

Chapter 9

Information for citizenship action and sustainable development promotion

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Introduction

This chapter is related to target 12.8, which aims to ensure that, by 2040, people everywhere have relevant information and awareness for sustainable development and lifestyles in harmony with nature. Based on the mission and guidelines of the Brazilian Agricultural Research Corporation (Embrapa) and the technological solutions it provides, the focus is mainly on delivering information from scientific research results, the source of which is the scientific researcher, who is the spokesperson for relevant information that should reach people everywhere. Other important social actors in this process are professionals working in communication and education who, based on this information, will express it under different forms, in order to encourage consumer taking citizenship action. This important link in the productive chain also represents the ordinary citizen who is required to act in favor of sustainable development.

Context

Providing access to information for all people everywhere seems to be an easily attained goal within the contemporary communicative context in which digital culture takes over, transporting information at instant speed. However, according to Dowbor (2017), producing and disseminating information, in compendiums of statistics and in fragmented media, by countless public institutions and civil society organizations, led to a gap in this process: technologies and basic information are available, but tools for organized knowledge for citizenship action were not created.

For Dowbor, an information network for citizenship action involves discussing a series of tools to create a broad and diversified process. Corporate support to information for citizenship initiatives is among the 11 tools mentioned by the author. Another aspect to be taken into consideration is the communicative character of our time, which inexorably implies multiple interaction between user-audience and screens (Gómez, 2014). The author refers to the daily interactions between citizens, which the author identifies as communicative citizenship, a concept that goes beyond the rights and obligations of citizens, and is based on from two issues: what citizens should learn from what comes from the screens and how to facilitate this learning (Gómez, 2014).

It is within this context that the initiatives of organizing and disseminating Embrapa's information on socio-environmental responsibility and commitment to promoting sustainable development are developed.

Problem

The chaotic context described above, caused by the large amount of information generated by various sources, is aggravated by content self-production. This, in turn, is facilitated by access to information and communication technologies (ICTs) and social networks. That is, the ordinary citizen is much more likely to produce and disseminate his own information, but, at the same time, as a reader, listener, interacting viewer, this large amount of information leaves him confused, in doubt as to how to act or, on the opposite end, convinced that his decisions were the right ones, because of the greater or lesser degree of credibility he attributes to sources to which he had access.

Embrapa, as a public company and source of scientific knowledge, must offer it to different audiences (technicians, farmers, students in areas related to its field of activity and ordinary citizens as consumers). To this end, Embrapa operates on two internally and externally interrelated fronts: communication management and technology transfer, and educational training processes to qualify peer educators. Topics related to sustainable development are varied: responsible consumption, environmental restoration, agroecology, organic production, soil and water conservation, environmental education, recycling, adequate waste disposal, among others. Teaching/learning modalities used are very diverse: on-site, distance/semi-distance learning, as well as conferences, symposiums, seminars, courses, lectures, video-lessons, hotspots, field days, workshops, among others.

In order to follow trends and face challenges posed by scientific information management and dissemination, Embrapa is aware of the technological revolution over the last decades, marked by accelerated computerization and digitization of procedures, previously performed in manual or analog modes, and by the development of new information and communication technologies (ICTs).

This chapter seeks to make explicit Embrapa's actions to disseminate technical-scientific knowledge it generates, and thus contributes to ensuring that people everywhere have access to relevant information and be aware of sustainable development and lifestyles in harmony with nature.

How does Embrapa promote its work?

Embrapa coordinates several initiatives on knowledge management and technical and scientific information organization and availability aimed at both peers (researchers and scientists) and the lay audience (various segments of Brazilian society, among which we highlight agriculturalists, rural technicians, rural extension technicians and other agents involved in agricultural production chains, young and small-scale family farmers, teachers and students of different schooling levels, as well as children and adolescents, entrepreneurs and opinion takers) (Embrapa, 2015).

Scientific dissemination and science popularization

Embrapa publishes electronic books (e-books) in specific format for reading on small screens of mobile devices such as tablets and cell phones. Audio and video content has been digitized and is freely available on the Internet. Embrapa's technical-scientific production, once accessible only in printed form in libraries, has become available to Internet users around the world through online repositories with open access to information.

