

# Sustainable Agriculture: A Greener Way to Grow

Sustainable agriculture uses micronutrients to promote soil health and support healthy plant growth. But what exactly is sustainable agriculture?

NEW YORK, NEW YORK, USA, May 24, 2022 /EINPresswire.com/ -- <u>Sustainable</u> <u>Agriculture</u>

Sustainable agriculture is based on the principle of using farming practices that meet society's current food and textile needs without compromising the ability of future generations to do



Sustainable Agriculture

the same. In other words, sustainable agriculture produces food and other essential goods in a way that does not damage or deplete the natural resources upon which our existence depends.

There are many different approaches to sustainable agriculture but all share a common goal: to create an environmentally, socially, and economically sustainable system. To achieve this, farmers employ various techniques designed to minimize their impact on the environment while maximizing yield. These techniques can include using more efficient irrigation systems, planting cover crops to improve soil health, and carefully monitoring the nutrient content of fertilizer applications.

The ultimate goal of sustainable agriculture is to help ensure food security for future generations while protecting long-term environmental stability. There are many benefits to adopting such practices, including reduced reliance on fossil fuels and other nonrenewable resources, reduced use of toxic chemicals in agricultural production, and improved ability to adapt to changing environmental conditions like rising temperatures or changing rainfall patterns.

As climate change continues to impact food systems worldwide, sustainable agriculture will be increasingly important in ensuring a stable future for society and the environment. By making changes today towards more sustainable farming practices, there is the possibility of creating a better tomorrow for everyone on the planet.

### Factors Affecting Sustainability

Sustainable agriculture is a farming method that helps maintain the long-term health and fertility of the soil. The most important factors that affect sustainability are climate, soil, nutrients, and water resources. Out of these, water and soil conservation are the two factors that involve human activities.

While growing and harvesting crops, farmers remove nutrients from the soil. Without replenishment, the land loses nutrients and becomes unusable or produces lower yields. Sustainable agriculture is based on replenishing the soil while reducing the use or need for nonrenewable resources like natural gas or mineral ores.

A farm that can produce permanently but harms environmental quality somewhere else is also not practicing sustainable agriculture. An example of a situation in which a global perspective may be justified is the implementation of fertilizer or manure, which can increase farm productivity but contaminate nearby rivers and coastal waters (eutrophication).

The other extreme is also undesirable, where low crop yields lead to nutrient exhaustion in the soil and rainforest destruction. In Asia, the precise land required for sustainable farming is approximately 12.5 acres, including land for animal fodder and cereal production.

### Nutrients Affecting Sustainable Agriculture

Nutrients are essential for plant growth and development, and sustainable agriculture practices rely on healthy soil in order to produce abundant crops. There are many different nutrients that plants need including nitrogen, phosphorous, potassium, calcium, magnesium, sulfur, iron, manganese, zinc, and <u>boron</u>. Each of these nutrients is absorbed by the plant through various pathways in the soil.

Nitrogen is an important nutrient for crop production because it increases yields and also helps to prevent plant diseases. Most crops require a moderate amount of nitrogen to grow well; too much or too little can be detrimental to their health.

Phosphorous is another crucial nutrient for plants as it is necessary for maintaining profitable crop and livestock production. It also enhances the biological productivity of surface water.

Boron helps regulate water retention, germination, and seed production in plants. It also plays a vital role in disease resistance and pest control, making it a key component of sustainable agriculture.

# What does Boron do For Sustainable Agriculture?

1. Essential Micronutrients

Boron is an essential micronutrient needed by plants. It helps to balance sugar and starch, enabling proper cell wall formation and seed reproduction. Boron directly impacts the seed and fruit structure, allowing for a higher agricultural yield. Boron requirements and tolerance to boron supply vary significantly between plants. Crops with high boron demand include corn, cotton, soybeans, alfalfa, and canola.

# 2. Deficiency in Soil affects Crop Yields and Nutrition

Boron deficiency has impacted the yield of 132 crops in at least 80 countries over the last few decades. According to research, an adequate boron supply reduces the occurrence of empty grains and increases yield by up to 5.5 percent in barley, multiplies spike length and plant pigment content, reduces the likelihood of sterility in wheat, and enhances tomato quality and shelf life.

# 3. Boron Improves Yield

Boron is a nutrient that improves crop yields in various crops and growing environments. A study in Brazil, for example, found that adding 1kg of boron per hectare to seed cotton led to an increase in yield by 8%. Another study conducted at the Cuu Long Delta Rice Research Institute in Vietnam found that applying 1.5kg of boron per hectare increased rice grain yields by 10%. And in China, a study from 2011 showed that using 400g/mu water-soluble boron fertilizer led to an increase in corn yield of 7.9% or 8.3%.

### 4. Boron-enhanced SOP

ABR authorized the University of Connecticut in 2020 to investigate the effect of its boronenriched SOP (sulfate of potash) fertilizer on the yield and growth of broccoli and tomato. These vegetables were chosen because they both need boron and potassium.

Broccoli has properties similar to other cruciferous crops such as cauliflower and cabbage. In the USA, 92% of broccoli and 90% of tomatoes are grown in California, where the Fort Cady mine is.

ABR provided four different SOP+B blends for the experiment. When ABR's boron-enriches SOP was used, broccoli yields were more than double, while the tomato results were less clear. Still, they suggest a linear relationship between the boron ratio and the yield effect.

It was observed that there is a narrow line between boron deficiency and toxicity, with one examination indicating that the optimal range for most species is 0.5-5mg/kg of hot water-extractable boron. Boron fertilization rates are typically 0.25-3kg/ha range.

# 5. Growing Component of the Fertilizer Market

In 2019, the global fertilizer market was worth \$156 billion, indicating that boron products account for a very small portion of the market. However, researchers believe that the market will grow at a CAGR of up to 12% by 2025 with a significant increase in borate consumption in the agricultural sector.

#### 6. Boron as Fertilizer

Liquid fertilizers are a common type of agricultural fertilizer typically made up of about 10% boron, with application rates varying depending on soil conditions and other factors. Boron

application rates in soil range from 0.5 to 3 lbs per acre, whereas foliar rates range from 0.09 to 0.4 lbs per acre. Some estimates suggest that boron demand in agriculture accounts for around 15% of total demand, with annual growth rates ranging from 4-12%.

### Conclusion

The use of boron in sustainable agriculture is a promising practice that can help improve soil health and fertility and increase crop yields. The current evidence suggests that boron is a valuable tool for sustainably increasing food production.

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