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REFLECTIONS ON DIGITAL TECHICAL ASSISTENCE AND INNOVATION FOR FAMILY FARMING: POST-COVID-19 DELIVERY OF TECHICAL ASSISTENCE SERVICES AND SUSTAINABLE RURAL DEVELOPMENT

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ABSTRACT

The objective of this article was to discuss the challenges and advances of digital TARE, as a possible complementary tool to the technical assistance and rural extension services as traditionally offered in Brazil. The reflections are based on the idea that, although not recent, the process of incorporating information technologies into the TARE service has accelerated after the advent of the Covid-19 pandemic. The hypothesis is that digital TARE presents itself as a complementary tool to enhance and expand the reach of TARE services in Brazil. For the analysis, we studied 17 experiences of strategies, methods, cases, tools and digital platforms used in the provision of TARE services and technology transfer actions with the institutions providing these services – public, private, and third sector – in progress for family farming in Brazil, Latin America and the Caribbean. We conclude, therefore, that the use of digital tools can enhance the reach of TARE, but not merely replace the practice of professionals in the area. In addition, it is necessary to expand the training for the use of digital tools in family farming spaces and extensionist teams. Finally, we identify international cooperation, led by the Brazilian State, as an opportunity to facilitate and leverage methodological experiences that result in higher quality and effectiveness of services offered, and we warn about the persistence of infrastructure challenges that need to be addressed, so that rural communities, even the most remote ones, can connect to the rest of society.

Keywords: Digital TARE, ICT, Smallholder Farmer, Rural Sustainable Development.

INTRODUCTION

The digital transformation process has been gaining strength in the most diverse sectors of the world economy. In agriculture, information technologies are already being rapidly incorporated into production processes. In rural areas, although unequal, the expansion of access to communication tools, the widespread use of smartphones and the expansion of internet access are expanding the integration of these spaces and impacting cultural and social aspects (FAO, 2019).

It is in this context that the Technical Assistance and Rural Extension service (TARE) is called upon to position itself, improving its practices, adapting methodologies and adopting the digital tools available to enhance, qualify and even update its actions with farmers.

The TARE service, as a key element for sustainable rural development, in its historic role as an inducer of innovation processes, is now debating the paths to follow to primarily fulfill its mission of communication and education, as indicated by Freire (1983). , given the digital transformations of this time.

The challenge of the TARE service in this scenario is to continue to offer quality technical guidance, using new methodologies and tools that support the adoption of production techniques appropriate to social aspirations and market demand, as well as facilitating technical knowledge and access to public policies for productive investment in rural properties. In addition, the expansion of market access opportunities also increasingly demands the use of information and communication technologies (ICT), reducing costs (FAO, 2019).

TARE actions equip farmers to make decisions based on reliable information. The promotion of family farming finds in the technical guidance and rural extension strategies the possible potentialization of its results through, for example, remote technical consulting initiatives and in the continued offer of TARE services supported in a systemic perspective, with greTARE reach and methodological improvement, arising from the incorporation of ICTs.

Conceição and Schneider (2019) attest that the new information and communication technologies (ICT), in which the internet stands out, are already part of the daily lives of family farmers and impact routine practices in the field

of production, forms of interaction with the market and communication. with agents of the technical sphere.

The article, in addition to this introduction, presents reflections on the digital TARE service for family farming and analyzes the potential and challenges of digital transformation based on the analyses of experiences of methodologies and cases of digital TARE and technology transfer carried out by companies public, private and third-sector programs for family farming in Brazil, Latin America and the Caribbean to exemplify and enrich the debate (PETTAN, 2021a; PETTAN, 2021b).

Finally, the conclusions dialog with future perspectives for the use of informational tools to support sustainable rural development.

THE DIGITAL TARE SERVICE

Digital Technical Assistance and Rural Extension or simply digital TARE, in this study, can be understood as assistance provided in person or at a distance, which combines traditional knowledge with scientific knowledge to incorporate, in this service, the use of information technologies. and communication - ICTs and the different digital tools available to expand the access of rural producers, women, young people, the population and traditional peoples to knowledge and information relevant to the improvement of their production practices and improvement of the quality of life in rural areas.

Digital TARE, therefore, should be understood as a qualifier and potentiator of the actions of conventional TARE in a context of advanced digital transformation in the field and not merely a virtual, remote service that is totally disconnected from the traditional practices of the service, where the direct relationship between the Extensionist and the Farmer is fundamental.

