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COMMUNICATION BARRIERS IN PUBLIC TECHNOLOGY TRANSFER POLICIES FOR THE AGRICULTURAL SECTOR

BARREIRAS DE COMUNICAÇÃO PARA QUE POLÍTICAS PÚBLICAS DE TRANSFERÊNCIA DE TECNOLOGIA CHEGUEM AO CAMPO

OBSTÁCULOS A LA COMUNICACIÓN QUE IMPIDEN QUE LAS POLÍTICAS PÚBLICAS DE TRANSFERENCIA DE TECNOLOGÍA LLEGUEN AL CAMPO

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ABSTRACT
A census survey conducted by the Instituto Brasileiro de Geografia e Estatística and Instituto de Economia Agrícola (IEA/LUPA) in 2016–2017 identified a low adoption rate of the Integrated Crop-Livestock-Forestry System (ILPF) among farms belonging to the Regional Rural Development Office of Tupã. In this context, this study aimed to analyze the communication barriers that hinder public policies for technology transfer to rural areas from reaching producers, particularly the Integra São Paulo program. The results indicate resistance to changes in production practices, interference in the communication flow due to the heterogeneity of audiences, and limited access to Information and Communication Technologies as a means of disseminating information and knowledge about processes, available technologies, programs, and public policies that could foster agricultural production.

KEYWORDS: Public policies; Integra São Paulo; Information and Communication Technologies; Integrated Crop-Livestock-Forestry System (ILPF); TIC.

Introduction

It is observed that there are significant barriers preventing Brazilian rural producers, especially small ones, from accessing public policies capable of facilitating technology transfer to the countryside. It is worth mentioning that public policies aimed at rural producers are fundamental to promoting sustainable rural development. However, for small producers to access such policies, they need to overcome communication barriers that are even more challenging in rural areas.

Kunsch (2003) defines barriers as mechanical factors, physiological issues, semantics, psychological and personal issues, administrative bureaucracy, and also information overload. Such a definition is enhanced by Bernardo and Bernardo (2013) who state that geographical location and access to ICTs are also barriers to rural communication. The former refers to the geographical conditions of rural properties, generally concerning their difficulties of access and lack of infrastructure, such as electricity, internet connection, postal service, roads in poor conditions, and distance from large centers. Lack of access to information and communication technologies (ICTs) is another relevant barrier in this process, arising not only from the conditions to acquire technology, but also from lack of training in its use.

Overcoming or mitigating such barriers is fundamental for rural producers to have access to information, and also to make decisions at the countryside. Reducing the atmosphere of great uncertainty and promoting the acquisition of as much information as possible assists in minimizing risks posed in agricultural production.

According to Duarte (2004), information imparted to producers must be efficient and made available through means appropriate to their needs, who are faced with even more severe communication barriers compared to urban residents. Vieira

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(2016) also states that, specifically regarding communication aimed at rural areas, establishing it requires skills and attitudes allowing the sender and receiver to be aligned in language and trust.

In this context, this research aims to analyze the communication barriers making public policies on technology transfer unable to reach rural producers in the agricultural sector, particularly regarding a program named 'Integra São Paulo'. It is worth mentioning that understanding how communication with rural producers is being used to disseminate public policies focused on the use of technologies in agriculture can guide discussions and future governmental initiatives to break down the barriers hindering the adoption and dissemination of technologies in rural areas.

Information and Communication Technologies and Transfer Technology

According to Vieira, Bernardo and Sant'Ana (2015b), the current scenario of technological development allows rural producers greater access to information in real time, therefore they must find alternatives to meet their demands and update themselves technologically. In this sense, there is technology transfer (TT) and diffusion of technology (DT). The former is characterized by imparting technology from one producer to another, and the latter is the dissemination of knowledge and information to be used and applied through rural extension activities, lectures, and any interaction with those involved (Mendes, 2015).

Vieira (2016) presents a systemic view on the flow of information within rural, academic, and technical environments, highlighting producer, researcher, and extension agents as individuals involved in acquiring and transmitting messages, respectively, stressing the importance encompassing social, environmental, economic and productive aspects, since all these actors are directly or indirectly affected when there is no steady flow of information, as in Table 1 as follows.

Table 1

Results of effective communication flow between rural and urban areas

PRODUCER	RESEARCHER	EXTENSION AGENT
Greater clarification of doubts and needs previously unknown to agents in the supply chain, improvement in technical and productive development, since it has more resources and individuals available for support.	Improved data acquisition and quality processes, as well as more accurate data and more effective applicability targeted to more specific problems.	Better identification of its role regarding the flow of communication, in terms of dissemination of information and knowledge in rural development.

