

Community strategies for strengthening food autonomy and *buen vivir* in a Nasa Indigenous Reservation, Colombia: A community-based participatory research (CBPR) approach

Sara María Cano-Bedoya ^{a*}
Universidad de Antioquia

Juan Camilo Calderón-Farfán ^d
Universidad Surcolombiana

Jennifer Marcela López-Ríos ^b
Universidad de Antioquia

Luz Nidia Finscue-Pete ^e
Resguardo Indígena Nasa Paéz-Huil

Leisy Cruz-Rodríguez ^c
Universidad Surcolombiana

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Abstract

The growing problem of hunger and food insecurity remains a persistent global challenge. In Colombia, the Department of Huila, an administrative region located in the southwest of the country, exhibits high levels of food insecurity and

malnutrition among its Indigenous population, a process linked to land and ancestral traditions that are part of the concept of food autonomy. This study aimed to describe the community strategies co-constructed by the Nasa Páez Indigenous

^{a*} *Corresponding author:* Sara María Cano-Bedoya, Health Administrator with emphasis on Health Services Management, Universidad de Antioquia, Facultad Nacional de Salud Pública; Medellín, Colombia; Cl. 62 #52-59; smaria.cano@udea.edu.co;  <https://orcid.org/0000-0002-6241-0334>

^b Jennifer Marcela López-Ríos, Master in Public Health, Health Administrator with emphasis on Health Services Management, Professor and researcher affiliated with the Grupo de Investigación en Salud Mental- GISAME, Universidad de Antioquia, Facultad Nacional de Salud Pública; Medellín, Colombia; jennifer.lopez@udea.edu.co;  <https://orcid.org/0000-0003-3629-9377>

^c Leisy Cruz-Rodríguez, Nurse, Universidad Surcolombiana, Facultad de Salud, Neiva, Colombia; leicru.1999@hotmail.com;  <https://orcid.org/0000-0003-1263-8194>

^d Juan Camilo Calderón-Farfán, PhD in Health Sciences, Master in Public Health, Nurse, Professor, Departamento de Enfermería, Universidad Surcolombiana, Facultad de Salud, Neiva, Colombia; juan.calderon@usco.edu.co;  <https://orcid.org/0000-0001-5965-5771>

^e Luz Nidia Finscue-Pete, Leader and Former Governor of the Resguardo Indígena Nasa Paéz-Huila, Íquira, Colombia; luznidia2402@hotmail.com

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Reservation to strengthen food autonomy and *buen vivir* (good living) within their territory. Using a qualitative community-based participatory research (CBPR) approach, the study was conducted in two phases. The approach to the community phase involved presenting the proposed study during a community assembly, forming a community coalition, and agreeing on methodological aspects. The diagnosis and strategy formulation phase included documentation review, participatory meetings on *buen vivir* and food memory, Circles of the Word (talking circles), and visits to the *tul* (traditional household garden). These activities facilitated the co-construction of community-led strategies to strengthen food autonomy. The community coalition established five strategies: the recovery of native seeds, the implementation of demonstration *tul*, the development of a Nasa cropping calendar, the installation of water filters, and a cross-cutting component focused on ongoing support, awareness-raising, and training. These strategies were grounded in the cosmovision, traditional knowledge, and practices of the Nasa people and took into account the local community's capacities. Ultimately, these community-led strategies helped lay the foundations for strengthening food autonomy and *buen vivir*, highlighting the value of the participatory process and the community's capacity to self-organize around food practices. This study offers valuable insights for strengthening participatory approaches to Indigenous food sovereignty.

Keywords

Indigenous peoples, community-based participatory research, food autonomy, food sovereignty, Colombia, traditional knowledge

Conflict of Interest Disclosure

The authors have no conflicts of interest to disclose.

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Introduction and Literature Review

The problem of hunger continues to grow and poses an ongoing global challenge. After remaining relatively stable since 2015, the prevalence of undernourishment around the world rose from 8% to 9.3% between 2019 and 2020; since then, the food-insecure population has increased each year (Food Security Information Network [FSIN] & Global Network Against Food Crises, 2024). These trends in hunger and food insecurity show discouraging results and setbacks in achieving targets 2.1 and 2.2 of the Sustainable Development Goals (SDGs) for 2030 (Food and Agriculture Organization of the United Nations [FAO] et al., 2024).

