

# Extension Practices Associated with Research and Teaching: Experience Report of the Kamby Group

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# CHAPTER 14

## Extension Practices Associated with Research and Teaching: Experience Report of the Kamby Group

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## CONTEXTUALIZATION

According to the National University Extension Plan (Brazil, 2018 p.1), university extension is understood as “an educational, cultural, and scientific process that inseparably articulates Teaching and Research and enables the transformative relationship between the university and society.” Its execution occurs through extension activities developed in the modalities of programs, projects, courses, events, and service provision, inserted in thematic areas and conducted with society (UNESP, 2022).

Higher Education Extension in Brazil is integrated into the curriculum matrix and the research organization, constituting an interdisciplinary, political-educational, cultural, scientific, and technological process (Brasil, 2018). Thus, university extension can promote mutual benefits for the local society and the universities, in such a way that extension is socially important by acting directly in assisting groups that need knowledge (Deslandes; Arantes, 2017).

At the postgraduate level, according to Moita and de Andrade (2009), extension “ends up being relegated to a secondary place, (...) contributing to research and teaching practices dissociated from reality.” Perpetuating this dissociated model of teaching, research, and extension results in the loss of a strategic space for generating knowledge, which favors multidisciplinary, the development of citizen and human awareness, as well as the formation of people capable of being proactive agents of change in society with an active and critical posture (Castro, 2004).

The Postgraduate Program in Agribusiness and Development (PGAD), since 2014, within its dynamic interdisciplinary performance, linked to its central research object, agribusiness, has been a conducive and encouraging means for researchers to act in extension in an associated manner to teaching and research.

In this scenario, this chapter aims to bring an experience report of extension activities associated with research and teaching developed by the Kamby Research and Extension Program (Kamby Group). The Kamby Group has been acting since 2015 alongside the dairy production

chain, developing the teaching-research-extension triad in the search for improving the quality and quantity of milk produced in the Alta Paulista region, driving innovation and social transformation.

## **EXTENSION ACTIVITIES AND THEIR APPROACHES**

University extension presents itself as an indispensable tool for bringing the general population closer to universities, as it facilitates transformative interaction between the university and sectors of society through the inseparability between teaching, research, and extension (Forproex, 2012). It is considered the main way to mitigate the vision that access to a university or college is something distant and restricted to the economic elite (Pinheiro; Narciso, 2022).

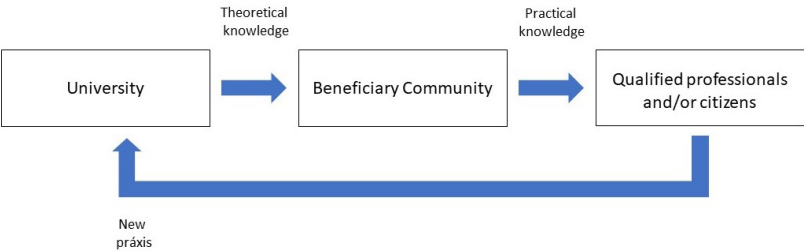
Its historical construction, in terms of applying the concept of university extension, has traversed four paths over time. At first, an extension was the process of transmitting knowledge from the university to society, making the university the sole holder of knowledge. In the second phase, scientific knowledge generated in association with local culture was presented beyond the university walls, serving as a means of transforming society. Regressing, in the third phase, the university resumes a conservative and anti-dialogical vision, turning extension into an assistentialist role. Finally, in its current phase, the university, supported by guidelines, recognizes the inseparability between teaching, research, and extension, and its execution is based on the exchange of knowledge, enveloped in dialogue between academics and society, enabling the praxis of knowledge (Bolzan, 2023).

In its current vision, extension activities at the university are characterized by their educational nature, making people capable of using knowledge in their own life situations (Unesp, 2022). Furthermore, it has an interdisciplinary, political, and academic purpose by promoting interaction between the university and social sectors (Forproex, 2012).

Thus, university extension plays an important role in the learning process of students and society. This cyclical learning process (Figure 1)

occurs through the transmission of theoretical knowledge (praxis) from the university, through its students and faculty, to the community it is inserted in (beneficiary community). The transmission of theoretical knowledge explains everyday situations and phenomena to the population, disseminating academic knowledge. The combination of theoretical knowledge with the practical (empirical) knowledge of society results in the complete qualification of citizens (Pinheiro; Narciso, 2022).

**Figure 1** – Cyclical Learning Process through University Extension



Source: Adapted from Pinheiro and Narciso (2022).

The process of transmitting this theoretical knowledge from the university to society, whether public or private sectors, occurs through extension activities (Box 1) developed in the forms of programs, projects, courses, events, and service provision (Brasil, 2018).

