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**The future of Plant Variety Protection: Legal and Policy
Recommendations**

Educational program 7M04210 – “Intellectual property and business law”

Thesis for the academic degree of Master of Law

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Introduction

A rapidly growing population is already threatening food security. Thus, protecting breeding achievements is a pressing and necessary task. Breeding and bioengineering play a key role in combating the consequences of global warming, including the spread of tropical diseases and pests to temperate zones. Kazakhstan is geographically situated in a region that is particularly vulnerable to the impacts of climate change, making it crucial to implement effective legal frameworks for the patenting of breeding achievements in order to address ongoing sustainability challenges. Research of plant patenting includes a multidisciplinary approach, as it is not only a legal issue but also an environmental, social and economic concern. The main aim of my study is to analyse current legislation on plant variety protection in Kazakhstan and search for amendments to improve the conditions of farmers and the economy by boosting the creation of innovations. The research addresses the central question: *What are the benefits and challenges of implementing plant patenting in Kazakhstan, and how can the legal system be adapted to balance innovation with society and the environment?*

The following key tasks were posed to explore this issue:

- Study the current regulatory framework in Kazakhstan
- Collect, compile, and perform analysis of scientific literature
- Examine the risks and benefits of joining UPOV
- Analyse alternative solutions for the protection of new plant varieties
- Conduct a comparative analysis of other jurisdictions regarding the protection of breeding achievements
- Investigate the environmental concerns of patenting plants
- Research gaps, find alternatives and improvements for national legislation

This study is particularly significant for Kazakhstan because improving legislation on breeding patenting could develop agriculture and improve the economic and legal status of farmers. In this research, plant patents will be investigated. The scarcity of articles in the post-Soviet region highlights the necessity to investigate this topic in the regional and national context. Its findings can guide decision-making based on sustainable development, which could influence policymakers and stakeholders. The scientific novelty of this study lies in the comprehensive analysis of Kazakhstan's plant variety protection system in light of international standards, combined with original empirical research on the structure and functionality of national patent registers. The study employed

a cross-disciplinary framework, integrating methods of doctrinal legal analysis, comparative legal research, and empirical data review.

Building upon the outlined research objectives and significance, this literature review explores various aspects of animal and plant patenting, drawing from international treaties, case law, scholarly articles, and books. The aim is to synthesise existing knowledge and establish a solid foundation for further research within the context of Kazakhstan's legal framework. The inclusion of both animal and plant patenting in the review is justified by the inherent interrelation between these domains, as the legal, ethical, and technical considerations surrounding the patenting of living organisms often overlap. Initially, this dissertation was intended to address both areas in full; however, due to limitations in scope and volume, the primary focus was narrowed to plant patenting, while still acknowledging the broader context in which these issues coexist.

International agreements provide the foundation for national legislation and also create the space for international communication on a legal basis. The Paris Convention for the Protection of Industrial Property established principles like national treatment and priority rights, allowing patent applications worldwide. However, it leaves the specifics of what constitutes patentable subject matter to national discretion¹. Later treaties, such as the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), provided clearer directives on biotechnology, requiring member states to protect microorganisms and plant varieties while allowing flexibility in excluding animals from patentability². The International Union for the Protection of New Varieties of Plants (UPOV Convention) focuses specifically on plant variety protection, offering a *sui generis* system distinct from traditional patents³. Critics argue that UPOV's provisions often favour multinational corporations over small-scale farmers and indigenous communities, a concern that is particularly relevant in countries with significant agricultural economies, such as Kazakhstan.

The ethical considerations surrounding the patenting of living organisms have been a consistent focus in scholarly discussions. Dresser⁴ highlights the moral

¹ Paris Convention for the Protection of Industrial Property (adopted 20 March 1883, as amended 28 September 1979) 828 UNTS 305, arts 2, 4.

² Agreement on Trade-Related Aspects of Intellectual Property Rights (adopted 15 April 1994, entered into force 1 January 1995) Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 UNTS 299 (TRIPS Agreement), arts 27.3(b), 28.

³ International Union for the Protection of New Varieties of Plants (UPOV), International Convention for the Protection of New Varieties of Plants (Act of 1991) (adopted 19 March 1991, entered into force 24 April 1998).

⁴ R Dresser, 'Ethical and Legal Issues in Patenting New Animal Life' (1988) 28 Jurimetrics 399.

dilemmas of commercialising genetically modified animals, arguing that such practices commodify life in ways that may conflict with societal values. Similarly, Kevles⁵ examines the controversies surrounding the Harvard Oncomouse, the first patented animal, illustrating the tension between innovation and ethical accountability. From a plant perspective, Kowalski⁶ critiques the role of intellectual property in agricultural biotechnology, particularly in countries like China. He emphasises the risk of monopolisation and the marginalisation of traditional knowledge systems, which often lack formal legal recognition but are crucial for biodiversity conservation. Cases such as *Diamond v. Chakrabarty*⁷ and *Ex Parte Allen*⁸ established that genetically modified organisms could be patented under U.S. law, creating a ripple effect in global intellectual property regimes. However, the European Patent Office (EPO) has taken a more restrictive approach, as seen in the *Broccoli II*⁹, *Tomato II*¹⁰ cases and the *Pepper Patent Case*¹¹, which excluded plants and animals obtained through essentially biological processes from patentability. These conflicting interpretations highlight the legal ambiguities surrounding biotechnology patents. Several studies underscore the positive correlation between patent protection and innovation. Moscona¹² documents how the introduction of patents for plant biotechnology in the United States led to increased private-sector investment and the development of novel crop varieties. Similar findings are mentioned in Woessner¹³, who explores the evolution of patents on transgenic animals, clones, and stem cells, noting their transformative impact on biotechnology industries. Donnerwirth¹⁴ et al. emphasised that robust intellectual property regimes are essential for attracting private investment, which is crucial for modernising agriculture in countries with transitional economies. While patents incentivise innovation, they also create risks of monopolisation and increased costs for farmers. Lesser¹⁵ highlights how patent holders can dominate markets, restricting access to essential technologies. This is particularly problematic for

⁵ DJ Kevles, 'The Advent of Animal Patents: Innovation and Controversy in the Engineering and Ownership of Life' in IPRs - Chap 02 (CABI Digital Library, 2002) 17.

⁶ SP Kowalski, 'Agricultural Biotechnology in China: An Unreachable Goal?' (2003) 6 The Journal of World Intellectual Property 655.

⁷ *Diamond v. Chakrabarty* 447 U.S. 303 (1980).

⁸ *Ex Parte Allen* 2 U.S.P.Q.2d 1425 (PTO Bd. App. & Interf. 1987).

⁹ *Broccoli II* G2/12 (EPO Enlarged Board of Appeal, 2015).

¹⁰ *Tomato II* G2/13 (EPO Enlarged Board of Appeal, 2015).

¹¹ *Pepper Patent Case* G3/19 (EPO Enlarged Board of Appeal, 2020).

¹² J Moscona, 'Flowers of Invention: Patent Protection and Productivity Growth in US Agriculture' (2022) unpublished manuscript, Harvard University

¹³ WD Woessner, 'The Evolution of Patents on Life – Transgenic Animals, Clones and Stem Cells' (2001) 83 Journal of the Patent and Trademark Office Society 830.

¹⁴ J Donnerwirth, J Grace, and S Smith, 'Intellectual Property Rights, Patents, Plant Variety Protection and Contracts: A Perspective from the Private Sector' (2004) 9 IP Strategy Today 19.

¹⁵ WH Lesser, *Animal Patents: The Legal, Economic, and Social Issues* (Macmillan 1989).

smallholder farmers, who may struggle to afford patented seeds or animals. The *Monsanto v. Bowman* case¹⁶ illustrates how patent exhaustion principles can disadvantage farmers, who are legally prohibited from saving seeds derived from patented crops.

In conclusion, the reviewed literature reveals a complex and often contested landscape surrounding the patenting of living organisms, with intersecting legal, ethical, and economic implications. The comparative examination of international treaties, case law, and scholarly critiques demonstrates that while patent systems can serve as powerful tools to stimulate biotechnological innovation, they also risk reinforcing asymmetries between corporate interests and individuals. The review further establishes that the legal treatment of animal and plant patenting is conceptually intertwined, though divergent in practice, particularly regarding *sui generis* protections for plant varieties under frameworks like UPOV¹⁷.

¹⁶ *Monsanto Co. v. Bowman* 569 U.S. 278 (2013).

¹⁷ International Union for the Protection of New Varieties of Plants (UPOV), International Convention for the Protection of New Varieties of Plants (Act of 1991) (adopted 19 March 1991, entered into force 24 April 1998).

Chapter 1. Legal Framework for Plant Patenting in Kazakhstan

1.1 Plant Variety Protection in Kazakhstan

Intellectual property objects are traditionally governed primarily by private law norms, but plant breeding achievements represent a special category of intellectual property. This uniqueness arises from the significant importance of breeding achievements for national food security, agricultural sustainability, and overall economic stability.

Breeding achievements are the result of creative scientific activity aimed at developing a new plant variety or animal breed that meets legally established protectability requirements. In other words, they represent a distinct category of intellectual property, different from traditional inventions: while technical solutions in biology (e.g., microorganism strains) can be protected by invention patents, new plant varieties and animal breeds are protected by patents for breeding achievements. To receive legal protection, a breeding achievement must be new, distinct, uniform, and stable. These criteria are established both in national legislation and international legal instruments¹⁸. This special form of protection reflects the high value of breeding achievements to society, as they lie at the intersection of agriculture, science, and law, playing a key role in food security and economic development, thus requiring a careful balance between private and public interests.

One of the global challenges humanity faces amid population growth is ensuring food security, namely, stable and sufficient food production. Breeding achievements make a critical contribution to this. Over recent decades, the development of high-yield cereal crops has enabled a sharp increase in food production. Thanks to plant breeding and accompanying agrotechnical advances during the “Green Revolution,” global cereal yields increased by about 44% between 1965 and 2010¹⁹, and production in developing countries more than doubled. Global grain production from 1950 to 1984 rose by 160%, helping to prevent widespread hunger and

¹⁸ Law of the Republic of Kazakhstan on the Protection of Breeding Achievements 2015 (No. 423-V ZRK), art 4; International Union for the Protection of New Varieties of Plants (UPOV Convention) (adopted 2 December 1961, as revised 1991) 815 UNTS 89.

¹⁹ P L Pingali, ‘Green Revolution: Impacts, Limits, and the Path Ahead’ (2012) 109(31) Proceedings of the National Academy of Sciences 12302 <https://doi.org/10.1073/pnas.0912953109>

feed billions.²⁰ These historical facts demonstrate the enormous importance of new varieties in meeting global food demand.