In order to reveal Embrapa efforts to provide society with relevant information and to promote citizen awareness for sustainable development, we present here a summary of our main actions to popularize science and disseminate scientific knowledge.

Internet – Embrapa seeks to follow the best digital practices, and one of its main advances in communicating with the general public was the improvement of its digital environments centralized on [Embrapa Portal](#). Embrapa has also joined

the universe of online social networks; it has institutional profiles and channels: twitter.com/embrapa, youtube.com/embrapa and flickr.com/embrapa.

All the online information products aimed at the external audience, as well as citizen support services, are accessible at Embrapa Portal, which also includes a corporate intranet for Embrapa employees and associates. Moreover, its portal holds special pages and websites to make specific information easily accessible and to generate value for users.

In 2016, the Embrapa Portal ranked first in Latin America in the world web ranking of research centers ([Webmoetrics](#)), ranking 36th in the overall ranking of that year. In Embrapa Portal, farmers and technicians can quickly access methods and experiences developed by the Company and its partners to promote sustainable development in the different Brazilian biomes, as well as good agricultural practices for sustainable land use. Therefore, research results to promote agricultural sustainability development and innovation are within reach of a click.

Through Embrapa Portal, the user can access all digital information products and services offered by the Company, presented below.

Scientific dissemination to peers (scientists and researchers) – Releasing journals to disseminate original technical-scientific works for professors, researchers, and students in related fields as priority audiences is a constant activity of Embrapa. Among these journals are the [Brazilian Journal of Agricultural Research](#) (PAB) and [Cadernos de Ciência & Tecnologia](#) (Science and Technology Journal – CC&T).

On a monthly basis, PAB welcomes unpublished works in fields such as Plant Physiology, Plant Pathology, Crop Science, Genetics, Soil Science, Food Technology, and Animal Science, among others. All of its editions are available on www.embrapa.br/pab. CC&T proposes to reflect and debate on agricultural development in its social, economic, environmental, cultural, and political aspects. All volumes, published quarterly, are also available for [free online access](#).

Another editorial line is made up of [serial releases](#) that are available to society in general at Embrapa Portal. They are: *Circular Técnica* (Technical Newsletter), *Comunicado Técnico* (Technical Bulletin), *Boletim de Pesquisa e Desenvolvimento* (Research and Development Bulletin), *Série Textos para Discussão* (Texts for Discussion Series) and *Série Documentos* (Documents Series).

Democratic access to scientific knowledge – Embrapa has conceived, created, and is the coordinator of an open access to the technical-scientific information project, made up of *Embrapa's Open Access Repository to Scientific Information* ([Alice](#)) and *Repository for Technological Information of Embrapa* ([Infoteca-e](#)), which make editorial content of Embrapa available for reading and free downloads. Also joining the project is the *Open Integrated Information System in Agriculture* ([Sabiia](#)), an automated search engine that collects and centralizes information offered by national and international institutions that, like Embrapa, are committed to free access to scientific information.

Printed and electronic publications – The concern to offer qualified information to varied reader profiles translates into the multiple options of Embrapa catalog of publications that, in addition to hundreds of individual titles, includes collections focused on specific topics or designed for specific audiences. Among them are those focused on sustainable development and manufacturing methods in harmony with nature, created in the 2000s, in tune with the most pressing themes in the field of diversity and sustainability in the countryside: the *Coleção Povos e Comunidades Tradicionais* (Traditional Peoples and Communities Collection); the *Coleção Transição Agroecológica* (Agroecological Transition Collection) and the *Coleção Direito Ambiental* (Environmental Law Collection). They add to the [already traditional series](#): *Coleção Plantar* (Planting Collection); *Coleção Saber* (Knowing Collection); *Coleção ABC da Agricultura Familiar* (ABC of Family Farming Collection); *Coleção Agroindústria de Alimentos* (Food Agroindustry Collection) and the *Coleção 500 Perguntas 500 Respostas* (500 Questions 500 Answers Collection) and the series *Sistemas de Produção Embrapa* ([Embrapa Production Systems](#) – SPE).