Source: Adapted from Vieira (2016).

Despite its importance, the flow of communication between urban and rural areas is not a simple process. It requires discipline in the flow and specific paths to be followed to effectively transmit, decode, and receive information, as well as feedback, which is extremely necessary to measure its effectiveness (Bernardo & Bernardo, 2013). It is susceptible to several noises considered as obstacles to decoding and acknowledgement of information in a communication flow, mainly given that characteristics of urban and rural environments are quite distinct, confirming the concept of communication barriers permeated by existing information and communication technologies, as in Table 2:

Table 2

Information and communication technologies according to Marinho (2010)

Devices	Internet	Digital technologies for capturing and processing images and sounds	Remote access	Radio frequency access
Personal computers	World Wide Web	Scanners	Wifi	RFID
Computer cameras or webcams for filming and taking pictures	Web sites and home pages	Digital photography	Wi-Max	EPVC
Burning CDs and DVDs at home	Forums (message boards)	Digital video	Voip	-
Hard drives or HDDs;	Podcasting	Digital sound	Bluetooth	-
Memory cards, flash drives, zip drives and similar devices	-	Digital TV and radio		-
Mobiles	-	-	-	-
Pay-per-view TV, cable or satellite dishes	-	-	-	-
E-mail	-	-	-	-
Mailing lists or listserv	-	-	-	-

Source: Adapted from Marinho (2010).

The classifications presented by Kunsch (2003) on communication barriers and the proposition added by Bernardo and Bernardo (2013), as aforementioned in the introduction section, are presented below in Table 3.

Table 3

Communication barriers

e-ISSN nº 2447-4266
Palmas, v. 12, n. 1, 2026
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Barrier	Description
Mechanical factors	Caused by physical factors, such as a malfunctioning device, noises and such.
Physiological Issues	Resulting from genetic problems or malformation of vital organs of hearing and speech.
Semantics	It stems from the use of language that is unfamiliar/uncommon to both the sender and receiver.
Psychological and personal issues	Sparked by emotional, spiritual, value-based, and personality factors, depending on how these aspects of individuals affect their willingness to communicate.
Administrative bureaucracy	They are related to how information is processed in organizations.
Information overload	This is due to information overload, meetings and related roles.
[1] Geographical location	Remote access and limited/scarce resources concerning power supply, telephone, postal service, basic infrastructure for board and lodgings, as well as lack of cultural language and such.
[2] Lack of access to ICT	Shortcomings in the digital inclusion process at rural areas, resulting in semi-literate and illiterate people being incapable of using information and communication technologies.

Source: Adapted from Kunsch (2003) and Bernardo and Bernardo (2013).

An increasing need to facilitate communication between urban and rural agents is emphasized by Rocha (2006), who states that people who lack access to communication flows tend to be excluded from insightful content and new technologies. Souza Filho *et al.* (2011) stress such a need by stating that technologies play a fundamental role in the economic and financial performance of agriculture, since they also directly affect the sustainability of agricultural activities in addition to boosting productivity.

The relation between technology adoption and diffusion among rural producers faces a major obstacle: lack of financial and structural resources among a significant number of rural producers, especially small, family, and settled farmers. Access to credit or their own financial resources tends to grant greater ability to manage risks and adopt technologies among such producers compared to those without such resources (Souza Filho *et al.*, 2011).

Souza Filho *et al.* (2011) further state that although these restrictions are relevant, they do not alone explain all barriers producers are faced with regarding technological adoption. In addition to the previously mentioned restrictions, there are

also barriers concerning the personal characteristics of each producer and their family, production methods and the rural property itself.

Technical Assistance and Rural Extension Public policies

According to Schumpeter (1939) and Souza Filho *et al.* (2011), technology adoption is characterized by the use of a certain technology that has not been previously used in that location. The moment that such adoption starts being employed by a group of people or organizations for a longer period is the time at which it becomes characterized as technology diffusion.

One of the most influential instruments for technology adoption – the availability of information – can be observed in the performance of Technical Assistance and Rural Extension (ATER) services. These services are characterized by direct extension in the field through the transfer of techniques and courses, books, magazines, and TV programs (Souza Filho, 2001).

