NHSMUN

Background Guide | *FAO*

NHSMUN
National High School Model United Nations

Dear Delegates,

Welcome to NHSMUN 2026! My name is Ariana Campos, and I will be your Director for Session I for the Food and Agriculture Organization (FAO). I am originally from Lima, Peru, but I am studying Business Administration at the University of Amsterdam! This is my second year as part of NHSMUN as staff. Last year, I served as the Assistant Director for the Organization for Security and Co-operation in Europe, and before that, I participated as a delegate in 2023.

I first joined the world of MUN when I was about 13 years old, completely unaware of its purpose or the role of a delegate. Over time, however, I developed a passion for defending your position and ensuring that your ideas were heard. Throughout the years, being part of this international community has helped me become a global citizen, growing into someone who is much more aware of the world-class issues happening in the day-to-day world. My experience as a delegate has provided me with valuable insights into the dynamics of international relations and the complexities of policymaking within the United Nations framework.

Moreover, our committee's topics are multifaceted, and delegates are strongly encouraged to approach them with careful consideration of their country's policy and the goal of collaboration and diplomacy in mind. Please do not hesitate to reach out if you have any questions regarding the topic or the committee in general. We are more than happy to assist you with your research.

Ariana Campos
Director of the Food and Agriculture Organization (FAO)
Session I
nhsmun.fao@imuna.org

NHSMUN
National High School Model United Nations

Dear Delegates,

Welcome to NHSMUN 2026! My name is Adrianna Preiss, and I will be your Director for Session II for the Food and Agriculture Organization (FAO). This is my second year on staff, my fourth NHSMUN conference, and my sixth year participating in Model UN. I was the assistant director for UNICEF during Session I last year, and as a delegate, I participated in the Legal and CSW committees. I am from Queens, New York, and go to school there, where I am a second-year pharmacy student at St. John's University. Other than that, I love to read and find new music, as well as watch sports like baseball, hockey, and wrestling. I am so excited to meet you all!

I could not be happier to be working with you all in FAO this year. Both of these topics are so important, and I cannot wait to see all the incredible research and ideas you bring to the conference. If you have any questions or concerns, always feel free to reach out.

Good luck and see you in March,
Adrianna Preiss
Director of the Food and Agriculture Organization (FAO)
Session II
nhsmun.fao@imuna.org

A NOTE ON RESEARCH AND PREPARATION

Delegate research and preparation is a critical element of attending NHSMUN and enjoying the debate experience. We have provided this Background Guide to introduce the topics that will be discussed in your committee. We encourage and expect each of you to critically explore the selected topics and be able to identify and analyze their intricacies upon arrival to the conference.

The task of preparing for the conference can be challenging, but to assist delegates, we have updated our Beginner Delegate Guide, Advanced Delegate Guide, Research Guide, and Rules of Procedure Guide. In particular, these guides contain more detailed instructions on how to prepare a position paper and excellent sources that delegates can use for research. Use these resources to your advantage. They can help transform a sometimes overwhelming task into what it should be: an engaging, interesting, and rewarding experience.

To accurately represent a country, delegates must be able to articulate its policies. Accordingly, NHSMUN requires each delegation (the one or two delegates representing a country in a committee) to write a position paper for each topic on the committee's agenda. In delegations with two students, we strongly encourage each student to research each topic to ensure that they are both prepared to debate throughout the committee. More information about how to write and format position papers can be found in the Research Guide. To summarize, position papers should be structured into three sections.

I: Topic Background – This section should describe the history of the topic as it would be described by the delegate's country. Delegates do not need to give an exhaustive account of the topic. It is best to focus on the details that are most important to the delegation's policy and proposed solutions.

II: Country Policy – This section should discuss the delegation's policy regarding the topic. Each paper should state the policy in plain terms and include the relevant statements, statistics, and research that support the effectiveness of the policy. Comparisons with other global issues are also appropriate.

III. Proposed Solutions – This section should detail the delegation's proposed solutions to address the topic. Descriptions of each solution should be thorough. Each idea should clearly connect to the specific problem it aims to solve and identify potential obstacles to implementation and how they can be avoided. The solution should be a natural extension of the country's policy.

Each topic's position paper should be **no more than 10 pages** long double-spaced with standard margins and 12 point font size. This is a maximum; **3–5 pages per topic is often a suitable length**. The paper must be written from the perspective of your assigned country and should articulate the policies you will espouse at the conference.

Each delegation is responsible for submitting position papers on or before **February 20, 2026**. If a delegate wishes to receive detailed feedback from the committee's dais, a position must be submitted on or before **January 30, 2026**. The papers received by this earlier deadline will be reviewed by the dais of each committee and returned prior to your arrival at the conference. Instructions on how to submit position papers will be shared directly with faculty advisors.

Complete instructions for how to submit position papers will be sent to faculty advisers via email. If delegations are unable to submit their position papers on time, please contact us at nhsmun@imuna.org.

Delegations that do not submit position papers will be ineligible for awards.

Committee History

The Food and Agriculture Organization of the United Nations (FAO) was founded on October 16, 1945, in Quebec City, Canada, in response to the urgent global need to address hunger and malnutrition.[1] Following the end of World War II, nations recognized that ensuring adequate access to food was essential for global peace and stability. After widespread disruption to agricultural production, factories that manufactured fertilizers, pesticides, and farming equipment were either destroyed or repurposed, leading to significant disruptions in the trade and distribution of agricultural products. The FAO was established as a specialized technical agency, tasked with providing information and assistance to countries to improve all components of biodiversity such as agriculture, fisheries, forestry, and food production. It also seeks to achieve international agreement on policies for the sustainable use and conservation of genetic resources for food and agriculture, along with ensuring fair and equitable sharing of the benefits derived from their use.[2]

Over time, the FAO's mandate has evolved to meet the changing challenges of global food security. Initially focused on increasing food production, its mission expanded to include sustainable development, climate change adaptation, the eradication of rural poverty, securing sustainable increases in the supply and availability of food, conserving and enhancing the natural resource base, and generating knowledge of food and agriculture, fisheries and forestry.[3] The organization now plays a pivotal role in addressing issues such as food waste, economic growth, malnutrition, and the impact of environmental degradation on agriculture.[4]

To meet the demands posed by major global trends in agricultural development and the challenges faced by member nations, FAO has identified key priorities on which it is best placed to intervene, such as: helping eliminate hunger, food insecurity, malnutrition, making agriculture more productive and sustainable, reducing rural poverty, ensuring inclusive and efficient agricultural and food systems, as well as protecting livelihoods from disasters. These priorities are designed to foster resilient agricultural communities and ensure sustainable development for future generations. Furthermore, the FAO's ability to address these global challenges is strengthened by its nearly universal membership, comprising 195 members, including 194 countries and the European Union.

This extensive representation enables the FAO to serve as a global platform for collaboration on pressing food and agricultural issues. With a technical and advisory focus, the FAO guides member states through evidence-based research and recommendations, distinguishing it from purely deliberative bodies.

Throughout its history, the FAO has collaborated with various international organizations, such as the World Health Organization (WHO) and the World Food Programme (WFP). These partnerships have been crucial in combating hunger and promoting nutritional security worldwide. Notable achievements include the launch of initiatives like the "Decade of Family Farming" which highlights the vital role family farmers play in ensuring food security, improving livelihoods, and sustainably managing natural resources. Family farming, which accounts for nearly 80 percent of the world's food production, is seen as a key driver in achieving the Sustainable Development Goals, particularly in rural areas, where it helps protect the environment and foster resilience.[5]

Despite its accomplishments, the FAO faces significant challenges in fulfilling its mission. Issues such as climate change, food insecurity in conflict zones, and the growing global population have complicated efforts to ensure

1 "About FAO | FAO | Food and Agriculture Organization of the United Nations," AboutFAO, n.d., https://www.fao.org/about/about-fao/en/.
2 Food and Agriculture Organization of the United Nations. *Biodiversity and Agriculture: A Contribution to the Global Biodiversity Assessment*. Rome: FAO, 2020. https://www.fao.org/fileadmin/templates/biodiversity_paia/PAR-FAO-book_lr.pdf.
3 Food and Agriculture Organization of the United Nations. "FAO's Mission and Vision Statements." Accessed September 26, 2024. https://www.fao.org/4/x3551e/x3551e02.htm.
4 "FAO: its origins, formation and evolution 1945-1981," n.d.,https://www.fao.org/4/p4228e/P4228E02.htm.
5 Food and Agriculture Organization of the United Nations. "Family Farming." Accessed September 26, 2024. https://www.fao.org/reduce-rural-poverty/our-work/family-farming/en/.

food availability for all. These limitations are likely to influence the FAO's ability to address future topics and will require innovative solutions and stronger international cooperation. To achieve lasting impact, the FAO must focus on developing sustainable, long-term strategies that not only address immediate food security concerns but also empower communities to adapt to changing circumstances and build resilience for the future.

Looking ahead, the FAO is committed to advancing the United Nations' Sustainable Development Goals (SDGs), particularly Goal 2: Zero Hunger. Its work in promoting sustainable agriculture, improving food systems, and reducing rural poverty will continue to be essential in the global effort to create a world free from hunger and malnutrition.[6]

6 Food and Agriculture Organization of the United Nations. "FAO Strategic Framework for Sustainable Development Goals." Accessed September 26, 2024. https://www.fao.org/about/strategy-programme-budget/strategic-framework/fao-sdg/en/.

Preserving Agricultural Heritage

Photo Credit: Azimronnie

Agriculture is another word for farming. It includes growing and harvesting crops as well as raising livestock like cows and sheep.[1] Many people also describe agriculture as the science, art, and practice of cultivating the soil, producing crops, and caring for animals to sustain human life. At times, it can also include related practices, such as silviculture—the management of forest growth—and aquaculture—the management of fish and aquatic life.[2] Agriculture combines creativity, imagination, and skill in planting crops and raising animals with modern production methods and new technologies. At the same time, it can be viewed as a business. It provides the global economy with basic goods known as commodities. These include grain, livestock, dairy, fiber, and raw materials for fuel.[3]

Agricultural heritage refers to traditional farming systems that have been preserved for hundreds of years. These systems use knowledge and practices built from the connection between people and their environment. They help protect biodiversity, keep cultural traditions alive, and support sustainable living.[4] Examples include terraced rice fields in the Philippines and pastoral systems in the Andes. These practices show local innovation, spiritual values, and ecological knowledge. The United Nations' Food and Agriculture Organization (FAO) states that preserving agricultural heritage is essential for keeping culture, ensuring food security, and adapting to climate change.[5]

Unfortunately, agricultural heritage is under threat. Industrial agriculture, land alterations, climate change, and the loss of Indigenous knowledge put it at risk.[6] Many young people move to cities and buy food from global systems that rely on mass production. Farmers grow high yield crops instead of traditional varieties, focusing on quantity over quality. These practices can destroy agricultural heritage, reduce biodiversity, and weaken food systems.[7] Saving agricultural heritage does not mean rejecting modern methods. Society demands food at a speed and volume that traditional agriculture cannot meet, and industrial processes help achieve those rates. Instead, it means learning from old practices and using them to support sustainable agriculture today.[8] The FAO has set out to address these challenges and has launched initiatives. One such initiative is the Globally Important Agricultural Heritage Systems (GIAHS) program. Its goal is to link tradition and innovation for sustainable development.[9]

Maintaining food and agriculture heritage helps communities manage their resources. It also protects biodiversity and reduces inequalities. These benefits make global food systems less vulnerable. It is therefore important to address the challenges of preserving agricultural heritage.

1 Melissa McDaniel and Santani Teng, "The Art and Science of Agriculture," National Geographic, last modified December 9, 2024, https://education.nationalgeographic.org/resource/the-art-and-science-of-agriculture/
2 "Agriculture," in Merriam-Webster Dictionary, July 28, 2025, https://www.merriam-webster.com/dictionary/agriculture.
3 Marcos Andres Bonet Rodriguez, "Why Is Agriculture Important? Benefits and Its Role | Maryville Online," Maryville University Online, April 24, 2024, https://online.maryville.edu/blog/why-is-agriculture-important/#what-is.
4 Food and Agriculture Organization of the United Nations, "Preserving Agricultural Heritage Around the World," FAO, https://www.fao.org/giahs/background/en/.
5 FAO, "Globally Important Agricultural Heritage Systems (GIAHS)," FAO, https://www.fao.org/giahs/en/.
6 Michael T. Hoffmann, et al., "Climate Change and Agricultural Heritage Systems," Climatic Change 2020, https://link.springer.com/article/10.1007/s10584-020-02736-y.
7 Cary Fowler, "The Svalbard Global Seed Vault: Securing the Future of Agriculture," Bioversity International, https://www.bioversityinternational.org/news/detail/the-svalbard-global-seed-vault-securing-the-future-of-agriculture/.
8 Mauro Agnoletti and Antonio Santoro, "Agricultural Heritage Systems and Agrobiodiversity," Biodiversity and Conservation 31, no. 10 (August 1, 2022): 2231–41, https://doi.org/10.1007/s10531-022-02460-3.
9 "Globally Important Agricultural Heritage Systems (GIAHS)," FAO, accessed August 22, 2025, https://www.fao.org/giahs/en.

