

Food and Agricultural Organization (FAO) Background Guide

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United Nations Food and Agricultural Organization Background Guide

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The Food and Agriculture Organization of the United Nations (FAO) was established in 1945 as a specialized United Nations (UN) agency. The creation of FAO originated from the devastating food shortages from World War II, which had been initially brought to the attention of the League of Nations.¹ Upon the establishment of FAO, the body's mandates were set to be the global improvement of nutrition levels, living standards, and agricultural goods production and distribution.² Currently, the FAO faces urgent issues in mitigating the rapidly growing population worldwide and the consequential agricultural demands. Not only does the FAO seek to bring food security across the continents, but it also intends to elevate the quality of those provisions.³

The UNFAO is divided into regional conferences, council committees, and technical committees. The regional conferences focus on numerous specific continents, with the exception of North America, Antarctica, and Australia. Council committees are separated by logistics: programme, finance, as well as constitutional and legal matters. The technical committees each have a set topic, including world food security, agriculture, commodity problems, fisheries, and forestry.⁴ All UN member states (and the European Union as a member organization) are members of the FAO.⁵ With 194 countries and the EU, the FAO provides more than 130 nations with food and agricultural support⁶.

¹ "FAO: Its Origins, Formation and Evolution 1945-1981." <https://www.fao.org/4/p4228e/P4228E01.htm>.

² "FAO: Food and Agriculture Organization of the United Nations - Office of the Secretary-General's Envoy on Youth." <https://www.un.org/youthenvoy/2013/09/fao-food-and-agriculture-organization-of-the-united-nations/>.

³ Food and Agriculture Organization of the United Nations. "About FAO | FAO | Food and Agriculture Organization of the United Nations." <https://www.fao.org/about/about-fao/en/>.

⁴ Food and Agriculture Organization of the United Nations. "Home | FAO Governing Bodies | Food and Agriculture Organization of the United Nations." <https://www.fao.org/governing-bodies/en>.

⁵ "Membership of FAO | The Development Law Service | Food and Agriculture Organization of the United Nations." <https://www.fao.org/legal-services/membership-of-fao/en/>.

⁶ Food and Agriculture Organization of the United Nations. "About FAO."

I. Global Response to Advancement of Genetic Modification of Organisms

Statement of the Issue:

Genetically Modified Organisms (GMOs) are plants, animals, and microbes that have an edited genetic sequence. The changes to their genes intend to provide humanity with convenience and/or aesthetic appeal. GMOs available in the market typically refer to crops, which can be engineered to imbue resistance to specific chemicals, control growth rate, and elevate their visual aspects.⁷ They target the needs of both farmers and consumers, seeking to improve natural products. Most genetically modified livestock are currently in the research and development phase, with rapid-growth salmon being the only animal currently available on the market.⁸

Genetic alteration and enhancement of living beings have existed for over 10,000 years. Notably, vegetables selectively grown for their appearance, taste, and resilience trace back to the ancient Mediterranean.⁹ GMOs, which achieve a specific physical trait through genetic alterations, are the subsequent development from the historical genetic selection of plants and animals. Beginning from slowly ripening tomatoes to pink pineapples, GMOs have been deeply integrated into many corners of global lifestyles.¹⁰ Furthermore, the technological advancement of genetic engineering continues to propel humanity forward into more sophisticated GMO creations. Supporters of GMOs argue that consumption of crops need not be dictated by the luck of the weather or rigorous nourishment of the fields, but effectively controlled using carefully aimed insertion, deletion, or mutation of genetic sequences.

While modern GMOs have distinct benefits to offer humanity, their biology and environmental impacts have not been globally addressed. In fact, each country has a unique

⁷ “List of Bioengineered Foods | Agricultural Marketing Service.” <https://www.ams.usda.gov/rules-regulations/be/bioengineered-foods-list>.

⁸ Doley, William P - APHIS. “BE Salmon Summary,” n.d.

⁹ Mabry, Makenzie E, Sarah D Turner-Hissong, Evan Y Gallagher, Alex C McAlvay, Hong An, Patrick P Edger, Jonathan D Moore, et al. “The Evolutionary History of Wild, Domesticated, and Feral Brassica Oleracea (Brassicaceae).” *Molecular Biology and Evolution* 38, no. 10 (June 22, 2021): 4419–34. <https://doi.org/10.1093/molbev/msab183>.

¹⁰ “List of Bioengineered Foods.”

perspective on the research, implementation, and trade of GMOs due to differences in scientific and economic development.¹¹ This has resulted in nation-specific regulations of genetically modified crops and livestock that range in severity and specificity.¹² With incohesive and often juxtaposing data on GMO safety worldwide, it is crucial that states cooperate to establish guidelines and control measures for GMO production in a diplomatic and respectful manner.

