

Impacts of International and National Regulatory Frameworks on Guaranteeing Farmers' Right in Brazil

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Abstract

As guardians of agrobiodiversity, farmers must have their rights to these resources recognized, rewarded, and supported by their unparalleled contributions in the development of landraces of cultivated plants and domestic animals. Thus, it is worth questioning to what extent multilateral treaties that deal with the use of plant genetic resources for food and agriculture would ensure the protection of these rights. With this objective, we evaluated legal and administrative multilateral, and national mechanisms for the protection of Farmers' Rights—FR regarding the sharing of benefits generated by the access to genetic resources and its implications for the conservation of agrobiodiversity. We conducted analyzes of official documents on norms, treaties, decrees, and regulations which enabled the understanding of the elements constituted by the agrobiodiversity conservation system. We demonstrated that the evaluated international regimes do not guarantee the FR but propose that the National States take decisions to implement them according to the needs of the country. The State, the competent bodies, and the Brazilian *RD&I* organizations must take effective measures and review the laws that should regulate FR, enabling the real participation of farmers in decision-making on conservation and the sharing of benefits derived from agrobiodiversity.

Keywords: multilateral treaties, plant genetic resources, agrobiodiversity, competent bodies

1. Introduction

The conservation of genetic resources is indispensable for safeguarding local and global food and nutritional security. According to special reports of the Food and Agriculture Organization of the United Nations (FAO, 2010, 2017, 2018), agrobiodiversity is a multidimensional complex, being understood as the biological richness that includes the various species, varieties, populations, and agroecosystems associated with cropping systems. This agrobiological diversity is maintained through the various forms of cultivation that develop from planting materials and formal and informal networks of exchange and is also generated by the social, cultural, political, economic, and technological factors of a given geographic space (Pautasso et al., 2013).

International regulation of *ex situ* collections of plant genetic resources for agriculture arises to mitigate growing tensions over intellectual property rights and perceived inequities about who pays the cost of conservation and who benefits (commercially) most from its use. While most biological diversity is in the tropics, in developing countries, the technological capacity to exploit biological diversity for commercial gain is concentrated in developed countries (Halewood, Noriega, & Louafi, 2012).

In this sense, it is worth asking: to what extent international and national regimes may impact Farmers' Rights in Brazil? Considering this fundamental aspect, the present work aimed to assess the impacts of international and national regimes on securing Farmers' Rights in Brazil. To make this finding a concrete approach, it was decided to take as a case study the cultures of cassava (*Manihot esculenta*) and guarana (*Paullinia cupana*) as examples of cosmopolitan species of recent dispersion and linked to food security, protected by the FAO treaty, in the case of the first, and endemic species of industrial and pharmaceutical importance protected only by the CBD, in the case of the second. In this study, we also evaluated the socio-economic importance of manioc and guaraná, i.e., the fundamental roles they play in Brazilian and world agriculture. As for the interdependence of genetic resources between countries (Khoury et al., 2015), we compare the centers of origin and domestication with the centers of production and technological innovation of these species.

2. Materials and methods

2.1 Documentary and Bibliographic Research

This research was based on the analysis of bibliographies and legal and technical documents about the various key themes of the study. We sought pertinent information in books, articles, and other scientific references, and legal and infra-legal documents, such as regulations, decrees, laws, provisional measures, and normative resolutions. The documentary research was carried out by analyzing the official documents that contained the pertinent information about the treaties, rules, decrees, and regulations of FAO, UPOV (Note 1), CBD, TRIPS (Note 2), among others, for the apprehension and understanding of the set of elements that constitute the system of research, development, and innovation of the resources derived from agrobiodiversity (patent, cultivars law, genetic resources, etc.). According to the interest of this study, we used these documents as sources of information, indications, and clarifications to elucidate the guiding questions concerning the guarantees of Farmers' Rights.

Bibliographic research aimed to analyze the content of articles, dissertations, theses, and books that deal with the research topics. This type of analysis takes longer because it requires a more detailed investigation since unlike technical and legislative documents, scientific literature contains information that has undergone scientific treatment (Oliveira, 2013; Figueiredo, 2007). In the bibliographic research, we sought to differentiate and analyze several studies reported in scientific sources, without resorting directly to the facts of empirical reality (Sá-Silva, de Almeida, & Guindani 2009). For the delimitation of the documentary and bibliographic research, we defined the generating themes of the research and the data that one wanted to raise, related to each of the themes and sources initially identified.