According to Rodrigues (1997), a rural extension policy can be understood as an agricultural policy allowing the public authorities themselves to intervene in the rural environment, aiming to achieve objectives according to current demands. However, they have been historically focused on economic issues in the pursuit of increased agricultural production and productivity. There are also policies directed towards the social welfare of family farmers or small producers. In this sense, the government has developed several public policies on rural extension, particularly the National Policy for Technical Assistance and Rural Extension (PNATER); the National Policy for Technical Assistance and Rural Extension for Family Farming and Agrarian Reform (PRONATER) and the National Agency for Technical Assistance and Rural Extension (ANATER), as described in Table 4.

Table 4

Contemporary domestic public policies for rural extension and technical assistance (ATER)

Contemporary public policies for rural extension services (ATER)	Name	Current legislation	Intended population
PNATER	National Policy for Technical Assistance and Rural Extension	Decree No. 5,033, of April 5, 2004	Family farming

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Palmas, v. 12, n. 1, 2026
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PRONATER	Programa Nacional de Assistência Técnica e Extensão Rural para a Agricultura Familiar e Reforma Agrária	Lei nº 12.188 de janeiro de 2010.	Programa Nacional de Assistência Técnica e Extensão Rural para a Agricultura Familiar e Reforma Agrária
ANATER	National Agency for Technical Assistance and Rural Extension	Law No. 12,897 passed on December 18, 2013	Small and medium-sized rural producers

Source: Adapted from Vieira *et al.* (2015).

Notwithstanding the public policies for rural extension presented, there are still several obstacles to sustainable and technological development in the context of small producers. Azevedo and Pessôa (2011) state that they are very uneven compared to other segments, as they make a much less significant political contribution in addition to reduced resources. In this sense, the most recent ATER (Rural Extension and Technical Assistance) policy establishes that rural extension goes beyond productivity and social well-being; it is also responsible for stimulating initiatives promoting rural development (Brazil, 2004). According to Caporal and Ramos (2006), this new perspective is grounded in the premise that the extension agent becomes a mediator of knowledge and skills who boosts the development of rural communities.

All these changes required to become a reality put the training of extension workers to the test, since it is a novel rural extension model, as well as the structure of the agencies, and thus they are faced with a mounting challenge. Rural extension should prioritize the relationship between extension workers and rural producers, offering a dialogue on local knowledge and active participation in political, social, environmental, cultural, ethical and economic changes (Caporal & Ramos, 2006).

However, for this policy to be effective, the rural extension agent must get to know the recipient of communication and have appropriate means and language to make it effective. Bernardo *et al.* (2015) stress this statement stating that a successful communication is ensured by being aware of which channel is most suitable for reaching a specific interlocutor with the appropriate language.

Thus, Bernardo *et al.* (2015, p. 15) reasserts the role of rural extension agents, depicting them as integral professionals to contribute to rural development: "The extension agent no longer assumes the role of merely imparting practices and techniques, but occupies a strategic role in the communicational process guiding the demands of research in the agribusiness sector and, subsequently, performing the role of a true rural educator."

Thus, the extension agent participation in activities and projects making technologies accessible to the countryside becomes fundamental. The novel rural extension, as indicated by Vieira *et al.* (2020), contributes to sustainability, therefore making information available to small rural producers about projects grounded in sustainability, and also becoming a mission for rural extension professionals. Among these projects, this research addresses Integra São Paulo, which is going to be presented in the following section.

The Integra São Paulo Project

Humans have been engaged in agricultural and livestock activities since the emergence of agricultural practices, bringing several benefits to the land, both in environmental terms and regarding productivity and economic diversity for producers (Kichel *et al.*, 2019; Balbino *et al.*, 2011). A significant increase in cattle herds in the 1970s, due to the replacement of native pastures with cultivated pastures, brought positive results concerning beef and milk production, leading to a 115% increase within the following 16 years (Kichel *et al.*, 2019).

Conversely, the process of pasture degradation started in the 1980s. This new scenario led to interest in recovering these areas with annual crops, as a result of studies carried out by Embrapa and other institutions to develop solutions and transfer technologies for pasture recovery. One of which was the Integrated crop-livestock system (ILP) – the Barreirão and Santa Fé Systems, and more recently, a more extensive system, the Integrated crop-livestock-forestry system (ILPF), which brought several benefits both to the environment and producers (Kichel *et al.*, 2019; Macedo, 2010).

In this context, the ILPF concept was incorporated into the Integra SP Project, which is a public policy implemented by the Coordination for Sustainable Rural Development (CDRS), an agency of the Secretariat of Agriculture and Supply established by Decree No. 58,930, passed on March 1, 2013, which consists in allowing technology transfer through technical projects.