Although hunger is a global issue, food insecurity is particularly acute in regions such as South America and Africa (FAO et al., 2018). It disproportionately affects the most vulnerable populations, including Indigenous communities (FAO et al., 2021), who often have limited resources to meet their basic needs, experience low and unstable incomes, and face restricted access to essential services such as healthcare, education, and nutritious food.

According to the most recent National Survey of Nutritional Status (ENSIN), conducted in 2015, the nutritional indicators for Colombia's Indigenous population reveal a deeply concerning situation. Inequities based on the ethnicity of the head of household are especially evident. In households headed by someone of Indigenous ethnicity, the prevalence of food insecurity reached 77%, which is 22.8 percentage points above the national average and 24.7 percentage points higher than in households without ethnic affiliation (Instituto Colombiano de Bienestar Familiar [ICBF], 2015). Among Indigenous children under five years of age, the prevalence of stunting was 29.6% (mirroring the 2010 rate of 29.5%) and considerably higher than the prevalence of 10% observed among non-Indigenous children under five that same year. Similarly, the prevalence of global malnutrition (low weight-for-age) among Indigenous children under five was 7.2%, compared to 3% in the general population. More recent data from 2023–2024 indicate that this population continues to experience the highest prevalence of acute malnutrition, with 2.31 cases per 100 children, surpassing

sing all other ethnic groups (Instituto Nacional de Salud [INS], 2025).

Upon reviewing figures on the food and nutrition situation in Huila, a survey conducted to assess the impact of the COVID-19 pandemic on food and nutrition security revealed that 42.8% of the 455 surveyed households reported moderate to severe food insecurity (Centro Latinoamericano para el Desarrollo Rural, 2021). This indicates that four out of 10 households in Huila reduced the quality and quantity of their food. Alarming, 8% of households faced severe food insecurity, indicating a risk of hunger.

In 2022, the Department of Huila's Nutritional Status Bulletin reported that the areas with the highest prevalence of stunting were the western zone, with an average of 11.73%, and the southern zone, with a prevalence of 9.41% (Gobernación del Huila, 2022). Notably, eight of the municipalities in these regions have the largest concentrations of Indigenous populations.

The Nasa Páez Huila Indigenous Reservation, situated in the western part of the department, constitutes the study population for this research. Originally from the municipality of Páez in Cauca, this community was resettled following the 1994 overflow of the Páez River. In 2018, the Indigenous Reservation recorded a stunting prevalence of 39.7% among children under five, an alarming figure that exceeded the 2018 departmental rate for Huila (8.4%) and the 2014 national statistic for Indigenous populations (38.4%) (Calderón-Farfán et al., 2018). These figures serve as evidence of the precarious food and nutritional conditions faced by Indigenous communities, highlighting the urgent need to develop and strengthen strategic actions.

For Indigenous peoples, in particular, food is deeply connected to the land and their ancestral traditions, which are linked to their physical, communal, and spiritual well-being. However, these practices and food systems have been altered and threatened by a range of factors. These include territorial dispossession and loss; unchecked industrialization; large-scale food production driven by neoliberal policies; the commercialization of ultraprocessed foods; deforestation, water scarcity, and pollution; the exclusion of Indigenous

knowledge from food policy frameworks; migration and urbanization; and the impact of armed conflict (Calderón-Farfán et al., 2023). These processes have significantly eroded and weakened the sovereignty and preservation of people's ancestral knowledge.

Although the Indigenous communities acknowledge the advances made by the national government in public policies aimed at ensuring adequate food security, the Food First Information and Action Network (FIAN, 2013) indicates that these efforts are rooted in a discourse that fails to represent them and renders them invisible. These measures fall short of affirming their collective human right to autonomously manage their own food processes in accordance with their traditions, customs, and practices.

In response, the Indigenous movement has embraced the concept of food autonomy as a fundamental right that entails comprehensive control over the food cycle, from seed production and reproduction to land access and stewardship over water and territory (Gómez, 2010; Millán, 2008; Zuluaga, 2019). Food autonomy encompasses the revitalization of ancestral farming techniques and native crops, including ecological and organic agriculture, the recovery of native seeds and plant varieties, and the redefinition of women's roles in food autonomy, enabling them to pass on their knowledge to future generations.