2.2 Documentary Research on Patents and Germplasm Banks

We dedicated a part of the documentary research to the analysis of patents associated with the genetic heritage of the two investigated species. We made an exploratory study of relevant information in the international patent database to be able to verify the technologies developed in the manufacture of products derived from cassava and guaraná, and at the same time observe the type of technology associated. Accessing the database allowed us to identify each patent that results from access to genetic resources, as indicated by the conservation of biological diversity and Brazilian law.

In the research, we selected patent documents and classified them by the country of origin, country of filing, institution, inventor, inventor's country, patent type, and classification of the International Patent Code (IPC) classes. From this, we identified those with access to the world's plant genetic heritage.

The methodology used to collect the data was bibliometric, characterized as a search for information in databases. For the bibliographical research, the following search terms in Portuguese and English were defined: "*Manihot esculenta* and *Paullinia cupana*". To achieve the different objectives of the study, the documentary and bibliographical research were accompanied in a complementary manner and dialogued, through consultation with experts in the species and managers of the *RD&I* systems. We conducted this inventory during the period from July to October 2020. We conducted the searches and the survey of patent documents related to cassava and guaraná in the online patent bank Inpi and Latipat, as a national source, and the international Espacenet (Note 3) European Patent Office (EPO). The latter refers to a worldwide patent base that gathers more than ninety million deposited patents with free access. As for the national ones, Latipat and Patenscope, the former being more focused on the development of patents for South and Latin American countries.

We sought to collect the largest possible number of patent documents related to the chosen species of cassava and guaraná. For this reason, we used different combinations with the keywords: "cassava", "cassava", "guaraná", "*Manihot esculenta*" and "*Paullinia cupana*", aiming to raise the largest possible number of documents. We used the same procedure for the patent searches via Patenscope and Latipat. To evaluate the national and international strategies and the richness of the agrobiodiversity of producing countries, the origins and quantities of accessions that are maintained in the germplasm banks of CIAT (International Center for Tropical Agriculture) in Colombia (Note 4), Embrapa in Brazil (Note 5), and IITA in Nigeria (Note 6) were evaluated (FAO, 2017).

3. Results

3.1 Aspects Present in the International Legislation Regarding Farmers' Rights and Access and Benefit-Sharing of Genetic Heritage

FAO was the first multilateral organization to create a global agreement and legal instrument to regulate the issue of FR. To this end, FAO launched the Commission on Genetic Resources for Food and Agriculture (CGRFA) in

1983 to create a mechanism for the evaluation of plant genetic resources through reports on the subject. In November 1989, the FAO Conference adopted the approved interpretation of the International Undertaking which understood that plant genetic resources are a World Heritage Site. However, some countries opposed this compromise because they did not recognize the Plant Breeders' Right that, at that time, was covered by the UPOV Convention. In 1996, 150 countries met at the 4th International Technical Conference for the Global Plan of Action, whose objective was the conservation and sustainable use of plant genetic resources.

At the time, participants affirmed that access and benefit-sharing were essential to ensure world food security. All this work culminated in 2001 with the approval and adoption of the legally binding International Treaty on Plant Genetic Resources for Food and Agriculture. This treaty came into force in 2004, and from there came the creation of a new international legal instrument to encourage countries holding plant genetic resources to implement the FR as needed (Figure 1).

