

The Dual Interaction between Tech progress and Health and Food Security Achievement

التفاعل المزدوج بين التقدم التكنولوجي وتحقيق الأمن الصحي والغذائي

Zebiri Maria¹

¹ Abbas Leghrou University Khenchela, (Algeria), zebir.maria@univ-khenchela.dz

Laboratory: State and community security: health, food and legal

Received: 16/10 /2025

Accepted: 26/05 /2026

Published June /2026

المخلص:

يشكل الأمن الغذائي والصحي تحديا حضاريا حيث يؤثر بشكل مباشر على الاستقرار الاجتماعي والاقتصادي للدول لاسيما في عصر العولمة وفي ظل التطور التكنولوجي المتسارع، الأمر الذي يفرض نوع من التكامل وتداخل بين هذين المفهومين بصورة متزايدة حسب علاقة التأثير والتأثر، حيث تساهم التكنولوجيا بشكل إيجابي في تطوير جودة الغذاء وتوسيع مجال الإنتاج الغذائي، وكذلك في الحد من المخاطر الصحية. ولكن في المقابل، قد تطرح هذه التقنيات تحديات جديدة تفرزها الآثار السلبية للتطور التكنولوجي، مما يتطلب إطارا أخلاقيا ورقابيا واضحا لأجل خلق الموازنة بين المتفاعلين على ضوء الأطر القانونية الخاصة، لذلك تسعى الدراسة إلى بحث أبعاد التفاعل المزدوج لتكنولوجيات الحديثة مع الأمن الغذائي والصحي، وذلك لأجل التوصل إلى تحديد ضوابط التأثير اللامتناهي بين المتفاعلين لأجل مواجهة التحديات المستقبلية لواقع الأمن الإنساني الشامل.

الكلمات المفتاحية: الأمن الصحي؛ الأمن الغذائي؛ التطور التكنولوجي؛ التنمية المستدامة؛ الصحة الرقمية...

Abstract:

Food and health security are crucial for our civilization, impacting social and economic stability. Technological advancements can improve food quality and production capabilities, while reducing health risks. However, these advancements can also bring new challenges due to unintended consequences. This highlights the need for a solid ethical and regulatory framework to balance all parties involved. This study aims to explore the complex interplay between modern technologies and food and health security, establishing controls to manage the effects and tackle future challenges of comprehensive human security. The goal is to establish controls to manage the far-reaching effects among involved parties.

Key words: health security; food security; technological advancement; sustainable development; digital health...

Introduction:

Food and health security are two of the most pressing challenges we face today, playing a vital role in the stability of our societies. They're not just about individual well-being; they also reflect a nation's progress. This issue covers a range of factors, including food accessibility, its quality, and safety, along with the overall health of people in terms of nutrition and protection from food-borne diseases.

In today's world, the importance of food and health security has become more apparent than ever. People are starting to realize just how interconnected these two issues are, especially after witnessing the devastation caused by wars and various environmental crises, often stemming from human mismanagement and an unyielding drive for progress and competition.

Unfortunately, this relentless pursuit has sometimes come at the cost of the very foundations needed for true security. As a result, the global community is now acutely aware of the pressing need to ensure that everyone has access to food while also addressing health security. This balancing act is crucial, especially as we navigate the many challenges that arise both within nations and on the international stage.

In the twentieth century, both international and regional agreements, along with national laws, made it clear that achieving health and food security is essential. Lately, this has been tied to globalization, which has become a reality we must adapt to in order to keep up with the rapid pace of scientific and technological advancements. These advancements have had a huge impact on food and health security, pushing us to utilize modern technologies to ensure comprehensive security.

While technology has certainly helped us produce food and medicine, it has also played a role in the rise of various diseases and epidemics. This is why we need legislative action to address the influence of modern technology, making sure we harness its benefits for food and health security while also minimizing any negative effects, all within the framework of achieving comprehensive security.

Given the current situation, we can't help but ask: what do we need to ensure robust security in today's tech-driven world, especially in terms of the connection between food and health security? With that in mind, the research problematic can be framed as follows:

How can we effectively integrate technology with health and food security to meet the standards for comprehensive security?

Given this context, to tackle the issues raised in the study, we'll adopt a descriptive methodology paired with an analytical approach that aligns with the research data. Our focus will be on understanding how internal systems can achieve a vital integration between food security and health security, especially in the realm of modern technologies.

Here's the plan we'll follow: First, we'll explore the role of technological advancements in boosting the integration of food and health security. Second, we'll discuss the importance of fostering a dual integration between technology, health and food security, all while considering the necessary legal protections.

1- The impact of technological progress on improving the integration between food security and health:

The ideas of food security and health security have become increasingly important in our modern world, especially given the challenges we face today. These concepts are key parts of a larger vision of comprehensive security, which looks at the various needs people have in their lives—like personal safety, faith, financial stability, dignity, access to food, family well-being, and the protection of their homeland and rights.¹ This is especially significant when we consider how technology continues to shape food security and the complex relationship between technological advancements and health security.

