JSS Law College
Autonomous
Kuvempunagar, Mysuru

JSS Journal for Legal Studies and Research
[ISSN 2321-4171]

Intellectual Property Rights and Food Security Enhancement in Afghanistan: A Human Rights-Based Analysis

Imranullah Akhtar[1]

Nazifullah Niazi[2]

ABSTRACT

The impact of intellectual property rights on enhancing food security in Afghanistan is assessed in this study, focusing on the human rights framework and the effectiveness of laws and policies. The potential for innovations in agricultural practices and food sources amid the difficulties presented by conflict, economic instability, and climate change is highlighted in this study, which explores the role of intellectual property rights in improving food security in Afghanistan. Literature reviews, articles, and studies on intellectual property rights and food security were analyzed using practical content analysis and descriptive analysis methods. This study suggests that robust intellectual property regulations in Afghanistan can encourage agricultural innovation and lead to the creation of novel methods and crops that will improve food security and output. It is possible to guarantee human rights to food and greatly enhance food production and access in Afghanistan by bolstering the legal framework and public understanding regarding intellectual property rights. Recommendations include enhancing intellectual property rights laws, supporting Afghan agricultural innovators and researchers, raising public awareness, and collaborating with international organizations.

Keywords: Afghanistan, Agriculture, Food Security, Human Rights, Intellectual Property Rights

CITATION: Imranullah Akhtar & Nazifullah Niazi, "Intellectual Property Rights and Food Security Enhancement in Afghanistan: A Human Rights-Based Analysis", JSS Journal for Legal Studies and Research, Vol. 10 (2) (2024), pp. 33-48, available at https://www.jsslawcollege.in/jsslc-online-journal/

[1] Head of Professional Development Center, Lecturer, Law & Political Science, Alfalah University, Nangarhar, Afghanistan
*Corresponding author email: imranullahakhtar@gmail.com
[2] Head of Quality Assurance, Lecturer, Law & Political Science, Alfalah University, Jalalabad, Afghanistan
Author email: nazifn20@gmail.com

1.0 INTODUCTION

Intellectual Property (IP) encompasses rights for instance copyrights, images, publishing, trademarks, and patents, which protect inventions, trademarks, industrial designs, literary and artistic works, and other ideas, enabling owners to benefit from and seek support from others. This research paper describes the impact of intellectual property rights (IPR) in improving food security for Afghans. The purpose of this research article is to protect IPR, which in turn support innovation and invention, this may result in higher-quality goods and economic expansion. This research topic was chosen to understand the relationship between Afghan IPRs and food security. Given the circumstances, in Afghanistan, this research paper supports that IPRs are necessary to introduce fresh machineries and strengthen innovation. To improve competition in the market, the protection of IPR is essential, and understanding IPR is crucial for the food sector to maintain and develop innovation. The protection system of IPR in Afghanistan and its challenges are significant topics to investigate, considering the food safety issues that Afghan citizens are facing. There is a need to analyze the role of IPR and understand how government policies and the protection of IPR contribute to the food security process. According to this research, the role of IPRs in improving food security for Afghan citizens and how the protection of IPRs improves food quality and production will be clarified. As a research hypothesis, the protection of IPRs has a positive effect on improving food security because it make available a basis for supporting innovation and inventions. This issue is crucial in Afghanistan, so understanding the link concerning the protection of food security and IPRs in other developed countries is necessary. Furthermore, exploring mechanisms and strategies to strengthen the protection of IPRs is important.

IP has a long history, dating back to ancient times when ideas were protected through secrecy, trade secrets, and patent protection. With the advancement of technology and industry, formal laws and regulations were needed to protect IPRs. The Berne Convention in 1883 was the first worldwide agreement, followed by the Patent Protection Act in the US in 1886.[3] The World Intellectual Property Organization (WIPO) was established in 1970 as a result of a series of laws and regulations passed worldwide. Industrialization led to the emergence of industrial agriculture as a commercial domain, allowing the preservation of technological achievements. The introduction of IPRs in agriculture supported the production and accumulation of wealth.[4]

1.1 Food Security and Intellectual Property

Food safety is essential for public health, as food must meet quality and safety standards. Protection of intellectual property rights (IPR) is essential to align thru international standards and strengthen business relationships. Food security is a set of principles aimed at ensuring human health, security, and quality in all stages of food production, processing, and distribution.[5] Article 25 of the 1948 Universal Declaration of Human Rights pinpoints the "right to food" as a crucial right for human life preservation.[6] However, determining governments' obligation to provide this

[3] Chowdhury. Enforcement of Intellectual Property Rights in Bangladesh: To What Extent Is It TRIPS-Responsive? *Beijing Law Review*, **9**, 425-438. (2018).
[4] Ren et al. The Study of Agricultural Intellectual Property and Intelligent Agriculture Development Strategies in China. *Journal of Service Science and Management*, **10**, 230-250. (2017).
[5] Adamo et al., Virtual Water Trade and Food Security for Iraq. *Engineering*, **15**, 417-430. (2023).
[6] UN General Assembly, Resolution 217A (III), Universal Declaration of Human Rights, art. 25 cl. 1(a). (1948).