The project encompasses two components: the Recovery of Areas Degraded by Gullies (RADGE) program and the Integrated Crop-Livestock-Forestry (ILPF) system, whose objective is to recover degraded areas and incorporate integrated systems of rotation, intercropping, or succession to enable the plantation of various crops or forests in the same area (SAA, 2019a). The program provides support through economic subsidies mediated by the São Paulo Agribusiness Expansion Fund (FEAP) and the Family Agribusiness Bank. Beneficiaries of these programs are rural producers in the state of São Paulo who meet the requirements discussed as follows (SAA, 2019b).

e-ISSN nº 2447-4266
Palmas, v. 12, n. 1, 2026
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The Integra São Paulo program, which is the subject of analysis herein, is going to be discussed in the following section.

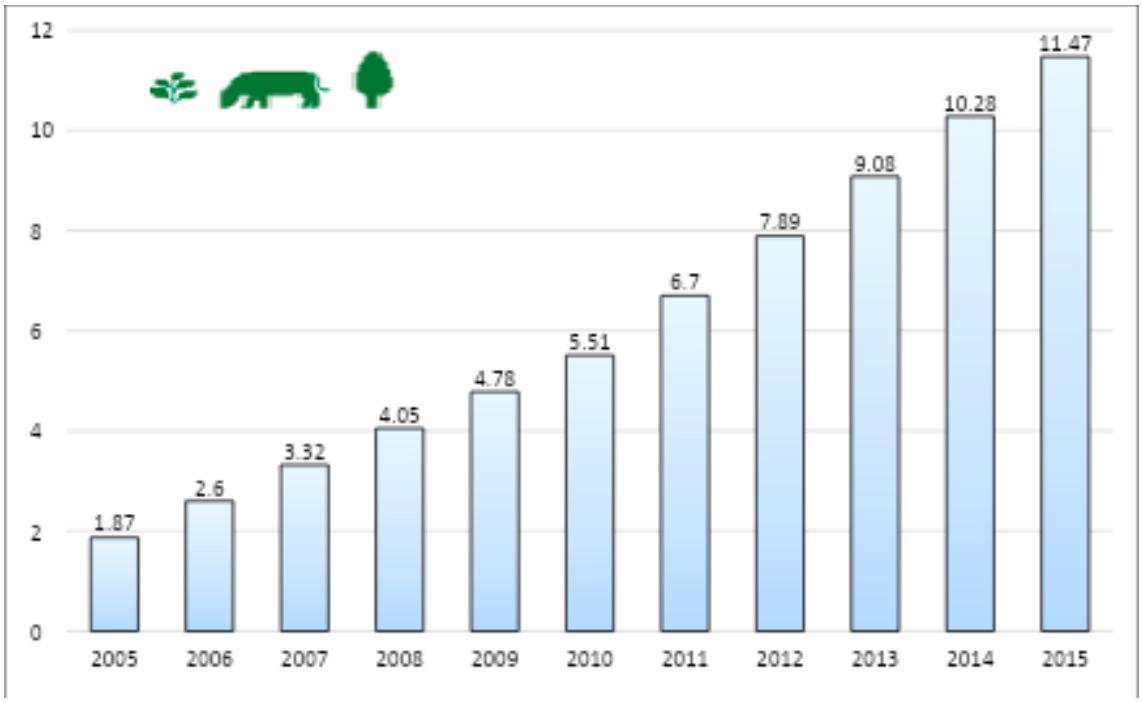
Integrated Crop-Livestock-Forestry System - ILPF

According to Kichel and Miranda (2002), the potential for adopting the integrated crop-livestock-forestry (ILPF) system in Brazil is influenced by its distinct ecosystems and intrinsically constrained by the following factors: availability of favorable soil and climate; infrastructure for the production and storage of products and inputs; own financial resources or access to credit; mastery of technology for grain, livestock, and forestry production; access to markets for the purchase of inputs and marketing of production; access to technical assistance; and the possibility of leasing land or partnering with traditional grain, livestock, or forestry producers.

Indeed, the demand for food and other products derived from natural resources has been growing exponentially in recent years (UN, 2019). Over the next 30 years, the Brazilian population is expected to grow by approximately 7%; it may seem insignificant, but it is actually concerning in economic and social terms, as available resources are becoming increasingly scarce. Therefore, Balbino *et al.* (p. 1, 2011) state that "modern agricultural activity has become characterized by standardized and simplified monoculture systems", due to a large demand for natural resources, in addition to showing signs of saturation.

According to research by Embrapa, ILPF (Integrated Crop-Livestock-Forestry Systems) areas underwent significant expansion between 2005 and 2015 (REDE ILPF, 2020). Such data is presented in the following chart.