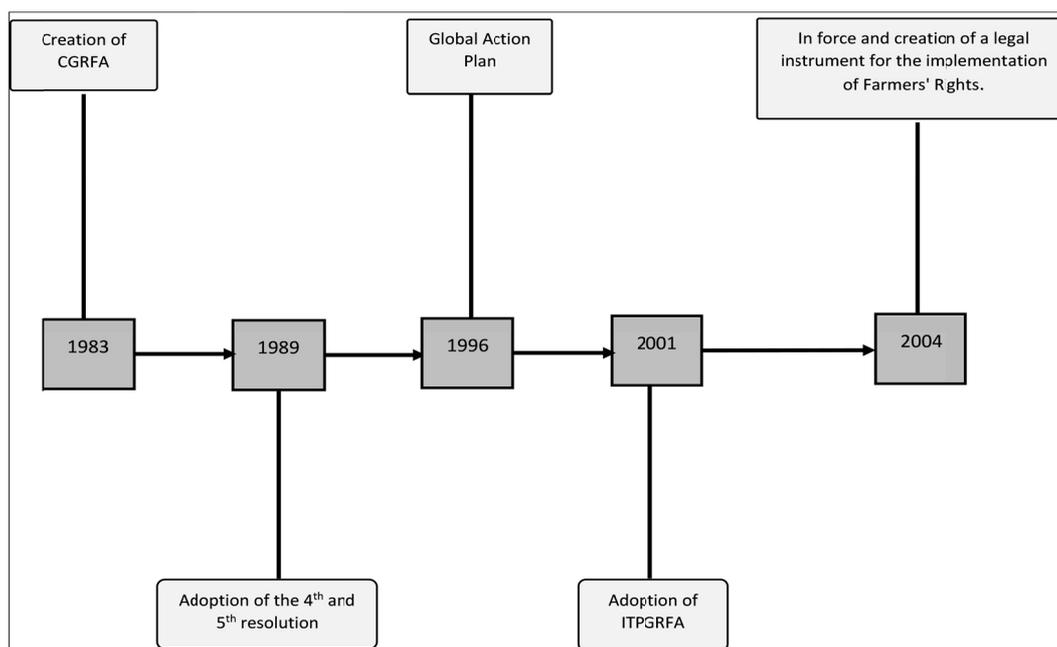


Figure 1. Timeline of FAO progression for legal aspects in the International Regime

In February 1991, an *Ad Hoc* working group became known as the Intergovernmental Negotiating Committee. Its work culminated on May 22, 1992, with the Nairobi conference adopting the agreed-on text of the Convention on Biological Diversity. The CBD (Note 7) opened for signature on June 5, 1992, at the United Nations Conference on Environment and Development. This Convention entered into force on December 29, 1993, 90 days after the 30th ratification. It is worth noting that between 1994 and 2006 there were 11 Conferences of the Parties—COP and one approved protocol (Figure 2).

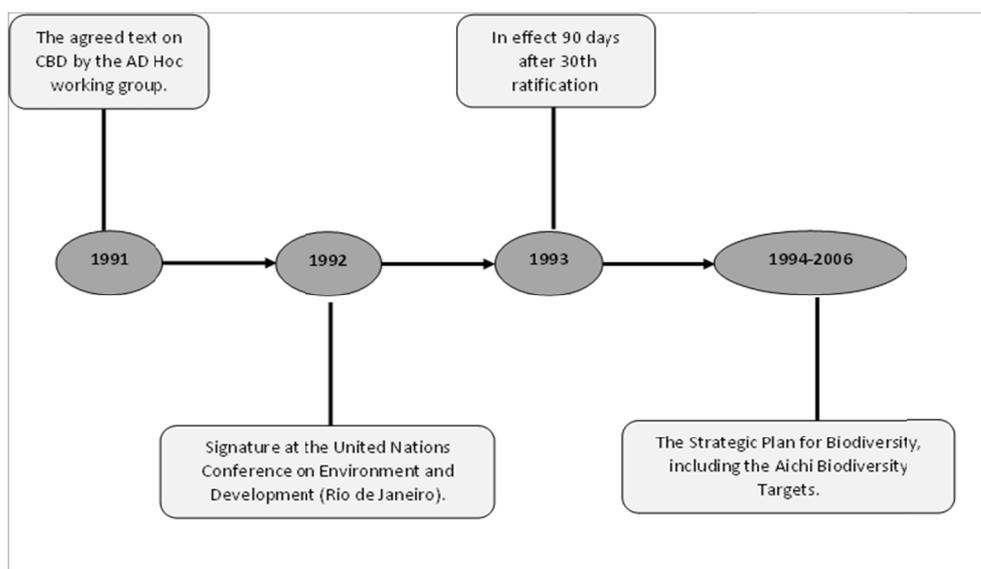


Figure 2. Timeline of the progression of the CBD for legal aspects in the International Regime

Differently, when compared to the ITPGRFA, the CBD has resulted in a form of the equation that is not limited to the exchange of technology and genetic resources, as it adds to this binomial of many variables the key role of Indigenous peoples and local communities (Arcanjo, 1997) (Box 1). Thus, CBD stated that there is significant importance of people for the conservation of agricultural diversity, that is, the role of communities who hold traditional knowledge associated with the resource used, in the sense that such knowledge encourages the maintenance, cultural, social, and economic integrity of these communities (Arcanjo, 1997; Mahot, 2014).

CBD	ITPGRFA
Bilateral—community × company (identifiable associated knowledge) company × union (genetic heritage and non-identifiable traditional knowledge).	Multilateral—free access to all (countries, individuals, and companies) from germplasm banks, and all countries agree to make their genetic diversity and related information about the varieties stored in their gene banks available to all through the multilateral system.
All inter-and intraspecific biological diversity, including domesticated or cultivated.	Sixty-four food crops and forages
<i>Ex-situ</i> conservation is treated as complementary to <i>in situ</i> .	Only covers resources conserved <i>ex-situ</i> , although it provides for <i>in situ</i> and on-farm

Box 1. Comparison of the regimes and scope of the Convention on Biological Diversity (CBD) and the FAO Treaty (ITPGRFA)

Source: Table adapted from Halewood et al. (2012).