From this standpoint, this research adopts the definition of food autonomy developed by the Regional Indigenous Council of Cauca (CRIC) and the Regional Indigenous Council of Huila (CRIHU) in Colombia:

The strategy of resistance by Indigenous peoples to the country's socio-political crisis, capitalist consumerist tendencies, and globalization policies ([e.g.,] free trade agreements, transgenic seeds). (Consejo Regional Indígena del Huila & IPS-I CRIHU, 2018, "Food Autonomy," para. 2)

This definition emphasizes the value of traditional crops, the recognition of traditional food preparation, the revival of food practices, and the preservation of family harmony through household

food production for self-consumption, avoiding the use of agrochemicals and monocultures, resisting the influence of media (visual marketing of products), and limiting reliance on external aid (external food programs). In this context, community-led resistance initiatives have gained relevance, such as the call from the National Indigenous Organization of Colombia (ONIC) to implement and strengthen the territories' strategies for food autonomy and sovereignty, grounded in their own identity, as an opportunity to return to their origins and reclaim traditional practices.

This study enriches the literature on CBPR and Indigenous food sovereignty by documenting a process of community reorganization around food autonomy in Colombia. It shows how established frameworks are locally adapted and strengthened through the intercultural co-production of knowledge and the revitalization of ancestral agroecological practices among the Nasa Páez people. Taking place between 2023 and 2025, these processes are embedded within broader historical trajectories of displacement, cultural resilience, and resistance that continue to shape Indigenous struggles for food sovereignty.

Accordingly, the objective of this article is to describe the community strategies developed and implemented by the Nasa Páez Indigenous Reservation to strengthen food autonomy and *buen vivir* in their territory.

Applied Research Methods

This study was guided by a critical social epistemological paradigm, an approach that seeks to question, relativize, and transform prevailing societal structures while proposing alternatives for change and improvement. Within this paradigm, the researcher assumes a self-reflexive and self-critical position regarding the conditions that hinder fair, dignified, and equitable social development (Cifuentes-Gil, 2011). From this epistemological perspective, the subject of study is recognized as a holder of valuable knowledge who often has been excluded from a leading role in scientific inquiry (Carabante-Muntada, 2011). Under this approach, the original constructs of the participants (*emic*) deserve the same consideration and importance as those produced by the researcher (*etic*).

The research team was composed of members of the Nasa Páez community and academic researchers from the University of Antioquia and the Surcolombian University. The Surcolombian University has maintained a consistent research presence in the territory, leading participatory and community-based initiatives that have fostered trust and intercultural dialogue over time. One author is a resident of the region and has participated as a facilitator in agroecological and intercultural education workshops. This positionality facilitated trust and dialogue while requiring constant reflexivity regarding all of the authors' dual roles as researchers and participants. The co-construction process was guided by mutual respect and collective decision-making in each research stage.

In line with this framework, a qualitative study was conducted using a community-based participatory research (CBPR) approach. This methodology enables research to be conducted in close collaboration with community members, actively involving them in all stages of the research process. The primary aim of CBPR is to deepen understanding of social phenomena while integrating the knowledge produced into interventions, policies, and social transformations that enhance the health and quality of life of the community (Israel et al., 1998; 2006).

The diagnostic and formulation process for the community strategies was developed in two phases, described below.

Phase I. Approach to the Community

This phase focused on initiating contact with the community, consulting with its members, and preparing activities to develop the research project. During this phase, the following activities were carried out: (a) presentation of the project to Indigenous authorities and community members during a community assembly, (b) formation of the community coalition, and (c) coordination of methodological, operational, and logistical aspects with the Indigenous *Cabildo* (community council), the highest governing body within the community. The community coalition, a specific strategy of the CBPR approach, comprises individuals from the community who work together to address local needs and find solutions

to the problems using their own resources and capacities.

The coalition included representatives from the Indigenous *Cabildo*, the Colombian Institute of Family Welfare's Own and Intercultural Modality Program (ICBF, n.d.), teachers, youth groups, parents, Indigenous authorities, and knowledge holders from the Indigenous Reservation. The continued presence and support of this group of community researchers ensured the acknowledgment and integration of ancestral knowledge and practices throughout the research process. The inclusion of interpreters also facilitated effective communication between Spanish and *Nasayuwe* speakers, the Indigenous community's native language.

Phase II. Diagnosis and Formulation of Community Strategies

The first part of this phase aimed to identify traditional knowledge and practices related to food autonomy within the Indigenous Reservation.

