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DIGITALIZATION OF FAMILY FARMING: FUNDAMENTALS AND ISSUES FOR A PUBLIC AGENDA FOR RURAL DEVELOPMENT

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Abstract: The use of information and communication technologies - ICTs is a continuous and growing process, capable of modifying the dynamics of commercialization and social relations. Family farming is not alien to this phenomenon and is part of this process whether related to the commercialization or management of properties and enterprises. However, the transition to ICTs is complex and requires collective actions and State participation. This study aims to evaluate how the digitalization of family farming fits into the public agenda for sustainable rural development. A qualitative and exploratory approach was chosen, through a literature review on the insertion of family farming in the context of digitalization. The analysis results in important considerations, in particular, about the challenges that family farmers face in terms of access, use and appropriation, and on the other hand, the challenges of the public agenda of expanding infrastructure, designing programs and offering technical assistance to optimize the uses of ICT in this increasingly digital context.
Keywords: digitalization of agriculture, e-commerce, digitalization of rural areas, public policies.

INTRODUCTION

Digital technologies are expanding rapidly across much of the world and are promoting significant changes in the ways of farming and selling food by family farmers (GAZOLLA; RUFINO DE AQUINO, 2021). This reflects the transformations in interpersonal relationships occurring worldwide and leading to a change in culture, resulting in a digital transformation: on average, eight out of every ten inhabitants of developing countries have a cell phone, and this number is growing continuously, according to the world bank report (BANCO MUNDIAL, 2016).

This report also raises awareness of the challenges that the process needs to overcome, the so-called digital dividends, which can be understood as a process of gaps that lead to the marginalization of populations in different locations on the planet, for example, the digital gaps in municipalities in the interior of countries can be as high as between developed and developing countries. This is because, according to the World Bank (2016), the acquisition gaps for cell phones between rural and urban populations are decreasing, although they are increasing in relation to internet access. It is understood that public and collective actions are necessary to reduce these gaps and to build a sustainable development agenda (SCHNEIDER, 2016).

In this study we will reflect on the digitalization process of family farming that involves the digital transformation of relationships and processes in rural areas, because the word family farming can sometimes not take into consideration, the diversity and modus operandi of the social categories that inhabit it. the rural environment of a country with significant sociocultural heterogeneity (NIERDELE, FIALHO and CONTARATO, 2014). Therefore, the digitalization of rural areas will be used here as a more comprehensive expression of this complexity, in order to incorporate the necessary infrastructure for the production, insertion and maintenance of family farmers connected to digital markets. This is a comprehensive process that involves not only the digitalization of agriculture, but above all, the digitalization of rural areas, as the digitalization of rural areas leads to changes in infrastructure and marketing and interconnects public policy agendas for this social category. Just as there are discussions in search of greater productive efficiency in precision agriculture. It is understood that both processes are important and necessary for the contemporary context.

In view of the above, an emerging question in this work is: How has the digitalization of family farming been included in the public agenda for sustainable rural development? The intention here is not to establish an in-depth analysis of how the digitalization of agriculture is influencing rural areas and especially family farming in Brazil, but rather to outline questions about how this digitalization process can contribute to the public agenda of sustainable development. From this, the general objective of evaluating how the digitalization of family farming fits into the public agenda of sustainable rural development was defined.

As a methodological conjecture, there is qualitative research with exploratory purposes, on the insertion of family farming in digital markets. To this end, a literature review was carried out on family farming and e-commerce, digitalization of agriculture, digital transformation. The work is divided into four sections including this first introductory section. The second section brings a discussion about digital actions already observed in the pre-Covid-19 pandemic context. The third provides a look at how to ensure that this digitalization process is not exclusionary, given the diversity of audiences in rural areas, and what actions and mechanisms have contributed to this inclusion. The fourth section presents final considerations about the study.

