

Women Plant Breeders in Mexico from 2019 to 2023: Sowing the Future



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MOTIVATION

The main motivation behind this research was the lack of statistical information in Mexico that allows identifying the number of plant varieties obtained by Mexican women. This information is crucial to promote and justify changes that will enable the country to increase research and development activities that result in new plant varieties to combat climate change, promote development, and empower women. At the same time, such data allows decision-makers to better understand the current situation in order to design more targeted policies and interventions. This research also aims to give voice to the many women who have broken paradigms and overcome challenges in their lives to become plant breeders.

Scope and Limitations

As with any research, there are certain limitations. First, the information was obtained through information requests, so it relies on what the authorities provided. Second, it was not possible to verify the nationality of the breeders to determine if they are Mexican or not. Therefore, the scope was limited to identifying whether the breeders are women or not. This was done with the support of the **World Intellectual Property Organization's** gender dictionary, complemented with names added by CAIINNO.

Support to SNICS

This effort seeks to support the work carried out by the **National Seed Inspection and Certification Service (SNICS)**. One of the things that strengthens a country is the participation of organized civil society. In this case, **CAIINNO** aims to contribute knowledge that helps both **SNICS**, the country, and other stakeholders (academics, specialists, etc.). We are grateful to **SNICS** for their willingness to share information, which in our view makes them an example in Latin America.

Gender and Sex Definition

For this research, definitions from the **World Health Organization** were used (2015). The term “**gender**” refers to the socially constructed characteristics of women and men, while the term “**sex**” focuses on purely biological differences.

Definition of Breeder

According to Article 1 of the **International Convention for the Protection of New Varieties of Plants**, a breeder is understood as “the person who bred, or discovered and developed, a variety” (UPOV, 1991).

POLITICAL NOTE

The work of **CAINNO**, as well as that of this research and its authors, is not related to any political party in Mexico or abroad. It was developed out of personal interest and with the aim of contributing to the country's improvement. While the document is intended to be useful for decision-makers and public officials, many of whom are linked to political parties, this publication is not designed to attack any party or candidate. Therefore, its use for such purposes is strictly prohibited.

ABSTRACT

This study identified, for the first time in Mexico, the participation of women in plant varieties granted in the country from 2019 to 2023, by reviewing the 314 plant varieties granted by the **National Seed Inspection and Certification Service (SNICS)**. After an extensive literature review, no similar effort was identified in Latin America and the Caribbean. The classification was based on the latest gender methodology proposed by the **World Intellectual Property Organization**.

Table 1. Plant varieties granted by type of gender in Mexico, from 2019 to 2023.

Year	All-male team	All-women team	Gender-balanced team	Mostly men	Mostly women	Only one man	Only one woman	Total per year
2019	22	0	5	15	0	31	1	74
2020	6	0	2	13	2	15	3	41
2021	14	0	8	27	0	26	0	75
2022	23	0	2	13	0	16	0	54
2023	27	0	5	10	0	28	0	70
Total by type	92	0	22	78	2	116	4	314

Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

In total, women participated in 106 out of the 314 varieties granted during the study period. Female participation was distributed as follows: **22 in “gender-balanced team”, 78 in “mostly men” teams, 2 in “mostly women” teams and 4 as “only one woman” participants**.

In percentage terms, women accounted for 37 percent of the total number of varieties granted. This contribution was as follows: “gender-balanced” with 7 percent, “mostly men” with 25 percent; and both “mostly women” and “only one woman”, with 1 percent respectively.

A key finding is that while the “only one man” group accounted for the highest number of registrations (116 or 37 percent), when combining the categories involving male-female collaboration (gender-balanced, majority female, and majority male), the total reaches 102 varieties or 33 percent. This shows that collaboration is a key space for increasing women’s presence in the field of plant breeding.

INTRODUCTION

A **World Intellectual Property Organization (WIPO)** article by Rivoire & Jewell (2019) highlighted that one of the objectives of the **2030 Agenda for Sustainable Development** is to ensure that food is sufficient, safe, affordable, and nutritious. The work of the **International Union for the Protection of New Varieties of Plants (UPOV)** is crucial to achieve this. In particular, this supports **Goal 12: Responsible consumption and production** (UN, 2015).

According to Jördens & Button (2011), in order to maximize the benefits that the plant variety system can bring to countries, it is necessary to have an effective system in the countries that responds to the challenges of a changing world. Similarly, according to Adelaiye (2010), it is necessary to have updated legislation, an office with human and economic resources and a rule of law that enforces the law when plant breeders' rights are violated. On the other hand, Santamaría (2022) identified that intellectual property protection has a positive effect on foreign direct investment.

Despite this evidence, as of 2025, Mexico still has not implemented the 1991 version of the **UPOV Convention**, even though it committed to doing so within four years in the final text of the US-Mexico-Canada Agreement (Government of Mexico, 2023).