Therefore, the replacement of the face-to-face TARE service is not recommended but rather the expansion and innovation in the use of ICTs and the digital tools available so that the Extension service continues to support family farming with the most advanced technologies. of technology.

Digital TARE can be understood in line with the principles of sustainability, equity and inclusion to strengthen family farming and effectively increase production and productivity, generating opportunities and offering alternatives

so that the activities characteristic of agriculture continue to be performed. more efficiently, incorporating innovations. Therefore, ICTs are available and increasingly accessible tools that should not override the respectful and constructive dialog between the popular and traditional knowledge of farming families and scientific knowledge. Thus, the methodological challenge for the TARE service is to avoid the merely diffusionist use of ICTs, thus losing the opportunity to innovate in methodologies that facilitate horizontal and dialogic communication with farmers.

Thus, the TARE services are also offered in a digital way, contributing to qualify and enhance the services offered by the face-to-face/traditional form. This process of incorporation of ICTs was already occurring to a lesser extent but was accelerated by the advent of the COVID-19 pandemic.

This acceleration, although it may have generated uncertainties and motivated reflections on the future of TARE itself, still preserves the guiding principles of this service when adopting digital tools. It is not possible to give up a dialogic posture in the relationship with the public served; the production of content and technical recommendations does not give up a horizon of sustainability; communication through multiple platforms does not fully replace direct communication – eye to eye; the promotion of participation, protagonism and autonomy, as well as TARE actions focused on women and young people, does not lose relevance; the densification of relationships and networking continues as a trend; institutional support and the performance of a multidisciplinary team remain fundamental; income generation goals, integration into value chains, market access and others are relevant topics when the service is offered with the use of ICTs.

Based on these principles, the methodological assumptions adopted in the execution of these services, when adopting digitalization strategies, must still be supported by a systemic view of the community reality and the farmer's property - its interaction with the space in which it is located, with the elements of nature, territorial actors, the market environment and access to public policies.

POTENTIAL AND CHALLENGES OF THE DIGITAL TRANSFORMATION FOR THE TARE

The internet and its potential

The use of the internet opens a number of possibilities for producers assisted by TARE, which, in addition to the exchange of technical production information, allows access to information and continued distance training via digital TARE. For farmers and their rural communities, access to useful information to support decision-making processes is expanded. Thus, the availability of an infrastructure element, internet access, may represent access to a wide range of development opportunities for rural communities.

Regarding the offer of technical content by digital TARE services, the availability of the internet provides, in addition to access, several opportunities to facilitate the exchange of knowledge between technicians and farmers and between farmers themselves, with permanent and accessible communication channels. Internet access in rural communities can facilitate innovations in social technologies appropriated by farmers but also bring together and facilitate the qualification of specialized technical knowledge, offering new paths for the methodological development of the TARE service. Other dimensions provided by the internet are, for example, the possibility of a direct relationship between farmers and final consumers or intermediaries of their production in the marketing process.

Access to this infrastructure profile and, therefore, to advanced technologies can contribute to achieving sustainability gains in agricultural activities. Digital transformation facilitates property management, establishes relationships and facilitates communication with the entire production chain (Conceição & Schneider, 2019).

Caatinga (2021) notes the importance of internet access in rural areas for women, young people and their social organizations. For women, traditionally invisible and devalued by patriarchal culture, access to the internet opens a window to the fight against injustice and violence, with advances in income autonomy, to use the internet as an ally to get out of isolation and create mechanisms of resistance in favor of gender equality and equity.

For young people, the study by Caatinga (2021) draws attention to the fact that this is the public in rural areas with more facilities and interest in ICTs and digital tools, but it is "necessary to ensure a more qualified participation in terms of content". and family and community dynamics". The study also highlights that young people are the central element in supporting older people in accessing the digital world and that the internet can be an excellent tool for disseminating technical innovations and public policies in the productive, economic, social and environmental areas.

Digital accessibility in the Brazilian countryside

The COVID-19 pandemic has highlighted the importance of digital technologies and connectivity. Mobile data traffic in Latin America has registered a significant increase in recent years, as reported by different studies by FAO, ECLAC (2021) and GSMA (2020), pointing to an increase of at least 25% during periods of isolation and approximately 57% of the population of Latin America connected. In the case of Brazil, SOPRANA (2020) found that the pandemic also accelerated connectivity and widened the digital inequality that exists in Brazil.