The UPOV plant variety protection system came into being with the adoption of the International Convention for the Protection of New Varieties of Plants, through a diplomatic conference in Paris on December 2, 1961. On this occasion, the Plant Breeder’s Right was recognized on an international level. The UPOV convention offered a *sui generis* system for the protection of intellectual property, which was specifically established for the process of plant breeding. This convention came into force on August 10, 1968. It was revised in three acts: the first of these on November 10, 1972, the second on October 23, 1978, and the third on March 19, 1991 (Figure 3). UPOV released these drafts to keep up to date with new advances in genetic improvement. One of the main objectives of the UPOV Convention was to encourage breeders to develop new plant varieties in the interests of Society.

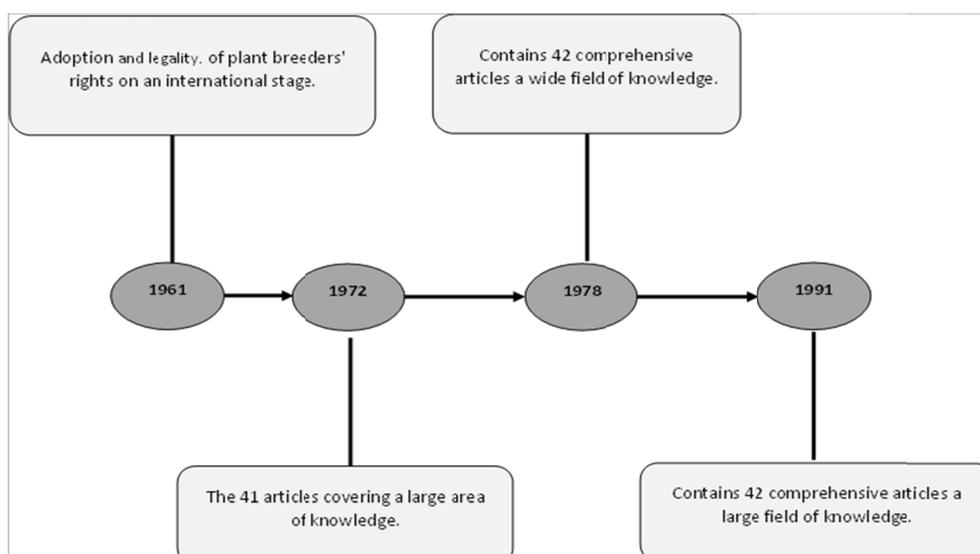


Figure 3. Timeline of progression of the UPOV convention for legal aspects in the International Regime

3.2 Formal Aspects Present in the National Legislation That Should Regulate Farmers' Rights

The FAO Treaty on Plant Genetic Resources for Food and Agriculture does not purport to define the term Farmers' Rights—FR, but in resolution 5/89 FAO defines it as “rights arising from the past, present, and future contributions of farmers in conserving, improving and making available plant genetic resources, particularly those in centers of origin/diversity”. Given this, the Treaty leaves the responsibility to the States to implement their right according to their needs and what can serve for agricultural and economic development. In this scenario, Brazil must create legislation for this.

Only in 2015, Law No. 13,123/15 related to the protection of Brazilian agrobiodiversity was published, which dealt with access to genetic patrimony, considered a new legal framework in the conservation and sustainable use of plant genetic resources. The document compiled diverse legislative texts related to the use and maintenance of resources, in the case of research for agricultural purposes or not. When analyzing the document, one should note that the concept of FR is not called. Even as an indirect reference, we find the following term: “Right of Indigenous and traditional populations”.

Regarding art. 10 (2015, p. 9), it is written that “[...] Indigenous populations, traditional communities, and traditional farmers who create, develop, hold, or conserve associated traditional knowledge are guaranteed the rights to participate in decision making [...]”. When analyzing the article, it is important to highlight those Indigenous populations, traditional communities, and traditional farmers are those who hold traditional knowledge; they are guardians who care for and develop locally adapted breed or creole seeds. In clauses I and II, article 10 of this law makes sure that the rights of these populations are recognized, as well as their contribution to the development and conservation of this genetic heritage for publication, use, exploitation, and dissemination, also considering the indication of origin of this access of associated traditional knowledge.