Equally important is the role of breeding achievements in crop resilience. New plant varieties are developed to withstand biotic and abiotic stressors, ranging from pests and diseases to drought, heat, and other climate-related impacts. Modern breeding programs, including those using molecular biology techniques, produce varieties that require fewer resources and can thrive under adverse environmental conditions. Studies show that improved varieties can yield consistently high harvests even in fluctuating climates while using water, nutrients, and soil more efficiently. Breeders also focus on creating varieties resistant to new strains of pathogens and pests, preventing catastrophic crop losses during outbreaks. This directly affects food security: genetically fortified, productive varieties ensure stable food production year after year, reducing the risk of grain shortages and other essential food crises.

Breeding achievements have a multifaceted positive impact on the agricultural sector and the economy as a whole. First, new high-yield varieties and breeds increase returns per unit of land and resources, thus boosting total agricultural production. Higher yields directly enhance the income of farmers and the efficiency of agricultural enterprises. Furthermore, plant breeding improves product quality (nutritional, feed, and technological properties), increasing its market value and encouraging the development of the processing industry.

The development of breeding achievements drives growth in the agri-industrial sector. Creating a new variety often results in the formation of an entire infrastructure: seed multiplication and distribution systems, agronomic support, marketing, and sales. A dynamic seed industry develops, attracting investment and generating jobs. Globally, the seed market is worth tens of billions of dollars and is characterised by a high concentration of scientific knowledge and capital, highlighting the economic significance of breeding. Active domestic breeding efforts reduce dependence on imported seeds and technologies, strengthening food sovereignty. Thus, advancing local breeding programs helps Kazakhstan avoid reliance on imported seeds and seedlings, contributing to sustainable agricultural development and reducing external risks (e.g., sanctions or price fluctuations). Countries that invest in plant breeding tend to achieve higher agricultural productivity, fully meet their food needs,

²⁰ FAO, 'The State of Food and Agriculture 2021' (FAO 2021) <https://www.fao.org> accessed 15 April 2025; World Bank, 'Agriculture and Food Security' <https://www.worldbank.org/en/topic/agriculture/overview> accessed 15 April 2025.

and increase their agricultural export potential. In this way, breeding achievements become a factor in national competitiveness.

Recognising the critical importance of breeding for society, governments have developed special legal mechanisms for protecting new plant varieties and animal breeds. At the international level, a foundational framework for plant variety protection is established by the TRIPS Agreement, specifically Article 27.3(b), which requires WTO member states to provide protection for plant varieties either through patents or through an effective *sui generis* system.²¹ This provision has significantly influenced national legislation, encouraging alignment with common standards. One such influential instrument is the International Convention for the Protection of New Varieties of Plants (UPOV), an organisation founded in 1961 and revised multiple times to enhance the rights of breeders.²² Today, UPOV includes over 70 member countries, encompassing most of the world's leading agricultural producers. The interaction between TRIPS and UPOV has shaped the global landscape of intellectual property in agriculture, often prompting legal reforms in developing countries.

At the same time, legislation provides mechanisms to balance breeder rights with public interests. Unlike invention patents, where monopoly rights are often stricter, breeding protection includes exceptions intended not to hinder scientific progress or harm legitimate agricultural needs. First, there is the “breeder’s exemption”, which allows the use of protected varieties in further breeding without the patent holder’s consent, which stimulates creative research and genetic exchange.²³ Second, use for personal, non-commercial purposes (e.g., in home gardens or for personal consumption) does not infringe on breeder rights.²⁴ Third, many countries allow farmers to reuse harvested seeds of protected varieties on their own farms. For example, India’s Protection of Plant Varieties and Farmers’ Rights Act, 2001 explicitly permits farmers to save, use, sow, resow, exchange, share, or sell their farm produce, including seeds of protected varieties, provided they do not sell branded seeds.²⁵ Similarly, Canada’s Plant Breeders’ Rights Act allows farmers to save and reuse seeds of protected varieties for planting on their own holdings.²⁶ These provisions ease the burden on farmers facing poor harvests or those unable to

²¹ TRIPS Agreement (adopted 15 April 1994, entered into force 1 January 1995), Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 UNTS 299, art 27.3(b).

²² UPOV Convention (adopted 2 December 1961, revised 1972, 1978 and 1991) 815 UNTS 89.

²³ UPOV Convention (1991 Act), art 15(1)(iii).

²⁴ *ibid* art 15(1)(i).

²⁵ Protection of Plant Varieties and Farmers’ Rights Act 2001 (India), s 39(1)(iv).

²⁶ Plant Breeders’ Rights Act, SC 1990, c 20 (Canada), s 5.

purchase seeds annually, balancing the interests of breeding companies with food security.

This balance of interests is also evident at the international level. Early UPOV acts allowed farmers to freely store seeds for replanting, but the 1991 Act significantly restricted this right, leaving it to national discretion. This sparked debate: on one hand, stronger breeder rights improve the profitability of private breeding programs; on the other, restrictions affect traditional farming systems that rely on seed saving and sharing. Critics argue that UPOV 1991 primarily benefits large corporate breeders and may marginalise small farmers and developing countries. Stronger protection standards often lead to seed market commercialisation, displacing small producers and public breeding centres.

In response, international efforts have emerged to preserve farmer rights and support non-commercial breeding (e.g., through access and benefit-sharing agreements like the International Treaty on Plant Genetic Resources for Food and Agriculture by the FAO). In this way, regulation seeks a “golden mean” between incentivising innovation through exclusive rights and maintaining open access for public benefit.²⁷

Public awareness may also be established by evidence of cultivation, use, or publication. The characteristics defining the descriptive and distinctive features of a variety or breed must be reproducible and accurately describable.

To obtain a patent for a breeding achievement, two main examination stages must be passed:

1. Formal Examination
2. Patentability Examination

During the preliminary examination, the application's priority date is determined, and the presence and compliance of required documents are checked. This stage is carried out by the National Institute of Intellectual Property (Qazpatent) under the Committee for Intellectual Property Rights of the Ministry of Justice of Kazakhstan.

If all requirements are met, a patent for a breeding achievement is granted, providing exclusive rights. The duration of a plant variety patent in Kazakhstan is 25 years from the date of application. However, for grape

²⁷ International Treaty on Plant Genetic Resources for Food and Agriculture (adopted 3 November 2001, entered into force 29 June 2004) <https://www.fao.org/plant-treaty/en/>

varieties, ornamental trees, fruit and forest species, including their rootstocks, the protection period extends up to 35 years, starting from the date the application is submitted to the examination authority.²⁸

The practice of judicial enforcement and litigation concerning plant variety patents remains relatively underdeveloped in Kazakhstan. To date, there have been very few judicial cases specifically related to the protection of plant varieties. The existing cases primarily revolve around three main legal issues: authorship disputes, ownership conflicts, and the regulation of licensing and rights transfers.

First, authorship disputes frequently arise between individual breeders and the institutions in which they work.²⁹ These conflicts often pertain to the determination of whether the intellectual contribution to the development of a breeding achievement is attributable to an individual researcher or the legal entity that provided funding and infrastructure. Such cases are particularly prevalent in scenarios of animal patenting involving state-funded research, where institutions may claim ownership of the results, leading to ownership conflicts over the resultant plant variety. Second, ownership conflicts often pertain to the question of entitlement, especially in situations where research was carried out using public funds. According to Kazakhstan's legislation, outputs from publicly funded research typically belong to the state or the institution, unless otherwise agreed.³⁰ This legal position, while grounded in statutory provisions, raises concerns about incentives for individual breeders, particularly in academic or governmental research institutions. Third, issues around licensing and the transfer of exclusive rights occasionally reach the courts, although these too remain few. These disputes usually concern ambiguities in licensing contracts or non-compliance with licensing terms, yet rarely address the substantive validity of the plant patent itself or allegations of infringement. Importantly, there is a noticeable absence of landmark judicial decisions concerning patent infringement or the cancellation of plant variety patents. This absence may be attributed to several factors: a generally low level of commercialisation of plant varieties, limited competition in the domestic seed market, and a lack of awareness or access to enforcement mechanisms among breeders and rightsholders. The scarcity of enforcement proceedings

²⁸ Article 5 of the Law on the Protection of Breeding Achievements

²⁹ Nurushev Murat Zhussypbekovich v Association of Legal Entities "Aday Horse Breed" and Kazakh Research Institute of Livestock and Feed Production (Astana Inter-District Civil Court, Case No. 7142-24-00-2/13627, 31 July 2024).

³⁰ Law of the Republic of Kazakhstan on Science and Technological Policy No 103-VIII ZRK (1 July 2024), art 40

further indicates either a general underutilisation of legal remedies or insufficient incentives to initiate judicial protection of rights.

Nevertheless, the legislative framework in Kazakhstan does provide mechanisms for addressing potential disputes or misuse of rights. For instance, the Law on the Protection of Breeding Achievements stipulates the possibility of patent cancellation if the plant variety in question no longer complies with the requirements of distinctness, uniformity, and stability (DUS), or if the breeder fails to fulfil maintenance obligations for the variety.³¹ Distinctness means the variety is distinguishable by one or more important characteristics from any other known variety at the time of application. Uniformity means the variety is sufficiently consistent in those characteristics (subject to the variation inherent to its propagation). Stability means the variety remains true to its description after repeated propagation.³²

Furthermore, voluntary termination of the patent is permissible upon the request of the patent holder, as provided under Article 30 of the Law on Patents.³³ This may occur, for example, when the breeder or institution no longer wishes to maintain the legal protection or when the variety is no longer commercially viable.

In addition to voluntary licensing, Kazakhstani law also provides for the issuance of compulsory licenses. This mechanism may be triggered in cases where the public interest necessitates wider access to the protected variety, such as in situations of food insecurity or agricultural emergencies. Compulsory licensing aims to balance private intellectual property rights with broader societal needs, yet remains underutilised in practice due to the absence of implementing regulations and a lack of precedent.

Despite the presence of these legal tools, Kazakhstan's current judicial framework related to plant variety protection exhibits significant institutional and procedural shortcomings. There is an urgent need for:

- The development of transparent judicial and administrative procedures concerning plant IP rights;
- The establishment of a publicly accessible database of granted and expired plant variety patents to ensure transparency and facilitate due diligence.

³¹ Law of the Republic of Kazakhstan 'On the Protection of Breeding Achievements' No 422-I (13 July 1999).

³² Ibid.

³³ Law of the Republic of Kazakhstan 'On Patents' No 427-I (16 July 1999), art 30.

- Targeted capacity-building programmes for judges, lawyers, and IP specialists to raise awareness of the specificities of intellectual property rights in the agricultural and biotechnological domains.

Addressing these issues is vital not only for the effective enforcement of breeders' rights but also for fostering innovation and investment in Kazakhstan's agricultural sector..

1.2 Genetic Resources, Traditional Knowledge or Patents

Plant varieties represent a special category of intellectual property (IP) objects. While most IP is governed primarily by private law, plant varieties lie at the intersection of private and public interests due to their strategic importance to both society and the state. Therefore, the state must actively regulate them through a special legal protection regime. This includes patent protection provided for in international agreements (such as the UPOV Convention), as well as national legislative mechanisms. As a result, plant varieties are at the centre of a balancing act between the rights of private companies that drive innovation and the public interest in ensuring access to and distribution of new varieties and breeds for sustainable agriculture and food security.

