

Uncovering Indigenous Women in STEM: A First Approach from Mexico

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Introduction

The Programa de Apoyo a Mujeres Indígenas en Ciencia, Tecnología, Ingeniería y Matemáticas (PEPMI) was launched in 2018.¹ This was the first programme of its kind in the history of Mexico due to three articulated components: (1) its target population (indigenous women with PhDs); (2) the level of training at which it operated (postdoctoral); and (3) its focus on Science, Technology, Engineering and Mathematics (STEM) fields. Furthermore, the programme included a range of supplementary supports for the fellows that is not typically encompassed in conventional scholarship schemes, providing them not only with a living stipend but also significant resources to carry out their research.

PEPMI lasted five years (2018–2022). Its main objective was to support indigenous women in the initial stage of their scientific careers by linking them to the country's research sector through a three-year postdoctoral stay. A second objective was to provide indigenous women with the opportunity to strengthen their skills and expertise for the generation of scientific knowledge in their areas of specialisation. Thirdly, it was expected that the enhanced scientific skills and expertise would facilitate the fellows' ability to contribute to the development of their communities and the country as a whole. At the end of the programme, it was expected that the fellows would have the necessary

1 Programme to Support Indigenous Women in Science, Technology, Engineering and Mathematics.

attributes to serve as role models to encourage greater participation of indigenous women in STEM fields, where they are particularly underrepresented.

A research study evaluating the academic experiences of PEPMI grantees ran parallel to the operation of PEPMI. The central purpose of the study was to document the academic profile of the grantees, their postdoctoral research experiences and the main academic results obtained at the end of the programme. As part of the data collection process, remote questionnaires were administered and visits were made to grantees at their research centres. Individual semi-structured interviews were also conducted, both in person and online, at various points during the postdoctoral period. Additionally, focus groups were conducted to gather further perspectives on the grantees' personal and research experiences. The study provided original information on the target population and useful data for partner institutions to assess the final results of PEPMI. It also served to identify the niche occupied by the programme and to raise awareness of its existence and relevance among scholarly circles.

Via PEPMI, a total of 12 young indigenous women scientists from different states and ethnic groups in Mexico were awarded scholarships. In addition to the significant benefits PEPMI brought to the grantees, the programme yielded knowledge and insights about a set of relevant topics that were not initially anticipated. Insights gained included the educational and professional barriers and opportunities for young indigenous women wishing to pursue scientific careers, as well as the policy and practical conditions in public research centres to host innovative programmes that foster social inclusion. This chapter seeks to shed light on the experiences of indigenous women who have reached the highest levels of academic training in STEM disciplines by highlighting additional knowledge and insights not covered in the original evaluation of PEPMI (Navarrete G. et al., 2023). Subsequently, the chapter aims to contribute to an understanding of the different challenges and opportunities of minority and disadvantaged sub-groups of women, and to the development of more effective strategies to address the specific gender gaps that affect them.

In the opening section, I examine the context in which PEPMI operated and the design components that made it stand out as an innovative programme, shedding light on the statistically small but socially relevant segment of the country's young indigenous women with the interest and preparation to pursue a scientific career.

Based on the information gathered in the evaluative research study on the academic trajectories and postdoctoral research projects of the grantees, the second section of the chapter reflects on the contribution that programmes such as PEPMI can make to advancing our knowledge of the personal capacities

and contextual factors that enable women from historically marginalised indigenous communities in Mexico to advance in their academic and professional pursuits. The second section also draws attention to the value of supporting and promoting the work of young indigenous women engaged in cutting-edge research. The project's emphasis on supporting and promoting fellows made a significant contribution to challenging and reshaping prevailing negative stereotypes and prejudices about indigenous women in Mexico, particularly regarding their capabilities in science and participation in STEM fields.

