



Feeding the world **WITH CONNECTED FARMING**

The world is struggling to feed itself. With the global population expected to exceed 8.5 billion people by 2030, the scale of activity required to provide food for everyone is driving the environment to breaking point. However, tech solutions deployed on robust digital infrastructure can streamline processes, minimize waste, maximize output, and let us once again walk the path to sustainability.

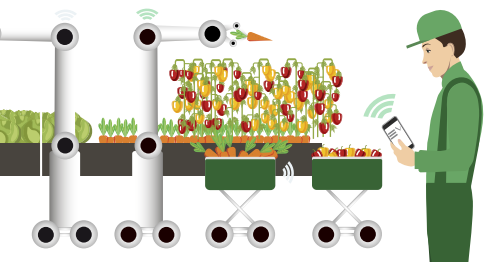
By Cipher Xi, Huawei





8.5 BILLION
people will inhabit the Earth by
2025

Monitoring systems can
boost productivity by **15%**



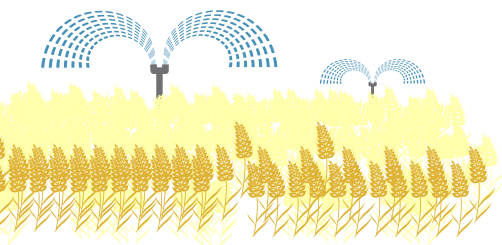
By 2020, the agriculture
market will be worth

US\$ 26.8 BILLION

Telcos will generate nearly

US\$ 13 BILLION

through smart
agriculture solutions and
applications by 2020



only address limited aspects
of farmers' operations.

Other restraints stopping farmers
from moving their businesses forward
are the general lack of targeted
connectivity services and solutions
coupled with a lack of standardization
of how data should be collected,
aggregated, and managed.

But things are changing. More
farmers are using mobile devices
and the Internet, both in emerging
and developing markets. Doing so
gives them the capability to improve
trade and engage in industry
initiatives. Moreover, advanced
companies are adopting IoT in
combination with low-cost cloud
applications, low-power wide-
area (LPWA) networks, sensor
technologies, and data analytics
platforms. These systems can
impact everything from back-end
processes such as purchasing
or inventory control to field
activities like planting, irrigation,
fertilizing and harvesting.

Digital transformation is helping
farmers evolve and transform. So,
what will digital transformation
look like in the agriculture industry
when it's more mature?

Getting smart for 2025

By 2025 agriculture will be in
the midst of a technological
transformation, perhaps as important
for global food supply as the invention
of the tractor or combine harvester.
Just as these machines enabled
farmers to achieve much more
at less cost and far more quickly,
so smart agriculture will enable
farmers to grow and manage crops
without human intervention and use
the continuous feed of intelligence
and insight to drive up efficiency,
resource utilization, and crop
yields. Research by Huawei X Labs
predicts that the total addressable
market for smart agriculture is
expected to grow from US\$13.7
billion in 2015 to US\$26.8 billion by
2020, a CAGR of 14.3 percent.

Key smart agriculture applications by 2025

- Precision farming will use data
derived from images and sensors
to track crops, soil, and the air in
real time so farmers can observe
and respond to changes at specific
locations, also in real time.





Telcos are poised to generate nearly US\$13 billion in annual revenues by 2020 from the smart agriculture value chain.

end service packages and solutions that are easy for farmers to use.

Telcos are poised to generate nearly US\$13 billion in annual revenues by 2020 from the smart agriculture value chain. By delivering E2E smart agriculture solutions and applications on cloud through partners, telcos can generate revenues from increased numbers of wireless and fixed network connections, sensors, systems integration, and services.

The highest revenues will come from precision farming, precision livestock, and yield monitoring solutions, but all potential applications are set to deliver decent returns.

Tech and telcos in action

Monitoring banana production

in Colombia: Colombia Telecom, Movistar, Claro and Tigo have all introduced monitoring systems for plantain crops to help farmers deal with flooding, soil oxygen exhaustion, humidity, and low temperatures, boosting productivity by 15 percent.

Monitoring fish in Vietnam: Viettel Mobile, MobiFone and VinaFone all offer livestock monitoring services. By deploying this type of solution, a major aquaculture has cut fish mortality by 40 to 50 percent and increased turnover by a similar percentage.

Automated irrigation in Spain:

Telefonica and ABB have supplied a GPRS-connected automated irrigation system to a dozen farms in Spain, slashing water usage, reducing electricity bills by 30 percent, and increasing profits by 25 percent.

Connected cows: Low-power and high-capacity, NB-IoT modules from Huawei can be attached to cows, enabling farmers to understand cows' natural cycles and when they're most likely to get pregnant, and also predict sickness through monitoring temperature.

For telcos, opportunities abound in areas that require high levels of connectivity and mobility like monitoring livestock, drones for aerial



photography and remote sensing, logistics and distribution, and high-bandwidth applications such as machine surveillance. Applications requiring dense networks of connected sensors and associated control systems are also rich in potential such as variable rate input technologies. In each of these cases, connectivity that isn't based on 3GPP network standards won't meet downstream and upstream bandwidth or latency requirements.

Operators can also provide support services such as mobile payments and insurance, access to trading platforms, and farmer helplines, which is especially important in many emerging markets.

Enterprise stakeholders

The opportunity to serve farmers with smart agriculture solutions isn't limited to telcos, with various other supplier types set to benefit:

Device and equipment vendors that provide components like sensors and farm machinery with inbuilt sensor and connectivity capabilities have a great opportunity for upselling, providing differentiated products, and creating new service propositions. Every year, millions of new connected devices will be needed, from classic machines such as tractors, harvesters, balers and planters to new tech like drones.

By 2025, sensors for monitoring animals, crops and environmental factors will be shipping in the billions, representing a hugely lucrative market space.

Application providers will be involved in most aspects of the smart agriculture revolution. Their tools will enable farmers to use the data collected from devices and sensors to monitor and automate farm processes and interact with farm machinery. A variety of crop, process and equipment-specific applications will be delivered as cloud native software services. To open the channel to customers, application providers will use direct sales models and third parties such as equipment vendors, systems integrators, and telcos. They have the opportunity to target a market that has never before been software-intensive.

Data analytics companies will help farmers understand what's happening on a local level, predict outcomes, and suggest interventions. Partnerships and visibility into multiple farms will let them collate information from across the industry. Typically cloud-based, these companies can then position analytics about individual farmers' crops and decisions on improving efficiency and productivity into the context of the wider industry. This macro-level data will be invaluable for farm suppliers by, for example, identifying the need for more raw materials, finance, insurance, or new equipment.

Systems integrators and outsourcing providers will have a significant role to play in bringing together the various systems needed to develop smart farms, which will in particular benefit the largest farms, especially those run on an international scale. These companies will often be the primary contractor that stitches together disparate sets of smart farm applications to create fully interconnected smart agriculture ecosystems. Smaller value-added resellers will have a role to play too – providing a channel to market to smaller farming businesses.

Connecting the dots

Connected farming will disrupt the farming industry. The tech is here now, and can be deployed to instantly improve efficiency, environmental impact, yield and crop quality, and profitability. As sensors become smaller and cheaper and as farmers realize the benefits of wirelessly connected crop management systems, smart farming will very quickly become the norm.

Telcos and enterprises have significant roles to play connecting the network and technological dots, and making smart farming accessible and attractive to all farmers regardless of scale. Agriculture can then move into an age where threats like water scarcity start to diminish in tandem with the amount of hunger facing the world. 