At present, our planet is facing increasing challenges related to food and health security, driven by factors like climate change, rising populations, pandemics, conflicts, and economic fluctuations. On the other hand, modern technologies—think artificial intelligence, the Internet of Things, big data, and biotechnology—present us with incredible chances to enhance the connection between our food and health systems.

1.1 Boosting food security through the lens of today's technology advancements:

The way we think about food security can really differ based on who you ask. For some, it's all about finding a balance between the ideas of security and food.

Food security is essentially about a community's ability to meet the essential food needs of its members consistently. This can happen either through growing food locally or by earning enough from exports to import what's needed when local production falls short.²

The Food and Agriculture Organization has shared several definitions, one of which states: "Ensuring that all people at all times have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life".³

When we talk about sustainable food security, we're looking at a food system that can continuously provide enough nutritious food for everyone while also protecting the environment and natural resources for future generations. This idea goes beyond just having enough food at present; it's about ensuring that agricultural production and food resources remain sustainable in the long run, using methods and tools that help safeguard our natural resources and promote healthy food.

Sustainable food security indicators are essential for shaping food security and nutrition policies while helping to pinpoint national priorities. They paint a clear and detailed picture of how food security stands in different countries. Some of the key indicators include food availability, access to food, food stability, food utilization, adequacy indicators, and measures of the ability to obtain food.⁴ Ultimately, food security is all about ensuring that individuals can consistently access enough safe and nutritious food whenever they need it.

Countries are stepping up their efforts to promote smart agriculture by boosting investments in the agricultural sector. They're embracing modern technologies to drive reforms that will enhance this vital industry. This initiative focuses on improving infrastructure, developing better irrigation methods, and optimizing water resource management. The goal is to achieve sustainable self-sufficiency while striking a balance between food security and environmental protection.

To ensure food security, we really need to put effective plans and policies into action that boost investments in modern agriculture by tapping into both capital and knowledge. It's also crucial to lean on agricultural reforms to ramp up food production and make the agricultural sector more efficient.

This means we need to improve agricultural management and encourage the use of innovative technologies that can enhance productivity and crop quality.⁵ In this context, leveraging the Internet of Things (IoT) and sensors to keep an eye on soil and water conditions is key, along with using drones for crop monitoring and machine learning to drive productivity. Additionally, agricultural policy should pivot towards harnessing natural resources with an eye on biodiversity, steering us toward smarter agricultural practices.

One of the key ways modern technologies are bolstering food security is through the implementation of policies by various countries that aim to improve food supply chains using cutting-edge techniques. Take smart supply chains, for example; technologies like blockchain enable us to track food safety from the farm all the way to our tables, ensuring we know exactly where our food comes from.

On top of that, genetic engineering plays a crucial role in creating crops that can withstand drought and resist diseases. Moreover, artificial intelligence steps in to analyze data and forecast potential disruptions in the food chain, helping to secure health resources for generations to come.

1.2 Support for health security in the context of modern technologies:

The idea of health security is seen as a key part of human security. This perspective has been shaped by research from the Copenhagen School and influential thinkers like Barry Buzan and Ole Wæver, who have explored the connection between health and security. Over time, the concept of security has shifted from being solely about state safety to including a broader range of areas.⁶

The Human Security Commission highlighted this in its 2003 reports, stressing the importance of safeguarding people from illness and disability. Since then, the definition has grown to encompass a more holistic and global view, incorporating various aspects as outlined by the World Health Organization, which defines health security as ensuring individuals' safety in physical, mental, and social dimensions.⁷

The 2009 Arab Human Development Reports highlight that health security is a humanitarian issue that goes beyond borders. It emphasizes the need for global collaboration to tackle risks, epidemics, and diseases, involving both public institutions and civil society. This effort must also respect legal standards, ethical principles, and human rights.⁸

In this approach, the World Health Organization emphasized in its constitution that everyone deserves to enjoy the highest possible standard of health, which is crucial for fostering peace and security. This is especially important considering the varying levels of health advancements and disease management across different countries.

These guidelines regarding the right to health create responsibilities for the states involved when they are put into action at the national level. It's also important to recognize that having access to shelter, housing, and food is essential for truly ensuring the right to health.⁹

Taking care of health security is something that really falls on local governments. International law gives them the power to put in place measures for preventing and controlling diseases, which can include taking strict actions to protect public health. This means they can declare a health emergency if there's an outbreak that poses a serious threat to health security.