Chart 1
Growth of areas adopting the ILPF system (millions/hectare)



Source: Adapted from ILPF Network (2020).

Such data allows observing that farmers have been seeking alternatives for pasture recovery, reducing environmental impact, and improving techniques and, consequently, their productivity. In this sense, integrating these systems is an alternative that has been used and shows a positive projection in the way ILPF (Integrated Crop-Livestock-Forestry Systems) are used on farms in the state of São Paulo. This study shows that 10 % of ILPF areas registered in 2015 will have increased to 23% in 2030 (REDE ILPF, 2016). This perspective is due to benefits achieved through the implementation of ILPF, where two factors are worth being highlighted: economies of scope, which produces results such as reduced cost for a given productivity or increased productivity without a proportional increase in costs; and reduced business risk, due to the diversification of agricultural activities (Júnior; Alves, & Contini, 2011).

According to Balbino, Cordeiro and Martínez (2011), in addition to these benefits, the ILPF system adoption also promotes: recovery of degraded areas; conservation and restoration of forest covers; progression and access to employment and income; adoption and dissemination of good agricultural practices (GAP); improvement in socioeconomic conditions; the production unit compliance with environmental legislation and appreciation of environmental services offered by agroecosystems, such as: conservation of water and the land's physicochemical resources; shelter for pollinators and agents performing the natural control of insect pests and diseases; carbon fixation in the soil; mitigation of GHG emissions; nutrient renewal and soil bioremediation.

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According to Bungenstab *et al.* (2019), integration systems follow four distinct operational approaches. The first one is the integrated crop-livestock system (ILP), or agropastoral system, which consists in diversifying, intercropping, and/or rotating agricultural and livestock crops in rural properties during the same year or over several years, either sequentially or interspersed. In such a case, the intercropping is between brachiaria grass with cowpea and cattle (Figure 8).

Figure 1
Integrated crop-livestock system (ILP) in Gravataí

Source: Embrapa (2020a).

The second one is a concept similar to the previous one, but using integrated systems: livestock and forestry (IPF) or silvopastoral systems. A pasture system with Holstein cows and eucalyptus trees is shown in Figure 9.

Figure 2
Integrated livestock-forestry system – Embrapa Southeast Livestock

Source: Embrapa (2020b).

The third system is one combining agricultural and forestry activities (ILF), also known as Silvoagricultural, commonly found on small properties or where annual crops are cultivated so that the area can be used during forest growth. An example of an integrated eucalyptus and soybean system is portrayed in Figure 10.

Figure 3

Integrated crop-forestry system (ILF) Sinop-MT

Source: Embrapa (2020c).

Lastly, there is a system integrating agricultural, livestock and forestry activities in the same area (ILPF), i.e. agroforestry. It can be implemented through rotation, succession, or intercropping. Agricultural activity can be carried out during the initial

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stages of forest establishment or not. Examples shown herein are eucalyptus, soybeans, and pasture (Figure 11).

Figure 4

Integrated crop-livestock-forestry system (ILPF) - MT

Source: Embrapa (2020d).

To enable producers to adopt this program on their property, the ILPF system network (2020) states that, for better decision-making, it is initially recommended that they seek specialized ILPF extension services, through which, the extension agent develops a project tailored particularly to the property based on analyses of both internal and external scenarios, and makes adjustments according to the producer's objectives. It is desirable for the producer to seek a bank branch offering financing to explore credit possibilities for this type of project. However, as a rule, there are two main lines of credit available from the federal government: PRONAF and the ABC Program, and from the São Paulo state government, Integra São Paulo, which is the focus of analysis in this research.

Materials and Methods

To carry out this research, it was necessary to carry out bibliographic and documentary research. Documentary research and primary data collection were carried out using official data on public policies and research institutes such as the Brazilian Institute of Geography and Statistics (IBGE), the Institute of Agricultural Economics (IEA), and the Campinas Agricultural Institute (IAC). Secondary data were obtained from articles found in scientific databases such as Web of Science, Scopus, and Ebsco, in

addition to searches in the Capes Journals digital library to find articles outside the aforementioned databases, also capable of contributing to this research.

The regional Rural Development Office (EDR) of Tupã was set as the locus of analysis, encompassing the municipalities of Arco-Íris; Bastos; Herculândia; Iacri; Inúbia Paulista; Osvaldo Cruz; Parapuã; Pracinha; Queiroz; Rinópolis; Sagres; Salmourão and Tupã.

