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AN ANALYSIS OF BIOSECURITY OF AGRICULTURE

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ABSTRACT

The most pressing issue confronting emerging countries is population growth and accompanying food insecurity. It is essential to safeguard crops and plants from both deliberate and accidental threats in order to satisfy the demands of the nation's population for meals, feeds, and fibers. There are many challenges to the agricultural system, all of which will have an impact on its long-term viability. To combat all of the dangers to agriculture, the United States was the first to use the Biosecurity technique, which is used to prevent or reduce the spread of infectious illnesses in crops and livestock. Population expansion and poverty, globalization, climate change, and varied agricultural infrastructure are the most prevalent problems for agriculture biosecurity that can be observed among all natives, both locally and globally. Other issues affecting agricultural bio-security include a lack of a suitable communication network for joint diagnosis and the growth of national and international technical standards to promote rapid global development. Governments or legislations should arrange educational programs to help farmers get a better knowledge of agricultural biosecurity. Various infectious illnesses may be identified on time as a result of biosecurity in agriculture, as well as appropriate information for climate change and other agricultural risks. It will also facilitate appropriate trade between the two nations and may be utilized for early detection of crop health, harvesting times, and advising farmers on the best approach for protecting their crops against intruders.

KEYWORDS: *Agriculture, Biosecurity, Development, Diseases, Farmers, Practices.*

1. INTRODUCTION

Agriculture, with a worldwide distribution of approximately 40% of accessible land, is the world's biggest industry in terms of land use and is the only source of human food. Farming has an important part in a country's economic development. Furthermore, agricultural food items provide for about 78 percent of the world's average per-unit-of-population energy needs, while other food bases such as egg, milk, and meats account for another 20% of the world's typical population requirements. As a result, meeting the expanding population's food needs is a basic need that can only be met by increasing agricultural output. Natural and agricultural plant systems are components of a sustainable civilization. The health of many businesses' plant systems has determined their success or failure(1).

Human epidemics of infectious illnesses have occurred numerous times throughout history, often as a result of societal strife and political instability. Plant disease outbreaks may have consequences that are substantially different from those of human buildings, and the cause of political uncertainty can be less obvious. Many dangers surround the plant system, and they have a greater probability of occurring. With advances in science and communication technology, increased transportation of humans, plants, and plant goods, and rising damages due to plant pathogens being intentionally brought into or compatible with trade partners, the risk of these hazards has dramatically increased, contributing to global food safety. Biosafety is a word that is

often used in many situations. Often, the variations in definition are determined by the system's scale. Security is viewed as a stage of preparedness, and the following reasons are provided: Lab scale biosecurity is a situation of preparation that ensures that a specific organism cannot run away carelessly from their workroom; a specific organism cannot be removed from the laboratory without prior approval geographical biosecurity is a condition of preparation that ensures that a specific organism is contained within and/or excluded from a defined area(2).

Until recently, the word biosafety was mostly used in the United States to refer to a technique that aids in the prevention or reduction of infectious disease transmission in crops and animals. Biological weapons against American agriculture include karnal bunt fungus (a wheat-infected disease), soybean roasts, and base and door conditions. However, under the name bio-security, more and more attempts were undertaken to avoid the deliberate and accidental damage caused by the entrance of animals into human health and the environment, as well as the agricultural and cattle sectors. Biological risk assessment in agriculture and food is used to explain the practical discussion because it is difficult to interpret biosecurity in any specific language and also discuss all other difficulties associated with it in different parts of the world, but after expert consultations with the United Nations Food and Agriculture Association, the concept behind biosecurity was developed. Biosecurity is a new idea that is currently being researched to see how it might be used in the future(3).