Regarding digital access in rural areas, the Brazilian reality is even worse, as the lack of internet access harms rural communities further away from urban centers. According to the SNA (2021), of the 5 million rural properties in Brazil, approximately 70% do not have connectivity.

The process of digitalization of the countryside, although it has advanced in the last biennium, remains an obstacle, especially for family farmers in more isolated rural communities. Accelerating this process of installing communication infrastructure can bring numerous benefits to rural development. For the specific case of the TARE service, the digital TARE service tends to reduce costs, expand the reach of farmers, and build bridges with the market and a wide range of public policies, with the power to diversify market opportunities and open new and better employment and income opportunities.

However, this limited ability to transfer information over the internet is a challenge for the advancement and implementation of digital technology in the field so that digital TARE is performed with quality when focused on the use of internet connections. Accelerating this infrastructural process is necessary and

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requires partnerships so that this technology can be accessed by a significant number of people. Public investment to remedy deficiencies in infrastructure in isolated communities is fundamental. The implementation of a State policy that can promote dialog and interaction between the different actors are measures that allow for greTARE equity in the distribution and use of information and communication technologies.

Thus, the benefits of digital TARE services are not limited to only accelerating transformations in the field but also to guiding the fulfillment of demands and contributing to national development in a postpandemic scenario. Studies of the Caatinga (2021) indicate that the main challenge for the digital TARE service to be received by farmers is access to the internet and to the most technologically advanced devices. Access to other, less individualized types of devices, such as notebooks, desktops and tablets, usually occurs at the headquarters of associations, unions, NGOs or public establishments such as schools and health units.

Connectivity and infrastructure in rural areas

The 2017 Census shows that the Northeast region has problems with access to telephone and internet networks, especially for rural areas, occupying the 4th position in a ranking that considers the large Brazilian regions. The South region, despite being in first place in relation to Brazilian regions, with approximately 42% of people with internet access, still has 58% that do not have regular access, in addition to a significant number without access to telephony, which corresponds to approximately 20%.

Studies by the Public Policy Group of USP/ESALQ in MAPA/AECS (2021) identified many discrepancies in the coverage of 4G technology in rural areas among Brazilian regions and that, even with improved connectivity, does not mean an increase in production efficiency because this parameter is linked to the ability of farmers to use the information accessed efficiently. This also corresponds to educational processes and access to financial resources. This would be an indication that digital TARE actions cannot, in the short term, do without integration with other public policies for the development of rural communities.

There is no way to talk about connectivity without thinking about the infrastructure to make it possible, considering the existing towers and antennas

and the installation of new ones. A study conducted by MAPA (2021) found that the installation of 19,582 antennas could cover almost all of the areas in need of connection in the country. Of these, 4,400 correspond to towers already built and would cover approximately 24.49% of the connection need, while 15,182 correspond to towers that would need to be installed and would cover the remaining 75.51% of the area.

ICTs and digital tools at the service of digital TARE

In the dynamics of the face-to-face visits of the extensionists to the farmers, other relationships are established in addition to the technical and productive ones that are, in the face-to-face TARE model, those of friendship, trust, exchange of knowledge and cooperation. Studies of the Caatinga (2021) found that families that were already involved in these dialogic dynamics of face-to-face TARE showed "a greTARE willingness to participate in remote and digital processes of complementary TARE" and identified great "resilience and creativity of TARE practices that quickly adapted to remote forms to continue its exercise", thus demonstrating "the commitment and innovation capacity of technicians with their audience".

In this way, extension workers can use various digital tools and technologies available for the execution of the TARE service to reach farmers, such as internet messaging applications such as WhatsApp and SMS (Short Message Service). The distribution of content, in turn, may require a multiplatform strategy via the Internet, TV and radio, among other channels, understanding that two-way interaction channels should be privileged that allow the farmer to interact with the technical team in solving problems. treated technicians.

The extension worker's oral communication can use voice recordings (podcasts), radio transmission, videos broadcast by open TV or cable (received in the field through satellite dishes), FAQs (Frequently Asked Questions) by messaging applications (WhatsApp, Telegram, SMS, others), access to the large Internet data (via browsers), and sharing experiences in the groups of some messaging applications (including valuing orality, taking into account the still high degree of illiteracy in rural areas) in addition to other possibilities of ICTs and digital tools.