In addition to patent or UPOV-based protection systems, plants can also be protected through public law mechanisms, particularly via the protection of traditional knowledge and genetic resources. Specifically, all genetic resources (excluding humans) and related traditional knowledge, innovations, and practices are regulated by the Convention on Biological Diversity (CBD).³⁴ According to the CBD and the Bonn Guidelines³⁵ developed under it, the use of biological diversity and the benefits arising from commercial and other utilisation of such resources are regulated.

While protection of plants through mechanisms tied to traditional knowledge and genetic resources may be limited in terms of commercial effectiveness, it plays a vital role in preventing biopiracy and the unauthorised exploitation of genetic resources. The CBD and Bonn Guidelines place obligations on states to ensure transparency and fairness in access to genetic resources and related traditional knowledge, and to promote equitable benefit-sharing arising from their use.³⁶ This

³⁴ Convention on Biological Diversity (CBD) (adopted 5 June 1992, entered into force 29 December 1993) <https://www.cbd.int/convention/>

³⁵ Secretariat of the Convention on Biological Diversity, Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization (CBD 2002) <https://www.cbd.int/doc/publications/cbd-bonn-gdls-en.pdf>

³⁶ Ibid.

framework not only safeguards the rights of Indigenous peoples and local communities who are the custodians of traditional knowledge but also supports biodiversity conservation and discourages unauthorised appropriation and exploitation of resources (“biopiracy”).

However, the effectiveness of this protection greatly depends on the national legislation and the commitment of states to fulfil their obligations under international frameworks. Despite the presence of international legal instruments, protection based on traditional knowledge and genetic resources remains limited due to the voluntary nature of the Bonn Guidelines and the lack of strict enforcement mechanisms under the CBD³⁷. In contrast, the Nagoya Protocol, which was adopted later, introduces more stringent obligations and enforcement mechanisms to enhance international protection of genetic resources and associated traditional knowledge.³⁸ Yet, its effectiveness depends on how thoroughly states implement its provisions and adhere to their commitments.

The CBD was ratified in 1994. In Kazakhstan, the implementation of the Nagoya Protocol was formalised by a 2023 Government Resolution, titled “On the Implementation of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilisation to the Convention on Biological Diversity.”³⁹

Nevertheless, an analysis of recent studies shows that Kazakhstan faces significant challenges in meeting its obligations under the CBD. A key issue is the absence of a unified long-term strategic document to coordinate cross-sectoral efforts in biodiversity conservation and sustainable use. The existence of multiple, uncoordinated programs and strategies weakens the effectiveness of national biodiversity policy. Another major challenge is the insufficient integration of ecosystem service valuation and natural capital into the national economy. For instance, Aichi Target 2, which aims to integrate the value of ecosystems and biodiversity into national accounting systems (like GDP), remains

³⁷ Ibid.

³⁸ Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (adopted 29 October 2010, entered into force 12 October 2014) <https://www.cbd.int/abs/>

³⁹ Government of the Republic of Kazakhstan, Resolution No 222 ‘On the Implementation of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization to the Convention on Biological Diversity’ (7 April 2023) <https://adilet.zan.kz/rus/docs/P2300000222>

under-implemented, impeding rational resource management and informed economic decision-making.⁴⁰

Kazakhstan also suffers from limited technical capacity and funding, which negatively impacts the quality and scope of biodiversity monitoring. This is compounded by a shortage of qualified specialists, especially biologists and ecologists capable of conducting effective monitoring and implementing conservation activities. As a result, biodiversity monitoring on protected areas is conducted irregularly and covers only select regions, making it unrepresentative and insufficient for capturing the full state of ecosystems.

To improve compliance with the CBD, Kazakhstan needs to:

- Develop a comprehensive, long-term strategy.
- Increase financial support for environmental initiatives.
- Build human capacity and technical infrastructure to ensure effective biodiversity monitoring and management.

The methods of protecting new plant varieties via traditional knowledge and genetic resource frameworks and through patent systems differ significantly. Patent systems involve clearly defined property rights, offering strong commercialization potential and encouraging innovation. This is especially important in a market-driven economy like Kazakhstan, where patents allow for monetization of new varieties and attraction of investment in breeding projects. Protection via genetic resources and traditional knowledge, on the other hand, is more oriented toward state regulation and public oversight. This requires additional compliance mechanisms and enforcement, making commercialization more complex and less flexible than under a patent model.

Therefore, under Kazakhstan's current legal and economic context, the patent model appears more effective and preferable for promoting innovation and integrating new plant varieties into the market. Protection based on genetic resources and traditional knowledge, while important for biodiversity conservation and equitable benefit-sharing, requires more detailed state regulation and enforcement to be fully effective.

⁴⁰ National Center for Biotechnology, 'Convention on Biological Diversity – 30 Years in Kazakhstan' (2024) 1 Ecology and Industry of Kazakhstan 6–11 <https://kap.kz/informatsiya-o-dgurnale>

1.3 Challenges, Gaps in the Current legislation in plant patenting

Unlike invention patents, plant breeding achievements are subject to their patentability criteria, which are distinctness, uniformity, and stability (DUS criteria). However, one criterion coincides with that of invention patents: novelty. During professional practice, the question arose: Which state authority is responsible for patent searches and determining novelty?

To clarify this issue, the following regulatory legal acts were examined: the Law on the Protection of Breeding Achievements⁴¹, the Rules for Registration of Breeding Achievements in the State Register of Breeding Achievements and Issuance of Protection Documents and Their Duplicates, Annulment and Early Termination of Patents⁴², the Rules for the Preliminary Examination of Applications for Breeding Achievements⁴³, the Rules for Variety Testing of Agricultural Plants⁴⁴. The responsibility for registering applications and granting patents for breeding achievements lies with the “National Institute of Intellectual Property” (QazPatent). QazPatent conducts the formal examination and forwards a request to the Republican State Institution “State Commission for Variety Testing of Agricultural Crops” under the Ministry of Agriculture of the Republic of Kazakhstan (hereinafter, the State Commission), for both verification of the variety name and substantive examination.

It is important to note that filing a patent application does not guarantee the grant of a patent. From the Rules on Preliminary Examination of Applications for Breeding Achievements, for which QazPatent is responsible, there is no information concerning novelty assessment or patent search of the variety. This implies that the National Institute of Intellectual Property’s role is limited to verifying the formal correctness of the application. Consequently, all four patentability criteria must be assessed by the State Commission. However, the methodology and rules only detail the examination of three DUS criteria. Although novelty is formally mentioned in regulatory acts, there is no established methodology

⁴¹ Law of the Republic of Kazakhstan “On the Protection of Breeding Achievements” No 422-І (13 July 1999).”

⁴² Order of the Minister of Justice of the Republic of Kazakhstan № 1343. ‘On Approval of the Rules for Registration of Breeding Achievements in the State Register of Breeding Achievements and Issuance of Protection Documents and Their Duplicates, Annulment and Early Termination of Patents’ (29 August 2018).

⁴³ Order of the Minister of Justice of the Republic of Kazakhstan № 730 ‘On Approval of the Rules for the Preliminary Examination of Applications for Breeding Achievements’ (29 August 2018).

⁴⁴ Order of the Minister of Agriculture of the Republic of Kazakhstan № 4-2/602 ‘On Approval of the Rules for Variety Testing of Agricultural Plants’ (13 August 2015).

for its assessment, which constitutes a regulatory omission. This hypothesis is supported by practice: neither of the aforementioned institutions conducts patent searches on plant varieties. Within the activities of the State Commission, variety verification is limited to checking the State Register of Breeding Achievements Recommended for Use in the Republic of Kazakhstan and by sending a request to regional Agricultural Departments to verify the existence of planting areas of the variety under examination.

Thus, unlike the DUS criteria, the issue of novelty examination is not regulated by any normative legal act. To resolve this issue, it is proposed to entrust the entire process of variety registration, examination, and the issuance of protection documents to the State Commission under the Ministry of Agriculture of the Republic of Kazakhstan, for several reasons, such as the specialisation of staff in agronomy, plant breeding, and botany; the lack of necessity for QazPatent's involvement, given its intermediary role in the variety registration process; the potential for direct state oversight of the use and commercialisation of new plant varieties by the Ministry of Agriculture.

A striking example of the lack of effective novelty examination in Kazakhstan's plant and animal variety protection system is the 2025 case concerning the Kazakh Tazy dog breed. In this case, the court annulled a previously granted patent because the breed did not meet the novelty requirement under Article 4 of the Law on the Protection of Breeding Achievements. The breed in question, the Kazakh Tazy, was found to be a well-documented, ancient national breed of Kazakhstan, widely known both domestically and internationally prior to the filing of the patent application.⁴⁵ Historical references to the Tazy date back to the 18th and 19th centuries, and the breed had already been subject to official standards, international recognition processes, and legal protection as a national heritage breed.⁴⁶

Despite this, the patent was granted in December 2024 based on a positive expert opinion issued by the Ministry of Agriculture. This case demonstrates a systemic flaw in the existing examination procedure, in which formal and technical compliance is verified, but no substantive patent search or novelty check is conducted. Although the example pertains to the patenting of an animal breed, the examination procedures for breeding achievements in Kazakhstan, whether concerning animals or

⁴⁵ Specialised Interdistrict Economic Court of Astana, Decision No 7119-25-00-2/2702 (19 March 2025), para 7–9.

⁴⁶ *ibid* paras 55–64.

plants, are structurally analogous, thereby highlighting systemic vulnerabilities across the broader framework of breeding achievement protection. As the court emphasised, the registration of the Tazy as a “new breeding achievement” not only violated legal requirements but also jeopardised the country’s cultural and genetic heritage. The incident underscores the urgent need for clear and enforceable methodologies for verifying novelty, particularly in relation to traditional knowledge and historically known varieties. Obtaining a patent is only the first step in developing a plant variety. For successful implementation, ensuring its commercial use and protection of intellectual property rights is essential.

During the internship, it became evident that there is a need to establish a system of monitoring and control over the exploitation of new plant varieties. It is important to note that harvest data is often underreported in order to hide actual income, which complicates the assessment of production scale. Moreover, there is a tendency to create new varieties merely for documentation purposes, after which the patent is deliberately not maintained.