Another key contribution of intellectual property is its potential to increase women's participation in innovation. **WIPO**, for example, has launched initiatives such as the **Gender Action Plan** (WIPO, 2023), aimed at increasing women's engagement in intellectual property. According to studies such as the one by **CAIINNO** (Santamaría Hernández et al., 2023), female inventors in Mexico still lag behind their male counterparts.

For these reasons, this research aims to quantify the number of women plant breeders in plant varieties granted in Mexico from 2019 to 2023; where “**breeder**” is defined as the person who created or discovered and developed a new variety, in accordance with **Article 1 of the UPOV Convention** (1991).

Additionally, it presents detailed data on the participation of women in this critical field of intellectual property. This research is a significant contribution to the literature, particularly as no similar study has been identified in Mexico or Latin America. It is intended as a useful tool for policymakers and an academic contribution to the work conducted by **SNICS**. The findings may also serve as a reference for other countries.

Scope and limitations:

- 1.** It was not possible to verify the nationality of all breeders, so it is possible that some are not of Mexican nationality.
- 2.** It is possible that, although some of the companies have a subsidiary or a registered address in Mexico, they may have obtained the variety and filed the first registration in another country, a fact that could not be identified for this research with the information obtained.
- 3.** It was not possible to identify the causes of the results presented, since that would require an additional and complementary effort to the one carried out here.

Plant varieties: general results and results by gender

This effort made by organized civil society aimed to identify the number of plant varieties granted to individuals or legal entities residing in Mexico from 2019 to 2023. The data were obtained from a request for information submitted to the **National Seed Inspection and Certification Service (SNICS, 2024)**.

Based on the data obtained, the participation of women breeders was identified. Breeder understood as the woman who created or discovered and developed a variety. This is in accordance with **Article 1 of the International Convention for the Protection of New Varieties of Plants (UPOV, 1991)**.

In order to specify their participation, a classification was made into 7 gender groups based on the classification used by the **World Intellectual Property Organization (WIPO, 2023)**, which is as follows:

- 1. Gender-balanced team** - Varieties where equal numbers of women and men participate as breeders of the same plant variety.
- 2. All-women team** - Varieties where only women participate as breeders of a plant variety.
- 3. All-male team** - Varieties where only males participate as breeders of a plant variety.

4. Mostly women - Varieties where there is at least one more female than the total number of males listed as breeders of the same plant variety.

5. Mostly men - Varieties where there is at least one more male than the total number of females listed as breeders of the same plant variety.

6. Only one woman - Varieties where only one woman participates as breeder of a plant variety.

7. Only one man - Varieties where only one male participates as breeder of a plant variety.

The number of female and male breeders was also identified. However, it is important to note that the calculation did not determine whether a person appears as a breeder in more than one plant variety, so it is possible that the same breeder appears in more than one and therefore be counted more than once.

Results of plant varieties granted in Mexico from 2019 to 2023

This research considered the plant varieties granted in Mexico between 2019 and 2023, analyzing a total of 314 plant varieties granted, which represent the full dataset available. Based on this, the varieties were classified by gender composition, as shown in **table 1**:

Table 1. Plant varieties granted by gender group in Mexico, 2019–2023.

Year	All-male team	All-women team	Gender-balanced team	Mostly men	Mostly women	Only one man	Only one woman	Total per year
2019	22	0	5	15	0	31	1	74
2020	6	0	2	13	2	15	3	41
2021	14	0	8	27	0	26	0	75
2022	23	0	2	13	0	16	0	54
2023	27	0	5	10	0	28	0	70
Total by type	92	0	22	78	2	116	4	314

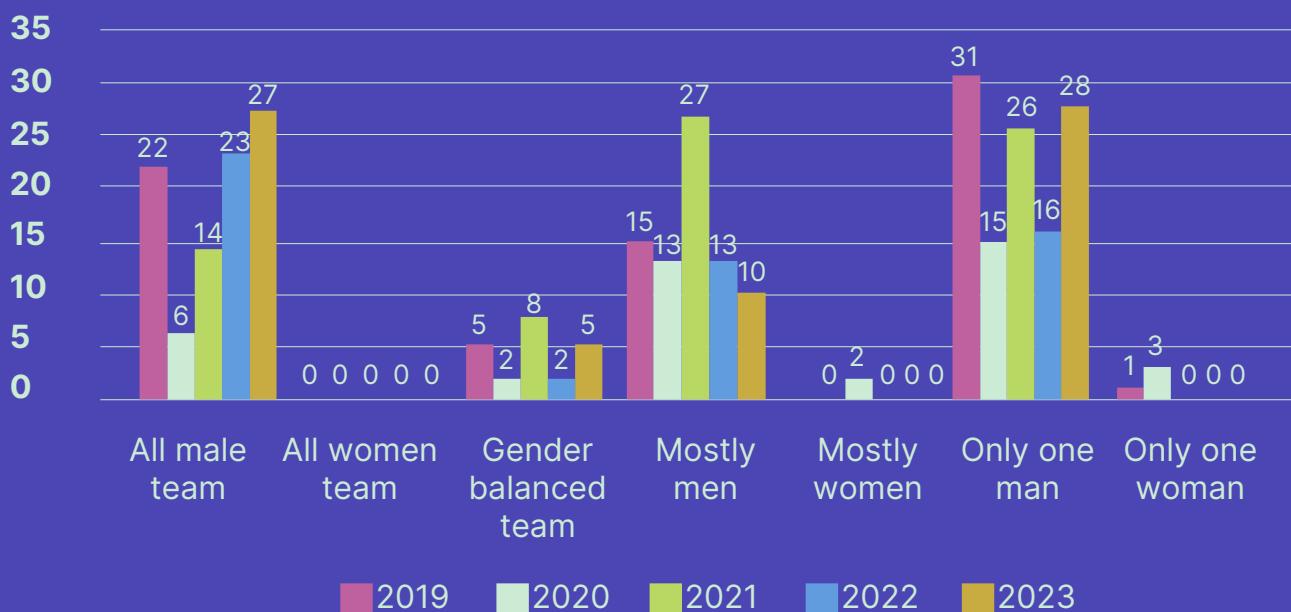
Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