It is also worth mentioning the [editorial projects aimed at children and adolescents](#), such as the *Coleção Educação e Cidadania* (Education and Citizenship Collection), in eight volumes, *Cartilha dos Jogos Ambientais da Ema* (Ema Environmental Games Booklet), in seven volumes, *Almanaque Hortaliça* (Greenery Almanac), in five volumes, and *Hortaliças para Crianças* (Greenery for Children), in three volumes.

On the [Embrapa Bookstore Website](#), all Embrapa publications can be purchased in print, and some are also available as e-books.

The Agência de Informação Tecnológica ([Technology Information Agency](#) – Ageitec), in turn, is a serial online publication. Each volume is called Knowledge Tree and is focused on a specific theme, whose content follows the three stages of the productive chain: pre-production, production, and post-production.

Audiovisual production – [Prosa Rural](#) was created in 2003 aiming at bringing information about technological solutions developed by Embrapa and its partners to the illiterate population. Thus, in 2006, the four regionalized programming grids of the program (North, South, Center-West, and Northeast/Jequitinhonha Valley) were established. It is weekly and broadcasted by a network of partner stations distributed throughout Brazil. Its collection of over 2 thousand programs is also available online at [Prosa Web](#) Radio Station and, through [Prosa Rural App](#), launched in 2017, is available to everyone who owns cell phones or other mobile devices.

The [Dia de Campo na TV](#) program (DCTV), created in 1998, is rebroadcasted throughout Brazil by Canal Rural and by other 55 stations that operate by parabolic signal. The news stories and segments that compose it are available at [DCTV Channel on YouTube](#). Covering varied themes, DCTV seeks to cover all research areas aiming at disseminating technologies developed by Embrapa and partners for different audiences.

Support for formal education – The Minibibliotecas ([Mini-libraries](#)) are an extra-curricular initiative that seeks to popularize technical-scientific knowledge produced by Embrapa by means of printed and audiovisual publications in order to support both extension specialists and educators who work in the regular education system, focusing on agricultural and rural schools. Based on this strategy, Embrapa started training community leaders to use its Mini-libraries and encourage the rural population to read agricultural publications. On its website, there is an [online bookshelf](#) with the main titles that make up the Mini-libraries collection.

Another online-only initiative for science dissemination aimed at children and adolescents during school time is the website [Contando Ciência na Web](#) (CCWeb), which, by means of games, illustrations, texts, audios, videos, and publications, tries to adjust information related to agriculture and livestock for this audience. In addition to the website, there is the [Embrapa & School](#) program, a historical effort of Embrapa to approach and guide children's audience. The program reaches thousands of students each year through lectures, visits, and activities in events.

Relationship with the media

One of the great communication challenges for a science and technology company is to provide knowledge and scientific research results to everyone who can benefit from them. At Embrapa, the communication is aligned with the

objectives, guidelines, and impact axes described in its Master Plan (PDE) and integrated with the decision-making process.

The cross-cutting communication actions help support research and development, technology transfer, and institutional development macro-processes, seeking to promote debate and interaction and to encourage harmony in the relationships between Embrapa and its audiences.

Embrapa keeps a relationship with the press that has been very efficient throughout its history. This is integrated with Embrapa News Agency, which weekly releases new stories and send them to more than 4,500 subscribers, most of them journalists.

In addition, Embrapa keeps its own media. One of them is the portal, which is updated daily and gathers news from all Embrapa Units. Each Unit has its own portal, and all are articulated in a network. Another media is the *Conexão Ciência* (Science Connection) TV program, produced with NBR TV, the federal government channel. There, new interviews with scientists on a subject of relevant public interest are presented weekly.

Another media action is the *XXI – Ciência para a Vida (Science for Life)* magazine, available on the Internet. It addresses in depth major research topics carried out by Embrapa throughout Brazil. To monitor what is published in the press, Embrapa has a clipping service that checks about 1,500 print and online vehicles, of general and specialized interest.

Promoting and attending events

Promoting conferences, seminars, fairs, and exhibitions, as well as field days, lectures and trainings, and taking part in events organized by third parties are among the actions that materialize Embrapa's efforts to offer society relevant information and to raise citizen awareness on sustainable development and lifestyles in harmony with nature.