Topic Background

Early Beginnings and Modern Practices

Agricultural heritage includes not only the techniques used for growing food, but also the social, cultural, and environmental values tied to this practice. Over time, it has evolved along with technological advancements. Early humans relied on tools made of wood, stone, and bone. Later, they created iron and copper tools for agriculture, such as sickles, hoes, and plowshares. These new tools transformed agriculture, making it easier for populations to cultivate crops. Civilizations built clay and stone irrigation canals. The domestication of draft animals provided animal traction on plows. They stored their crops using mudbrick, thatch, and fired brick stores at the end of the harvest. These technologies enhanced productivity by facilitating agriculture for farmers, and constructed landscapes: terraces reduced soil erosion, canals created arable land, and specific seeding improved crops.[10]

Although experts have estimated that the earliest fossil evidence of *Homo sapiens*—modern humans—is roughly 196,000 years old, agriculture is much more recent, dating back only 10,000 to 12,000 years.[11] This development led humans to settle in one place and form more permanent communities. They farmed land and managed resources to create stability.[12] This significant lifestyle change also affected their living conditions. Farming is estimated to have provided 10 to 200 times more calories per acre of land than hunting and gathering—a significant improvement.[13]

Farmers across the world domesticated hundreds of native plants and livestock breeds. In northern China, people grew rice and millet. In Central America, maize, beans, and squash became basic foods. In the Fertile Crescent, a region in the Middle East where some of the earliest civilizations were established, early farmers cultivated wheat, barley, and lentils, and also domesticated cattle, sheep, and goats.[14] In the process, farmers also created genetic diversity among crops that helped protect against disease, pests, and climate change. They also built detailed calendars and seasonal rituals to guide planting and harvesting. Farming became tied to myths, celebrations, and social identity, while also shaping the economy and spiritual life. These systems would be the foundation for the agricultural heritage that was being established.

An example of this is the Oases of the Maghreb in Tunisia. They are recognized as a Globally Important Agricultural Heritage System (GIAHS) by the FAO. Dating back to the Roman era, they allow the sustainable cultivation of date palms in desert environments where water exists closer to the surface. Palm groves cool the environment and create a livable and recreational space, whereas oasis farming sustains nutrition and income for locals, often serving as their chief or secondary livelihood.[15] These oases demonstrate how early methods, such as planting diverse crops together and managing water resources, have created strong systems that continue to benefit local communities today.

Similarly, different cultures developed unique tools and techniques that reflected their environment. In the Fertile Crescent of the Middle East, they tamed animals to break up soil and invented irrigation techniques. Neolithic China developed the

10 Kofi Britwum and Matty Demont, "Food security and the cultural heritage missing link," *Global Food Security*, No. 32, December 2022, https://doi.org/10.1016/j.gfs.2022.100660.
11 Trinkaus E. Early Modern Humans. Annu Rev Anthropol. 2005;34(1):207-230.; "The Development of Agriculture," n.d., https://education.nationalgeographic.org/resource/development-agriculture/.
12 "History of Agriculture | Food System Primer," Food System Primer, n.d., https://foodsystemprimer.org/production/history-of-agriculture.
13 Diamond J. Guns, Germs, and Steel: The Fates of Human Societies. New York, New York: W. W. Norton and Company; 1999.
14 Montgomery D. Dirt: The Erosion of Civilizations. Berkeley and Los Angeles, California: University of California Press; 2008.
15 Parviz Koohafkan, *Globally Important Agricultural Heritage Systems: A Legacy for the Future* (FAO, 2011), http://www.fao.org/fileadmin/templates/giahs/PDF/GIAHS_Booklet_EN_WEBt2011.pdf

earliest kind of sericulture—cultivating silkworms to produce silk.[16] Romans' knowledge of physics and architecture helped them develop aqueducts to direct water where it was needed most. They also created or refined methods to effectively plant crops, irrigate, and drain fields, vastly improving farm productivity. Modern farmers still use many of these techniques pioneered by various ancient cultures.[17] By remembering and preserving these techniques, we continue to recognize that heritage is not just about crops, but also about the systems of work and knowledge that have shaped societies.

When the Renaissance began in the 1400s, the expansion of global trade increasingly started to connect different parts of the world. This trade allowed different cultures to exchange knowledge about agriculture, farming practices, crops, and animals.[18] Europeans became familiar with new crops such as potatoes and maize from the Americas, eventually adopting them as common foods in their cuisine. The cross-continental exchanges built better diets that improved health and contributed to growing populations.[19]

In the 1800s, the Industrial Revolution transformed agriculture. Machines like tractors and harvesters replaced much of the manual labor on farms. Advances in animal breeding and scientific land management also increased food production.[20] These changes led to the rise of large-scale farms, which continue to produce enormous amounts of food for the world today. Thanks to centuries of innovation, modern farming is far more productive and efficient than ever before.[21] Although these changes have transformed agriculture, they have become part of its heritage as well. They represent accumulated knowledge that continues to support modern agriculture.

Over the last three centuries, the Industrial Revolution, colonial expansion, and global trade transformed farming. Yet agricultural heritage survived. Many old techniques are still valuable. For example, controlled burning was used for thousands of years by Native American tribes and Aboriginal Australians. It helped manage land and prevent wildfires. Today's large wildfires in North America and Australia show the importance of these traditional practices.[22] Traditional and modern farming use different methods, but both methods have strengths and weaknesses. As a general rule, traditional farming values culture, local sustainability, and low environmental impact. Modern farming focuses on high output, global markets, and technology.

The key to sustainable agriculture is combining both. Blending traditional knowledge with modern tools can make farming more resilient and productive, while respecting culture and the environment. Modern machines and infrastructure are built on the innovations of past communities. Many groups still keep their traditions alive, adapting them to new contexts or mixing them with modern practices.[23] The mix of old and new helps agriculture face today's challenges while staying connected to its heritage.

Biodiversity and Food Security

FAO defines agro-biodiversity as "the variety and variability of animals, plants and microorganisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries." In some parts of the world, industrial farms may produce the same crop over dozens

16 "The Shift to Agriculture," n.d., https://education.nationalgeographic.org/resource/shift-agriculture/.
17 "Traces of Ancient Rome in the Modern World," n.d., https://education.nationalgeographic.org/resource/traces-ancient-rome-modern-world/.
18 Adrian Ludwig, "History of Agriculture: A Timeline," April 22, 2025, https://www.crestcapital.com/tax/history_of_agriculture.
19 Alfred W. Crosby, The Columbian Exchange: Biological and Cultural Consequences of 1492 (Westport, CT: Greenwood Press, 1972).
20 Marcel Mazoyer and Laurence Roudart, A History of World Agriculture: From the Neolithic Age to the Current Crisis (London: Earthscan, 2006).
21 "The Shift to Agriculture."
22 National Geographic n.d. "The Art and Science of Agriculture," https://education.nationalgeographic.org/resource/the-art-and-science-of-agriculture/.
23 Boyan A, "Traditional Vs. Modern Farming Techniques: A Comparative Analysis," Milk and Honey Ranch, 2024, https://milkandhoneyranch.com/traditional-vs-modern-farming-techniques-a-comparative-analysis/.

of square miles. Although these farms are often very productive, they are also vulnerable. Pests and diseases that harm crops spread more quickly through single-crop farms. This is why many industrial farms must use harsh pesticides and herbicides to protect crops. However, the environmental costs of these chemicals are enormous.[24] Agricultural heritage systems are among the most effective means of conserving biodiversity, both in terms of agro-biodiversity (crop and livestock diversity) and wild biodiversity (associated flora and fauna).[25] Unlike intensive farming, which often leads to habitat destruction and species loss, traditional farming practices create ecologically balanced landscapes that support a wide range of organisms.[26]

Western Ghats, India (Credit: Timothy A. Gonsalves)

Heritage systems are also valuable for preserving genetic diversity. Indigenous farmers have conservatively bred and preserved thousands of crop varieties adapted for particular regions, microclimates, and soil features.[27] For example, traditional rice farmers in the Western Ghats of India maintain over 300 landraces, some of which have unique traits like flood tolerance or particularly high nutritional value. This genetic bank is crucial to scientists and farmers interested in developing climate-resilient crops.[28] In addition to genetic diversity, environments created through traditional agro-ecologies imitate the structure of natural ecosystems and tend to provide wildlife with habitat connectivity. Traditional agroecosystems in Spain and Portugal connect oak woodlands with livestock grazing to create a mosaic landscape that includes habitats for endangered species like the Iberian lynx and imperial eagle.[29] The Aohan Dryland Farming System in China balances millet cultivation with maintaining natural vegetation in areas sensitive to desertification, that also offers habitat for pollinators and birds.[30]

Another crucial contribution is the conservation of pollinator species. Many heritage farming practices, such as maintaining hedgerows, flowering crops, and fallow periods, support bees, butterflies, and other pollinators essential for food production.[31] In contrast, industrial agriculture's heavy pesticide use has led to dramatic drops in the number of pollinators, which is a major threat to global food supplies.[32] Finally, heritage systems often incorporate

24 "Become a GIAHS | Globally Important Agricultural Heritage Systems | Food and Agriculture Organization of the United Nations," GIAHS, 2025, https://www.fao.org/giahs/become-a-giahs/en.
25 FAO, The State of the World's Biodiversity for Food and Agriculture (Rome: FAO, 2019), 89.
26 Thrupp, "Linking Agricultural Biodiversity," 268-270.
27 FAO, State of the World's Biodiversity, 112-115. FAO, State of the World's Biodiversity, 112-115.
28 Ramesh et al., "Traditional Rice Varieties of the Western Ghats," Indian Journal of Plant Genetic Resources 28, no. 2 (2015): 145-152.
29 J. A. Gómez-Limón et al., "Dehesas as High Nature Value Farming Systems," Agroforestry Systems 87, no. 3 (2013): 543-559.
30 Min Qingwen, "Conservation of Aohan Dryland Farming Systems," Journal of Resources and Ecology 7, no. 3 (2016): 198-205.
31 Claire Kremen et al., "Pollination and Other Ecosystem Services Produced by Mobile Organisms," Ecology Letters 10, no. 4 (2007): 299-314.
32 David Goulson, Silent Earth: Averting the Insect Apocalypse (London: Jonathan Cape, 2021), 112.

sacred groves and community-managed forests, which act as biodiversity refuges. In parts of Africa and Asia, these conserved areas protect medicinal plants, wild relatives of crops, and endangered fauna, contributing to broader ecological stability.[33]

Furthermore, preserving agricultural heritage is not only crucial for managing land, biodiversity, and local livelihoods, but it also plays a key role in reducing food insecurity worldwide. Unlike modern industrial agriculture, which often relies on single-crop farms and chemical inputs, traditional farming methods prioritize diversity, resilience, and adaptability, incorporating sustainable practices that enhance productivity without compromising the environment, a key factor in maintaining stable food supplies. The link, however, between food security and agricultural heritage remains overlooked. There is a need for further study on how cultural heritage can enhance and strengthen food security worldwide. 342 million people face acute hunger, and 1.9 million suffer due to catastrophic hunger, primarily in Gaza and Sudan, but also in Bolivia, Haiti, Mali, South Sudan, and Yemen.[34]

One of the most significant contributions of agricultural heritage to food security is its emphasis on crop diversity. Traditional farmers cultivate multiple crop varieties, including drought-resistant and pest-tolerant strains, which act as a safeguard against climate variability and disease outbreaks.[35] For example, in the Andean region, Indigenous communities grow thousands of potato varieties, ensuring that even if some fail due to pests or extreme weather, others will thrive.[36] This contrasts sharply with industrial agriculture, where reliance on a few high-yield varieties increases vulnerability to large-scale crop failures.[37]

Another critical aspect is soil fertility management. Agricultural heritage systems often use organic practices such as crop rotation, intercropping, and composting, which maintain soil health without synthetic fertilizers.[38] The *waru waru* system of the Peruvian Andes, an ancient raised-field technique, prevents soil erosion and retains moisture, allowing crops to flourish even in harsh conditions.[39] Such methods ensure sustained agricultural productivity, directly supporting local food availability.[40]

Moreover, traditional systems often integrate livestock and crop farming, creating closed-loop systems that enhance food security.[41] In agro-pastoral communities, animals provide manure for fields while consuming crop residues, reducing waste and improving soil fertility. This integrated approach ensures a steady supply of both plant and animal-based foods, contributing to balanced diets.[42] Finally, agricultural heritage systems strengthen local food sovereignty by reducing dependence on external inputs like hybrid seeds and chemical fertilizers. Communities relying on Indigenous knowledge and locally adapted seeds are less vulnerable to market fluctuations and supply chain disruptions. Thus, preserving these systems is not just about cultural heritage but also about creating reliable durable food systems.[43]

Agricultural Heritage as Cultural Heritage

Cultural heritage can be defined as the expression of how people live. It includes many facets of culture, often categorized into tangible and intangible heritage.[44] Tangible cultural heritage refers to physical

