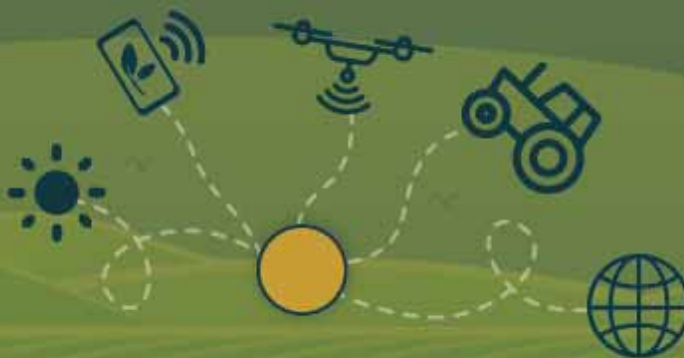




ImpactAim



AgriTech
ACCELERATOR



FAST

ICARE



Armenia
National SDG
Innovation Lab



ADB Ventures

1. DATA-DRIVEN AGRICULTURE

Efficiency and productivity will increase in the coming years as “precision agriculture” becomes bigger and farms become more connected. It’s estimated that by 2020, over 75 million agricultural IoT devices will be in use: **The average farm will generate 4.1 million data points daily in 2050, up from 190,000 in 2014.**

Internet of Things (IoT) - IoT technologies allow correlations of structured and unstructured data to provide insights into food production. IoT platforms such as IBM’s Watson are applying machine learning to sensor or drone data, transforming management systems into real AI systems.

Automation of skills and workforce - New technologies will be needed to ease the workload on farmers: Operations will be done remotely, processes will be automated, risks will be identified, and issues solved. In the future, a farmer’s skills will increasingly be a mix of technology and biology skills rather than pure agriculture.

Data-driven farming - by analyzing and correlating information about weather, types of seeds, soil quality, probability of diseases, historical data, marketplace trends, and prices, farmers will make more informed decisions.

Chatbots -Currently, AI-powered chatbots (virtual assistants) are used in retail, travel, media, and insurance sectors. But agriculture could also leverage this technology by assisting farmers with answers and recommendations on specific problems.

Drones - aren’t a new technology. But thanks to investment and a relaxed regulatory environment, their time may have arrived: The value of drone-powered solutions in all applicable industries could be more than \$127 billion, according to reports. Here are six ways drones will be used throughout the crop cycle:

Soil and field analysis -by producing precise 3-D maps for early soil analysis, drones can play a role in planning seed planting and gathering data for managing irrigation and nitrogen levels.

Planting - startups have created drone-planting systems that decrease planting costs by 85 percent. These systems shoot pods with seeds and nutrients into the soil, providing all the nutrients necessary for growing crops.

Crop spraying and crop monitoring - drones can scan the ground, spraying in real time for even coverage. The result: aerial spraying is five times faster with drones than traditional machinery. With drones, time-series animations can show the development of a crop and reveal production inefficiencies, enabling better management.

Irrigation - sensor drones can identify which parts of a field are dry or need improvement.

Health assessment - by scanning a crop using both visible and near-infrared light, drone-carried devices can help track changes in plants and indicate their health—and alert farmers to disease.

2. ONLINE MANAGEMENT SYSTEMS AND E-COMMERCE

Easy to use digital platforms for accounting and financial reporting. E.g Service Titan for agriculture. Most of the agri businesses (farming) are family owned with little or no finance/accounting knowledge.

Payment and optimization systems for agriculture services, planning and optimization of service delivery. (UNDP is planning to open Food Banks in Vayots Dzor and Gegharkunik marzes; this will be the perfect pilot to test the solution).

Land modelling and sales. E-commerce platform for aggregating available land data as well as connecting potential buyers and sellers in order to ensure efficient land usage and development of large-scale agriculture.

Online sales and delivery systems for farmers, to ensure fully commercialized agriculture services. Global scale up of the products via efficient logistics schemes by linking farmers to international trade hubs.

Training and advisory services in rural areas to introduce the new technologies as well as digital and entrepreneurial skills.

Sustainable pasture management systems. Good grazing and pasture management is one of the most influential factors on the productivity, soil health, water, and sustainability of a dryland grazing property. During the pasture period farmers have to relocate the cattle/animals to areas which usually have no proper access to communication networks as well as energy and water supply.

Agricultural waste management system. An agricultural waste management system (AWMS) is a planned system in which all necessary components are installed and managed to control and use by-products of agricultural production in a manner that sustains or enhances the quality of air, water, soil, plant, animal, and energy resources.

3. INCREASED EFFICIENCY IN FOOD PRODUCTION VALUE CHAIN THROUGH NEW TECHNOLOGIES

VERTICAL AND URBAN FARMING - 95 percent less water used, less fertilizer and nutritional supplements, and no pesticides, while boosting productivity. E.G. San Francisco-based Plenty's field-scale indoor farms combine agriculture and crop science with machine learning, IoT, big data, and climate-control technology, enabling it to grow healthy food while minimizing water and energy usage. Governments have also initiated initiatives around this technology.

GENETIC MODIFICATION AND CULTURED MEATS - Clustered, regularly interspaced, short palindromic repeat (CRISPR) technology is an important new approach to genome editing that allows greater selectivity and reduces the element of chance. The technique not only can create breeds with improved yields and resistance to adverse conditions, but can also be used to propagate crops with essential vitamins, nutrients, and minerals. CRISPR is facilitating the generation of engineered animal food products. E.g. *MosaMeat, a Netherlands based company, is among the handful of startups using the technology.*

APPLYING 3D PRINTING TECHNOLOGY TO FOOD - 3D printing, which is becoming important in manufacturing industries, is now being applied to food production. 3D printing (also known as additive manufacturing) is a process whereby layers of material are formed to create objects—and in this case, familiar dishes. Experts believe printers using hydrocolloids

(substances that form gels with water) could be used to replace the base ingredients of foods with renewables like algae, duckweed, and grass.

SUSTAINABLE PACKAGING: BIOPLASTICS - New technologies and solutions are disrupting not only the production side of the value chain but also food packaging. Consumers increasingly are urging companies to develop food containers that can be recycled and are biodegradable or compostable too. E.g. *TIPA was founded with the vision is to create a compostable, recyclable package that is the equivalent to a fruit or vegetable.*