The table above shows that **during the period from 2019 to 2023 the participation of men was much higher than that of women**. The “**only one man**” group obtained the highest number of varieties granted, **with 116**, while the “**only one woman**” group **were only 4**. On the other hand, the “**mostly men**” group **totaled 78**, while the “**mostly women**” group **were barely 2**. Finally, “**all-male teams**” **totaled 92**, a figure well above the **22 in “gender-balanced teams”**, and there were **zero cases of “all-women teams.”**

It is important to reiterate the scope and limitations of the study. First, it was not possible to verify the nationality of all breeders, meaning some may not be of Mexican nationality. Second, although some companies have subsidiaries or registered addresses in Mexico, the plant breeding and initial registration may have been carried out in another country, a factor that could not be verified in this investigation.

Below is a graphical representation of the total number of plant varieties granted by gender type from 2019 to 2023. As can be seen, the “**all-women team**” group **had zero plant varieties granted**. The “**gender-balanced**” group **showed minimal variation over the years**. In contrast, the “**all-male team**” and “**only one man**” categories, despite some year-to-year fluctuations, consistently recorded the highest number of granted varieties, with 92 and 116, respectively. The “**mostly men**” group **remained relatively stable**, with a significant variation in only one year.

Graph 1. Comparison of plant varieties granted by gender group in Mexico, from 2019 to 2023.



Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

Now, in percentage terms from 2019 to 2023, the following table presents the results for the period under analysis. Focusing on the varieties in which women participated, **the greatest fluctuations are observed in the “gender-balanced team” group**, with a low of 9 percent and a peak of 36 percent the following year.

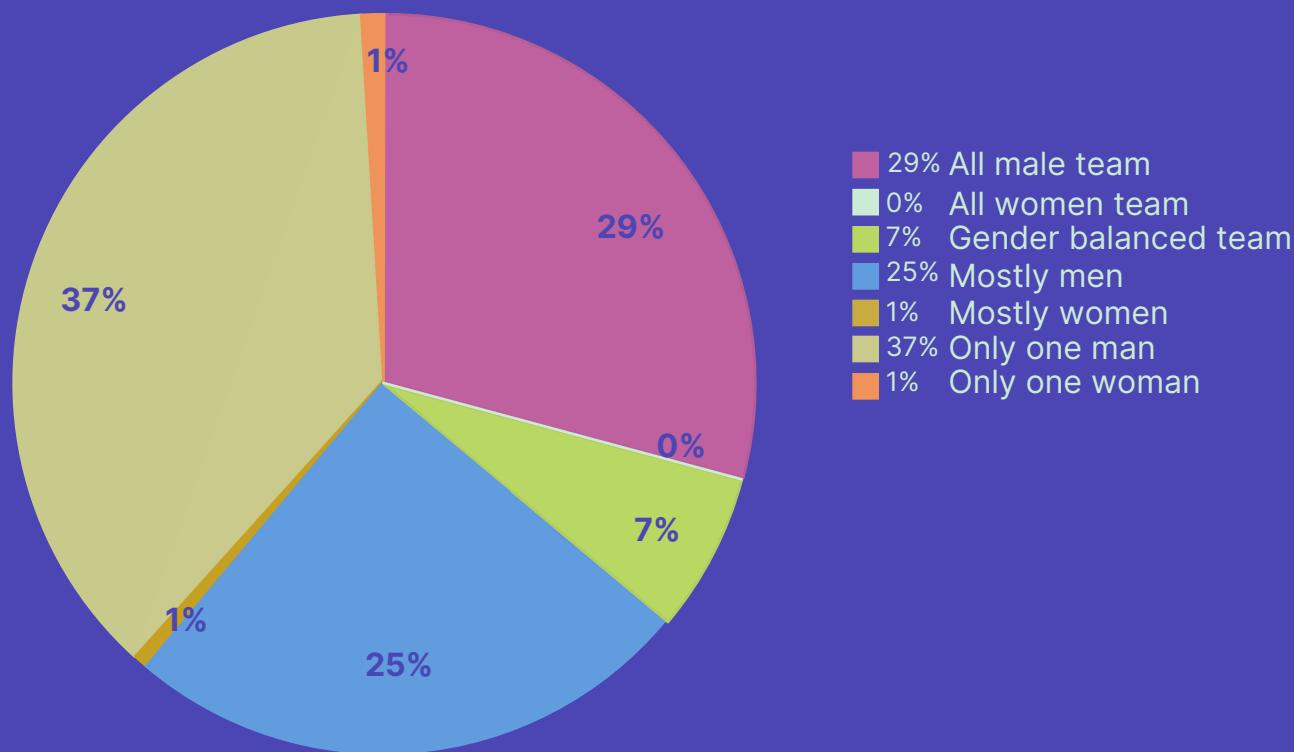
Table 2. Plant varieties granted by gender group in Mexico, from 2019 to 2023, by percentage.

