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Agriculture Disruption: Can Agtech Help to Feed a Changing World?

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Introduction

Agriculture was once an industry exclusively for farmers with generations of knowledge and expertise. Investments in the industry from outsiders was difficult and rare. But now entrepreneurs and investors are coming from all angles to enter the industry. And the reason lies in Agtech.

In order to feed almost 9.8 billion people by 2050, food production needs to increase by roughly 50%. In response to this, investments in agtech have tripled over the last year. These investments centre around the use of modern technology in agriculture to improve efficiency, sustainability and profitability.

The Situation Today

The world population is expected to reach 9.8 billion by 2050. The number of people living in Africa will double within the next 30 years. Developing countries, in particular, will contribute to this predicted growth. Couple this with a longer life expectancy and it's easy to understand why food production needs to increase by roughly 50%. Output wise, annual meat production has to rise by 200 million tonnes to reach 470 million tonnes and annual cereal production needs to rise by 0.9 billion tonnes to reach 3 billion tonnes. The demand for proteins and nutrition is growing significantly in underdeveloped countries.

Climate change affects conventional agriculture; weather conditions make growing enough food a challenge, air pollution causes the degradation of land and there is limited access to water. To stop climate change, food miles (the distance food is transported from production until it reaches the consumer and a major factor in assessing the environmental impact of farming) need to be reduced and farming needs to become more ecological. This can be achieved by producing sustainably, efficiently and locally.

70% of people are expected to live in urban areas by 2050, and as space is limited and in constant demand in cities globally, experts in the field of agriculture are looking for a solution.

Agtech offers hope to curtail agri-impact in climate change

Agtech is the use of technology in agriculture, horticulture, and aquaculture with the aim of improving yield, efficiency, sustainability and profitability. The technologies can be products, services or applications derived from agriculture that improve various input/output processes. This means that agtech is working along the value chain from farming to distribution.

Experts believe that gene editing, artificial intelligence and digital technology can help to achieve higher yields and produce more nutritious food. Universities and research centres around the world are teaming up and focusing research on technological agriculture. Some companies such as Unilever invest in their own research centres.

Quick read

- Advancements in agtech or agriculture technology are seen as vital with global population heading for 9.8 billion by 2050
- Climate change challenges conventional means of satisfying food demand. In addition measures to tackle climate change mean food must be produced more locally
- Experts believe that gene editing, artificial intelligence and digital technology can help to achieve higher yields and produce more nutritious food.
- Crop testing, vertical farming, alternative proteins and hydroponics are all the subject of considerable R&D and investment as agtech practitioners seek to engage with the issue of rising food demand

Examples of Agtech Today

Crop testing is conducted in tech-heavy, climate-controlled rooms. By adjusting lighting conditions the characteristics of vegetables themselves can change; the smell, taste and even vitamin content. Experiments that are currently conducted by robots

can measure the vitamin content and the ripeness of peppers. Drones and special cameras analyse fields for pest and disease prediction.

It is simply amazing what can be achieved with gene editing, artificial intelligence and technology. One of the most promising systems is "Vertical Farming".

Vertical Farming is basically farming in layers. It is done indoors with artificial lighting in places like industrial halls, skyscrapers, containers, and undergrounds. The environment's light, water, temperature and air are fully controlled. Vertical farms are often highly automated; conveyor belts, sensors and water systems lower the amount of labour needed for farming. There is no need for the use of pesticides or herbicides, water use is very efficient and soil is almost never used. Most vertical farms are hydroponic or aeroponic, meaning they do not require the use of soil. Crops commonly grown in vertical farms are greens such as salads and herbs. This concept is designed for urban areas with little available space for agricultural operations. What's more, vertical farms can be operated 365 days a year, the output of which is organic and nutritious because the perfect balance of light, water and temperature can be achieved.

Alternative proteins are needed to meet the growing demand for protein-rich food. Research is centred around creating protein strings in labs which have the consistency and the taste of conventional meat. As well as growing cultured meat, genes in crops are edited to increase the level of proteins and nutrition in general. Insects as a protein source have become very popular all over the world.

Hydroponics, Aeroponics and Aquaponics are new ways of farming without the use of soil. Hydroponics is a method of growing plants without soil by using mineral nutrient solutions in a water solvent. Aquaponics is a system that combines conventional aquaculture with hydrophobics in a symbiotic way. Aeroponics is a process of growing plants in an air or mist environment where plants are sprayed with a nutrient solution. These three alternative growing technologies can be used anywhere in the world because they require no soil and very little space compared to traditional growing methods.

Experts and investors agree–they believe that conventional agriculture needs disruption. To feed a rapidly growing world, we need to implement better technologies. While high costs in the introduction phase often delay return on investment, the long term benefits are clear. Research is imperative and this requires investment. There is already a flurry of interest in this area–investments in agtech have tripled over the last year. In 2017, 10$ billion was invested in the industry. In a space traditionally held and understood by the farmer, the entrepreneurs have well and truly arrived.

Figure: A Better Future Imagined with Agtech Implementation.

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Source: Nielsen

Conclusion

Advancements in agtech or agriculture technology are seen as vital with global population heading for 9.8 billion by 2050. Climate change challenges conventional means of satisfying food demand. In addition, measures to tackle climate change mean food must be produced more locally. Experts believe that gene editing, artificial intelligence and digital technology can help to achieve higher yields and produce more nutritious food. Crop testing, vertical farming, alternative proteins and hydroponics are all the subject of considerable R&D and investment as agtech practitioners seek to engage with the issue of rising food demand.

Expert in this Insight

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