

# A Comparative Analysis of Seed Legislation across CAS Countries

A critical examination of legal frameworks, intellectual property rights, and biotechnology in Argentina, Bolivia, Brazil, Chile, Paraguay, and Uruguay.

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*Consultancy for the Inter-American Institute for Cooperation on Agriculture (IICA)*

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# Introduction: The Crossroads of Modern Agriculture

Modern agriculture stands at a critical juncture, facing the challenges of climate change, the sustainability of natural resources, and food security, while simultaneously striving to integrate into international markets, adopt advanced technologies, and respond to an environment of significant social scrutiny.

Within this context, new plant varieties emerge as a fundamental axis that transcends their biological role; they embody genetic innovation and constitute a cornerstone of agri-food productivity and sustainability.

## Objectives of the Study

1. To analyze the differences among the seed regulatory frameworks of the member countries of the Southern Agricultural Council (CAS).
2. To examine the manner in which these national regulatory frameworks govern the key aspects related to the production, certification, inspection, commercialization, and protection of plant varieties.
3. To determine the implications of such differences in the seed regulatory frameworks of CAS member countries for regional competitiveness, productive sustainability, and institutional cooperation.
4. To assess the extent to which these regulatory frameworks are able to adapt to technological challenges associated with biotechnology and precision gene editing, as well as to the tensions arising between formal and informal systems in the region.

# Introduction: The Crossroads of Modern Agriculture

The study draws upon information current as of June 2025.

**Methodology:** A comparative and critical research approach, based on a comprehensive bibliographic review of laws, decrees, regulations, academic publications, and sectorial reports.

**Intended audience:** opinion leaders

**It does not represent the opinion of the institution**

# Chapters

1. Introduction
2. Analysis of the international regulatory framework on seeds and the intellectual property of plant varieties and biotechnological events
3. Description of the seed industry in CAS countries: market structure, key actors, and technological capacities
4. Comparative analysis of seed regulatory frameworks in CAS countries with regard to certification, oversight, commercialization, and the protection of plant varieties
5. Assessment of the availability of transgenic events in CAS countries
6. Analysis of challenges and opportunities for regional cooperation and integration
7. General conclusions, recommendations, and future lines of work

## 2. International Regulatory Framework on Seeds and Intellectual Property

Dates of Ratification, Signature, or Accession to the Various International Treaties

COUNTRY	TRIPS	CBD	NP	ITPGRFA	CPB	UPOV	PCT
ARGENTINA	01/01/1995	22/11/1994	09/12/2016	13/05/2016	----	25/12/1994	----
BOLIVIA	12/09/1995	03/10/1994	06/10/2016	05/09/2016	11/09/2003	21/05/1999	----
BRASIL	01/01/1995	28/02/1994	04/03/2021	22/05/2006	22/02/2004	23/05/1999	09/04/1978
CHILE	01/01/1995	09/09/1994	----	14/01/2016	----	05/01/1996	02/07/2009
PARAGUAY	01/01/1995	24/02/1994	----	24/10/202	08/06/2004	08/02/1997	----
URUGUAY	01/01/1995	05/11/1993	14/07/2014	01/03/2006	31/01/2012	13/11/1994	07/01/2025

**TRIPS:** Agreement on Trade-Related Aspects of Intellectual Property Rights.

**CBD:** Convention on Biological Diversity.

**NP:** Nagoya Protocol.

**ITPGRFA:** International Treaty on Plant Genetic Resources for Food and Agriculture.

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## 2. International Regulatory Framework on Seeds and Intellectual Property

The patenting of plants, plant varieties, and any plant structures leading to the development of a complete plant is **not authorized**.

In principle, the patenting of the following is **authorized**:

- Any procedure in which human intervention plays a predominant role in controlling or determining the desired outcome, provided that it involves subject matter not pre-existing in nature and meets the patentability requirements (absolute novelty, inventive step, and industrial applicability)
  - Recombinant DNA sequence
  - Recombinant DNA construct
  - Modified gene
  - Vectors (plasmids)
  - Transformed microorganisms
  - Promoters
  - Molecules
  - Microbiological procedures
  - Methods of gene insertion
  - Methods of plant transformation

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## 2. International Regulatory Framework on Seeds and Intellectual Property

### EDV

- Brasil
- Bolivia
- Paraguay

### No-EDV

- Argentina
- Chile
- Uruguay

**Edited Variety X**

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graph TD; A[Edited Variety X] --> B[Dependent of the iv]; A --> C[Independent of the iv];
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Dependent of the iv

Independent of the iv

## 2. International Regulatory Framework on Seeds and Intellectual Property

- The international framework on seeds and intellectual property is complex, marked by tensions between the protection of collective rights and the promotion of technological innovation.
- The overlap of treaties (TRIPS, CBD, Nagoya Protocol, ITPGRFA, UPOV) generates contradictions and hinders legislative harmonization.
- CAS countries show uneven progress: Argentina and Brazil lead in biotechnology, while others face legal and institutional gaps.
- These imbalances affect regional competitiveness, biodiversity, and traditional production systems.
- Weak articulation persists between international norms and peasant practices, requiring the integration of informal seed systems.
- The regulatory future depends on regional consensus that harmonizes technical standards, respects sociocultural realities, and ensures fair and sustainable access to technological benefits.