Year	All-male team	All-women team	Gender-balanced team	Mostly men	Mostly women	Only one man	Only one woman	Total per year
2019	24%	0%	23%	19%	0%	27%	25%	24%
2020	7%	0%	9%	17%	100%	13%	75%	7%
2021	15%	0%	36%	35%	0%	22%	0%	15%
2022	25%	0%	9%	17%	0%	14%	0%	25%
2023	29%	0%	23%	13%	0%	24%	0%	29%
Total by type	29%	0%	7%	25%	1%	37%	1%	100%

Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

Based on the above, it was identified that the **“only one man”** group **accounted for 37 percent** of all granted varieties, followed by **“all-male teams” with 29 percent**, and **“mostly men” with 25 percent**. The **“gender-balanced”** group **reached 7 percent**, while both the **“mostly women”** and **“only one woman”** categories each **represented only 1 percent**. The **“all-women team”** group is not included in the graph, as its participation **was zero percent**.

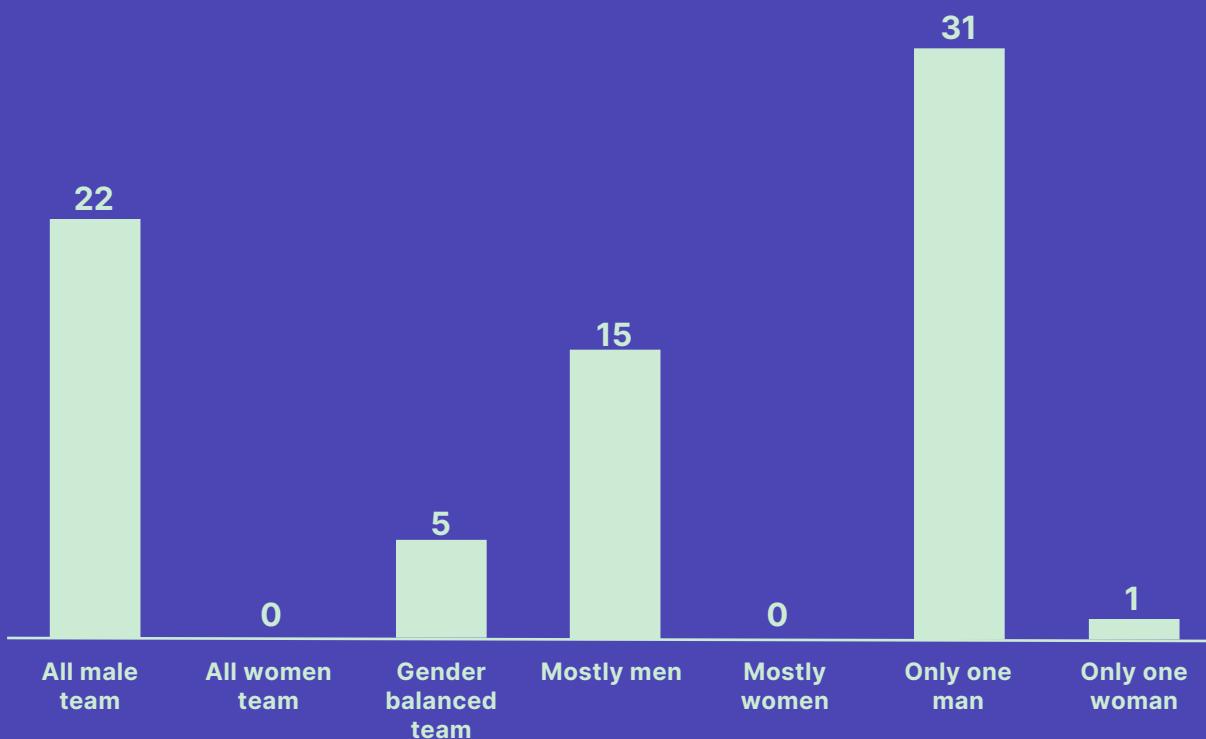
Graph 2. Percentage of total plant varieties granted by gender group in Mexico, from 2019 to 2023.



Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

Moving on to the annual analysis, **in 2019 a total of 74 plant variety registrations were granted in Mexico, with women participating in 20 of them representing 27 percent of the total.** The “**only one man**” group had the highest number of granted varieties. This was followed by the “**all-male team**” group **with 22**. Women’s participation was lower, appearing in the “**mostly men**” and “**gender-balanced**” categories **with 15 and 5 varieties**, respectively. Only one variety was granted under the “**only one woman**” group, **while there were zero in the “all-women team” group.**

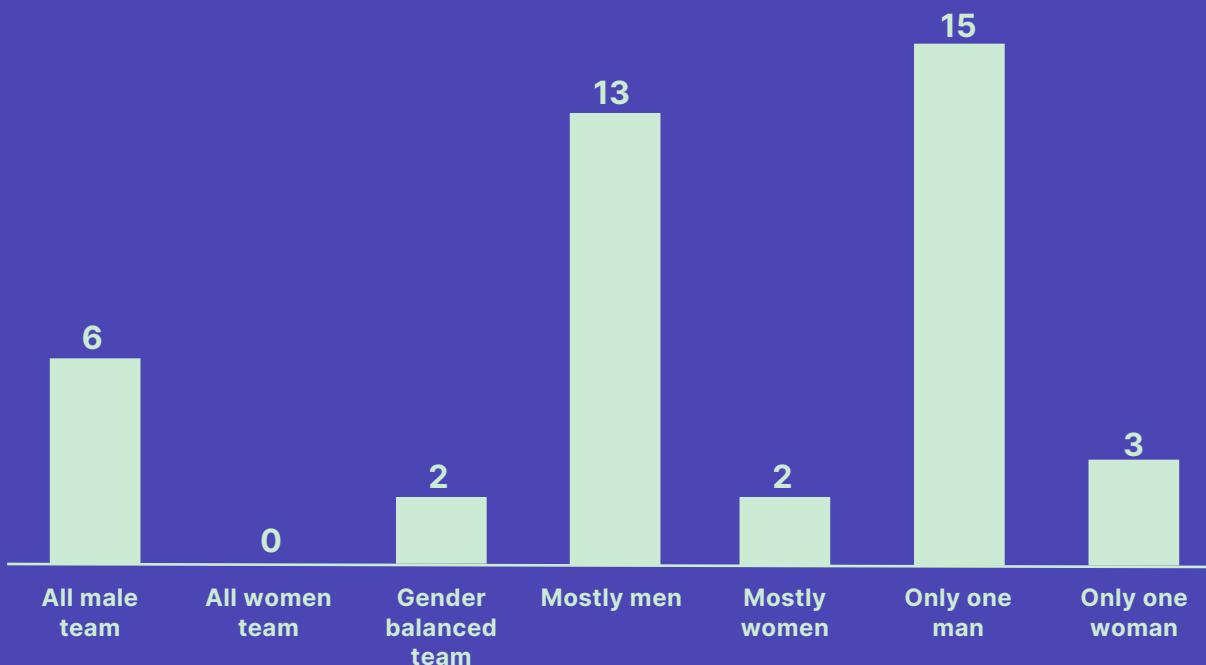
Graph 3 Total plant varieties granted by gender group in Mexico, in 2019.



Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

In 2020, a total of 41 new plant varieties were granted, with women participating in 20 of them representing 49 percent of the total. The “one man only” group continued to have the highest number of granted varieties. However, **women’s participation increased this year**, as the “mostly men” group ranked second, and **three varieties were granted under both the “only one woman” and “mostly women” categories.**