DIGITALIZATION OF BRAZILIAN AGRICULTURE

Discussions about the digitalization of family farming have already been taking place before the advent of the Covid-19 pandemic, however, they intensified with social isolation and the closure of fairs and the need for access to markets by both consumers and farmers and it is believed that this is the evolution accelerated by the pandemic (GAZOLLA; RUFINO DE AQUINO, 2021). The digitalization of Brazilian family farming is a transformation that goes beyond information about the performance of devices and interaction platforms between farmers, consumers, suppliers or technical assistance and involves structural changes that require collective infrastructure actions for the process, also called a revolution digital agriculture (IICA, 2021; BUAINAIN; CAVALCANTE; CONSOLINE, 2021).

Graziano da Silva (1999) considers that the contemporary scenario of family farming, which he calls "new rural", is made up of multiple agricultural and non-agricultural activities, as family farming goes beyond agriculture and agroindustry, also encompassing handicrafts and rural tourism. Blum (2001) considers that this scenario of family farming is marked by transformations that occur at an accelerated rate. However, the author considers that since 1970 Brazil began to face some difficulties in entering the market in general, resulting from agricultural modernization. Even today, family farming faces several problems that it is intrinsically unable to resolve, problems that permeate the infrastructure of rural areas, requiring government action through efficient public policies that can guarantee the stability of family farming in the face of these transformation processes. agricultural (FEIDEN et al., 2020).

The covid-19 pandemic has accelerated the change in sociability in markets and a new revolution of interactivity and buying and selling relationships is being experienced in Brazilian agriculture, with emphasis on the greater relevance of consumer decisions in digital markets (SCHNEIDER et al., 2020; GAZOLLA; RUFINO DE AQUINO, 2021). For Schneider, et al. (2016), markets are spaces in which the exchange and sale of goods and products occur, as well as interaction through dialogue and cultural actions, but rather than

the exchange of goods, they are spaces for sociability between farmers and consumers. Family farmers are largely part of so-called short marketing circuits, which benefits local production, reduces middlemen and marketing channels, in addition to promoting the exchange of information between those who produce and consume.

The Covid-19 pandemic also gave greater notoriety to Artificial Intelligence and big data, which are among the main trends identified by experts in the transformation of Brazilian agriculture (BUAINAIN; CAVALCANTE; CONSOLINE, 2021). This transformation gains ramifications as science, technology and business initiatives drive Brazilian agriculture to be part of this transformation (CEPAL, 2020).

The transformation mentioned above tends to accompany a global change in the importance of agriculture and food, in which discussions take place in the growing importance of the demand for healthy and sustainable food (SCHNEIDER et al., 2020). And in studies on digitalization there are two processes that are complementary, however, it can be distanced as the social arenas for formulating public policies (SOUZA, 2006) are directed towards the digitalization of agriculture can also be understood as precision agriculture. While the digitalization of agriculture focuses on the more technical ritual, with efficient use of resources, the digitalization of rural areas involves public policies of a social nature for the productive inclusion of rural actors in family farming (SOUZA, 2006; SCHNEIDER et al., 2020). It is not the intention of this article to delve into these questions about public policies for family farming, however it will recall the current paradigm that guides public policies so that they are in fact aligned with sustainable development (GRISA; SCHNEIDER, 2014).

INFORMATION AND COMMUNICATION TECHNOLOGIES IN RURAL AREAS

Information and Communications Technologies or ICTs allow the expansion of horizons and the incorporation of life expectations, as they modify sociability in rural areas. ICTs allow everything from the creation of marketing groups to access to public policies, in addition to estimates of harvests and performance on stock and commodity exchanges and access by family farmers to banking services and credit and production cooperatives, as well as access to education distance and technical assistance (SCHNEIDER et al., 2020). To this end, state action is central to social policy agendas as a guarantee of infrastructure for the Brazilian rural environment, which as it happens aligns with the rural development process (FREITAS; FREITAS; DIAS, 2012; SOUZA, 2006).

The same perception is pointed out in the World Bank report: The full benefits of ICT transformation will only become reality if there are investments in the education and health of its population and the promotion of good governance. The report also warns countries, stating that digital technologies alone do not boost productivity or reduce social inequality (BANCO MUNDIAL, 2016). Experience the greatest evolution of information and communication in history; more than 40% of the world's population has access to the Internet; Among the poorest 20% of households, almost seven out of every 10 have a cell phone and according to this report, rural or peripheral households are more likely to have access to cell phones than to sanitary facilities or drinking water (BANCO MUNDIAL, 2016).