History:

Humans have cultivated genetically selected plants and animals long before the establishment of GMOs. Unlike GMOs, the historical cultivation of organisms did not rely upon altering DNA sequences. Instead, it employed the manual selection and reproduction of cohorts with a desired trait. The origin of selective breeding may appear surprising, as it begins with man's best friend: dogs. Research completed in China revealed that wild wolves were domesticated as dogs by the Chinese about 32,000 years ago.¹³ Less aggressive wolves remained within the company of Chinese hunter-gatherers, leading to the progressive breeding of friendlier wolves. This subsequently led to domesticated dogs.¹⁴

In a similar fashion, wild crops were cultivated to produce desired products as early as 10,000 years ago. The wild cabbage was known to be selectively farmed during this time, leading to analogous crops such as broccoli, brussels sprouts, collard greens, and more. Taking the example of broccoli, a farmer would focus on growing wild cabbages with pleasantly tasting flowerheads, which led to the speciation of the flowery, tree-like vegetable.¹⁵ The geographic

¹¹ Turnbull, Crystal, Morten Lillemo, and Trine A. K. Hvoslef-Eide. "Global Regulation of Genetically Modified Crops Amid the Gene Edited Crop Boom – A Review." *Frontiers in Plant Science* 12 (February 24, 2021): 630396. <https://doi.org/10.3389/fpls.2021.630396>.

¹² *Ibid.*

¹³ Zimmer, Carl. "From Fearsome Predator to Man's Best Friend." *The New York Times*, May 16, 2013, sec. Science. <https://www.nytimes.com/2013/05/16/science/dogs-from-fearsome-predator-to-mans-best-friend.html>.

¹⁴ *Ibid.*

¹⁵ "We've Been Genetically Altering Plants for Thousands of Years | Good Growing | Illinois Extension | UIUC," November 17, 2023. <https://extension.illinois.edu/blogs/good-growing/2015-06-12-weve-been-geneetically-altering-plants-thousands-years>.

origin of these wild cabbage-originating plants remains unelucidated, although there have been theories tracing mostly back to the Mediterranean as well as England or Italy.¹⁶

After years of selective nurturing, the world met the age of modern GMOs in the late 20th Century. GMOs differ from other cultivating methods due to the use of genetic engineering. These organisms have an edited genetic identity, leading to a favorable *phenotype*, or physical quality.¹⁷ In 1973, biochemists from Stanford University developed the first official GMO product approved by the United States Food and Drug Administration (US FDA), which was insulin.¹⁸ Synthetic insulin effectively treated countless diabetic patients who were suffering from hyperglycemia, also known as high blood sugar.¹⁹

Modern GMOs typically refer to crops, known as plant products intended for consumption. The first genetically modified plant was tobacco, which was edited with a yeast gene in 1982.²⁰ The tobacco plant was later used for advanced drug development, such as human growth hormone (1986) and synthetic antibodies (1989). Tomatoes were the first official edible crop to be genetically modified in 1994. Known as the *Flavr Savr*, this product ripened at a slower pace compared to natural tomatoes. In turn, it would provide more time for consumers to store and eat their household grocery item.²¹

Currently, the Agricultural Marketing Service of the US Department of Agriculture lists the following as the globally available GMOs: alfalfa, apple, canola, corn, cotton, eggplant, papaya, pineapple, potato, salmon, soybean, squash, sugarbeet, and sugarcane.²² By 2015, 28

¹⁶ Mabry, Makenzie E, Sarah D Turner-Hissong, Evan Y Gallagher, Alex C McAlvay, Hong An, Patrick P Edger, Jonathan D Moore, et al. “The Evolutionary History of Wild, Domesticated, and Feral Brassica Oleracea (Brassicaceae).” *Molecular Biology and Evolution* 38, no. 10 (June 22, 2021): 4419–34. <https://doi.org/10.1093/molbev/msab183>.

¹⁷ “Genetically Modified Organism (GMO).” <https://www.genome.gov/genetics-glossary/Genetically-Modified-Organism-GMO>.

¹⁸ “Herbert Boyer and Stanley Cohen | Lemelson.” <https://lemelson.mit.edu/resources/herbert-boyer-stanley-cohen>.

¹⁹ *Ibid.*; Program, Human Foods. “Science and History of GMOs and Other Food Modification Processes.” *FDA*, September 5, 2024. <https://www.fda.gov/food/agricultural-biotechnology/science-and-history-gmos-and-other-food-modification-processes>.

²⁰ “A Brief History of Genetic Engineering.” https://www.iatp.org/sites/default/files/Brief_History_of_Genetic_Engineering_A.htm.

²¹ “Q and A About Genetically Modified Crops | ISAAA.Org.” <https://www.isaaa.org/resources/publications/pocketk/1/>.

²² “List of Bioengineered Foods.”

countries had been cultivating GMOs worldwide.²³ The most commonly grown genetically modified crops are soybean, corn, cotton, and canola.²⁴ The leading countries in GMO production are the US, Brazil, Argentina, India, and Canada.²⁵ These products focus on aesthetics, disease resistance, or healthier chemical composition. To demonstrate the range of modern GMO advancement, two drastically different examples will be discussed: corn and pink pineapple.