Thus, health threats go beyond just epidemics and infectious diseases. The definition has broadened to encompass natural disasters, chemical or nuclear incidents, and radiological events. It also includes all the risks tied to zoonotic diseases and food safety, which can seriously endanger the health of both individuals and entire communities.¹⁰

The idea of health security today is closely tied to digital health, which falls under the umbrella of e-health. According to the World Health Organization, digital health involves using information and communication technologies (ICT) to boost and support health and related areas. It includes e-health, mobile health, and telemedicine, all designed to improve access to healthcare, especially in vast areas like rural and remote locations. This reflects the wider use of digital technologies in the healthcare sector.¹¹

In this approach, we really shine a light on how artificial intelligence speeds up the process of diagnosing diseases by analyzing images and medical data. Plus, it takes health monitoring to the next level with smart wearable devices that keep an eye on vital signs and alert users to any potential health risks.

1.3 The positive interaction between health and food security in the context of modern technologies:

Proper nutrition plays a crucial role in enhancing our health, acting as the bedrock of our overall well-being. When we're healthy, we can truly make the most of the food we eat. Looking at it this way, we can see how food security and health security are closely linked: they really do go hand in hand!

Firstly: Proper nutrition is the key to health.

This equation can be tackled with the help of modern technologies that innovate our food systems. For instance, we can develop genetically modified foods that are better equipped to withstand diseases and drought. Regarding diversifying, our livestock sources, lab-grown meat emerges as a sustainable and healthy alternative to traditional meats. Additionally, we can look to functional foods to help boost immunity and ward off diseases, further diversifying our food supply.

Food safety and quality hinge on the combined efforts of regulation and technology, which work together to reduce the risks tied to unsafe or contaminated food. These risks can lead to serious outbreaks of foodborne illnesses like salmonella and E. coli, commonly known as food poisoning. This issue has a direct effect on public health, and it becomes even more critical during disasters or conflicts when food security takes a hit, ultimately harming the health of the population.

That's why maintaining proper nutrition is essential for disease prevention. When nutrition is imbalanced—whether from a lack of food or poor-quality options—it can lead to chronic health issues like obesity, diabetes, and heart disease. Thankfully, technology is contributing by introducing innovative, data-driven dietary systems tailored to individual health data, which can help manage and alleviate the symptoms of these conditions.

Secondly: The role of digital health in creating a healthy diet

Modern technology is key to pushing digital health forward, especially through specialized apps that help people make healthier dietary choices. These apps tap into medical databases to create personalized meal plans that fit each individual's unique body, and they also offer remote nutritional consultations powered by artificial intelligence.

The link between food security and health security really stands out during epidemics. In times of health crises, ensuring that everyone has access to food becomes a significant challenge that the global community needs to tackle effectively.

Thirdly: The rapid response to health emergencies balanced with the need to maintain food security

A health emergency is an official announcement made by a country when it faces a serious health crisis. This declaration acts as a special measure to tackle sudden and unexpected epidemics, prompting public authorities to take immediate preventive actions on a temporary basis. The goal is to keep the epidemic in check and reduce risks to people's health and safety, as well as to the overall health and environmental systems.¹²

Since these exceptional situations are often global in nature, countries don't differ based on their level of development. While the methods nations use to protect their health security may be similar, each country has its own way of implementing precautionary measures to fight the epidemic, tailored to its specific internal structure.

In this approach, the decision has been made to pause many commercial activities that usually draw large crowds under normal circumstances. The goal is to minimize contact between people, as this can contribute to the spread of the epidemic. However, strictly sticking to the right to work can jeopardize community safety, leading to a drop in people's living standards.

Thus, declaring a health emergency during outbreaks of serious diseases and epidemics should be guided by clear laws. This would create a legal framework for government authorities to step in, ensuring that the measures taken are legitimate and can be effectively implemented nationwide to tackle the COVID-19 virus.

These measures are justified by the need to protect the public interest. The exceptional actions that may be necessary are outlined in executive orders, regulatory decisions, or circulars, communicated through announcements. This approach is seen as the most effective and appropriate for the urgent need to prevent and limit the spread of the epidemic, given their straightforward nature and the fact that they bypass administrative red tape.¹³

In this context, it's clear that while prioritizing health security is crucial for ensuring overall human security, we also need to pay equal attention to food security and support for low-income communities. Achieving this goal requires us to tackle the issue of our country's self-sufficiency in essential foods and to encourage the growth of local industries.

All of this plays a significant role in creating job opportunities,¹⁴ especially considering how health crises like COVID-19 have shaken up food security. They've disrupted supply chains, driven up food prices, and led to shortages of essential goods. As a result, we've seen a troubling increase in food insecurity rates, particularly in countries affected by ongoing conflicts and internal conflicts for an extended period.¹⁵

Currently, health security is playing a crucial and effective role in tackling health crises, especially in our ever-evolving media landscape. This is particularly important as we see a surge in cybercrime targeting institutions and organizations both at home and abroad. Because of this, it's vital to protect information, programs, and data flow by putting in place a solid strategy to manage the digital realm.