33 Madhav Gadgil and V. D. Vartak, "Sacred Groves of India: A Plea for Continued Conservation," Journal of the Bombay Natural History Society 72, no. 2 (1975): 314-320.
34 UN World Food Programme (WFP), "A Global Food Crisis," n.d., https://www.wfp.org/global-hunger-crisis.
35 Karl S. Zimmerer, "Agrobiodiversity and Food Security in the Peruvian Andes," Geoforum 41, no. 1 (2010): 71-82.
36 Karl S. Zimmerer, "Agrobiodiversity and Food Security in the Peruvian Andes," Geoforum 41, no. 1 (2010): 71-82.
37 David Tilman et al., "Agricultural Sustainability and Intensive Production Practices," Nature 418, no. 6898 (2002): 671-677.
38 Pretty, Agroecology in Action, 115-118.
39 Clark L. Erickson, "Prehistoric Landscape Management in the Andean Highlands," Science 302, no. 5643 (2003): 416-419.
40 FAO, The Future of Food and Agriculture: Trends and Challenges (Rome: FAO, 2017), 45
41 Food and Agriculture Organization of the United Nations, Livestock's Long Shadow (Rome: FAO, 2006), 67.
42 Koohafkan and Altieri, Globally Important Agricultural Heritage Systems, 45-47.
43 IPES-Food, COVID-19 and the Crisis in Food Systems (Brussels: IPES-Food, 2020), 15.
44 UNESCO, Institute for Statistics, 2009 UNESCO Framework for Cultural Statistics

artifacts produced, maintained, and transmitted across generations, ranging from personal works of art to large monuments. Intangible cultural heritage describes cultural *ideas*, such as how we celebrate, how we mourn, how we transfer knowledge, etc.[45] The importance of intangible cultural heritage is not the cultural manifestation itself but rather the wealth of knowledge and skills that are transmitted through it from one generation to the next. All cultures have both tangible and intangible cultural heritage. However, this heritage can be lost. Particularly for minority groups in a country, the transmission of cultural heritage—particularly intangible heritage—across generations can decide if cultures thrive or decay.[46]

UNESCO's 2003 Convention for the Safeguarding of Intangible Cultural Heritage explains five main areas of this heritage. These include oral traditions and language, performing arts, social practices and festivals, knowledge about nature and the universe, and traditional craftsmanship.[47] Food was first recognized by UNESCO as intangible cultural heritage in 2010. Examples include the Mediterranean diet, Mexican cuisine, the French gastronomic meal, and Croatian gingerbread. There is also a middle ground between tangible and intangible elements. Research shows that tangible elements often come from intangible ones. This is true for agricultural heritage, where oral traditions, ancient knowledge, and farming practices are used to produce traditional food.[48]

Food systems are embedded in economic systems, which ultimately forge both community and financial identities. Traditional farming influences social structure, religious practices, and daily life. For many Indigenous communities, for instance, farming is a sacred duty, transmitted orally from generation to generation. In Japan's *satoyama* ecosystems, village societies manage forests and paddy fields on a sustainable basis, exemplifying the harmony between human beings and nature.[49] Similarly, the terraced rice fields of the Philippine Cordilleras or the Andean *chakra* systems are not just agricultural feats but living cultural symbols.[50] From these discussions, it can be understood that diverse aspects of food production and consumption identities have been, and are shaped by cultural heritage.

Framing food within a cultural heritage sphere has broader implications beyond cultural identity.

In this sense, agriculture is not merely an economic activity but a foundation of cultural identity. Agricultural practices shape traditions, festivals, cuisines, and communal values across the world.[51] These practices passed down through generations reflect a deep connection between people and their land, forming an intangible heritage that defines entire societies. This connection is also heavily influenced by their crops and environment. Therefore, it is critical to understand these practices as part of the community's cultural heritage due to the strong ties between them. In this sense, recognizing agricultural heritage as cultural heritage, particularly through UNESCO designations, can safeguard these practices while promoting sustainable development.

Globally Important Agricultural Heritage Systems

International organizations and local governments have jointly exerted efforts to recognize

45 UNESCO, "What Is Intangible Cultural Heritage?," n.d., https://ich.unesco.org/en/what-is-intangible-heritage-00003.
46 UNESCO, "Intangible Heritage Domains in the 2003 Convention," n.d., https://ich.unesco.org/en/intangible-heritage-domains-00052.
47 UNESCO, "Text of the Convention for the Safeguarding of the Intangible Cultural Heritage - UNESCO Intangible Cultural Heritage," n.d., https://ich.unesco.org/en/convention.
48 Jorge Otero, "Heritage Conservation Future: Where We Stand, Challenges Ahead, and a Paradigm Shift," *Global Challenges* 6, no. 1 (October 15, 2021), https://doi.org/10.1002/gch2.202100084.
49 "Japan's Satoyama Landscapes," The Geography Hub, accessed August 22, 2025, https://thegeographyhub.com/japans-satoyama-landscapes/.
50 "Rice Terraces of the Philippine Cordilleras," UNESCO, accessed August 22, 2025, https://whc.unesco.org/en/list/00722.
51 M.R. Reshma, B. Kannan, V.P. Jagathy Raj, S. Shailesh, Cultural heritage preservation through dance digitization: A review, Digital Applications in Archaeology and Cultural Heritage, Volume 28, 2023, ISSN 2212-0548, https://doi.org/10.1016/j.daach.2023.e00257.

agricultural heritage systems (AHSs) to preserve traditional agricultural wisdom and promote sustainable agriculture. In recent years, the significance of AHS conservation in sustainable agriculture has gained worldwide recognition. AHSs not only maintain agricultural biodiversity and form a wealth of Indigenous knowledge, but more importantly, they also provide various products and services that ensure local livelihoods and food security, ultimately improving people's quality of life.[52]

One such initiative is the FAO's designation of Globally Important Agricultural Heritage Systems (GIAHS). GIAHS are agroecosystems, communities of plants and animals interacting with their physical and chemical environments that people have modified to produce food or other products for human consumption and processing.[53] The communities that live in GIAHS have developed an intricate relationship with their territory. They usually involve farming, animal husbandry, forestry, and other uses in "land-use systems." These evolving sites are resilient systems characterized by remarkable agrobiodiversity, traditional knowledge, invaluable cultures and landscapes, sustainably managed by farmers, herders, fisherfolk, and forest people in ways that contribute to their livelihoods and food security.[54]

The initiative for GIAHS began in 2002 with the framework of the World Summit for Sustainable Development, when the FAO recognized that family farming and traditional systems were being compromised by climate change, community displacement, and biodiversity loss. It acknowledged that while modern industrial agriculture was advancing, it was also causing environmental harm, diminishing biodiversity, and breaking cultural connections.[55] GIAHS was endorsed as an FAO Corporate Programme at the 39th session of the FAO Conference in 2015.

GIAHS are exceptional because they feed people and support communities, but they also conserve magnificent landscapes, conserve biodiversity, and conserve cultures with their traditions and social values. Essentially, they are living treasures of how humans can live in harmony with nature and are the result of the gradual co-evolution of local communities and their environments. GIAHS are designed as a facility to identify, acknowledge, support, and safeguard these traditional systems and help them adapt to modernity. Through GIAHS, the FAO seeks to bring together conservation, development, and sustainability, enabling farmers to protect their traditions while improving their livelihoods.[56] GIAHS are classified and typified based on their ingenuity of management systems, high levels of agricultural biodiversity and associated biodiversity.[57]

GIAHS utilizes a multi-stakeholder process. It works with local farmers, governments, scientists, and community groups in a process built on partnerships. Its activities range from providing technical assistance, promoting agritourism, assisting with marketing, and promoting awareness of the importance of agricultural heritage.[58] FAO has designated 67 systems in 22 countries, with a further 15 proposals currently being considered. The GIAHS program has designated systems in Africa, Asia and the Pacific, Europe and Central Asia, and Latin America and the Caribbean.[59] For instance, in 2018, the Italian Agency for Development Cooperation and the University of Florence initiated a project called "GIAHS Building

52 Jilong Liu, Chen Qian, and Xiande Li, "Livelihood and Food Security in the Context of Sustainable Agriculture: Evidence From Tea Agricultural Heritage Systems in China," Foods 13, no. 14 (July 16, 2024): 2238, https://doi.org/10.3390/foods13142238.
53 Biodiversity Information System in Europe, *Agroecosystems,* n.d., https://biodiversity.europa.eu/europes-biodiversity/ecosystems/agroecosystems.
54 Food and Agriculture Organization of the United Nations, *Twenty years of Globally Important Agricultural Heritage Systems – Success stories of dynamic conservation for sustainable rural development,* (Rome, 2022), https://doi.org/10.4060/cc2385en
55 *Twenty Years of Globally Important Agricultural Heritage Systems*, *FAO eBooks*, 2022, https://doi.org/10.4060/cc2385en.
56 Food and Agriculture Organization of the United Nations, Globally Important Agricultural Heritage Systems, 2024.
57 Parviz Koohafkan, "A case of Agricultural Heritage systems," n.d. Rome, Italy.
58 Italian Agency for Development Cooperation and University of Florence, *GIAHS Building Capacity Report* (Florence: AICS/DAGRI, 2018).
59 Liu, Qian, and Li, "Livelihood and Food Security in the Context of Sustainable Agriculture: Evidence From Tea Agricultural Heritage Systems in China," July 16, 2024.

Capacity" to identify and protect agricultural heritage sites across the globe.[60] Taking inspiration from GIAHS, the Chinese government launched its own Nationally Important Agricultural Heritage Systems (NIAHS), a program to identify and protect national important heritage farming systems.[61]

GIAHS represent a living, evolving system of human communities in an intricate relationship with their environment. In many of these systems, the prosperity of nature and the poverty of people unfortunately coexist. Therefore, the initiative does not intend to freeze systems in time, but instead calls for their "dynamic conservation," emphasizing a balance between conservation, adaptation, and socio-economic development. It aims to empower smallholder farmers and pastoralists, traditional communities, and Indigenous peoples to maintain their conventional agricultural systems and to create an economic stake in the conservation of biodiversity so that nature and people can prosper together.[62]

Through GIAHS, the FAO is exploring paths in which traditional knowledge and clever agricultural practices can exist to support modern food and economic needs. These systems, once mastered by communities, combine old and new thinking about how to manage land, water, and biodiversity in ways that have protected their identity and transferred wisdom, traditions, and practices that can benefit future generations. GIAHS not only represent more sustainable ways of farming, but they also protect the rich diversity of cultures, histories, and communities across the globe, and serve as models to inspire better national and regional systems toward sustainability.[63]

Qingtian fish (Credit: Zicheng zic)

Case Study: GIAHS in China

For over 1,300 years, farmers in Longxian, located in Qingtian County in China's Zhejiang Province, have been using a clever farming method that combines raising fish with growing rice. This system, known as the rice-fish culture, is a brilliant example of how humans can work in harmony with nature. In their traditional method, the fish and rice crops benefit each other as they grow. The fish fertilize the soil, help move water, eat harmful weeds and pests, and help hold the environmental balance in the flooded rice paddies. The rice plants can offer shelter and food to fish, creating a stable ecosystem for productive farming of fish and rice. This collaboration of nature not only allows farmers to provide healthy and nutritious food for their families but also limits the use of chemical fertilizers, pesticides, and herbicides. This

60 FAO, *Twenty Years of Globally Important Agricultural Heritage Systems.*
61 Ministry of Agriculture and Rural Affairs of China, China-NIAHS Report 2024.
62 Food and Agriculture Organization of the United Nations, ACTION PLAN FOR THE DYNAMIC CONSERVATION OF THE URU SHIMBWE-JUU AS A GLOBALLY IMPORTANT AGRICULTURAL HERITAGE SYSTEM (GIAHS) AREA, 2022.
63 FAO, *Twenty Years of Globally Important Agricultural Heritage Systems.*

method promotes biodiversity and reduces the costs of production.[64]

In 2005, this ancient method of food production received global recognition when Qingtian County's rice-fish culture became the first in the world to be designated as a GIAHS by the FAO. Since that time, the local government has put in considerable effort to protect and promote this sustainable farm-based heritage practice. Under the Issued "Qingtian Action Plan," part of a long-range development plan for the county, Qingtian has focused on developing the rice–fish industry through improved local practices, assistance to farmers, and economic development initiatives. The results were phenomenal. Between 2017 and 2021, the total income of 104 villages using this system grew from USD 400,000 to USD 2.6 million—a 60 percent annual growth rate. The region developed and certified two brands: "Qingtian paddy fish" and "Qingtian paddy rice and fish," which were both recognized at the national level and contributed to local pride around these products. The rice-fish culture development in Qingtian was cited as one of the top ten innovative rural revitalization projects in Zhejiang Province in 2021.[65]

The successful implementation of the rice–fish model has motivated many young people and even overseas Chinese to return to their hometowns to start businesses using the rice-fish system. For instance, Lizhen Wu, a local farmer, opened Qingtian County's first rice-fish restaurant. She now earns more than USD 74,000 a year and won a local government "Model Farmhouse" in recognition of her superior achievements in agriculture. Yuepin Jin returned from France to understand the rice-fish system. He established a demonstration site featuring a koi fish breeding center and a cooperative for rice-fish farmers. He also registered the product trademarks and received national "green food" certification for both the rice and the fish to illustrate their quality and value to the environment. In 2014, the FAO identified him as a "model farmer" for his contributions.[66]

After the designation as a GIAHS, Qingtian County established a dedicated committee to enhance the preservation and development of its agricultural heritage. Local governments in Qingtian County then created two ten-year plans for the rice-fish system. This also included the reintroduction of traditional crops, as the farming community introduced 20 old varieties of rice. Approximately 30 farmers are directly involved with the diversity and conservation of the rice and fish species. A unique research center was also established to study and conserve the biological resources that made the rice-fish system so successful. As a result of these combined activities, the area of land utilizing this production system has increased, and presently the rice-fish system is about 1,600 hectares, improving the livelihoods of more than 52,000 people. Farmers participating in the system have increased their income by an average of USD 2,200 per hectare since joining the rice-fish system. To support this achievement, over 30 training sessions have taken place to demonstrate to farmers how to manage the rice-fish system. The training sessions have included higher-level courses from international cooperation programs.[67]

The Qingtian rice-fish culture is considered a potent example of how the past can influence current developmental directions and practice. Applying and honoring past understanding, the rice-fish system illustrates that sustainable and eco-friendly agriculture is possible and feasible. Still, it can also be productive, enhancing food sources for local communities' security, protecting biodiversity, fostering rural economies, and enhancing cultural continuity.[68]

64 "Rice-fish Culture, Qingtian County, China," FAO, accessed August 22, 2025, https://openknowledge.fao.org/server/api/core/bitstreams/40e90719-4775-4228-afaa-e1e6730df7e6/content/giahs-2022/rice-fish-culture.html?utm.
65 FAO, "Rice-fish Culture, Qingtian County, China."
66 FAO, "Rice-fish Culture, Qingtian County, China."
67 FAO, "Rice-fish Culture, Qingtian County, China."
68 Food and Agriculture Organization of the United Nations, *Twenty years of Globally Important Agricultural Heritage Systems – Success stories of dynamic conservation for sustainable rural development,* Rome, 2022, https://doi.org/10.4060/cc2385en.