1.1 Difference between bio-safety and bio security:

Biosafety is the protection of humans and the environment from the unintentional spread of disease-causing microorganisms and biohazards, while biosecurity is the process of protecting humans and the environment from the deliberate release of pathogenic microbes and biohazards. Food output in India has doubled in the 20 years since the commencement of the green revolution. Chemical fertilizers and insecticides were increased sevenfold and 375fold, respectively. Furthermore, increased access to unrestricted and sensitive chemical species types (such as nitrate, phoxylate, ammonias, chlorides, and heavy metals content) in the soil structure has resulted in a rise in excessive agricultural input caused by pollution. The most important job for an Indian culture is to feed the growing population (i.e. food security), next to wisely utilize natural resources, to preserve socioeconomic balance (in terms of market, livelihood, and yield), and to integrate traditional knowledge and efforts into resources(4).Figure 1 is representation of importance of agriculture.

1.2 Importance of Agriculture:

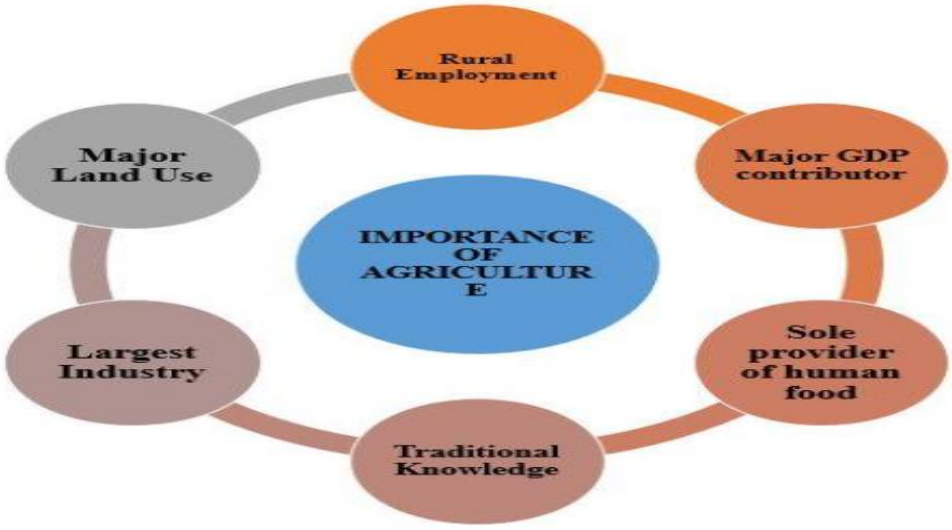

Figure 1: Representation of Importance of Agriculture.

Agriculture contributes significantly to a country's economic development by being one of its largest industries and a major contributor to GDP, increasing employment by providing jobs for both skilled and non-skilled workers, playing a major role in providing food to humans all over the world, and being the largest industry known to date.