The following activities were conducted:

- Documentation review on food and nutrition practices: A review of both gray and scientific literature on food autonomy among the Nasa Indigenous peoples, with a focus on the Nasa Páez Huila Indigenous Reservation.
- Four meetings on buen vivir and food memory: These gatherings aimed to recover ancestral knowledge related to food, traditional agriculture, and nutrition, following the Nasa agroecological calendar. Traditional methodologies included communal pots, knowledge dialogues, Circles of the Word around the *tulpa* (a three-stone fire), territorial tours and harmonization, and *mingas* (collective work gatherings) for preparing food and ancestral medicine.
- Two Circles of the Word with grandmothers, mothers, and women leaders of the Indigenous Reservation: These sessions focused on discussing the community's food and nutrition situation from their knowledge, practices, and perspectives. Each session lasted approximately one hour and involved 20 women.

- Visits to the *tul*: Using participant observation and semi-structured interviews, the research explored food autonomy at the household level, addressing topics such as food supply, preparation practices, and hygiene and sanitation conditions.

Once the ancestral practices of the community on the Indigenous Reservation were identified, community strategies to strengthen food autonomy were co-constructed. To achieve this, the findings related to ancestral practices were presented at a community assembly with the participation of parents, youth, knowledge holders, traditional authorities, and representatives of the Indigenous *Cabildo*. Approximately 250 inhabitants of the territory attended this meeting.

After this meeting, four participatory sessions were held with different population groups from the Indigenous Reservation (each consisting of 20–25 participants). These sessions served as collaborative spaces for the co-construction of lines of action and educational strategies to strengthen food autonomy. It should be noted that these strategies were developed through active participation in community spaces, including rituals, assemblies, and *mingas* of thought and work with community representatives. These strategies were developed by integrating knowledge, practices, and participatory dynamics across the board, and are detailed in the results section.

For information analysis, analytical tools from Strauss and Corbin's (2002) grounded theory were used. This inductive methodology enabled the identification of emerging categories and themes that naturally arose from the research context without being constrained by pre-existing theoretical frameworks. Community members also contributed their insights and participated in validating the findings.

The study was classified as presenting more than minimal risk in accordance with Resolution 8430 of 1993 issued by Colombia's Ministry of Health. To mitigate potential risks, continuous community participation and adherence to local norms were ensured. The project also adhered to international ethical standards, including those outlined in the Nuremberg Code and the Declara-

tion of Helsinki, thereby upholding the principles of respect for persons, beneficence, non-maleficence, and justice.

Beyond formal ethical approvals, this study required ongoing reflection on the power dynamics inherent in collaborative research. The process of co-designing and co-authoring with community members involved negotiating different epistemic positions and ensuring that community voices guided decision-making at each stage. Authorship was conceived as a collective expression of shared knowledge production, aligning with the CBPR principle that research should benefit and represent the community as an equal partner.

Results

In the Nasa Páez Indigenous Reservation in Huila, the community coalition established five strategies to strengthen food autonomy: the recovery of native seeds, the implementation of demonstrative *tul*, the development of a Nasa cropping calendar, the implementation of water filters, and a cross-cutting component focused on ongoing support, awareness-raising, and training. Collectively, these strategies, rooted in the Nasa people's worldview and aligned with their local capacities, aim to improve nutritional status and strengthen *buen vivir*, thereby contributing holistically to the community's food sovereignty.

Recovery of Native Seeds: Re-sowing What Is Ours

This community strategy was focused on rescuing native seeds. The community's forced relocation following the 1994 flooding of the Páez River resulted in a significant loss of agro-food and cultural wealth. Many native seeds were either replaced by commercial hybrids to meet market demands or were simply lost, undermining both food autonomy and the transmission of cultivation knowledge associated with these seeds. As a Reservation health promotor noted,

My dad used to keep the corn in big *totumas*. He'd shuck it, cover it with a bag, and even add some medicinal plants so the seeds wouldn't spoil until it was time to plant again.

That way of preserving products is fading; you hardly see it anymore.

In addition, the primary economic activity in the Indigenous Reservation is coffee cultivation, which has further limited the diversity of traditional crops. This monoculture-based production model has displaced ancestral agricultural practices, increasing dependence on external food sources and accelerating the loss of native seeds, affecting the links with the territory. As one Indigenous community leader explained,

What's happening now is that a lot of people are using their land just to grow coffee. And with this whole coffee monoculture thing, it's like, "If I've got coffee, I've got money to go to the store." That's the mindset that's taking hold.