According to what is established in paragraph III of art. 10 of this law, farmers have the right to obtain benefits from the associated knowledge resulting from the economic exploitation by third parties. Importantly, according to this law, farmers also have the right to participate in the decision-making process regarding access to associated traditional knowledge and the sharing of benefits arising from such access. In theory, these provisions are in line with the principles of the CBD.

Thus, it was clear that any institution, whether public or private, including Universities that develop products or processes based on access to associated traditional knowledge, should ensure that in the event of economic exploitation of such products or processes, benefit-sharing mechanisms must be provided for. In this way, an individual or legal entity that decides to work without the agreement of the farmers will be in a criminal situation, as foreseen in this law.

It is worth remembering that, in law 13.123/15, which regulates access to genetic patrimony, the term “cultivar” is not present, that is, only the term “local variety”, “creole” or “locally adapted breed” is mentioned. Therefore,

there would be no obligation to register a local cultivar, or local varieties, since the commercialization of products derived from genetic heritage or traditional knowledge is governed by the provisions of the Plant Variety Protection and Seeds and Seedlings laws.

Finally, these two laws related to the protection of breeders' rights have no provision for landraces or traditional or locally adapted breed varieties. However, section six of the access law (or "biodiversity law") gave traditional farmers the right to conserve, manage, save, produce, exchange, developed p, and improve all reproductive material that is related to genetic heritage or associated traditional knowledge. This should be considered an original or fundamental right since traditional farmers are the true custodians of genetic heritage and traditional knowledge associated with local plant varieties.

In its second paragraph, the access law indicates that the genetic heritage held in *ex situ* collections in different institutions will be accessible to Indigenous populations, including traditional farmers. According to the provisions of this law, access to traditional knowledge associated with genetic heritage (in the case of *ex-situ* collections) by farmers should be conducted without difficulty and any service consideration; nor when they use genetic material (seeds, seedlings, cuttings) for the development of agricultural activity, subject to regulations.

Decree No. 8,772 of May 11, 2016, which regulates the access law, cites the term "*Traditional Farmers*" 31 times. Art. 18 of the decree regulates "free access" to the genetic heritage of local traditional variety and associated traditional knowledge of unidentifiable origin, and, like the law, restricts it to agricultural purposes. Agricultural activities are those of production, processing, and commercialization of food, beverages, fiber, en, energy, and planted forests. Also included are biofuels, such as ethanol, biodiesel, biogas, and electricity cogeneration from biomass processing. Thus, in the country, the heritage and traditional knowledge associated with food and agriculture are considered public property.

Paragraph 4 of this article establishes that, in the case of access to the genetic heritage of a traditional local or creole variety, the user must deposit reproductive material of the variety in an *ex-situ* collection maintained by a public institution. However, although the decree makes the deposit an obligation for all research or technological development conducted on samples of local varieties, it does not establish how this obligation will be funded and supervised by the government. If operational, this mechanism should lead to a marked increase in the number of accessions of local varieties held in *ex-situ* collections, which has not been the case.

It is understood that the scope of the Brazilian legislation applies only to species native to Brazil. According to art. 113 of the mentioned decree, the Ministry of Agriculture, Livestock and Supply must present an updated reference list of domesticated or cultivated animal and plant species that were introduced in the national territory and used in agricultural activities. This list indicates the species that are not considered Brazilian genetic heritage. Therefore, research with these plants would not need authorization from CGEN (Note 8). Currently, the list—available on the website of the Ministry of Agriculture, Livestock and Supply (updated in May 2019)—contains 766 taxas, among them corn (*Zea mays* L.) and soybeans (*Glycine max* (L.) Merr.). In MAPA's (Note 9) understanding, for products developed from these plants, there would be no obligation of benefit sharing.

3.3 The Socioeconomic Importance of Cassava and Guaraná and the Interdependence of Genetic Resources Between Countries

Thus, the two plants to which we refer are especially important for Brazilian agriculture and even worldwide (in the case of cassava). They are key components as cosmopolitan plants because they generate economic and food security benefits necessary for local development, in the case of guaraná, and countries, in the case of cassava. However, cassava production in Nigeria, the world's largest producer of the crop, is dependent on genetic resources sourced and maintained in Brazil.

The demand for patent documents for these plants (cassava and guaraná) increases with time, especially for cassava, which is a globally recognized plant. Three countries dominate the cassava-related patent applications. The United States produces more than 54% of the documents with patent demands. This makes them the first country in a total number of papers related to patent applications. Japan and Germany are in second place and produce more than ten thousand documents related to cassava patents. Even so, the percentages of documents produced by these countries (7.81%, and 7.55%, respectively) are far below if compared to the percentage of the United States, which reaches 54.7% (Figure 4).