This strategy aims to bolster cybersecurity, improving the performance of various state institutions, particularly in the health sector. By doing so, we can ensure that their operations are more advanced, which helps promote social stability and national security—especially as we embrace e-government initiatives and work to shield institutions from cyber threats.¹⁶

2. The necessity of activating the dual integration between technology and health and food security in accordance with the requirements of legal protection:

The idea of food security has evolved significantly, highlighting the urgent need to understand the risks that come with its absence, especially considering the current global landscape, which is filled with both opportunities and challenges that threaten human security. This is especially pertinent in our tech-driven world, where modern technologies have a profound influence.

In light of this pressing issue, there's been a noticeable rise in global awareness about the necessity for action. It's crucial to coordinate international efforts to create regulations that effectively integrate technology with health and food security, all while ensuring that legal protections are in place.

2.1 The challenges and potential risks in the field of interactive relationships:

The way we handle our environment and the consequences it has on food preservation is becoming one of the biggest threats to humanity's security today. This is especially true given the various development trends that often come at the cost of our environmental heritage and put human security at risk. It's crucial for the international community to come together in solidarity and cooperation to ensure environmental security and lay the groundwork for food security, with the United Nations leading the charge.

The hard work put in by the global community, including both individuals and organizations, is viewed as a crucial step toward protecting our environment. Yet, there are still several hurdles that stand in the way of making these efforts a reality. One major issue is the current state of international relations, which shows that following international laws—especially those related to environmental protection, health security, and food security—often depends on the interests of the countries involved. This situation can undermine the stability of health security, which is closely linked to food security as well.

The situation is becoming increasingly urgent because of the technological divide between developing and developed nations. This gap brings up a host of legal challenges with regard to figuring out how well a country can meet its commitments under international treaty law, along with the timing of the economic, social, and political shifts that the international agreement covers. One major hurdle in both health and food security is the issue of international protection related to liability, especially given the ongoing discussions about what that really means.

In a similar spirit, global practices emphasize a shared understanding of the principle of accountability for environmental damage. This principle asserts that a state is responsible for any environmental harm resulting from activities it conducts or allows within its borders, or from actions taken under its authority. Even today, there are still many uncertainties regarding the exact details of this principle.

The principle discussed here is widely seen as one of the most pressing issues we face,¹⁷ bringing a host of challenges to our interactive relationships. This is particularly relevant when we consider the ongoing effects of environmental risks, especially in the context of rapid technological advancements that threaten the stability of our health and food security.

As a result, it's crucial for our legal systems to evolve in response to the negative impacts of technological progress to ensure comprehensive security. We can achieve this by creating innovative legal frameworks that focus on strengthening protections at both national and international levels.

One of the key risks in maintaining health security revolves around privacy and safeguarding health and nutritional data from breaches that could target our digital health systems. This concern is especially pressing given the rising tide of organized crime and cybercrimes in the healthcare sector.

Malware can really throw a wrench in the works when it comes to communication networks, medical devices, computers, and smartphones. It often targets mobile devices using wireless technology to sneak into patient data and operating systems. What's even more alarming is the rampant sharing of passwords and the disabling of encryption for programs that are supposed to protect sensitive information, like patient records and medical archives.

This kind of breach in the digital health system is a serious concern, as it can be exploited by malicious actors to create chaos and fear. In urgent situations, this could even lead to the tragic loss of lives, as patients might not receive the timely care, they need due to failures in the digital systems set up in healthcare facilities.¹⁸

One of the downsides of leaning too heavily on technology for food security is that it often sidelines traditional farming methods, even though they have so much to offer. This is especially important because traditional agriculture is key to keeping our natural resources in check and achieving self-sufficiency while meeting sustainable development goals. Plus, it helps bridge the economic and trade gap between developed and developing countries, preventing the misuse of technological progress that could favor wealthier nations at the expense of those still growing. Ultimately, this reliance on technology can also lead to a dangerous dependency, which might put food security at risk.

Keeping traditional farming methods alive is a crucial step for developing countries aiming to secure their food supply. It also helps reduce the risks that come with an over-dependence on modern technologies used in wealthier nations, especially as concerns about the ethics and health implications of genetically modified foods continue to rise. This issue is even more pressing in communities where health and nutrition awareness is lacking. The situation can worsen during political turmoil and conflicts that disrupt food supply chains,

creating opportunities for harmful food practices that can have serious consequences for people's health.

In today's world, the negative effects of modern technology are becoming increasingly evident, especially with artificial intelligence reshaping job landscapes. We're seeing many traditional roles, particularly those that are repetitive or dangerous, fade away. But with this change comes the creation of new opportunities tied to AI and the Fourth Industrial Revolution.

As machines take over certain tasks, we're also witnessing a rise in unemployment rates. This shift has sparked a growing need for jobs in programming, data analysis, and positions focused on risk management and maintenance. All of this is having a direct impact on the workforce structure and overall productivity,¹⁹ which in turn threatens our self-sufficiency and food security.