According to available data from the State Register of Inventions, Utility Models, Industrial Designs, Trademarks, Geographical Indications, and Plant Varieties of the Republic of Kazakhstan, a diagram (Figure 1) was created. Out of 1,016 patents, only one-third (350) remain active. The majority have been terminated due to non-payment of fees. A small number of patents (8) were cancelled at the request of the owner, and 7 were terminated early upon the patent holder’s request. In the legislation of the Republic of Kazakhstan, two distinct terms are used in relation to the termination of a patent: cancellation of a patent and early termination of a patent at the request of the patent holder. As given in the State Register of Breeding Achievements of Plant Varieties⁴⁷ (Figure 2), the number of national applications consistently exceeds that of foreign applicants by a factor of two to three. This trend is likely attributable to the fact that the Republic of Kazakhstan is not a member of the International Union for the Protection of New Varieties of Plants, which may discourage foreign breeders from seeking protection in the country. Furthermore, statistical analysis shows that the average duration of the examination period is approximately 5.6 years, with both the mode and median values at 5 years (see Figure 3). Figure 3 illustrates the duration of protection for patents that were terminated early due to non-payment of annual fees. The graph reveals a significant concentration of terminations between the 4th and 6th years of protection, with peaks at the 4th (103 cases), 5th (112

⁴⁷ Republic of Kazakhstan, State Register of Breeding Achievements <https://gosreestr.kazpatent.kz/>

cases), and 6th (82 cases) years, suggesting a common threshold beyond which applicants are unwilling or unable to continue maintaining patent rights. This pattern reflects a broader trend of strategic patenting for non-commercial purposes, particularly for academic reporting or research output, without intent or capacity for long-term commercial exploitation. The sharp decline in maintained protection beyond the 7th year, and the rarity of patents reaching the maximum duration (up to 18 years), further supports the conclusion that financial or practical barriers often limit the lifecycle of plant variety patents in Kazakhstan. These findings support the hypothesis that the majority of plant variety patents are pursued primarily for grant reporting and academic output, rather than for commercialisation.

A patent is cancelled in the following cases:

1. Invalidation of the patent — if it is established that, at the time of issuance, the plant variety did not meet the criteria of novelty and distinctness, or if the person listed as the patent holder did not have legal grounds to obtain the patent.
2. Non-compliance of the variety or breed with the criteria of uniformity and stability: if, during use, it is revealed that the breeding achievement has lost the declared characteristics.
3. Failure to provide required information — if the patent holder, within 12 months, fails to provide the expert authority with the requested information, seeds, breeding material, or documents necessary to verify the stability of the variety or breed.
4. Cancellation of the name of the plant variety — if the name of the plant variety is annulled after the patent is granted, and the patent holder does not propose an alternative suitable name.⁴⁸

Early termination of a patent at the request of the patent holder is carried out when the patent holder voluntarily applies to terminate the patent. In this case, the patent is considered terminated from the date the application is submitted.⁴⁹

Thus, the key difference between these two concepts lies in the initiator and reasons for the termination of the patent: cancellation is initiated by authorised bodies or third parties due to certain violations or non-

⁴⁸ Article 22 of the Law of the Republic of Kazakhstan "On the Protection of Breeding Achievements."

⁴⁹ Article 30 of the Law of the Republic of Kazakhstan "On Patents"

compliance, whereas early termination is carried out at the voluntary request of the patent holder.

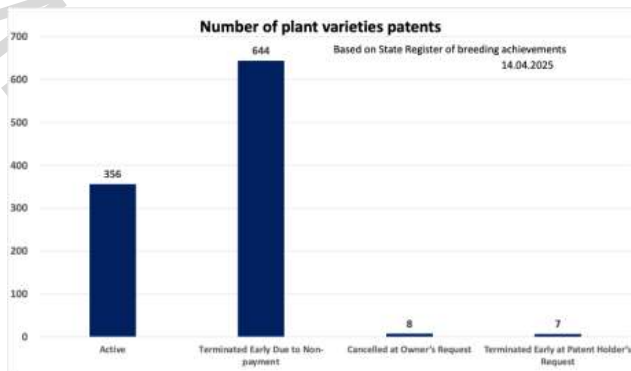


Figure 1. Number of patents on plant varieties

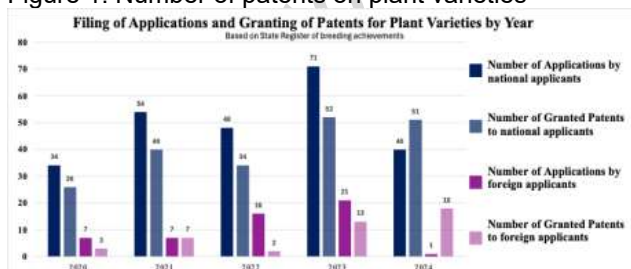


Figure 2. Patent applications and number of patents granted to national and foreign applicants

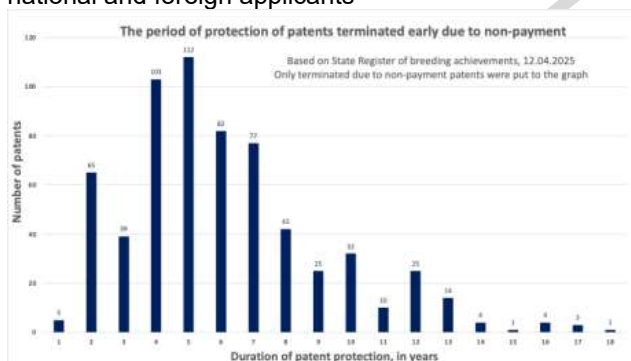


Figure 3. Duration of patents terminated due to non-payment

Furthermore, it is recommended to address the inefficiencies related to the management of official registers. Specifically, the possibility of consolidating the databases maintained by the Ministry of Agriculture and those related to breeding achievements should be considered, in order to create a unified, streamlined system. The current State Register of Breeding Achievements of Qazpatent is not user-friendly: the website undergoes nightly reservations and frequent daytime technical failures, significantly hindering access to essential information. In addition, the data provided by the State Register is difficult to analyse due to its fragmented and non-systematic structure. For this research, the data from the State Register had to be manually transferred into a separate analytical table to enable meaningful statistical evaluation.

A key task for both the government and private sector is the continued exploitation and commercialisation of patented plant varieties. Commercialisation can follow several key strategies:

- Licensing – granting usage rights to third parties. Licenses may be exclusive (one licensee) or non-exclusive (multiple users).
- Patent sale – transferring all rights to another entity, often a large agricultural company.
- In-house production – the patent holder independently grows and markets the variety.
- Joint ventures – partnering with agribusiness companies to expand into new markets.
- Government support – public subsidies and grants to encourage commercialisation.

A critical challenge is the lack of systematic oversight regarding the use of patents in commercial practice. In Kazakhstan, protection certificates are often used merely as formal research outputs, with no follow-up commercialisation. In several countries, there are mechanisms to support the commercialisation of plant varieties. The European Union offers grant programs to encourage the market introduction of new varieties.⁵⁰ In the United States, the Plant Variety Protection Act (PVPA) provides extended legal protection for developers, including mechanisms to prevent unauthorised reproduction.⁵¹ In the Republic of Belarus, the commercialisation of scientific research and development projects financed by public funds is strictly regulated to ensure the effective use of state resources. This process is governed by Presidential Decree No. 59

⁵⁰ European Commission, 'Agricultural and Rural Development: EU Plant Variety Development Grants' <https://agriculture.ec.europa.eu>.

⁵¹ Plant Variety Protection Act 1970 (United States), 7 USC §§ 2321–2583.

of February 4, 2013, which establishes mandatory commercialisation requirements for all scientific, technical, and innovative results created wholly or partially at the expense of the state.⁵² Exceptions are made only for fundamental research if explicitly stated in relevant state programs. In cases where commercialisation is not achieved within the established timeframe, the financial resources used are deemed to be misused and are subject to recovery under budgetary legislation.⁵³ Furthermore, the regulation specifies the ownership structure of intellectual property rights, which may belong to the researchers, state customers, or participating institutions. Co-ownership is permitted in certain cases, such as projects with mixed funding sources. To support monitoring and enforcement, a national register of rights to research and development results is maintained, allowing the government to track and evaluate the use and transfer of such results. Additionally, state customers are required to keep internal registers of project outcomes. Overall, this system reflects the country's strategic focus on transforming scientific output into practical innovations, emphasising responsibility, transparency, and economic impact. Adopting similar measures in Kazakhstan could strengthen IP protection and promote industry development.

After commercialisation, it is crucial to monitor compliance with intellectual property rights, as unauthorised use can significantly undermine the breeder's economic interests. Effective control requires the involvement of national plant variety protection authorities, which are responsible for registering new varieties and overseeing their proper use. In addition, certification and labelling systems play a key role by verifying the authenticity of protected plant varieties and helping to prevent counterfeit or unlicensed products from entering the market. Legal enforcement through judicial or administrative actions is essential for addressing violations and ensuring accountability. Furthermore, international cooperation, particularly the exchange of information under intellectual property protection agreements such as UPOV, enhances transparency and supports the global enforcement of breeders' rights.

To improve commercialisation and control over new plant varieties, Kazakhstan should implement a range of targeted measures. First, it is necessary to develop a comprehensive monitoring system to track the actual implementation and use of patented varieties in agricultural practice. This would allow for better oversight and assessment of the

⁵² Presidential Decree of the Republic of Belarus No 59 'On the Commercialization of Results of Scientific and Scientific-Technical Activities Created Using Public Funds' (4 February 2013)

⁵³ *ibid* para 6.

effectiveness of plant variety protection. Additionally, introducing conditional patent renewals, where the continuation of protection depends on proof of real commercial use, would discourage the practice of obtaining patents solely for reporting purposes without subsequent exploitation. The government should also establish support mechanisms for breeders, including grants, subsidies, and tax incentives, to stimulate innovation and encourage the development and distribution of new plant varieties. Finally, stronger control over unauthorised use must be ensured through improved administrative and legal enforcement tools, which would safeguard intellectual property rights and promote fair market conditions.

The State Register of Plant Breeding Achievements Recommended for Use in the Republic of Kazakhstan⁵⁴ is an official list of varieties and hybrids that have passed testing for economic value. Although its name suggests a link with plant variety patents, in practice, inclusion in the register is based on a separate examination unrelated to patent protection.

To avoid confusion and more accurately reflect its function, it is proposed to rename the register to: *“State Register of Varieties and Hybrids Recommended for Use in the Republic of Kazakhstan”*. In addition to renaming, it is advisable to change the legal status of the register from advisory to mandatory. Currently, the register has a recommendatory nature, which limits the ability to effectively regulate the use and spread of plant varieties.

As a best practice, the Russian Federation’s register has a permissive status, titled “State Register of Plant Varieties Approved for Use,” which ensures strict control over what is cultivated nationwide. Kazakhstan would benefit from adopting a similar approach by reviewing its legal framework and introducing mandatory approval for variety use, enhancing regulation and oversight of agricultural production.

In summary, although Kazakhstan has established a basic legal framework for plant variety protection, significant procedural gaps remain, particularly regarding the examination of novelty and the effective commercialisation of breeding achievements. The current structure insufficiently safeguards innovation and sustainable agricultural development. Additionally, inconsistencies such as the misleading title of the State Register of Plant Breeding Achievements Recommended for

⁵⁴ State Register of Breeding Achievements in Crop Production Recommended for Use in the Republic of Kazakhstan

Use further complicate the regulatory environment, underscoring the need for comprehensive legislative and institutional reform.