The community proposed recovering seeds of corn, bulb onions, cilantro patimorado, bush beans, and common garlic. This activity was carried out during the National Day of Indigenous Children and Adolescents, when these seeds were distributed to families for sowing in their *tul*. The recovered seeds originated from the ancestral Nasa territory of Tierradentro, Cauca (municipality of Páez), where traditional varieties of these crops are still preserved by local families. As a predominantly agricultural people, the Nasa practice polyculture adapted to diverse thermal floors and are recognized as a maize-based culture (ICBF & Universidad de Antioquia [UdeA], 2025). The recovery of native seeds serves as an act of cultural reaffirmation and resistance to industrial and market-driven processes, while reinforcing food autonomy and the reconstruction of the collective and territorial memory of the Nasa people.

Finally, this community strategy recognizes that seed availability is essential. Thus, before considering building a greenhouse or planting in it, it is essential to prepare the seeds to be grown in this space; that is, to have the seeds available to be planted. These seeds generally come from previous harvests, which have been stored in plastic containers by community members and kept planted, with seeds being recovered from that harvest.

Implementation of Demonstration Tul: Spaces for Memory and Life

The tul is a traditional agricultural system used by the Nasa people for cultivating various native crops, including corn, potatoes, cassava, other vegetables, fruits, aromatic herbs, and medicinal plants (Calderón-Farfán, Dussán-Chaux et al., 2021; Calderón-Farfán, Rosero-Medina, Pedrozo-Peñañiel et al., 2022). It is the primary mode of self-sufficient food production, sustaining local economies and cultural traditions through the production of chemical-free food.

According to participants, tul plays a fundamental role in transmitting knowledge from older to younger members of the community and strengthening family ties. In family and community tul, teaching processes are carried out through practical exercises, observation, and the integration of all community actors in the different tasks performed.

However, in the Indigenous Reservation, people report that several families have stopped cultivating their own food and are more dependent on buying it in markets and supermarkets. Some households also lack sufficient land for farming. In response, the establishment of a pilot tul was identified as a crucial strategy to promote food availability and, by extension, food autonomy. A member of the Reservation *Cabildo* said,

Well, for us, the tul is the foundation of *buen vivir*, because it's thanks to the generosity of the land that we have food and can nourish our families.

With the intention of strengthening tul as spaces of living and collective memory, three *mingas* were organized to build two pilot tul at the ICBF's Own and Intercultural Modality Program and the *Kue Dsi'* Ethno-Educational Institution. Community mothers, parents, cultural facilitators, administrative personnel, and human resource coordinators actively participated. Each plot was cleared of weeds to prepare it for cultivation. Then, organized planting beds were created to arrange the crops, making it easier to plant, care for, and monitor them.

Then, a harmonization ceremony called *Ritual Mayor de Çxa Puç* was conducted in both plots,

guided by the community's spiritual leaders. At the heart of the ceremonial space, the traditional rhombus symbolizing the territory was placed and adorned with multicolored flowers, representing the joy of spiritually reuniting with those who are no longer on the earthly plane.

After a welcoming message, the purpose of the ritual was reaffirmed: to honor departed loved ones and invoke harmony and balance, which are essential to the community's social fabric. The spiritual guides carefully prepared the ritual elements (sacred plants and symbolic offerings) destined for Mother Earth and ancestral spirits.

The central moment of the ritual involved giving offerings: each participant stepped forward to present food that reflected the tastes of those being remembered, as well as plants symbolizing their deep connection with nature. Finally, candles or lights were lit, each one representing a loved one, concluding the ceremony in an atmosphere of remembrance, reflection, and spiritual connection.

The demonstration tul are a fundamental part of the region's traditional setting for strengthening food autonomy. In this project, the tul are reinterpreted as long-term educational spaces that foster early, sustained engagement with agroecological knowledge, cultural identity, and relationships with Mother Earth. Through continuous participation in these spaces, children and youth from *Kue Dsi'* develop both practical skills and a sense of vocation related to food systems and land stewardship. This process has translated into concrete outcomes: in recent years, several graduates from the educational institution have chosen to pursue agricultural and related fields at university, inspired by their formative experiences in the tul.

Development of a Cropping Calendar: Nasa's Passage of Time

The cropping calendar was developed from community knowledge and wisdom. To create it, information was gathered through in-depth interviews, Circles of the Word, and participatory workshops, allowing for the direct collection of agricultural knowledge, perceptions, and practices from key community stakeholders.

The calendar reflects the Nasa people's understanding of time, organized around four central rit-

uals, ancestral and cultural knowledge, agroecological and climatic patterns specific to the territory, and lunar and solar cycles relevant to agricultural activities. An early childhood program facilitator explained,

There are certain moon phases for planting specific crops. For example, onions, cassava, and plantains are planted during the waning moon. That's something the community has to keep in mind, because if you don't, the whole planting can fail.