Part three presents a reflection on the scope and limitations of PEPMI by addressing the question: Are postdoctoral fellowships an appropriate way to support and promote the professional development of indigenous women scientists, particularly in STEM fields, and are investments at the individual level an effective strategy to advance broader social and gender equity goals in the Mexican scientific system? As will be demonstrated in the following sections, the PEPMI results provide a positive answer to both questions.

Through the discussion of the context surrounding PEPMI, the value of the programme for grantees and a broader understanding of the experiences of indigenous women scientists in Mexico and the limitations of PEPMI, the chapter aims to provide an overview of the programme, including successes and areas for future improvement. In all, through reflection, the chapter aims to provide insights for those looking to better understand the challenges faced by indigenous women scientists and those looking to implement programmes to support them.

An innovative programme: The context and rationale surrounding PEPMI

Recruiting indigenous women with PhDs in STEM fields was one of the first challenges that the PEPMI coordinator and her team at the Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS) faced when starting the programme in the spring of 2018. At the invitation of the coordinator, I participated in several working meetings where the topic was discussed. It was difficult to find candidates, given the specific requirements of the programme.

The solid experience of CIESAS in operating postgraduate scholarship programmes for indigenous peoples offered valuable information about indigenous women with doctorates (Navarrete G. & Gallart, 2018).² The landscape

² CIESAS has operated two different postgraduate scholarship programmes for indigenous people but articulated sequentially and in their design and objectives. The first, the Programa Internacional

was very different from twenty years prior, when practically nothing was known about indigenous women with doctorates (Navarrete G., 2013). CIESAS's extensive network of contacts, including indigenous fellows and alumni of the scholarship programmes, together with the relationships established over twenty years with the institutions and graduate programmes where they have studied, has proved a useful resource. However, it was insufficient for the specific outreach required for PEPMI. While previous indigenous-focused postgraduate fellowship programmes were open to candidates from all disciplines of knowledge, the stipulation that applicants have a robust history of practical work and social commitment meant previous scholarships were in social sciences and humanities fields. PEPMI's focus on STEM disciplines was uncharted territory.

Resources and expertise from CONACYT (Mexico's National Council of Science and Technology), PEPMI's funding partner institution, together with the International Development Research Centre (IDRC) were also leveraged in the effort to identify eligible candidates for PEPMI. Created in the 1970s, CONACYT was the public institution responsible for drawing up the country's science and technology policies and for promoting and strengthening its scientific and technological development.³ It was also the main public body that awarded scholarships for postgraduate studies. CONACYT therefore had an extensive database of its scholarship recipients, although only in recent years has it begun to record their ethnicity. Despite its utility, the information in question lacked sufficient consistency and was not frequently updated. The distribution of the initial PEPMI call for applications to the email inboxes of the former PhD fellows with whom CONACYT had a record-keeping relationship yielded modest results. The two rounds of grants were also publicised through

de Becas de Posgrado para Indígenas (IFP Mexico, for its acronym in English), began in 2001 and concluded in 2013 (Navarrete G., 2013). Funded by the Ford Foundation, it was the first master's and doctoral scholarship programme aimed at the indigenous population in Mexico. Shortly before the conclusion of this programme, which yielded successful results, and with the aim of providing continuity to a type of intervention that continued to be relevant and necessary, in 2012 CIESAS managed to attract the interest and funding of CONACYT, giving rise to the Programa de Becas de Posgrado para Indígenas (PROBEPI). This programme continues to date. For an introduction to PROBEPI, see <http://becasindigenas.ciesas.edu.mx>.

- 3 In May 2023, the General Law on Humanities, Sciences, Technologies and Innovation was enacted, which introduced changes in the functioning and name of CONACYT, which became the Consejo Nacional de Humanidades, Ciencias y Tecnologías (CONAHCYT, National Council for Humanities, Sciences and Technologies). In November 2024, CONAHCYT disappeared, being replaced by the Ministry of Science, Humanities, Technology and Innovation (SECIHTI, for its acronym in Spanish). The acronym CONACYT, which was in force during the implementation of PEPMI, will be used in this text.

other media; these included the websites of CIESAS, CONACYT and other higher education institutions offering STEM degrees.