During the collection of information for the construction of this study, a diversity of digitalization processes or strategies were found in relation to access to markets, this

is because there are farmers who use social networks, even with structural difficulties in a more autonomous way, while, farmers involved in collective actions access more digital platforms (GAZOLLA; RUFINO DE AQUINO, 2021) and (SCHWANKE, 2020).

Bodini and Zanoli (2011) consider that electronic commerce is a potential access to markets, considering that through the internet there is a reduction in geographic obstacles, allowing more people to be reached. Furthermore, electronic commerce is an opportunity to promote the social organization of production, whether through cooperatives or associations.

In summary, the resilience that family farming in e-commerce has produced is noticeable. Digital transformations in the agriculture and food sector present uneven and worrying processes regarding the possible marginalization of social assets (GAZOLLA; RUFINO DE AQUINO, 2021). This is because technologies for agriculture have involved homogeneous social groups, according to the ECLAC report in 2020 (Figure 1), including men, young people and large properties and implying state actions to reduce inequalities in insertion for women, the elderly and family farmers.

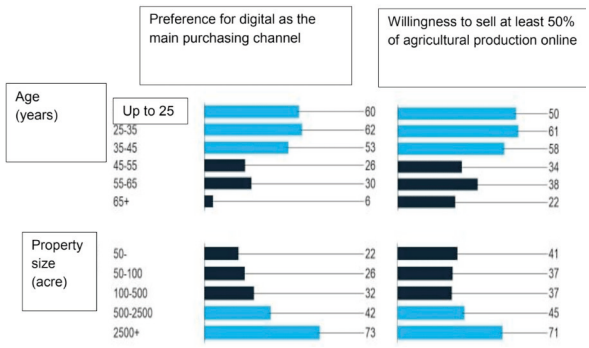

Figure 1 – The profile of Brazilian farmers who access digital technologies in Brazil, characterized by young people who manage large properties and intend to sell online.

Source: (FERREIRA, CANELA, JANK, 2021).

Digitalization based on ICTs in agriculture and food is becoming an expanding reality in Brazil, whether through access to markets (GAZOLLA; RUFINO DE AQUINO, 2021; SCHWANKE, 2020) or through the incorporation of ICTs into agricultural work. There is a lot of information about the benefits of digitalization and the use of innovative technologies in agriculture (FERRAZ, 2021), however, little is known about the consequences of this digital transformation, including only homogeneous groups, as shown in figure 1. Digital transformation in the countryside is seen by society and the Brazilian government as a necessary response to meet the demand for food in a sustainable way from a socio-environmental point of view, but it is also an opportunity to include social well-being in social agendas, (GAZOLLA, 2021). However, there is still little systematic evidence on digitalization in rural areas as a whole, with the majority of existing work being limited to the discussion on the use of ICTs in precision agriculture, related to production techniques and may refer to a process of green revolution (BUAINAIN; CAVALCANTE; CONSOLINE, 2021; CONTERATO et al., 2013; GAZOLLA, 2021). Therefore, attention is needed to social groups that are still on the margins of this process.

In summary, studies indicate that the digital marketing of food and family farming products is an expanding reality in the country and that supply cannot meet the high demand (GAZOLLA; RUFINO DE AQUINO, 2021; SCHWANKE, 2020; SOUZA DE ALVEAR et al., 2020), but actions are needed to guide public agendas so that this process can include a greater diversity of farmers in terms of electronic marketing and digital markets.

Regarding new techniques and instruments for this transformation in agricultural production, ICT instruments allow deeper and more detailed knowledge of agricultural

areas and, the more knowledge, the better and more assertive the decisions in agriculture (FERRAZ, 2021). Furthermore, the use of information for decision-making can increase productivity and production quality while also enabling cost reduction and increased input efficiency. However, despite all these advantages, the numbers released in the survey carried out in 2020 by Embrapa, Sebrae and Inpe on Digital Agriculture in Brazil show that less than 20% of properties use GPS location systems and less than 8% use digital maps or geographically located information (FERRAZ, 2021).