A community validation process of the calendar followed, during which representatives and Indigenous authorities from each rural hamlet participated. In this phase, the planting, maintenance, and harvesting cycles were adjusted to ensure that the final version of the calendar accurately reflected the territory's specific conditions and needs.

The construction and implementation of the Nasa cropping calendar promotes food autonomy, as it is intrinsically tied to cultural planting, harvesting, and food preservation practices. It supports the preservation of the community's food heritage, ensuring the continued availability of traditional and culturally significant foods. Moreover, the calendar strengthens the cultural identity and self-determination of the community by promoting the use and transmission of ancestral knowledge and encouraging the participation of community leaders and members in decision-making related to food production. It also helps improve agricultural practices and outcomes, drawing on ancestral knowledge to guide cultivation cycles and adapt to environmental changes.

Implementation of Community Water Filters: Building Health and Well-Being

This strategy addressed access to clean and safe water, recognizing it as essential to community health and nutrition. The initial steps involved identifying and assessing local water sources, as well as promoting appropriate solid waste management practices. The community also engaged in awareness-raising activities on the sustainable use of water, emphasizing its vital role in life through

participatory activities such as role-playing and hands-on learning.

The second step involved establishing a partnership with *Diversa*, an organization that promotes community co-creation and low-cost, innovative, and sustainable solutions to local challenges. Three participatory workshops were held with this organization: in the first workshop, participants learned to construct homemade water filters using locally available materials such as cotton, charcoal, sand, and gravel; in the second workshop, participants explored the concept of pH and water quality using a natural indicator made from purple cabbage; and in the third workshop, participants received training in basic microbiological water analysis, including the construction of a handmade microscope using accessible materials. As a practical outcome, a water filter was constructed using low-cost technology at one of the Community Child Care Units (UCA) operated by the ICBF, which provides comprehensive early childhood care. The system consists of two phytoremediation tanks, a nature-based technology that filters water through planted beds to reduce turbidity and retain heavy metals such as lead. As an educational facilitator said about the workshops,

Thanks to this experience, we realized how important it is to implement different ways of treating water and also to take care of and protect our water sources in our territory. We picked up new knowledge and also strengthened what we already knew about key concepts related to water.

The purpose of this initiative was to purify the water used in food preparation for young children, ensuring healthier and safer dietary conditions. In this way, constructing a water filter using community resources also served to strengthen food autonomy in the reserve, with improving water quality for consumption being the main objective.

Ongoing Support, Awareness-Raising, and Training: Sharing Words, Constructing Knowledge

This cross-cutting component complemented all the strategies described above. A series of theoretic-

cal and practical workshops on agroecology was delivered. The workshops also emphasized the use of local resources for producing organic fertilizers.

Follow-up visits were conducted every two months over one year (2024–2025) by community agricultural technicians to monitor and provide assistance for household *tul*. These visits helped to evaluate effectiveness in terms of planting and production; identify progress, strengths, needs, and opportunities for improvement; and foster knowledge exchange among families, thereby promoting collective learning. A household father commented,

This experience really helped us build and reinforce our knowledge about agroecological practices. We learned how to make organic and liquid biofertilizers, and we got tools to help control pests and diseases, which is so important for taking care of our crops and the land.

The above highlights the fundamental importance of ongoing support, awareness-raising, and training as core components for achieving food autonomy. These processes strengthen the community's capacity for sustainable food production and environmental stewardship, making optimal use of local resources and knowledge to ensure long-term sustainability. While measurable improvements in nutritional status will require longitudinal assessment, the participatory process has already demonstrated tangible social achievements, such as increased community participation, the revitalization of ancestral practices, and the emergence of local leadership in advancing food autonomy initiatives.

The following discussion contextualizes these findings within broader debates on Indigenous food sovereignty and participatory research.

Discussion

The results presented here reflect the processual success of community engagement and methodological collaboration rather than quantifiable nutritional improvements, which would require longer-term evaluation. Future longitudinal research should therefore explore how these participatory

processes translate into measurable health and nutritional outcomes, providing deeper insight into the long-term impacts of community-led strategies for food autonomy and *buen vivir*.

The strategies implemented in the Nasa Páez Huila Indigenous Reservation have made a significant contribution to the strengthening of food autonomy, *buen vivir*, and community health. This process is not limited to food, as it is grounded in healthcare, encompassing the care and preservation of physical and spiritual health, as well as the restoration of harmony with Mother Earth (Calderón-Farfán, Rosero-Medina, & Arias-Torres, 2022). It also involves recovering native seeds; securing access to land and water; exercising the freedom to exchange, distribute, and commercialize; and preserving and revitalizing culture and traditional ways of life and production (La Vía Campesina, 2022).

