

Science Communication in web 2.0¹: the case “Agro Sustentável”

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Abstract

Access to scientific information has been improved by the increase in internet users and the expansion of new tools developed in 2.0 platforms, which stimulate the exchange of information, enhance collaboration and virtual environments. The Facebook profile “Agro Sustentável”, an EMBRAPA’s experience, proved that social media can be used as an efficient channel for science communication, specially to dialogue with stakeholders on sustainable agricultural technologies and practices. The figures confirm that the initiative became particularly effective in providing technical and scientific content through digital publications. In addition, “Agro Sustentável” has shown to be an alternative for high-qualified scientific and interested people to find information and help other users to find them. It is also efficient for people to share information, to recommend and by doing so

¹ It is understood by web 2.0: "A new philosophy for the use and development of internet websites became no longer an environment in which content pages were set by an administrator or owner, but rather a shifting platform built collaboratively by many users in what was dubbed web 2.0 or collaborative internet" (MEDEIROS, 2013, P. 8).

create a network. Moreover, it revealed for Brazilian Agricultural Research Corporation (EMBRAPA) a new way of communication and interaction in science communication for sustainable development.

Introduction

Since the expansion of 2.0 digital instruments, the access to information has become quite easier. Especially social media have contributed to that, which stimulate the exchange of information, enhance collaboration in virtual environments and offer access to a significant number of publications and networks.

Within this context, the EMBRAPA launched a Facebook profile named “Agro Sustentável”. It was created for the United Nations Conference on Sustainable Development (Rio +20) in 2011. Since then, it has proven to be an important tool for expanding science communication and to dialogue with stakeholders on sustainable agricultural technologies and practices.

Currently, its editorial covers topics such as agro ecology, organic production, family farming, management and conservation of natural resources, biofuels, climate change, biofortified foods, environmental education, biodiversity, among others related to sustainability in agriculture, with emphasis on the distribution of technical and scientific publications.

Between January and July 2013, the Facebook page provided nearly 300 content items and registered about 16,000 fans², a number that grew by about 12% per month. To maintain this, daily at least one content was published integrated with specific creative image to increase the attractiveness and encouraging interaction.

Over the 7 months (January and July 2013) of analysis, the average involved user rate was about 1.000 people per post, which represented 7% of each post reach. The average engagement rate was 475 people per post, or about 50% of the involved users and 3% of the total number of profile fans. According to studies of Socialbakers, the reference for the average engagement rate was 0.29% at that time. Among the engaged users, on

² Social media users who have chosen to receive the “Agro Sustentável” contents in their personal profiles.

average, just 31 % were fans, which means that 69% of people, who did not follow the “Agro Sustentável” profile, had been achieved by the viral effect of “friends”.

Methodology

To understand the impact of science communication at “Agro Sustentável”, it is essential to consider the different types of posts for different types of metrics.

Within the 20 posts with the highest reach³, 45% were related to technical and scientific publications for download. Also, those posts were rated as the most engaging⁴, compared to other categories of posts.

Table 1: Post’s repercussion by reach ranking. Source: Facebook Insights. Access: August 9, 2013.

Post	Published	Reach
From the laboratory to the table, there are many people who work for a more sustainable agriculture. On this World Day of Agriculture, we congratulate all who are part of this story.	3/20/13	603,027
On this International Forests Day, we separate two materials rich on our native forests. The first is the Tree of the Knowledge of Brazilian Arboreal Species http://bit.ly/11khMRP . The second is a collection of books on the same theme http://bit.ly/WEvgUB . Share it!!	3/21/13	178,044
Today is World Book Day and to celebrate 249 separate works made available for free by Embrapa. http://bit.ly/ZKdEER scientific and technical books http://bit.ly/17fYnAS	4/23/13	156,704

³ Number of people who have seen the page (unique users)

⁴ Public actions to enjoy, share or comment.