The problem that is evident is that the digitalization of agriculture is an ongoing process that can distance itself from the more inclusive process of social actors, which is the digitalization of rural areas, when we talk about digitalization of rural areas, it is involved in improvements in access to basic education, infrastructure and preventive health services for the rural population that supply short marketing circuits, that is, internal markets and which are directly linked to public sustainable development agendas (SCHNEIDER, 2016). Therefore, by associating the digitalization of rural areas, the digitalization of family farming in the most diverse socio-productive contexts in the country is linked.

Regarding public actions, there is a political mobilization to regulate digital technologies in agriculture and rural areas. In September 2021, the Chamber of Deputies approved the bill that regulates the use of artificial intelligence in Brazil aimed at the operating parameters of precision agriculture (FERRAZ, 2021). The Federal Senate approved Bill No. 172/2020, which will bring changes to the rules for using resources from the Telecommunications Services Universalization Fund (FUST), which could provide the expansion of internet access in the countryside, however, will Is the internet only a solving factor for digital transformation to actually occur? (FERRAZ, 2021) it is understood that investments in digital education, electricity and support equipment are necessary. This is because only with an infrastructure framework for rural areas, such as education, electricity, road infrastructure, among others, will it promote productive inclusion of family farmers and thus greater access to digital markets, new forms of marketing family farming products (BANK MUNDIAL, 2016; GAZOLLA; RUFINO DE AQUINO, 2021; SCHNEIDER et al., 2020).

There is another Bill, PL 149 of 2019, which establishes the National Policy for Precision Agriculture and Livestock, which has not yet been deliberated, but which aims to regulate and encourage precision agriculture and traceability (FERRAZ, 2021). However, these actions are related to agricultural techniques and production and the inclusion of family farmers in these contexts is still elusive, given the breadth of this social category.

We understand that family farming has resilience in the process of entering new expanding markets in the post-pandemic economic crisis caused by Covid-19 (GAZOLLA; RUFINO DE AQUINO, 2021; SCHNEIDER et al., 2020; SCHWANKE, 2020), however, it cannot be said that this insertion reaches a diversity of family farmers. Guided actions and public policies aimed at the diversity of farmers in this process are supported by previous experiences.

It is based on the changes that occurred in Pronaf's history, designating, throughout its trajectory, lines of credit to respond to diversified demands for resources for rural development and which interconnect the new dynamics of rural space and which cannot be marginalized in State intervention planning and processes (FREITAS; FREITAS; DIAS, 2012).

CHALLENGES OF DIGITALIZATION FOR MARKET ACCESS

The digital market represents great potential for family farming, as virtual interaction is capable of boosting products on the market, bringing consumers and farmers closer together, reducing marketing channels and thus enabling resilience due to the amount of information about the product, providing a satisfactory proximity between farmers and consumers (GAZOLLA; RUFINO DE AQUINO, 2021), since the use of social networks allows for greater exchange of information and greater reach of users more quickly compared to traditional commerce (SCHWANKE, 2020).

However, for e-commerce in family farming to be truly inclusive, it is necessary to evaluate comprehensive factors. Talk about the means of resilience that family farming adopted during the pandemic and which are still limited (social networks) while others access them (digital platforms in addition to social networks). Assessing some social groups requires more attention to productive inclusion and the role of the State is fundamental for this, as will be discussed in the next section of this study.

There are many positive impacts on the digitalization of family farming for access to markets, including: (i) being able to take greater control over marketing, when marketing middlemen are eliminated; (ii) the proximity of farmer and consumer and thus the demand knows more about the origin of the product (iii) expansion of demand for products, with greater visibility of these. There is also greater access to new audiences for the products, in addition to reducing costs with marketing channels (CONTERATO et al., 2013; GAZOLLA; RUFINO DE AQUINO, 2021; SCHWANKE, 2020).