The recovery of native seeds is of vital importance, functioning as a symbolic and political act that ties to the territory and promotes the development of its identity. At the same time, it serves as an act of resistance against neoliberal processes rooted in the Green Revolution: strengthening of external food or large-scale food production, monocultures, heavy use of agrochemicals, hybrid and transgenic seeds, and a shift away from community-centered economic practices (Forigua-Sandoval, 2020; Otero, 2013).

Moreover, seeds represent the foundation of Indigenous food production, impacting both the economic sustainability of families and their spiritual relationship with the land (Calderón-Farfán, 2014; Calderón-Farfán, Torres-Soto et al., 2021). Native seeds are central to preserving continuous reproductive cycles; they provide sustainability by adapting to local conditions, reducing input costs, and strengthening food sovereignty. Their conservation enhances resilience to external shocks, fosters agrobiodiversity, and mitigates the effects of climate change (García-López et al., 2019; Teixidor-Toneu et al., 2023). Hayden and Hayden (2025) further emphasize that seed recovery is crucial not only for maintaining genetic diversity but also for highlighting the essential role of women in preserving genetic diversity, as well as their role in preserving knowledge and traditions in Indigenous societies.

For the Nasa people, preserving the tul is essential for producing healthy food and preventing illness while also providing a viable economic alternative that supports family livelihoods (Calderón-Farfán, Rosero-Medina, & Arias-Torres, 2022). Beyond their productive function, tul are pedagogical, spiritual, and symbolic spaces. They are the heart of family and community life and a symbol of the Nasa *buen vivir*. The ancestral heritage is also found in the tul (Pencue-Rivera, 2021). As Delormier and Marquis (2019) argue, tending vegetable gardens is an essential practice for maintaining native seeds and contributing to the revitalization or restoration of culture, identity, well-being, governance, and Indigenous food systems.

The conservation of vegetable gardens is not only foundational for sustaining traditional agricultural knowledge and local food systems but also for the preservation of these systems (Duthie-Kannikkatt et al., 2019). The conservation of vegetable gardens represents a claim to the right to self-determination (Huambachano, 2018), positioning communities in an active struggle to protect biodiversity, native species, and ancestral knowledge (Heywood, 2011; Holt-Giménez & Patel, 2010; Kuhnlein, 2015).

Cropping calendars are important for collectively systematizing knowledge about agricultural cycles, seasonal timing, and climate conditions specific to the territory. As a tool, the calendar facilitates production planning while also strengthening the epistemological autonomy of the Indigenous Reservation by acknowledging the value of its own forms of knowledge. Previous studies have highlighted the importance of cropping calendars for rural families despite the influence of productivist approaches promoted by development institutions. Knowledge and know-how practices are highlighted in this process as they enable communities to adapt to their unique geographic and climatic conditions, serving as guiding frameworks for crop production systems (Apaza-Ticona et al., 2021). Moreover, they hold socio-communal significance, integrating agricultural cycles with community festivals and Indigenous rituals (Broda, 2013).

The community water filters that were implemented represent a concrete example of how innovation can be integrated into community-led pro-

cesses using participatory, low-cost methodologies adapted to the local context. Framed in a social innovation approach, these processes underscore the need to implement change through innovative procedures and methodologies that provide alternative, context-specific solutions to common challenges.

In this regard, phytoremediation has been widely studied and implemented in diverse contexts as a sustainable water treatment strategy. For instance, constructed wetlands have demonstrated the capacity to remove between 70% and 90% of heavy metals and nutrients while operating at 30–50% lower costs compared to conventional treatment plants. Constructed wetlands are further characterized by low operational costs, minimal energy requirements, and reliance on naturally regenerating plant systems, which align with the principles of ecological design and community adaptability. Their maintenance typically involves the periodic harvesting of plants and occasional removal of accumulated solids, tasks considered manageable for community-based management. The materials used in constructed wetlands, such as native wetland plants, gravel, and sand, are locally sourced and cost-effective, enhancing their suitability for participatory environmental solutions (Wentzell, 2025).

This initiative encourages interaction among local leadership, community knowledge, and technical expertise, fostering experimentation and active learning and facilitating communication among community members, scholars, and government institutions (López-Pabón & Guerrero-Escobar, 2021).