Genetically modified corn is produced in North, Central, and South America, as well as Southeast Asia and Africa.²⁶ Most lines focus on resistance to insects and tolerance of herbicides. *Genuity*® *DroughtGard*™ cultivated in Brazil, Canada, and the US specifically aims for the survival of corn through drought.²⁷ Other lines of genetically modified corn have nutritional benefits such as the *Enogen*™ from the 2010s, which is meant to efficiently provide energy to cattle.²⁸

Established in 2020, the *Pinkglow*® pineapple has lycopene, a naturally occurring chemical in tomatoes and watermelon that produces a characteristic pink-red shade.²⁹ Grown in Costa Rica and owned by Del Monte, the Pinkglow® has a unique appearance and sweeter taste compared to its traditional counterparts.³⁰ GMO products such as the Pinkglow® aim to please the consumers through purely aesthetic and flavor appeal.

A current genetically modified livestock is the AquAdvantage Salmon.³¹ It grows faster than other Atlantic salmon products due to the genetic combination of the Chinook salmon and ocean pout.³² The eggs themselves are developed in Canada and are then transported to Indiana,

²³ “What GM Crops Are Being Grown and Where? | Royal Society.” <https://royalsociety.org/news-resources/projects/gm-plants/what-gm-crops-are-currently-being-grown-and-where/>.

²⁴ *Ibid.*

²⁵ *Ibid.*

²⁶ Doley, William P - APHIS. “BE Corn Summary,” n.d.

²⁷ *Ibid.*

²⁸ *Ibid.*; “Enogen | Syngenta.” <https://www.syngenta-us.com/enogen>.

²⁹ Del Monte. “Quite Frequently Asked Questions.” Pinkglow® Pineapple. <https://www.pinkglowpineapple.com/faq>.

³⁰ *Ibid.*

³¹ Doley, William P - APHIS. “BE Salmon Summary,” n.d.

³² Medicine, Center for Veterinary. “AquAdvantage Salmon Fact Sheet.” FDA, March 7, 2023. <https://www.fda.gov/animal-veterinary/aquadvantage-salmon/aquadvantage-salmon-fact-sheet>.

US to complete their growth.³³ The US FDA has approved this line of salmon to be safe for consumption. The evaluation process involved comparing the key hormones between AquAdvantage Salmon and its non-genetically modified counterpart (Atlantic salmon). No significant changes were found in the levels of estradiol, testosterone, 11-ketotestosterone, insulin-like growth factor, and more.³⁴

The current global record and organization of GMO development is the FAO GM Foods Platform, an online database for genetically engineered plants.³⁵ As an open-access website, the platform provides information on safety assessments from each country of production. Each product is labeled by the Organization for Economic Co-operation and Development (OECD) Unique Identifier. A formal registration process is required to upload new test results to the platform, with only “officially nominated Focal Points” having permission to register.³⁶

Analysis:

The significant drawback to GMO development is the potential adverse effects, including environmental impacts and antibacterial resistance. The most sensitive concern to consumers is likely their toxicity and carcinogenic risks. The trials for GMO toxicity testing initially involve laboratory animals and later employ human subjects. While there are numerous studies completed on the variety of publicly available GMOs, the outcomes seem to be inconsistent in terms of safety. For example, the *Flavr Savr* and naturally occurring tomatoes were tube-fed to rats in 1992. Reports indicated that feeding genetically modified tomatoes did not lead to toxic outcomes for the rats.³⁷ However, a more modern study on genetically modified corn line NK603 in 2020 showed that their resistance to the herbicide Roundup led to long-term toxicological effects.³⁸ As shown by these results, the safety of GMOs is not clarified for the worried

³³ Doley, William P - APHIS. “BE Salmon Summary.”

³⁴ Center for Veterinary Medicine. “AquAdvantage Salmon Fact Sheet.”

³⁵ “Food Safety and Quality: GM Foods Platform.” <https://www.fao.org/food/food-safety-quality/gm-foods-platform/en/>.

³⁶ *Ibid.*

³⁷ Bawa, A. S., and K. R. Anilakumar. “Genetically Modified Foods: Safety, Risks and Public Concerns—a Review.” *Journal of Food Science and Technology* 50, no. 6 (December 2013): 1035–46. <https://doi.org/10.1007/s13197-012-0899-1>.

³⁸ Seralini, Gilles-Eric. “Update on Long-Term Toxicity of Agricultural GMOs Tolerant to Roundup.” *Environmental Sciences Europe* 32, no. 1 (February 11, 2020): 18. <https://doi.org/10.1186/s12302-020-0296-8>.

consumers. Granted, the World Health Organization (WHO) currently states that “specific systems have been set up for the rigorous evaluation of GM organisms”.³⁹

Today, the regulation of GMOs remains a regional-specific responsibility. The EU follows the Directive 2001/18/EC, as recorded in the Food, Agriculture and Renewable Natural Resources Legislation Database (FAOLEX). This legislature specifies the need for explicit consent and evaluation of environmental risks to release GMOs to the market as well as other external locations.⁴⁰ Australia follows the Gene Technology Act 2000, a comprehensive document that outlines the regulation of genetic engineering, inspection of pertinent processes, proper licensure of GMO development and trade, and emergencies regarding GMOs. The act also calls upon the Gene Technology Technical Advisory Committee and the Gene Technology Ethics and Community Consultative Committee.⁴¹ Similarly, in Canada, the federal institution Health Canada has a team consisting of “chemists, nutritionists, toxicologists, microbiologists, and molecular biologists”.⁴² They test the safety of GMOs based on the Guidelines for the Safety Assessment of Novel Foods.⁴³

On the other hand, some countries in South America have a governmental ban on GMOs. The Ecuadorian Constitution forbids the cultivation of transgenic crops and seeds. However, there is an exception that seeds with genetic modification can be studied for research.⁴⁴ In Peru,

³⁹ “Food, Genetically Modified.” Accessed December 13, 2024. <https://www.who.int/news-room/questions-and-answers/item/food-genetically-modified>.