Meet the project that aims to introduce and validate, in urban and rural areas, organic gardens , fruit with nutritional and medicinal properties , in order to contribute to reducing hunger and improving the quality of life of the population http://bit .ly/13p8KyY	7/29/13	80,960
To download: 500 questions and 500 answers about garden http://bit.ly/Zpzwc2	4/27/13	75,437
Today is Embrapa's birthday. Congratulations to you and all who believe in our work and help build our history.	4/26/13	67,892
For World Water Day , we made a selection of news, publications, videos and software on the topic. Access now: http://bit.ly/Y3H0Rz	3/22/13	62,778
To download: How to deploy and conduct a small garden http://bit.ly/12jQ0nM	7/10/13	62,624
In this Earth Day, let us remember our limited resources in this planet. Make use and management of these resources intelligently and responsibly is fundamental for the Earth and the beings who live there. To learn more about the Earth, download this publication on Major biogeochemical cycles of the planet http://bit.ly/YBv6uU	4/22/13	43,494
The contribution of the Brazilian cattle industry for emissions of greenhouse gases have the first results released this week for the world's largest conference on the GGAA 2013 (Greenhouse Gases & Animal Agriculture) , Dublin , Ireland.	6/27/13	43,200

Embrapa and partner institutions have nine scientific articles and three lectures http://bit.ly/14a8bLL		
Advancement of Science: Learn the heifer Brasilia result of the first successful cloning experiment bovine cells from adipose (fat) from an animal born. Cloning is a tool for genetic improvement used for the multiplication of high quality animals. Learn more: bit.ly / CloneB http://bit.ly/16bNMJI	5/6/13	40,528
To download: check out the Brazilian Catalog Vegetables with planting tips and recommendations for use. A full plate for better health and quality of life! http://bit.ly/138xjWu	6/29/13	40,368
World Environment Day : learn how energy from biomass, a renewable source, is already a reality in Brazil and a bet of agricultural research for the future http://bit.ly/EnergiaVerdeAmarela	6/5/13	34,432
In this Day Farmer, Embrapa pays tribute to all men and women of the field : http://bit.ly/agricultor	7/28/13	33,888
Tillage system , rotation of crops and integrated pest management are among the practices discussed in this booklet , pointing paths to sustainable agriculture . Download the free http://bit.ly/YDO2sB	3/31/13	31,974
To download: Pest management in vegetables during agroecological transition	6/18/13	30,000

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http://bit.ly/11269tJ		
Reading Tip : Sustainability Indicators in Agroecosystems http://bit.ly/10rH8tn via https://www.facebook.com/livrariaembrapa	4/4/13	28,855
Download the eBook " Good Practices in Environmental Education in Family Farming " http://bit.ly/1bcIPke	7/5/13	27,296
Book for free download : Beekeeping http://bit.ly/11fpTLk	4/18/13	25,045
President Dilma Rousseff has signed a law project establishing the National Agency for Technical Assistance and Rural Extension (Anater) . Embrapa will participate . Learn more : http://bit.ly/Anater...	6/6/13	24,320

Table 2: Post's repercussion by engagement ranking. Source: Facebook Insights. Access 09 August 2013.

Post	Publicado em	Engajamento
To reflect: " Treat the earth well . She was not granted to you by your parents . It was loaned to you by your children . " This sentence is attributed to the ancient Africans.	1/16/13	33.2%
Check out the Video Library Embrapa , Embrapa 's official channel on YouTube , with nearly 400 videos and over 1 million views . Each week new videos with techniques for anyone working in the field and in the cities guidelines are inserted . Get	1/23/13	26.5%

access now http://www.youtube.com/VideotecaEmbrapa		
To reflect: The integration of social technologies and <i>barraginhas</i> multiple use has been ensuring water sustainability for farmers in semi-arid and sub-humid regions in several states of Brazil , enabling the supply of water for human and animal consumption , irrigation of gardens and small farms and fish farming . Learn more http://bit.ly/Barraginhas	1/28/13	23.5%
Reading Tip: Agroecology , principles and techniques for a sustainable organic agriculture . Available in Bookstore Embrapa http://bit.ly/XouQO8	2/7/13	15.3%
With proper cultural practices and precautions, it is possible to control pests and diseases of plants and reduce or avoid the use of pesticides . See this book some of these alternatives http://bit.ly/ControleAlternativo	1/7/13	15.3%
Children's book to download : Writing in Portuguese and Guarani , " Yvyra Poty and the trees of the forest" is a primer for children about Indian public life , highlighting the importance and utility of trees for these communities . The publication encourages ecological awareness and respect for ethnic and cultural diversity http://bit.ly/YvyraPoty	1/31/13	15.3%
Community gardens can increase fruit and vegetable supply in urban and rural areas to	2/11/13	14.4%