Current Status

Threats to Agricultural Heritage

The most significant and urgent threat to agriculture today is climate change. Rising global temperatures, shifting rainfall patterns, prolonged droughts, heatwaves, floods, and intensified storms disrupt farming cycles and reduce crop yields. For instance, extreme weather events in regions like the Horn of Africa and Southeast Asia have caused recurring food shortages and displacement of farming populations. According to the Intergovernmental Panel on Climate Change (IPCC), by 2050, crop yields for staples like wheat, rice, and maize could drop significantly in many regions, especially in tropical and subtropical zones.[69] Increased atmospheric CO_2 levels may initially benefit certain crops, but long-term impacts, such as soil degradation, nutrient depletion, and water scarcity, negate these short-term gains.[70]

Additionally, sea level rise threatens coastal agricultural areas in countries like Bangladesh and Vietnam, potentially displacing millions of small-scale farmers. Agriculture is also a contributor to climate change, accounting for about 20 percent of global greenhouse gas emissions, mainly from livestock, deforestation, and synthetic fertilizers.[71] Moreover, desertification, especially in sub-Saharan Africa and parts of the Middle East, is stripping once-fertile lands of their agricultural potential. The degradation of ecosystems further reduces pollination, natural pest control, and water regulation, which are critical services for farming that nature provides freely.[72] Thus, the relationship between agriculture and climate is both reciprocal and fragile.

Another serious problem is the loss of biodiversity. In the past, farmers grew many kinds of crops and raised many types of animals. Now, modern industrial agriculture often includes monocultures—systems in which only one crop is grown over large swathes of land, and it increasingly reduces genetic diversity.[73] This increases the vulnerability of crop systems to numerous threats.[74] An excellent example of genetic vulnerability is the Irish Potato Famine of the 1840s that resulted from the potato blight *Phytophthora infestans*, which was exacerbated by the heavy reliance on potato crops.[75] Currently, the FAO states that over 75 percent of the world's food comes from just 12 plant species and five animal species.[76]

The extensive reliance on agrochemicals and mechanization is another cause for concern. While the use of synthetic fertilizers and pesticides has facilitated farming on a larger scale, it has come at the cost of environmental deterioration. Runoff from chemical inputs is now spreading pollutants through rivers and groundwater, resulting in unfortunate consequences, such as diminished aquatic biodiversity,[77] especially in destinations like the Mississippi River Basin that have

69 Cheikh Mbow et al., *Chapter 5 : Food Security — Special Report on Climate Change and Land, Special Report on Climate Change and Land*, 2019, https://www.ipcc.ch/srccl/chapter/chapter-5/.
70 Elizabeth A. Ainsworth, Alvaro Sanz-Saez, and Courtney P. Leisner, *Crops and Rising Atmospheric CO 2: Friends or Foes?,* Philosophical Transactions of the Royal Society B Biological Sciences 380, no. 1927 (2025), https://doi.org/10.1098/rstb.2024.0230.
71 Hannah Ritchie, Pablo Rosado, and Max Roser, *Environmental Impacts of Food Production,* Our World in Data, 2022, https://ourworldindata.org/environmental-impacts-of-food.
72 Hannah Ritchie, Pablo Rosado, and Max Roser, *Environmental Impacts of Food Production,* Our World in Data, 2022, https://ourworldindata.org/environmental-impacts-of-food.
73 Food & Hospitality Asia, "Monoculture Farming: Practices, Benefits, and Alternatives," Food & Hospitality Asia, June 27, 2025, https://foodnhotelasia.com/glossary/fnb/monoculture-farming.
74 Sandeep Kaur et al., "Monoculture of Crops: A Challenge in Attaining Food Security," in Advances in Food Security and Sustainability, 2024, 197–213, https://doi.org/10.1016/bs.af2s.2024.07.008.
75 Catharina Japiks, "The Irish Potato Famine of the 1840s - Victory Seed Company," 1994, https://victoryseeds.com/pages/potato-famine.
76 Elsa Tsioumani, Asterios Tsioumanis, "Biological Diversity: Protecting the variety of life on Earth," 2020, https://www.iisd.org/articles/deep-dive/biological-diversity-protecting-variety-life-earth.
77 Food and Agriculture Organization of the United Nations, "The state of the world's land and water resources for food and agriculture (SOLAW) – Managing systems at risk, Rome and Earthscan, London, 2011.

undergone intensive farming.[78] Furthermore, the over-application of pesticides leads to pest resistance, while excess fertilizer usage leads to soil acidification and ultimately reduced fertility. Mechanization in agriculture is convenient, but often entails substantial costs that require extensive investment, making mechanization out of reach for many smallholders, ultimately putting them at the mercy of loans.

Changing consumer behaviors, globalization, and processed food have all shifted traditional agriculture, too. These factors have changed the way people consume food and diminished local food systems. Additionally, conventional and resource-efficient native crops are often mistakenly replaced or abandoned for industry-standard, high-yielding, marketable crops. Crops such as sorghum and millet have declined in importance in favor of wheat and rice, which are popular among modern consumers. However, sorghum and millet have better drought resilience, making them more able to withstand the coming effects of climate change.[79]

As cities grow bigger, they often build over farmland to make room for homes, roads, and businesses. In fast-growing countries like China, India, and Nigeria, this means fertile farmland is being lost to the construction of housing and commercial spaces. This not only hurts food production and makes life harder for farmers who live just outside the cities, but it also severs traditional links between urban consumers and rural producers, altogether contributing to social inequality and food insecurity in cities, especially for low-income populations.[80]

These threats risk the loss of unique agricultural biodiversity, traditional knowledge, healthy land, and rural livelihoods. They also endanger food sovereignty for many farming communities. Once GIAHS disappear, their cultural and environmental benefits will be gone forever. Protecting agricultural heritage and building resilient food systems requires a mix of science, traditional wisdom, community action, and strong policies.

Integration of Traditional Knowledge into Modern Agriculture

Traditional knowledge is now seen as key to resilience, sustainability, and adapting to climate change. This knowledge, also called Indigenous knowledge or local knowledge, includes practices on soil, water, crop diversity, and ecosystem care. It has been built and passed down through generations.[81] Modern farming is blending ancestral knowledge with science to create sustainable agroecological systems. These systems protect biodiversity, increase productivity, and strengthen community empowerment.[82]

For starters, the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report argues that any climate adaptation that is resilient and equitable must include and respect Indigenous knowledge systems.[83] These knowledge systems are developed by paying attention to the weather cycles, animal migration, and the behaviors of plants and soils. In Africa, for example, small farmers observe animal and wind behaviors. If goats give birth in April and many butterflies are observed, it is not a far stretch to assume the rains may be coming along with potential pests.[84] Some of these traditional processes, including the selection of varieties, soil conservation, or early warning rituals, are never referred to as scientific, nor do they rely on Western science, yet are nevertheless incredibly useful in preparing for an unknown future.

78 Madeline Heim Milwaukee Journal Sentinel and Madeline Heim Milwaukee Journal Sentinel, "Not Just a Gulf Problem: Mississippi River Farm Runoff Pollutes Upstream Waters," Investigate Midwest, June 19, 2024, https://investigatemidwest.org/2024/06/19/not-just-a-gulf-problem-mississippi-river-farm-runoff-pollutes-upstream-waters/.
79 Food and Agriculture Organization of the United Nations, "The state of the world's land and water resources for food and agriculture," 2011.
80 Food & Agriculture Organization, *"Future of Food and Agriculture: Trends and Challenges."*
81 Food & Agriculture Organization, *"Future of Food and Agriculture: Trends and Challenges."*
82 Food & Agriculture Organization, *"Future of Food and Agriculture: Trends and Challenges."*
83 IPCC, Climate Change 2022: Impacts, Adaptation and Vulnerability, Working Group II, Chapter 18, accessed July 2025, https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-18.
84 Sospeter et al., "Indigenous Knowledge for Climate Change Adaptation Among Tanzanian Farmers," Climate and Development 2025, https://journals.sagepub.com/doi/full/10.1177/03400352251317997.

In Tanzania, researchers are using Indigenous and local knowledge to help communities deal with climate change. This is important for rural areas that cannot easily use official climate forecasts. This knowledge helps protect biodiversity, keep water in the soil, choose the right time to plant, and improve food security.[85]

Agroecological practices are a way of farming that works with nature instead of against it. It combines science, traditional farming knowledge, and ecology to create food systems that are good for the environment, support farmers, and produce healthy food.[86] This custom has existed along with Indigenous and local knowledge of communities in Africa and Latin America. In West Africa, *zaï* or *tassa*, is a traditional practice that involves digging small circular holes in the soil and filling them with compost or manure. In Burkina Faso, this practice is being brought back to repair damaged soil and make the land productive again. The circular pits improve water infiltration and termite work, restoring arid land to productive millet and sorghum fields. Farmers who use local knowledge to integrate *zaï* with contemporary mapping technology indicate yields increased by over 50 percent.[87]

Sustainable forestry (Credit: NRCS Oregon)

Sustainable forestry is also of vital importance. One example is Mexico's *kuojtakiloyan*, a forest garden created by the Nahua and Totonaku communities. It combines fruit trees, coffee, tubers, herbs, and legumes into diverse systems. These gardens support pollinators, keep soil healthy, and provide food, medicine, animal feed, and fuel. Such local systems are built on ancient cultural knowledge. They are seen as climate-smart landscapes that respond to climate risks while respecting local knowledge, culture, and social needs.[88]

At the global level, the UN Food and Agriculture Organization (FAO) is using Indigenous knowledge to help shape climate policies. Indigenous groups are also playing a bigger role in international climate talks, like the Koronivia Joint Work on Agriculture. These efforts stress that Indigenous communities must give their free and informed consent and take the lead in planning for climate change. Overall, world leaders are starting to see that traditional knowledge is not just extra, it should be central to climate and farming policies.[89]

85 Martinus Eustace Sospeter, Wuylstan Mtega, and Andrew Malekani, *Smallholder Farmers' Perception Toward Use of Indigenous Knowledge for Climate Change Adaptation in Morogoro-Tanzania,* Regional Journal of Information and Knowledge Management. 10, no. 1 (2025): 120–39, https://doi.org/10.70759/g8szny92.
86 Food and Agriculture Organization of the United States, *Agroecology Knowledge Hub*, 2025, https://www.fao.org/agroecology/overview/en/.
87 Food and Agriculture Organization of the United States, *Agroecology Knowledge Hub*, 2025, https://www.fao.org/agroecology/overview/en/.
88 "Sustainable Development Goals," UNDP, n.d., https://www.undp.org/sustainable-development-goals/life-on-land.
89 "Koronivia Joint Work on Agriculture," FAO, accessed August 22, 2025, https://www.fao.org/koronivia/en/.

There are several advantages to integrating traditional knowledge into present-day agriculture. Most notably, there is improved resilience. Farming systems that mix different crops, trees (agroforestry), and traditional seeds help farmers face challenges like late rainfall, pests, and changing market prices. By using this diversity, farmers can reduce risks and keep their farms productive even as the climate becomes less predictable. In addition, traditional practices (e.g., natural pest deterrents and composting) reduce reliance on expensive synthetic inputs (e.g., pesticides and fertilizers), which not only increase the economy of farming but also diminishes harm to the environment. Integrating traditional knowledge also strengthens cultural systems, supports local identities, and provides young people with opportunities to consider agriculture viably, while recognizing value in local systems knowledge. Finally, many components of traditional systems improve biodiversity values, carbon sequestration, soil fertility, and, like conventional knowledge, are valuable tools to diminish environmental degradation.[90]

Integrating traditional knowledge has many benefits, but many challenges still exist. The first challenge is that traditional knowledge is often not recorded and is often transferred orally. As generations pass and young people migrate to urban centers and away from farming, valuable local knowledge will likely vanish too.[91] Universities, governmental, and research institutes often seek validation of traditional knowledge through academic, scientific, and governance institutions, which may further devalue local agricultural systems by framing them as anecdotal sources without accepting them as legitimate knowledge.