Chapter 2. Alignment with International Standards

This chapter examines how Kazakhstan's legal framework for protecting plant varieties aligns with key international agreements. While the regulation of plant and animal patenting is a relatively underdeveloped area in public international law, two core instruments remain relevant: the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)⁵⁵ and the International Convention for the Protection of New Varieties of Plants (UPOV Convention)⁵⁶. These agreements establish minimum standards for the protection of intellectual property and breeders' rights, which many states have incorporated into national legislation to varying degrees.

It is important to note, however, that the Paris Convention for the Protection of Industrial Property⁵⁷, one of the foundational treaties in the international intellectual property system, does not include specific provisions on plant breeding or agricultural biotechnology. This omission reflects the historical focus of the Convention on traditional categories of industrial property, such as inventions, trademarks, and industrial designs, rather than innovations in biological and agricultural domains.

Given the narrow scope of international obligations specific to plant varieties, this chapter provides a concise analysis of the relevant provisions contained within TRIPS and the UPOV framework. The aim is to identify both overlaps and divergences between these instruments and Kazakhstan's current legislation, as well as to consider the legal and practical implications of Kazakhstan's non-membership in UPOV. Despite the limited number of international legal norms, their influence on domestic legislative choices and breeders' rights policy remains significant, particularly in the context of trade, innovation, and sustainable development.

Kazakhstan's legal framework for protecting plant varieties is primarily governed by the Protection of Breeding Achievements Law, adopted in

⁵⁵ Marrakesh Agreement Establishing the World Trade Organization, annex 1C (adopted 15 April 1994, entered into force 1 January 1995) 1869 UNTS 299, art 27 (TRIPS Agreement).

⁵⁶ International Convention for the Protection of New Varieties of Plants (adopted 2 December 1961, last revised 19 March 1991) 815 UNTS 89 (UPOV Convention).

⁵⁷ Paris Convention for the Protection of Industrial Property (adopted 20 March 1883, last revised 14 July 1967, and amended 28 September 1979) 828 UNTS 305.

1999⁵⁸. It is important to note that different international treaties protecting intellectual property rights have already been ratified by Kazakhstan, while UPOV membership is still under question. To join the International Union for the Protection of New Varieties of Plants (UPOV), countries must ratify the UPOV convention and also change the legislation and mechanism of seed protection within the country⁵⁹. According to Article 27(3)b of TRIPs⁶⁰ (which was ratified by Kazakhstan on July 27, 2015), countries are allowed to choose between plant variety protection methods, either by patents or a *sui generis* system. Thus, using the UPOV system is a unique way of protecting breeders' rights. However, countries are not obliged to ratify it and can find a more appropriate way of PVP for their nation. Currently, patent-based protection is used in Kazakhstan, while legislation is in the process of aligning with UPOV standards to ensure compliance with the convention's requirements.

As stated earlier, Kazakhstan is not yet a Member State, as the requirement for participation is legislation that complies with the provisions of the Convention. In that case, it is interesting to compare existing laws, mostly protection of breeding achievements law, with convention. Some of the articles have already been aligned with the UPOV system. However, some still differ. To analyse how the Law of Breeding Achievements Protection in Kazakhstan differs from the UPOV convention, it is important to classify provisions into three groups: similar (Table 1), with distinction (Table 2), and absent in Kazakhstan legislation. It is important to note that this law consists of not only plant variety protection but also animal, therefore, the second part of the law will not be taken into consideration. For comparative analysis, Guidance for the preparation of laws based on the 1991 Act of the UPOV Convention⁶¹ was used.

After a careful comparison of the given regulatory legal acts, it is obvious that there are still many legislative gaps in Kazakhstan's law. However, some of the articles are identical to the UPOV convention. The main difference is in the patent-based regulation instead of the term "breeder's rights". Also, it is important to note that the convention has tightened

⁵⁸ Protection of Breeding Achievements, Law of the Republic of Kazakhstan (13 July 1999).

⁵⁹ International Union for the Protection of New Varieties of Plants (UPOV), International Convention for the Protection of New Varieties of Plants (adopted 2 December 1961, as revised 19 March 1991).

⁶⁰ Agreement on Trade-Related Aspects of Intellectual Property Rights (adopted 15 April 1994, entered into force 1 January 1995) Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 UNTS 299 (TRIPS Agreement), art 27.3(b).

⁶¹ International Union for the Protection of New Varieties of Plants (UPOV), *Guidance for the Preparation of Laws Based on the 1991 Act of the UPOV Convention* (adopted by the Council at its fifty-eighth ordinary session on 25.10.2024) https://www.upov.int/information_documents/en/

conditions and measures of breeders' and farmer's rights. Consequently, there is still significant work to do in Kazakhstan for UPOV membership.

Table 1. Similar articles of the UPOV convention and the Law of Breeding Achievements Protection

Article from Law of Breeding Achievements Protection	Relevant Article in UPOV Convention
Article 1	Article 2
Article 4	Article 5, 6, 7, 8, 9
Article 7	Article 11
Article 5	Article 12
Article 14	Article 14
Article 17	Article 15
Article 3(5)	Article 19
Article 6	Article 20
Article 21	Article 21
Article 22	Article 22
Article 26	Article 25
Article 7(2)	Article 10 (1)

Absent UPOV articles in Kazakhstan's legislation: Articles 3, 4, 10 (2), 16, 17, 18, 23, 24, 26, 27.

According to Article 13(3) of the 1991 Act of the UPOV Convention, member states are required to provide measures aimed to protect the interests of the breeder during the period between the filing or publication of the application and the official grant of the breeder's right. This provision introduces the concept of provisional protection, which offers limited safeguards but does not confer the full scope of exclusive rights provided under Articles 14 to 16. It follows that breeders' rights do not arise upon filing or priority date, but only upon the formal decision to grant protection by the competent authority. In contrast to the UPOV Convention, Kazakhstan's patent law provides that protection begins from the filing

date of the application, provided that a patent is eventually granted.⁶² This distinction is particularly relevant for legal certainty, as it marks the point at which the breeder may legally enforce their exclusive rights against unauthorised use of the variety. Until that point, only equitable remuneration or analogous remedies may be available under national legislation implementing provisional protection.

Table 2. Articles with distinction of the UPOV convention and the Law of Breeding Achievements Protection

Article from Law of Breeding Achievements Protection	Relevant Article in UPOV Convention
Key difference elements	
Article 2. Using a patent, patent holder and related definitions, protected plant variety is defined as agricultural	Article 1. Using the term “Breeder’s right”
Article 9. During provisional protection breeders are allowed to sell and transfer seeds only for scientific reasons, seed production for storage or in cases of assignment of rights	Article 13. Only provisional protection and measures are used, without breeder’s rights during the period of provisional protection

Pros and cons of UPOV

The discussions of UPOV Membership dragged out for different reasons. It started in 2006 when the Resolution of the Government of Kazakhstan ordered to investigate the issue of UPOV joining⁶³. In the meantime, almost 20 years later, the question is still not solved as there are few opponents of the Union because of social and economic concerns for the country and farmers. Substantially, the main resisters are the Kazakhstan Association of Sugar, Food and Processing Industry inside the country, but there is also the international organisation GRAIN working against UPOV. Arguments made by both organisations are similar, such as undermining biodiversity and sustainability, limiting farmers’ rights, and creating legal and financial hardships for farmers by favouring

⁶² Law of the Republic of Kazakhstan No 427-І ‘On Patents’ (16 July 1999), art 4

⁶³ Approval of the Priority Measures Program for 2006–2008 for the Implementation of the Concept of Sustainable Development of the Agribusiness Complex of the Republic of Kazakhstan for 2006–2010, Decree of the Government of the Republic of Kazakhstan No. 149 (6 March 2006).

corporations⁶⁴. The negative possible effects will be discussed in more detail in the next paragraphs.

On the one hand, UPOV supporters, including the State Commission for Variety Testing of Agricultural Crops⁶⁵, claim that membership will bring economic development. For example, it can boost agricultural investment attractiveness in research and development. There is a potential that breeders would actively create new crop varieties with better qualities due to strengthening intellectual property rights with better monitoring and control. Access to all protected plant varieties for research and breeding purposes leads to the creation of more resistant, productive and sustainable plant varieties. Also, it is stated that agricultural exports of the country will rise as the membership creates opportunities for cooperation with other countries and promotes export-oriented agriculture. Finally, participation in the Union gives opportunities to local breeders, lawyers and stakeholders for the exchange of expertise and best practices among Member States. Therefore, it seems being a part of UPOV is important to the country's prosperity and development.

On the other hand, joining UPOV does not allow registering plant varieties internationally in the Member States, so this will not simplify the registration. To obtain protection, breeders need to register plant variety in each UPOV Member State separately. Also, countries with highly developed bioengineering and diverse flora and fauna could benefit from the Union as this makes exporting and market dominance in some crop varieties. Although Kazakhstan has many rare, endemic and unique biomaterials, the country lacks research, laboratories and specialists in the agricultural sector. Thus, instead of a sharp increase in revenue from seed distribution, national farmers will suffer from a high seed price as they are restricted from storage, reproduction and resale of non-certified plants⁶⁶. Moreover, it is quite possible that joining the Union will benefit only transnational corporations and developed Western countries, while local farmers will face challenges. The presumption of innocence is not working under UPOV, as farmers must prove the origin of seeds. This means that if the farmer used non-certified seeds, exchanged seeds with another farmer or didn't keep records of purchases, it would lead to legal proceedings in the case of the usage of UPOV-protected varieties.

⁶⁴ Grain, The Great Seed Robbery
<https://grain.org/system/articles/pdfs/000/006/644/original/EI%20gran%20robo-ENG-6MAR.pdf?1617722769>

⁶⁵ T. B. Azhgaliev, Joining the UPOV: Advantages for Kazakhstan (2022) RGU "State Commission for the Variety Testing of Agricultural Crops," Ministry of Agriculture of the Republic of Kazakhstan.

⁶⁶ M. N. Sirotina, *On the Risks of Kazakhstan Joining UPOV* (2022) QazTrade.

Consequently, farmers need to have strong financial, legal and educational support to protect themselves from economic sharks. This will lead to the unequal confrontation of legally weak individuals with corporations which have strong and experienced lawyers.

Additionally, there is a possibility that if Kazakhstan ratifies the convention, it will lead to the weakening of the state's position. The influence of UPOV on the inner issues of the government will certainly make the plant agriculture system vulnerable and dependent on the decisions of the Union instead of the government. Developing countries without strong agricultural enterprises, such as Kazakhstan, would be at risk of losing inner farming companies and farmers as they would be unable to compete with multinational corporations, which could dominate the seed market. Also, strong control over seeds in the country could create increasing dependency on imported seeds, which are not always better and appropriate to the local climate and soil features. As a result, small-scale farmers may face increased financial pressure due to higher seed costs and limited access to diverse plant varieties. Furthermore, the requirement to comply with UPOV standards might force Kazakhstan to adopt more rigid intellectual property laws, potentially restricting farmers' traditional practices, such as seed saving and reuse. This could disproportionately affect rural communities that rely on these practices for their livelihoods.

