Conserving biodiversity is our collective responsibility

Biodiversity is declining at a precipitous rate. This decline has serious implications for agriculture, given farming's reliance on biodiversity to sustain a healthy balance with nature and ensure the resilience of food production.

To understand biodiversity, and how best to protect it, the world needs more on-the-ground, in-the-field data than is currently being captured.

Introducing a breakthrough:
The world's first 24/7 biodiversity monitoring technology that can automatically, autonomously, reliably and at low cost identify most moving species.

We do not have time series data on farmland, what species occur where and when, how active they are throughout the day, and the influence of farming practices on these variables. And how species behave in a climate change context?

To understand the impact of biodiversity restoration - effective, clear, transparent, verifiable data is critical. However, due to the lack of technologies and fragmented biodiversity data, a continuous data stream is unavailable. That information gap is the impetus for the Biodiversity

Sensor Project — a system for the reliable, autonomous, low-cost collection and sharing of biodiversity data..

The Biodiversity Sensor Project is designed to be the first step on the road to gather a continuous stream of global biodiversity data. This will give researchers, policy makers and farmers the information they need to help biodiversity thrive.

"The spatial and temporal biodiversity data could help in bringing accuracy to predicting biodiversity variables across the globe and can serve as a critical mechanism to provide a more holistic picture of nature, its pressures, and trends especially in the climate change context. How about we build a close to real time biodiversity index just like air quality index?"
Kiran Joseph
Digital Sustainability Product Manager, Syngenta Group

The first focus species: insects.

Insects are the most diverse category of organism. There are 900,000 insect species, making up 80% of total animal species worldwide.

They are the unseen army of laborers who protect our food growing in the fields. They pollinate plants, disperse seeds, spread nutrients around, aerate the soil keeping it fertile. Some of them are natural biocontrollers protecting crops from destructive pests. Ladybugs can eat up to

5,000 harmful aphids in their short lives. The larvae of hover flies also eat aphids, as well as scales, thrips and caterpillars. Parasitic wasps are natural pest controllers too – one species is known to parasitize over 200 species of common garden pests.

Insects are also a rich source of protein and minerals, and the sole food source for many amphibians, reptiles, birds and mammals.

And insects like termites, flies and rhinoceros beetles decompose organic matter, restoring valuable nutrients to the soil.

What is biodiversity sensor?

A low-cost, solar-powered, state-of-the-art motion-capturing system that would draw on artificial intelligence (AI) and machine-learning algorithms to identify and quantify most moving species — automatically, autonomously, reliably and at scale.

The device is low-cost, solar-powered and weather proof.

