

FORUM:	World Health Assembly
ISSUE:	Measures to Regulate Unapproved Genetically Modified Organism (GMO) Varieties and Prevent Unintended Toxin Production or Nutrient Loss
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POSITION:	Deputy Chair of World Health Assembly

Introduction

Genetically modified organisms (GMOs) are organisms whose genetic material has been altered. They are widely used in agriculture to improve crop yield, pest resistance, nutritional value, and resilience to different environments. However, unapproved GMO varieties may enter food systems without the process of completing the safety assessments required by national authorities. According to the World Health Organization (WHO), GMOs should be evaluated individually because each modification may affect human health and the environment. Although an unapproved GMO is not automatically guaranteed as harmful, it may raise concerns about unintended toxin production, allergens, or changes in nutritional value.



Genetically Modified Organism (GMO)

The spread of unapproved GMO varieties has become a growing concern because modern food supply chains involve the movement of seeds and crops across many and various countries. GMO material enters other crops through cross-pollination, shared farming equipment, transportation, storage facilities, or experimental field trials. This can create problems for governments, farmers, exporters, and food safety authorities. In particular, developing countries may be more vulnerable than other developed nations because some lack advanced laboratories, trained experts, and effective monitoring systems to regulate wrong usage of GMOs. Along with it, strict import bans or the destruction of contaminated shipments increase food prices, disrupt trade, and cause economic losses.

As this issue influences food safety, trade, agriculture, and the environment, the issue requires international cooperation. Countries require stronger and powerful safety testing, clear approval procedures, reliable traceability systems, and faster information sharing. Without effective regulation, unapproved GMO varieties reduce public trust and create health, environmental, and economic concerns.

Therefore, GMO regulation is not only a scientific issue but also important global challenge that includes food security, international trade, and technological development as a component.

Background

Due to differences in national approval systems and national situations or circumstances, unapproved GMO varieties present a complex and big challenge, requiring scientific and policy interventions. An unapproved GMO is a variety that has not received authorization in a particular country, even if it has been approved elsewhere, such as different nation or continent. These varieties enter food and feed supplies through cross-pollination, contaminated seeds, shared equipment, storage facilities, transportation, or poorly contained field trials, different and various ways to enter. Genetic modification causes unintended changes in gene expression or plant metabolism, affecting natural toxin, allergen, antinutrient, or nutrient levels in different and various ways like those mentioned above. Thus, safety assessments compare modified crops, with conventional, original, and not artificial varieties, and examine toxicity, allergenicity, and nutritional composition. According to the Food and Agriculture Organization of the United Nations (FAO), 198 incidents involving low levels of GM(Genetically Modified) crops in traded food and feed were reported between 2002 and 2012, and affected shipments were often rejected, returned, or destroyed which shows the severity of unapproved GMO. Differences in approval timelines and testing standards continue increasing the risks of trade disruptions. Developing countries are particularly vulnerable because many lack advanced laboratories, validated detection methods, and complete safety data. Thus, unapproved GMOs remains as a major concern involving food safety, economic stability, public trust, and international cooperation.



Food and Agricultural Organization

Problems Raised

Food Safety and Environmental Risks

Unapproved GMO varieties enter the food supply before national authorities completed the required safety assessments by different governments and nations. Genetic modification can sometimes cause unintended changes in gene expression or plant metabolism, which may alter the levels of nutrients, allergens, antinutrients, or naturally occurring toxins which will affect humans eventually. Although these changes are not always harmful and does not ensure harming humans and organisms itself, the absence of



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complete testing makes it difficult for regulators to determine their effects on human health as there are no limitations as mentioned above. Adding on, unapproved seeds spread through cross-pollination or poorly controlled field trials, making them difficult to remove once released into the environment. The Cartagena Protocol requiring countries to prevent unintended movement and manage possible risks to biodiversity and human health is there.

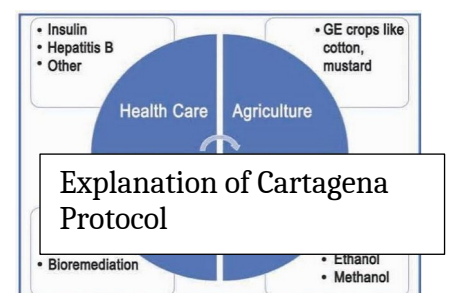
Trade Disruption and Unequal Regulatory Capacity

Differences in GMO approval systems causes serious trade and economic problems to both developing countries and developed countries. A GMO approved in one exporting country remains unauthorized in an importing country because national testing standards and approval timelines differ as each country and nation have different standard, circumstances, and culture. These actions create financial losses for farmers, exporters, and food companies while increasing food prices and delaying supplies for consumers. Developing countries are especially vulnerable as many lack advanced laboratories, trained experts, validated testing methods, and access to safety data. Without stronger international coordination, meaning having similar standard and matched limitations on this issue, unapproved GMO incidents will continue to weaken public trust and disrupt global food security and trade both nationally and internationally.