right has been a contentious issue, with both supporters and critics. One of the most basic human rights is the right to nourishment, guaranteeing access to wholesome, appetizing food in accordance with international accords such as the International Covenant on Economic, Social, and Cultural Rights and the Universal Declaration of Human Rights. The four elements of the right to food can be identified here.[7] This means that every person must have the means to provide enough food. Food should be affordable and accessible to every person. Food should be healthy, tasty, and nutritious. Individuals should have the right to cultural food. The UN General Assembly accepted the right to adequate and nutritious food in 2002, emphasizing food security components.[8] Governments are committed to recognizing this right, improving individual status, and ensuring the full enjoyment of this right. Countries have specific laws and regulations governing food security, establishing standards for quality and security, and regulating production, processing, and distribution based on legal principles. The FDA and FAO are crucial in food security, establishing standard procedures and regulations. Violation of security laws can lead to penalties and legal consequences, the purpose of which is to protect public health.[9] Governments formulate policies and programs for food security, enhancing agriculture, food industry, and distribution. They also educate the public about food security through public awareness campaigns and maintain monitoring and surveillance mechanisms to continuously assess food quality and security.[10] Food security is a concept based on the right to food, ensuring economic and physical access to healthy, sufficient foodstuff for entirely individuals in the community, promoting a healthy diet for a healthy and active life, and sustainable productivity. Food security is the state in which every human being has sufficient, tasty, nutritious food that is continuously available. Economic, cultural, and social factors are associated to each other. The food production and consumption system must be strong enough to reach all people, affordable food must be compatible with all people's economic status, and the food production and consumption system must be in harmony with the environment and sustainable development.[11] Intellectual property rights are those rights established to protect people and inventions, creative works, and innovations. The rights include copyright, patent, trademark, and industry sample rights. The four elements of the right to food can be identified; it is used to protect literary and artistic works, the patent is used to protect inventions, which gives the right to copy them, trademark protects trademarks and logos, and industrial design rights protect products with a special shape or design.[12] Selvakumar (2002), asserts that economic stability, the right to food, and food security are all significantly impacted by intellectual property rights. They support

[7] Fan et al., Innovation or imitation: The role of intellectual property rights protections. Journal of Multinational Financial Management, 23(3), 208-234. (2013).

[8] Kiprutto et al. Agriculture, Climate Change and Food Security. Open Access Library Journal, 2, 1-7. (2015)

[9] Kokabisaghi. Assessment of the effects of economic sanctions on Iranians' right to health by using human rights impact assessment tool: a systematic review. International journal of health policy and management, 7(5), 374. (2018).

[10] Ma. The Tripartite Evolutionary Game of Intellectual Property Protection with Government Participation. Open Journal of Business and Management, 10, 2790-2804. (2022).

[11] Sugeng et al. Intellectual property rights in agriculture: plant variety protection and food security. Audito Comparative Law Journal (ACLJ), 5(2), 66–91. (2024).

[12] Owasa and Fall. Food Security in Developing Countries: Factors and Mitigation. American Journal of Climate Change, 13, 391-405. (2024)

innovation and production, ensuring food safety and quality. Producers can innovate to protect food rights, promoting food rights. Economic incentives also strengthen food security. Thus, food is a right, food is security, and intellectual property rights are interrelated, promoting sustainable development and food safety.[13]

1.2 Human Rights Framework, IPR and Food Security

According to the Human Rights, the state has an obligation to protect IPR to achieve this, the government needs to establish strong regulations and laws that ensure the safeguard of inventions, agricultural innovations, and food production.[14] These laws create a conducive environment for farmers and companies to implement innovations and produce food. The government is urged to provide investment and financial support through the enforcement of intellectual property rights. Protecting these rights encourages investors to fund their innovative projects, leading to increased food production and quality. According to the Human Rights Framework, the government should support innovation and research projects, particularly in agriculture.[15] Intellectual property provides a legal framework for innovation that enhances food production and safety through research and invention. The government should raise public awareness about intellectual property. Developing training programs for farmers, students, and professionals is essential to help them understand the value of intellectual property rights and leverage those. By enforcing intellectual property rights, the government is aligning with international standards.[16] This is crucial for Afghanistan's food security to access international markets and prepare products for export according to global standards. The Human Rights Framework emphasizes the promotion of transparency and accountability in the implementation of IPR, which enhances the government's credibility and trust among the people. Enforcing intellectual property rights is vital for improving food security[17] The government must make significant efforts in legislation, investment, innovation, training, and adhering to international standards to enhance food production, quality, and safety. Through these measures, the government can elevate the standard of living for its citizens and take crucial steps towards the economic development of the country.

Article 25, The Universal Declaration of Human Rights (UDHR) states that everybody has the right to satisfactory livelihood, security, and adequate food.[18] It expresses the concept of the right that humans should have the necessary materials for their life and well-being. Article 11, The International Covenant on Economic, Social and Cultural Rights (ICESCR) pays special attention to food security and emphasizes that everyone has the right to food security.[19] This

[13] Selvakumar. Overlap of Trademarks with Other Intellectual Property Rights: The Strategies of Global Brands. *Beijing Law Review*, **13**, 429-448. (2022)

[14] Zou and Guo. China's Food Security Evaluation Based on Factor Analysis. *American Journal of Industrial and Business Management*, **5**, 447-456. (2015)

[15] Martin-Shields, & Stojetz. Food security and conflict: Empirical challenges and future opportunities for research and policy making on food security and conflict. World Development, 119, 150–164 (2018).

[16] Hou et al. New knowledge and regional entrepreneurship: the role of intellectual property protection in China. Knowledge Management Research & Practice, 21(3), 471-485. (2023).

[17] Shehata and Eldali. Some Economic Aspects of Fish Food Security in Egypt. Open Journal of Social Sciences, 10, 351-366. (2022)

[18] UN General Assembly, Resolution 217A (III), Universal Declaration of Human Rights, art. 25 cl. 1(a). (1948).