**Box 1** – Types of Extension Activities and Their Definitions Extension

| Extension Activity | Definition                                                                                                                                                                                                                                                            |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Program            | Characterized by integrated scientific-academic actions, carried out within a determined time frame, inseparable from teaching and research, aiming at the production and dialogical sharing of knowledge and wisdom that involve problems and/or demands of society. |
| Projects           | Offered to the external community, aimed at the socialization of academic knowledge, enhancing the interaction process between the University and other sectors of society, through the execution of its own schedule and program content.                            |

| <b>Extension Activity</b> | <b>Definition</b>                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Courses                   | Characterized by the primary articulation with other sectors of Society and can be carried out in the form of exhibitions, meetings, symposiums, workshops, congresses, conferences, or cycles of conferences, seminars, forums, debates or cycles of debates, technical meetings, concerts, festivals, artistic and cultural manifestations, ateliers, exhibitions, and similar activities, directed at specific audiences. |
| Events                    | Activity of delivering innovative solutions and exchanging experiences with society from the intangible heritage of the university - understood as an inseparable set of practices, expressions, knowledge, and techniques that contemplate the dialogical dimension of University Teaching, Research, and Extension.                                                                                                        |
| Service Provision         | Characterized by integrated scientific-academic actions, carried out within a determined time frame, inseparable from teaching and research, aiming at the production and dialogical sharing of knowledge and wisdom that involve problems and/or demands of society.                                                                                                                                                        |

Source: Adapted from Unesp (2022).

## **THE KAMBY EXTENSION PROGRAM AND ITS RESEARCH AND TEACHING ACTIONS: THE ORIGIN**

The Kamby extension program was created in 2015 at the Faculty of Sciences and Engineering of the São Paulo State University “Júlio de Mesquita Filho” (UNESP), Tupã Campus. In that year, the extension project Kamby “Keeping an Eye on Milk” began its activities with the aim of integrating university students, technicians, and dairy producers in the Tupã region through the exchange of technical and practical knowledge, seeking to improve the dairy production in the region in terms of both quality and quantity of milk produced.

The motivating factor for its creation was the negative impact caused by the closure of the local cooperative, which caused instability among dairy producers in the region, characterized mainly by family production profiles, who found themselves unsupported regarding the future of their livestock activities.

Located in the Alta Paulista, a region of strong indigenous influence in the state of São Paulo, the term Kamby was chosen to honor the local

native peoples, considering that the term kamby originates from the Tupi-Guarani dialect, translated as milk from the breast.

In its first year, the focus of the activities was on extension activities, mapping and characterizing the dairy producers in the region and subsequently bringing technical information about dairy farming.

In 2016, the extension project gained new activities with the inclusion of research activities at the undergraduate level (through scientific initiation) and linking with teaching activities in the Biosystems Engineering bachelor's course.

The complexity of the problems identified in extension activities promoted in 2017 the inclusion of postgraduate research, linking the Kamby extension project to the Agribusiness and Development Postgraduate Program (PGAD) of the same institution.

In 2020, supported by the maturation of the extension project, which then conducted teaching and research activities at the undergraduate, master's, and doctoral levels, culminated in the formalization before the National Council for Scientific and Technological Development (CNPq) of the Kamby Research Group – GPKamby – Good Practices in Dairy Farming (CNPQ, 2023).

The GPKamby is formed by three Research Lines (LP), which are:

- LP 1 – Good manufacturing practices and milk quality: aims to study the means of milk and its derivatives manufacturing so that they can be improved through good sanitary and management practices techniques. Additionally, it aims to evaluate the quality of milk from small, medium, and large producers in Tupã and the region and associate the improvements of good manufacturing practices with quality improvement according to the production and quality standards of the Ministry of Agriculture and Livestock.
- LP 2 – Ambience and dairy farming 4.0: aims to study the effect of the environment on dairy herds in Tupã and the region and develop new technologies for improving the environment for

animals and workers in the dairy sector. Maintaining thermal comfort and studying animal behavior, physiological, and immunological variables are tools that will assist in decision-making on the property and in designing technological innovations for the sector

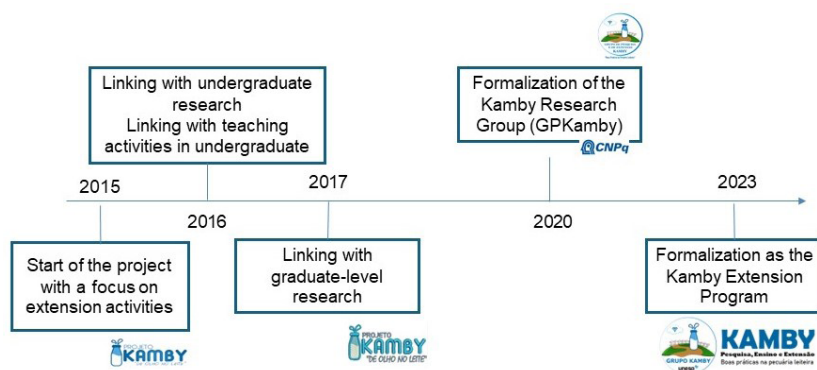
- LP 3 – Management of the dairy production chain: aims to study the management of the dairy supply chain. It includes aspects of planning and managing activities involved in supply and delivery. It works on studies of coordination and collaboration with channel partners (suppliers, intermediaries, third-party service providers, and customers), manufacturing operations, process coordination, and activities through marketing, sales, product design, finance, and information technology.

The conception of GPKamby's research lines aims to align with the activities conducted by the extension project, allowing the analysis of advances in the production chain, milk quality requirements, dairy chain management, regional, national, and global production chain growth, the organization of producers and other chain links, as well as the needs of animals, producers, and the market regarding sanitary aspects, good practices, and the application of new technologies for improving this agricultural sector.

Consolidated by the extension activities carried out, and which are articulated inseparably with teaching and research, in 2022 the extension project coordinators submitted a proposal to change the status, formalizing in 2023 the Kamby Extension Program "Good Practices in Dairy Farming" (Figure 2).