⁴⁰ “Directive 2001/18/EC of the European Parliament and of the Council on the Deliberate Release into the Environment of Genetically Modified Organisms and Repealing Council Directive 90/220/EEC | FAOLEX.” Accessed December 13, 2024. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC034933/>.

⁴¹ Department of Health and Aged Care. “Gene Technology Act 2000,” October 14, 2024. <https://www.legislation.gov.au/C2004A00762/latest>.

⁴² Canada, Health. “About Novel and Genetically-Modified (GM) Foods.” Navigation page, July 26, 2004. <https://www.canada.ca/en/health-canada/services/food-nutrition/genetically-modified-foods-other-novel-foods.html>.

⁴³ *Ibid.*; Canada, Health. “Guidelines for the Safety Assessment of Novel Foods.” Guidance, August 2, 2006. <https://www.canada.ca/en/health-canada/services/food-nutrition/legislation-guidelines/guidance-documents/guidelines-safety-assessment-novel-foods-2006.html>.

⁴⁴ Turnbull, Crystal, Morten Lillemo, and Trine A. K. Hvoslef-Eide. “Global Regulation of Genetically Modified Crops.”

GMO seeds were not allowed during 2011-2021, which was known as the “10-year legislative moratorium”.⁴⁵ After this period, this regulation was extended to 15 more years.⁴⁶

Considering the possibility of danger in GMO development, states must work together to create a goal that encompasses their geopolitical and economic differences. Each country has a unique cultural standpoint on GMOs, depending on their rich history, dominant religious beliefs, scientific advancement, and other moral values. GMOs are projected to continue implementation in a variety of crops, livestock, and even microbes. To ensure that GMO products are safely created, tested, and sold in the global market, the nations of FAO must communicate accurate and complete information regarding their governmental regulations and projected plans for GMO developments.

Conclusion:

GMOs have brought a new age of streamlined farming, prolonged transportation time, and a novel appeal to consumers. They demonstrate a coalition of genetic engineering and agriculture, where precise editing of DNA sequences will lead to a tangible and profitable product on the market. While crops have been the main subject of genetic modification, there also seems to be movement on testing this technology on livestock as well. GMOs show promising results, elevating the experience of creating, exporting, and importing crops across the world.

However, for this reason, GMOs continue to be a controversial topic for consumers, distributors, and governmental bodies. While these GMO goods are exceptional in their engineered physical traits, there are many questions yet to be answered regarding their implementation and implications. The biological and environmental risks of GMOs have been previously studied in literature, but lack a cohesive result. In this sense, additional investigation into such impacts will be necessary. Furthermore, the different stances of countries on GMOs

⁴⁵ *Ibid.*; “Reglamento de la Ley N° 29811, Ley que establece la Moratoria al Ingreso y Producción de Organismos Vivos Modificados al Territorio Nacional por un Período de 10 años,” n.d.

⁴⁶ “Peru Renews Its Moratorium Law Against Genetically Modified Organisms | IFOAM,” January 20, 2021. <https://www.ifoam.bio/news/peru-renews-its-moratorium-law-against-genetically>.

also need to be considered to ensure an inclusive and understanding resolution on proper regulation of goods.

Questions to Consider:

1. How can states of different GDPs cooperate to peacefully regulate GMO development and trade?
2. What potential directions will genetic modification head to in the next few years? Are there possibilities of more genetically modified livestock being approved and sold on the market for consumption?
3. How do GMOs impact the economic and agricultural dynamic of your assigned country?
4. Can distinctions be made regarding the various types of genetic modifications? For example, is there a moral difference between changing an apple's aesthetic appeal and enhancing its survival in a drought?

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II. The Future of Global Fisheries

Statement of the Issue:

Fish play a key role in global food ecosystems. Just 6.7% of global protein intake is fish, but over 3 billion people rely on fish for over 20% of their protein intake.⁴⁷ Aquatic animal consumption is projected to continue to increase over the next 10 years, mainly as a result of population growth and increasing economic growth (and therefore, urbanization, increasing accessibility of aquatic foods) in developing countries.⁴⁸ While the pace of growth is expected to slow down (with just a 12% increase from 2022 to 2032 compared to a 24% increase from 2012 to 2022),⁴⁹ this increase in consumption continues to present challenges in maintaining a sustainable fishing ecosystem. In addition, 7.3% of the global population⁵⁰ (around 600 million people) rely on fisheries for their livelihoods, with roughly 58.5 million jobs in primary fish production.⁵¹ These are mainly concentrated in Asian countries (accounting for 85% of global jobs in the industry, followed by Africa at 10%).⁵²

In order to address this mounting threat, companies around the world have invested in the process of aquaculture (growing fish on farms). For the first time ever, aquaculture production of

⁴⁷ “What Does the World Eat? - Sustainable Fisheries UW,” April 27, 2019. <https://sustainablefisheries-uw.org/seafood-101/what-does-the-world-eat/>.