[19] UN General Assembly, Resolution 2200A (XXI). ICESCR, art. 11 cl. 1(a). (1966).

article also mentions the duty of states to help create the relevant facilities and resources in the implementation of this right. The ICESCR is an essential human rights context as it highlights the right to access food. This right requires access to satisfactory and healthy food for all individuals, and to ensure this right, it is necessary to respect laws regarding agricultural innovation and IPRs.[20] As stated by the Human Rights Framework, IP explains the role of government and the political system regarding IPRs and their protection. IP is essential for innovation, inventions, and the protection of various artistic and scientific works. These rights are important for the marketing of innovations and inventions, as they allow individuals and companies to feel protected in their work, thus encouraging innovation. The government plays a key role in protecting intellectual property rights, and strong laws are necessary to enforce these rights.[21] Increasing public awareness of intellectual property is also crucial so that individuals know how to exercise their rights. Intellectual property is vital for economic development, as it provides the conditions for innovation, productivity, and business growth. Governments support innovation and inventions by ensuring the safety of IPRs and providing financial support for these endeavors. By creating financial support programs and collaborations for innovators and researchers, governments can foster innovation and economic growth.[22] In order to improve international trade relations, it is important to protect international intellectual property rights, as this allows countries to present their products on the international market. Governments should establish mechanisms to resolve violations and complaints of intellectual property rights to ensure their protection. When it comes to food security, the Human Rights Framework discusses political institutions and the role of government in promoting food security.[23] The government should participate in various ways to ensure the health and safety of its citizens. The government plays a substantial role in providing food security by establishing and implementing laws and regulations pertaining to food quality, production, and distribution. Food security is indispensable for publics' well-being, economic growth, and social stability. Establishing quality monitoring agencies to protect food safety and increasing public awareness about food security are also essential tasks for the government.[24] By promoting food security, the government can improve the standard of living of its citizens and economic development. Increased food safety results in better population health, productivity, and general well-being. In times of refugees and insecurity, the government should take urgent measures to ensure food security and cooperate with international organizations and other countries to improve food security.[25] By creating food safety policies according to international standards, the government can play a significant role in promoting food security for economic development and the health of individuals. Legislation, monitoring,

[20] Shepherd. Thinking critically about food security. Security Dialogue, 43(3), 195-212. (2012).
[21] Donkor, & Daliri. The Role of Nanotechnology in Agriculture and Food Security. In Advanced technologies and societal change (pp. 149–190). (2024).
[22] Temory. Impact of COVID-19 on Food Security and Household Income in Herat Afghanistan. *Open Journal of Social Sciences*, **12**, 148-166. (2024)
[23] Weston. Human rights. Encyclopedia Britannica. (2024).
[24] Selvakumar. Overlap of Trademarks with Other Intellectual Property Rights: The Strategies of Global Brands. *Beijing Law Review*, **13**, 429-448. (2022)
[25] Yolchi et al. Impact of Floods on Food Security in Rural Afghanistan. *International Journal of Disaster Risk Reduction*, *112*, 104-746. (2024).

public awareness, and food supply networks are crucial ways in which the government can improve food security. Through these efforts, the government can enhance the standard of living of its citizens and contribute to the development of society. IP also plays a crucial role in economic development, innovation, and the competitiveness of a country.[26] By establishing laws and policies to protect IPRs, the government can create a favorable environment for innovators and producers, leading to important achievements in economic and social development.

1.3 IPR in Agriculture and Food Security

Intellectual property rights (IPRs) in agriculture protect innovations, technologies, and scientific achievements in agricultural production and resource exploitation. These rights include patents, new plant varieties, copyrights for agricultural technologies, and trademarks for agricultural products.[27] Their consequences on food security vary. Intellectual property rights encourage innovation and investment in agricultural technology research, leading to increased crop productivity, climate change and disease resistance, and improved agricultural technologies, ultimately strengthening food security. IPRs in agriculture lead to the concentration of technologies and innovations in multinational corporations, limiting access to essential resources like improved seeds for smallholder farmers and developing countries, negatively impacting food security in these regions.[28] Intellectual property rights impact agricultural product pricing, as companies developing new technologies may raise prices, putting pressure on small farmers and producers. This increases food production costs, negatively impacting food security, especially in low-income countries, and potentially affecting food security.[29] Intellectual property rights decrease agricultural biodiversity by relying too heavily on a few commercial species, potentially threatening agro-ecosystems and long-term food security, as a decrease in biodiversity can be mitigated. Intellectual property rights lead to farmers' dependence on companies, causing them to buy improved seeds annually and cannot save them for future planting. This dependence can hinder farmers' ability to meet their own and community's food needs. Sustainable technologies like drought- and pest-resistant seeds can promote sustainable agriculture, mitigate climate change's effects on food production, and improve food security if distributed fairly.[30] The government can promote innovation and productivity by supporting new agricultural technologies, such as drought- and disease-resistant seeds, which boost agricultural production. This promotes economic growth and sustainable production. Protecting agricultural products through IPR can increase exports and income for farmers, contributing to food security. The government can prevent monopoly by ensuring small farmers have access to necessary resources and technologies. Homogenization of agricultural products can lead to decreased cultivated areas, biodiversity loss, food security issues, import limitations, increased costs,