**Figura 2** – Timeline of the Kamby Extension Program “Good Practices in Dairy Farming”



Source: Prepared by the authors (2024).

Thus, in 2023, reaffirming its purpose, the Kamby extension program reestablished its objective, which is “to improve dairy production in the Tupã region, both quantitatively and qualitatively of the milk produced, through the dissemination of knowledge and exchange of experiences among its target audience.”

Through its knowledge dissemination extension activities, the program contributes to the policy proposed by the United Nations Sustainable Development Goals (SDGs). This policy was constituted by 17 Sustainable Development Goals (SDGs), which together form a framework to guide the actions of governments, international bodies, civil society, and other institutions over the next 15 years to promote sustainable agriculture, eradicate extreme poverty and hunger (FAO, 2015).

The Kamby extension program in its extension activities promotes advances towards sustainable development, as it directly assists in meeting the SDGs. With emphasis on SDG 2, which addresses combating hunger and planning sustainable agriculture, SDG 8, which talks about decent work conditions and regional and national economic growth, and SDG 12, which discusses responsible consumption and production to ensure sustainable production and consumption standards of food (FAO, 2015).

## **THE KAMBY EXTENSION PROGRAM AND ITS GOALS**

The actions promoted by the Kamby program are planned for the quadrennium 2023-2026 and have eight achievement goals:

1. Partner with associations, city halls, agricultural houses, schools, other extension projects and programs, and other entities related to dairy production.
2. Map dairy producers and dairy industries located in the Alta Paulista region.
3. Disseminate knowledge to rural producers, extension workers, and dairy industries through workshops, field days, and technical meetings, through face-to-face and online events, aligned with previously raised technical, management, basic knowledge difficulties, and milk consumption.
4. Increase knowledge dissemination through social media reaching the target audience directly and indirectly involved in the program's actions (@kamby.unesp).
5. Promote integration among the various agents in the dairy production chain.
6. Promote integration with the external community not directly linked to the dairy production chain, such as high school students, the elderly, and children, and schools in the region.
7. Participate and support fairs, agricultural exhibitions, dairy tournaments involving the different links of the dairy production chain.
8. Reconcile the extension program with research projects of the unit (GPKamby and others).

Meeting the goals set for the quadrennium in question includes the continuity of mapping dairy producers in the Alta Paulista region, establishing partnerships with associations, city halls, agricultural houses,

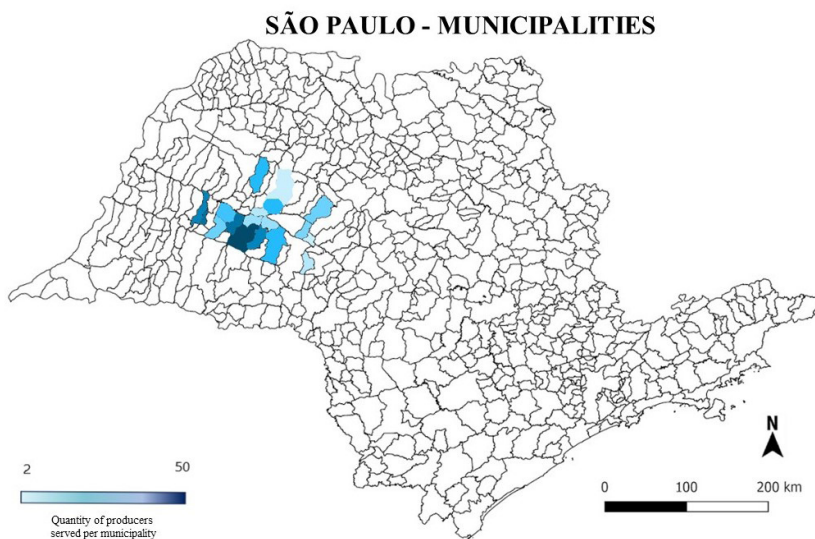
schools, extension projects and programs, and other entities related to dairy production, disseminating knowledge to rural producers, extension workers, and dairy industries through workshops, field days, and technical meetings, both face-to-face and online, and preparing support materials.

All these goals are aligned with the technical, management, and basic knowledge of handling, and sanitary difficulties, as well as milk consumption, which were previously raised and aligned with the extension program by the research projects carried out at the Unit by researchers from the Kamby Research Group.

### THE KAMBY EXTENSION PROGRAM DEPICTED IN NUMBERS AND IMAGES

In its 8 years of operation, the Kamby program has helped more than 180 dairy producers distributed in 19 municipalities around the Alta Paulista region (Figure 3).