From an environmental view, there is also another issue which could potentially harm the sustainability and food security of Kazakhstan. It is stated that breeding science is in the initial stage in the country. This means that probably many plant varieties are not registered or even revealed yet, even if they are used in agriculture. After joining the Union, it seems that crop varieties which have already existed in the country will too slowly be added to UPOV-protected plant varieties as it takes time and resources to obtain protection. In such circumstances, it becomes more practical for farmers to rely on seeds that are already registered within the UPOV framework, potentially limiting their options for local varieties. Therefore, this shift could put protected plants in demand, and it is not always a good choice because it can appear that newly planted crops will get worse in productivity compared to their growing in place of origin⁶⁷. Or vice versa, the protected crops could not be implemented sustainably in the ecosystem of the region, as the environment got used to local varieties and adopted its interconnection to plants which have been growing there for decades. The adaptation of these varieties to local conditions could

⁶⁷ Grain, The Great Seed Robbery <https://grain.org/en/article/6616-upov-animation-the-great-seed-robbery>

lead to decreased yields, which would ultimately affect both the agricultural sector and the food security of the country. To address the issue, farmers may be compelled to purchase agrochemicals⁶⁸, including fertilisers, pesticides, and herbicides, which are often tailored for specific UPOV-protected crop seeds. While these inputs could help prevent yield losses, their widespread use may pose challenges from both economic and environmental perspectives. Economically, the reliance on agrochemicals could increase production costs for farmers, particularly small-scale producers, making agriculture less accessible and sustainable. In addition, this will create economic dependence on imports. Environmentally, the excessive or improper use of such chemicals could lead to soil degradation, water contamination, and a loss of biodiversity, further exacerbating the ecological impact on Kazakhstan's agricultural ecosystems.

In conclusion, the protection of new plant varieties in Kazakhstan is carried out through a patent-based system, which is permissible under the TRIPS international agreement. To obtain a patent, an applicant must undergo a formal and patentability examination assessing four criteria: novelty, distinctness, stability, and uniformity. Without adequate protection mechanisms for local breeders, Kazakhstan's agricultural sector could face challenges in developing its own competitive, sustainable varieties. Previous research indicates that legislative gaps and significant shortcomings within the UPOV system are the primary reasons Kazakhstan has not yet achieved membership. Therefore, while UPOV membership may offer certain benefits, such as fostering innovation, it also presents significant risks for the agricultural sovereignty of Kazakhstan, particularly in relation to small farmers and national agricultural autonomy. It could also undermine the sustainable development of the country by creating an addiction to agrochemicals.

⁶⁸ Grain, Who Profits under UPOV? <https://grain.org/en/article/6921-who-profits-under-upov>

Chapter 3. Comparative Analysis

As global agricultural innovation accelerates, nations are faced with the complex task of aligning legal protection for plant varieties with their developmental goals, food security strategies, and obligations under international treaties. The diversity of legal approaches to plant innovation reflects not only differing legal traditions but also varying national priorities in balancing breeder incentives, public access, and the rights of traditional communities. This chapter explores how selected jurisdictions have navigated this terrain, offering insights into the practical outcomes of their chosen legal models and informing potential directions for Kazakhstan's evolving framework.

The United States uniquely provides two statutory regimes and a patent option for plant variety protection. First, the Patent Act allows utility patents on plants (including plant varieties) as long as general patent criteria are met.⁶⁹ The U.S. also has a special Plant Patent Act of 1930, which created plant patents for new and distinct asexually reproduced plant varieties (covering most fruit trees and ornamentals).⁷⁰ Secondly, a *sui generis* system, the Plant Variety Protection Act 1970 (PVPA), as amended, grants Plant Variety Protection (PVP) certificates for new, distinct, uniform, and stable sexually reproduced or tuber-propagated plant varieties.⁷¹ Thus, inventors of plant innovations in the U.S. may choose between utility patents (20-year exclusivity), plant patents (20-year exclusivity, no maintenance fees), or PVP certificates (20 years for most crops, 25 for trees/vines).⁷² Notably, the U.S. is a member of UPOV (1978 Act), and its PVPA aligns with UPOV standards, but U.S. law also permits patenting of plants in a way UPOV does not require.⁷³

For utility patents, plants must satisfy the same criteria as any invention: novelty, non-obviousness, and utility.⁷⁴ A landmark Supreme Court decision, *Diamond v. Chakrabarty* (1980)⁷⁵, established that living organisms produced by human intervention are patentable subject matter ("anything under the sun made by man")⁷⁶, which opened the door to plant

⁶⁹ United States Code, Title 35 – Patents (Patent Act of 1952)

⁷⁰ Plant Patent Act of 1930, codified at 35 USC §§ 161–164.

⁷¹ Plant Variety Protection Act 1970, 7 USC §§ 2321–2583 (as amended by the Plant Variety Protection Act Amendments of 1994 and subsequent updates).

⁷² United States Department of Agriculture, 'General Information Regarding the Plant Variety Protection Office' (USDA, 2024).

⁷³ International Union for the Protection of New Varieties of Plants (UPOV), 'Members of the International Union' (UPOV, 2024) <https://www.upov.int/members/en/>.

⁷⁴ United States Code, Title 35 – Patents (Patent Act of 1952).

⁷⁵ *Diamond v Chakrabarty* 447 US 303 (1980).

⁷⁶ *JEM Ag Supply Inc v Pioneer Hi-Bred International Inc* 534 US 124 (2001).

biotechnology patents. In *J.E.M. Ag Supply v. Pioneer Hi-Bred* (2001), the Supreme Court confirmed that plant varieties (even those eligible for PVPA or plant patents) can also be protected by utility patents, as Congress intended these to be cumulative protections. For plant patents, the invention must be a new and distinct variety of plant that is asexually reproduced (other than tuber-propagated plants and bacteria) – essentially, the plant must differ from known varieties by at least one characteristic and not have been sold or disclosed more than one year before the application⁷⁷. No inventive step requirement applies for plant patents, but the variety must be stable through asexual propagation. For PVPA certificates, the variety must be new (commercially novel, with a one-year domestic and four-year foreign novelty grace period), distinct from existing varieties, uniform (sufficiently consistent in relevant characteristics), and stable (traits remain unchanged through successive generations).⁷⁸ These criteria mirror UPOV's DUS tests. The applicant must also designate an acceptable variety denomination. In summary, U.S. law sets a relatively high bar for utility patents on plants (full patent criteria) but provides alternative, lower-threshold protection via plant patents or PVP for those who prefer those routes.

In the U.S., commercialisation of protected plant varieties often involves licensing agreements and strict contractual controls, especially for patented seeds.⁷⁹ Companies owning utility patents on plant traits or varieties (e.g. biotech seed companies) commonly require growers to sign technology use agreements that restrict seed saving and enable the company to monitor compliance.⁸⁰ Enforcement is vigorous: patent holders have sued farmers for unauthorised use or resale of patented seed (famously, Monsanto's enforcement of Roundup Ready soybean patents).⁸¹ PVP certificates under the PVPA confer exclusive rights to the breeder to sell, reproduce, import/export, or use the variety in producing (conditioning) seed.⁸² License agreements for PVP-protected varieties are also used, though breaches of PVP are generally remedied through civil infringement suits rather than the kind of on-farm investigations seen with patented genetically modified (GM) seeds.⁸³ The U.S. seed industry thus operates a dual system: patent-based protection (including plant patents and utility patents) tends to be used for high-value horticultural varieties

⁷⁷ Plant Patent Act of 1930, codified at 35 USC §§ 161–164.

⁷⁸ Plant Variety Protection Act 1970, 7 USC §§ 2321–2583 (as amended).

⁷⁹ United States Code, Title 35 – Patents (Patent Act of 1952).

⁸⁰ Monsanto Company, 'Technology/Stewardship Agreement' (Monsanto, 2024)

⁸¹ *Monsanto Co v Bowman* 569 US 278 (2013).

⁸² Plant Variety Protection Act 1970, 7 USC §§ 2321–2583 (as amended).

⁸³ United States Department of Agriculture, 'Plant Variety Protection Office: General Information' (USDA, 2024)

and biotech traits – enforcement here is robust (injunctions and damages for infringement) – whereas PVPA protection is common for staple crop varieties developed by public universities or smaller breeders, with a somewhat more open model of use (allowing saved-seed under certain conditions).⁸⁴ Marketing of new varieties often involves certification (to ensure varietal purity) and the use of variety trademarks.⁸⁵ The USDA's Plant Variety Protection Office maintains a public register of protected varieties, and the existence of protection puts buyers on notice that propagation requires authorization.⁸⁶ In practice, major agribusiness firms have gravitated toward patent protection (utility patents) for cutting-edge biotech plant innovations, due to stronger remedies and no statutory research exemption, whereas PVP remains important for conventional breeding in self-pollinating crops (e.g. wheat, soybeans) and where breeding programs are in the public sector.⁸⁷

U.S. law provides different degrees of farmers' privilege depending on the type of protection. Under the PVPA, farmers have a limited right to save seed of a protected variety for replanting on their own farm (the so-called "farmers' exemption") and, historically, even to sell saved seed to other farmers in limited circumstances.⁸⁸ However, the PVPA exemption was narrowed by the Supreme Court in *Asgrow Seed Co v Winterboer* (1995), which held that a farmer who legally purchases PVPA-protected seed may save enough seed only to replant on his holdings, and cannot sell saved seed to others for replanting beyond the amount needed for his own use.⁸⁹ Thus, brown-bag sales of seed (unauthorised sales of protected seed) are prohibited. The PVPA also includes a research exemption, allowing others to use a protected variety to breed new varieties (essentially the UPOV "breeder's exemption").⁹⁰ By contrast, utility patents on plants do not carry a farmers' saving exemption as patent law's exclusive rights make it infringement for a farmer to save patented seed without permission. In *Bowman v Monsanto Co* (2013)⁹¹, the U.S. Supreme Court unanimously ruled that a farmer who buys patented GM soybean seed cannot replant progeny seeds without the patent holder's consent, because patent exhaustion "does not permit a farmer to reproduce patented seeds

⁸⁴ Craig A Rigdway, 'Enforcing Seed Patent Rights: Monsanto Co. v. Bowman' (2013) 12(1) *Journal of Intellectual Property Law* 89.

⁸⁵ Federal Seed Act, 7 USC §§ 1551–1611.

⁸⁶ USDA Plant Variety Protection Office, 'Public Search for PVP Certificates' (USDA, 2024)

⁸⁷ Alison Peck, 'The Plant Variety Protection Act at 50: A History and Analysis of its Implementation' (2021) 39(2) *Journal of Agricultural and Food Law* 1.

⁸⁸ Plant Variety Protection Act 1970, 7 USC §§ 2321–2583 (as amended).

