connecting farmers in Africa to conservation practices

Traditional agriculture in many areas around the world, such as large parts of southern Africa, relies on practices such as slash-and-burn clearing that are simple to implement, requiring little in the way of

> Traditional agricultural practices such as slash-and-burn clearing quickly exhaust the soil, requiring years to recover and creating demand for more farmland.

technology, and easily enable subsistence farming—but at a high long-term cost. Slash-and-burn provides a short-term burst of nutrients, but the soil is quickly exhausted and requires many years to recover. Once that happens, farmers must move on to clear more forest or grasslands to create new fields. This cycle is very destructive for the local ecosystems, eliminating the habitats of many species from animals to plants to insects, as well as causing extensive erosion.

Additionally, as the human population continues to soar, more land is cleared and dedicated to agriculture to meet the growing need to feed everyone. Climate change is compounding this push into the wilderness, as existing cultivated lands in some areas are increasingly subject to drought, flooding, or other damaging weather. Combined with the common farming methods previously described, the demand for cultivated land poses a strong threat to the transfrontier conservation areas (TFCAs) that have been established between several African nations to protect large ecosystems that stretch across man-made borders. Working to counter this threat and change farming practices for the better is an important part of the mission of the Peace Parks

[Foundation](#) to provide economic development opportunities for communities living in and adjacent to these protected areas.

Based in Stellenbosch, South Africa, the Peace Parks Foundation (PPF) was founded with the goal of facilitating cross-border conservation efforts and has been actively involved in establishing and developing ten of the 18 TFCAs, or so-called peace parks, in southern Africa. PPF also provides strategic planning assistance to governments and other agencies in support of the parks, which combined covers roughly one million square kilometers.

Improving farming through conservation agriculture

Conservation agriculture offers an alternative set of practices that promises to address the problems of traditional farming while increasing yields up to eight times over the current practices. For example, no-till farming, crop rotation, and the use of cover crops preserve the natural organic soil layer, reducing erosion and

> # Conservation agricultural can increase yields up to eight times over traditional farming; PPF's mobile app will help teach and expand these practices.

runoff while allowing the soil to be productive for longer periods. Conservation farming techniques have been taught by PPF to farmers working in and adjacent to peace parks for many years, and this has contributed to efforts aimed at enabling the local communities to live more in harmony with the surrounding protected areas while sustaining food security and developing their livelihoods. The next step is to expand the reach of this approach while also helping the farmers gain better access to markets to capitalize on their improved productivity and better support themselves and their communities. PPF is looking to a mobile app as technology solution—and Microsoft—to help.

In 2018, Microsoft Philanthropies awarded PPF a grant to support its move to the cloud, whilst Microsoft AI for Earth awarded the Foundation three grants to support various aspects of their work, including a conservation farming app solution. The AI for Earth grant provides PPF with access to Microsoft cloud and AI tools to accelerate its work to expand conservation farming.

Extending conservation farming to help more farmers

PPF has developed the connected conservation farming application for web and mobile devices, with several goals in mind. First, the app will provide training materials and guidance on conservation farming, to help spread the knowledge and practices to more people. Data collected by the app will help PPF monitor and

evaluate the success of the conservation farming program. With the right information from data acquisition and analyses, PPF can introduce interventions to increase the viability of conservation farming and extend these to other regions. The app also will help the farmers communicate with each other and their trainers, sharing their knowledge and experiences. Finally, with the app, farmers can more easily tap into markets for supplies or selling their surplus production.

An important aspect of the app development is the establishment of a cloud-based centralized environment. The Microsoft grants enables PPF to move its infrastructure to the cloud, where large volumes of data collected by various sensors will be aggregated, analyzed, and autonomously interrogated using customized Azure Cognitive Services.

Part of the conservation farming training program includes asking the farmers to provide metrics as they work, such as the time spent weeding and watering or the areas covered, as well as photos of the area worked. Combined with mapping through GIS, and using What3Words as an addressing and index base, this data will also provide some measurement of which areas are being farmed—and which can be rehabilitated and reforested. Through the machine learning capabilities of Azure, PPF not only can see how well the farmers are doing with learning and applying the techniques, but also can learn how effective the techniques are and develop changes and improvements as needed.

Moving forward

PPF is field-testing the initial version of the app already with farmers in the area of the Simalaha Community Conservancy in Zambia, within the Kavango Zambezi TFCA. The app is designed to function offline, but it will need to sync up online on a regular basis, weekly if not more frequently, for the farmers and PPF to get the full benefits of it. To help encourage that frequency, PPF will be working with an organization which connects schools in the area, so that they have Wi-Fi to serve as connectivity hubs. PPF is partnering with this organization and their open Wi-Fi service for farmers to send and receive data.

Another important next step is to integrate weather services through the app. As climate change alters the long-term weather patterns around the globe, the local traditional knowledge of optimal periods of planting is becoming less reliable, and farmers are faced with more crop failures and losses. By deploying IoT-based weather and moisture sensors in the fields, connecting them to the apps on mobile devices, and processing all that data through machine learning, PPF will be able to help the farmer better forecast weather conditions and help them know when to plant seeds or to fetch water for the fields.

About Peace Parks

Peace Parks Foundation (PPF) has been involved in establishing and managing transboundary conservation areas in southern Africa for over two decades. PPF's dream is to reconnect Africa's wild spaces—re-establishing, renewing, and preserving large functional ecosystems—so as to create a future for man in harmony with nature. PPF has been actively involved in establishing and developing ten of the 18 transboundary conservation areas in southern Africa, called peace parks, and also provides strategic planning assistance to governments and other agencies in support of the parks, which combined cover roughly one million square kilometers.

Resources

Websites
Peace Parks Foundation