Displacement of traditional knowledge is also a huge concern. Often, traditional knowledge is appropriated by companies or universities without fair and equitable access to potential benefits. Further, there are no conditions of consent established before using traditional knowledge. Intellectual systems of protection for knowledge often fail to address the rights of agricultural communities to seeds or traditional farming ways of doing because it is usually established at an individual level of intellectual ownership. In many geographical regions, Indigenous agricultural communities lack formal land rights, making them vulnerable to displacement and unable to apply traditional farming methods. Therefore, corrective action is needed in legal structures, policy and decision frameworks, and institutional protocols to strengthen respect and recognition of traditional knowledge systems and to provide a legal structure of cultural and ethical protocols outlining the distinction of Indigenous intellectual sovereignty.[92]

Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs) are a set of objectives adopted by all UN member states in 2015 to ensure the well-being of the planet, hoping to achieve them by 2030. The 2030 Agenda outlines 17 distinct goals that aim to end world hunger, build sustainable communities, support education, fight against discrimination, and much more. Not only that, but they acknowledge that these challenges are interconnected and must not be dealt with independently.[93] They act as a set of guidelines for all UN member states regardless of income level or political system, allowing them to plan policies, track progress, allocate funding, and coordinate partnerships globally in a coherent manner with countries and sectors.[94] The UN Secretary General presents an annual report on progress towards achieving the SDGs based on the global indicator

90 "Knowledge and Climate Change | Indigenous Peoples | FAO," IndigenousPeoples, n.d., https://www.fao.org/indigenous-peoples/pillars-of-work/indigenous-peoples--knowledge-and-climate-change/.
91 Marta Olazabal et al., "Subaltern Forms of Knowledge Are Required to Boost Local Adaptation," One Earth 4, no. 6 (June 1, 2021): 828–38, https://doi.org/10.1016/j.oneear.2021.05.006.
92 Nabiswa, "Leveraging Indigenous Knowledge for Climate Change Adaptation in the Indo-Pacific Region — the Indo-Pacific Studies Center."
93 "Sustainable Development Goals."
94 UNDP "Sustainable Development Goals," n.d., https://www.undp.org/sustainable-development-goals.

framework and data produced by countries' statistical systems. Several goals apply to the preservation of agricultural heritage, most notably SDG 11: Sustainable Cities and Communities, and SDG 15: Life on Land. [95]

SDG 11 consists of ensuring cities and human settlements are inclusive, safe, resilient, and sustainable.[96] With urbanization rising rapidly, millions have migrated towards bigger cities, leaving rural life behind and all that it entails. Currently, over half of the world's population lives in an urban area, and with this, housing affordability has reached crisis levels. Up to three billion people worldwide struggle to afford a place to live, and 1.12 billion live in slums or informal settlements without basic services.[97] Therefore, as more people continue to renounce their rural lifestyle for better life opportunities in the city, they are also letting go of their traditions. As farms are situated in the country, the slimming population only makes the case worse against the preservation of agricultural heritage. Even more, with the younger population moving away, traditional agrarian knowledge gets erased and forgotten as the older generation passes away. Moreover, all those who do decide to stay in the countryside often suffer due to the lack of opportunities for professional development in the area, receiving little to no support for preserving traditional agricultural practices that enrich the country's history and culture.

Preserving agricultural heritage is also deeply tied to SDG 15, which protects, restores, and promotes sustainable use of territorial ecosystems, sustainably manages forests, combats desertification, and halts and reverses land degradation and halts biodiversity loss.[98] Agricultural heritage systems are closely tied to traditional ecological knowledge and are often found in areas rich in biodiversity. Protecting them helps conserve native species, local ecosystems, and cultural landscapes. Many of these places have been shaped for centuries through practices like terracing, crop rotation, and water-sharing systems.

Bloc Analysis

There is a widespread agreement that maintaining agricultural heritage is valuable, but there is significant disagreement across countries about how this goal should be implemented. These disagreements emerge from differences in how agricultural heritage is seen, whether as a cultural object to be protected, a system to be received for future purposes, or a living practice that is fundamental to rural lives. For example, while some countries emphasize the protection of landscapes or practices according to institutional requirements or through international recognition, others prioritize technological modernization to make heritage more marketable, verified, or fit into modern systems. In other countries, the inclusion of Indigenous knowledge or the continued use of culminating traditional farming systems through a path to food security and environmental resilience is prioritized.[99]

The divisions shape not only what countries advocate and negotiate for in FAO discussions, but also how they interpret concepts like preservation, innovation, and authenticity. A country may agree to a position that promotes agricultural heritage in principle,

95 United Nations, "Sustainable Development Goals," n.d., https://sdgs.un.org/.
96 United Nations, Sustainable Development Goals
97 United Nations Department of Economic and Social Affairs, "The Sustainable Development Goals Report 2025", 2025, New York, https://unstats.un.org/sdgs/report/2025/The-Sustainable-Development-Goals-Report-2025.pdf
98 "Sustainable Development Goals," UNDP, n.d., https://www.undp.org/sustainable-development-goals/life-on-land.
99 Harsh Vardhan Bhati and Yaffa Epstein, "Protection of Biocultural Heritage in the Anthropocene: Towards Reconciling Natural, Cultural, Tangible and Intangible Heritage," Journal of Environmental Law 35, no. 3 (June 28, 2023): 353–75, https://doi.org/10.1093/jel/eqad020.

but oppose specific policies that endanger economic equivalence, self-determination over genetic resources, or the rights of local public communities. They are also an essential part of how countries engage with each other. Countries that have similar definitions or structural similarities are more likely to form partnerships, coordinate joint working papers, and propose solutions together. Countries with conflicting interests may behave very differently in terms of their strategic diplomacy, negotiating wording of resolutions, questioning funding mechanisms, or defending their national ways of doing things against international pressure.

Countries with GIAHS

This bloc is made of states where their cultural identity is deeply tied to some of their agricultural practices, usually being host to one or more GIAHS. This bloc comprises countries where their cultural identity has deep, cemented roots in their agricultural practices. Their agricultural practices go back centuries and, therefore, are highly protected. The members of this bloc have formally recognized and protected their agricultural heritage through national laws, cultural registries, and participation in international frameworks such as UNESCO initiatives. Moreover, in these countries, agricultural heritage is not only highly valued due to its link with their cultural identity, but it is also a significant factor that influences their policy making and economic strategies, using agricultural heritage to promote national identity, culinary tourism, and diplomacy.

Japan is one member of this bloc, whose agricultural history stands back more than a thousand years old. Some of their traditional techniques, such as the Traditional Wasabi Cultivation in Shizuoka, are not a highly valued and well protected practice part of their national cultural identity. These practices are also still being employed to this day.[100] Japan hosts 15 recognized GIAHS sites as well as their national program, the National Important Agricultural Heritage Systems (NIAHS) established in 2013.[101]

Technologically Modernized Agricultural Economies

This bloc is made up of rapidly modernizing states with an industrialized, export-oriented agricultural economy. Efficiency and productivity are vitally important to these countries. They invest in modern agricultural methods, and minimally rely on traditional agriculture, if at all. Countries in this bloc tend to take an economic-scientific view of agriculture where innovation, mechanization, biotechnology, and digitalization are prioritized.[102] The countries in this category acknowledge heritage, although to different degrees and as an exceedingly selective part of broader strategies related to globalization, trade, market competitiveness, and research-driven improvement.

Importantly, their food systems are highly export oriented. When systems, research, and policy are developed in this context, the first concerns are typically food security, efficiency in trade, and environmental sustainability or climate-smart agriculture (e.g., net-zero carbon strategies). They may still be part of FAO and UNESCO initiatives. Still, their engagement with heritage tends to be instrumental to their acquisition of predetermined outcomes and therefore finds the support of heritage where it advances diplomatic, environmental, or commercial objectives. They are likely hesitant to commit to any binding mandate that might limit agricultural modernization or access to markets.

One member of this bloc is the Netherlands, which has one of the world's most technologically advanced agricultural sectors. While it has a wonderful agrarian tradition, it is being led by a government that supports entirely

100 FAO, "Traditional Wasabi Cultivation in Shizuoka, Japan," GIAHS, n.d., https://www.fao.org/giahs/giahs-around-the-world/japan-shizuoka-wasabi-system/en.
101 "Lessons from Japan's Nationally Important Agricultural Heritage Systems (NIAHS): Insights and Opportunities for the Global Network," FAO, accessed August 22, 2025, https://www.fao.org/giahs/news-and-events/events/events-detail/webinar-lessons-from-japan/en.
102 Investopedia Team, "Industrialization: What It Is, Examples, and Impacts on Society," Investopedia, June 26, 2024, https://www.investopedia.com/terms/i/industrialization.asp.

high-efficiency greenhouse farming, data-driven crop management, and sustainable intensification. While the Netherlands appreciates and promotes international cooperation on agri-heritage issues when it intersects with innovation or global food security, it tends to oppose any proposal that would limit the possibilities of its sophisticated mechanized system. In addition, the Netherlands is also in favor of partnerships between the public and private sectors in agriculture and may connect with countries that focus on agricultural innovation, digital farming, and agricultural biotechnology development.[103]

States with Predominantly Traditional or Indigenous Agricultural Systems

This bloc is composed mainly of medium to small-sized countries (as defined by GDP and population) that heavily rely on smallholder agriculture with traditional farming. The majority of the food they produce is consumed locally. Therefore, they advocate for regulation in favor of agricultural heritage, as their population heavily relies on these practices to survive.

The members of this bloc may not have formal recognition systems like GIAHS, but they have practices that have emerged from Indigenous knowledge and customary law. Many of these countries are dealing with ongoing land insecurity, climate change, or marginalization of rural people, and recognize that protecting traditional agricultural systems is a political, environmental, and ethical endeavor. They often gain political traction by holding pro-local knowledge positions. Members of this bloc often take pro-smallholder or pro-Indigenous positions in committee, usually linking those positions to a call for development related to capacity development, financing, or legal frameworks protecting farmers and agrobiodiversity.

An example is Peru, where Indigenous farming systems like terraced agriculture in the Andes, local production of potatoes, and community water management are common. These practices are significant culturally but also suit their harsh, variable climate and degraded, inhospitable land configuration. Peru has a GIAHS designation and is a part of international heritage systems. Still, many of their Indigenous agriculture systems exist outside of these formal heritage and recognition structures and are more broadly based on Indigenous systems. These systems, like ritualistic practices, exercise forms of governance by the community. On the international stage, Peru provides a focus on the need for biocultural diversity protection, support for smallholder resilience, and recognizes the relevance of Indigenous agriculture.[104]

Committee Mission

The FAO is the United Nations agency dedicated to solving world hunger and other things. Since being founded in 1945, the main goal of the FAO has been to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives.[105] Some of the FAO's primary objectives include eliminating food insecurity and malnutrition, increasing the productivity and sustainability of agriculture, reducing rural poverty, and creating inclusive and efficient food systems around the world. It also includes advising on agricultural policy, global farming, and coordinating international aid efforts. FAO aims to preserve agrarian heritage by recognizing

103 Food and Agriculture Organization of the United Nations, "Globally Important Agricultural Heritage Systems - Andean Agriculture, Peru," 2011, https://www.fao.org/giahs/giahs-around-the-world/peru-andean-agriculture/en
104 Food and Agriculture Organization of the United Nations, "Globally Important Agricultural Heritage Systems - Andean Agriculture, Peru."
105

and protecting Indigenous and local farming practices, traditional crop varieties, and sustainable land-use systems passed down through generations. These systems often promote biodiversity, resilience to climate change, and strong community identities.

Delegates should focus on involving, supporting, and protecting traditional farming systems that are culturally, environmentally, and food security relevant. These heritage systems have often been developed over centuries and reflect unique ways of knowing and deep connections between people and natural environments. This committee seeks to protect a way of life and strongly supports and adopts sustainable livelihoods through recognizing the role of Indigenous and local communities and the agricultural heritage that is stewarded.

During times of rapid modernization and climate change, it is crucial delegates focus on preserving heritage and maintaining systems that provide essential agricultural practices, connections, and heritage reflecting people's identities and ways of knowing. Ultimately, by preserving agricultural heritage, delegates will support a more resilient, diverse, and inclusive food system.

Building Resilient Food Systems

Photo Credit: Jonathan McIntosh

Vulnerable food systems weaken countries, especially in terms of health and economy. By creating resilient food systems, these issues can be rectified, enabling a stronger country as a whole. Topics such as unsustainability and inequality with food distribution and marketing systems cause overall weaknesses internationally.[1] Without maintaining these practices, the systems fail, leading to long-term struggles. Countries deal with many types of shocks that cause stress on food systems, such as climate change, social, political, and economic issues.[2] By understanding the origin and impact of these issues, food systems can be strengthened, lessening international hunger.

The Food and Agriculture Organization (FAO) has worked to combat such issues since its inception. It maintains that there are many levels of this issue. One crucial factor is the resilience of food production. By protecting the way food is produced, it can be harvested appropriately and then distributed. This allows for a proper amount of food to be available for consumers, making it much more accessible. There also must be a focus on not just national food security and nutrition, but also on an individual and household level. By monitoring food security at all levels, issues and inequalities within systems can be found and dealt with more efficiently. The resilience of communities also must be considered, with government and infrastructure being the focus. This helps to highlight how such problems as crime and lack of access to services are presented and dealt with. By tracking the effectiveness of community initiatives, we can identify areas for change and create novel solutions. Besides agriculture itself, food supply chains (including transportation, processing, and packaging) also play a critical role in food security.[3] Disturbances like those can cause massive issues in supply chains, further causing inaccessibility in these systems.

While there are many factors in monitoring the depth of this topic, there are also many ways to address these issues. One way is keeping back-ups and redundancy in systems.[4] By having these in place, systems can recover from things like natural disasters quickly. Adaptability and redundancy allow for stronger and more resilient systems. Working with nature rather than against it is another efficient way to improve resilience. [5] Increased, for example, provides for proper health of crop production, allowing for better harvest and abundance for distribution.

The complexity of the issue of resilient food systems makes it not only a pressing issue but a difficult one to solve entirely. By using multiple lenses to look at the issue, FAO hopes to work through this and toward a safer, less hungry world.