⁴⁸ “Fisheries and Aquaculture Projections, 2022–2032.” <https://doi.org/10.4060/cd0683en>.

⁴⁹ Ibid.

⁵⁰ Newsroom. “FAO Report: Global Fisheries and Aquaculture Production Reaches a New Record High.” <https://www.fao.org/newsroom/detail/fao-report-global-fisheries-and-aquaculture-production-reaches-a-new-record-high/en>.

⁵¹ Ibid.

⁵² “Employment in Fisheries and Aquaculture.” <https://doi.org/10.4060/cd0683en>.

aquatic animals surpassed the amount captured by conventional fishing in 2024 (130.9M tons compared to 92.3M tons).⁵³ Aquaculture is currently dominated by a select group of countries such as China (57.8% of global production), Indonesia (11.6%), and India (7.5%).⁵⁴ This correlates with global trends in aquatic consumption as a whole; Asia is responsible for about 71% of global consumption,⁵⁵ and most of aquaculture's production goes back into these countries. As a whole, this has increased food security and created rural livelihoods. However, aquaculture poses its own sets of questions about environmental impact and food safety. These are often similar to problems observed in conventional factory farming, such as nutrient overuse⁵⁶ and potential concerns with food safety.⁵⁷ Addressing these concerns will be key in developing resolutions to adapt to the state of global fisheries.

Global capture fisheries production has remained stable in absolute terms since the late 1980s.⁵⁸ This level is unsustainable, with many fish stocks being threatened with depletion, endangerment, and extinction. The FAO estimates that the share of fishery stocks outside biologically sustainable levels rose from 10% in 1974 to 35.4% in 2019.⁵⁹ Among the most important challenges facing the modern fishing industry is the growth of illegal, unreported, and unregulated (IUU) fishing. It is estimated that as much as 1 in 5 fish caught globally is the result of IUU fishing,⁶⁰ representing up to 26 million tons of fish annually.⁶¹ Despite persistent global awareness of and action on IUU fishing (including Sustainable Development Goal target 14.6),⁶²

⁵³ Newsroom. "FAO Report: Global Fisheries and Aquaculture Production Reaches a New Record High." <https://www.fao.org/newsroom/detail/fao-report-global-fisheries-and-aquaculture-production-reaches-a-new-record-high/en>.

⁵⁴ "World Aquaculture - December 2023." <https://www.was.org/Magazine/2023/04/22/#zoom=true>.

⁵⁵ "Apparent Consumption of Aquatic Foods." <https://doi.org/10.4060/cd0683en>.

⁵⁶ Streicher, Michael D., Henning Reiss, and Katrin Reiss. "Impact of Aquaculture and Agriculture Nutrient Sources on Macroalgae in a Bioassay Study." *Marine Pollution Bulletin* 173 (December 1, 2021): 113025. <https://doi.org/10.1016/j.marpolbul.2021.113025>.

⁵⁷ Center for Food Safety. "Center for Food Safety | Human Health Risks | Human Health Risks." <https://www.centerforfoodsafety.org/issues/312/aquaculture/human-health-risks>.

⁵⁸ "Capture Fisheries Production." <https://doi.org/10.4060/cd0683en>.

⁵⁹ World Bank. "Oceans, Fisheries and Coastal Economies." <https://www.worldbank.org/en/topic/oceans-fisheries-and-coastal-economies>.

⁶⁰ "Despite Progress, Illegal Catch Continues to Reach the Market," August 2, 2023. <https://pew.org/3YfLyGQ>.

⁶¹ "Illegal, Unreported and Unregulated (IUU) Fishing | Food and Agriculture Organization of the United Nations." <https://www.fao.org/iuu-fishing/en/>.

⁶² SDGIndicators. "14.6.1 Illegal, Unreported Unregulated Fishing | SDG Indicators Data Portal | Food and Agriculture Organization of the United Nations." <https://www.fao.org/sustainable-development-goals-data-portal/data/indicators/1461-illegal-unreported-unregulated-fishing/en>.

progress has been slow, and measures such as the IUU Fishing Risk Index,⁶³ which assess states' vulnerability, prevalence, and response to IUU fishing, have shown little change in overall metrics since 2019.