However, the challenges for this commercialization are great and require collective effort to overcome. As well as the need for the State to once again stimulate rural development policies that are based on the productive insertion of various actors in rural areas, that is, to move towards digitalization of rural areas, not just the production process itself, and which makes digitalization much more comprehensive than agriculture (precision agriculture or agriculture 4.0) beyond agricultural practices.

It is understood that the process of digitizing rural areas involves family farmers more effectively than just the digitization of agriculture. Therefore, family farmers face several obstacles related to the insertion of products in markets that involve rural infrastructure and access to technical assistance. It is understood that public policies need to promote family farming and foster sustainable rural development, encouraging local and regional markets in order to add value to production and meet consumer demand for healthy and truly sustainable food (SCHWANKE, 2020).

Studies by Souza (2006) and Evans (1993) are used to understand that government actions are guided by ensuring the first fruits of the Brazilian constitution for the well-being of society and the inclusion of marginalized groups, as a development and not just economic growth. For this reason, it is understood that the digitalization of rural areas must be part of sustainable rural development agendas (Figure 2). Through the synthesis of studies on the digitalization of agriculture, electronic commerce of family farming and digital transformations and news and forums on the subject, we tried to illustrate in figure 2 how complex the field of study on the digitalization of agriculture and the Brazilian rural environment is. and that the importance of these studies persists as they are directly at the interface with the UN's

sustainable development objectives (United Nations, BRAZIL, 2015).

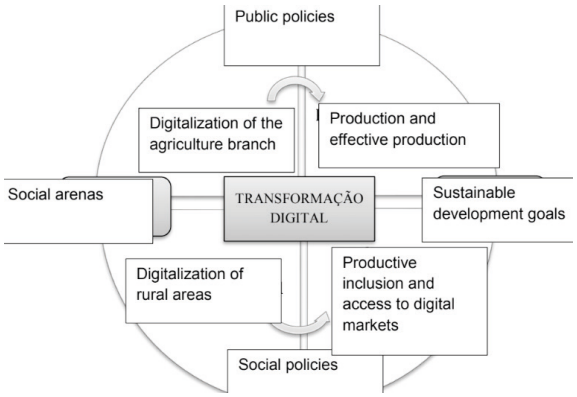

Figure 2 - Representation of the digital transition diversification panorama that occurred through the digitalization of agriculture or precision agriculture and the process of digitalization of rural areas or family farming, are two parallel, but not antagonistic, processes that aim to align with the country's sustainable development.

* They are linked to sustainable development objectives in Brazil number 2, 10,11, 12 and 16 (UN BRAZIL, 2015).

Source: Elaborated by the authors based on the compilation of information from studies by (GAZOLLA; RUFINO DE AQUINO, 2021); (SCHNEIDER et al., 2020); (SCHNEIDER, 2016); (BUAINAIN; CAVALCANTE; CONSOLINE, 2021); (CEPAL, 2020), (BANCO MUNDIAL, 2016); (CONTERATO et al., 2013);(GRISA; SCHNEIDER, 2014) and (SOUZA, 2006) (FERRAZ, 2021) (OTACVIANO, 2010).

According to recent studies, the creation of strategies for accessing online markets is not possible on an individual basis (GAZOLLA; RUFINO DE AQUINO, 2021). The intention of Figure 2 is to systematize information from various studies on the topic of digitalization of family farming, electronic marketing, digital markets, productive inclusion related to the challenges that this process faces in the current paradigm of sustainable development.

Firstly, it is necessary to highlight that the digitalization of agriculture or rural areas is included in the digital revolution or digital transformation that is taking place worldwide, a process that is ongoing and expanding and hence the importance of turning rural studies towards this process. Another important point is that the processes sometimes present themselves as parallel given the objectives they have: one of productive efficiency and the other of productive inclusion, however both are aligned with the interests of sustainable development objectives.

By presenting different objectives, they enter into social arenas that lead to the search for public policies more focused on technology and other public policies of a social nature (SOUZA, 2006). social policies, productive inclusion policies, with greater diversity of farmers, focused on local realities.