1 "Global Forum on Food Security and Nutrition (FSN Forum)," Food and Agriculture Organization of the United Nations, last updated June 25, 2024, accessed July 22, 2025, https://www.fao.org/fsnforum/index.php/consultation/building-resilient-food-systems-hlpe-scope-report.
2 FAO, "Global Forum on Food Security and Nutrition (FSN Forum)."
3 FAO, "Global Forum on Food Security and Nutrition (FSN Forum)."
4 James Worstell and John Green, "Eight Qualities of Resilient Food Systems: Toward a Sustainability/Resilience Index," *Open Call Papers: Food System Resilience*, 7 no. 3 (May 2017): https://doi.org/10.5304/jafscd.2017.073.001.
5 James Worstell and John Green, "Eight Qualities of Resilient Food Systems: Toward a Sustainability/Resilience Index."

Topic Background

Historical Technological Advancements

Before the 20th century, many communities practiced methods that we now know work to promote biodiversity and sustainability. These include crop rotation and the use of local greenery such as trees and shrubs in farming systems.[6] These ideas help improve the ecosystem. Most of these ideas are still used today. There have also been many advancements in the world of agriculture, especially within the last century. Nature-positive agriculture works to build resilient ecosystems in terms of both environmental health and food production. This concept has existed since the 1930s, working through the lens of the importance and interactions of the natural environment surrounding them. This was done using methods such as anthropology, ethnobotany, ecology, and agronomy.[7] A significant portion of this work involved synthesizing the ideas of Indigenous and local communities with modern science to enhance and update existing work. Both communities had many methods that had worked for decades, if not longer, so to get rid of them altogether would not make any sense. Therefore, they were merely built upon rather than gotten rid of together. Most of these concepts still exist today in different forms.

From the 1940s through the 1960s, the focus was placed on increasing food production, rather than looking at the impact this would have on local biodiversity. Due to this lack of attention and research, ecosystems suffered as they were not being cared for. While food production was at an all-time high, the environment was deteriorating quickly due to a lack of protection and knowledge. This led to a growing awareness of sustainability and a push towards organics. One significant way this was done was the usage of Indigenous knowledge as the basis, with similar ideas to those used in the pre-20th century.[8] These ideas aim to take pre-existing expertise and identify what remains usable in light of modern science. Ideas like waste recycling and soil biodiversity form the foundation for enhancing the ecosystem we are currently working with.

Because farming is based on traditions, farmers tend to be more conservative when it comes to their practices. Such traditions are passed down from generation to generation, and they have been proven to work well in most cases. Farmers often take a long time to get used to the idea of new technology, and even longer to trust and implement it in a widespread manner.[9] Ideas such as precision agriculture combine the latest technology with these trusted methods to increase both efficiency and quality of production.[10] Things such as sensors were implemented to view variables like temperature better, thereby gaining more control over their operations. By combining trusted ideas with technology, farmers can better adapt to them. Concepts like precision agriculture are crucial in areas facing resource shortages and climate change, as they help address the issues at hand. Precision agriculture uses real-time measurements of yield and different variables to allow for more accuracy.[11] Technology like this helps to grant more control over farming and helps to improve efficiency and productivity.

6 Manoj Kaushal, Mary Atieno, Sylvnus Odjo, Frederick Baijukya, Yosef Gebrehawaryat and Carlo Fadda. "Nature-Positive Agriculture-A Way Forward Towards Resilient Agrifood Systems," *Sustainability* 17, no. 3 (January 2025): https://doi.org/10.3390/su17031151.
7 Kaushal, Atieno, Odjo, Baijukya, Gebrehawaryat and Fadda, "Nature-Positive Agriculture-A Way Forward Towards Resilient Agrifood Systems."
8 Kaushal, Atieno, Odjo, Baijukya, Gebrehawaryat and Fadda, "Nature-Positive Agriculture-A Way Forward Towards Resilient Agrifood Systems."
9 Dimitrios Kalfas, Stavros Kalogiannidis, Olympia Papaevangelou, Katerina Melfou and Fotios Chatzitheodoridis, "Integration of Technology in Agricultural Practices towards Agricultural Sustainability: A Case Study of Greece," *Sustainability* 16, no. 7 (March 2024): https://doi.org/10.3390/su16072664
10 Kalfas, Kalogiannidis, Papaevangelou, Melfou and Chatzitheodoridis, "Integration of Technology in Agricultural Practices towards Agricultural Sustainability: A Case Study of Greece."
11 Guin, Sahoo, Samanta, Maity and Bera, *Advancements in Agricultural Technology: A Historical Perspective,* 255

In recent decades, soil biodiversity has been a primary focus. Soil is a non-renewable resource and can serve numerous vital functions for ecosystems. Therefore, better soil biodiversity leads to better overall functioning. Living organisms in the soil, such as bacteria and worms, help break down and decompose organic matter in a process called waste recycling. Key plant nutrients such as carbon and nitrogen often sit within the soil. Microorganisms within the soil biota allow for those nutrients to be cycled, allowing them to be available to different plants afterward.[12] By paying attention to ideas such as soil diversity, ecosystems are allowed to work better within themselves to keep things afloat, along with other human interactions.

Technology has made significant contributions to the agricultural world. Digital technology has especially helped enhance the work already being done by farmers. However, due to the difference in access to these technologies, they have not been as effective as they could be if they were more common throughout the world.[13] This is known as the digital divide and has proven to be a problem in many fields, but especially in rural areas such as farming. A lack of access to new technologies can have a considerable negative impact, particularly on smaller farms. Smaller farms tend to have fewer resources for experimenting with new technologies. Although it is hardly surprising, funding is often a key reason why smaller farms fall behind technologically.[14]

Overall, there have been a multitude of critical agricultural advancements that have helped strengthen food systems. By combining past tactics with modern information, things have only gotten better. While there is still a long way to go, efforts to help both food production and the environment have been made significantly. Recognizing the relationship between the two topics and leveraging technology to support it has been a great way to work on it. Recent policies have worked to include those educated in farming to work with one another to improve agriculture throughout the world.[15] By working through this, agricultural systems will hopefully continue to grow with technology that is accessible and effective.

Natural Disasters and Land Issues

Natural disasters wreak havoc on the economy, physical safety, and overall well-being of communities. The agricultural systems of these communities are not an exception. Often, this section is hit the hardest, as the physicality of these disasters deeply harms areas like farms. They also have both long-term and short-term impacts. Resilient food systems need to be able not only to withstand these disasters, but they also need to be able to recover from them quickly.[16] Sudden shocks often do the most damage; however, even with planning, these disasters can be severely underestimated. This, in turn, can cause even more damage, especially when multiple disasters converge.[17] However, it is still essential to understand what to do in the event of a natural disaster and how to plan for all that can be scheduled.

Energy in the form of electricity grids and power plants is usually one of the first areas to be impacted by natural disasters. This is generally done physically and disturbs many things, including food production.[18] Without working

12 Kaushal, Atieno, Odjo, Baijukya, Gebrehawaryat and Fadda, "Nature-Positive Agriculture-A Way Forward Towards Resilient Agrifood Systems."
13 Zu Jiahua, Yanzi Li, Meiping Zhang and Shuhan Zhang, "Sustainable agriculture in the digital era: Past, present, and future trends by bibliometric analysis," *Heliyon* 10, no. 14 (July 2024): https://www.sciencedirect.com/science/article/pii/S2405844024106433
14 Freddy Ruzhani and Abbyssinia Mushunje, "Technical efficiency in agriculture: A decade-long meta-analysis of global research," *Journal of Agriculture and Food Research* 19, no. 101667 (March 2025): https://doi.org/10.1016/j.jafr.2025.101667
15 Ruzhani and Mushunje, "Technical efficiency in agriculture: A decade-long meta-analysis of global research."
16 Yipin Fang, Xinjun He, Xueyuan Huang, and Baosheng Wang, "Assessment of the spatial and temporal dynamics of food system resilience and its response to natural hazards," *International Journal of Disaster Risk Reduction* 112, no. 104781 (October 2024): https://doi.org/10.1016/j.ijdrr.2024.104781.
17 Fang, He, Huang, and Wang, "Assessment of the spatial and temporal dynamics of food system resilience and its response to natural hazards."
18 Bassel Daher, Silva Hamie, Mohammad Nahidul Karim, Konstantinos Pappas, and Tessa Thomas, "Toward Resilient Water-Energy-Food Systems under Shocks: Understanding the Impacts of Migration, Pandemics, and Natural Disasters," *Sustainability,* 13, no. 16 (August 2021): Pgs, https://doi.org/10.3390/su13169402.

electricity, farms cannot operate their machinery. Manual cultivation is less efficient, more dangerous, and farmers are less experienced with those methods today. These disasters cause physical damage to other critical infrastructure as well, further causing problems with food production.[19] Without working resources, farms cannot operate properly. This causes issues in both the local and global economies.

Water has a straightforward impact on agriculture. Oftentimes, natural disasters also have a direct effect on water. Floods and cyclones often reduce water quality, harming the crops used on as well as the environment as a whole.[20] Without clean water, crops cannot flourish due to a lack of essential nutrients. These nutrients would usually be brought to the crops through the water cycle. However, when unclean water is cycled, it causes further harm. The surrounding environment faces the same issue, causing any interaction between the surrounding nature and the crops to only further degrade the crops. Issues with things such as electricity grids can also disrupt water access, causing scarcity.[21] This leads to less food production due to less water, weakening the food system as a whole. Without proper access to water, crops cannot survive properly.

Flood in Kerala, India (Credit: Gannu03)

Droughts are also a significant issue for food systems for similar reasons. Droughts can cause poor soil moisture, leading to crop failure.[22] Whether crops are rain-fed or irrigated, droughts can still have an impact, as water reservoirs also tend to decline in droughts. Long-term droughts also tend to disrupt supply chains that impact health and hygiene.[23] Issues like this harm the workers, which in turn tends to impact productivity. When both the crops and the farmers are subject to poor water, everything suffers. Supply chain issues also impact what is received by the farmers, even if the disaster did not personally impact them. This creates a more widespread impact and makes it even more devastating when it occurs.

Climate change also has a long-term impact on agriculture. One major one is an increase in the number of heatwaves.[24] When temperatures become too high, crops struggle to survive and cannot grow well. Global warming has also been noted to cause more frequent

19 Daher, Hamie, Karim, Pappas, and Thomas, "Toward Resilient Water-Energy-Food Systems under Shocks: Understanding the Impacts of Migration, Pandemics, and Natural Disasters."
20 Daher, Hamie, Karim, Pappas, and Thomas, "Toward Resilient Water-Energy-Food Systems under Shocks: Understanding the Impacts of Migration, Pandemics, and Natural Disasters."
21 Daher, Hamie, Karim, Pappas, and Thomas, "Toward Resilient Water-Energy-Food Systems under Shocks: Understanding the Impacts of Migration, Pandemics, and Natural Disasters."
22 Ellen Bruno, Ashok Mishra, and David Zillberman, "Compound natural and human disasters: Managing drought and COVID-19 to sustain global agriculture and food sectors," *Science of The Total Environment* 754, no. 142210 (February 2021): https://doi.org/10.1016/j.scitotenv.2020.142210
23 Daher, Hamie, Karim, Pappas, and Thomas, "Toward Resilient Water-Energy-Food Systems under Shocks: Understanding the Impacts of Migration, Pandemics, and Natural Disasters."
24 Van Aalst, "The impacts of climate change on the risk of natural disasters."

storms and cyclones, which can devastate farms.[25]

In general, natural disasters impact both food production and the workers involved with it. With everyday climate issues being further worsened by natural disasters, farms are unable to produce needed food. By understanding the impacts of these hazards, farmers can prepare for even minor incidents, which policymakers can then work with to protect their farmers. These laws and regulations would hopefully protect the economy and those working towards it in the long run.

Impact of Conflict on Agriculture

Both internal and external conflicts have multiple significant impacts on agriculture. Conflicts cause issues in accessibility in both production and trade in and around the conflict region.[26] Most conflict zones are rural and therefore heavily reliant on agriculture for their economy.[27] These issues also weaken already at-risk economies as well as the health of these countries and their populations.

Fighting tends to cause physical damage. Weapons can cause intense damage in general, and when chemical weapons are used, they can also lead to contamination. This leaves damage that cannot be repaired for some time and causes further damage to the state's health and economy. Even surrounding areas can be subject to physical damage. Often, deforestation will increase before and during a conflict to secure military resources or create defensive positions. Natural ecosystems take decades to recuperate, leaving these regions with devastated landscapes and ecologies. Finally, if key resources are being diverted to soldiers and militaries, that often leaves farmers with shortages of key technology and funding.[28] Decisions such as these are more focused on survival rather than long-term impacts. Without considering the future, nations are often left to recover from a position of vulnerability.

Communities themselves suffer greatly during wars. Without consistency, they struggle to survive for several reasons, including poor health resulting from hunger and limited access to clean water. People may be displaced due to unsafe living conditions, and without proper resources, they cannot return to their everyday lives and jobs. Agriculture is often particularly reliant on seasonal workers that migrate. If those migration patterns are interrupted by conflict zones, there may be a severe labor shortage. The migrant workers are then unable to support themselves and their families. These issues may cause some to give up the profession in its entirety.[29] This is also an issue for the farm owners themselves who rely on this labor.[30] Without people able to harvest crops, farms can go permanently bankrupt.