### 3. Characterization of the Seed Industry in CAS Countries

- The seed industry in CAS countries is heterogeneous, marked by tensions between corporate concentration, unequal technological distribution, and the lack of normative and commercial integration.
- Argentina, Brazil, Chile, and Uruguay have advanced in biotechnology, although with strong market concentration in strategic crops.
- Bolivia and Paraguay prioritize food sovereignty and native seeds, but face structural limitations, informality, and low technological competitiveness.
- The public sector (INTA, EMBRAPA, INIA-UY, INIA-CH) has demonstrated capacity in R&D, although still uneven when compared to the predominance of foreign capital.
- Gene editing opens opportunities and holds significant potential to reduce inequalities if supported by adequate public policies.
- Export-oriented specialization, particularly in transgenic soybeans, entails risks due to vulnerability to external demand, genetic erosion, and the absence of regional trade integration.
- Informal seed systems are key to biodiversity and resilience, yet they are often marginalized by legislation; linking them with the formal sector is essential to address concentration and exclusion.

## 4. Comparative Analysis of National Legislations: The Farmers' Exception

The regulation of seed trade and intellectual property over biotechnological inventions within CAS countries exhibits divergent approaches that affect both innovation and conservation. The “farmers’ exception,” which allows producers to use saved seeds for future planting without paying royalties, varies significantly across countries

### Scenario A: Uruguay (and Brazil)

A royalty-free exemption applies to small farmers (defined both qualitatively and quantitatively). Private contracts govern all others. The law specifies who must pay and who is exempt, while leaving enforcement details and business models to lower-ranking regulations. It introduces the concept of Essentially Derived Variety (EDV) and provides legal certainty for small farmers.

### Scenario B: European Union

A royalty-free exemption applies to small farmers (quantitatively defined). The business and control model is explicitly established in the legal framework. The law specifies payment conditions and value parameters, leaving no ambiguities. It introduces the concept of Essentially Derived Variety (EDV) and extends protection to harvested material.

### Scenario C: United States

The farmers’ exception is prohibited due to the scope of patent law, which extends protection to plant varieties. This represents a unique model at the global level and has not been adopted by other countries

### Scenario D: Argentina and Paraguay

The farmers’ privilege has no limits in terms of species, production scale, land area, incremental use, or type of beneficiary producer. This generates significant imbalances and constitutes the scenario that requires the greatest attention for future reforms.

Assuming the impracticability of Scenario C within the CAS and the need to modify Scenario D, Options A and B emerge as the most viable. The choice between these scenarios directly affects both the capacity for innovation and equity within the regional agricultural sector.

## 5. Availability of Transgenic Events in CAS Countries

CAS countries have exhibited divergent trajectories in the regulatory approval and commercialization of transgenic events, shaped by technical, economic, institutional, and ideological factors.

	ARGENTINA	BOLIVIA	BRASIL	CHILE	PARAGUAY	URUGUAY	TOTAL
ALFALFA	2						2
COTTON	12		26		6		44
CANOLA				1			1
SUGARCANE	1		8				9
SAFFLOWER	1						1
EUCALYPTUS			8				8
MAIZE	74		80	1	29	12	196
POTATO	1						1
BEAM			1				1
SOYBEAN	26	1	27	1	13	8	76
WHEAT	1		1		1		3
<b>TOTAL</b>	<b>118</b>	<b>1</b>	<b>151</b>	<b>3</b>	<b>49</b>	<b>20</b>	<b>342</b>

Number of Transgenic Events Commercially Approved in CAS Countries. Data compiled from ISAAA's GM Approval Database (<https://www.isaaa.org/gmaprovaldatabase/>). Accessed June 2025

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**92,4%**

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**78,7%**

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## 5. Availability of Transgenic Events in CAS Countries

- The adoption of transgenic crops in CAS countries reflects diverse national strategies that extend beyond purely technical considerations.
- Brazil and Argentina lead in approvals and scientific development.
- Paraguay and Uruguay show selective adoption, following regional dynamics.
- Chile has a low rate of approvals, linked to an export-oriented model.
- Bolivia maintains regulatory resistance, although not a practical exclusion of biotechnology

## 6. Challenges and Opportunities for Regional Cooperation

- Regional cooperation in seeds and biotechnology is strategic but constrained by regulatory fragmentation and institutional asymmetries.
- The lack of legal harmonization generates uncertainty, creates competitive imbalances, and hinders the integration of the regional market.
- Technical and scientific cooperation holds potential, yet it faces corporate concentration and limited inclusion of local actors.
- The exchange of germplasm is essential but restricted by heterogeneous frameworks and conflicts between breeders' rights and patents.
- The future of CAS depends on building a regional agenda grounded in harmonization, collaborative research, and equitable access to germplasm.

## 7. General Conclusions, Recommendations, and Future Lines of Work



### CONCLUSIONS

- Regulatory fragmentation and regional asymmetries.
- Overlapping international treaties that generate conflicts.
- Uneven progress (Argentina/Brazil as leaders; Bolivia/Paraguay lagging; Chile/Uruguay in intermediate positions).
- Disparities in the observance of rights and barriers to germplasm access.
- Market concentration of hybrid varieties in multinational companies and of self-pollinated varieties in national entities.
- Exclusion of informal seed systems.



### RECOMMENDATIONS

- Progressive regulatory harmonization with mutual recognition of certifications.
- Differentiated protection and integration of informal seed systems.
- Strengthening public research and regional consortia.
- Establishment of permanent multi-stakeholder dialogue platforms.
- Review of intellectual property to reconcile breeders' rights and patents.
- Development of indicators for monitoring regulatory impact



### FUTURE LINES OF WORK

- Participatory empirical studies with producers.
- Evaluation of the impact of regulatory reforms on diversity, innovation, and resilience.
- Development of an inclusive regional agenda with flexible frameworks.
- Revalorization of seeds as a common good.
- Consolidation of sustainable integration based on autonomy, equity, and social justice.

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