<p>improve the food security and reduce poverty . This book presents the Embrapa experiences of community gardens in Brazil and an overview of community gardens in the United States http://bit.ly/WQYrSH</p>		
<p>In an interview with Terra Viva TV , three researchers from Embrapa talk about Agroecological Transition Project , which has an active network of scientists across the country http://bit.ly/TransicaoAgroecologica</p>	1/29/13	14.0%
<p>Agroforestry backyard is a production area , usually next to the house , where he grows a variety of agricultural and forest species , and small animals . See this brochure a list of species to form your backyard agroforestry http://bit.ly/QuintalAgroflorestal</p>	2/3/13	13.2%
<p>More than four thousand different types of corn are preserved in a Active Germplasm Bank maintained by Embrapa in Brazil . The seeds from different countries are cataloged and stored in cold chambers . The site is considered a source of genetic variability for plant breeding and other research activities . Learn more http://bit.ly/BagMilho</p>	1/17/13	12.2%
<p>In an interview with magazine XXI , Embrapa , Dutch researcher Frank Rijsberman , chief executive of the newly formed CGIAR Consortium , talks about how agricultural research can contribute to sustainable</p>	2/1/13	11.6%

development http://bit.ly/XYgO6p		
Who does not like the shade of a tree or a flowering plant? They soften the gray landscape of cities. See this publication for urban tree species suggested in the Caatinga region http://bit.ly/ArborizacaoUrbana	2/5/13	10.7%
Published to download - The black soils of the Amazon Indians : its characterization and use of this knowledge in the creation of new areas http://bit.ly/TerraIndio	1/2/13	10.5%
Have you ever seen black soybeans? And he knew that a " sojoada " has , besides other properties of soybean , anthocyanin , a natural antioxidade that can slow aging ? Then check out the work of agricultural research to develop black soybeans for human consumption http://bit.ly/SojaPreta	1/15/13	10.4%
See how a pet can turn a bottle drinker for chickens http://bit.ly/YHeiUh	2/9/13	9.6%
Guarana is a traditional Brazilian Amazon plant and raw material for soft drinks and energy drinks . Learn more about the culture of guarana http://bit.ly/VmEnZI	2/16/13	9.2%
It is called the Tree of Life. And no wonder : there are more than two thousand years , in Indian culture , its use is already established , as well as their potential is recognized both in the control of insects and pests , as in the manufacture of cosmetics , reforestation and in	1/11/13	9.1%

human medicine and animal. See this publication to cultivate the neem . Download now : http://bit.ly/PlantarNim		
Açaí Ice Cream combines with the Brazilian summer . To avoid risks to consumer health and product waste , Embrapa guides producers to adopt best practices in artisanal manufacture of acai . Check out : http://bit.ly/WnPgpF and http://bit.ly/117Ulds . Photo: Fábio Martins	1/8/13	8.9%
This text presents a discussion of extraction in the Amazon , through the need to protect natural resources and the threats of biopiracy . "The preservation of the Amazon biodiversity depend on the appropriate use of already deforested areas , the recovery of the areas that should not have been destroyed , greater investments in S & T and social infrastructure. " Http://bit.ly download the full publication / Biopiracy	1/26/13	8.9%

Results

The figures indicate that “Agro Sustentável” has strong potential to become an important communication channel for providing scientific and technical content.

By observing user’s behavior, the disclosure of EMBRAPA’s digital publications has significant adhesion compared to other posts. This impact is also evidenced by the reports that analyze the rates of access to EMBRAPA’s publication repositories.

For instance, the book "Gardens, the producer asks, EMBRAPA answered", which provides guidance for growing vegetables on small farms or urban environments, was downloaded by 53 people from 1 to 26 April in 2013. When posted in “Agro Sustentável” on April 27, the number of downloads in a single day grew to 1,054 - 155% more than the number of downloads of the entire 2012 year, which reached 412 in total

downloads. Besides that, the book reached over 75,000 users and involved more than 4,600 people, totalizing more than 3,000 comments, shares, and likes. Over two months, it received over 5,600 clicks.

Title : Hortas: o produtor pergunta, a Embrapa responde.

Entry Date : 09-06-2012

Downloads and views

Day	Downloads	Views
01, Mon	4,0	3
02, Tue	4,0	2
03, Wed	6,0	7
04, Thu	3,0	7
05, Fri	1,0	5
06, Sat	1,0	0
07, Sun	1,0	0
08, Mon	2,0	2
09, Tue	4,0	5
10, Wed	1,0	2
11, Thu	4,0	5
12, Fri	2,0	0
13, Sat	1,0	0
16, Tue	1,0	2
18, Thu	4,0	6
19, Fri	4,0	3
20, Sat	1,0	2
21, Sun	1,0	0
22, Mon	1,0	1
23, Tue	2,0	1
24, Wed	3,0	2
25, Thu	1,0	0
26, Fri	1,0	3
27, Sat	1.054,0	1.703
28, Sun	773,0	1.274
29, Mon	543,0	977
30, Tue	200,0	390
Total	2.623,0	4.402