**Figure 3** – Municipalities of Dairy Producers Served by the Kamby Program

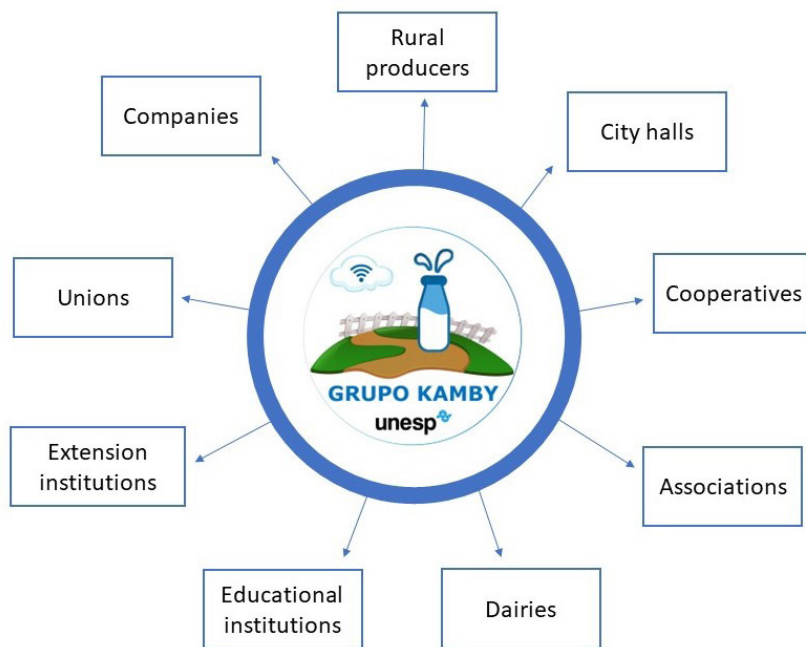


Source: Prepared by the authors (2024).

To foster the various extension activities proposed by the Kamby program, the participation of various agents is necessary, acting as partners. For this, the Kamby program constantly relies on partnerships with public and private entities that add technical support and knowledge (Figure 4).

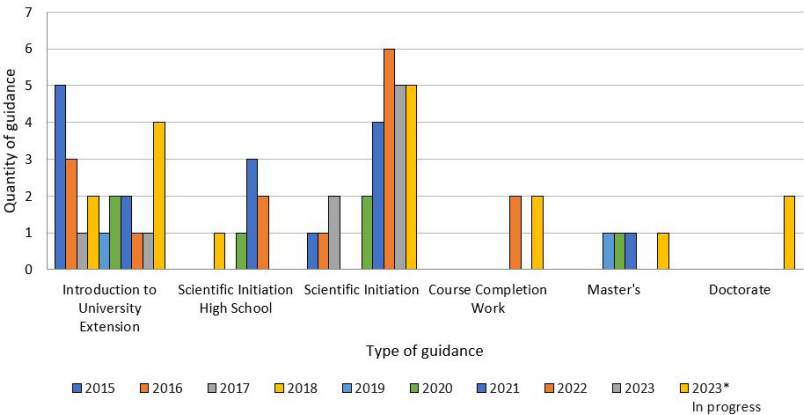
The extension and research activities are conducted by students regularly enrolled in undergraduate and postgraduate courses, supported by the Kamby program coordinators, who play an advisory role. Over these 9 years, 65 students have been guided, sometimes with research and extension scholarships from funding agencies and the University (Figure 5). The PGAD stands out in this scenario as a propellant of teaching-research-extension actions, acting in a two-way street at times, by generating research themes that are solved with the support of extension and teaching, and by being the scientific means for solving problems identified through extension activities.

**Figure 4** – Agents Participating in the Kamby Program



Source: Prepared by the authors (2024).

**Figure 5 – Number of Undergraduate and Postgraduate Students Guided in the Kamby Group**



Source: Prepared by the authors (2024)

**EXTENSION ACTIVITIES CONDUCTED BY THE KAMBY GROUP**

The Kamby Group is formed by members active in the research group (GPKamby) and/or in the Kamby extension program. This group includes undergraduate students from the Biosystems Engineering and Administration courses and postgraduate researchers linked to PGAD, who together conduct extension activities with specific objectives, reaching various target audiences, as depicted in Box 2.

**Box 2 – Extension Activities Conducted by the Kamby Group, Their Objectives, and Target Audience**

| Extension Activity | Objective                                                                                                                                                              | Target Audience                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Field Protagonists | Focused on the female target audience, it brings the dissemination of knowledge and exchange of experiences with women who stand out in their activities in the field. | University students, professors, technicians, extension workers, milk producers, dairy industry, and the general population. |

| <b>Extension Activity</b>                                    | <b>Objective</b>                                                                                                                                                             | <b>Target Audience</b>                                                                                              |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Tupá Dairy Tournament                                        | Milk tournament, focused on dairy producers in the program's area of operation, and aims to reward producers who stand out through the analysis of milk quality.             | Milk producers                                                                                                      |
| Good Practices Meeting in Dairy Farming                      | Annual meeting promoted by GPE Kamby since 2016, which aims to bring knowledge to the dairy production chain in the program's area of operation through lectures.            | University students, professors, technicians, extension workers, milk producers, and the general female population. |
| Activities with Elementary Education Schools                 | Dissemination of knowledge to elementary school children about the origin of milk, as well as its main derivatives, and presenting a dairy farm in loco.                     | Children in elementary education                                                                                    |
| Activities with the Elderly                                  | Dissemination of knowledge to the elderly about the origin of milk, as well as its main derivatives, and presenting a dairy farm in loco.                                    | Extension programs that serve the elderly, milk and cheese producers                                                |
| Activities with Rural Producers to Improve Properties        | Dissemination of knowledge on good practices in dairy farming, which can have different approaches, such as sanitary, feeding, milking management, to meet specific demands. | University students, technicians, extension workers, milk producers, and the general population.                    |
| Dissemination of Material in Apps and Social Media           | Dissemination of content related to dairy farming in apps and social media to provide knowledge updates.                                                                     | University students, technicians, extension workers, milk producers, and the general population.                    |
| Conducting "Lives" to Meet Producers' Demands                | Conducting live sessions on social media with agents from the dairy chain addressing dairy farming content to provide knowledge updates.                                     | University students, technicians, extension workers, milk producers, and the general population.                    |
| Distribution of the Good Practices Handbook in Dairy Farming | Distribution to dairy producers of a handbook with the main guidelines on the process of good milking practices in dairy farming.                                            | Milk producers                                                                                                      |