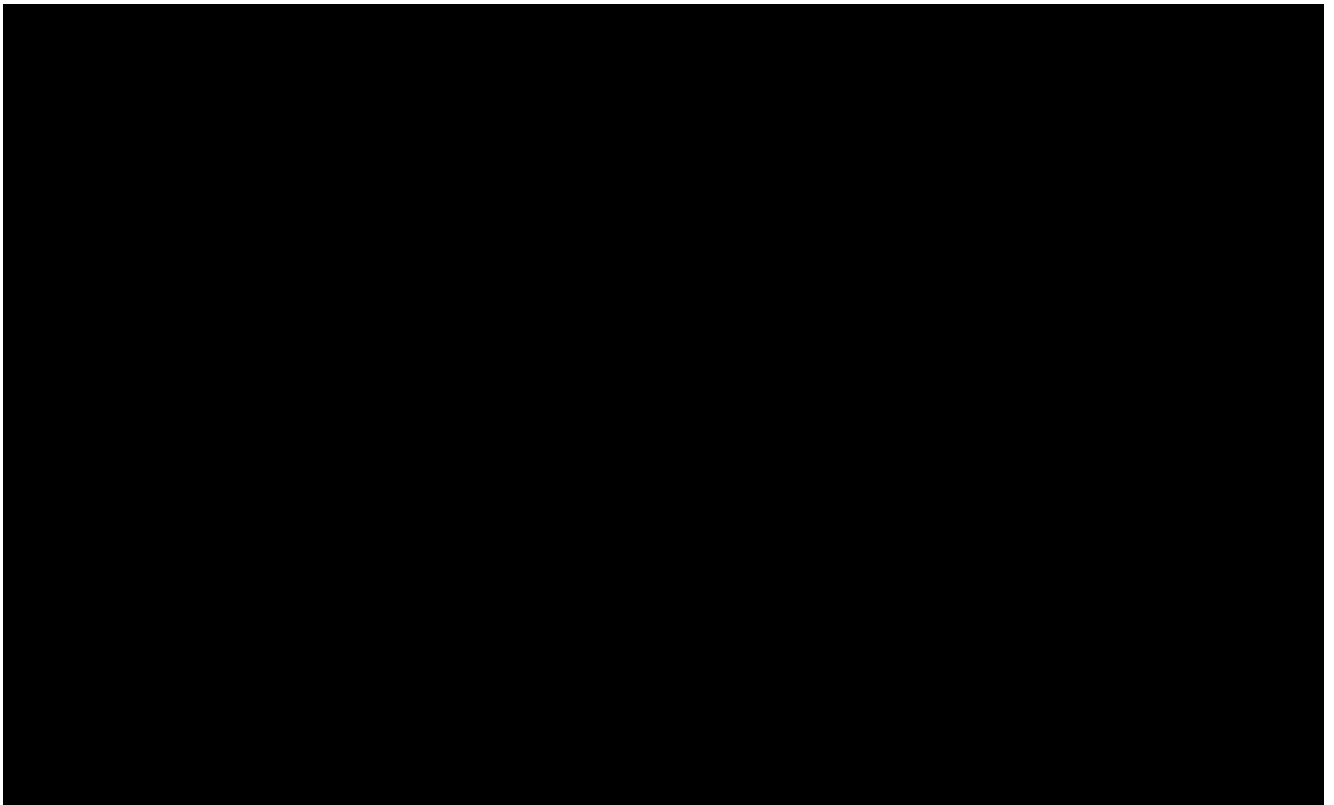
It has a specially developed motion-detecting, wide-angle **camera** which surveys 180 degrees to track most moving species and is powered by an artificial intelligence algorithm to quantify and classify them. Changing daylight and background movement like wind-tossed vegetation don't affect it.