[26] Hou et al. New knowledge and regional entrepreneurship: the role of intellectual property protection in China. *Knowledge Management Research & Practice, 21*(3), 471-485. (2023).
[27] Shepherd. Thinking critically about food security. *Security Dialogue, 43*(3), 195-212. (2012).
[28] Ren et al. The Study of Agricultural Intellectual Property and Intelligent Agriculture Development Strategies in China. *Journal of Service Science and Management*, **10**, 230-250. (2017).
[29] Selvakumar. Overlap of Trademarks with Other Intellectual Property Rights: The Strategies of Global Brands. *Beijing Law Review*, **13**, 429-448. (2022)
[30] Temory. Impact of COVID-19 on Food Security and Household Income in Herat Afghanistan. *Open Journal of Social Sciences*, **12**, 148-166. (2024)

environmental threats, soil erosion, land degradation, and increased fertilizer use.[31] Genetically modified seeds offer higher productivity but increase economic dependence, increase costs, reduce genetic diversity, and depend on imports. They also threaten food security and local knowledge, making it difficult for farmers to invest in other sectors. The loss of biodiversity and genetic resources in agriculture, exacerbated by changing cultivation patterns and genetically modified crops, poses threats to food security, innovation, and indigenous species extinction. Multinational companies' monopolization of seed production poses a significant threat to agriculture, causing increased costs, reduced diversity, and reduced power, especially in developing nations.[32] Large companies imposing contractual conditions on farmers can lead to economic dependence, food independence, and limited control over resources, reducing local innovations and traditional knowledge. Furthermore, IPR can increase international cooperation in agriculture, leveraging global technologies and knowledge to strengthen food security.[33] Thus, IPR can be a powerful tool for enhancing food security in Afghanistan. Intellectual property rights (IPR) can significantly enhance food security in Afghanistan. Recognizing and utilizing intellectual property rights in agriculture presents challenges. Alternatively, it can lead to improved innovation and enhanced agricultural productivity, and it may lead to unequal access to technologies, increased costs, and reduced biodiversity.[34] To maintain food security, a balance must be struck between supporting innovation and ensuring equitable access to agricultural resources. The government of Afghanistan can support the innovation and sustainable growth of agriculture and improve the food security of citizens by developing and implementing appropriate policies in the field of IPRs.

1.4 Food Security and IPR in Afghanistan

The intellectual system of agricultural ownership and food security varies between developed and developing countries. Developed countries rely on mechanized agriculture, while developing countries, like Afghanistan, rely on local farming. Developing countries face economic, social, and environmental challenges that directly impact their sustainable development and food security.[35] One of the biggest challenges in Afghanistan is poverty. Due to political unrest and ongoing wars, a high ratio of the population lives in deficiency. This issue leads to severe economic and social inequalities and limits access to basic resources and services. Afghan farmers primarily depend on traditional farming methods and lack access to modern technologies and resistant seeds. This lack of technology results in

[31] Donkor & Daliri. The Role of Nanotechnology in Agriculture and Food Security. In *Advanced technologies and societal change* (pp. 149–190). (2024).
[32] Singh et al. Sustainable Agriculture and Food Security in India. In *Advances in geographical and environmental sciences* (pp. 199–209). (2024).
[33] Weiler et al. Food sovereignty, food security and health equity: a meta-narrative mapping exercise. *Health Policy and Planning*, *30*(8), 1078–1092. (2014).
[34] Sani and Kemaw. Analysis of Rural Households Food Security in Western Ethiopia. *Food and Nutrition Sciences*, **10**, 249-265 (2019)
[35] Yolchi et al. Impact of Floods on Food Security in Rural Afghanistan. *International Journal of Disaster Risk Reduction*, *112*, 104-746. (2024).

decreased production and productivity, threatening food security.[36] Climate change has negative effects on agriculture, water resources, and ecosystems, especially in vulnerable areas like Afghanistan. Droughts and climate fluctuations can lead to decreased agricultural production and food security. Political and security instability hinder sustainable development in Afghanistan and limit investment in infrastructure and technology. Continuous unrest makes it impossible for farmers to plan effectively and increase their production. The poor educational attainment and ignorance of the most effective farming methods and intellectual property rights reduce productivity and hinder farmers' ability to use new technologies.[37] This issue also impedes the empowerment of farmers and the improvement of their economic conditions. Poor infrastructure, such as roads, storage facilities, and irrigation systems, harms agricultural production and prevents access to markets. These weaknesses lead to a decrease in farmers' income and food security. Weak healthcare systems not only harm the health of farmers but also affect food production and food security. Diseases can lead to a decrease in labor and agricultural production. Food security for Afghans means that all Afghans consume and right to use to satisfactory, nutritious, and proper food constantly, without facing hunger or food insecurity. The problem of food security in Afghanistan is multifaceted and related to economic instability, conflict, natural disasters (such as droughts and floods), and outdated and limited agricultural practices.[38] Therefore, food security for Afghans is not only a matter of production and distribution but also depends on people having the financial means to obtain adequate and nutritious food. The government and international organizations are working to improve food security in Afghanistan, but it remains a significant problem that requires sustainable and comprehensive solutions. The role of IPRs in food safety is fundamental and essential, as intellectual property provides a legal framework for the fortification of innovations, technologies, and inventions. These innovations contribute to the improvement of fresh technologies in agriculture and food production, improved seeds, pesticides, and new methods of food processing, resulting in increased food production and improved food safety.[39] The protection of IPRs ensures that companies, universities, and research institutions can benefit from their innovations and invest in new agricultural technologies. Through these developments, we can increase agricultural production, improve food quality, and ensure global food security. IPRs, such as patents, provide legal protection for agricultural products and food innovations, playing an important role in food security. The role of IPRs in food security in Afghanistan is crucial in the agricultural and economic system of the country, given the obstacles that harm food security.[40] Intellectual property provides a legal framework for innovation and creativity that encourages new technologies and inventions in agriculture and food production. For example, Harvey's methods, soil quality improvement techniques, and improved