⁸⁹ *Asgrow Seed Co v Winterboer* 513 US 179 (1995).

⁹⁰ Plant Variety Protection Act 1970, 7 USC § 2544.

⁹¹ *Bowman v Monsanto Co* 569 US 278, 282 (2013)

through planting and harvesting without the patent holder's permission."⁹² The buyer of a patented seed may consume or sell the commodity crop obtained, but may not use second-generation seeds for planting.⁹³ Plant patents (for asexually reproduced plants) similarly do not include a seed-saving issue (since they cover clones), and propagation without consent is infringement. In sum, U.S. farmers' traditional privilege to save seed survives only under the PVPA, and even there, it is limited to seed saved for use on the same farm. Farmers do not have broader "rights" in the Indian sense; rather, their privileges are framed as narrow exceptions to breeders' IP rights. That said, many commodity farmers in the U.S. routinely purchase new seed each season (especially for hybrid or GM varieties), and those who use farm-saved seed for self-pollinating crops operate within the constraints of the PVPA or use older, expired varieties.

Table 3. Comparison of Farmers' Rights under U.S. Plant Intellectual Property Systems

Category	Plant Variety Protection Act (PVPA)	Utility Patent	Plant Patent
Saving seed for replanting	Permitted for replanting on the farmer's own holdings (limited farmers' exemption)	Prohibited without patent holder's permission	Not applicable (covers asexual reproduction)
Selling saved seed	Prohibited beyond own use (<i>Asgrow Seed Co v Winterboer</i>)	Prohibited	Prohibited
Using protected variety for breeding	Permitted under research/breeder's exemption	Prohibited without permission	Prohibited without permission
Sale of harvest as commodity crop	Permitted (standard commodity markets)	Permitted (but no right to replant progeny)	Not applicable
Main propagation method	Sexually reproduced or tuber-propagated varieties	Sexually reproduced (often biotech-modified traits)	Asexually reproduced plants (clones)

Table 3 summarises key differences in farmers' rights under U.S. plant intellectual property regimes, highlighting the broader exemptions available under the PVPA compared to the stricter controls imposed by utility patents and plant patents.

⁹² *Bowman v Monsanto Co* 569 US 278 (2013).

⁹³ United States Patent and Trademark Office, 'Exhaustion of Patents' (USPTO, 2023)

In Europe, plant variety protection is primarily governed by *sui generis* breeders' rights under the UPOV Convention⁹⁴, and patent law explicitly excludes plant varieties.⁹⁵ At the European Patent Office (EPO), Article 53(b) of the European Patent Convention (EPC) prohibits patents on "plant or animal varieties" and on "essentially biological processes" for producing plants.⁹⁶ This means a specific plant variety cannot be patented in Europe. However, patents may be granted for plant-related inventions that are not confined to a single variety. For example, a genetic trait or biotechnological invention applicable to multiple plant lines, the EPO has allowed patents on genetically modified plants or genes, so long as the claim scope is not restricted to a particular variety.⁹⁷ Alongside the EPC's exclusion, the EU has a directive on biotech inventions (Directive 98/44/EC) which affirms that inventions involving plants are patentable if the technical feasibility is not limited to a particular variety, and it provides certain safeguards (including a limited farmer's privilege for patented seeds).⁹⁸

On the *sui generis* side, the EU operates the Community Plant Variety Rights (CPVR) system under Council Regulation (EC) No 2100/94.⁹⁹ This system, administered by the Community Plant Variety Office (CPVO), provides a unitary plant breeders' right covering all EU member states. The CPVR system is UPOV-based (the EU is a UPOV'91 member) and coexists with national plant variety protection laws in some member states (though breeders usually prefer the EU-wide CPVR for efficiency). In summary, the EU model is a dual regime: patents for plant biotechnological inventions (excluding variety-as-such), and PVR for protecting new plant varieties. Unlike the U.S., one cannot obtain a patent on a plant variety in the EU, but one can protect varieties via CPVR and potentially patent-enabling technologies or traits. Patent protection is available only for technical innovations, such as genetic traits or breeding methods, that are not confined to a single plant variety.

Under the CPVR (UPOV) system, a plant variety must be distinct, uniform, stable, and novel. Novelty for CPVR purposes is a form of commercial

⁹⁴ International Convention for the Protection of New Varieties of Plants (UPOV Convention) (adopted 2 December 1961, as revised at Geneva on 19 March 1991).

⁹⁵ European Patent Convention (adopted 5 October 1973, entered into force 7 October 1977) 1065 UNTS 199, art 53(b).

⁹⁶ *Ibid.*

⁹⁷ European Patent Office, Guidelines for Examination in the European Patent Office (EPO 2024) Part G-II, 5.4.

⁹⁸ Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions [1998] OJ L213/13.

⁹⁹ Council Regulation (EC) No 2100/94 of 27 July 1994 on Community plant variety rights [1994] OJ L227/1.

novelty—the variety must not have been sold or disposed of in the EU more than one year before filing, nor outside the EU more than four years (or six years for trees/vines) prior.¹⁰⁰ These criteria are examined through official growing trials (DUS tests) conducted by entrusted examination offices. If the criteria are met, the breeder is granted a CPVR certificate, usually lasting 25 years (30 years for vine, tree, and potato varieties) from grant.¹⁰¹

Under European patent law, the criteria are the standard patentability requirements (novelty, inventive step, industrial applicability)¹⁰², but with the constraint of EPC Article 53(b).¹⁰³ In practice, European patent applications directed to plant innovations must be drafted to avoid claiming an excluded “plant variety.” For example, a patent can claim a technical process to create a plant (if not purely biological crossing/natural selection) or a genetic construct or trait introduced into plants, or even a group of plants defined by a particular gene, as long as it is not one specific variety. The EPO’s case law, such as *Novartis II* (G 1/98), held that a claim covering plant varieties is allowable if varieties are not individually claimed but rather the invention can be applied to a range of plants.¹⁰⁴ Recent EPO Enlarged Board decisions, including the *Broccoli* and *Tomato* cases (G 2/12, G 2/13, and G 3/19)¹⁰⁵, have grappled with the line between essentially biological processes and patentable inventions, ultimately confirming that plants obtained exclusively by essentially biological breeding are not patentable under Rule 28 EPC.¹⁰⁶ In accordance with European law, breeders of new plant varieties generally pursue protection through Community Plant Variety Rights (CPVR), as patent law excludes individual plant varieties from patentability.¹⁰⁷ By contrast, developers of novel plant technologies, such as transgenic traits or gene-editing methods, may seek patent protection for their inventions, provided the claims are not confined to a single plant variety.¹⁰⁸ As a result, genetically modified crops within the European Union are often protected both by

¹⁰⁰ Community Plant Variety Office (CPVO), Examination of Applications (CPVO, 2024)

¹⁰¹ Council Regulation (EC) No 2100/94 of 27 July 1994 on Community plant variety rights [1994] OJ L227/1, arts 55–57, 19(1).

¹⁰² European Patent Convention (adopted 5 October 1973, entered into force 7 October 1977) 1065 UNTS 199, arts 52–57.

¹⁰³ European Patent Convention, art 53(b).

¹⁰⁴ Enlarged Board of Appeal, G 1/98 (*Novartis II*) [2000] OJ EPO 111.

¹⁰⁵ G 2/12 (*Broccoli II*) (EPO Enlarged Board of Appeal, 2015); G 2/13 (*Tomato II*) (EPO Enlarged Board of Appeal, 2015); G 3/19 (*Pepper Case*) (EPO Enlarged Board of Appeal, 2020).

¹⁰⁶ Enlarged Board of Appeal, G 2/12 and G 2/13 (*Broccoli II/Tomato II*) [2015] and G 3/19 (*Pepper*) [2020] OJ EPO.

¹⁰⁷ European Patent Convention (adopted 5 October 1973, entered into force 7 October 1977) 1065 UNTS 199, art 53(b).

¹⁰⁸ Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions [1998] OJ L213/13, arts 4–5.

patents (covering the gene or event) and by plant variety rights (covering the stabilized varietal line), whereas conventional varieties are typically safeguarded exclusively through CPVR.¹⁰⁹

Under the EU CPVR regime (and national PVR laws), commercialisation of a protected variety requires the breeder's authorisation.¹¹⁰ Breeders typically license their varieties to seed producers or directly produce seed for sale. Every protected variety is registered with a unique denomination, which must be used in marketing that variety's propagating material.¹¹¹ Enforcement of PVR is generally the breeder's responsibility: they may bring civil infringement proceedings against anyone who, without consent, produces or sells propagating material of the variety.¹¹² In some EU states, intentional infringement of PVR can even attract criminal penalties under seed marketing laws (for instance, selling seed of a protected variety under a different name can be considered fraud).¹¹³

An important aspect of EU practice is the compulsory listing of varieties in national catalogues or the EU common catalogue for seed marketing; a variety (whether protected or not) usually must pass tests for Value for Cultivation and Use (VCU) and DUS to be certified for commercial seed sales.¹¹⁴ This means that for major crops, a protected variety is often simultaneously undergoing agronomic performance trials for registration in the catalogue. Breeders sometimes license varieties in particular territories, but the EU CPVR by nature covers all member states, so breeders can enforce rights EU-wide.

The CPVR system also allows granting compulsory licenses in the public interest or for the interdependence of patents/PVRs (mirroring Article 12 of Directive 98/44/EC and Article 29 of the CPVR Regulation).¹¹⁵ For example, if a patent on a biotech trait and a PVR on a variety block each other, a cross-license can be compelled in certain circumstances.

As for patents, companies that hold patents on plant biotech often engage in licensing to seed companies (e.g., licensing a herbicide tolerance trait

¹⁰⁹ Council Regulation (EC) No 2100/94 of 27 July 1994 on Community plant variety rights [1994] OJ L227/1.

¹¹⁰ Council Regulation (EC) No 2100/94 of 27 July 1994 on Community plant variety rights [1994] OJ L227/1, art 14.

¹¹¹ *ibid*, art 63.

¹¹² *ibid*, art 94.

¹¹³ German Seed Marketing Act (Saatgutverkehrsgesetz), §17.

¹¹⁴ Council Directive 2002/53/EC of 13 June 2002 on the common catalogue of varieties of agricultural plant species [2002] OJ L193/1, arts 5–7.

¹¹⁵ Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions [1998] OJ L213/13, art 12; Council Regulation (EC) No 2100/94, art 29.

to multiple breeders' varieties). Monitoring compliance is done via contracts and through EU-wide plant health and seed certification systems, which track seed lots.¹¹⁶ Compared to the U.S., the European approach relies slightly less on private policing and more on formal requirements (e.g., only certified seed of registered varieties can be sold, which indirectly helps enforce PVR because illegal reproductions cannot be easily certified or marketed). Nonetheless, infringement cases (both civil and some criminal cases) do occur, and industry groups coordinate to detect unauthorised propagation (e.g., "brown bag" seed sales of protected varieties). Overall, commercialisation under PVR in Europe is a structured system involving variety registration, certified seed production, and licensing, with PVR providing an incentive for breeders while seed laws ensure seed quality and traceability.