1.3 Major problems associated for the implementation of Biosecurity:

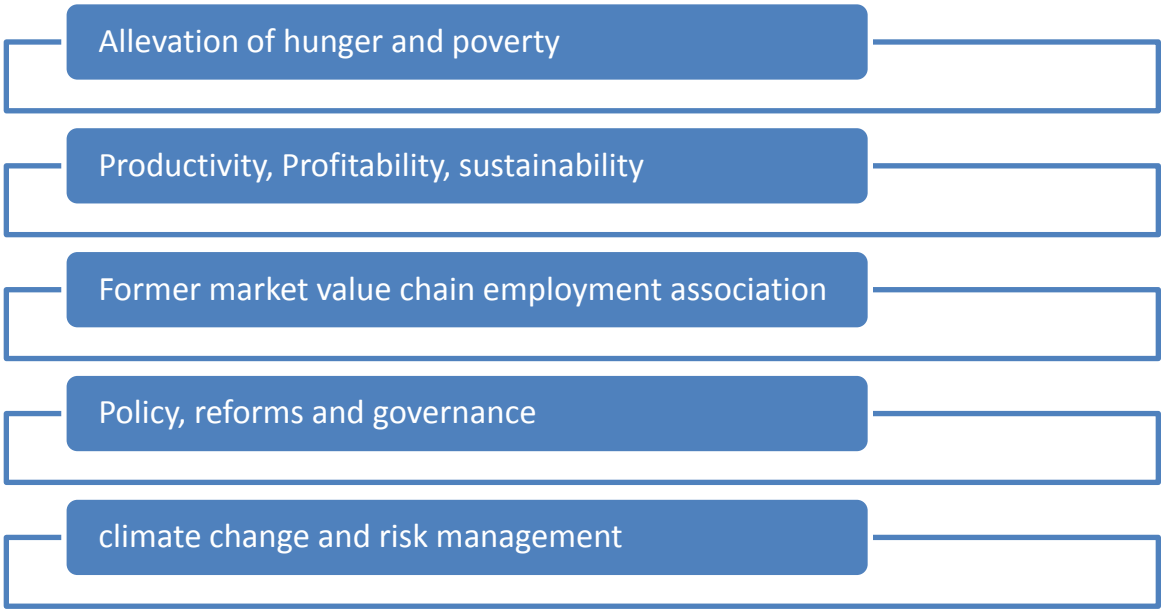

Figure 2: Representation of Major problems associated with the implementation of Biosecurity

Figure 2 represents Major problems associated with the implementation of Biosecurity. A major biosecurity issue is the increase of hunger and poverty in the nation, which necessitates the production of more agricultural commodities in order to support such vast populations. Farmers should be supplied with emerging and suitable technology for increasing the efficiency of inputs in order to produce products efficiently. The Bali road map for climate change should be implemented, as well as the establishment of a regional biosecurity shield equipped for early detection of forecasts and risk management, and the development of a link between farmers and market areas. To help distant farmers, the government and policymakers should offer resources, technology, and different programs and regulations(5).

1.3.1 Diversification and Poverty:

Agriculture diversification towards high-value activities, such as horticulture and animal husbandry, generates better returns that meet smallholder farmers' resources and income needs, who allocate bigger areas to high-value crops and also make output more productive than larger farms. The biggest benefit to marginal and smallholder farmers is a reduction in poverty among people who work in these businesses. As a result, technology-driven diversification, markets, and legislation may help farmers increase their incomes, generate employment, maintain agricultural expansion, and decrease poverty.

1.3.2 Livestock Policy and Reforms:

Despite having significant potential for improving and maintaining agricultural development, the livestock industry is underinvested and neglected by financial institutions (credit and insurance) and support services. Currently, agriculture gets just around 10% of government spending and 5% of agricultural loans. Furthermore, our feed demand estimations might aid in reorienting food

management strategy and optimizing animal population. More livestock development resources are justified based on estimations of cattle's beneficial environmental impact. The tenancy statutes of various states should be properly adjusted in light of unique regional requirements. Land leasing should be limited to SMEs as much as feasible, while big farmers should be encouraged to embark on non-fertile ventures.

1.3.3 Market Restructuring:

Price policy and market reforms should: I increase market competition by connecting farmers to markets through institutional developments such as contract farming and producer associations; promote infrastructure investments (road, electricity, and communication), lowering transportation and transaction costs and encourage the private sector to invest in infrastructure. Plants that are cultivated for meals, feeds, fibers, and fuels are linked to some of the main issues related with crop-biosecurity. A wide variety of indirect and direct contacts over short and long time periods are used to combat alertness on the way to validate the harvest and viability of the system. Few issues are apparent in existence and their effect can be readily assessed, such as viruses that cause illness, while others, such as the environment and unique goods, are ambiguous. All countries have established a few key successful crop security plans to increase their ability to produce food(6).

2. LITERATURE REVIEW

According to Meyerson et al., biosecurity is more than a buzzword; it is the central endeavor of planning, decision-making, and coordination to protect human beings, animals, and the environment against biological threats. The main goal of biosecurity is to protect against the threat posed by diseases and creatures; the main instruments of biosecurity are prohibition, abolition, and regulation, all of which are maintained by knowledgeable organization supervision, procedures, and the quick and effective safeguarding and distribution of vital data. As natural diversity, modernity, technological advancements, and community-based conflicts develop, the risks of biosecurity breach will continue to climb, and the consequences will become more frequent and severe. To maintain bio-security, significant attention should be given to strategies for preventing and quickly detecting, as well as quickly reacting to, potentially harmful and destructive organisms. Certainly, lawmakers will weigh the costs of technology, people, and accommodations, as well as the possibility of a bad public perception of regulatory mechanisms, against the benefits of financial expenditures in damages and a favorable communal image of security principles. Biosecurity is defined as the totality of risk management capabilities used to defense against biological threats.

