Microsoft

Sustainability. Good for Business.

# Executive Playbook

## 2021 and beyond

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Technology is expected to be an important lever in the transition to sustainable agricultural practices, as resource scarcity coupled with demand growth for agricultural products call for new smart ways to produce more with less.

# Integra's agriculture solution – Smarteye - demonstrates how the use of IoT and analytics is expected to enable farmers to realize higher crop yields and reduce their environmental footprint

## COMPANY INTRODUCTION

Born as a training and computing company in 1986 in Aragon, Spain, Integra has evolved into a technology, strategy, and consulting company. Today, Integra specializes in digital transformation of companies and the application of innovative technologies to create new smarter solutions.

This case zooms in on how Integra applies technology to contribute to solve some of the key challenges related to sustainable agriculture. The specific tech solution – Smarteye – has been developed by Integra in collaboration with Ibercaja.

+2,500 clients

+500 professionals

Based in Spain

# With the Smarteye solution, Integra takes aim at some of the key challenges facing global agriculture in relation to sustainable food production


The global agricultural sector is under increasing pressure and new smart ways to produce is needed to transition to sustainable food production systems. Agricultural output must go up, as UN's Food and Agriculture Organization (FAO) estimates that the global food production will need to increase with 50% by 2050 to meet the demand of a world population of nearly 10 billion*. Yet, conventional agricultural systems cannot be leveraged to meet growing demands given its concerning environmental footprint measured in greenhouse gas emissions, biodiversity loss and water consumption. Instead, inefficient and environmentally exhausting practices must be retired and replaced with smart, resource effective agricultural practices.

**Three key challenges facing global agriculture now and tomorrow**

| Challenge | Contributing factors |
|---|---|
| **Scarcity of resources** | The global food system has a large environmental footprint; agriculture occupies nearly 40% of the earth's surface, far more than any other human activity, accounts directly for approx. 11% of global greenhouse gas emissions, and crop irrigation comprises 70% of global water use. In addition, expanding agriculture often results in deforestation, biodiversity loss, excessive use of harmful pesticides, and further greenhouse gas emissions. |
| **Demand growth** | Agricultural output needs to increase to meet future demand but with a lower environmental footprint per output; global population is expected to increase with 50% reaching a global population size of 10 billion. In addition, global income levels are expected to grow resulting in additional demand for agricultural products. Yet, demand growth cannot be solved by expanding conventional agricultural (land use change already accounts for 24% of greenhouse gas emission from food production**). |
| **Inefficient practices** | Inefficient processes- and natural resource use must retire; to produce more with less land and fewer natural resources, efficiency is key. Therefore, new smart agricultural practices need to substitute conventional ways of doing things. |

*Source: OECD, 2019
**Source: Our world in data

# Combining IoT and analytics, Integra's Smarteye solution enables farmers to monitor and respond to variables affecting crops with the potential benefits of higher yields and lower environmental footprint

### Data generation through IoT

Based on intelligent sensors installed in fields, Smarteye monitors and collects data points on a multitude of variables that affect crops such as temperature, humidity, atmospheric pressure, rain, wind, and soil temperature.

### Personalized tool and smart analytics

The rich data is processed through an analytics platform and visible in the farmer user application to inform farming practices like seeding, irrigation, and harvesting. The setup is tailored to the farmer's individual needs allowing them to apply their own logic to create the specific data insights they need.

### Data driven action and knowledge sharing

The real time insights on the different variables that affect crop yields enable farmers to act with more precision and capture benefits such as higher crop yields and a lower environmental footprint arising from – for example – reduction of pesticide and agricultural machinery use. In addition, the solution enable farmers to share data insights, much like an open platform.

## The tech ecosystem collects farmer specific data and insights that enables informed decisions in relation to crop management


### Sample of sensors and indicators

Soil temperature · Humidity · Rain · Atmospheric pressure · Leaf moisture · wind · Temperature · Soil moisture

# Minimizing the carbon footprint per agricultural output is one of the main tenants of sustainable agriculture, and intelligent solutions like Smarteye can potentially help drive some of the reductions

**How to minimize the carbon intensity in crop agriculture?**

**1**

*"Produce the same crop output with less input"*

On the one hand, smart technology solutions hold the potential to reduce agricultural inputs by site-specific applications, as they better target inputs to spatial and temporal needs of the fields, which can result in lower carbon intensity per crop output.

**2**

*"Produce more crop output with the same input"*

On the other hand, smart technology has the potential to affect agriculture productivity; by optimizing agricultural inputs crop yields increase, which can result in lower carbon intensity per crop output.

## Observed sustainability impact from Smarteye

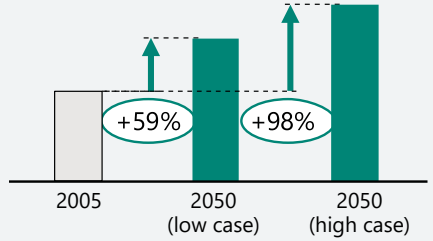
Although no exact sustainability quantifications have been calculated yet for Smarteye (given the novelty of the solution) real impact is seen on a variety of environmental parameters, including reductions in; pesticides usage, water consumption, and fuel consumption related to agricultural machinery.

Sources: *Harvard Business Review (2016), **(1) American Farm Bureau, (2) OnFarm,

## As food production rises, new solutions to drive down carbon intensity per kg crop is needed

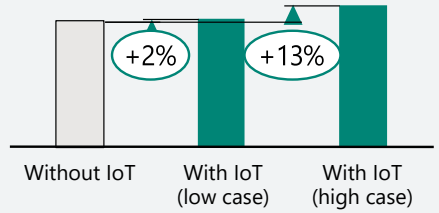
**Food demand is expected to increase anywhere between 59% to 98% by 2050**
(% increase in food demand*)

As food demand increases, farmers worldwide will need to enhance agricultural productivity and ensure the carbon footprint per agricultural output is reduced as much as possible.




**IoT solutions can help farmers increase crop yields and potentially drive down the crop carbon intensity**
(% crop yield increase**)

Studies have found that IoT can help drive higher yields (2%-13% improvements) in crop agriculture. Assuming the higher yields are achieved without additional emissions given the features of IoT (better target inputs to spatial and temporal needs of the crop), the crop carbon intensity can potentially be reduced with a close to similar percentage interval.



## LOOKING BEYOND

### Integra

In the eyes of Integra, the sustainability potential of IoT-based solutions, such as Smarteye, is not limited to agriculture. This is merely one example among many. In fact, the properties of IoT can enable solutions to a wide variety of sustainability challenges across industries – now and in the future - such as the built environment, manufacturing, transportation, and even city infrastructure challenges, such as congestion and air pollution. One of the IoT areas Integra views as *high impact* is smart water management. Therefore, Integra is currently working on smart water solutions that apply IoT technology to monitor and measure water quality. The solution holds great potential, as it enables the local city council to evolve its business and incentive model. Now companies that minimize their impact can be rewarded instead of just fining companies that surpass decided thresholds limits.

> "Today it is more necessary than ever to work on solutions that ensure sustainable development. With Smarteye, we do not only have a crop control and monitoring system that empower farmers to take the most appropriate economic decisions but also protect the environment by utilizing natural resources more effectively."
>
> **Gabriel García Rubio, IoT Business Development Manager at Integra**

> "Today we are capable of developing technological solutions that can reduce our negative environmental impact, preserving natural resources for the next generations to come. Leveraging IoT, Big Data, talent, and commitment is key to guarantee new solutions that will enable us to tackle the sustainability challenges we face as a global society."
>
> **Felix Gil, CEO of Integra**