The conflict between Russia and Ukraine has had a significant impact on global food systems. Both states were major exporters of agricultural goods, such as wheat, but the large amount of damage and casualties led to international disruption. When major players in worldwide trade are threatened, it creates issues in each market it even vaguely has ties to. At the start of this conflict, Ukraine's main ports, known as the Black Sea ports, were closed until mid-2022, when they had not even shipped their 2021 crops yet, leading them to take more expensive routes. This and other factors caused consumer food prices to increase rapidly.[31]

Overall, food insecurity is both a cause and an effect of conflict. Conflicts cause immediate, long-term, and in some cases permanent damage to both the production and trading of agricultural goods. These issues harm us as a world at large. By working to combat these issues and prevent them, we can create a

25 Maarten K. Van Aalst, "The impacts of climate change on the risk of natural disasters."
26 Birgit Kemmerling, Conrad Schetter, and Lars Wirkus, "The logics of war and food (in)security," *Global Food Security* 33 no. 100634 (June 2022): https://doi.org/10.1016/j.gfs.2022.100634.
27 Rob Vos, Julius Jackson, Sally James, and Marco Sanchez, *Refugees and conflict-affected people: Integrating displaced communities into food systems*, (Washington D.C.: Global Food Policy Report, 2020), https://cgspace.cgiar.org/items/aa6d833f-3f70-4462-9e35-00d95109742d.
28 Kemmerling, Schetter, and Wirkus, "The logics of war and food (in)security."
29 Kemmerling, Schetter, and Wirkus, "The logics of war and food (in)security."
30 Vos, Jackson, James, and Sanchez, *Refugees and conflict-affected people: Integrating displaced communities into food systems.*
31 Ben Hassen, T., and El Bilali, H, "Conflict in Ukraine and the unsettling ripples: implication on food systems and development in North Africa," *Agriculture & Food Security* 13 no. 16 (April 2024): https://doi.org/10.1186/s4006 6-024-00467-3.

safer and more livable planet for us all.

Agriculture and the Economy

Agricultural success is often reflected economically. When agriculture thrives, poverty is alleviated.[32] For many countries, their agriculture industry is one of the biggest contributors to their economy. When communities have enough food to survive on affordably and can successfully trade with other countries, they can start to thrive and support themselves. When economies fail due to poor agricultural earnings and production, the citizens within them suffer, as evidenced by their inability to afford most foods. Affordability issues in farming, including labor and access to usable water, are often caused by shortages of labor and resources. This causes affordability issues for consumers. By addressing these issues, the communities that farmers serve can begin to thrive properly.

Agricultural growth is usually noted as one of the most important kinds of economic growth a country can have.[33] To ensure a stable food supply, countries are often willing to help other countries financially to support agricultural businesses.[34] This helps build up the country's economy, even making goods more affordable to its citizens. When these forms of aid and investment work well, states will even provide funding for other positive things for their allies, such as better education and infrastructure.[35] By forming strong trade connections, countries can form allies that help further development in various areas.

Vietnam, for example, has experienced many agriculture-related economic changes. Due to its high population density and deep investments in forestry and agriculture, it is considered one of the most economically vulnerable countries to climate change. In fact, about one-fifth of all of Vietnam's gross domestic product (GDP) is from of agriculture, as it provides income to about three-fourths of the country's population. The specific threats from climate change are numerous. Coastlines make up a lot of Vietnam's geography.[36] Things like varying sea levels can change and impact farming in those areas. They also have a risk of tsunamis, which, while rare, cause devastating loss of infrastructure and underlying land.

Overall, agriculture has a significant impact on economic growth and decay globally. Countries with better agricultural productivity, as well as those that can adapt, tend to have better economies due to this importance. One thing that unites us all is the importance of nutrition. In most cases, this comes in the form of some sort of agricultural product. When these products come from resilient sources, citizens can thrive, leading to a healthier and more stable country, helping the world as a whole.

Current Status

Recent Updates

Climate change has been noted to have an alarming effect on these already pressing issues. One main issue is a rise in non-communicable diseases. Heatstroke, hypertension, cholera, and diarrhea are noted to increase due to climate change because of instances of heatwaves, irregular rain patterns, and flooding. Climate change also causes a

32 Arega D. Alene and Ousmane Coulibaly, "The impact of agricultural research on productivity and poverty in sub-Saharan Africa," *Food Policy* 34 no. 2 (April 2009): Pgs, https://doi.org/10.1016/j.foodpol.2008.10.014.
33 Cervantes-Godoy, D. and J. Dewbre, "Economic Importance of Agriculture for Poverty Reduction," *OECD Food, Agriculture and Fisheries Papers* no. 23 (January 2010): Pgs, https://doi.org/10.1787/5kmmv9s20944-en.
34 Paul Mosley and Abrar Suleiman, "Aid, Agriculture and Poverty in Developing Countries," *Review of Development Economics* 11 no. 1 (November 2006): https://doi.org/10.1111/j.1467-9361.2006.00354.x.
35 Mosley and Suleiman, "Aid, Agriculture and Poverty in Developing Countries," *Review of Development Economics*
36 Huong, Nguyet, Hung, Duc, Chuong, Tri, and Phung Van Hien, "Economic Impact of Climate Change of Agriculture: A Case of Vietnam."

micronutrient deficiency in crops within that area. This deficiency causes malnutrition, a frighteningly common occurrence. Healthcare systems need to adapt quickly and safely to accommodate these issues.

There have been several promising scientific developments in recent years to combat issues related to food security. One major area of focus has been sustainable agriculture.[37] Issues related to climate change have exacerbated food insecurity and weakened food systems, making it crucial to address these challenges. There has also been further focus on taking local and Indigenous knowledge and fusing it with adaptation techniques to be both sustainable and strong.[38] By building upon existing customs and structures, farmers cannot only save money but also work to be more environmentally friendly. One example of this is planting crops earlier to adjust to climate change-related seasonal shifts.[39] By planting earlier, farmers can react to changing weather conditions while utilizing the machines and resources they already have. This approach not only saves them money in the short term by using their existing resources but also in the long run, as it ensures a better harvest than if they had not planted at that point. Another new idea has been to use native microorganisms to vaccinate crops.[40] In this way, crops are provided with natural immunity to disease and resistance to pests. They are often fermented to get the specific metabolites, enzymes, and biomass needed for this inoculation.[41] This allows them to be appropriately distributed to the required areas and provides them with protection. Ideas such as this have proved somewhat effective for these issues and have shown a need for further work to be done.

The social aspects of these issues have proven to be an essential factor as well. The FIRST Program was formed in 2016 and has worked to bring awareness to both the problems Pacific countries face and what can be done to help them.[42] FIRST takes a look through a social lens to protect those who are already facing issues with access to food. The program believes that different sectors need to work to incorporate nutrition into their goals, as well as the idea that food production should be more resilient, equitable, and environmentally friendly.[43] By putting these core values at the forefront of their work, they are able to not only work on reaching these goals but also find those who want to work with them and form stronger connections. FIRST works to promote, advocate, and restore the original Pacific food systems and cuisines through showcasing local cuisine and Indigenous farming practices. Sustainability often relies on pre-existing ideas, making it essential to preserve these methods. This can also help reduce imported food, benefiting both the economy and the environment. One significant way FIRST brought this to the public was through a reality TV show that gave affordable and simple dishes that used local resources. Pacific Island Food Revolution (PIFR) helped use both television and social media to explain the importance of food's impact on the health of the viewers and the environment.[44] By enhancing the public's view on this critical topic, they were able to have a successful and easy way to impact the lives of their consumers.

Case Study on the Democratic Republic of the Congo

It is estimated that 8 in 10 people who live with food insecurity also live in areas that often experience damage and the brunt of climate change.[45] One area that fits this criterion is the Democratic

37 Jiahua, Li, Zhang and Zhang, "Sustainable agriculture in the digital era: Past, present, and future trends by bibliometric analysis."
38 Chowdhury, Hasan, and Islam, "Climate change adaptation in Bangladesh: Current practices, challenges and the way forward."
39 Chowdhury, Hasan, and Islam, "Climate change adaptation in Bangladesh: Current practices, challenges and the way forward."
40 Alondra Maria Diaz-Rodriguez, Fannie Isela Parra Cota, Luis Alberto Cira Chavez, Luis Fernando Garcia Ortega, Maria Isabel Estrada Alvarado, Gustavo Santoya, and Sergio de los Santos-Villalobos, "Microbial Inoculants in Sustainable Agriculture: Advancements, Challenges, and Future Directions," *Plants* 14 no. 2 (January 2025): https://doi.org/10.3390/plants14020191.
41 Diaz-Rodriguez, Cota, Chavez, Ortega, Alvarado, Santoya, and Santos-Villalobos, "Microbial Inoculants in Sustainable Agriculture: Advancements, Challenges, and Future Directions."
42 FAO, *Stories of agrifood systems change* (Rome: FAO, 2024), https://openknowledge.fao.org/bitstreams/a8ee372d-f33d-407c-a8e4-4a396c7391b3/download.
43 FAO, *Stories of agrifood systems change*.
44 FAO, *Stories of agrifood systems change* pgs.
45 "Resilience Building," World Food Program USA, accessed July 19, 2025, https://www.wfpusa.org/work/programs/resilience-building/.

Republic of the Congo, also known as the DRC. The DRC has seen many issues that have contributed to the hunger crisis, especially in recent years. Without serious intervention, the Congolese people are in great danger. Thankfully, there has been an uptick in various forms of aid these past few years.

Civil war, natural disasters, and diseases are just a few key reasons for the food security crisis in the DRC, which is seen as one of the largest in the world. As of 2022, it was estimated that one in three Congolese were hungry.[46] FAO defines hunger as a physical feeling of pain or discomfort due to poor consumption of food.[47] These issues affect not only those living in the DRC currently but also those who have fled. People have been displaced into neighboring countries, leading them to abandon their farms. This contributes to the hunger crisis as fewer people are available to harvest crops, leading to less food availability. Those who have fled also find a lack of access to things like food, shelter, and healthcare in their host countries due to a need for food aid in overcrowded and under-resourced areas. Without this proper aid, many are still unable to live safely and comfortably. Displacement is often something that people are forced into. However, in instances like this, it is harmful for both sides.

A boy stands in a cassava field in the DRC with disease-resistant crops (Credit: Alain Mukeba, USAID)

Armed groups have also caused a lot of harm to the DRC, especially those active in civil war fighting. Since January 2025, violence has uprooted over 660,000 people in Goma, in eastern DRC, leaving them without access to food.[48] This also leaves people without the ability to provide for themselves, further fueling displacement.

The WFP has worked hard to fight hunger and food insecurity throughout the world. They operate using mainly emergency food, repairs, and early warning systems to care for the countries they aid.[49] To fulfill their mission of eliminating hunger, they have provided aid to the DRC. The WFP has helped 1.1 million people in the DRC with food and cash assistance between January and March 2025. Aid in both of these senses is crucial for addressing issues like this, as it can also help rebuild vital infrastructure, which is essential for farming and agriculture. One significant way the WFP works is by giving children daily school meals and take-home rations to support learning and nutrition, a program that has helped 115,000 children.[50] By building up one of the most vulnerable groups, children, the WFP helps build a better future for both these students and the future

46 "Nearly 60% of the World's Hungriest People Live in Just a Few Countries. Why?" World Food Program USA, May 17, 2022, https://www.wfpusa.org/news/60-percent-of-the-worlds-hungry-live-in-just-8-countries-why/.
47 "Food," United Nations, accessed July 27, 2025, https://www.un.org/en/global-issues/food.
48 World Food Program USA, "As More People Are Driven from Their Homes in DRC, Food Insecurity Worsens," news release, May 23, 2025, https://www.wfpusa.org/news/more-people-displaced-drc-hunger-worsens/.
49 "Emergency Relief," World Food Program USA, accessed July 19, 2025, https://www.wfpusa.org/work/programs/emergency-relief/.
50 World Food Program USA, "As More People Are Driven from Their Homes in DRC, Food Insecurity Worsens," news release, May 23, 2025, https://www.wfpusa.org/news/more-people-displaced-drc-hunger-worsens/.

as a whole. When nutrition suffers, learning suffers, which can lead to poor employment in the future.

The WFP is not the only group that works to protect the people of the DRC from hunger. Rehabilitation and Education for Development (RET) is an NGO working to help rebuild through these issues. They work to provide humanitarian aid to areas such as the DRC. One way they have worked is through establishing and guiding agriculture to provide new knowledge and tools. This has worked to increase productivity, which is crucial for offsetting any worker losses from displacement. Productivity increases can also help combat hunger in conflict zones, as they provide more resources for everyone. These methods have proved effective as there have been a higher number of successful harvests since intervention.[51] Proving success tangibly is crucial for issues like these, as it underscores the need for substantial aid. RET has also helped local economies by providing equipment and infrastructure.

In most cases, existing infrastructure and equipment have been damaged, proven outdated, or simply were not there. By providing these parts of the plan, they are able to tackle the issue more comprehensively. One example of this has been through setting up germination facilities to help nurse seedlings.[52] This has helped to take care of a major part of the agricultural process in a safer, more consistent, and efficient way. By taking care of this, RET can help further successful harvests.

These organizations do not just work on their own, though. The WFP is working to reach 6.4 million people with nutrition assistance in 2025. However, it needs about 433 million USD to keep these operations up until October 2025.[53] Without funding, these organizations can't properly serve the people they need to. Emergency hunger relief is an important part of addressing the issues presented within the DRC as a whole. To take care of this, the WFP has worked to get donations to find both short-term and long-term solutions for the people of the DRC.

By taking the examples given, the world can become a safer and healthier place. The DRC has had its fair share of issues for a long time now, but there are many forms of aid being given to help address these challenges. While there is still a lot of work to be done, aid like this is proven effective time and time again. Concepts like those used by RET and WFP have made significant contributions to helping the Congolese people, and in many cases, could also benefit people in other countries with severe hunger issues.