Waage et al. [9]describe the stoppage and controller of the introduction of new pests and diseases is an agricultural and interest-bearing challenge.This anxiety stems in part from the perception that the danger is increasing, although the changing rates of the biosecurity threat have been poorly studied, and there is no clear signal. Traditional animal and plant biosecurity systems differ significantly, yet they are becoming convergent. Bio-economic risk modeling is a useful tool for guiding the distribution of limited biosecurity assets. The future preventive and management methods will be significantly influenced by new technologies and the growing involvement of the private sector. In general, today's bio-security systems are being called into question by shifting national trade objectives, increased environmental concerns regarding biological assaults, and the issue of "Who will suffer?" Tomorrow's systems may have to be more varied in terms of their efficacy. It was proposed that three distinct changes be made: integrating biosecurity between plants and animals into a single, proactive, risk-based method; focusing more on global collaboration to address source-related dangers; and commitments to resisting bio-security, rather than erecting barriers around agro ecosystems, to building resiliency(7).

According to Vaughan Higgins et al., worldwide efforts to halt the spread of all biological threats

linked to large agro-food production are gradually being delegated from country law to agricultural businesses and farmers. Prior research has highlighted all of the ground-level and institutional challenges that come with engaging farmers in plant biosecurity. Though, little is known sociologically about what is already known to farmers and whether or not they are able to manage all disease threats, and, most crucially, how they follow plant biosecurity. The problem is solved by putting theoretical efforts into the maintenance plan. Framers' traditional techniques for herd health and farm play a significant part in making biosecurity practical, according to the categorical results of the Australian cattle sector. Farmers make a significant contribution to national livestock biosafety beliefs and practices by incorporating two important activities: skilled craftwork and fluid engineering. Farmers must have a thorough knowledge of localized biosafety procedures in order to participate effectively in biosecurity governance(8).

Michele GrazianoCeddia et al. describe one of the components of biosecurity that defend plants against different hostile alien species, which are among the greatest risks to intrinsic biodiversity and economic effectiveness in many sectors, including agriculture, across the globe. Agriculture farmers, on the other hand, are not all the same across the globe. They may have distinct objectives and priorities, use different technologies, and have access to various areas of land. There may be some external influences in the conformation of the pest disseminate effects and subsequent damage caused if farmers exhibit diversity in their behavior in response to invading pests and the harm they cause. The impact is shown in the case of two different types of manufacturers: profit-driven professional manufacturers and utility-driven hobby manufacturers. After a discussion on possible strategy tools to pinpoint this market disappointment and highlight the importance of taking different stakeholder and their differing inducements when scheming strategies, the hobby-aspired producers define a breeding base to deal with pest problems, less investment for pest regulation, and as well as after discussion on possible strategy tools to pinpoint this market disappointment and highlight the importance of taking different stakeholder and their differing inducements when scheming strategies(9).

J. P. Stack established that the plant system is the foundation of food production methods, making it a key component in the creation of a sustainable civilization. Various risks to the plant system must be eliminated in order to maintain a sustainable environment in its balanced state. Plant biosecurity poses many challenges at the global, regional, and local levels. Increased population, globalization, climate variation, bioterrorism and bio-crime, and changing infrastructure linked to agricultural industry are all issues related to plant biosecurity. Other issues related to plant biosafety include the need for proper communication networks for cooperative diagnosis, the establishment of national and international technology policies to promote the rapid development of appropriate diagnostic technologies and procedures around the world, and the need for educational programs to elaborate the role of plan. Every country should develop a plant bio-security arrangement to ensure continuous supply of feedstock, fiber, and food, and it is also pretty important to build a global framework for cooperation that will assist to sustain plant biosecurity without negotiating trade(10).