The participation of the state in this process is extremely important as it involves social policies for the participation of family farming in this process and avoiding negative consequences, as can already be observed in the course of the socioeconomic transformations caused by the green revolution in rural areas (OCTAVIANO, 2010). However, the state has already provided policies in the last decade that support the rapprochement of consumers and producers at the local level. such as the PAE and PNAE (TRICHES and SCHNEIDER, 2010).

However, the risks of the state's absence in the spaces for discussion on public actions for this digital transition worry experts, when the processes of technological division between farmers or marginalization, the consequences are: the loss of jobs, the lack of labor qualified work to fill jobs in rural areas and one of the most important is the inclusion of a diversity of family farmers in this technological transition (OCTAVIANO, 2010; SCHNEIDER, 2020; GAZOLLA and RUFINO, 2021; GRISA and SCHNEIDER, 2015).

Discussions in the political sphere about the digitalization of agriculture and family farming refer to what Souza (2006) defined as social arenas, as he sees public policy as an initiative of political entrepreneurs or public policies. Making a parallel about the digitalization of agriculture and rural areas, public agendas gained importance when some government policy makers started to pay attention to precision agriculture and agriculture 4.0 and some still remain ignored or stagnant, such as the inclusion of diversity of social actors in rural areas in this transition, digital education and the importance of training workers, training ATER agents for digital ATER in serving different audiences and the use of these technologies in accessing digital markets (FERRAZ, 2021; SOUZA, 2006; GAZOLLA and RUFINO de AQUINO, 2021).

A possible explanation for this scenario is that governments tend to focus on economic-monetary indicators. And what mechanisms to draw the attention of decision-makers and public policy makers (SOUZA, 2006), such as studies of the challenges, indicators, opportunities and impacts of digital technologies in rural areas, are in the beginning or have not yet caught the attention of decision-makers and formulators of public policies. It must be noted that public policy formulations to boost rural development directly impact the country's economy and are linked to the development of the state in the 21st century (EVANS, 2018).

DIVERSITY OF INCLUSION IN THE DIGITALIZATION OF AGRICULTURE

Family farming is also characterized by its productive diversity, which in turn can be understood as a complex network of articulation between the different family forms that cohabit rural spaces, with their multiple strategies of social, economic and cultural reproduction. Therefore, understanding this social heterogeneity is of fundamental importance for understanding the different territorial characteristics where this social category appears. In this sense, productive diversity is related to the different strategies of social, economic and cultural reproduction and to the different social actors that interrelate (NIERDELE and GRISA, 2008; SCHNEIDER and NIEDERLE, 2008; DEPONTI, 2014).

It is important to analyze the social heterogeneity characteristic of family farming, since this understanding "implies considering different levels of education, income levels, size of properties, forms of family composition, forms of property management, etc." (DEPONTI, 2014, pg. 13). This way, the proposals of an ongoing public agenda, on digital ATER, Agriculture 4.0 or the digitalization of rural areas, involve numerous previous debates, in particular, on the need to "take into account local knowledge and that farmers do not be seen as mere receivers, but also as an active part of the interactive communication and information processes" (DEPONTI, 2014, page 13). For Deponti apud Thornton (2003), thinking about the adoption of Innovation and Communication Technologies (ICTs) presupposes thinking about the ways of appropriating these technologies. This is because, regardless of a public or private initiative, the use of ICTs takes into consideration, factors such as access, use and appropriation.

Given the aforementioned context, the

implementation of the National Policy for Technical Assistance and Rural Extension for Family Farming and Agrarian Reform (PNATER), observing its principles in the area of new debates about digitalization, becomes hampered. Initially, we can analyze the principle of free, quality and accessibility, associated with a public perspective on the use of ICTs and digitalization (both extension action and new management mechanisms). In addition to the analysis of technology as a resource to support family farming, Farias and Duenhas (2019) point out that ATER itself is still a challenge, especially when we look at the aforementioned principle. Data from the Agricultural Census (IBGE, 2019) indicate that only 30% of establishments with up to 10ha receive technical assistance and of these, only 38% receive government technical guidance.