[36] Lee. Reconceptualizing the role of intellectual property rights in shaping industry structure. *Vand. L. Rev.*, *72*, 1197. (2019).
[37] Akhtar. The Significance of International Cooperation on Climate Change Mitigation in Afghanistan. *NUIJB*, *3*(02), 456–459. (2024).
[38] Dosi & Stiglitz. The role of intellectual property rights in the development process, with some lessons from developed countries: an introduction. *Intellectual property rights: Legal and economic challenges for development*, *1* (2014).
[39] Khurshid et al. Technological innovations for environmental protection: role of intellectual property rights in the carbon mitigation efforts. Evidence from western and southern Europe. *International Journal of Environmental Science and Technology*, *19*(5), 3919-3934. (2022).
[40] Yolchi et al. Impact of Floods on Food Security in Rural Afghanistan. *International Journal of Disaster Risk Reduction*, *112*, 104-746. (2024).

land use methods. Companies can improve the quality of their products through intellectual property rights. Introducing new crops and seeds designed for higher quality and yield improves food security.[41] Intellectual property rights give investors and companies the assurance that they will benefit from their innovations and inventions. This encourages them to invest in agriculture, improving food production and quality. By protecting intellectual property rights, farmers can obtain financial and technical support for new and improved seeds, pesticides, and other agricultural innovations. This assistance increases food production and provides adequate conditions for security. Application of IPRs is an important task for the government, helping formulate laws and policies for agriculture development. These laws aim to protect innovation, support agriculture, and ensure food security.[42] Enforcement of intellectual property rights provides access to international markets for Afghan farmers and companies. If they have innovations and provide products according to international standards, they can expand in the field of food exports. Food security in Afghanistan is achievable through the implementation and protection of IPRs.[43] These rights are fundamental to innovation, quality, and economic stability in agriculture. If the government and relevant agencies prioritize the protection of IPRs, it will be a significant step for Afghanistan's food security and economic development.

A key framework for the defense and upholding of intellectual property rights globally is provided by the International Agreement on Trade-Related Intellectual Property Rights (TRIPS). The TRIPS Agreement ensures Afghanistan's protection of IPRs, allowing access to advanced agricultural technologies and patents.[44] It also facilitates integration with international markets, requiring standardized processes for Afghan products. Compliance with international standards, established by the TRIPS Agreement, boosts the quality and competitiveness of Afghanistan's agriculture and production, thereby enhancing its agricultural sector. The government's role in food security in Afghanistan is essential for improving the economy and social situation of this country.[45] The government should strive to improve food security through various policies, programs, and measures. The government should develop comprehensive policies and strategies for food security, including support for agricultural projects, water management, and key measures for agricultural development. This policy should be adapted to the social and economic situation.[46] The government's duties include establishing a financial support system in agriculture and providing farmers with access to loans and other financial instruments. This assistance will be crucial for agricultural production and food security. The government should implement programs and projects for the development of agriculture. This covers the launch

[41] Donkor & Daliri. The Role of Nanotechnology in Agriculture and Food Security. In *Advanced technologies and societal change* (pp. 149–190). (2024).
[42] Temory. Impact of COVID-19 on Food Security and Household Income in Herat Afghanistan. *Open Journal of Social Sciences*, **12**, 148-166. (2024)
[43] Haugen et al. Food security and intellectual property rights: Finding the linkages. In T. Wong & G. Dutfield (Eds.), *Intellectual Property and Human Development: Current Trends and Future Scenarios* (pp. 103–138). (2010).
[44] Lee. Reconceptualizing the role of intellectual property rights in shaping industry structure. *Vand. L. Rev.*, *72*, 1197. (2019).
[45] Singh et al. Sustainable Agriculture and Food Security in India. In *Advances in geographical and environmental sciences* (pp. 199–209). (2024).
[46] Fan et al. Innovation or imitation?: The role of intellectual property rights protections. *Journal of Multinational Financial Management*, *23*(3), 208-234. (2013).

of novel agricultural technologies, crops, and pesticides.[47] Develop training programs for farmers and agronomists to learn about innovations, technical skills, and best agriculture practices. This will increase food production and enhance food security. The government should create effective food distribution and delivery systems to see the needs of individuals facing starvation and food insecurity.[48] The government should promote the marketing of domestic products and create favorable conditions and policies for food exports. This will improve food security by increasing the value of the produce. The government must cooperate with international organizations, non-governmental organizations, and other aid institutions, which will help in creating various aids and resources to improve food security.[49] The government of Afghanistan has a significant role to play in improving food security. With strong policies, financial support, training, and initiatives in agriculture, the government can develop the economy and quality of public's life. Food security is the basic foundation for Afghanistan's stability and development, and the government should make serious efforts in this area.

2.0 MATERIALS AND METHODS

This research uses academic articles and literature review to analyze the relationship between IPRs and food safety. The study uses a qualitative research design, analyzing data through a descriptive and content analysis and using the Human Rights Framework to understand government role in implementing laws and policies. The Human Rights Framework provides a inclusive analysis of the association between IPR and food security in Afghanistan, focusing on rights to food, equity, justice, government responsibilities, empowerment, and sustainability.

3.0 RESULT

While benefiting from the international system of IPRs under certain conditions, developing countries have to form a special system that guarantees the support of farmers' rights and traditional knowledge. In a world where IPRs are problematic to revoke, it is important to protect the weak rights of farmers and traditional knowledge holders. Weak intellectual property rights in Afghanistan and a lack of protection for innovators in the field of biotechnology call for new laws on intellectual property. For the right to food security, expanding support for farmers and balancing intellectual property and the right to food is necessary. Other related topics are highlighted in the tables below.