| Extension Activity                                                              | Objective                                                                                                                                                                                                                           | Target Audience                                                                                                                                                           |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kamby Extension Program                                                         | Improve dairy production in the Tupá region, both in quantitative and qualitative aspects of the produced milk, through the dissemination of knowledge and exchange of experiences with the target audience                         | Rural producers, municipalities, companies, unions, Higher Education Institutions, Elementary Schools, dairy industry, associations, cooperatives, extension institutions |
| Management of Reproductive Indicators – Kamby: Disseminating Data and Knowledge | Carry out data management and knowledge dissemination actions with dairy producers in the Tupá region, served by the +Pecuária Brasil Program, aiming to improve reproductive indices on the property and assist in decision making | Milk producers                                                                                                                                                            |

Source: Prepared by the authors (2024).

The extension activities conducted by the Kamby Group, directly and indirectly, impact the various agents operating in the dairy production chain. This aspect is favored by the diversity of the proposed extension activities' profiles. Box 3 presents the relationships for each extension activity, along with the classification by type and the involved participating agents.

### **Box 3 – Extension Activities and Their Classification by Type and Participating Agents**

| Extension Activity      | Type of Extension Activity |        |         |         | Involved Agent Participants |               |             |           |                              |                       |                    |                  |                  |                      |
|-------------------------|----------------------------|--------|---------|---------|-----------------------------|---------------|-------------|-----------|------------------------------|-----------------------|--------------------|------------------|------------------|----------------------|
|                         | Event                      | Course | Program | Project | Rural Producer (PR)         | City Hall (P) | Company (E) | Union (S) | Higher Education Inst. (IES) | Elem. Ed. Inst. (EEI) | Dairy Industry (L) | Associations (A) | Cooperatives (C) | Extension Inst. (IE) |
| Kamby Extension Program |                            |        | x       |         | x                           | x             | x           | x         | x                            | x                     | x                  | x                | x                | x                    |

|                                                                                 |   |   |  |   |   |   |   |   |   |   |   |   |   |   |
|---------------------------------------------------------------------------------|---|---|--|---|---|---|---|---|---|---|---|---|---|---|
| Management of reproductive indicators – Kamby: disseminating data and knowledge |   |   |  | x | x | x |   |   | x |   |   | x |   |   |
| Field Protagonists                                                              | x |   |  |   | x | x |   | x | x |   |   | x | x | x |
| Tupã Dairy Tournament                                                           | x |   |  |   | x | x | x | x | x |   | x | x | x |   |
| Meeting of Best Practices in Dairy Farming                                      | x |   |  |   | x | x | x | x | x |   | x | x | x |   |
| Activities with Elementary Education Schools                                    | x |   |  |   | x |   |   |   | x | x | x |   |   |   |
| Activities with Rural Producers for property improvements                       |   | x |  |   | x | x | x | x | x |   | x | x | x | x |
| Dissemination of material in apps and social media                              | x |   |  |   | x |   |   |   | x |   |   | x | x | x |
| Conducting “lives” to meet producer demand                                      | x |   |  |   | x |   |   |   | x |   |   | x | x | x |
| Distribution of the Best Practices in Dairy Farming Handbook                    | x |   |  |   | x |   |   |   | x | x | x | x | x | x |

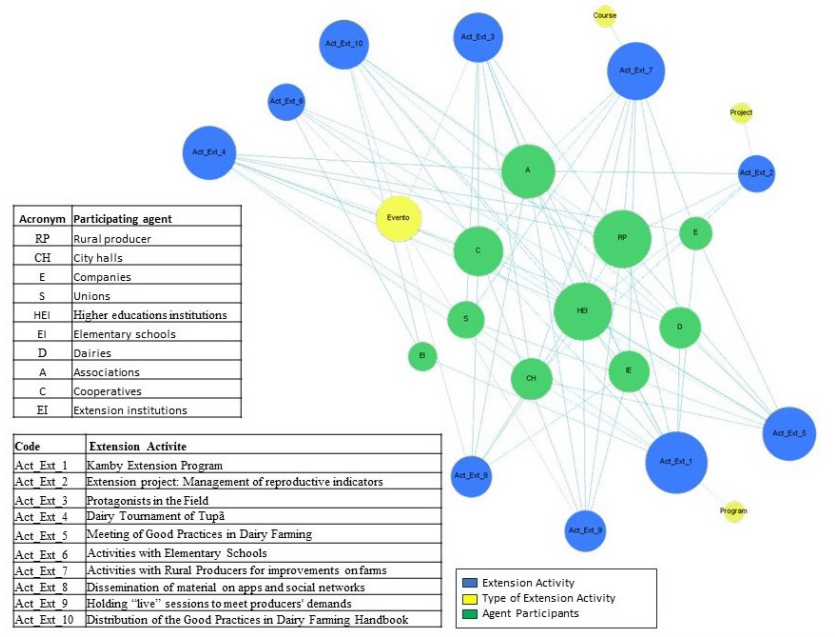
Source: Prepared by the authors (2024).