The EU has a limited concept of farmers' privilege (often not termed "rights") within both its PVR and patent frameworks. Under Article 15 of UPOV 1991 (mirrored in EU law), private and non-commercial use and research use are exempted acts for PVR.¹¹⁷ Thus, acts done by a farmer purely for replanting on his own farm might be considered "private and non-commercial", but UPOV '91 left it to national law to permit or regulate farm-saved seed. The EU's CPVR Regulation (Article 14 of Reg. 2100/94) provides a specific farm-saved seed exception for certain crops (notably cereals, potatoes, oilseeds, pulses and fodder plants, essentially those where farm saving was common).¹¹⁸ Under this rule, small farmers may save seed of a protected variety for reuse on their own land without paying a royalty, whereas larger farmers may also save seed but must pay an "equitable remuneration" to the breeder, which is lower than the royalty for certified seed. This balances breeder rights with traditional practices for certain crops. For crops not listed (e.g. vegetables, flowers) or any sale of saved seed to others, the privilege does not apply. There is no general "farmers' right" to exchange or sell protected seed; those acts are infringement.

Under patent law, the EU's Biotechnology Directive (98/44/EC) Article 11 explicitly provides a parallel farmer privilege for patents on plant material: when a farmer purchases patented propagating material of a plant variety, the farmer is implicitly authorized to use the product of the harvest for replanting on their own farm, analogous to the CPVR farm-saved seed

¹¹⁶ Council Directive 66/402/EEC of 14 June 1966 on the marketing of cereal seed [1966] OJ P125/2309, art 10.

¹¹⁷ International Convention for the Protection of New Varieties of Plants (UPOV Convention) (adopted 2 December 1961, as revised 19 March 1991), art 15.

¹¹⁸ Council Regulation (EC) No 2100/94, art 14(3).

privilege (and subject to the same conditions that apply under the CPVR regime). In other words, a farmer who lawfully acquires seed of a patented plant variety can save and reuse seed on their holding to the extent permitted for PVR-protected varieties (including payment of a remuneration to the patentee, usually handled similarly to PVR royalties). This provision ensures farmers are not in a worse position under patents than under PVR for essentially the same activity.

Apart from this, research/breeding exemptions: under PVR, breeding a new variety using a protected variety is allowed (the resulting new variety can be commercialised freely, except if it is essentially derived from the initial variety). Under patent law, the EU has no statutory research exemption Union-wide, but many member states recognize some form of experimental use defense; additionally, the Biotechnology Directive's recital 55 and some national laws encourage access for breeding (and compulsory cross-licences can be granted if a breeder cannot breed a new variety without infringing a patent, per Directive 98/44/EC Article 12).¹¹⁹ Farmers' rights in the broader sense (as in the International Treaty on Plant Genetic Resources, e.g. rights to save and exchange seed of any varieties, traditional knowledge, benefit-sharing) are not specifically addressed in EU IP law; those are handled through separate policy measures (e.g. conservation variety rules, seed banks).¹²⁰

Table 4 summarises the key differences between plant variety protection and patent protection in the European Union regarding plant innovations, farmers' privileges, and enforcement mechanisms. In summary, the EU approach provides a carefully delimited farmer's privilege in both PVR and patent contexts for on-farm reuse of seed, while otherwise safeguarding the breeder's exclusive rights. This system seeks to uphold breeders' incentives by limiting large-scale seed saving and ensuring remuneration while mitigating the impact on farmers' customary practices for certain crops.

¹¹⁹ Directive 98/44/EC, art 12.

¹²⁰ International Treaty on Plant Genetic Resources for Food and Agriculture (adopted 3 November 2001, entered into force 29 June 2004) 2400 UNTS 303.

Table 4. Overview of Plant Innovation Protection in the EU

Category	Plant Variety Rights (CPVR system)	Patent Protection (under EPC and Biotech Directive)
Legal Basis	Council Regulation (EC) No 2100/94 (CPVR Regulation)	European Patent Convention (EPC); Directive 98/44/EC
Subject Matter	Plant varieties (new, distinct, uniform, stable, novel)	Plant-related inventions (genes, traits, technical processes) not confined to a single variety
Protectability Criteria	Distinctness, Uniformity, Stability, Novelty (DUS and commercial novelty)	Novelty, Inventive Step, Industrial Applicability (standard patent criteria) excluding "plant varieties" (Art 53(b) EPC)
Scope of Protection	Exclusive rights to produce, sell, market, and reproduce propagating material	Exclusive rights to exploit the patented invention (including plants carrying the invention)
Farmers' Privilege	Limited farm-saved seed exception (Article 14 CPVR Regulation); certain crops only	Limited farm-saved seed privilege (Article 11 of Biotech Directive); mirrors CPVR conditions
Breeder's Exemption	Allowed: breeding a new variety from a protected variety (except for essentially derived varieties)	No general statutory breeder's exemption (but some Member States recognize experimental use defenses)
Compulsory Licensing	Possible in the public interest or in cases of interdependence with patents (Article 29 CPVR Regulation)	Possible for dependent inventions (Article 12 Biotech Directive)
Enforcement Mechanism	Civil litigation by breeders; some criminal sanctions under seed marketing laws	Civil litigation by patent holders; certification and plant health regulations support compliance
Territorial Scope	EU-wide protection across all member states	National patents or EPO-granted European patents covering selected designated states

In conclusion, the United States and the European Union offer two contrasting models for the protection of plant innovations. The U.S. system provides multiple overlapping avenues, such as utility patents, plant patents, and PVP certificates, allowing inventors to choose the most appropriate protection strategy, with strong private enforcement mechanisms. By contrast, the EU maintains a stricter separation between *sui generis* plant variety protection through CPVR and patent protection for plant-related technologies, carefully balancing breeders' rights and farmers' privileges.

Conclusion

This research critically examined the legal framework of plant variety protection in Kazakhstan, analysed its alignment with international standards, and compared it with the legal practices of leading jurisdictions such as the United States and the European Union. It was established that Kazakhstan currently utilises a patent-based system for plant variety protection, permissible under Article 27(3)(b) of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).¹²¹ However, significant gaps were identified, particularly regarding the novelty examination, control over commercialisation, and the limited enforcement mechanisms in practice.

A key finding is the absence of an effective methodology for verifying novelty, as evidenced by the annulment case concerning the Kazakh Tazy breed.¹²² Additionally, statistical analysis showed that many patents are filed primarily for academic reporting purposes, with a low rate of commercialisation. Kazakhstan's non-membership in the International Union for the Protection of New Varieties of Plants (UPOV)¹²³ presents both advantages and drawbacks for future development, affording regulatory flexibility while creating potential challenges for breeders and investors.

Recommendations for Policy and Practice.

Several recommendations arise from this study. Firstly, it is crucial to entrust the full expertise over the four patentability criteria (novelty, distinctness, uniformity, stability) to the Ministry of Agriculture of the Republic of Kazakhstan, particularly the State Commission for Variety Testing of Agricultural Crops. This would consolidate technical expertise and improve the quality of examinations. Secondly, the State Register of Plant Breeding Achievements Recommended for Use in the Republic of Kazakhstan should be renamed to the State Register of Plant Varieties Approved for Use, and its legal status strengthened from advisory to mandatory, thereby ensuring more effective regulation of the seed market. Thirdly, there is an urgent need to strengthen control over the commercialisation of patented varieties post-registration, by introducing

¹²¹ Agreement on Trade-Related Aspects of Intellectual Property Rights (adopted 15 April 1994, entered into force 1 January 1995).

¹²² Specialised Interdistrict Economic Court of Astana, Decision No 7119-25-00-2/2702 (19 March 2025) (Tazy breed patent annulment case).

¹²³ International Convention for the Protection of New Varieties of Plants (adopted 2 December 1961, last revised 19 March 1991) 815 UNTS 89.

monitoring systems, conditional patent renewals based on proof of use, and stricter enforcement mechanisms against unauthorised propagation. These issues highlight the urgent need to modernise the databases to ensure accessibility, reliability, and analytical utility for both researchers and policymakers. Finally, while pursuing possible UPOV accession, Kazakhstan must carefully balance breeder rights and farmers' rights, ensuring protection for small-scale farmers and promoting sustainable agricultural development without fostering overreliance on imported seeds and agrochemicals.

Limitations of the Study.

This study focused primarily on the legal and institutional frameworks and did not deeply explore the ethical, moral and ecological aspects of plant patenting, such as biopiracy concerns, indigenous knowledge protection, and biodiversity conservation. These issues, while crucial, require a broader interdisciplinary analysis combining law, sociology, ethics, and environmental sciences, which exceeded the scope of this master's research. Furthermore, although the study briefly discussed the protection of genetic resources and traditional knowledge under the Convention on Biological Diversity¹²⁴ and the Nagoya Protocol¹²⁵, detailed research on foreign implementations and enforcement mechanisms was not conducted in full.

Areas for Future Research

The findings of this research open several promising avenues for future investigation, particularly at the doctoral level. Future studies could explore ethical frameworks for balancing innovation with biodiversity preservation in the context of plant variety protection, addressing the moral dimensions currently underexamined in the literature. A comparative analysis of the implementation of the Convention on Biological Diversity¹²⁶ and the Nagoya Protocol¹²⁷, across different jurisdictions and their effects on local agricultural communities would provide valuable insights into equitable benefit-sharing models. Moreover, examining foreign policies and regulatory practices concerning traditional knowledge and genetic

¹²⁴ Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79.

¹²⁵ Nagoya Protocol to the Convention on Biological Diversity (adopted 29 October 2010, entered into force 12 October 2014).

¹²⁶ Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79.

¹²⁷ Nagoya Protocol to the Convention on Biological Diversity (adopted 29 October 2010, entered into force 12 October 2014).

resources could inform the development of bespoke national frameworks suited to Kazakhstan's specific socio-economic and environmental conditions. Further research might also analyse the impact of UPOV membership on the agricultural economies of countries with similar development trajectories, creating predictive models to assess the potential outcomes for Kazakhstan. Finally, there is significant scope to study alternative *sui generis* systems of plant variety protection beyond the UPOV Convention, to devise novel, locally adapted legal mechanisms to foster sustainable agricultural innovation. Through deepening this research, it will be possible to propose a more holistic, sustainable, and equitable framework for plant variety protection that respects both innovation and the vital role of local farming communities in biodiversity conservation.

In conclusion, the study demonstrates that while Kazakhstan's current patent-based model complies with minimum international obligations, substantial improvements in novelty examination, commercialisation control, and legislative alignment are necessary to foster sustainable agriculture. By implementing these recommendations, Kazakhstan would not only enhance its national plant variety protection system but also contribute to achieving Sustainable Development Goals (SDGs), particularly Goal 2 (Zero Hunger), Goal 9 (Industry, Innovation and Infrastructure), and Goal 15 (Life on Land), ensuring food security and environmental safety.

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