Despite these resources, the number of applications received was lower than expected. The result can be attributed to several factors. It is not uncommon for the inaugural calls of new fellowship programmes to attract a smaller number of applications than those received in subsequent promotions, when the existence of the programme and the opportunities it offers have become more widely known. Further, the number of scholarships on offer – 10 in each PEPMI call – may have discouraged some applicants from applying because they assumed that their chances of obtaining a scholarship would be low. Eligibility criteria for scholarship applicants, which included having to carry out the postdoctoral stay in a public research centre and the requirement to develop a project aligned with CONACYT-prioritised lines of knowledge generation and application, may have limited the number of applicants as well.⁴

Critically, the programme's target population, indigenous women holding doctoral degrees in STEM disciplines, is limited in size, and there are no precise data on the population, as scant attention has been devoted to the matter. It is nevertheless acknowledged that their number is very limited, which is partly related to the number of indigenous women entering university and those who manage to study at the doctoral level.

The following data overview establishes population characteristics. In 2020, the mean level of schooling among women aged 15 and over who speak an indigenous language was 5.8 years (INEGI, 2022).⁵ As might be anticipated, indigenous women represent only a small minority of those pursuing higher education. In the 2021–2022 academic year, only 33 106 women speakers of indigenous languages (MHLI)⁶ were registered as pursuing a bachelor's degree, representing 0.7% of the total national enrolment at this level of education. In the same academic cycle, there were 593 MHLI enrolled in master's programmes

4 The CONACYT System of Public Centres – under the SECIHTI since 2024 – comprises 26 scientific research and specialised human resources training institutions. Spread across the country, these scientific institutes develop different research lines. Ten centres specialise in exact and natural sciences, eight in technological development and eight in social sciences research (<https://secihti.mx/cp/>). They represent a significant and influential element of Mexico's scientific system, which encompasses a broader array of research institutions, including those affiliated with the country's public and, to a lesser extent, private universities.

5 The National Commission for the Development of Indigenous Peoples shared data based on a 2015 census that 51.1% women and 48.9% men in the overall population of the country are indigenous (Gobierno de México, 2018). This figure represents just under 6% of the total population of the country.

6 MHLI is the Spanish abbreviation for *Mujeres Hablantes de Lenguas Indígenas*.

(0.19% of the national master's enrolment) and 104 enrolled in doctoral programmes (0.18% of the national doctoral enrolment) (ANUIES, 2022).⁷

In general, Mexico's indigenous population faces low levels of access to higher education. The limited rates of indigenous peoples in higher education can be attributed to a number of factors, including poverty, difficulties in accessing university education services due to geographic isolation, the low quality of education received at previous levels, and, until recently, a dearth of institutional support for higher education.⁸ Despite the longstanding awareness of the educational disparities between indigenous and non-indigenous individuals and the adverse implications of this for Mexican society, the most significant legal reforms and institutional initiatives exclusively targeting indigenous students' access to higher education date to the early 2000s (Didou, 2011; Navarrete G., 2017). Prior to that, disadvantageous competition with students from more fortunate socio-economic sectors and with superior academic preparation was the norm for indigenous students in pursuit of scholarships.

For indigenous women, the problems described above were compounded by several additional difficulties. The dominant patriarchal culture of most indigenous groups, the reproductive role assigned to women, their family responsibilities centred on child-rearing and housework and stereotypes characterising them as less competent are all factors that hinder their formal educational progression (Navarrete G. et al., 2023).