Sustainable Development Goals (SDGs)

The United Nations has 17 Sustainable Development Goals (SDGs) to achieve by 2030 for peace and prosperity.[54] These goals have served as a blueprint for the future, adopted by all UN member states. These were implemented in 2015 and have been worked on every year since. These topics encompass social justice, sustainability, and international health. By accomplishing these goals, the UN hopes for a safer world that can properly protect all its people.

It was estimated that by 2030, over 600 million people worldwide would face hunger, with one in three struggling with moderate to severe food insecurity.[55] SDG 2: Zero Hunger calls to end hunger to improve health and nutrition. Hunger causes malnutrition, which puts future health and well-being in jeopardy.[56] Long-term health issues often originate from hunger, even in young people. This has a further impact on things such as education and employment.

51 "RET's Impact on Food Security: A Glimpse into North Kivu and Ituri in DRC," RET, October 13, 2023, https://theret.org/2023/10/drc/rets-impact-on-food-security-a-glimpse-into-north-kivu-and-ituri-in-drc/.
52 RET's Impact on Food Security: A Glimpse into North Kivu and Ituri in DRC," RET,
53 "Democratic Republic of the Congo," World Food Programme, accessed July 19, 2025, https://www.wfp.org/emergencies/drc-emergency.
54 "The 17 Goals," UN Sustainable Development Goals, accessed July 19, 2025, https://sdgs.un.org/goals.
55 UN Sustainable Development Goals, "Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture," https://sdgs.un.org/goals/goal2.
56 UN Sustainable Development Goals, "Goal 2."

SDG 2 also works to develop areas in terms of both agriculture and living sustainably. Many rural areas fall behind urban ones in terms of things like healthcare, water, sanitation, and electricity.[57] Without proper access to these key resources, agriculture also suffers as there is not enough to run things like farms properly. It also leads to health issues among farm workers, further reducing productivity.

SDG 6: Clean Water and Sanitation, works to provide safe and clean water. Since implementing SDGs, there has been a 6 percent increase in safe drinking water and a 12 percent increase in basic hygienic services.[58] By protecting safe water, they are protecting the safety of the world as a whole. Without these safe practices, people are susceptible to waterborne diseases such as cholera, which harms a country's health. It is estimated that today, 2.2 billion people lack access to safe drinking water, and more than 4.2 billion people lack safe sanitation.[59] This proves a need for safe access to water. Safe water is also important for agriculture. Water provides nutrients for the plants it is used on, and without clean water, these nutrients are not properly distributed. Without proper water access, agriculture suffers as a whole, leaving the food systems they are used on weaker as a result.

Without properly protected land, agriculture cannot function properly. About 17.6 percent of land has been protected due to SDG 15, protecting terrestrial ecosystems, with the target being 30 percent by 2030. By protecting land, agriculture can be conducted safely with the proper resources and nutrients, allowing plants to grow healthily and abundantly. One major way to protect land is through protecting biodiversity. Biodiversity helps keep ecosystems healthy, and without it, they can suffer greatly. It has been recognized that global biodiversity loss does harm to food security, nutrition, water access, and health.[60] Deficiencies in essential nutrients, such as micronutrients, occur as a result of poor biodiversity, leading to international health issues. Plants also fail to grow properly in poor ecosystems, leading to further shortages.

By working to meet these goals, the world can combat numerous issues, including insecure food systems and widespread hunger. Putting things in place to monitor them as a whole also helps keep track of what progress is being made.

Bloc Analysis

Points of Division

Geography, weather, conflict, and political landscapes all contribute to resilience in food systems. While these factors can divide these groups, they also indicate how sensitive or resilient a system is. One measure of this is the Global Food Security Index (GFSI) created by Economist Impact. It ranks 113 countries using a score from 0 to 100, where 100 means the strongest food security. It evaluates four key aspects: affordability, availability, quality and safety, and sustainability and adaptation.[61] These categories look at pillars like food prices, how reliable supply chains are, whether food is nutritious and safe, and how well countries can handle challenges such as climate change. This is then used to show trends in international food security, both internationally and in specific areas of the world. Affordability and availability both show the access that consumers

57 "Rural Development," UN Sustainable Development Goals, accessed July 19, 2025, https://sdgs.un.org/topics/rural-development.
58 "Goal 6: Ensure availability and sustainable management of water and sanitation for all," UN Sustainable Development Goals, accessed July 19, 2025, https://sdgs.un.org/goals/goal6.
59 "Water and Sanitation," UN Sustainable Development Goals, accessed July 19, 2025, https://sdgs.un.org/topics/water-and-sanitation.
60 UN Sustainable Development Goals, "Water and Sanitation."
61 "Global Food Security Index 2022," Global Food Security Index, accessed July 20, 2025, https://impact.economist.com/sustainability/project/food-security-index/.

have to food available.[62] They also show how these areas would react to things like economic and supply issues. Quality focuses on the safety of the food available on average. Lastly, adaptability shows the reactions to possible issues caused by things like climate change.

Countries With Highly Sensitive Food Systems

This bloc is made up of countries that rank lower on the GFSI, with scores lower than 50, proving sensitive food systems. It is also made up of those with long-term food insecurity, as they have proven a need for protection. These areas have shown that they most likely do not have strong food systems, much less ones that are adaptable to future issues that may arise. This indicates a lack of resilience necessary for security. Long-term issues also weaken even moderate systems, making them even more vulnerable and less resilient.

One example of this group is the Democratic Republic of the Congo (DRC), which ranks 113th out of all countries within the index. The DRC ranks among the lowest in all four categories and has a noted 39.8 percent prevalence of undernourishment.[63] While they are noted as a low-income country, they have a high change in food costs.[64] Without food prices adjusted for the high poverty rates, any food they have is more inaccessible. They also do not have many agricultural inputs, with many supply chain issues and even more food loss.[65] Without proper access to food in general, this only drives up prices, causing even more inaccessibility. They also have poor risk management with not much commitment to adaptation.[66] With a place as vulnerable as it is due to factors like conflict and natural disasters, any shocks to their already weak systems would cause significant damage. This bloc would also contain countries such as Haiti, Syria, Uganda, Venezuela, and Yemen, among others.

Countries With Moderately Sensitive Food Systems

This bloc is made up of countries that rank in the mid-range of the GFSI, with scores between 50 to 70, showing somewhat stable food systems that still have room for improvement. This would also include those with food systems that have started becoming more stable within the past decade or so, showing that they have worked to become more secure but are still not necessarily incredibly strong. These areas typically have somewhat resilient food systems that may be more adaptable, but they are not as robust as they should be to be considered secure.

One example is Guatemala. They sit fairly in the middle of all categories and are 58 overall, with a score of 62.8. They have a decent amount of food safety programs and do not have much change in average food costs.[67] This keeps everything fairly affordable as they are able to make up for any issues with these programs. There is a fair number of agricultural inputs and research, as well as commitments to policies regarding food security.[68] This helps keep things available and accessible as they work toward securing food and establish a fairly good basis. They have a fairly large availability of micronutrients as well as food safety.[69] This keeps their citizens healthy and proves that most food accessible to the people of Guatemala is healthy and allows them to have sufficient nutrition. This bloc would also contain countries such as Algeria, Colombia, India, and South Africa, among others.

62 Global Food Security Index, "Global Food Security Index 2022,"
63 "Congo (Dem. Rep.)," Global Food Security Index, accessed July 21, 2025, https://impact.economist.com/sustainability/project/food-security-index/explore-countries/congo-(dem.-rep.).
64 Global Food Security Index, "Congo (Dem. Rep.),"
65 Global Food Security Index, "Congo (Dem. Rep.),"
66 Global Food Security Index, "Congo (Dem. Rep.),"
67 "Guatemala," Global Food Security Index, accessed July 21, 2025, https://impact.economist.com/sustainability/project/food-security-index/explore-countries/guatemala.
68 Global Food Security Index, "Guatemala,"
69 Global Food Security Index, "Guatemala,"

Countries With Highly Resilient Food Systems

This bloc would be made up of countries that rank highly in the GFSI, with scores above 70, providing very stable food systems. They would also have been seen as historically stable, proving staying power and adaptability. This would demonstrate not only that they have resilient food systems but also that they are known to be stable, making them ideal examples for the rest of the committee. There are also many different ideas presented for food systems within the top 20 or so countries on the index, meaning they could work for diverse climates presented within other delegations and countries. Most of these countries also would have, to some extent, excess resources such as money and farming supplies.

Finland ranks 1st overall on the GFSI, making it an obvious choice for a resilient food system.[70] While they are a high-income country, they have food safety net programs for any individuals still needing aid.[71] This proves a commitment to accessibility and helps illustrate the needs of their people. They also have many agricultural inputs and a fairly sufficient supply.[72] This proves further accessibility as they have many sources of food, providing security from any issues due to the abundance of sources. They also have a very high disaster risk management and political commitment to adaptation.[73] This also helps protect against any issues that may arise, as they have ways to adapt to them. This bloc would also contain countries such as Costa Rica, Greece, Hungary, Ireland, and Uruguay, among others.

Committee Mission

FAO's main mission is to defeat hunger, working in 130 countries worldwide to do so.[74] A major step in this mission is building resilient food systems. With liaison offices in North America, Europe, and Asia, FAO works to reach out globally and work where there are issues.[75] Stronger food systems increase safety and public health. FAO works to achieve food security for all, as well as providing regular access to high-quality food to lead active and healthy lives.[76] This can only be done if the existing food systems can withstand pressure and external issues. Once those are addressed, food can become more accessible, helping to lower food insecurity and hunger.

The second Sustainable Development Goal presented by the United Nations is to eliminate hunger, something very important to FAO.[77] Delegates must work to build more resilient food systems. Through doing this, inhabitants of all countries can have access to the proper resources and foods to live stronger and nutritious lives. In doing so, this makes a safer and healthier world. Delegates in FAO are encouraged to focus on this goal through learning what makes for an effective, resilient food system for their climate and communities. Delegates should also learn what area they need support in, as well as how they can support their fellow delegates.

70 "Finland," Global Food Security Index, accessed July 21, 2025, https://impact.economist.com/sustainability/project/food-security-index/explore-countries/finland.
71 Global Food Security Index, "Finland,"
72 Global Food Security Index, "Finland,"
73 Global Food Security Index, "Finland,"
74 "About FAO," Food and Agriculture Organization of the United Nations, accessed July 22, 2025, https://www.fao.org/about/about-fao/en/.
75 "FAO and UN System Partnerships," Food and Agriculture Organization, accessed July 22, 2025, https://www.fao.org/partnerships/fao-un-system/en/.
76 Food and Agriculture Organization of the United Nations, "About FAO"
77 UN Sustainable Development Goals, "Goal 2."

RESEARCH AND PREPARATION QUESTIONS

The following research and preparation questions are meant to help you begin your research on your country's policy. These questions should be carefully considered, as they embody some of the main critical thought and learning objectives surrounding your topic.

Topic A

1. How will your country use sustainable agriculture to spark social, economic, or environmental change for communities?
2. In what ways has the modernization of agriculture contributed to soil erosion and the destruction of culturally significant land?
3. How can fair trade certifications, geographical indications, and eco-tourism provide incentives in your country?
4. What methods do you have for your country and others to collaborate across cultural differences to overcome historical or social stigmas?
5. What roles have international organizations (beyond the FAO) played in ensuring your country is able to improve agriculture and protect fragile ecosystems?
6. Should other governments and international organizations play a role in providing fiscal, legal, or other forms of aid to your or other countries?
7. In what ways have the SDGs guided your country to increasing long-term sustainable food practices?

Topic B

1. Does your country use Indigenous knowledge, regenerative agriculture, or new technologies in its farming practices?
2. How has your country been affected by the digital divide? What policy measures can be put in place to address it?
3. How has your country addressed water, energy, and food security? What role does agriculture play in the consumption of these vital resources?
4. What laws or protocols does your country have to enable farmers to adapt to increased natural disasters caused by climate change?
5. Has your country's food system been affected by conflict, and if so, how has your country addressed its impact on farming communities? How resilient is your country's food supply chain?
6. Where does your country stand on the Global Food Security Index (GFSI)? What safety nets exist in your country for marginalized and low-income groups who live in food deserts and food insecure areas?

Important Documents

Topic A

"Globally Important Agricultural Heritage Systems." Food and Agricultural Organization of the United Nations. Accessed September 10, 2025. https://www.fao.org/giahs/en.

Parviz Koohafkan and Mary Jane Dela Cruz. "Conservation and Adaptive Management of Globally Important Agricultural Heritage Systems (GIAHS)." Journal of Resources and Ecology 2, no. 1 (March 1, 2011): 22–28. https://doi.org/10.3969/j.issn.1674-764x.2011.01.004

"Preserving Agricultural Heritage Around the World." Food and Agricultural Organization of the United Nations, April 13, 2017. https://www.fao.org/countryprofiles/news-article/en/c/881214/.

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Topic B

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Qualities of Resilient Food Systems: Toward a Sustainability/Resilience Index." Open Call Papers: Food System Resilience 7, no. 3 (May 2017). https://doi.org/10.5304/jafscd.2017.073.001.

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Written by Ariana Campos and Adrianna Preiss.

Edited by Devansh Bhartia, Joelle Boilard, Ana Margarita Gil, Sabeeh Mirza, Tyler Schmied, Althea Turley, Nastasja Vasquez, and Sofia Velasco.