Embrapa's participation in agricultural fairs and exhibitions is important to consolidate its image and strengthen its relationship with strategic audiences, such as rural extension technicians, farmers, cooperatives, congresspersons, and opinion leaders, so that all Brazilian regions are represented and diverse themes are addressed; thus, Embrapa technologies can be present in the main agricultural production chains.

We highlight the participation of Embrapa in the following agricultural fairs:

- *ShowRural Coopavel* (Cascavel/state of Paraná) – This is considered the agricultural fair with the best market return due to the volume of business generated, number of farmers and technicians present, and diversity of topics addressed.
- *Expodireto Cotrijal* (Não-me-Toque/state of Rio Grande do Sul) – This fair has been growing in commercial and political importance every year, attracting mainly audiences from Mercosul countries.
- *Tecnoshow Comigo* (Rio Verde/state of Goiás) – This is a major event of nationwide impact, focused on the agricultural reality of the central region of Brazil.
- *Agrishow* (Ribeirão Preto/state of São Paulo) – This is a prominent event in the agricultural machinery and equipment sector, where Embrapa maintains a Technological Reference Unit (TRU) for integrated crop-forest-livestock system (ICLF).
- *Expozebu Dinâmica* (Uberaba/state of Minas Gerais) – This is a recent event, which is held separately from *Expozebu*. Embrapa attends it since its first edition, focusing on livestock and strong methodological appeal for livestock dynamics, with guided technology presentations, training courses, and technological circuits.
- *Agrotins* (Palmas/state of Tocantins) – This is the main agricultural event in the Matopiba (an acronym of Maranhão, Tocantins, Piauí and Bahia states) region, where Embrapa maintains a TRU of ICLF and a technological showcase.
- *Agrobrasilíia* (Brasília/Federal District) – This is considered one of the great agricultural events of the Midwestern region.
- *Bahia Farm Show* (Luis Eduardo Magalhães/state of Bahia) – Second largest agricultural event in the Matopiba region, it gathers a large number of agricultural sector authorities and attracts a significant amount of farmers and technicians (mainly from the private sector).
- *Expointer* (Esteio, state of Rio Grande do Sul) – This is the main exhibition focused on livestock located in Brazil's Southern region.

In addition, Embrapa is invited annually to attend major events of governmental programs and technical-scientific events. We highlight Embrapa's participation

in governmental educational programs, such as the national conferences to the youth on the environment, *National Environment Week* and *National Science and Technology Week*, promoted by the Ministry of Science, Technology, Innovation and Communications (MCTIC) since 2004. The objectives are to raise people's, especially children and young people's, awareness on themes and activities pertaining Science and Technology (S&T); to value creativity, scientific attitude and innovation; and to help the population to know and discuss scientific research results, relevance and impacts.

Peer educators training

Embrapa seeks to expand training and qualification of peer educators in technical assistance and rural extension programs in order to promote technology transfer and updated priority area knowledge exchange and construction. Embrapa does not directly provide technical assistance and/or rural extension, but it needs such processes to fulfill its mission of promoting development. Expanding and strengthening partnerships through peer educator training provide access to information and facilitates the incorporation of technological solutions in productive systems.

In the group of peer educators, there are technicians from public and private Technical Assistance and Rural Extension (Ater) agencies, cooperatives, associations, rural unions, non-governmental organizations (NGOs), and other agents that work directly with farmers throughout Brazil to present them technological solutions to be adopted.

The qualification of peer educators involves several methodological practices also connected with public policies or emergency needs to solve a problem in a given context or region. For instance, Embrapa carries out caravans to train extension agents and technical assistance professionals, during which Embrapa researchers travel through Brazil to assist farmer with implementing emergency actions to solve some problem, as happened in 2013–2014 to control *Helicoverpa* and other pests, in which occasion the adoption of integrated pest management (IPM) was also encouraged. Training courses are not restricted to national borders; they may also be provided in partnerships with other countries that seek Embrapa knowledge to enhance its development, such as:

- Training of Mexican technicians in the scope of the Projeto Formação de Técnicos Especializados em Agricultura, Pecuária e Silvicultura Tropical para o Desenvolvimento das Zonas Tropicais do México (Training Project

of Specialized Technicians in Tropical Agriculture, Livestock and Forestry for the Development of the Tropical Zones of Mexico). The partners in this action were the Mexican Agency for International Development Cooperation (AMEXCID); the National Institute for *Forestry, Agriculture, and Livestock Research* (INIFAP); the Ministry of Foreign Affairs/Brazilian Cooperation Agency (MRE / ABC) and Embrapa.