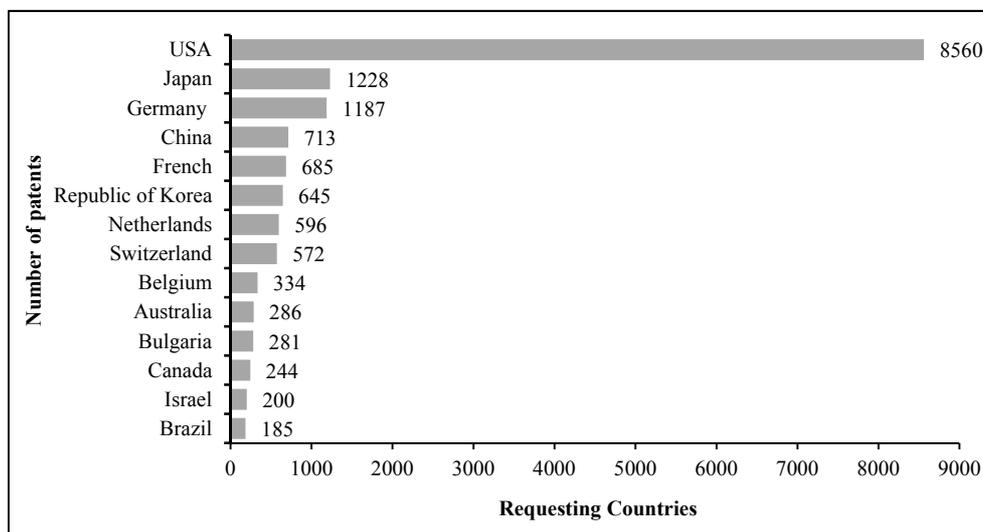


Figure 4. Presentation of countries with the highest number of documents related to cassava patents

4. Discussion

4.1 Aspects Present in the International Legislation Regarding Farmers' Rights and Access and Benefit-Sharing of Genetic Heritage

It was through this prestigious initial treaty that the term “*Farmer's Right*” was mentioned for the first time, in the sense of the conservation, use, and exchange of locally derived propagating materials. The idea of this treaty was to establish mechanisms for the equitable distribution of plant genetic resources derived from agrobiodiversity to contribute to the sustainable development of countries that are the centers of origin of some of the plants that constitute the basis of food. But the FAO's treaty on plant genetic resources was based on the principle that these are considered the common heritage of humanity and should be accessible without any restrictions. In other words, this perspective came to mean that anyone could use these resources whenever they wanted, without paying anything for them. Santilli (2009) argued that FAO created in theory a legal regime of free access to plant genetic resources, which presented an inconsistency.

With the adoption of the FAO International Undertaking on Plant Genetic Resources, plant genetic resources are now considered to be a heritage of humankind. This means that they should be available without restriction to all. The latter practice was internationally dominant in the management of plant genetic resources before the application of the right of state sovereignty, initiated by FAO at the 22nd Conference on the International Treaty on Plant Genetic Resources for Food and Agriculture—ITPGRFA (Rhodes, 2016). Therefore, the unrestricted open access regime tends to have the effect of concentrating the benefits of research and use of a given genetic resource on a limited number of individuals, groups, and states, regardless of their origin (Rhodes, 2016).

However, Article 9.3 of the ITPGRFA provides that nothing shall be interpreted to restrict any rights that farmers have in safeguarding, exchanging, and selling locally derived seed or propagating material, subject to national law. However, the extent to which this FAO treaty provision interacts with the UPOV Convention provision is open to interpretation for a country willing to implement farmers' rights as a member of both UPOV and the FAO treaty (Sanderson, 2013; Rabitz, 2017; Cabrera Medaglia, Oguamanam, Rukundo, & Perron-Welch, 2019).

Also, in the international scope of the regulation of access rights to genetic resources is the International Convention for the Protection of New Varieties of Plants (UPOV (Note 10)), established in the 1960s and forced in 1998. The UPOV was an important legal instrument for securing the rights of breeders with specific interests in the genetic improvement of plants in agriculture. In addition, Plant Variety Protection, also known as “plant breeders' rights,” is a *sui generis* form of Intellectual Property (IP), tailored to the plant breeding process about the seven acts (Note 11) (Cabrera Medaglia, Oguamanam, Rukundo, & Perron-Welch, 2019). While UPOV as a binding multilateral agreement internationally ensures the intellectual protection of new plant varieties in the farmer's field for commercial purposes, plant breeders' rights are at the discretion of national legislation and should not be affected in a way that compromises breeder interests (Cabrera Medaglia, Oguamanam, Rukundo, & Perron-Welch, 2019).