Regarding access to information technologies, there has been an evolution in recent years in relation to the existence of telephone devices, showing an increase of 158% from 2006 to 2017. There has also been an evolution regarding data on internet access, where "1,430,156 producers declared to have access to the internet, with 659 thousand through broadband, and 909 thousand through mobile internet, contrasting with the year 2006, where the total number of agricultural establishments that had access to the internet was only 75 thousand" (IBGE, 2019, p. 79-80). However, navigating this virtual world also poses challenges for farmers in relation to the adoption of ICTs, in particular, the education of family farmers. According to IBGE (2019), 73% of all producers have at most primary education (formerly primary) by level of education, and 23% of the total declared that they do not know how to read and write.

An analysis can also be established based on another PNATER principle, such as the need to "adopt a participatory methodology, with a multidisciplinary, interdisciplinary and intercultural approach, seeking the construction of citizenship and the democratization of public policy management" (BRAZIL, 2011, art. 3). The actions proposed by the ATER DIGITAL programs of the Ministry of Agriculture, Livestock and Supply (MAPA) seem to move in the opposite direction. According to the respective body's website, one of the objectives and pillars of the program consists of strengthening and expanding the Brazilian System of Technical Assistance and Rural Extension through an innovative governance model, and promoting the wide use of Information and Communication Technologies (TICs) in actions of the Technical Assistance and Rural Extension companies (Ater) and Brazilian agriculture.

As is evident, the proposal is to incorporate ICTs into the performance of ATER services with a view to streamlining and expanding service, aimed at agribusiness. Furthermore, the multi and interdisciplinary character is lost, given that the communication action of the extension worker and the farmers' environment are often loaded with codes that need to be decoded. And this decoding, through intercultural communication, is fundamental for sustainable rural development (BORDENAVE, 1983; VIEIRA, BERNARDO, LOURENZANI, 2015).

Equity in gender, generation, race and ethnicity relations is another principle of PNATER which we can carry out another analysis. Among the scarce bibliography on the topic, Schwartz (2012) brings an analysis of ICTs in family farming and gender relations, adopting the municipality of Santa Maria, in Rio Grande do Sul, as the study unit. According to the author, ICTs have fundamental importance in the empowerment of rural women, in particular, as they constitute vehicles capable of strengthening

and strengthening affective and productive bonds, in addition to creating new bonds that help to overcome the traditional role of subordinate rural women and/or supporting role in the management of property and family. Furthermore, the existence of computer and internet devices are most often acquisitions influenced by women, given the recognition of these resources in the formation of children.

Regardless of the principle association previously made, in general, ATER as a public policy can assume other roles and contributions to family farming. In addition to the organization and insertion of producers in local and regional markets, and consequently the economic dynamization of territories, it can also play an essential role in the use of ICTs and connectivity of rural people. In this new scenario, there is a more emphatic discussion that "technology can be a great ally for family farmers, both in property management and in marketing" (FARIAS; DUENHAS, 2019, pg. 148).

Analyzing the introduction of ICTs for small farmers in the municipality of Montenegro-RS, Deponti (2014) found that, even though farmers have access to the most diverse technological equipment, they lack the necessary knowledge to use them as instruments for developing their properties. Thus, the author emphasizes that ATER in this context can act as an inducer of processes that make it possible to envision Family Farming 4.0. Souza and Filho (2004) in turn, recommend that it would be necessary to define the key question, namely, "what is the role of technology for these farmers? Or rather, is this a problem of lack of adequate technology or lack of conditions to adopt techniques that have already been used, even by family farmers, for decades?" (SOUZA and FILHO, 2004, pg. 04). However, there are some challenges such as the high costs inherent to the management process, the lack of adequate infrastructure, the low level of education and cultural training of some farmers, among other elements (THORNTON, 2003; VIERO; SOUZA, 2008; BUAINAIN and FONSECA, 2011; DEPONTI, 2014)