To illustrate the relationships between extension activities, the type of extension activity, and the participating agents, the theory of networks, derived from Social Network Analysis (ARS), was employed. ARS is a research method in the field of applied social sciences that aims to understand the relationships between various interconnected or intra-connected actors (Mollo Neto, 2015). The construction of networks was conducted using Gephi® software version 0.10.0.

Thus, Figure 6 presents the relationships between extension activities (in blue), the type of extension activity (in yellow), and the participating agents (in green). The size of the node (circle) represents the level of interaction, with larger nodes indicating greater representativeness (Maciel, 2018).



**Figure 6** – Relationship of Extension Activities Conducted by the Kamby Group, Type, and Participating Agents



Source: Prepared by the authors (2024).

In observation of Figure 6, it is noted that extension activities present themselves in four types: program, event, course, and project. The nature of Kamby's history made it evolve into a program, advocating long-term actions in the dairy production chain. Although not visible due to the theoretical classification of extension activities, the extension activities conducted derive from the Kamby Group, which serves as the guiding line of extension activities. Thus, extension activities of event (70%), course (10%), and project (10%) profiles are conducted.

All these activities impact all agents involved in the dairy production chain, with rural milk producers (the main subject of the activities) and university students being 100% involved in extension activities. It is noteworthy that students are active agents of transformation, planning, organizing, and executing extension activities, allowing the

Kamby Group to contribute to the curricularization of extension, which became mandatory for undergraduate courses starting in 2023 (Brasil, 2018). Other significant agents in the conducted extension activities are cooperatives (90%), associations (80%), and dairy industries (60%), which present themselves as the main beneficiaries of the product generated by producers. The relationship between these links is important, as the legislation IN 76 and 77 (Mapa, 2018a, 2018b), which came into force in May 2019, introduced changes regarding the minimum quality standards required and the establishment of penalties in case of non-compliance. At this point, fostering relationships between these agents is essential for the competitiveness of the chain.

Agents such as city halls and extension institutions enhance the conducted extension activities, mainly by sometimes playing the role of a motivational link between the rural producer and the proposed activities. Partnerships between the government and extension projects are an option in seeking sustainable solutions for local and regional problems and reducing socio-economic inequalities (Lopes *et al.*, 2013). Finally, elementary schools are an important means to demonstrate the importance of the chain and demystify false concepts attributed to milk.

Science has in its essence the search for solving a problem, often carried out through the systematization of knowledge, which is observed, identified, categorized, explained, and then theories are formulated for explanation and solution. In this scenario, sometimes dairy producers, associations, cooperatives, city halls, and extension institutions contacted the Kamby Group to present problems and request support in finding a solution.

The problems brought by these dairy chain agents are real problems arising from society that motivate research in seeking a solution. It is interesting to note that sometimes the solution to the problem does not only go through the theoretical solution but through conducting a set of actions, which sometimes involve various extension activities. Box 4 presents the relationship between extension activities, research lines, the level of research developed, and whether there is also a relationship with teaching.

## **Box 4** – Extension Activities and Their Relationships with Research Lines, Level of Research Developed, and Teaching

| Extension Activity                                                              | Research Link |   |   | Teaching Link | Research Line |      |      |
|---------------------------------------------------------------------------------|---------------|---|---|---------------|---------------|------|------|
|                                                                                 | G             | M | D |               | LP 1          | LP 2 | LP 3 |
| Kamby Extension Program                                                         | x             | x | x | x             | x             | x    | x    |
| Management of reproductive indicators - Kamby: disseminating data and knowledge | x             | x | x | x             | x             | x    | x    |
| Protagonists in the Field                                                       |               |   |   |               | x             |      | x    |
| Dairy Tournament of Tupã                                                        |               |   |   |               | x             |      | x    |
| Meeting of Good Practices in Dairy Farming                                      |               |   |   | x             | x             | x    | x    |
| Activities with Elementary Schools                                              | x             |   |   | x             | x             | x    | x    |
| Activities with Rural Producers for improvements on farms                       | x             |   |   | x             | x             | x    |      |
| Dissemination of material on apps and social networks                           |               | x | x | x             | x             | x    | x    |
| Holding “live” sessions to meet producers’ demands                              |               | x | x | x             | x             | x    | x    |
| Distribution of the Good Practices in Dairy Farming Handbook                    |               | x |   | x             | x             | x    | x    |

Source: Prepared by the authors (2024). Legend: G – undergraduate, M – master’s, D – doctorate, LP – Research Line

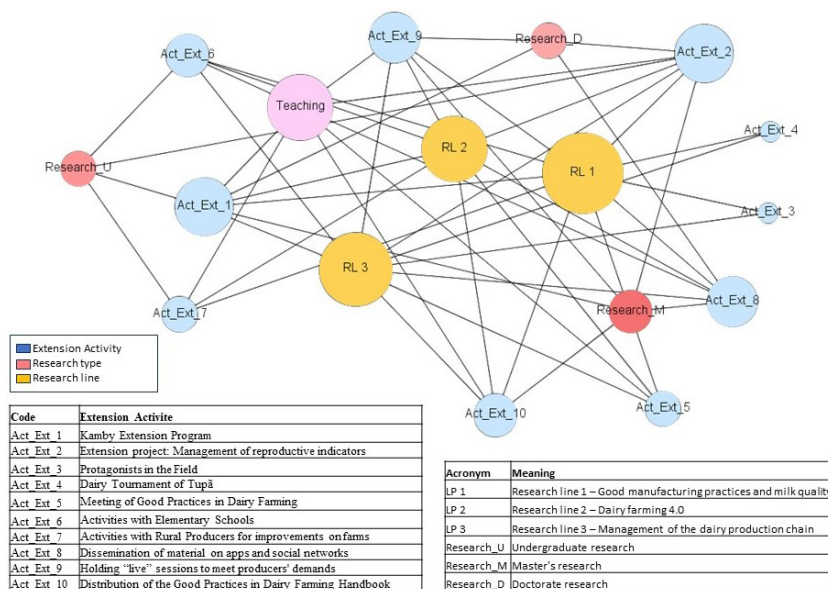
In this context, Figure 7 depicts the network of extension activities conducted by the Kamby Group, relating to research lines (in yellow), research level developed (in red), and teaching (in pink). The size of the node (circle) represents the level of interaction, with larger nodes indicating greater representativeness (Maciel, 2018).