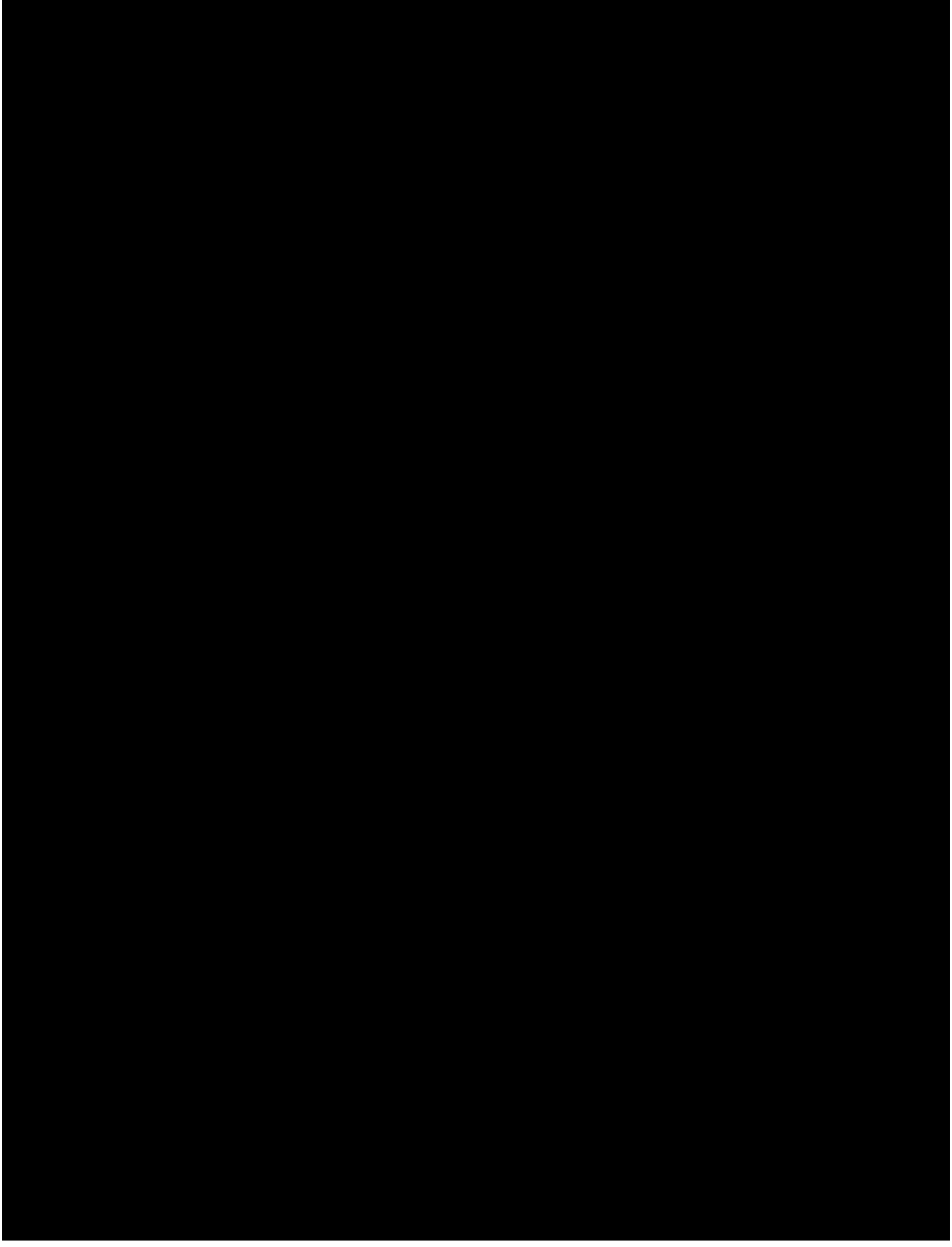
Sensors also measure temperature, humidity and light intensity.

We foresee that with a sensor network in place, the research community and organizations can generate new prediction models with high precision and also identify new problems to solve. The sensor network is also supposed to bring transparency to biodiversity restoration investments and generate actionable insights through novel biodiversity reporting and data framework.

The vision is to work together with partners, researchers , NGO`s and policy makers to create a global biodiversity network

The **software** uses AI and machine learning to identify and classify the species captured on camera with more than 95% accuracy. Then the data is added to a **repository**, slowly building a biodiversity map.





The vision is to work together to create a global biodiversity network, even a novel Biodiversity Index, a valuable resource for everyone.

Imagine: a global network of biodiversity sensors, all mapping data – open and usable so everyone from farmers to scientists, regulators to consumers, can make use of it.

Farmers, for example, can track their on-farm biodiversity, and learn about their own hyperlocal ecosystems. They'll see when new species of insects appear, and which predators exist on different sections of their farms – a valuable source of information for natural pest control.

"The adoption of economically and ecologically beneficial agricultural practices, and the establishment of rules, policies and recommendations in support of such practices, requires that farmers be able to measure, monitor and report the state of biodiversity on their land."
Vasileiadis Vasileios,
Sustainable and Responsible Business Manager, Syngenta Crop Protection AG

The data will also help farmers to demonstrate to regulators and policymakers where farm subsidies to support biodiversity are working.

Consumers will benefit from more information on the sustainability of the food they buy. And researchers, scientists, citizen-scientists and nature lovers will be able to make use of the data for their own projects.

The Biodiversity Sensor is being developed by the

Syngenta Group Digital Team and a constellation of partners. Together, we launched the first version in March 2022 to plenty of enthusiasm.
Catch up with the launch:

We are working with three key partners:

The Fraunhofer Institute for Molecular Biology and Applied Ecology (Fraunhofer IME) is the leading organization for applied life sciences research in Europe. Fraunhofer IME intends to validate that the science used to detect and classify insects is accurate and aims to certify that the new technology represents a breakthrough, as compared to conventional methods.

The Indian Institute of Technology Ropar (IIT Ropar), a leading hub for Internet of Things (IoT) research based in Punjab, has developed the hardware for the Biodiversity Sensor Project.