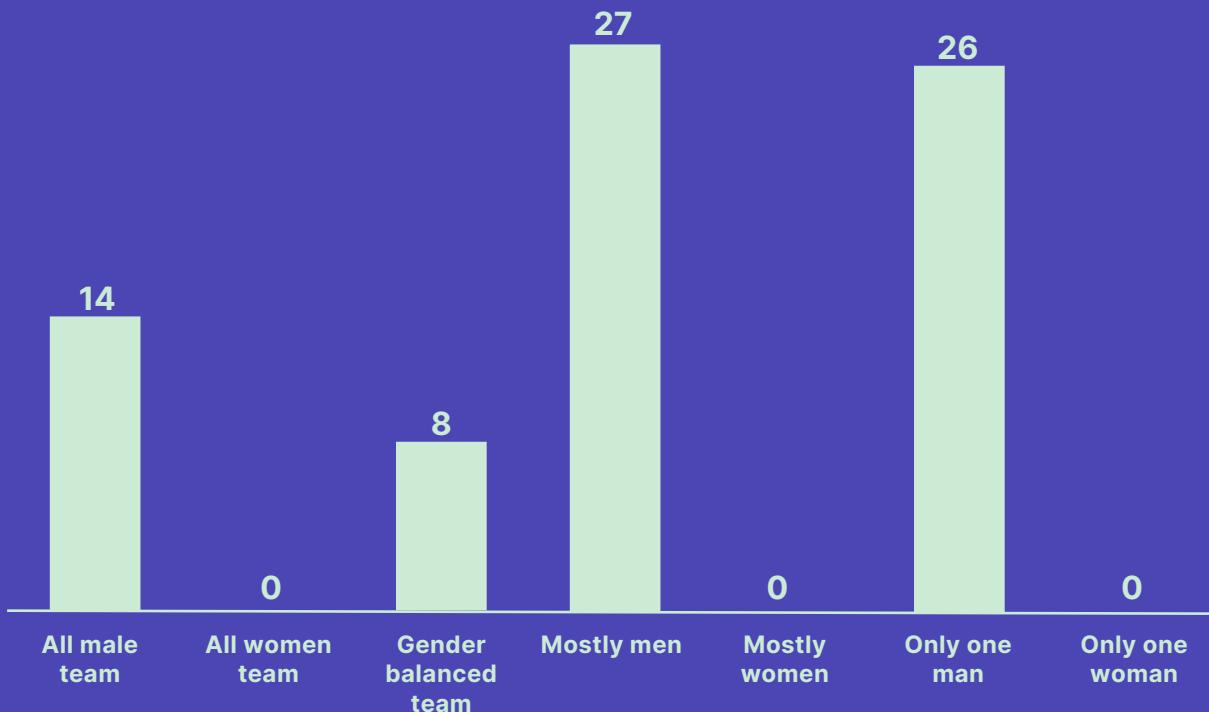
Graph 4 Total plant varieties granted by gender group in Mexico, in 2020.



Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

In 2021, the highest number of plant variety registrations during the study period was recorded, with a total of 75, of which women participated in 35 representing 47 percent of the total. Notably, for the first time, one of the categories involving women surpassed the group consisting exclusively of male breeders. Specifically, the “mostly men” group had **26 granted varieties**, while the “only one man” group **also had 26**.

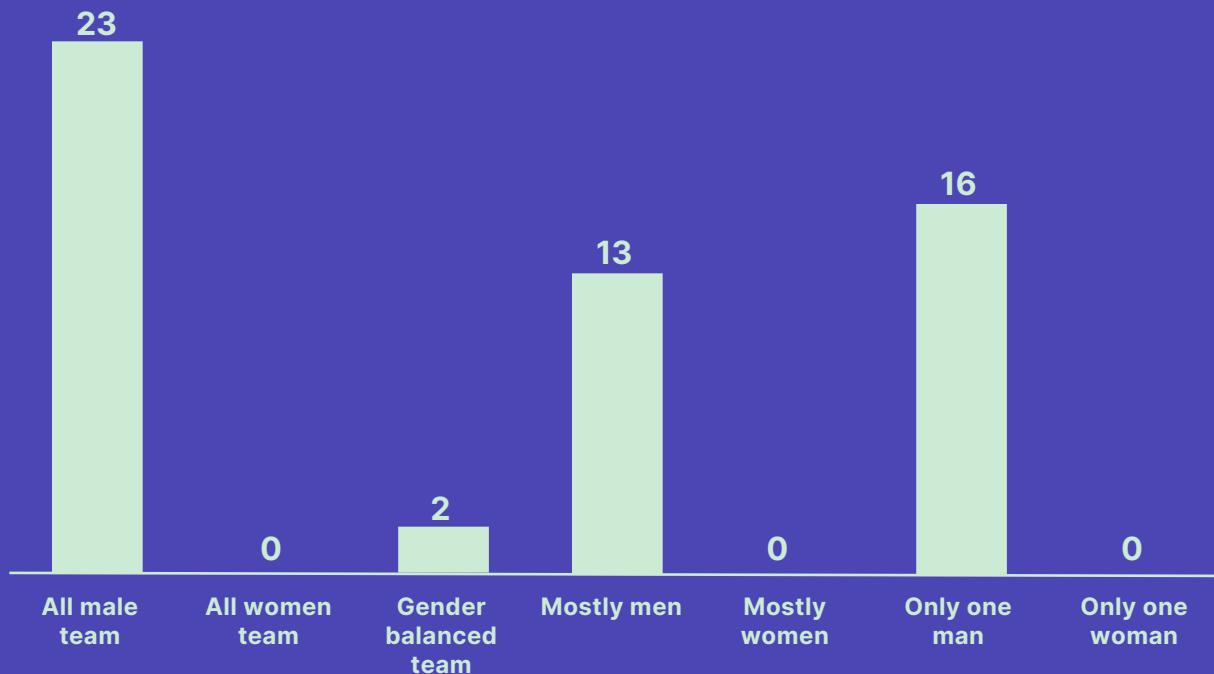
Graph 5 Total plant varieties granted by gender group in Mexico, in 2021.



Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

In 2022, a total of 54 new plant varieties were registered in Mexico, with women participating in 15 of them. Unlike previous years, the “all-male team” group had the highest number of granted varieties, with **23. Women’s participation decreased significantly compared to the previous year**, accounting for only **28 percent of the total**.

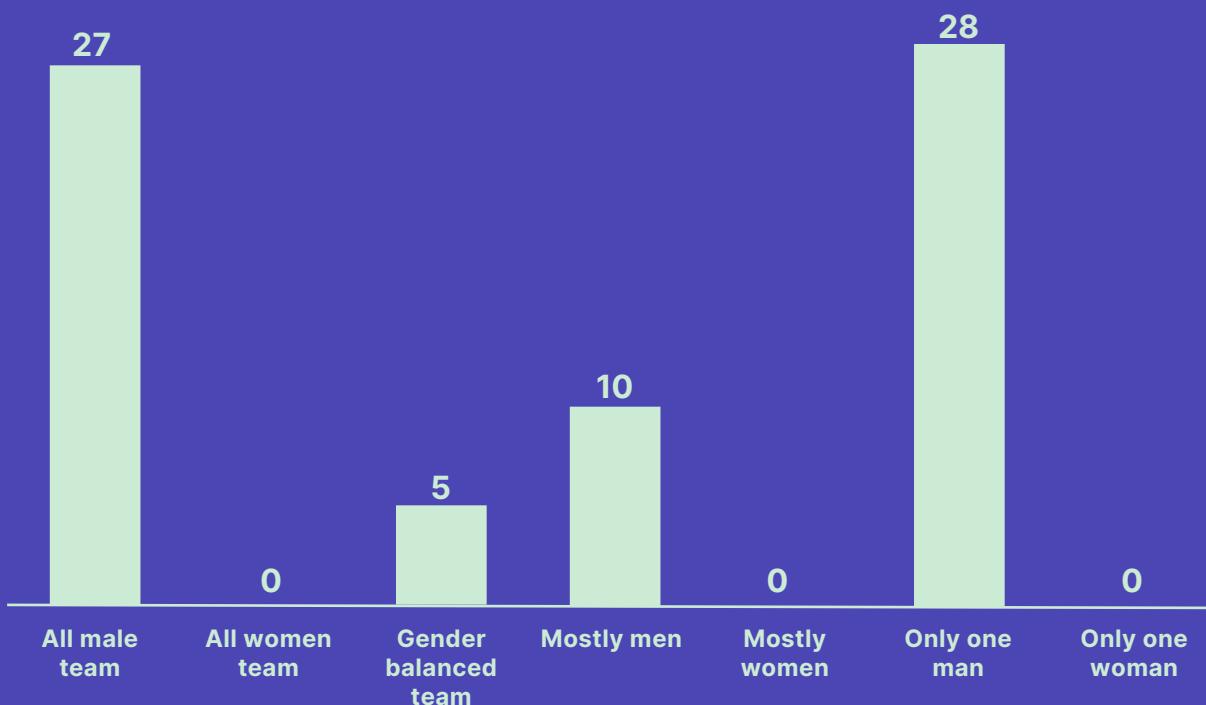
Graph 6 Total plant varieties granted by gender group in Mexico, in 2022.



Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

Finally, in 2023, a total of 70 plant varieties were granted in Mexico, with women participating in 15 of them, specifically in the “gender-balanced” and “mostly men” categories. This year, along with 2022, saw the lowest levels of women’s participation during the entire study period. In 2023, this low participation is particularly notable, as those 15 varieties represent only 21 percent of the total.

Graph 7. Total plant varieties granted by gender group in Mexico, in 2023.



Source: Own elaboration based on data obtained through various information requests submitted to the National Seed Inspection and Certification Service, to which filters designed with the R programming language, specifically for this research, were applied.

CONCLUSIONS

Regarding the participation of women and men in plant varieties granted in Mexico from 2019 to 2023, this research concludes the following:

- 1. For the first time in Mexico and in any country in Latin America and the Caribbean, the gap between male and female plant breeders in granted plant varieties has been identified and documented.**
- 2. Women participated in 106 of the plant varieties granted in Mexico during the study period. Their involvement in each group was as follows: 22 in “gender-balanced” teams, 78 in “mostly men”, 2 in “mostly women”, and 4 in the “only one woman” group.**
- 3. In percentage terms, women participated in 37 percent of the total granted varieties. Their participation was distributed as follows: 7 percent in “gender-balanced”, 25 percent in “mostly men”, and 1 percent each in “mostly women” and “only one woman”.**
- 4. In the “all-female team” group, there were zero varieties granted during the study period. In contrast, 92 varieties (29 percent) were granted under the “all-male team” group.**
- 5. Although “only one man” was the leading group overall with 116 registrations (37 percent), it is worth highlighting that when combining the three categories involving both men and women (gender-balanced, mostly women, and mostly men), a total of 102 varieties were granted representing percent. This demonstrates that women are increasingly gaining ground in plant breeding through collaboration with men.**