To locate the conflicts around farmers' rights, we need to consider the power and interest relationship that exists between developed countries (holders of patents and technologies) and developing countries (technology-dependent but holders of genetic resources and large agricultural producers). TRIPS is one of the constituent agreements of the World Trade Organization (WTO) and "represents the most comprehensive scope of multilateral harmonization efforts" in Intellectual Property law (Abbott, Cottier, & Gurry, 2019). Most of the countries that have acceded to the UPOV convention are first located in the northern hemisphere and are the most industrialized. However, after the TRIPS agreement came into force, the UPOV submitters capitalized on the TRIPS agreement to increase membership and include the southern countries that are developing (Sanderson, 2013).

The Agreement on Trade-Related Aspects of Intellectual Property Rights became known as the TRIPS Agreement. It was the first international agreement to establish protection for the inventor of intellectual property, covering copyrights, trademarks, geographical indications, industrial designs, and patents, and to include Intellectual Property protection in the international trade regime (La Vina, James, & Paz, 2009).

When analyzing Article 27 of TRIPS, it is noted that the provision requires that the patentable subject matter be new, non-obvious, and useful. In these cases, patents create exclusive rights for individual rights holders that promote plant varieties that demonstrate uniformity (in monocultures), without protecting traditional agricultural practices and informal inventions (Bragdon, 2016). Thus, patents can hurt food security by limiting the sale of seeds and other propagation materials by farmers and increasing their prices. All of this can contribute to the erosion of genetic diversity and associated knowledge; impede the exchange of material and knowledge through informal seed systems; and fail to sufficiently recognize and reward farmers' contributions to the development of new varieties (Bragdon, 2016).

When analyzing Article 27.3 (b) of the TRIPS agreement, it is found that microorganisms, non-biological and microbiological procedures are patentable, while plants and animals are not patentable. However, plant varieties may be protected either by a patent or by a *sui generis* system, or a combination of both. In this case, plant varieties may be protected under the *sui generis* system according to the UPOV Convention if they meet the basic criteria (distinguishable, uniform, and stable) set out in the UPOV Convention (Ribeiro; 2007; La Vina, James, & Paz, 2009). However, the study conducted by Ribeiro (2007) on the convergence of both regimes, TR, IPS, and CBD, revealed disagreement on several issues, such as the protection of traditional and Indigenous knowledge, the protection of genetic resources, races, and the fair and equitable sharing of benefits derived from their use. The author pointed out that neither the CBD nor TRIPs, through their legal texts, present provisions, and measures that guarantee the implementation of farmers' rights. In the end, each agent is seeking to defend its interests.

4.2 Formal Aspects Present in the National Legislation That Should Regulate Farmers' Rights

According to Article 114 of the same decree, a joint act of the Ministers of State of Agriculture, Livestock and Food Supply and of Agrarian Development should disclose the list of traditional local or landraces and locally adapted races. However, this list has not yet been prepared, characterizing non-compliance with the decree. Such a list would be of fundamental importance to guarantee the rights of traditional farmers. Finally, like Santilli (2009), we believe that on the issue of property rights of plant resources for agriculture, the legislation should establish the legal mechanisms to ensure that farmers have the full right to continue to create, conserve, and manage agrobiodiversity resources.

4.3 The Socioeconomic Importance of Cassava and Guaraná and the Interdependence of Genetic Resources Between Countries

A study conducted by Allem (2002), on the origin and taxonomy of the genus *Manihot* species, showed that cassava was first domesticated somewhere in the Amazon and that the cassava ancestor evolved in the Brazilian cerrado before spreading to the Amazon region. Guaraná (*Paullinia cupana* var. *sorbilis*) is a native species and its modern domestication, i.e., attempts to commercially exploit the species, began in 1669 (Atroch et al., 2012; Atroch & Nascimento Filho, 2018).

National authority first officially recognized Cassava and guaraná as native Brazilian agrobiodiversity species by Interministry Ordinance No. 163 on May 11, 2016 (MMA/MDS), replaced more recently by Interministry Ordinance No. 284 on May 30, 2018. In its annex is the list of eighty-two species, recognized as "native species of Brazilian sociobiodiversity with food value." For Clancy and Vernooy (2016), this would be a good example of the application of Article 9.2(b) of the FAO Treaty, which promotes the rights of farmers to participate equitably in the sharing of benefits arising from the use of PGRFA.