International Actions

Cartagena Protocol on Biosafety

In 2000, countries adopted the Cartagena Protocol on Biosafety under the Convention on Biological Diversity entered into force in 2003 with the help and assistance of the protocol, nations, and different governments. The Protocol created to ensure the safe handling, transportation, and use of living modified organisms that negatively affects biodiversity or human health is there since 2003, establishing procedures requiring exporting countries to provide information before certain GMOs introduced into another country's environment and circumstances. It also created the Biosafety Clearinghouse, where governments can share GMO approval decisions, national regulations, and scientific risk assessments through cooperation and with globally standardized standards. By improving transparency and international communication, the Protocol helps countries identify unapproved GMO varieties and make informed decisions before allowing their import or release, making the issue to be less severe.



Codex Guidelines for GM Food Safety



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In 2003, the Codex Alimentarius Commission, established by the FAO and the WHO, adopting international guidelines for assessing foods produced from genetically modified plants was made by these organizations. The guidelines recommend case-by-case evaluations that compare a modified crop with a conventional variety, making the standard suitable in different nation, country, culture, and environment. These assessments examine, search for, and find possible toxins, allergens, changes in nutrients, and other unintended effects caused by genetic modification. They also consider the inserted gene, the newly produced protein, and the crop's nutritional composition either. Although these guidelines are not legally binding, they provide governments with a common scientific standard, evidence, and guidance for approving GMO foods and preventing unsafe varieties from entering food supplies.



Key Players

European Union

The European Union maintains one of the world's strictest GMO regulatory systems, being the strongest Union in the world. GM products must receive authorization following a scientific risk assessment before entering the EU market, making sure that GMO is approved through a strong regulation and framework. Member States conduct inspections and laboratory testing to verify the absence of unauthorized GMOs with a strong framework and regulation. The EU requiring traceability and labeling throughout the supply chain, allowing products to be withdrawn if unexpected health or environmental risks are identified is in progress. Its approach prioritizes consumer transparency, environmental protection, and strict control over unapproved varieties, making EU as having one of the strongest regulation and framework in the world.



United States

The US regulates GMOs through several federal agencies, particularly the FDA, USDA, and EPA, making US as having the strongest framework and regulation towards unapproved GMO in the world. The FDA requires GM and non-GM foods to meet the same safety standards and reviews new products individually through its biotechnology consultation program, not differentiating two to make equal and fair judgement on any products. Meanwhile, USDA-APHIS regulates the importation, movement, and



environmental release of modified organisms that may pose plant-pest risks, regulating with a strong framework. The U.S. generally supports a science- and risk-based approach that encourages agricultural innovation while evaluating food and environmental safety either.

Possible Solutions

Strengthening Safety Testing and Traceability

Governments should strengthen approval systems to ensure that GMO varieties are thoroughly tested before commercial release, making a strong regulation towards unapproved GMOs. Safety assessments should examine possible changes in toxicity, allergenicity, nutrient levels, and environmental effects either. Governments should also require producers to provide validated detection methods and reference materials so laboratories can identify specific GMO varieties either, maintaining strong framework. After approval, monitoring should continue to detect unexpected effects or accidental spread, making the framework even stronger. Traceability systems using clear records, labels, and shipment documents could help authorities determine where seeds and crops were produced and quickly remove affected products either. Stronger containment rules should also be applied to experimental field trials to prevent cross-pollination and seed mixing to make the framework, regulation, and standard stronger.

Improving International Cooperation and Regulatory Capacity

Countries improving cooperation by sharing GMO approval decisions, scientific risk assessments, and detection information through systems such as the FAO GM Foods Platform and the Biosafety Clearing-House should be there. These platforms allowing governments to access official safety information and respond more effectively when unapproved GMO material is detected should co-exist. International organizations and developed countries should also provide funding, laboratory equipment, and technical training to countries with limited regulatory capacity either, making a better standardized global regulation on GMO. Common standards should be established to distinguish between unsafe experimental GMOs and low-level traces of varieties already assessed elsewhere. This would protect consumers while reducing unnecessary shipment destruction, trade disruption, and food shortages either.

Glossary

Genetically Modified Organism (GMO)

An organism whose genetic material has been changed using biotechnology.

Unapproved GMO

A GMO variety that has not received legal authorization in a specific country.



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Cross-Pollination

The transfer of pollen between plants, which may unintentionally spread modified genes.



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