- Training of technicians from Mozambique taking part in the Projeto de Apoio aos Programas de Segurança Alimentar e Nutricional de Moçambique (Mozambique Food and Nutrition Security Programme Support Project – Psa), which is part of a trilateral technical cooperation between Mozambique, Brazil, and the United States.

Disseminating knowledge generated at Embrapa through peer educators enables small-scale farmers and their families to access to technical assistance and rural extension services and information that leads to sustainable local development.

Collective information production for citizenship action

Although still incipient, we identify some Embrapa initiatives to promote multiple interaction (audience-users-screens) towards communicative citizenship. For Gómez (2014, p. 96, our translation), communicative citizenship is relevant and “[...] must be fundamentally addressed based on education as one of the most precious objects of human and democratic formation today.” In this education and information production process, it is also essential to give voice to people who are major players of sustainable development, be they traditional populations or ordinary citizens.

In training events (meetings, courses, workshops, etc.), multiple face-to-face interactions enable the construction of new meanings of the addressed themes. As an example, the [Traditional Peoples and Communities Collection](#), launched in 2017, resulted from a collective information production. It gathers experience reports on work performed with rural communities and their traditional knowledge throughout the country. Another very important editorial publication that provides citizens with relevant information to guide them to take action is the [Coleção Educação Ambiental para o Desenvolvimento Sustentável \(Environmental Education for Sustainable Development Collection\)](#), launched at the *Rio +12 Conference*. It addresses the construction of macro-education pedagogical and

methodological proposal, discussing how to see, judge, and act on the perception of environmental impact and culminating in the debate on socio-environmental responsibility of companies and schools.

Collective production, in this interaction process, refers not only to editorial procedures but, above all, to debating and creating a discourse that contemplates the perception and role of the social agents involved. An example of this is the methodological proposal for the production of environmental videos after participants have interacted and analyzed the literary-cultural discourse of Amazonian artists to address topics such as: deforestation, wildfires, climate change, and, above all, local socio-biodiversity appreciation. Similar experiences involve different types of audience, from extractive farmers to elementary urban school students (Oliveira, 2017). Results show the possibility of communicating and educating in non-formal educational context, as is the case of rural/forest extension activities, whose objective is to disseminate technological solutions on environmental conservation and to encourage citizenship action for sustainable development.

In both cases, interactants co-construct meaning in various ways and fulfill different functions, either as speakers, as interlocutors, or as mediators of speeches from different sources: family farmers, environmental educators, researchers, journalists, writers and interpreters creating their own discourse, to be expressed by varied forms of communication, including the interpersonal one.

Final considerations

Faced with the challenge of reaching relevant information to all people everywhere by 2040, this chapter addressed conceptual aspects related to scientific communication in order to encourage citizenship action in favor of sustainable development and communicative citizenship, which calls into question what citizens should learn (from what reaches them by the media) and how to facilitate this learning. It is, therefore, an old question related to the means and the reception of what is transmitted by them, which in communication science is called mediatization.

While organizing information about the contribution of Embrapa for scientific dissemination and popularization of science, we have seen that Embrapa proposes and coordinates editorial products and services created according to the audience, in a process that includes adjusting the language to the target

audience; choosing data (text, image, audio, video) presentation format; and defining both the support (print, electronic, digital, online) and the means of communication to be used (book, journal, leaflet, radio or television broadcast, Internet).

Embrapa uses varied resources so that information can reach the most diverse citizen profiles, from researchers who hold doctoral degrees and are polyglots to technicians specialized in some area of the agricultural field, educators, students and others interested in these topics. As discussed above, there are also actions to reach the illiterate and unlearned portion of the population, such as institutional radio and television programs.

This is how Embrapa provides society with relevant information capable of raising awareness about sustainable development and lifestyles in harmony with nature. A future challenge is to expand interaction with the audience and articulate with other information subsystems, of both State entities and civil society organizations, thus allowing an integrated vision of the progress or difficulties in each community, city or region.

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