Barriers for women in STEM fields are similar to those reported in Mexico and in Latin America for women in general (Andrade Baena, 2023; Bello & Estébanez, 2022; IPADE & Movimiento STEM, 2020; ONU Mujeres, 2020). For most indigenous women, poverty and racial discrimination are two important additional factors. Women are not a homogeneous group, nor are their barriers and opportunities to access and participate in these disciplines. However, intersectionality, or an understanding of how an individual's multiple identities impact their experiences, is often overlooked. In her recent study on the gender gap in STEM in Latin America, Assorbi (2023) found that 120 out of 154 recent gender-sensitive STEM education initiatives in 17 Latin American countries,

7 No information was located on self-identified indigenous women pursuing university studies. Self-ascription is another legally recognised criterion for the classification of the indigenous population in Mexico. The average level of education among these women is 9.9 years (INEGI, 2022), higher than those who speak an indigenous language. However, few are likely to go on to study for a doctorate. In Mexico, about 1% of the population has a doctorate.

8 Numerous reports, research and empirical studies have highlighted the importance of these factors among the various barriers to greater participation by indigenous people in higher education. See Carnoy et al. (2002); González Girón and Martínez García (2022). These limitations help explain the low percentage of the indigenous language-speaking population with higher education: 4.7% in 2015 (CDI, 2015).

including Mexico, do not have an intersectional perspective at all, “targeting only girls and women in general, regardless of other socio-economic characteristics that may be related to their exclusion from access”. To develop effective programmes and policies aimed at reversing inequalities and discrimination, it is essential to design them with intersectionality in mind.

It was in this context that PEPMI was launched and implemented. However, it must be stressed that this did not occur in isolation. Over the last 20 years, numerous organisations and institutions in Mexico have developed proposals and initiatives at different levels with the objective of reducing gender-based gaps and promoting women’s scientific vocations in STEM fields.⁹ However, none of these actions targeted indigenous women. The implementation of PEPMI, with its additional focus on the post-doctoral level, made this population group and its specific needs in the final stage of the lifecycle visible.¹⁰ It also provided a first insight into the challenges and opportunities encountered by young indigenous women in their pursuit of research positions and involvement in scientific and technological production within STEM fields.

The duration of the scholarships was three years, which was one year longer than the standard duration for a postdoctoral fellowship in Mexico at the time. In addition to the support provided by CONACYT for postdoctoral fellowships (including a monthly stipend for the fellows’ expenses, a lump sum for relocation and installation expenses, and medical services in the public health system), IDRC’s participation injected funding for research and dissemination, as well as a seed fund for community projects or activities. Research funding was ‘demand-driven’ or ‘tailor-made’, allowing each grantee to define what she needed for her research project. Grantees were also eligible for funding to improve their English language skills.

In accordance with the agreement between the programme partners, the postdoctoral stays were to be carried out in one of the 26 public research centres (CPI) of CONACYT. The host research institution provided an experienced researcher and subject matter expert as a tutor for each postdoctoral fellow. The tutors offered guidance on the design and development of research projects, including financial aspects, which were often unfamiliar to the post-docs. They also aided with training of specialised programmes and laboratory equipment, the planning and implementation of human resources training

9 For an overview of the main proposals and actions implemented, see Andrade Baena (2023); Ramírez Hernández et al. (2022).

10 I adopt the concept of ‘lifecycle’ as employed by numerous scholars to signify the various stages women traverse in their relationship with science. These include the early years of childhood and primary education, followed by secondary education, higher education, and finally, research positions and scientific and technological production.

activities (including teaching and thesis direction) and the dissemination of the results of the grantees' research.

The physical and human research infrastructure provided by each CPI, and the importance of the tutor in supporting and facilitating the work of the fellows in the abovementioned aspects, illustrate the value and formative benefits that postdoctoral periods can have. This highlights the necessity for institutional support for this purpose. Although the postdoctoral period is typically regarded as a time dedicated to advancing research in one's chosen field, for young indigenous scholars who have recently completed their doctoral studies, it is more than just an academic experience. It also provides an opportunity to expand their personal and professional networks and to develop self-confidence.

