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Plant Biotechnology In The New Millennium

Plant Science

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ABSTRACT

The Impact of biotechnology in agriculture as plant biotechnology has been immense, visible to the scientific community, may not be visible to the general public but the application of the same has become part of our daily lives . Here, this journey of technological transformation is traced back from the commencement of this processes to the impact in the world over, and to the point where it stands as of now, and where it is most wanted in the modern world.

Biotechnology denotes current and earliest methods of procuring food products (Zaid *et al* 1999). In the past half century, the progress of crops have been enhanced by genetic engineering, agronomic practices which have benefited agriculture for the world over and had ensured greater impact in the developing world.

The journey was tremendous when the application of such science unravelled on the minimization of uncertainty, the reduction of time factor, disease elimination ,inclusion of useful traits from other plants and other sources(Geoffrey *et al*, 2014), this also involved ventures such as whole gene sequencing as in the plant *Arabidopsis,* which is conferred as milestone in plant biotechnology. One such advancement has been especially the technological innovations which assisted poverty alleviation, reducing susceptibility, increasing productivity (Adato and Meinzen-Dick 2003) but the impact of success differed in degrees which depended on policies of the presiding communities, their strategies and progressions.

Amongst the many, the farmers in the community of producers have gained immensely from this technological boon, augmented a higher yield, enhanced their productivity, resistance to stress and disease. Biotechnology has the potential to address poverty issues in the developing world, but it depends on how the application is utilized in the case scenario, but privatization and inaccessibility, the incapability of seed systems to bring novelties towards farmers (Pingali and Traxler 2003) hampered farmer's need, these are the issues that still need to be addressed around the developing world.

In the broader picture developing countries are already profiting and will continue to do so from developments in plant biotechnology. To emphasize this Bt-cotton, a natural insecticide protein from bacteria, is providing high vintage to millions of farmers with condensed insecticide expenses and lower health risks. Several further valuable plant biotechnology crops that will profit underprivileged farmers and customers are in store that should soon reach farmer's fields.These are thought to benefit billions of individuals in developing countries. Apart from the success stories in North America and Brazil, Asia in biotechnology achieved growths in crop efficiency which was adequate to bring down a part of its population, distressed from lingering malnutrition to nearly half of its percent. Adapting technology has saved environments from converting to agricultural land, by aggregating harvests on land previously used in production, therefore technology plays a major role in conservation of tropical forests.

But, the undaunted task of solving the problem of feeding nearly eight hundred million people is still at hand especially in the developing world, they are still found chronically under nourished, their meals under required calories, deficient in minerals, vitamins and nutrients. (Toenniessen,2003).The less fortunate were found mostly in rural areas, where technologies have not been implemented due to inadequate basic sources; water, irrigation facilities (Conway 1999).

In most developing countries, small-scale farming is a common practice, these populations happen to produce their own food substances, depending on it for their source of revenue. China, India and Africa, can benefit most because millions of people depend on the small scale agricultural-farming, further genetic improvements of crops by conventional plant breeding, as well as breeding supplemented by new biotechnologies that are derived from advances in plant molecular and cellular biology. Although profitability was the major motive for farmer's implementation of agricultural biotechnology, other reasons include, reduced contact to pesticides and reduced exertion for pest watching which was needed for pesticide applications. The scale of such paybacks is also associated with pest pressure(Piggott and Marra 2008).

Including genetic engineering, a number of potent tools were innovated in biotechnology to manipulate genetics of animals and plants (Naylor, 2004). The experience for three decades of biotechnology demonstrates the prerogatives of enthusiasts and challengers to assess the scenarios of crops that have been genetically engineered. (Geoffrey *et al*, 2014). Sequencing the rice genome has been the basis for development of cereals considered as one of the utmost significant crops (Yu,, *et al* , 2002) further it has been thought that 10% of cultivable land that has been used for crops, use technology though it raises certain concerns from public(James,2011). At the heart of this technology lies genetic engineering which is considered as the key to mend crop reaction to climate alteration, enhance staple crop's nutrient quality. In such a technologial advancement, consideration should be given to the exclusive perils, each attribute might demonstrate(Geoffrey *et al*. 2014).

It would be incomplete if 'Golden rice' is not mentioned here. 'Golden rice' is one of the greatest and highest profile product of genetic engineering in biotechnology, it has been highly attributed, as well as invited critics. Called golden since it holds beta carotene, this makes a light yellow coloured grain, here beta carotene is transformed into Vitamin A after consumption, thus providing this critical nutrient in the diet. It is thought that about 400 million in the developing world would benefit from such a revolutionary product (Dawe, 2002).The other high profile biotechnology products include Bt-cotton, Insect-herbicide-resistant Bt- cereals and grains, seeds and several other vegetable and fruit crops.

In conclusion, biotechnology is the future of agricultural crops, the technological revolution has already affected the lives of most people around the world, it can be said that at this stage it is impossible to have high quality crops in quality and quantity with out the input of such technology. What is needed is the application of the same in every society, its accessibility to the areas that have so far could not afford it, further the implemen-

tion, embracing of this sceince is found wanting in societies that need it the maximum, to uplift economies. Although the path has its perils, but the poverty and social evils can be eradicated to a large extent, should plant biotechnology find its place in the agriculture of the socities that need it the most.

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