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The Influences of Genetic Engineering with

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Abstract

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method of growing crops must be administered. Research involving genetically modified
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for increasing agricultural output. With other countries utilizing GMOs for agricultural practices,
Kenya can adopt the technology and produce crops despite conditions.

The Influences of Genetic Engineering in

Introduction

While genetically modified organisms (GMOs) may be a familiar concept to some, what a Genetically Modified Organism (GMO) is an animal, plant, or microbe whose DNA has been altered using genetic engineering techniques. This allowed scientists to produce a derivative organism that is composed of a desired gene code. GMOs have been studied and experimented on in the agricultural field in hopes of effectively altering the genes of a crop to produce more optimal yields.

Kenyan farmers undertake an arduous process to cultivate crops that requires daily labor from start to finish. Factors such as weather conditions, pest infestation, disease, and low soil fertility can affect cultivation. GMOs may be able to alleviate many of these problems by providing a more resilient alternative for agricultural production. When deciding whether Kenya should utilize GMOs to restore its national agricultural output, knowing the history behind genetic engineering and its potential influence on the world is crucial.

The study and findings of GMOs

Long before the recent advancements in biotechnology, genetic engineering began with selective breeding and crossbreeding. Certain traits of significant output (f s) J ET Q qpl. agive crq 0 0 612 7

Kenya's background

Kenya is located in east Africa on the equator where
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 Britain on December 12, 1963, allowing the country to
 create a new constitutional democracy. The primary
 languages spoken are Swahili and English, but Kenyan
 native languages can be divided into three groups: Cushitic,
 Nilotic, and Bantu (the largest group). The country has a multiparty political system and is a
 presidential representative democratic republic.

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from the decline in crop production. Based on the second image, the large cities in the south (mainly Nairobi and Mombasa) are the main centers of population and economic activity.

degradation, and economic hardship will not be resolved by supplying food and other needs to millions of suffering households but instead by having an efficient production system during drought conditions.

Introducing GMOs in Kenya

Although the Kenyan government has now decided to inaugurate GMOs, this would not be the first time that the technology was introduced in the country. In 2010, genetically modified testing for maize began in Kenya but this study soon stopped in 2011 as a result of a proposal that was formed by the then Public Health Minister, Beth Mugo, to ascertain the preparedness of Kenya to embrace GMOs. The technology was questioned regarding the banning of GMOs in other countries due to potential unnatural, carcinogenic properties. When analyzing how GMOs affect the health of humans, the U.S. Food and Drug Administration (FDA) has concluded that GMOs are as healthful and safe to eat as their non-GMO counterparts. During the safety of GM crop intake.

More importantly however, the main concern with the utilization of GMOs was how it would affect the livelihoods of smallholder farmers. The Seed and Plant Varieties Act of 2012. This act prevents farmers from exchanging or selling their own seeds and creates a dependency on multinational companies by smallholder farmers, thus threatening self-sufficiency. The establishment of GM seeds in Kenya raises questions about

Unexpectedly, in 2019, the Kenyan Cabinet approved the commercialization of genetically modified pest resistant cotton known as Bt cotton, commencing the reinstatement of * 0 2 V L Q W R . H Q \ D ¶ V , later in 2020, Bayer, a pharmaceutical company known for supplying GMO seeds, donated maize and vegetable seeds to relieve smallholder farmers from the impacts of COVID-19 and to prevent the pandemic health crisis from turning into a hunger crisis. It was not until last year, 2022, that the newly elected President William Ruto declared that the ban on GMOs in Kenya was lifted.

This created immediate havoc among the people of Kenya. The essential question was ³ Z K D W F K D Q J H G W K H P L Q G V R I W K H . H Q \ D Q J R Y H U Q P H Q W " ´ in 2009 which granted the National Biosafety Authority (NBA) the power W R ³ H [H U F L V H J H Q H V X S H U Y L V L R Q D Q G F R Q W U R O R Y H U W K H W U D Q V I H U K D Q G O with a view to ensuring: safety of human and animal health; and provision of an adequate level R I S U R W H F W L R Q R I W K H % H Q V D U H R W P H Q W K R U D W L R Q D G 7 K L V to restrict and oversee any usage of GMOs in Kenya for the safety of the people. However, October 2022, Kenya re-established GMOs to alleviate the effects of severe drought. This decision was made A W H U . H Q \ D ¶ V F D E L Q H W I D F W R U H G L Q E L R W H F K Q doctors, and global agencies including the United Nations, by allowing the utilization of GMOs around the world . H Q \ D ¶ V J R Y H U U S P e w y d e v e l o p e d w e t e r m i n a t e t h a t biotechnology is beneficial for helping eliminate the water shortage in Kenya.

The influence of GMOs on Kenya's economy

Analyzing Kenya's economic history helps identify how the country is likely to flourish or suffer in the face of a changing climate. According to USAID (2022), Kenya has a GDP of

\$95 billion with the agricultural sector contributing approximately 33% to this figure.

Additionally, this sector employs more than 40% of the total population and 70% of the rural population. Evidently, agriculture is the primary sector that many Kenyans partake in to make a living, but Z L W K ³ R I W K H S R S X O D W L R Q O L Y L Q J R Q O H V V W K D C
 action to reduce food insecurity, unemployment, gender poverty (Food and Agriculture
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This image from The World Bank presents the alarming fall in labor productivity in Kenya over the past 28 years. Based on the graph, labor productivity has declined since 1991 to its lowest point during the financial crisis in 2009, with a slight increase since that time. Globalization and modern economic developments have decreased youth participation within the agricultural sector, but that is likely a result of the decrease in labor productivity in the sector. The decline in labor productivity which hinders the growth of the agricultural sector. The fall in agricultural output leads to a decline in government revenue. The government must spend more on imports of food and other agricultural products. With the water shortages preventing normal crop production, Kenya must import maize from countries that have

suffered less from the droughts of climate change. One country that provides Kenya with maize

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2022). This reveals how costly it is to import a staple crop such as maize during off-season.

The above image from the Kenya Revenue Authority depicts how much food and beverages the country has imported. Ultimately, the value of imports seems to fluctuate around \$20 billion

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graph presents how imports tend to increase during those month intervals.

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when compared to non-GMO production WKH DYHUDJH SULFH GLIIHUHQFH LV

(Spectrum Nation, 2019). This contrast provides Kenya with a profitable margin where

importing GMO crops yields more value. GM crops will also combat the estimated decrease

in economic growth from 5.9% in 2022, to 5.7% in 2023, which is fueled by the decline

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arrangement of duty-free importation of 10 million bags of GMO maize in the next six months

in hopes of relieving the citizens of Kenya. The performance of this arrangement will help

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