A further noteworthy aspect of the PEPMI design was the incorporation of the aforementioned research study. Despite the proven value of these types of studies accompanying the development of fellowship programmes, it is not a common practice to allocate funding for the purpose of evaluating a fellowship programme. This component guaranteed the availability of comprehensive documentation of the academic experiences of the fellows during their tenure at the conclusion of PEPMI. Furthermore, the analytical component of the study enabled the programme's projections to be extended beyond their internal dimension and disseminated in specialist forums.

The innovative nature of PEPMI was also evident in the institutional spaces where it was implemented. The presence of indigenous postdocs and the existence of a programme specific to their gender and ethnic identity was a novel phenomenon in the CPIs where the grantees carried out their stays. In most of these scientific institutes, research has been conducted *on* indigenous communities. These communities and their members tend to be seen as research subjects rather than actors in their own development.

This perception changed among many of those who had the opportunity to interact with the grantees and gain insight into their scientific research capabilities. The research team also conducted interviews with senior CPI staff and fellows' tutors, which served as a further catalyst for challenging these stereotypes. These discussions, in conjunction with the questionnaires distributed to the tutors at the outset and conclusion of the postdoctoral fellows' tenures, and participation of several tutors in select collective work meetings convened by the Programme Coordination with grantees, compelled the tutors to engage in more profound reflection concerning the ethnic and gendered attributes of the postdocs and how these attributes influenced their research projects. Furthermore, the tutors were encouraged to consider broader issues, such as

the lack of social inclusion policies and the systematic underrepresentation of indigenous women in the country's scientific institutions.

Dismantling stereotypes and biases: Twelve young indigenous women scientists

Additional PEPMI eligibility criteria included having obtained a PhD within a period of no more than five years (i.e. in 2013 or later) and having a high-quality academic profile and production. Applicants were also required to have been accepted to engage in research pertaining to a specific line of knowledge generation and application, as developed within a CONACYT CPI.

Two calls for applications with national coverage were made, one in 2018 and the other in 2019. The applications were evaluated by CONACYT, which selected a group of 12 indigenous women from the centre and south of the country, belonging to seven different ethnic groups (see Table 1). The first cohort of six postdoctoral researchers commenced their tenure in 2018 and concluded in 2021, while the second group's tenure was from 2019 to 2022.

The grantees were between 31 and 49 years old, with the majority (8) falling within the 31–37 age range. Six were single, five were married and one was divorced. Four of the married women had one child and one had two children. The grantees were born in localities in central and southern Mexico, where the highest percentage of the country's indigenous population is located: four of them were born in Yucatan, four in Oaxaca, two in Chiapas and two in the State of Mexico (Figure 1). The grantees belong to the following indigenous groups: Mayan (4), Zapotec (2), Mixtec (1), Mazatec (1), Mam (1), Tzeltal (1) and Otomi (2).

The research study identified the educational and professional profiles of the grantees. It also identified the motivations and circumstances that enabled them to pursue their formal studies to doctoral level. From the findings common elements and experiences emerged that speak to the personal capacities and contextual factors that enabled women from indigenous communities in Mexico to progress academically and professionally.¹¹ This cohort is characterised by its ability to recognise and seize opportunities at hand, even in the face of constraints.

The group of indigenous women recruited and supported by PEPMI had outstanding knowledge capital and skills for study and scientific work. At the same time, they lacked certain tools and needed to strengthen other skills

¹¹ The following reflections are based on the data contained in Navarrete G. and García Martínez's (2023) unpublished report.

Figure 1: Map of grantees' places of origin

that were important for their long-term success in STEM (e.g. networking, technical laboratory skills and English language skills). The clarity provided by the research study on these issues facilitated a more precise allocation of programme resources and support.