History:

In order to standardize varying conventions on appropriate usage of the resources of global oceans,⁶⁴ the United Nations Convention on the Law of the Sea (UNCLOS) was created, coming into effect in 1994. For this committee, the most important provisions of UNCLOS include its definitions of territorial waters (up to 12 nautical miles from a country's coast) and an exclusive economic zone (EEZ), given to every country (except in cases of overlapping zones), defined by a distance of 200 nautical miles from their coastline.⁶⁵ UNCLOS left the question of global management of fish stocks in international waters initially vague, only establishing provisions to ensure equitable distribution of fish stocks to geographically disadvantaged populations and an obligation to cooperate on measures to "manage and conserve living resources."⁶⁶

The UN Fish Stocks Agreement (UNFSA), which came into force in 2001, filled in some of the key gaps left by UNCLOS. The UNFSA mainly covered two classes of fish that existed in both EEZ waters and "high seas" waters (waters not in any country's EEZ). These were "straddling" fish stocks, whose range could be on both sides of the border between a country's EEZ and high seas waters, and "migratory" fish stocks, who regularly travel long distances as a result of their natural migratory patterns.⁶⁷ UNFSA's main solution to the challenge of regulating fish stocks that dipped in and out of national waters was to establish several regional fishery management organizations (RFMOs). Today, there are 16 RFMOs,⁶⁸ 5 of which focus on highly migratory species (mainly tuna) and 11 of which focus on specific geographic areas. RFMOs'

⁶³ "IUU Fishing Risk Index." <https://iuufishingindex.net/>.

⁶⁴ "UNCLOS | Illegal, Unreported and Unregulated (IUU) Fishing | Food and Agriculture Organization of the United Nations." <https://www.fao.org/iuu-fishing/international-framework/unclos/en/>.

⁶⁵ "Overview - Convention & Related Agreements."

https://www.un.org/depts/los/convention_agreements/convention_overview_convention.htm.

⁶⁶ Ibid.

⁶⁷ "UNFSA Overview | Division for Ocean Affairs and the Law of the Sea."

<https://www.un.org/oceancapacity/UNFSA>.

⁶⁸ "Regional Fisheries Management Organisations (RFMOs) - European Commission," December 11, 2024. https://oceans-and-fisheries.ec.europa.eu/fisheries/international-agreements/regional-fisheries-management-organisations-rfmos_en.

main function has been to manage fishing levels for threatened species, aiming to allow overfished species to recover to about 20% of their unfished biomass levels⁶⁹ (this percentage is the definition of a fishery’s “maximum sustainable yield”, serving as a minimum goal).

As IUU fishing has grown, UN action to target it specifically has responded to the issue. In 2016, the UN Agreement on Port State Measures (PSMA) entered into force as the first binding international agreement to target IUU fishing.⁷⁰ Currently, there are 79 parties to PSMA.⁷¹ PSMA mainly applies to vessels that seek entry into the port of a state that is different from their flag state. This applies to the vast majority of vessels that are responsible for IUU fishing, as certain countries will use their maritime registers as a source of revenue, irrespective of the nationality of a ship’s owner or its history of IUU fishing. This allows ships to bypass regulation by RFMOs, and it is estimated that around 15% of all large-scale fishing vessels sail under these “flags of convenience,”⁷² under countries such as Panama, Liberia, and the Marshall Islands.⁷³ The PSMA allows port states to deny access to or immediately inspect⁷⁴ vessels that they suspect to be engaging in IUU fishing. This denies IUU-caught fish from being sold in port states,⁷⁵ allowing for a crackdown on major IUU fishing vessels.

From 1990 to 2020, global aquaculture output increased by 609%, with an average growth rate of 6.7% per year.⁷⁶ This rapid recent growth has placed aquaculture at the forefront of FAO’s vision for its “Blue Transformation,” which outlines FAO’s vision for the transformation of aquatic food systems.⁷⁷ In 2021, the UNFAO updated its 1995 Code of Conduct for Responsible Fisheries (CCRF)⁷⁸ with its Committee on Fisheries (COFI)

⁶⁹ “Governments Make Progress on United Nations Fish Stocks Agreement,” May 19, 2023. <https://pew.org/3W4NmS9>.

⁷⁰ Compendium of Decisions Made by the Parties to the FAO Agreement on Port State Measures. FAO, 2024. <https://doi.org/10.4060/cd2598en>.

⁷¹ “Parties to the PSMA | Agreement on Port State Measures (PSMA) | Food and Agriculture Organization of the United Nations.” <https://www.fao.org/port-state-measures/background/parties-psma/en/>.

⁷² Stop Illegal Fishing. “Flags of Non-Compliance.” <https://stopillegalfishing.com/issues/flags-of-convenience/>.

⁷³ ITF Seafarers. “Current Registries Listed as FOCs.” <https://www.itfseafarers.org/en/focs/current-registries-listed-as-focs>.

⁷⁴ “The Port State Measures Agreement: From Intention to Implementation,” April 12, 2018. <https://pew.org/2IGKGTE>.

⁷⁵ Ortiz, Alexis J. “Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing.” *International Legal Materials* 55, no. 6 (December 2016): 1157–79. <https://doi.org/10.1017/S0020782900030886>.

⁷⁶ “Aquaculture Production.” <https://doi.org/10.4060/cc0461en>.

⁷⁷ “Blue Transformation: A Roadmap.” <https://doi.org/10.4060/cd0683en>.