In a similar way, AI-driven security systems have been created to guard against a range of cyber threats. Yet, alternatively, these very systems can also be taken advantage of by hackers, intruders, and even security agencies to carry out more sophisticated phishing attacks and automated threats. They can modify executable code and adjust to different operating systems to slip past virus detection and antivirus software.²⁰ This situation presents future challenges for developing effective digital health strategies, putting the stability of health security at risk.

It's worth noting the downside of modern technology when it comes to how we perceive health risks. For instance, the threat of biological warfare can lead to new and mutated epidemics, which often end up overwhelming healthcare systems in various countries. This situation poses a serious challenge to maintaining health security and stability.

In today's world, artificial intelligence has found its way into some pretty alarming areas, including the production and development of biological weapons. With the help of algorithms, we can discover new antibiotics and medications to fight off infections.

But in contrast, these same technologies can be twisted to hunt for toxic drugs that create harmful molecules, which could be misused by terrorist groups and biological labs around the globe. This is especially worrisome considering how accessible these technologies have become and how their costs are dropping.²¹ All of this raises serious concerns for public health security, emphasizing the urgent need for global collaboration to steer AI advancements toward improving health safety.

As the world's population continues to grow, the demand for food is skyrocketing. However, dietary habits, cultural practices, and consumer awareness can differ greatly depending on the social and economic conditions in each country. This variation can create serious challenges in the quest for food security.

Moreover, as more people move to cities, we often see urban areas expanding into agricultural land to tackle housing shortages. This raises concerns about whether we can achieve local food self-sufficiency, especially when agricultural production is on the decline. On top of that, depending heavily on food imports makes it even harder to secure a stable food supply.

The situation poses a real challenge when it comes to adapting modern technologies in the food and health sectors to fit the unique social and economic contexts of different

countries. It's crucial to ensure that the experiences of migrants are in sync with the infrastructure of the communities that welcome them, especially given the growing economic divide between developed and developing nations. To truly make a difference, we need to focus on enhancing food and health education, as well as improving food control systems.

The growing strain on our water resources, worsened by ineffective agricultural practices that favor irrigated farming over rain-fed methods, is a serious threat to our water security. This issue is especially alarming given the effects of climate change, which stem from the harmful impacts of pollution on our environment.

We're seeing higher temperatures than usual and unpredictable rainfall patterns, which are turning more land arid and negatively impacting crop yields. This decline in agricultural productivity threatens the land's capacity to sustain farming, putting our food security at risk.

To tackle the challenges that climate change brings to agriculture and food security, we really need to embrace a development approach focused on agricultural climate information systems. This means we should enhance our current institutional framework to better align with the climate changes we expect and improve our monitoring and early warning systems. It's also vital to set up a coordinating mechanism for these frameworks, with a strong emphasis on sustainable agriculture and food security.

Moreover, we should work on strengthening innovation units, agricultural business incubators, and partnerships with various organizations and countries. This will help attract investors to innovative business projects that can turn clean, modern technology ideas and conservation agriculture into real opportunities for economic growth, ultimately supporting and boosting the sustainability of food security in both production and consumption.²²

In addition to the challenges of radioactive and noise pollution that our modern world grapples with, we can't overlook the serious harm done to the ozone layer. This damage contributes to rising temperatures on Earth, which can trigger a range of disasters. These include threats to our food security and an increased risk of devastating natural events like earthquakes and floods.²³

While traditional energy sources currently help ensure food security, they are bound to become a threat to it and increase the risk of hunger down the line. That's why it's so important to shift our focus to renewable energy sources that are environmentally friendly and can help combat global warming. Plus, producing and using these clean energy options can boost the financial and economic health of countries.²⁴

It's not just solid waste that's polluting our environment; our seas and oceans are also taking a hit from human activities. Coastal regions, which are crucial for our communities, are facing pollution from things like industrial growth, high population density, urban sprawl, ports, waste disposal, and the use of outdated technologies. On top of that, the effects of climate change are becoming increasingly clear, altering our forests and, in turn, impacting all forms of life.²⁵

One of the biggest challenges we face today is ensuring sustainable food security indicators for everyone. This means we need to be able to meet the nutritional needs of both current and future generations over the long haul. To make this happen, we have to manage our natural resources wisely and govern their use in a way that protects our environment and

preserves our raw materials. Plus, it's crucial to boost local production sustainably while also creating supportive policies for those who are most vulnerable.

2.2 Regulations for creating balance among the interacting parties in light of the specific legal frameworks:

Given the pressing issue of food insecurity, there's a growing global agreement on the need to lay down the groundwork for food security. This effort has been driven by various conferences and studies organized by international organizations, all aimed at tackling food-related challenges and boosting food security.