Results and Discussion

Agribusiness has a significant and unquestionable share in the country's economy and Gross Domestic Product (GDP), representing 23.8% of Brazil's GDP in 2023, according to CEPEA/ESALQ (2024). These data highlight the crucial need for research in this area.

One way to highlight such importance is related to public policies on credit and sustainable rural development, covered in this research as public policies for technology transfer through technical assistance and rural extension. In particular, the Integra São Paulo public policy was addressed within the context of the Regional Development Office (EDR) at Tupã, where one of its two activity areas highlights integrated crop-livestock-forestry systems. According to data from IEA/LUPA (2017a), out of the 637 municipalities in the state of São Paulo, only 171 used these resources assigned to the ILPF system, amounting to a total allocation of R$ 23,961,222.56 to finance these contracts (SAA, 2020). As shown in Table 1, few municipalities in this EDR have adopted ILPF.

Table 1

ILPF at the EDR in Tupã (2017)

ILPF Adoption		
Municipalities	**Crop**	**Cultivated area/ha**
Arco-Íris	*Braquiaria*	1.9
Bastos	*Pinus*	9
Herculândia	*Braquiaria*	155.8
Iacri	-	-
Inúbia Paulista	-	-
Osvaldo Cruz	*Braquiaria* Eucalyptus	0.6 3
Parapuã	-	-
Pracinha	-	-
Queiroz	-	-
Rinópolis	-	-

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Sagres	Avocato tree *Brachiaria* Eucalyptus Rubber tree	2 10.7 33.3 30.6
Salmourão	Eucalyptus	16
Tupã	*Brachiaria* Eucalyptus	397.3 7.2

Source: The authors based on IEA/LUPA (2017b).

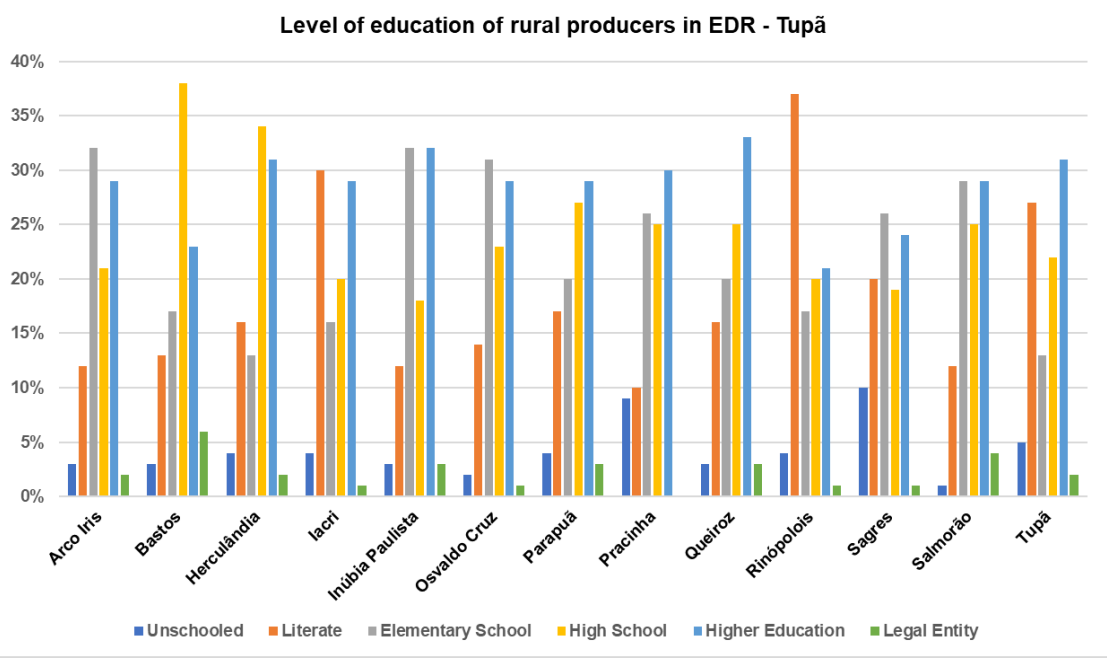
In order to support an analysis of indicators of the existence of communication barriers for this policy to reach small producers at the EDR in Tupã, two aspects were characterized: rural producer and level of support received, which are presented is the following section.

Characteristics of rural producers in the Regional Development Office (EDR) of Tupã

Based on data provided by IEA/LUPA (2017c), it was possible to determine the educational level of producers in the analyzed EDR, as follows:

Chart 2

Educational level of rural producers in the EDR of Tupã



Source: The authors based on data from IEA/LUPA (2017c).