A primary commonality among grantees is that they are of recent generations of indigenous people who continue to contend with social inequity yet have witnessed partial improvements in their living conditions compared to older generations, in part due to the implementation of various public programmes and policies over recent decades (CONEVAL, 2019). It is also noteworthy that, in comparison to other states with sizeable indigenous populations, the number of higher education institutions in the states of origin of the fellows – Oaxaca, Yucatán, Chiapas and the State of Mexico – has increased in the present century, thus facilitating greater availability of educational opportunities for the indigenous population.¹²

A further common experience among the fellows is that they received their entire education, from elementary level through to postgraduate studies,

12 Notwithstanding the considerable obstacles faced by indigenous women, the educational trajectory of PEPMI grantees illustrates that educational opportunities are gradually expanding. Furthermore, although not exceeding the narrow range of MHLI pursuing a postgraduate degree noted in the previous section, a recent investigation revealed that the number of MHLI engaged in master's degree studies increased twofold between 2016 and 2022 (outnumbering men in the latter year), while the number of those pursuing a doctorate rose threefold over the same period (approaching parity with men) (Romero-López & Anell-Parra, 2023).

within the public education system. This underscores the importance of free public education in Mexico for a vast array of socio-economic groups, including indigenous women. Additionally, several of the postdocs highlighted the significance of having received a publicly financed scholarship (at the state or national level) during one or more stages of their pre-university education. The recipients of those scholarships attested that the scholarships were essential to continuing their studies. This is also the case regarding their postgraduate studies (master's and doctorate), for which all the grantees received a grant from the federal government through CONACYT.

At the time of applying for the scholarship, most grantees had already gained work experience in areas related to their interests and specialisations. One was a laboratory manager in a private company, one worked in the food industry and others were teaching at their home universities. These activities tended to be undertaken between the completion of their bachelor's degree and the start of their master's degree. Nine of them also engaged in volunteer work, which was also related to their professional interests.

The family backgrounds of the fellows are similar in terms of educational attainment. There has been significant progress in their generation's level of education compared to that of their parents and especially their grandparents (see Chapter 11 for similar findings in a sample of Bolivian women in STEM). The information provided by the postdocs shows a very low level of educational attainment for their grandparents: grandparents were illiterate, did not attend primary school and only in a few cases did they manage to complete it. The case of one grandmother who completed sufficient studies to become a teacher, stands out as unique.

The parents of the grantees and their siblings have higher levels of education when compared to grandparents, with the siblings being relatively more likely to have a baccalaureate or bachelor's degree. Even then, in all but two cases, the grantees are the most highly educated members of their families and hometowns. The grantees come from low-income families, with fathers who are small farmers, labourers, artisans, small traders and, in three cases, primary school teachers. Among the mothers, there were housewives, kitchen helpers, domestic workers and two primary school teachers.

Grantees also report receiving high levels of support from their nuclear families. This crucial support enabled almost all the grantees to complete their studies within the deadlines set for each level of education. Family support included financial, emotional, moral and motivational supports. This involved a demanding and time-consuming effort on the part of the grantees' parents. In addition to this support, there were siblings – usually the eldest – who also

contributed financially to their sisters' studies and other close relatives who, in some cases, hosted the scholars in the city they were studying.

The motivations and pathways to STEM specialisation of the indigenous women supported by PEPMI are particularly relevant. Among other reasons, it allows identifying traits that differentiate them from women from other social backgrounds who also work in STEM fields. These are not young female scientists with only theoretical interests or oriented towards market-driven technological development. Their lines of research are oriented towards the production of socially useful knowledge, especially for disadvantaged groups. As members of disadvantaged groups themselves, grantees have important perspectives to offer. Growing up in or close to rural contexts and direct knowledge of the problems of the respective populations have permeated their research interests. The desire to learn more and to look for ways to improve the living conditions of their communities, and with wider social projections, was clear in their postdoctoral research projects. One fellow expressed this link in the following way:

In the rural community, agriculture was one of the main activities carried out by both men and women, but many have abandoned this activity and opted to work in the nearest cities. I grew up in an agricultural environment, which sparked my interest in seeking development options that make appropriate use of the resources and capacities of rural farming communities.