A key moment in this journey was the World Food Conference in 1944, which led to the creation of a global food council. This council was set up to coordinate the work of all international organizations focused on food policy. Moreover, it paved the way for an international food security agreement to ensure that countries can meet their food needs, the establishment of a food security committee within the Food and Agriculture Organization, and the launch of the International Fund for Agricultural Development to help developing countries enhance their agricultural output.

The Food and Agriculture Organization has become a key player in the global mission to ensure everyone has access to food security. Its primary goal is to advocate for sustainable food practices. This organization was established following discussions that began in 1941, which focused on negotiating the International Wheat Agreement.

Over the years, the Food and Agriculture Organization made a significant move by launching the Freedom from Hunger Campaign in 1960. This initiative aimed to garner support from governments and engage both individuals and institutions in addressing the root causes of food insecurity worldwide.

In light of this campaign, the *“Right of Humans to Freedom from Hunger”* was announced. Moreover, back in 1962, the FAO teamed up with the World Health Organization to create the Food Constitution Authority, which takes charge of setting international food standards. Fast forward to 1974, the FAO made a bold global declaration aimed at eradicating hunger and malnutrition. Then, in 1976, they kicked off a technical cooperation program designed to offer more flexibility in tackling urgent situations.

In 1978, the World Forestry Conference took place in Jakarta, focusing on the theme “Forests for People”. The goal was to make a real difference in forest development and enhance the FAO’s efforts in this area. Fast forward to 1992, when over 150 countries came together to sign the first global agreement aimed at conserving biological diversity and promoting its sustainable use.

Then in 1994, the organization kicked off the Special Program for Food Security. By 1998, they had set up the Secretariat of the International Plant Protection Convention, which ties into the Agreement on the Application of Sanitary and Phytosanitary Measures. In 1999, a Fisheries Committee was established, and just a year later, the organization achieved a significant milestone by receiving its first United Nations patent. This patent was for a process that enables industrial companies to package coconut water in bottles while preserving its delicious flavor and nutritional benefits.²⁶

In reality, the organization is involved in a variety of activities focused on protecting the environment. It consistently evaluates how its policies, actions, and field projects impact the natural world.²⁷

To tackle these issues, a range of quick-response measures are put in place to either stop real threats to the environment or to fix the damage caused by pollution. Environmental taxes and levies are seen as some of the most effective ways to uphold the “*polluter pays*” principle, along with establishing civil liability for environmental harm.²⁸

The Food and Agriculture Organization has teamed up with specialized agencies, financial institutions, and various United Nations organizations that work in emergency situations. This partnership is particularly evident with international organizations like the World Health Organization, which has broadened its focus to include agriculture. Together, they set up the Expert Committee on Food Additives back in 1955 and also created the Codex Alimentarius Commission, which is tasked with developing international food standards to improve food quality and safety.

Moreover, the Food and Agriculture Organization has joined forces with the International Labor Organization, leading to the creation of the Committee on Forest Work Methods and Training for Workers. It has also collaborated with the United Nations Children's Fund, where both organizations participated in a significant program aimed at providing assistance.

The partnership with the United Nations Educational, Scientific and Cultural Organization (UNESCO) in crafting strategies for the Food and Agriculture Organization (FAO) is all about tackling and preventing malnutrition. UNESCO is also taking a close look at the nutrition education programs created by the FAO, getting them ready for schools. On top of that, the FAO is working hand in hand with international development and trade organizations, the Bretton Woods institutions, and various groups that focus on emergency and humanitarian efforts.²⁹

On a regional scale, there are quite a few international organizations dedicated to food and agriculture. For instance, we have the Arab Organization for Agricultural Development, which is linked to the Arab League, along with the Regional Center for Agricultural Reform and Rural Development in the Near East. Then there's the Lake Victoria Fisheries Organization, the American Food Council, the European Agricultural Council, the African Development Bank, and the Comprehensive Agricultural Development Program in Africa.

The global community, represented by the United Nations, has set up a dedicated organization to tackle the issues surrounding artificial intelligence and robotics. Their goal is to oversee the development of AI technologies from a strategic and organizational standpoint.

Back in 2017, the UN introduced the Center for Artificial Intelligence and Robotics, which is part of the United Nations Regional Institute for Crime and Justice Research. When it first opened its doors, the center raised concerns that AI technologies could potentially lead to disruptions in the world, such as warfare and job loss, which could have a detrimental effect on human progress.³⁰

The action plan from the Global Food Summit highlighted the urgent need to ramp up production to secure sustainable food for everyone. This approach is rooted in the careful management of our natural resources. Aligning with the twelfth goal of the Sustainable

Development Goals, the idea of sustainable production focuses on eco-friendly methods that help us manage these resources wisely, as laid out in the 2030 agenda. Achieving sustainable production means using products that fulfill people's basic needs while also reducing the reliance on harmful natural and toxic resources, ensuring we protect future generations from potential harm.³¹