⁷⁸ “FAO. Code of Conduct for Responsible Fisheries.” <https://www.fao.org/4/v9878e/v9878e00.htm>.

Declaration on Sustainable Fisheries and Aquaculture,⁷⁹ which put renewed emphasis on the environmental impact of aquaculture production. Today, the COFI Sub-Committee on Aquaculture serves as a forum for FAO members to collaborate on aquaculture development and management.⁸⁰

Analysis:

Several global environmental changes threaten the sustainability of global fisheries in the medium to long-term. Structurally, global capture fisheries (even legal fishing, following sustainability standards) cause immense environmental damage as a result of the methodology of large-scale commercial fishing. For example, methods such as bottom trawling and purse seine⁸¹ result in large amounts of bycatch (fish caught accidentally) that is often disposed of. Bottom trawling, in particular, is immensely environmentally destructive to ocean seabeds, which provide the foundation for an aquatic ecosystem. Despite advances, bycatch numbers remain persistently high (ranging from 1-20% bycatch per desired fish caught),⁸² but switching to other methods is unpopular. For example, switching exclusively to pole and line fishing may increase costs and decrease absolute amounts of fish caught. While this is likely to limit fishing to biologically sustainable levels, it may have short-term adverse effects on combating food insecurity.

The environmental impact of aquaculture can be directly related to the bycatch problem. A major source of nutrients for feeding fish raised in aquaculture is fishmeal, which is often created from parts of “trash fish” that would be undesirable for human consumption otherwise. Aquaculture accounts for about 87% of global fishmeal consumption.⁸³ Reducing this reliance on animal parts (fishmeal), especially given the increasing usability of alternatives such as soy and algae⁸⁴ will aid in reducing the strain that aquaculture can still exert on capture fisheries.

⁷⁹ 2021 COFI Declaration for Sustainable Fisheries and Aquaculture. FAO, 2021. <https://doi.org/10.4060/cb3767en>.

⁸⁰ “UN Atlas of the Oceans: Subtopic.” <https://www.oceansatlas.org/subtopic/en/c/1533/>.

⁸¹ Classification and Illustrated Definition of Fishing Gears. FAO, 2021. <https://doi.org/10.4060/cb4966en>.

⁸² “Commercial Fishing Methods - Sustainable Fisheries UW,” April 27, 2019. <https://sustainablefisheries-uw.org/seafood-101/commercial-fishing-methods/>.

⁸³ “Utilization and Processing.” <https://doi.org/10.4060/cd0683en>.

⁸⁴ “Limit Wild Fish Use in Aquaculture | Seafood Basics | Seafood Watch.” <https://www.seafoodwatch.org/seafood-basics/sustainable-solutions/limit-wild-fish-use-as-feed>.

Aquaculture farms are often located in coastal areas, where interactions with local ecosystems can still take place. As a result of lax protections, the widespread use of antibiotics,⁸⁵ pesticides,⁸⁶ and excess nutrients can jeopardize both food safety as well as the surrounding environment. For example, excess nutrient leakage into aquatic ecosystems often results in eutrophication, where a nutrient-enriched environment can lead to the overgrowth of algae, depleting the oxygen content of that environment.⁸⁷ Antibiotics and pesticides in aquaculture pose significant health risks in large quantities, including the potential growth of antibiotic-resistant bacteria and carcinogenic effects from excessive concentrations of pesticides remaining in farmed fish.⁸⁸ Furthermore, escaping fish from aquaculture pens, who may be completely unadapted to natural environments (especially given that as many as 1.74 million tons per year, or 26.5% of global aquaculture production, is of non-native species),⁸⁹ leads to risk of disease transmission in both directions.⁹⁰ Even disregarding disease transmission, fish in aquaculture are often bred for different characteristics than wild fish. Sudden increases in fish numbers as a result of escapes from aquaculture farms can throw off delicate ecological balances.

When it comes to enforcing international regulations, several global powers are not parties to some of the key treaties previously discussed. For example, the United States has not ratified UNCLOS, despite recognizing it as international law. This restricts its ability to mediate between countries over disputed waters in regions such as the Arctic and South China Sea.⁹¹ With respect to cracking down on IUU fishing, China's position as a major origin country for IUU fishing (it ranks #1 in the world on the IUU Risk Index⁹²) makes its refusal to become a

⁸⁵ "Antibiotics in Aquaculture | Seafood Watch." <https://www.seafoodwatch.org/our-projects/antibiotics-in-aquaculture>.

⁸⁶ Gan, Weijia, Rongrong Zhang, Zhi Cao, Hao Liu, Wentao Fan, Aili Sun, Suquan Song, Zeming Zhang, and Xizhi Shi. "Unveiling the Hidden Risks: Pesticide Residues in Aquaculture Systems." *Science of The Total Environment* 929 (June 15, 2024): 172388. <https://doi.org/10.1016/j.scitotenv.2024.172388>.

⁸⁷ US Department of Commerce, National Oceanic and Atmospheric Administration. "What Is Eutrophication?" <https://oceanservice.noaa.gov/facts/eutrophication.html>.