Another fellow emphasised the significance of her status as an indigenous woman:

As a woman from an indigenous community, I am acutely aware of the specific needs of rural communities. This has informed my decision to pursue studies in the field of sustainable rural development. To a greater or lesser extent, my research can contribute to the well-being of rural families. Furthermore, my status as an indigenous woman affords me a greater degree of empathy, which enables me to develop my research with greater motivation.

Another motivating factor that encouraged grantees to pursue a STEM specialisation was the influence of their family members, particularly their fathers, followed by their mothers, and in some cases, their grandparents and siblings. Grantees also pointed to the role of secondary and high school teachers in fostering their interest in mathematics and science as relevant. By the time

they reached university and graduate school, their vocation was clearly defined. Nevertheless, the assistance provided by some of the professors in these academic settings was of particular importance. The professors' support facilitated the formation of networks and identification of potential opportunities. Additionally, they offered well-informed guidance on suitable pathways and academic institutions for studies and developing a scientific career.

PEPMI and its associated study represent a significant initial step in the national agenda to enhance the representation and participation of indigenous women in science in Mexico. The information summarised in this section documents the existence, profile, interests and scientific work of a subset of indigenous women about whom no prior information was available. Viewed from a wider perspective, their trajectories reflect on the access routes to scientific careers for the larger, albeit small, population group to which they belong. They are the tip of the iceberg of a larger but to date unknown universe of indigenous women with interest and capacity to contribute to the production of scientific knowledge in the country.

Reflections on the contributions, scope and limitations of PEPMI

Latin America is one of the two regions in the world in which gender parity has been achieved among researchers, with women representing approximately 45% of the total number of researchers (Bello & Estébanez, 2022). Although nowhere near the heights of countries such as Venezuela (60%), Argentina (53%) and Uruguay (50%), Mexico has experienced recent improvements towards gender parity: from 2000 to 2016 female participation in the total number of researchers increased from 28% to 33%. This increase in women's participation in research is the result of the various policies and programmes implemented at different levels this century. However, the lack of parity also speaks to the need for continued vigorous and sustained action to improve women's participation in STEM. One of the key arguments made in this chapter is that PEPMI has made contributions towards the achievement of this goal.

It would be inaccurate to suggest that a scholarship programme that supported 12 women and was in operation for five years had a significant impact on a large scale (see Chapter 10 for information about a set of programmes designed to benefit women in STEM across the Global South). However, PEPMI was not designed to achieve large numbers or to prompt immediate far-reaching transformations. Rather, its aim was to have a qualitative impact

on two main levels: first, enhancing the careers of its grantees; and second, increasing the visibility of indigenous women scientists.

Regarding the first, the programme was successful in reinforcing the skills and knowledge necessary to put the postdocs in better positions to continue their aspirations and efforts to develop professionally as scientists. It allowed grantees to become known and to broaden their networks in their small and competitive fields of research. With one exception,¹³ all fellows expressed a high degree of satisfaction at the end of their postdoctoral stay. One case exemplifies this:

I am very happy with what I have achieved with this great opportunity. It was an enormous learning experience. Apart from working with my tutor, it has allowed me a lot of autonomy, to know how to move, how to carry out my own processes as a researcher, and it has also helped me to train myself a great deal.

Secondly, by focusing on indigenous women, the programme recognised, addressed and documented the existence of a subset of women that has largely been ignored in efforts to increase women's participation in STEM in Mexico or Latin America more broadly. PEPMI allowed for the understanding and subsequent addressing of challenges faced by indigenous women at the postdoctoral level. Indigenous women in STEM are faced with limited access compared to other women attempting to establish or establishing a presence in science. In addition to their gender and socio-economic status, stereotypes about their ethnicity reinforce the widespread questioning of their ability to become relevant actors in scientific production. One fellow, a PhD and specialist in polymeric materials, recalled the following about her initial postdoctoral period:

When I arrived here, I did see that part of being indigenous, I did have that conflict, didn't I? That they expected someone different and they didn't believe that one had indigenous origins ... they didn't think that an indigenous person could have a postgraduate degree ... But I should clarify, not from the researchers, but from the students.

