ACCORD

Supporting sustainable coffee in a demanding world

Global demand for coffee is increasing, while supply relies on exports from a myriad of countries around the world, grouped largely around the equator in the 'bean belt'.

Yet the growing impact of climate change is threatening the reliability of harvests in this region. Coffee is a difficult crop to grow and requires careful nurturing. The leaves and berries the tree produces are susceptible to a range of diseases and pests which can swiftly threaten the crop as particular conditions develop within the local climate.

Knowing when to fertilise, or when to spray, are time-critical decisions every coffee farmer now wrestles with to protect and maximise their crop yields and quality.

The ACCORD programme provides a new solution, offering accurate and timely data to farmers, enabling them to take action in alleviating the impacts of climate change. By bringing greater certainty and precision to coffee farming, ACCORD helps deliver reliable and high-quality supply and protects farmer livelihoods: building a more sustainable supply chain, from bean to brew.

Uncertain climates, unreliable harvests

To deliver high yields and high-quality coffee, the trees that grow coffee 'berries' need careful management.

Climate change is already leading to both rising temperatures and less predictable rainfall patterns. Kenya, for example, has experienced erratic rainfall, punctuated by severe droughts in recent years. Over the past decade, droughts of this nature have been occurring more frequently and such climatic uncertainty makes the decisions the coffee farmers make about managing their trees much harder.

These conditions, and the less reliable micro-climate, can reduce the growth of coffee plants, as well as inhibit their ability to flower, and consequently their ability to produce fruit. Climate change could halve the area suitable for growing coffee by 2050, while there is a general decline in global coffee yields – without improvements in the sector it is likely that the supply of coffee with fall short, and global demand will go unmet.

Coffee requires shade during its growth phase, sun when it starts to produce fruit, and regular rain. The application of agricultural 'inputs' such as fertilisers can greatly aid the farmer's chance of achieving a high crop yield and healthy berries, but timing the application of fertiliser with unpredictable rainfall to get the best result has become much harder. The combination of rising temperatures and irregular rainfall patterns are leading to unpredictable harvests.

Securing speciality coffee

Like wine, coffee is increasingly being desired and purchased based on subtle flavours, taste profiles, and 'mouthfeel'. The 'third wave' of coffee is seeing a rising demand for speciality varieties at premium prices. To satisfy the discerning coffee connoisseur, coffee companies rely on the skill and knowledge of farmers to produce the highest quality beans from the berries. Therefore, the crop must be of the highest quality too. Just one bean defect in a 300g sample can rule out specialty coffee status.

The key to maintaining this premium quality in the coffee crop is the management of the all-important 'inputs', the fertilisers, pesticides, and fungicides which encourage growth and protect against pests. Pests, such as the Black Twig Borer, and fungal diseases like Coffee Berry Disease and Coffee Leaf Rust can cause devastating losses of 50-80% of a coffee crop if left untreated.

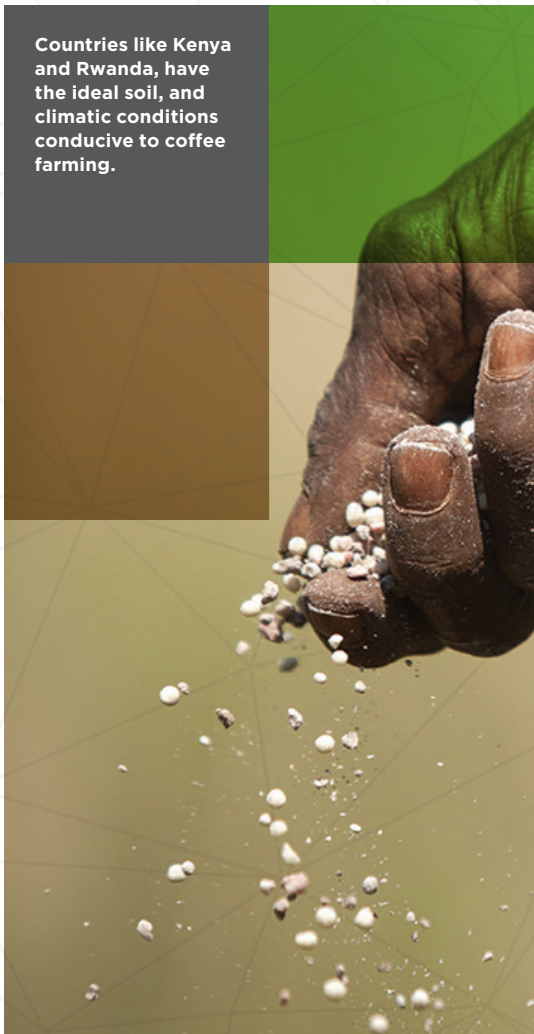
These inputs are essential but expensive. Effective application relies on very precise timing, and accurate localised forecasting of the changes in micro-climate that create conditions conducive to pests and disease.