⁸⁸ Center for Food Safety. "Center for Food Safety | Human Health Risks || Human Health Risks." <https://www.centerforfoodsafety.org/issues/312/aquaculture/human-health-risks>.

⁸⁹ Atalah, Javier, and Pablo Sanchez-Jerez. "Global Assessment of Ecological Risks Associated with Farmed Fish Escapes." *Global Ecology and Conservation* 21 (March 1, 2020): e00842. <https://doi.org/10.1016/j.gecco.2019.e00842>.

⁹⁰ NOAA Fisheries -- Office of Aquaculture, "Fish Farms and Escapes," 2022, <https://www.fisheries.noaa.gov/s3/2022-03/Fact-Sheet-Potential-Risks-of-Aquaculture-Escapes.pdf>.

⁹¹ "Unmoored from the UN: The Struggle to Ratify UNCLOS in the United States - The SAIS Review of International Affairs," June 26, 2023. <https://saisreview.sais.jhu.edu/unmoored-from-the-un-the-struggle-to-ratify-unclos-in-the-united-states/>.

⁹² "IUU Fishing Risk Index." <https://iuufishingindex.net/>.

party to the PSMA glaring. In addition, China's overseas fishing fleet has been known to fish illegally, including within countries' territorial waters, threatening to undermine the rules-based order of international waters.⁹³

African countries are poised to make great strides in the growth of aquatic production. Africa's fleet has been increasing and represented over 19% of the world's fishing vessels in 2022.⁹⁴ However, over 70% of this fleet is non-motorized (compared to a global share of about 33%),⁹⁵ and even among the motorized ships in African fishing fleets, 84% of them have a length of less than 12 meters (for comparison, among Asian motorized fishing fleets, this proportion is just 77%).⁹⁶ The result of this is that many African fishers end up working for large commercial fishing vessels registered in other countries and run by foreign companies. The labor conditions on these ships, which are often run illegally through front companies⁹⁷ in spite of regulations, are often abusive, with long hours, low pay, and dangerous practices.⁹⁸ This is not limited to certain countries, and the net result of this is that oceans near developing countries (Africa, South America, etc.) are some of the most overfished areas in the world, despite mainly being fished by foreign fishing fleets.

Conclusion:

Global fisheries are affected by a wide variety of factors that can be outside the purview of the FAO. For example, climate change and its resulting effects on ocean temperatures is projected to drastically alter the biodiversity of the ocean. Delegates are encouraged to keep these factors in mind, but should come into committee with a focus on the FAO's main mission: food security. As with any other Model UN committee, some issues will be more contentious than others, and delegates are encouraged to explore the FAO's 2024 Report on the State of

⁹³ Myers, Steven Lee, Agnes Chang, Derek Watkins, and Claire Fu. "How China Targets the Global Fish Supply." *The New York Times*, September 26, 2022, sec. World. <https://www.nytimes.com/interactive/2022/09/26/world/asia/china-fishing-south-america.html>.

⁹⁴ "Fishing Fleet." <https://doi.org/10.4060/cd0683en>.

⁹⁵ *Ibid.*

⁹⁶ *Ibid.*

⁹⁷ McVeigh, Karen. "Massive Strike Pits African Fishers against 'Superprofitable' EU Firms." *The Guardian*, June 14, 2023, sec. Global development. <https://www.theguardian.com/global-development/2023/jun/14/massive-strike-pits-african-fishers-against-superprofitable-eu-firms>.

⁹⁸ "Ghana Fishing: Abuse, Corruption and Death on Chinese Vessels." January 4, 2023. <https://www.bbc.com/news/world-africa-63720181>.

Global Fisheries and Aquaculture⁹⁹ to get an overview of where their country stands on a regional basis and research which other countries are likely to have similar stances.

It is estimated that global aquatic animal production will have to increase by 22% by 2050 in order to maintain the 2022 per capita global fish consumption. This presents a few optional approaches to the committee: opting to advocate for increased fish production (such as by investing in aquaculture), opting to decrease global consumption (advocating for plant or insect-based diets as alternative protein sources), or a combination of these approaches.

Exploring reasons why countries are not participants in existing international agreements will also illuminate opportunities for improving future enforcement of international law. There are a variety of approaches that countries can take to aid each other in ensuring that global fisheries will remain a bulwark against food insecurity, and delegates are encouraged to develop creative ideas based on their national interests.

Questions to Consider:

1. To what extent should aquaculture be relied on as a solution to food insecurity? What actions can countries take to balance growing aquaculture production as fast as possible and mitigating environmental harms?
2. How can policing of international waters be enforced to protect sustainability? What are the shortcomings in current international agreements, and what compromises can be made to bring major bystanders into the fold?
3. How can countries nurture aquatic animal production into being an economic booster? What legislation can ensure that fishers and farmers are able to create sustainable livelihoods? How can food distribution be improved with respect to aquatic foods?

⁹⁹ “The State of World Fisheries and Aquaculture 2024.” <https://openknowledge.fao.org/items/06690fd0-d133-424c-9673-1849e414543d>.

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