The cross-cutting component of ongoing support, awareness-raising, and training emerges as a foundational axis for ensuring the sustainability of the other strategies. These spaces foster reflection, collective learning, and knowledge exchange.

This strategy is based on the importance of recognizing, transmitting, and revitalizing the community's ancestral knowledge in connection with their territory and land-based practices. In this regard, this study highlights the need to strengthen the transmission of ancestral knowledge and practices, which have been eroded over time, to children and new generations. These processes must

be rooted in principles of solidarity, fraternity, harmony, joy, love, and integral respect (Chaté-Tumiñá, 2013).

Similarly, research conducted in Indigenous communities in Oregon and California underscores the collective desire to regain access to native foods and resume customary practices, emphasizing the importance of knowledge transmission in the preservation of culture (Sowerwine et al., 2019) through strategies such as food preservation and food preparation workshops (Delormier & Marquis, 2019). From this perspective, it is necessary to revisit history and promote awareness and education through participatory research. This is a pathway to decontaminating minds, reframing understandings, and fostering deeper recognition and appreciation of what is inherently one's own. The most tangible evidence of this reclamation is the good food: the food grown in vegetable gardens, which our grandparents taught us to grow and consume (Chaté-Tumiñá, 2013).

Finally, recent international studies have documented similar participatory approaches to Indigenous food autonomy and agroecological revitalization. For instance, research with First Nations communities in Canada (Price et al., 2022), Māori food sovereignty movements in Aotearoa/New Zealand with the Kai Atua project (Smith & Hutchings, 2024), and Native Hawaiian food systems (Antonio et al., 2021) highlight the interconnections between cultural resurgence, self-determination, and sustainable food production. Situating the Nasa experience within this broader comparative context underscores both the shared principles and the distinct sociocultural trajectories shaping Indigenous food autonomy worldwide.

Beyond confirming findings from previous studies, this work aligns with recent Latin American and global research that recognizes culture as an integral dimension of community-based participatory research and Indigenous food sovereignty. Current studies emphasize that successful CBPR processes are those that integrate ritual, agroecological, and intergenerational dimensions of knowledge, acknowledging the inseparable links between spirituality, territory, and collective well-being. Consistent with these perspectives, our findings illustrate how intercultural and community-

driven methodologies can strengthen food autonomy while respecting and revitalizing local cultural practices. Overall, the lessons drawn from this participatory process contribute valuable insights for advancing future research and for guiding practice in Indigenous and rural contexts.

Conclusions

Practices of food autonomy are essential to the spirituality, territorial preservation, and collective work of the Nasa Indigenous community. In this sense, food autonomy emerges as a cross-cutting element that is fundamental to strengthening community identity and sustainability.

The community-based participatory research process described here demonstrates how collaborative methodologies can effectively support Indigenous communities in co-designing culturally grounded strategies for food autonomy and *buen vivir*. In the case of the Nasa Páez Huila Indigenous Reservation, food autonomy is not only a means to improve living conditions but also a vital expression of spirituality, territorial preservation, and collective work. The strategies co-constructed through this process reflect a holistic and comprehensive approach that interweaves cultural, social, spiritual, territorial, and health dimensions. Rather than evidencing measurable outcomes, this paper highlights the methodological and relational achievements that make such transformations possible and sustainable within Indigenous contexts.

Taken together, these strategies promoted the construction and reinforcement of intercultural and participatory approaches aimed at consolidating fairer, more sustainable, and culturally grounded agrifood systems. These processes were centered in the territory, where it is relevant to recognize the voices, leadership, knowledge, and proposals of Indigenous communities as key actors in their own development, autonomy, and self-determination processes.

In addition to the above and based on our findings, we propose the following recommendations for future research, policy, and practice related to food systems:

- For research:
 - Prioritize community-based participatory

research (CBPR) methodologies that recognize Indigenous Peoples as knowledge holders and active co-researchers.

- For policy:
 - Develop and support public policies that guarantee Indigenous food autonomy and sovereignty, including legal protection of native seeds, land tenure, and culturally appropriate food education.
 - Adapt food and nutrition policies to local contexts, drawing inspiration from Indigenous worldviews, values, and practices.
- For practice:
 - Strengthen intercultural education and

agroecological training in Indigenous communities, with particular attention to young people and women, who play key roles in preserving traditional knowledge and food practices.

- Promote intergenerational knowledge exchange to sustain and revitalize ancestral agroecological practices. 

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