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Some of these media, in some cases, can be even more effective than the oral and face-to-face exposure of the technician, as is the case of the technical videos made available through YouTube or social networks for the qualification and training of farmers who will be able to access these contents at any time and even repeatedly.

The varied collection of possibilities for the use of media opens the way to expanding the number of families served by TARE services. Considering that most family farmers in Brazil do not receive any type of technical guidance, the digital TARE modality may represent a significant reinforcement of conventional, face-to-face TARE.

Use of ICTs and digital tools by farmers and technicians

FERRAZ (2021) states that despite all the advances and benefits of digitalization and the use of innovative technologies in agriculture, there is still a long way to go before this digital transformation becomes popular in the countryside and significantly affects society. Among the bottlenecks, he considers that most farmers do not have the necessary training to use their full potential or are even unaware of the possibilities of digital tools, which is also presented as a challenge in FAO (2019).

In this regard, GREGOLIN (2021), in his studies in Latin America and the Caribbean, identified several challenges to expand the use of digital tools in the provision of TARE services, highlighting the following: at the level of farming families, at the level of extension workers and at the level of public policies.

Corroborating GREGOLIN (2021), the studies of the Caatinga (2021) also highlight the importance of the role of young people in the peasant family who more quickly learn to master the language and the modus operandi of using applications, websites and the various digital tools; therefore, they provide valuable services by offering mediation with their parents or older adults.

Content development for TARE digital

Content development comprises all actions taken before, during and after the creation of content to ensure that what has been produced is valuable to

rural producers, their families and social organizations. Such content is developed by state or national agricultural research centers, universities, private TARE companies, public companies and the third sector.

Until the advent of the internet, ICTs and digital tools, these contents were—and still are—distributed via printed booklets, books, folders and other forms of dissemination. However, with the advent of digital transformation, this content is massively produced and distributed digitally.

On the other hand, the development of content for digital TARE can also be understood as the design of information, services or platforms that allow the exchange, collection and dissemination of data, with the objective of solving a problem of a public nature, as reported by the authors. studies on the digitization of agriculture for the inclusive transformation of rural societies for food systems and COVID-19 in Latin America and the Caribbean, conducted by FAO/ECLAC in May 2021 (FAO/ECLAC, 2021). Thus, these contents are considered public goods and are usually provided by the State and financed with public resources, as they potentially benefit all members of the community (FAO, 2002). In the case of agrifood systems, content development is related to meteorological information, early warning of disasters, markets for agricultural and livestock goods, services or procedures and government support.

CONCLUSION

This article sought to reflect on the challenges and advances related to digital TARE in Brazil, resulting from a process of digital transformation in Brazilian agriculture, as well as impacted, with the adaptation of the conventional TARE service or innovation in the provision of these services in a digital way, a process immensely accelerated by the COVID-19 pandemic. It is observed, therefore, that important challenges remain for the implementation of this type of innovation in rural extension services, although it is recognized that several solutions were created in this period that began with the advent of the pandemic, which needed physical distancing.

The points raised point to the transformation of an analog TARE to the construction of a digital TARE, although not in mere replacement of the way the service is traditionally offered. Therefore, it is necessary to deepen the look

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at this new reality, in which the use of informational tools, ICT, is the new reality of TARE. These points should be seen as theoretical references for debate, reflection and especially for the construction of innovative proposals for the performance and provision of rural extension services in a technological and digital era that takes into account the mass use of ICTs and the different digital tools as strategic supporters for the qualification of those services.

Thus, it is concluded that it is relevant for the development and methodological improvement in the area of Technical Assistance and Rural Extension to consider that a) the use of digital tools can enhance the reach of TARE but do not replace the professionals and their TARE work; b) training in the use of digital tools in small-scale, family farming should be expanded and continued for farmers and offered to extension workers; c) international cooperation, led by the Brazilian State, can contribute to facilitating and leveraging methodological experiences that result in greTARE quality and effectiveness of the services offered; and d) infrastructure challenges need to be addressed so that rural communities, even the most remote ones, can connect with the rest of society.

In this sense, digital TARE presents itself as a process of improvement, qualification and correction of some possible problems of analog TARE and tends to be increasingly present in technical assistance and rural extension services, either as a tool to induce innovations or facilitating access to technological knowledge.

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