Table 1: Intellectual Property Rights can Enhance Food Security

IPR Mechanism	Potential Benefits for Food Security	Human Rights Considerations	Recommendations
Patents	Encourage innovation and development of new agricultural technologies	Risk of monopolization by patent holders	Grant compulsory licenses for essential technologies*

[47] Al-Mawali. Intellectual Property Rights and Bilateral Intra-Industry Trade Flows: An Intuitive Framework. *Theoretical Economics Letters*, **4**, 716-726 (2014).
[48] Yolchi et al. Impact of Floods on Food Security in Rural Afghanistan. *International Journal of Disaster Risk Reduction*, *112*, 104-746. (2024).
[49] Owasa and Fall. Food Security in Developing Countries: Factors and Mitigation. American Journal of Climate Change, 13, 391-405. (2024)

Trademarks	Protect brands and reputation of agricultural products	Potential for trademark infringement by counterfeiters	Strengthen enforcement of trademark laws
Copyrights	Protect genetic resources and traditional knowledge	Risk of exploitation of ethnic communities	Ensure fair compensation for traditional knowledge holders*
Geographical Indications (GIs)	Promote local and regional agricultural products	Potential for misappropriation of GIs	Implement strong GI protection measures
Plant Variety Rights (PVRs)	Encourage breeding of new and improved crop varieties	Risk of restricting access to essential seeds	Promote the exchange of genetic material between farmers

Table 1 shows that Intellectual Property Rights (IPRs) can enhance food security by promoting innovation in agriculture, protecting local products, and safeguarding traditional knowledge, while addressing risks like monopolization and exploitation.

Table 2: Challenges and opportunities to food security and the role of IPRs

Challenge	IPR Intersection	Opportunities
Conflict and Instability	Destruction of agricultural infrastructure	IPRs can incentivize the development of conflict-resistant agricultural technologies
Climate Change	Drought, floods, and temperature extremes	IPRs can protect traditional varieties adapted to changing climates
Poverty and Inequality	Limited access to agricultural inputs and resources	IPRs can promote the development of affordable and accessible technologies
Governance and Corruption	Lack of effective policies and institutions	Strong IPR frameworks can enhance governance and transparency
Limited Access to Markets	Difficulty in exporting agricultural products	IPRs can protect Afghan agricultural products from counterfeiting and piracy
Lack of Agricultural Research and Development	Limited innovation in the agricultural sector	IPRs can encourage research and development of new agricultural technologies
Traditional Knowledge	Risk of exploitation of traditional agricultural practices	IPRs can protect traditional knowledge and ensure fair compensation

Table 2 represents that IPRs can address challenges like conflict, climate change, poverty, and limited market access in agriculture by promoting innovation, protecting traditional knowledge, and enhancing governance and transparency.

Table 3: Using IPRs to Promote Innovation and Equitable Access in Afghan Agriculture

IPR Mechanism	Strategies to Promote Innovation	Strategies to Ensure Equitable Access
Patents	Grant incentives for research and development	Implement compulsory licensing provisions
Trademarks	Protect brands and reputation of agricultural products	Promote the use of generic trademarks for essential inputs

Copyrights	Protect traditional knowledge and genetic resources	Make sure that the advantages of applying old knowledge are distributed fairly
Geographical Indications	Promote local and regional agricultural products	Support the development of cooperative associations for GI holders
Plant Variety Rights	Encourage breeding of new and improved crop varieties	Promote the exchange of genetic material between farmers

Table 3 displays that IPRs in Afghan agriculture can foster innovation through patents, trademarks, and copyrights, while ensuring equitable access by implementing licensing provisions, promoting cooperatives, and supporting the exchange of genetic materials.

Table 4: Human Rights Implications of IPRs and Food Security

Human Rights	Potential IPR-Related Implications	Addressing the Implications
Right to Food	IPRs can restrict access to essential agricultural inputs and technologies	Implement compulsory licensing provisions for essential technologies
Right to Health	IPRs can limit access to essential medicines derived from agricultural products	Promote the development of affordable generic alternatives
Right to Property	IPRs can protect breeders and the rights of farmers to their innovations	Ensure that IPRs do not disproportionately benefit large corporations
Right to Cultural Heritage	IPRs can protect genetic resources and traditional knowledge	Respect the rights of local communities to their cultural heritage
Right to Development	IPRs can hinder the development of the agricultural sector	Balance IPRs with public interest considerations

Table 4 illustrates that IPRs impact human rights like access to food, health, and cultural heritage, necessitating measures such as compulsory licensing, protection of traditional knowledge, and balancing corporate and public interests.

Table 5: Policy Recommendation for Enhancing Food Security through IPRs in Afghanistan

Policy Area	Recommendations
IPR Legislation	Strengthen IPR laws and regulations to support agricultural innovation
IPR Enforcement	Establish effective IPR enforcement mechanisms
Public-Private Partnerships	Foster collaboration between government, research institutions, and private sector
Technology Transfer	Facilitate the transfer of appropriate technologies to Afghan farmers
Access to Finance	Provide financial support for agricultural innovation and development
Capacity Building	Develop the capacity of Afghan farmers, entrepreneurs, and government officials in IPR matters
International Cooperation	Collaborate with other countries and organizations to promote food security through IPRs
Human Rights	Respect human rights in the implementation of IPR policies
Traditional Knowledge	Protect traditional knowledge and ensure fair compensation for its use
Gender Equality	Promote gender equality in the agricultural sector and ensure that women have equal access to IPRs

Table 5 indicates that Policy recommendations for enhancing food security through IPRs in Afghanistan focus on strengthening legislation, enforcement, technology transfer, financial support, capacity building, and ensuring human rights, gender equality, and protection of traditional knowledge.