Supporting coffee communities

Coffee is one of the most valuable commodities in the world, yet the majority of the people who grow coffee exist on a semi-subsistence level. More than 120 million people in the world rely on activities relating to coffee production, including 25 million smallholder farmers and workers*. These farmers grow coffee on a small scale, which means a bad harvest can directly impact the income of families in these areas.

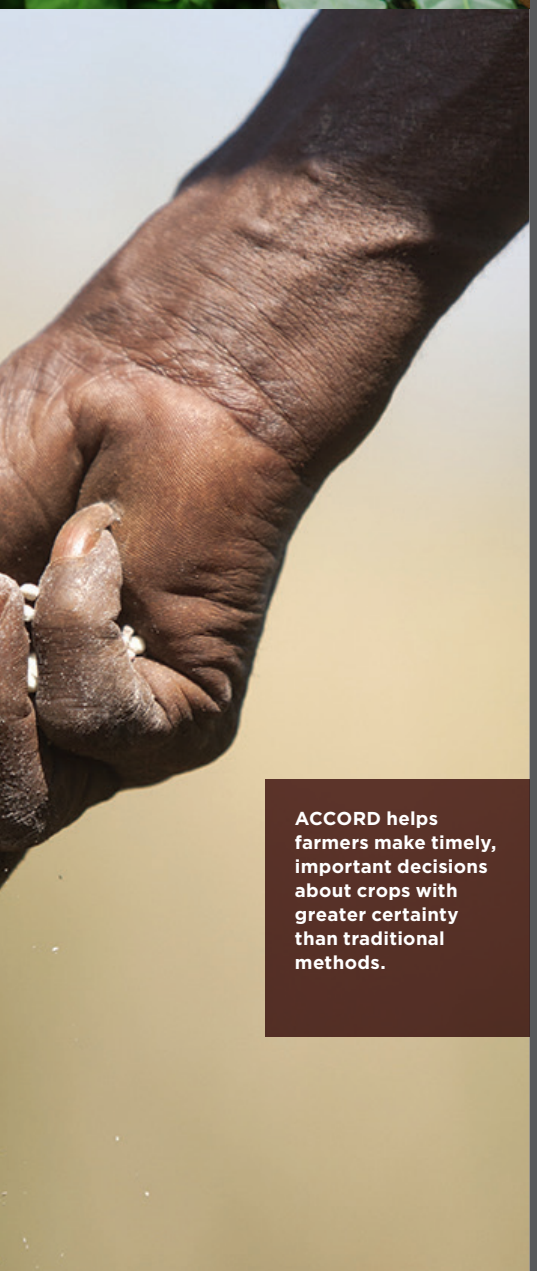
Decreases in farmers' earnings from a cash crop such as coffee threaten overall crop sustainability. Smallholder farmers, already on limited incomes, may choose to decrease their dependency on coffee as a cash crop if the returns they receive from growing it are threatened. They may switch to other cash crops that are easier to cultivate, or increase the land area devoted to subsistence in order to feed their families.

European consumers are increasingly concerned about the social and ecological impact of their consumption, with sustainability becoming a key driver behind purchasing decisions. Sustainability is inextricably linked to farmer incomes and the economics of farming cash crops on a small scale, most often in developing countries. Supporting coffee communities in countries such as Kenya and Rwanda, is therefore vital to the sustainability of the coffee industry, and also in meeting consumer demand, particularly for fine specialty coffees that rely on the Arabica bean.



Countries like Kenya and Rwanda, have the ideal soil, and climatic conditions conducive to coffee farming.

ACCORD



ACCORD helps farmers make timely, important decisions about crops with greater certainty than traditional methods.

ACCORD: bringing precision and certainty to coffee farming

Smallholder coffee farmers must make up to 30 critical decisions a year about their crop that directly affect yield and quality. Currently they have to make these decisions based only on their own personal experience, the advice of agronomists, and relatively generalised and inaccurate weather forecasting. These alone do not provide the precision or certainty required to guarantee positive outcomes.