3. DISCUSSION

Agriculture is the country's biggest sector, accounting for about 40% of worldwide distribution and playing a critical part in the country's economic growth. Crops provide 78 percent of the world's overall energy requirements, with the other 20% coming from milk, eggs, meat, and other sources. Farming has an important role in the country's financial development. More food is required as the population grows, and more agricultural output is required to satisfy their requirements, which is always a problem for progress. India invests just 0.4 percent of its GDP on agricultural research, a figure that is much lower than that of industrialized nations. There is sufficient data to suggest that agricultural R&D investment pays off handsomely. Agricultural research expenditures must continue to push yield boundaries higher, reduce production costs, and

strengthen production systems' resilience. A transition from traditional irrigation methods to modern irrigation technology with institutional and governmental support is needed to improve irrigation efficiency. The United States government invests about $4 billion on their country's farmers and future. The US government will spend about $200 million on a biosecurity monitoring system and improved analysis of high-risk biosecurity threats. The biosecurity investigation system assists the section in identifying and responding to biosecurity risks, as well as providing signals to keep the market entry free of pests and diseases.

Expansion of the Native Guards' biosecurity work and increased biosecurity awareness across the globe via target-based messaging and public events financing. Biosecurity has an impact on everyone–it is necessary to maintain a 'Maximum Watch' to detect and account for potential biosecurity threats, as this will allow for the development of trusting relationships with the agricultural zone and motivate the participation of major industries and stakeholders in biosecurity activities. Several awareness products, including as films, media, and financing needed community events, are used to engage appropriate champions and ambassadors who demonstrate a link to the agricultural industry and raise awareness.

By establishing a web page that contains a community that can be used to report weeds, pests, and diseases, the biosecurity surveillance information was improved in terms of analysis, collecting, dissemination, and monitoring. Increased biosecurity awareness helps to reduce the level of risk posed globally and has applications in the agricultural sector and economy. The Native Guards program provides employment, training, and a career path for Native people in the fields of terrestrial and maritime security. Investment in laboratory infrastructure, which includes diagnostic equipment and is used to support pest and disease research. This will help us focus biosecurity decisions on high-risk areas, allowing us to protect our most valuable produce and export.

New agricultural practices based on the Green Revolution have resulted in a sequential increase in crop production at the same time as normal source depletion. In agriculture, externalization leads to a substantial reduction in soil fertility and environmental flexibility. There are many threats to the agricultural system that jeopardize its long-term viability. At the local, neighborhood, and global levels, there are many obstacles to achieving agricultural biosecurity. Growing population, global development, climate change, bio-terrorism and bio-crime, and varied agricultural industry organization are all issues that have to do with agriculture bio-security. Additional issues include the need for communications systems to allow cooperative diagnosis, the expansion of domestic and international technical policies to encourage rapid global placement with appropriate analytical techniques and uniform practices, and the need for learning broadcasts about the importance of agriculture bio-security for sustainable development.

4. CONCLUSION

Unwanted pests and diseases may be harboured on purpose or by accident. Most agricultural issues are caused by the unintentional introduction of naturally occurring pollutants via plants or animal resources. In contrast, many pest imports, such as numerous unfriendly plants, fish, and animals that are now posing a threat to environmental assets, were deemed introductions that had not been assessed for their impact on biodiversity and ecosystem management. These various dangers will, rationally, have different inhibition strategies. Deliberate introduction will amplify risks as they are strengthened to establish themselves, or at the very least to maintain continuity. Continuous introductions are heavily weighted in terms of risk. The current biosecurity system is unlikely to change quickly. Many of them are now 'locked' in global contracts, allowing them to carry out harsh trading authorizations on variants. Despite the fact that the costs of running this organization are decreasing as a result of increased recurrent violations, additional exclusive trading damage, and abolition plans, there will be increasing pressure to perform more proactively

and preventively in order to combine efforts to check new pest and disorders at their source. New research that enables monitoring, modeling, and identification of risks linked with biotechnology for animal and plant opposition will be an important feature of this inevitable growth of bio-security structure. Furthermore, bio-security will facilitate proper trade between the two countries and may be utilized for initial detection of crop health, harvesting time, and advising farmers on how to safeguard their crops from intruders.

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