4.0 DISCUSSION

Food security and the intersection of Intellectual Property Rights (IPRs) represents a intricate landscape where innovation, human rights, and agricultural development converge. The tables provided outline various IPR mechanisms and their implications for food security, highlighting both their potential benefits and associated challenges. The potential for IPRs, such as patents and plant variety rights, to drive agricultural innovation cannot be overstated. By encouraging the development of new technologies and improved crop varieties, IPRs can significantly enhance food production and resilience, particularly in regions like Afghanistan, where agricultural challenges are pronounced. However, the risk of monopolization by patent holders poses a significant barrier. Implementing compulsory licenses for essential technologies could mitigate this risk, ensuring that innovations remain accessible to those who need them most. The human rights implications of IPRs are critical to consider. As highlighted in Table 4, the right to health and the right to food can be jeopardized by restrictive IPR frameworks that limit access to essential agricultural inputs and medicines. Addressing these concerns requires a careful balance between protecting innovators and ensuring that the needs of the population are met. The recommendation to promote affordable generic alternatives and to implement compulsory licensing provisions is essential in this regard. The challenges outlined in Table 2 emphasize the multifaceted nature of food security issues. Conflict and climate change, for instance, create urgent needs for resilient agricultural practices. IPRs can play a role in incentivizing the improvement of technologies that withstand such adversities. Additionally, the intersection of poverty and limited access to agricultural resources can be addressed through the equitable dissemination of innovations, ensuring that smallholder farmers benefit from technological advancements. Traditional knowledge and genetic resources are invaluable assets that face the risk of exploitation. The tables underscore the importance of protecting these assets through appropriate IPR mechanisms. Ensuring fair compensation for traditional knowledge holders not only respects cultural heritage but also fosters sustainable agricultural practices. The policy recommendations in Table 5 provide a roadmap for enhancing food security through IPRs in Afghanistan. Strengthening IPR legislation and enforcement mechanisms is crucial to creating an environment conducive to innovation. Furthermore, fostering public-private partnerships can enhance collaboration and resource sharing, leading to more effective agricultural solutions. Capacity building for farmers and government officials in IPR matters is equally important, confirming that stakeholders are prepared to navigate the complications of IPRs. In conclusion, while IPRs hold significant promise for enhancing food security, careful consideration must be given to their implementation. Balancing innovation with human rights, protecting traditional knowledge, and addressing the unique challenges faced by agricultural sectors in developing countries are paramount.

By adopting a holistic approach that integrates these considerations, stakeholders can work towards a more secure and equitable food future.

5.0 CONCLUSION

The tables highlight how Intellectual Property Rights (IPRs) can enhance food security, especially in Afghanistan. Key IPR mechanisms such as patents, trademarks, copyrights, geographical indications (GIs), and plant variety rights (PVRs) can promote innovation in agriculture, protect local products, and safeguard traditional knowledge. However, there are concerns about monopolization, exploitation of indigenous knowledge, and restricted access to seeds and technologies. To address these issues, recommendations include granting compulsory licenses, strengthening trademark enforcement, ensuring fair compensation for traditional knowledge, and promoting equitable access to innovations. Policy recommendations emphasize stronger IPR legislation, public-private partnerships, technology transfer, capacity building, and ensuring human rights and gender equality in the agricultural sector. I propose several recommendations for Afghanistan's agricultural sector, including strengthening intellectual property rights, implementing compulsory licenses for necessary technologies, protecting local products, protecting trademarks and brands, respecting human rights, facilitating technology transfer, providing financial support for agricultural initiatives, and ensuring equal access to the agricultural sector for women. These recommendations aim to reduce restrictions on food access, protect local products, and promote cultural heritage and traditional knowledge. Future research should focus on protecting Afghanistan's traditional agricultural knowledge and innovations through intellectual property rights and strengthening the legal framework in this area.

6.0 REFERENCE

1. Adamo, N., Al-Ansari, N., Sissakian, V., Laue, J. and Al Khanfar, S. (2023). Virtual Water Trade and Food Security for Iraq. *Engineering*, **15**, 417-430. DOI: 10.4236/eng.2023.157032.
2. Akhtar, I. (2024). The Significance of International Cooperation on Climate Change Mitigation in Afghanistan. *NUIJB*, *3*(02), 456–459. Retrieved from https://nuijb.nu.edu.af/index.php/nuijb/article/view/263
3. Al-Mawali, N. (2014). Intellectual Property Rights and Bilateral Intra-Industry Trade Flows: An Intuitive Framework. *Theoretical Economics Letters*, **4**, 716-726. DOI: 10.4236/tel.2014.48091.
4. Chowdhury, M. (2018). Enforcement of Intellectual Property Rights in Bangladesh: To What Extent Is It TRIPS-Responsive? *Beijing Law Review*, **9**, 425-438. DOI: 10.4236/blr.2018.93026.
5. Donkor, L., & Daliri, E. B. (2024). The Role of Nanotechnology in Agriculture and Food Security. In *Advanced technologies and societal change* (pp. 149–190). https://doi.org/10.1007/978-981-97-6184-5_4
6. Dosi, G., & Stiglitz, J. E. (2014). The role of intellectual property rights in the development process, with some lessons from developed countries: an introduction. *Intellectual property rights: Legal and economic challenges for development*, *1*, 1-55.
7. Fan, J. P., Gillan, S. L., & Yu, X. (2013). Innovation or imitation?: The role of intellectual property rights protections. *Journal of Multinational Financial Management*, *23*(3), 208-234.