It is observed in Figure 7 that the research actions conducted by the Kamby Group involve its three research lines. Research Line 1, good manufacturing practices and milk quality, stands out for having repercussions in all extension activities, while Research Line 3, dairy production chain management, and Research Line 2, ambience, and dairy farming 4.0, have repercussions in 90% and 80% respectively. This fact demonstrates an appropriate alignment of extension activities to face and solve problems identified in society.

The research development occurs at various levels proposed by the University, with research at the undergraduate level (scientific initiation), master's, and doctorate levels.

Sometimes, the problems for their solution do not only require research and the action of the researcher but teaching how to act and creating a culture towards the problem so that it does not happen again. Therefore, teaching has significant importance among the extension activities conducted by the Kamby Group, linked to 80% of activities and resulting in the inseparable teaching-research-extension triad.

**Figure 7 – Relationship Between Extension Activities of the Kamby Group with Research Lines, Research Level, and Teaching**



Source: Prepared by the authors (2024).

Thus, every extension activity conducted generates an impact on society, whether in isolation or when linked to the research or teaching tripod. Box 5 presents how extension activities relate to the impacts generated for society.

### Box 5 – Extension Activities and the Type of Impact Generated for Society

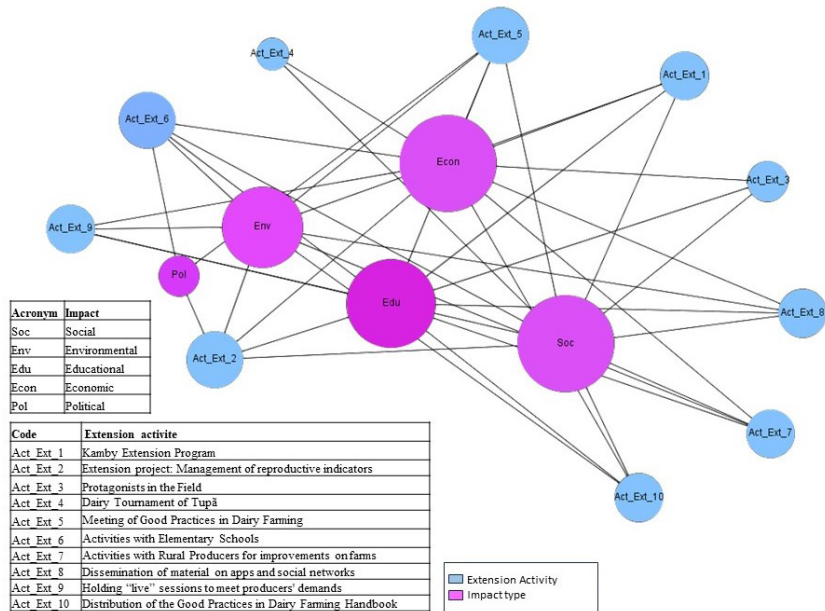
| Extension Activity                                                           | Type of Impact |               |          |           |             |
|------------------------------------------------------------------------------|----------------|---------------|----------|-----------|-------------|
|                                                                              | Social         | Environmental | Economic | Political | Educational |
| Kamby Extension Program                                                      | x              | x             | x        |           | x           |
| Reproductive Indicators Management – Kamby: Disseminating Data and Knowledge | x              | x             | x        | x         | x           |
| Protagonists in the Field                                                    | x              |               | x        |           | x           |
| Tupã Dairy Tournament                                                        | x              |               | x        |           |             |
| Good Practices in Dairy Farming Meeting                                      | x              | x             | x        | x         | x           |
| Activities with Elementary Schools                                           | x              | x             | x        | x         | x           |
| Activities with Rural Producers for Property Improvements                    | x              | x             | x        |           | x           |
| Dissemination of Material in Apps and Social Media                           | x              | x             | x        |           | x           |
| Conducting “Lives” to Meet Producer Demand                                   | x              | x             | x        |           | x           |
| Delivery of the Good Practices in Dairy Farming Handbook                     | x              | x             | x        |           | x           |

Source: Prepared by the authors (2024).

Figure 8 illustrates through the network how extension activities (in blue) act on various types of impact (in purple). The size of the node (circle) represents the level of interaction, with larger nodes indicating greater representativeness (Maciel, 2018).

It is noted that the economic impact has the greatest representativeness, followed by the social and educational impact. The representativeness of these impacts is explained by the nature of the Kamby Group, which seeks to improve the quality and quantity of milk produced. Quality improvement is directly associated with the social and educational aspect, while quantity concerns the economic aspect. Along with this, there is an awareness of the environmental impacts of activities and the political actions that are developed.