Based on the presentation we discussed, the theoretical side of international efforts to achieve food security is emphasized through various international documents and the work of organizations dedicated to this cause. It also touches on the constitutional acknowledgment of the right to adequate food. Among the many practical ways, the world shows its commitment to food security are monitoring food supplies, penalizing those who violate regulations, and ensuring a reliable water supply by diversifying its sources.³²

The Algerian government is significantly strengthening its efforts across multiple sectors, both in the executive and legislative branches, to ensure food security and tackle any threats that come its way. This dedication is evident in the decisions made regularly and the new laws that have been put into place, like Law N^o.21-15, which focuses on cracking down on illegal speculation.³³

The real collaboration between the government, the private sector, and civil society plays a crucial role in boosting food security in our country. By tapping into various effective strategies, we can make this happen. Yet, even with this teamwork aimed at building a foundation for human security, we still face significant challenges that make achieving this goal a tough journey ahead.

Conclusion:

The integration between food security and health, especially in light of today's modern technologies, is incredibly important. With the rapid pace of technological advancements and the global challenges we face regarding food and health, it's clear that collaboration among various stakeholders is essential for achieving true human security.

In today's rapidly evolving world, where effects differ greatly, collaboration is no longer optional—it is essential. The globalization of technology has created a vital link that seamlessly integrates nutrition and health, making it more precise, comprehensive, and sustainable. This not only enhances our quality of life but also helps build communities that can thrive independently within a supportive international framework.

The way food security and health interact with modern technologies opens up a fantastic chance to boost our well-being and that of our communities. To make the most of this opportunity, we need to create regulations that strike a careful balance between innovation and potential risks.

This balance should embrace the latest technological advancements while staying true to ethical standards and legal guidelines. So, when we invest in technology, it's crucial that we also develop policies and laws that promote fairness, sustainability, and the safeguarding of human health, ensuring that both food and health security are prioritized.

Results:

- At present, we really need to take a close look at what's happening in our area of interest.
- It's important to think about all the different factors that shape the market's overall dynamics.

- Everyone involved needs to stay alert and adjust to the shifting circumstances to keep thriving.
- Working together with various groups will be key to navigating the complexities we face.
- In the end, taking a proactive stance will lead to better results and sustainable growth over time.

Recommendations:

- The global community really needs to put its energy into pushing forward artificial intelligence technologies while also keeping a close eye on how they're used. This is crucial for ensuring both food and health security, all while sticking to international legal frameworks that can keep up with the fast-paced changes in our societies.
- These frameworks ought to lay down some solid guidelines for making the best use of modern technologies, making sure they fit in with the goals of sustainable and comprehensive security governance.
- Creating ethical frameworks is absolutely essential to guarantee that smart technologies are used in line with our ethical values and principles. This will help strengthen the relationship between different state components and ensure that society as a whole remains secure.
- This approach also ties in with the need to uphold national security and build strong cooperative relationships, all while maintaining the integrity of international relations.
- It's crucial to adopt a sustainable energy strategy that leans on renewable sources, especially in light of modern technologies. This is key to achieving food security and laying down the groundwork for health security through a development program that meets the needs of human security.
- We must keep the elements of food security intact to prevent food crises and ensure that food financing is stable and sufficient. This can be achieved by boosting technical capabilities and modern technologies in agriculture, alongside implementing effective development policies that tackle the intertwined political, social, and economic challenges we face.

Citations:

- 1- Abdelkader Chikhli - *Environmental Protection in Light of Sharia, Law, Administration, Education, and Media* - 1st ed - El-Halabi Legal Publications – Lebanon – 2009 - pp.24-25.
- 2- Ibid. p.37.
- 3- Souhir Ibrahim Hadjem - *International Legal Mechanisms for Environmental Protection within the Framework of Sustainable Development* - 1st ed - El-Halabi Legal Publications – Lebanon – 2014 - p.367.
- 4- Bouras Fatima, Challenges of Achieving Sustainable Food Security in Algeria - Current Situation and Future Prospects - *Journal of Economic Diversification* - Ain Temouchent University - Volume 6 - Issue 3 – 2025 - pp.30-33.
- 5- Kouissi-Ben Moussa Kamel - Challenges of Food Security in Algeria and Ways to Achieve It, *Journal of Economics – Finance and Business* - Volume 7 - Issue 2 – 2022 - p.433.
- 6- Abdelhak Bendjedid & Mourad Ben Guita - Health Security in a Borderless World: Growing Concerns and Contrasting Implications - *Afak Al-Ulum Journal* - Djelfa University - Volume 1 - Issue 3 – 2016 - p. 45.
- 7- Belkadi Ishak - Protecting International Health Security within the Framework of the International Health Regulations - *Journal of Legal Studies* - Yahia Fares University of Medea - Volume 3 - Issue 1 – 2018 - p.103.
- 8- Nabil Chaeib - The Semantic Employment of the Concept of Health Security and its Cognitive Problems in the Time of Corona: A Semiological Reading of the Cartoons Circulating on Facebook Pages - *Algerian Journal of Human Security* - Volume 5 - Issue 2 – 2020 - p.428.
- 9- Moumen Bakkouch Ahmed & Marghini Haizem Badreddine, Legal Measures to Confront the Coronavirus (COVID-19) Pandemic at the International and National Levels - *International Journal of Legal and Political Research* - Volume 4 - Issue 3 – 2020 - pp.75-76.
- 10- World Health Organization - *International Health Regulations: A Brief Introduction*, 2005 - Criteria for Further Extensions - Regional Office for the Eastern Mediterranean – 2013 - Document No.EM/RC60/8 - p.1.
- 11- Nouar Wessar - Digital Health in the Shadow of the COVID-19 Pandemic: Digital Health Applications via Smartphones as a Model - *International Journal of Social Communication* - Abdelhamid Ben Badbess University – Mostaganem - Volume 9 - Issue 1 – 2022 - p.402.
- 12- Ben Bghila Leila - The Legal Basis of the State of Health Emergency in Algeria - *Journal of Sharia and Economics* - Volume 9 - Issue 17 – 2020 - p.28.
- 13- Ibid. - p.32.
- 14- Moumen Bakkouch Ahmed & Haizem Badreddine Marghani - op.cit - p.76.
- 15- For more details - see Chawki Hafiani & Abdelkrim Kebbech - Food Security after the COVID-19 Pandemic - *Algerian Journal of Legal and Political Sciences* - Volume 58 - Issue 5 – 2021 - pp.239-240.
- 16- Mourad Belyacine - Digital Security in the Health Sector in Algeria - *Madar for Digital Communication Studies* - Volume 2 - Issue 2 – 2022 - p 3.
- 17- Souhir Ibrahim Hadjem - op.cit - p.90.
- 18- Mourad Belyacine - op.cit - pp.62-63.
- 19- Atallah Ahmed - *The Impact of Artificial Intelligence Economics on Economic Growth*, Master's Thesis - Mansoura University – Egypt - p.37.
- 20- Debbar Mohammed El-Amine & Babou Djamel Eddine - Implications of Artificial Intelligence for National Security - *Journal of Private Law* - Vol. 2 - No.1 – 2004 - p.107.
- 21- Ibid - p.108.
- 22- AbdelKhalek Oudina & Aicha Lalmi - Ways to Enhance Food Security in the Arab World - A Reading of the Arab Program for Sustainable Food Security 2022 - *Journal of Scientific Research and Studies* - Vol.19 - No.1 – 2025 - p.13.

- 23- Ameer Mahmoud Tarraf - *Pollution Terrorism and the Global System* - 1st ed - University Foundation for Studies - Publishing, and Distribution – Lebanon – 2002- pp.34-35.
- 24- Talbi Meriem & Bouriah Selma - Energy Security Policies and Their Role in Embodying Food Security in Algeria: Prospects for 2030 - *Academic Journal of Legal and Political Research* - Vol. 9 - No. 1 – 2025 - p.1038.
- 25- Ata Saad Mohammed Haouas - *Liability for Pollution Damage* (no edition) – Egypt - Dar Al-Jami'a Al-Jadida – 2012 - pp.45 ff.
- 26- Nadia Ahmed Omrani - *The Legal System of Global Food Security - Between Theory and Practice*, - 1st ed - Dar Al-Thaqafa – Jordan – 2014 - pp.127-135.
- 27- Litouch Dalila - The Interaction between Food Security and Environmental Security and Their International Protection - *Al-Mi'yar Journal* - Vol.24 - No.3 – 2020 - p.730.
- 28- Ghiles Amina - The Contribution of Environmental and Economic Security to Achieving Development in a State of Law - *Journal of Rights and Freedoms* - Volume 11 - Issue 2 – 2023 - p.71.
- 29- Nadia Ahmed Omrani - op.cit - p.169.
- 30- Medjahed Mohammed - Civil Liability for Artificially Intelligent Robots: A Comparative Study - *Legal Journal* - Cairo University - Volume 9 - Issue 2 - p.285.
- 31- Tchanchan Manel - Sustainable Food Security Standards in Algerian Public Policies: Between Reality and Hope - *Journal of Real Estate Law* - Volume 10 - Issue 2 – 2023 - p.92.
- 32- Khaled Dho - International Attention to Achieving Food Security and Mechanisms for Its Protection, *Algerian Journal of Historical and Legal Studies* - Volume 6 - Issue 3 – 2022 - p.89.
- 33- For more details, see: Houcine Rebai - The Reality of Food Security in Algeria in Light of New Strategies and Legal Mechanisms - *Emir Abdelkader Journal of Islamic Sciences Journal* - Volume 36 - Issue 3 – 2022 - pp.270-273.