The different ways of life in the heterogeneous rural environment, especially family farming, are directly related to the use and appropriation of ICTs. The use of devices such as cell phones, computers and the internet is related to the use that families already make of these to communicate and exchange information in their daily lives. In turn, the appropriation of these technologies refers to the possibilities of greater mastery of these technologies. This "presupposes its use beyond the exchange of information, also including the qualification of management processes, control of the property and the expansion of interaction with other farmers and organizations linked to rural areas". (DEPONTI, 2017, pg. 9)

In this process of inclusion of this diversity present in family farming, the cooperative movement has assumed an important role in helping to include farmers in ICTs. For Corbari et al (2017), cooperatives in this segment have branches depending on their membership structure distributed across several municipalities, which provides an extensive network of interaction and dissemination of knowledge. Furthermore, cooperatives act according to their doctrinal principles, such as the principle of "training, education and information", which therefore legally obliges these organizations to retain at least 5% of their surplus for the Technical, Educational and Social (FATES).

Current initiatives in relation to the commercialization of AF products in Brazilian states, there have been indications of measures within the scope of electronic commerce, such as the creation of digital platforms (virtual fairs) to help connect producers and consumers.

This trend of virtualization of markets, due to restrictions on the movement of people and the impossibility of their access to fairs, markets and other establishments, was also observed by Schneider (2020). For the author, "the main transformation resulting from the pandemic in relation to food sales is the increase in virtual purchases" (SCHNEIDER, 2020, p. 178). The recent insertion in these virtual spaces has occurred, from the adoption of simple tools such as messaging applications (WhatsApp), through social networks and virtual fairs, to specific platforms such as e-commerce websites (SCHNEIDER, 2020; BREITENBACH, 2021). However, these records occur more as a result of the behavior of farmers and their organizations in the face of the scenario imposed by the COVID-19 pandemic, rather than an incentive resulting from a public agenda.

ATER gains new challenges in the face of government actions proposed for the digitalization of agriculture. Both farmers and extension workers are targets of these initiatives, which already have ongoing actions, although they are not yet configured as final programs within the scope of the 2020-2023 Multi-Year Plan. In addition to the challenges of promoting the inclusion of the public in the service, this in turn still faces problems related to access and infrastructure of information and communication technologies. Furthermore, there is public technical assistance coverage, which is still insufficient, even for the family segment.

FINAL CONSIDERATIONS

This study sought to highlight and discuss the interrelationship between family farming and digital technologies, the issues that permeate access and appropriation of these technologies, but above all, how it has been inserted into this new digital horizon. What is necessary, since talking about access, use and appropriation of technologies, also concerns which public agendas have been undertaken within the scope of sustainable rural development in this segment, capable of providing education, infrastructure and technical assistance to enable effective use of these new technologies.

This way, the use of digital technologies leads to sociocultural changes and socioeconomic relations in rural areas and requires the articulation of social agents towards a public agenda with a commitment to discussing the challenges that the transformation of digitalization causes in rural areas and which, consequently, in family farming. The demands for digital markets are already significant according to studies cited throughout the article, however, the diversity of farmers in this process and support for agricultural production requires public actions for expansion. And that discussions about the digitalization of rural areas necessarily require the state to act. This is because given the understanding of family farming, given its very nature as a sociopolitical category (GRISA and SCHNEIDER, 2015), it cannot be disconnected from the trajectory of public policies and State intervention.

The importance of more studies and adherence to rural studies on this process of digitalization in rural areas is emphasized so that, similar to what happened with other public policies such as, for example, PRONAF, a pool of policies is created that is fundamental to guaranteeing reproduction of family farming, in addition to opening new fields

of research for rural studies (NIERDELE, FIALHO and CONTARATO, 2014).

ATER plays a fundamental role in this process, whether in helping farmers with the decoding intrinsic to ICTs, whether in the scope of everyday actions or in the sphere of specific actions and programs. It is necessary that the public agenda addresses the issue of expanding ATER actions, as, although necessary, it is insufficient in terms of coverage according to IBGE. Farmer organizations are also of significant importance, whether in reducing the transaction costs of adopting these new technologies. Cooperatives, given the characteristics of their social structure, consist of true information networks, promoting a multiplier effect between the different actors.

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