8. Fitzgerald, Brian F., Shi, Sampsung Xiaoxiang, Foong, Cheryl, & Pappalardo, Kylie M. (2011), "Country of Origin and Internet Publication: Applying the Berne Convention in the Digital Age". *Journal of Intellectual Property* (NJIP) Maiden Edition, pp. 38–73.
9. Haugen, H. M., Muller, M. R., & Narasimhan, S. M. (2010). Food security and intellectual property rights: Finding the linkages. In T. Wong & G. Dutfield (Eds.), *Intellectual Property and Human Development: Current Trends and Future Scenarios* (pp. 103–138). Chapter, Cambridge: Cambridge University Press.
10. Hou, B., Zhang, Y., Hong, J., Shi, X., & Yang, Y. (2023). New knowledge and regional entrepreneurship: the role of intellectual property protection in China. *Knowledge Management Research & Practice*, *21*(3), 471-485.
11. Khurshid, A., Rauf, A., Calin, A. C., Qayyum, S., Mian, A. H., Qayyum, S., & Fatima, T. (2022). Technological innovations for environmental protection: role of intellectual property rights in the carbon mitigation efforts. Evidence from western and southern Europe. *International Journal of Environmental Science and Technology*, *19*(5), 3919-3934.
12. Kiprutto, N., Rotich, L. and Riungu, G. (2015) Agriculture, Climate Change and Food Security. *Open Access Library Journal*, **2**, 1-7. DOI: 10.4236/oalib.1101472.
13. Kokabisaghi, F. (2018). Assessment of the effects of economic sanctions on Iranians' right to health by using human rights impact assessment tool: a systematic review. *International journal of health policy and management*, *7*(5), 374.
14. Lee, P. (2019). Reconceptualizing the role of intellectual property rights in shaping industry structure. *Vand. L. Rev.*, *72*, 1197.
15. Ma, X. (2022). The Tripartite Evolutionary Game of Intellectual Property Protection with Government Participation. *Open Journal of Business and Management*, **10**, 2790-2804. DOI: 10.4236/ojbm.2022.105138.
16. Martin-Shields, C. P., & Stojetz, W. (2018). Food security and conflict: Empirical challenges and future opportunities for research and policy making on food security and conflict. *World Development*, *119*, 150–164. https://doi.org/10.1016/j.worlddev.2018.07.011
17. Owasa, H. and Fall, A. (2024) Food Security in Developing Countries: Factors and Mitigation. *American Journal of Climate Change*, **13**, 391-405. DOI: 10.4236/ajcc.2024.133018.
18. Ren, D., Song, W. and Ge, Z. (2017). The Study of Agricultural Intellectual Property and Intelligent Agriculture Development Strategies in China. *Journal of Service Science and Management*, **10**, 230-250. DOI: 10.4236/jssm.2017.103020.
19. Sani, S. and Kemaw, B. (2019) Analysis of Rural Households Food Security in Western Ethiopia. *Food and Nutrition Sciences*, **10**, 249-265. DOI: 10.4236/fns.2019.103019.

20. Selvakumar, M. (2022) Overlap of Trademarks with Other Intellectual Property Rights: The Strategies of Global Brands. *Beijing Law Review*, **13**, 429-448. DOI: 10.4236/blr.2022.132027.
21. Shehata, G. and Eldali, N. (2022) Some Economic Aspects of Fish Food Security in Egypt. *Open Journal of Social Sciences*, **10**, 351-366. doi: 10.4236/jss.2022.105023.
22. Shepherd, B. (2012). Thinking critically about food security. *Security Dialogue*, *43*(3), 195-212.
23. Singh, S., Chaubey, A. K., & Kumar, T. (2024). Sustainable Agriculture and Food Security in India. In *Advances in geographical and environmental sciences* (pp. 199–209). https://doi.org/10.1007/978-981-97-6706-9_10
24. Sugeng, S., Aidy, W. R., & Cardenas, A., Jr. (2024). Intellectual property rights in agriculture: plant variety protection and food security. *Audito Comparative Law Journal (ACLJ)*, *5*(2), 66–91. https://doi.org/10.22219/aclj.v5i2.33097
25. Temory, M. (2024) Impact of COVID-19 on Food Security and Household Income in Herat Afghanistan. *Open Journal of Social Sciences*, **12**, 148-166. DOI: 10.4236/jss.2024.127011.
26. Weiler, A. M., Hergesheimer, C., Brisbois, B., Wittman, H., Yassi, A., & Spiegel, J. M. (2014). Food sovereignty, food security and health equity: a meta-narrative mapping exercise. *Health Policy and Planning*, *30*(8), 1078–1092. https://doi.org/10.1093/heapol/czu109
27. Weston, B. H. (2024). Human rights. Encyclopedia Britannica. https://www.britannica.com/topic/human-rights
28. Yolchi, J., Wang, H., & Pede, V. (2024). Impact of Floods on Food Security in Rural Afghanistan. *International Journal of Disaster Risk Reduction*, *112*, 104 -746. https://doi.org/10.1016/j.ijdrr.2024.104746
29. Zou, J. and Guo, S. (2015) China's Food Security Evaluation Based on Factor Analysis. *American Journal of Industrial and Business Management*, **5**, 447-456. DOI: 10.4236/ajibm.2015.56044.