The ACCORD, or Advanced Coffee Crop Optimisation for Rural Development programme offers a smarter, data and technology driven solution by using satellite-enabled technology combined with localised weather and ground truth data.

ACCORD guides farmers and agronomists on precisely when to apply fertiliser, pesticides and fungicides in each specific field.

By taking the guesswork out of applications, it can help to improve coffee berry yields and bean quality while eliminating the costs of wasted inputs.

Such data could also be harnessed in the future to build greater understanding of factors affecting coffee production in different regions, enhancing each stage of the coffee supply chain.

Supporting smallholder farmers with data science

ACCORD helps farmers make timely, important decisions about crops with greater certainty than traditional methods. This supports the livelihoods and increases the incomes of farmers by enabling them to deliver a reliable, sustainable supply of high quality coffee.

This greater income generated from improved crop yields and coffee quality improves the standard of life for those that make a living growing coffee and their families. The growers are able to invest their income in the long-term, such as paying for education or training, with a positive knock-on effect for the entire community.

How it works:

- *Individual smallholder farmers' fields are mapped by agronomists using handheld GPS devices and overlaid on satellite imagery*
- *Satellite imagery and mapped fields are combined with highly localised micro-climate data and forecasting*
- *Used together, these can very accurately predict the weather and provide early warnings on the risks of disease and pests rising at a specific time, and on an individual farm-level*
- *This information is collated into a simple SMS message identifying the precise time window to apply inputs, or when to mulch, in order to achieve the best crop outcomes*
- *The farmer/agronomist receives the information straight to their mobile phones, enabling them to make critical decisions within the precise windows of opportunity when they have time to act*

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The ACCORD consortium

The ACCORD programme, or Advanced Coffee Crop Optimisation for Rural Development, is led by Earth Observation and insights company Earth-i, working with partners WeatherSafe, and in association with the UK Space Agency and International Partnership Programme to deliver the timely, trusted insights needed to improve coffee yields and quality.

About Earth-i

Earth-i is a 'New Space pioneer' using imagery from a wide range of Earth Observation satellites to deliver meaningful insights about life on planet Earth. Integrating satellite imagery and video with data from a wide range of other sources, Earth-i delivers meaningful analytics and insights to clients globally. This includes national and local governments, NGOs, a multitude of specialist geospatial companies, and other commercial organisations in sectors as diverse as agriculture, mining, commodity trading, asset management and national security.

Through the application of artificial intelligence and machine learning, Earth-i's data analytics and insights help organisations and decision-makers improve investment and trading moves, provide better crop management, monitor and track assets more cost-effectively, observe changes or activities in critical locations, formulate more effective government policies, and predict future events with more accuracy.

About WeatherSafe

WeatherSafe aims to help coffee stakeholders around the world protect and improve their farming operations with uniquely powerful software tailored to the industry. We combine weather monitoring, agronomic data modelling, and satellite data to deliver a solution that helps farmers, government and NGOs.

WeatherSafe's mission is to significantly improve yields and profitability from agriculture by advancing the intelligence and the management of agricultural practices which enable farmers and organisations to respond quickly and effectively to environmental risks. Our vision is to enable pro-active environmental stewardship through solutions that provide a range of benefits and add value environmentally, socially and economically.

As smallholder level precision agriculture increasingly becomes the cornerstone of profitable and sustainable agriculture, WeatherSafe will lead the thinking as to what future conventions and practices will become industry standards.

In association with the UK Space Agency and the IPP Programme

UK Space Agency

The UK Space Agency is responsible for all strategic decisions on the UK civil space programme and provides a clear, single voice for UK space ambitions. At the heart of UK efforts to explore and benefit from space, the agency is responsible for ensuring that the UK retains and grows a strategic capability in space systems, technologies, science and applications. It leads the UK's civil space programme in order to win sustainable economic growth, secure new scientific knowledge and provide benefit to all citizens.

International Partnership Programme (IPP)

The UK Space Agency's International Partnership Programme (IPP) is a five-year, £152 million programme designed to partner UK space expertise with overseas governments and organisations. It is funded from the Department for Business, Energy and Industrial Strategy's Global Challenges Research Fund (GCRF).

Learn more at: earthi.space/accord/
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*(ICO, 2014) https://unctad.org/en/PublicationsLibrary/ditccom2018d1_en.pdf