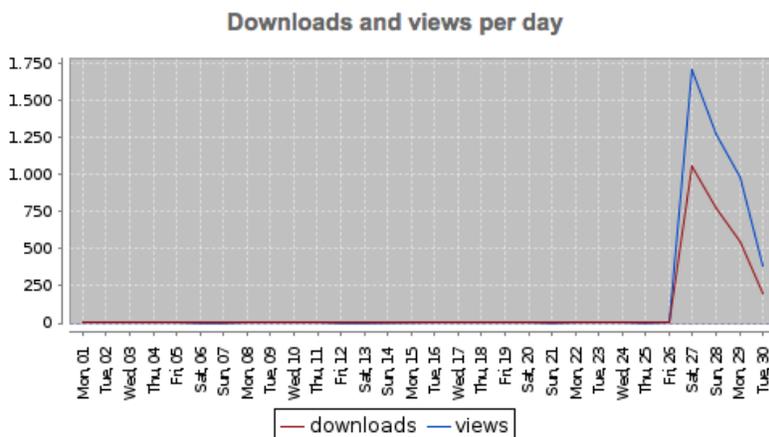


Figure 1: Number of downloads of the book "Gardens: producer asks, Embrapa answered", in April 2013. The increase in the number of accesses overlaps the posting in “Agro Sustentável”. Source: Repository Embrapa Information Technology in Agriculture (Infoteca-e). <<http://bit.ly/InfotecaE>> Access on 10 August 2013.

The top ten contents in Infoteca between January and July 2013 were posted at “Agro Sustentável” (table 3). The repository statistics show that the increase in the number of accesses overlaps the posting in the social media.

Table 3: Ranking of the most accessed publications in Infoteca from January to July 2013.
Source: Information Office and Access <<http://bit.ly/RankingInfoteca>>. Access on August 2013.

Consults	Title
6.743	Gardens: producer asks, Embrapa answers.
3.705	How to deploy and conduct a small vegetable garden.
2.480	Ways to changes in processes and practices towards agroecology.
2.249	Garden in small spaces
1.752	Pest management in vegetables during agroecological transition.
1.677	10 tips to mount gardens ecological basis.
1.513	Identification Manual of soybean diseases.
1.328	Agriculture low carbon: the evolution of a new paradigm: executive summary.
1.228	Organic fertilization in organic vegetable production system.
1.153	Waste Composting for the produce biofertilizer production.

Discussion

As an assumption considering the analysis of the presented data, social media are essential in communication strategies for science as they're efficient in clustering and spreading content of interest. Social media also improve the construction of a highly qualified and potentially interested network about sustainable agriculture.

Martha Gabriel (2010, p. 87) affirms that new media "means social interaction of people to people and not company to company. Social means relationship, achievement, engagement, ethics and respect. In part, it could explain users' behavior of "Agro Sustentável". The initiative worked as a platform for people to share relevant content information and to establish dialogues. Some authors believe that understanding this phenomenon is the step for organizations to act in social media:

"Groundswell for Li & Bernoff (2012), is" a social trend in which people use technology to get what they want from each other, and not with traditional

institutions like corporations. "Social media would be the technology and this movement would be irreversible. It is up to organizations, in their opinion, to understand the phenomenon and adapt to take advantage of it.

(MEDEIROS, 2013, p. 14).

Conclusion

Historically, agriculture has been considered a villain for sustainable development due to, among other issues, the use of large areas and potential deforestation of native forest as researches indicate. However, advances in agricultural research reveal that the agricultural practice can not only minimize negative impacts, but also contribute to sustainability. For this reason, it is essential to expand the information and knowledge about sustainable alternatives developed by the Brazilian agricultural research.

So, to succeed in promoting sustainability, it is fundamental to expand information on the topic. "Agro Sustentável" was developed to cooperate with this need. Since its launch, the channel has been disseminating information to stakeholders and encouraging the practice of the solutions developed by agricultural research.

The figures confirm that the initiative became particularly effective in providing technical and scientific content through digital publications. In addition, "Agro Sustentável" has shown to be an alternative for high-qualified scientific and interested people to find information and help other users to find them. It is also efficient for people to share information, to recommend and by doing so create a network. Moreover, it revealed for EMBRAPA a new way of communication and interaction in science communication for sustainable development.

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