Alliance for Biodiversity Knowledge to share our learnings and learn from the extensive research undertaken by hundreds of scientists and researchers across the world.

We are looking for research and partnerships:

To better understand biodiversity and achieve a common position on how good looks like in productive agroecosystems.

To monitor, measure and analyze biodiversity.

To derive and select the right measures – policies and technology for farmers and others along the agriculture value chain.

Join us!

Our Biodiversity Sensor Project timeline

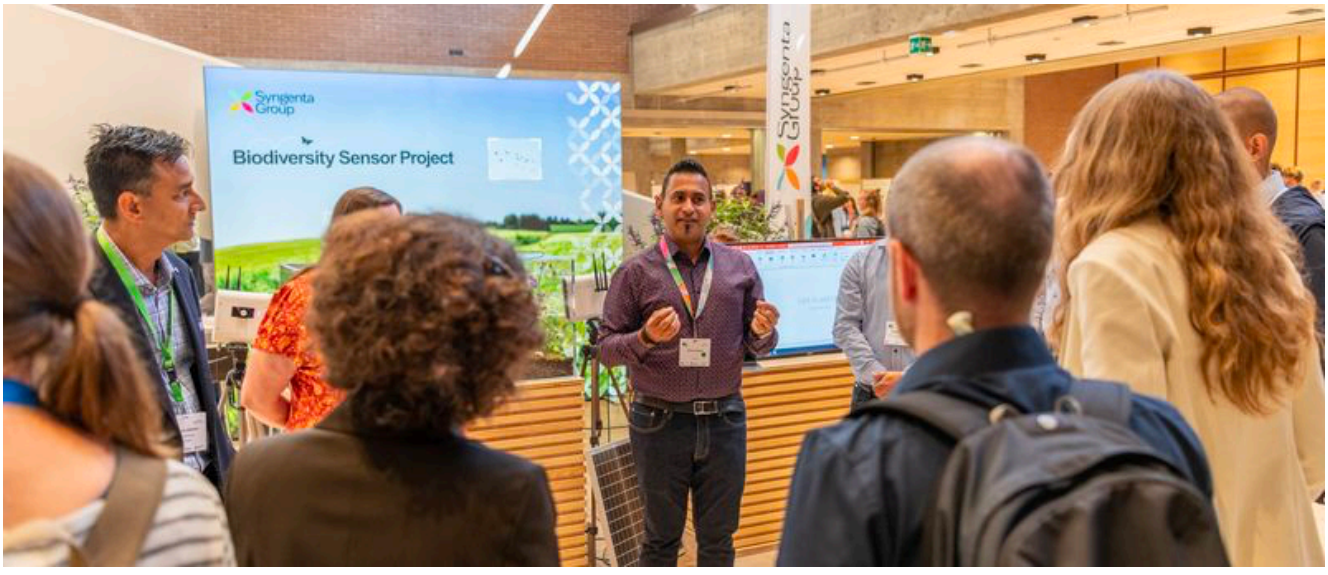
2020

Exploration of existing technologies and patents

2021

Core team creation:
Indian Institute of Technology,
Fraunhofer IME, Tumbling Dice and TDWG

Prototype version 1.0 lab tested



2022

Formal Launch at World Biodiversity Forum

Prototype version 2.0 field tested

Crop Science Awards 2022:
Runner-up in Best Innovation in Digital Farming Technology
Runner-up Cloud Awards for Sustainability

2023

Pilot with selected on-field use cases to improve the maturity of hardware and software

Featured in G20 Technology and Innovation summit in India

2024

Measure biodiversity at scale

The global population is likely to swell to 10 billion by 2050. Farmers will need to produce significantly more food in balance with nature. Protecting biodiversity can help.

As an innovation and technology company Syngenta Group provides existing and future solutions, as well as thousands of researchers to achieve the common goal to protect and enhance biodiversity.

We are intensifying our efforts and similar to other challenges, we need to protect and enhance biodiversity together, within and beyond our industry.

With more partners from different areas, we can go further. The sensor is scalable and can be deployed anywhere and used to monitor other species. We're excited that this technology will have uses we don't even know about yet.