**Figure 8** – Extension Activities of the Kamby Group and Types of Impact



Source: Prepared by the authors (2024).

Finally, as previously described, the Kamby Group acts towards SDGs 2, 8, and 12. The extension activities promoted by the Kamby Group relate to these SDGs, generating a positive impact on society. Box 6 depicts how extension activities relate to the SDGs.

**Box 6** – Relationship of Extension Activities to the SDGs of Kamby Group's Operation

| Extension Activity                                                           | SDG 2 | SDG 8 | SDG 12 |
|------------------------------------------------------------------------------|-------|-------|--------|
| Kamby Extension Program                                                      | x     | x     | x      |
| Reproductive Indicators Management – Kamby: Disseminating Data and Knowledge | x     | x     |        |
| Protagonists in the Field                                                    |       | x     |        |
| Tupá Dairy Tournament                                                        | x     | x     |        |
| Good Practices in Dairy Farming Meeting                                      | x     | x     | x      |

|                                                           |   |   |   |
|-----------------------------------------------------------|---|---|---|
| Activities with Elementary Schools                        |   |   | x |
| Activities with Rural Producers for Property Improvements | x | x | x |
| Dissemination of Material in Apps and Social Media        | x | x | x |
| Conducting “Lives” to Meet Producer Demand                | x | x | x |
| Delivery of the Good Practices in Dairy Farming Handbook  | x | x | x |

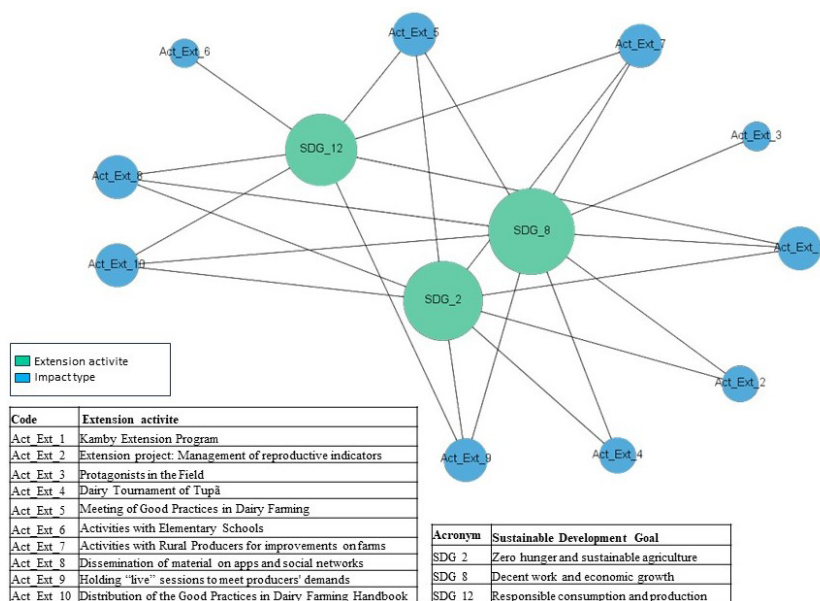
Source: Prepared by the authors (2024).

Figure 9 illustrates through the network the extension activities of the Kamby Group (in blue) and the SDGs (in green). The size of the node (circle) represents the level of interaction, with larger nodes indicating greater representativeness (Maciel, 2018).

It is observed through Figure 9 that the achievement of the SDGs is carried out in various ways through extension activities, with a slight superiority in the representativeness of SDG 8 (responsible consumption and production) over SDG 2 (zero hunger and sustainable agriculture) and SDG 12 (decent work and economic growth).

When confronted with the SDGs developed by PGAD, there is synergy with those conducted by the Kamby group. PGAD has a high performance in SDGs 2 and 12, with SDG 2 also having synergy with SDG 8 (PGAD, 2023). This aspect demonstrates the strategic alignment of the proposed actions between the Kamby group and PGAD.

**Figure 9** – Extension Activities of the Kamby Group and Their Relationship with the SDGs



Source: Prepared by the authors (2024).

## FINAL CONSIDERATIONS

The Kamby Group, in its years of operation, is relevant in generating and disseminating knowledge to rural producers, technicians, researchers, undergraduate and postgraduate students, technical courses, elementary education, and the elderly.

The extension activities conducted allow the target audience to enhance their knowledge of the dairy production chain, aiming to instigate knowledge so that they are also actors in disseminating what they have learned.

Conducting extension at the university is advocated by the inseparability of research and teaching, as demonstrated in this chapter, sometimes the interaction with society is the catalyst for identifying



research problems, and teaching is one of the pillars for disseminating knowledge.

At the postgraduate level, the Kamby Research and Extension Program stands out for inseparably conducting its activities concerning teaching-research-extension. This collective construction is complex and involves the employment of various areas of knowledge and wisdom, in an interdisciplinary process that promotes results directly impacting society, specifically the agents operating in the dairy production chain.

Thus, conducting extensions related to the Kamby Group helps overcome problems arising from society and positively impacts economic, social, educational, environmental, and political aspects.

Finally, the contribution to society reflected by the Kamby Group with the United Nations Sustainable Development Goals is highlighted, promoting extension activities aligned with research and teaching for responsible consumption and production (SDG 8), achieving zero hunger and sustainable agriculture (SDG 2), and decent work and economic growth (SDG 12).

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