Cassava, having become a plant known worldwide and cultivated in several countries where it is a staple food, is protected by the FAO Treaty. According to data from the FAOSTAT (Note 12) system, Brazil, although it holds the origin and the largest center of diversity of the cassava species, is not the largest producer of this plant, occupying the third position in the world ranking. In terms of germplasm management, Brazil stood out for having the largest number of registered varieties, both in Embrapa and CIAT (CIAT, 2020; Embrapa, 2020). This showed that cassava varieties developed in Brazil have great genetic variability. In turn, guaraná, which is a national plant, also has significant importance to Brazilian agriculture. Given this relevance, Embrapa maintains a germplasm collection for the maintenance of plant diversity, but for the development of modern varieties.

5. Conclusions

The conservation of agrobiodiversity as a key element for agricultural development is equally important for the world's food security. Thus, the fair and equitable sharing of benefits derived from the use of plant genetic heritage is of fundamental importance in the maintenance of agroecosystems, a key component of agrobiodiversity. Therefore, international legal mechanisms, such as FAO, CBD, UPOV, TRIPS, and the Nagoya Protocol, are fundamental for the implementation of the FR in countries where traditional farmers maintain plant genetic resources. In evaluating these mechanisms, the later ones do not have adequate legal provisions for the full protection of FR. In a way, they propose measures and incentives for national governments to implement FR according to the needs of the country. In other words, it is the responsibility of the state to make the necessary decisions that will be important for economic, agricultural, political, and social development. The FAO treaty on plants was the first instrument to deal with the issue of FR, and after that, it became more used in the conferences of the parties. It is worth noting that among the international legal instruments, the FAO treaty, through several resolutions, is one of the most relevant documents and expresses the interest in the country to take decisions to implement the rights that farmers have on genetic heritages. So, when food or agricultural resource is subject to a benefit-sharing mechanism, the multilateral system of the treaty trumps the bilateral system of the CBD. There is a necessity to review the legal provisions that the law no.13.123/15 provides farmers as a guarantee of the right to benefit and participate in the decision-making on the issue related to the associated traditional knowledge. In this scenario, the competent bodies should take measures to make farmers participate in the plant breeding program, so they will not be considered spectators, but real actors.

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Notes

Note 1. International Union for the Protection of New Varieties of Plants.

Note 2. Agreement on Trade-Related Aspects of Intellectual Property Rights.

Note 3. Espacenet is a patent database maintained by the European Patent Office (EPO). In Brazil, the National Institute of Industrial Property (INPI) is the national and Latipat patent base in South and Latin America.

Note 4. CIAT. (2021). Ongoing. *CIAT Germplasm Bank Database*. Rome, Italy: CIAT. Retrieved November 10, 2020, from <http://isa.ciat.cgiar.org/urg/main.do?language=en>

Note 5. Embrapa. (2021). *Portal Alelo*. Retrieved September 20, 2020, from <http://alelobag.cenargen.embrapa.br/AleloConsultas/Home/index.do>

Note 6. International Institute of Tropical Agriculture, Genetic Resources Center. (2021). Retrieved December 10, 2019, from <http://genebank.iita.org>

Note 7. Signed in Rio de Janeiro at the United Nations Conference on Environment and Development, in June 1992. Effective at the international level as of December 29, 1993, and for Brazil as of May 1994. Permanent secretariat in Montreal and in August 1996 it had 149 ratifications.

Note 8. O Conselho de Gestão do Patrimônio Genético (CGen) in english The Genetic Heritage Management Council is a collegiate body that seeks to make the national system of access and benefit sharing a tool for the country's economic, social, cultural and environmental development, promoting the conservation of Brazilian biodiversity.

Note 9. O Ministério da Agricultura, Pecuária e Abastecimento MAPA in Brazil—(Ministry of Agriculture, Livestock and Supply) is responsible for managing public policies to encourage agriculture, promote agribusiness and regulate and standardize services linked to the sector.

Note 10. The International Convention for the Protection of New Varieties of Plants (UPOV Convention) was first signed in Paris in 1961, and revised in 1972, 1978, and 1991. The latest revision (the 1991 Act) entered into force in 1998.

Note 11. Under the 1991 Act, the right extends to “seven acts in relation to the propagation of material of a variety requiring the authorization of the breeder: (1) production or reproduction (multiplication); (2) conditioning for propagation purposes; (3) offering for sale; (4) sale or other marketing; (5) export; (6) import; and (7) stockpiling for any of the purposes mentioned in (1) through (6).”

Note 12. Food and Agriculture Organization of the United Nations. (2021). *FAOSTAT*. Retrieved from <http://www.fao.org/faostat/en/#home>

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