The PEPMI programme has been instrumental in addressing the pervasive stereotypes and prejudices that have historically been directed towards

¹³ The grantee who expressed some dissatisfaction attributed this mainly to the lack of support she received from her tutor. Conversely, she indicated high satisfaction with her CPI as a venue for conducting research and expanding her professional contacts and networks.

indigenous women in Mexico. In addition to its focus on indigenous women scientists in STEM, PEPMI moved beyond the conventional limitations of fellowship programmes – which are typically constrained to their operational implementation – by incorporating a component to ensure the visibility of the programme’s existence and outcomes. A pivotal element of PEPMI’s dissemination efforts was the availability of the information, analysis and reflections provided by the research study as the programme developed. An account of the programme’s outcomes was published at its conclusion, accessible to a broad readership (Navarrete G. et al., 2023).

One of the aims of the programme was for the grantees to acquire or reinforce the attributes necessary to serve as role models, thus encouraging more indigenous women to pursue careers and participate in science (see Chapter 12 for discussion on considerations when using role models to address gender disparities in Africa). As the postdocs progressed through their respective stays, they exhibited an increase in both individual and group self-confidence. Some stated that, at various points in their personal, academic and professional lives prior to receiving the fellowship, they concealed their indigenous identity. During and following the fellowship, grantees felt they were able to openly display their indigenous identities in interviews and conferences. With the initiative and financial support of the programme, grantees established the country’s inaugural indigenous in science network (REDMIC).

Figure 2: REDMIC logo



It is also noteworthy that the programme provided support to pioneering research in a range of fields, including biomedicine, plant physiology and nutrition, food chemistry, organic agriculture, the solidarity economy, ecology and climate change, and sustainable development. These studies were conducted by

a cohort of young indigenous women scientists, guided by the desire to enhance the quality of life for their communities and regions, as well as for Mexican society as a whole.

This chapter illustrates the value of fellowship programmes such as PEPMI in promoting STEM career paths and supporting and making visible young indigenous women scientists. That said, PEPMI was not without limitations. The programme was implemented in a limited number of CPIs, and therefore the reported experiences do not extend to all CONACYT research centres. Even in the CPIs that participated in the programme, the presence of the fellows was largely confined to their assigned laboratories or academic departments, with low engagement in other areas.

Moreover, the implementation of measures to combat the spread of the SARS-CoV-2 virus in 2020 and 2021 resulted in the disruption of the integration process and the proximity of fellows to the academic community of the host CPIs. Consequently, the visibility that would have been afforded to them under normal circumstances was also reduced.

The time that has elapsed since the end of the programme allows us to observe the limited use that has been made of this experience at the institutional level. Until 2023, CONACYT maintained its provision of postdoctoral fellowships for indigenous women. In 2024, the call for applications was opened to both indigenous women and men. Contrary to PEPMI, the scholarships offered in 2023 did not include any additional support for research, capacity-building or community projects. This emphasises the significance of international collaboration in advancing intervention models that exceed the financial capabilities of national public institutions, or whose priorities undergo a transformation upon the conclusion of respective cooperation agreements.

Conclusion

It is of the utmost importance to direct attention towards the value and proven results of interventions with broad social benefits, such as PEPMI. This programme pioneered a novel and far-reaching approach to fostering the participation of young indigenous women scientists in STEM disciplines. The programme also outlined and documented specific strategies for the recruitment, selection and support of indigenous women postdoctoral indigenous fellows. These strategies, in conjunction with the insights gained from their implementation, represent a valuable resource for informing and refining the design and execution of future actions and programmes inspired by similar objectives. Alongside the valuable individual benefits for grantees, such

programmes can facilitate pathways towards social inclusion and the democratisation of highly segmented scientific systems and societies, including Mexico and other Latin American countries.

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