RECOMMENDATIONS

- 1. For organized civil society, academia, and business chambers related to the field of plant varieties**, it is recommended that they become actively involved and support the generation of more statistical information. Likewise, they are encouraged to take concrete actions to increase the participation of women. **Increasing women's participation cannot be the sole responsibility of the public sector.**
- 2. For the government**, particularly the **Ministry of Agriculture, the Ministry of Science, Humanities, Technology and Innovation**, and the **National Seed Inspection and Certification Service (SNICS)**, it is necessary to design, implement, and evaluate public policies aimed at increasing the participation of women in the field of plant varieties especially to boost the number of female plant breeders.
- 3. For the Federal Congress**, first, to **legislate** in favor of promoting women's participation in research and development activities that could result in new plant varieties. Second, **allocate appropriate resources in the national budget** so that the government bodies mentioned above can achieve those goals.
- 4. For state governments and congresses**, to take the necessary actions within their legal scope to **increase women's participation** in research and development activities and to **eliminate or reduce the barriers that hinder the emergence of more female plant breeders.**

BIBLIOGRAPHY

- Adelaiye, V. O. (2010). PLANT VARIETY RIGHT AND INTELLECTUAL PROPERTY LAW IN NIGERIA: A REVIEW. *Journal of Management and Technology*, 20(1), 451-462. Retrieved from https://www.researchgate.net/profile/Victory-Adelaiye/publication/384354758_PLANT_VARIETY_RIGHT_AND_INTELLECTUAL_PROPERTY_LAW_IN_NIGERIA_A REVIEW/links/66f53e1c553d245f9e35a17d/PLANT-VARIETY-RIGHT-AND-INTELLECTUAL-PROPERTY-LAW-IN-NIGERIA-A-REVIEW.pdf
- Gobierno de México. (2023). *Textos finales del Tratado entre México, Estados Unidos y Canadá (T-MEC)*. Ciudad de México: Gobierno de México. Retrieved from <https://www.gob.mx/t-mec/acciones-y-programas/textos-finales-del-tratado-entre-mexico-estados-unidos-y-canada-t-mec-202730?state=published>
- Jördens, R., & Button, P. (2011). Effective System of Plant Variety Protection in Responding to Challenges of a Changing World: UPOV Perspective. *Journal of Intellectual Property Rights*, 16, 74-83. Retrieved from <https://nopr.niscpr.res.in/bitstream/123456789/11564/1/JIPR%2016%282%29%2074-83.pdf>
- OMPI. (2023). *The Global Gender Gap in Innovation and Creativity*. Ginebra: Organización Mundial de la Propiedad Intelectual. Retrieved from <https://www.wipo.int/publications/en/details.jsp?id=4653>
- OMPI. (2023). *WIPO Intellectual Property (IP) and Gender Action Plan : The Role of IP in Support of Women and Girls*. Ginebra: Organización Mundial de la Propiedad Intelectual. Retrieved from <https://tind.wipo.int/record/47608/?v=pdf>
- ONU. (2015). *Objetivos de Desarrollo Sostenible*. Organización de las Naciones Unidas. Retrieved from <https://www.un.org/sustainabledevelopment/es/>

- Rivoire, B., & Jewell, C. (2019). UPOV: Seguridad alimentaria gracias a la protección de las variedades vegetales. *OMPI revista*(1). Retrieved from UPOV: Seguridad alimentaria gracias a la protección de las variedades vegetales
- Santamaría Hernández, E. (2022). *Derechos de propiedad intelectual y políticas públicas para la economía creativa: recomendaciones para América Latina y el Caribe*. Washington, DC: Banco Interamericano de Desarrollo. Retrieved from <https://publications.iadb.org/es/derechos-de-propiedad-intelectual-y-politicas-publicas-para-la-economia-creativa-recomendaciones>
- Santamaría Hernández, E., Rangel López, A. M., Usiña Mogro, J. G., Valenzuela Bernal, H. A., Martínez Martínez, J. E., Hurtado Tejada, M. F., . . . Rovira, G. (2023). *Mujeres inventoras: América Latina construyendo el futuro*. Ciudad de México: Centro de Análisis para la Investigación en Innovación, A.C. Retrieved from <https://www.caiinno.org/wp-content/uploads/2023/08/Mujeres-CAIINNO-GLIPA.pdf>
- SNICS. (2024). *Solicitud de información con folio 330028224000036*. Servicio Nacional de Inspección y Certificación de Semillas.
- UPOV. (1991). *Convenio Internacional para la Protección de las Obtenciones Vegetales*. Ginebra: Unión Internacional para la Protección de las Obtenciones Vegetales. Retrieved from https://www.upov.int/edocs/pubdocs/es/upov_pub_221.pdf