Based on these data, it is possible to outline an educational profile for each unit belonging to the EDR (Regional Development Office) at Tupã, initially identifying that the most common education levels are higher education and secondary/high school

education, generally characterizing the region of this EDR as significantly literate. This is a factor that may hinder access to and understanding available ICTs, except for the municipalities of Arco-Íris, Iacri, and Rinópolis, where the predominant level of education is lower.

This characterization may influence the data related to the use of technologies such as the internet and computers in rural areas of the Regional Development Office (EDR) of Tupã. According to IEA/LUPA (2017d), this access is at low levels, considering current availability, i.e. an average of 14.2% of Agricultural Production Units (UPAs) in studied municipalities having internet access and 8% having computer access. These data are considered crucial in the search for technical assistance and access to information regarding public policies and government programs to assist rural producers, as well as the difficulty in disseminating technologies, mainly due to their absence on farms, considering the barriers to ICT access presented by Bernardo and Bernardo (2013).

Another characteristic found in the rural producer population of the EDR in Tupã is that only 8.6% are female and the average age of these producers is between 45 and 75 years (IBGE/Censo Agropecuário, 2017a). It can be said that this population is more experienced, however, poorly connected and unfamiliar with existing technologies, seeking more traditional alternatives for managing and administering properties, which may hinder the use of the ILPF system as an alternative. This aspect may corroborate the barriers presented by Kunsch (2003), who stated that an elderly individual tends to have a more traditional language, and that, compared to more contemporary language, can lead to communication noise, thence hindering the flow of information.

Technical assistance provided

Based on data collected at IEA/LUPA (2017d), a classification was first obtained regarding the number of rural establishments receiving specialized technical assistance as information support (Table 2).

Table 2

Technical assistance provided (%) (Tupã EDR)

Municipalities	Unprovided	Governmental institutions	Private institutions	Both
Arco-Íris	32.1 %	62.6 %	2.5 %	2.8 %
Bastos	67.8 %	5.6 %	20.7 %	5.9 %
Herculândia	12.3 %	53.0 %	5.2 %	29.5 %
Iacri	37.3 %	15.1 %	22.2 %	25.3 %
Inúbia Paulista	4.5 %	71.4 %	2.6 %	21.4 %

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Osvaldo Cruz	64.4 %	12.9 %	15.5 %	7.1 %
Parapuã	48.8 %	20.9 %	12.8 %	17.5 %
Pracinha	36.3 %	46.2 %	9.9 %	7.7 %
Queiroz	30.8 %	26.7 %	25.8 %	16.7 %
Rinópolis	23.8 %	68.0 %	5.2 %	3.1 %
Sagres	61.8 %	15.8 %	15.5 %	6.9 %
Salmourão	50.7 %	21.9 %	7.8 %	19.6 %
Tupã	57.7 %	10.1 %	13.9 %	18.3 %

Source: the authors based on IEA/LUPA (2017d).

According to these data, it is possible to highlight the municipalities where producers receive the least technical assistance, whether from public or private institutions: Bastos (67.8%), Osvaldo Cruz (64.4%), Sagres (61.8%), Salmourão (50.7%), and Tupã (57.7%). These same municipalities, except for Bastos, presents the lowest percentages of internet and computer use, i.e. a fact corroborating the difficulty in accessing information about services, programs, and technical assistance, as well as access to responsible agencies and institutions.

Another point worth mentioning is a limited amount of ATER (Technical Assistance and Rural Extension) available in the region. According to information gathered at the CATI unit in Tupã, there is difficulty in accessing information about such policies, which may be related to the cultural profile found in the regional community. These aspects may be hindering the adoption of programs available from the government, due to the fear of incurring debt and also lack of financial structure of producers in general. This attitude is characterized by psychological and personal barriers, which are linked to the values, knowledge and spiritual condition of individuals, as presented by Kunsch (2003).

One way to obtain information and establish social connections as means of staying close to government policies and programs is to associate with institutions and bodies serving the interests of producers. Rural producers located at the EDR in the region of Tupã have a high level of association with these entities (Table 3), although they do not yet have a high level of adherence to the ILPF program.

Table 3
Association with support entities

Municipalities	Belonging to		
	Producers' Association	Cooperative	Union
Arco-Íris	8.7 %	21.6 %	6.4 %
Bastos	9.5 %	32.4 %	25.4 %
Herculândia	15.9 %	57.9 %	18.6 %
Iacri	8.3 %	46.7 %	14.9 %
Inúbia Paulista	64.9 %	77.9 %	63.6 %

Osvaldo Cruz	31.0 %	57.9 %	18.3 %
Parapuã	57.5 %	71.5 %	12.5 %
Pracinha	48.4 %	72.5 %	13.2 %
Queiroz	15.8 %	60.8 %	25.0 %
Rinópolis	17.6 %	75.9 %	46.9 %
Sagres	25.0 %	47.4 %	15.1 %
Salmourão	67.6 %	75.8 %	1.8 %
Tupã	5.5 %	47.0 %	12.9 %

Source: The authors based on IEA/LUPA (2017d).

Based on supplementary data, it was found that the main sources considered to be technical assistance information for producers in this EDR are: television with an adherence of 80.76%, followed by the internet with 46.58%. Assistance through personal knowledge is also noteworthy, being the third most commonly used method representing 40.85%, followed by assistance through cooperatives with almost 30% (IBGE/Censo Agropecuário, 2017b).

Such difficulty in accessing specialized technical assistance can be considered as one of the factors contributing to a low concession of rural credit by producers (22.6%), i.e. one of many other negative consequences.

Final Considerations

Public policies are increasingly important in rural areas, especially for small producers who, due to lack of appropriate financial resources, often have to resort to credit lines provided by official bodies, and even financing from private banks and cooperatives at times.

However, in several regions, such as the Tupã EDR, these policies are not widely disseminated and wind up falling off the radar of producers, especially small rural producers and family farmers. One explanation for such a scenario may stem from the fact that the administrators of these properties are mostly elderly, which can be considered a factor of resistance to the use of Information and Communication Technologies (ICTs). These, in turn, can represent one of the main boosters of technology transfer and adherence to the aforementioned public policies.

Specifically regarding the ILPF system aimed in this article, its low adoption rate can be understood as a result of low access to technical assistance and specialized rural extension, little use of ICTs, and also due to the influence of cultural aspects, such as semantic, psychological, and personal barriers.

Another point worth mentioning is the pressing need for investment in technical assistance and rural extension. This includes developing increasingly effective communication and information dissemination mechanisms reaching rural producers

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clearly and appropriately, and ensuring that they are aware of and have access to available options for a more sustainable development of their productive activities.

However, it is evident that current incentives and forms of support for small rural producers are not reaching them. It is also clear that the federal and state governments lack a well-structured form of technical assistance and rural extension (ATER) capable of providing small producers with opportunities for digital inclusion, information on credit, and consequently, production alternatives based on the three pillars of sustainability: economic, social, and environmental areas.

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RESUMO
Em pesquisa censitária realizada pelo IBGE e IEA/LUPA de 2016/2017, identificou-se baixo número de adoção do sistema ILPF nas propriedades pertencentes ao EDR regional de Tupã. Diante desse contexto, esta pesquisa objetivou analisar as barreiras de comunicação para que as políticas públicas de transferência de tecnologia para o campo cheguem aos produtores rurais, em especial o Integra São Paulo. Os resultados apontam para resistência à mudança na produção; interferência no fluxo de comunicação, devido à heterogeneidade de públicos; falta de acesso às TIC como forma de disseminar a informação e o conhecimento sobre processos, tecnologias disponíveis, programas e políticas públicas que possam fomentar sua produção.

PALAVRAS-CHAVE: Políticas públicas; Integra São Paulo; Tecnologias de Informação e Comunicação; Sistema ILPF; TIC.

RESUMEN
En una investigación censal realizada por el Instituto Brasileiro de Geografia e Estatística y el Instituto de Economia Agrícola (IEA/LUPA) en 2016/2017, se identificó un bajo nivel de adopción del Sistema Integrado de Cultivo-Ganadería-Forestal (ILPF) en las propiedades pertenecientes a la Oficina Regional de Desarrollo Rural de Tupã. En este contexto, esta investigación tuvo como objetivo analizar las barreras de comunicación que impiden que las políticas públicas de transferencia de tecnología hacia el campo lleguen a los productores rurales, en particular el programa Integra São Paulo. Los resultados señalan resistencia al cambio en los sistemas de producción; interferencias en el flujo de comunicación debido a la heterogeneidad de los públicos; y falta de acceso a las Tecnologías de la Información y la Comunicación como medio para difundir información y conocimiento sobre procesos, tecnologías disponibles, programas y políticas públicas que puedan fomentar la producción.

PALABRAS CLAVE: Políticas públicas; Integra São Paulo; Tecnologías de la Información y la Comunicación; Sistema ILPF; TIC.