

A group of white Zebu cows with large, drooping ears are standing on a dirt path in a forest. The path is lined with tall, slender trees with reddish-brown bark. The cows are looking towards the camera. The background is filled with green foliage and branches.

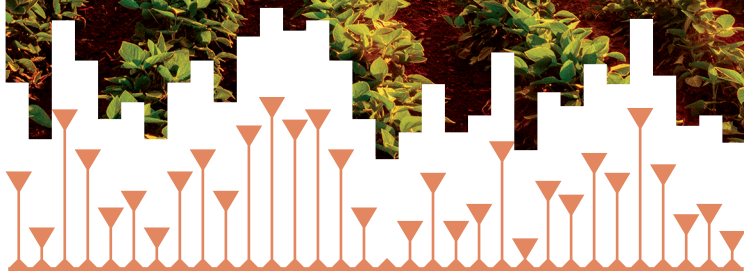
2016

Social Report

Embrapa

2016 Embrapa Social Report

1) Calculation Basis		2016 (BRL)		2015 (BRL)	
1.1) Net Operational Revenues (NR) *		3,066,380,053.78		2,911,471,047.52	
1.2) Operating Income (OI)		(487,936.412,94)		(456,683,936.12)	
1.3) Gross Payroll (GP)		1,855,831,775.76		1,686,938,544.16	
1.4) Independent Contractors		74,391,141.12		65,751,262.75	
2) Labor indicators		Amount (BRL)	% of	Amount (BRL)	% of
		GP	NR*	GP	NR*
2.1) Meals/Meal vouchers		111,649,811.34	6.02	103,841,467.05	6.16
2.2) Compulsory Payroll Taxes		497,674,347.74	26.82	465,299,440.33	27.58
2.3) Private Pension Plan		124,085,788.30	6.69	113,019,694.95	6.70
2.4) Occupational Welfare, Health, and Safety		53,097,312.95	2.86	50,834,590.92	3.01
2.5) Professional Education and Training		138,209,048.52	7.45	134,679,574.13	7.98
2.6) Daycare centers or allowances		11,231,973.23	0.61	9,491,683.29	0.56
2.7) Other benefits		28,044,479.45	1.51	27,547,724.60	1.63
Total Labor indicators		963,992,761.53	51.94	904,714,175.27	53.63
3) Social indicators		Amount	% of	Amount	% of
		BRL	GP	BRL	GP
3.1) Taxes (excluding Payroll Taxes)		7,574,834.31	0.41	7,168,129.18	0.42
Total Social Indicators		7,574,834.31	0.41	7,168,129.18	0.42
4) Technologies Developed and Transferred to Society (TT)		33,913,860,222.03	1,827.42	25,967,537,330.37	1,539.33
5) Social profit (2 + 3 + 4)		34,885,427,817.87	1,879.77	26,879,419,634.82	1,593.38
6) Staff Indicators		2016		2015	
6.1) Number of Employees at the End of the Period		9,650		9,733	
6.2) Number of Admissions During the Period		0		5	
6.3) Number of Interns and Junior Apprentices		9,499		8,682	
6.4) Number of Employees over 45 Years of Age		6,165		5,994	
6.5) Number of Women who Work in the Corporation		2,923		2,948	
6.6) Percentage of Management Posts Held by Women		31%		30%	
6.7) Number of Black Staff Members that Work in the Corporation		3,927		3,947	
6.8) Percentage of Management Posts held by Black Staff Members		33%		33%	
6.9) Number of Employees with Disabilities		112		107	
7) Relevant Information Regarding the Exercise of Corporate Citizenship		2016		2015	
7.1) Ratio Between the Highest and the Lowest Remuneration in the Corporation		14.5		16.2	
7.2) Total Number of Occupational Accidents		94		98	
7.3) Actions of Relevant Social Interest		1,106		1,056	
7.4) Number of new jobs generated during the year by the Technologies Developed and Transferred to Society		43,229		71,787	
7.5) Percentage of Actions of Relevant Social Interest that promote gender and/or racial equality		29%		35%	
7.6) Social and environmental projects are defined by	() Directors () Employees () Beneficiaries			(x) Directors, Employees, and Beneficiaries	
7.7) Health and safety standards in the work environment are defined by	() Directors (x) Directors and managers			() All employees and the IAPC (Internal Accident Prevention Committee)	
7.8) The private pension plan includes	() Directors (x) Directors and managers			(x) All employees	
7.9) As for employee participation in volunteer work schemes, the Corporation	() Does not get involved (x) It offers support			() Organizes and encourages it	
8) Notes					
8.1) Embrapa does not share profits or income. It is a Public Corporation whose capital stock belongs entirely to the Brazilian Federal Government. Embrapa does not employ child or slave labor, has no involvement with prostitution or sexual exploitation of children or teenagers, and is not involved with corruption. The Corporation values and respects diversity both internally and externally.					
8.2) In spite of operational accounting losses, important benefits were supplied to society, as shown in sections "Labor Indicators", "Social Indicators" and "Technologies Developed and Transferred to Society". Such benefits are expressed by the total Social Profit of R\$ 26,879,419,634.82 in 2015, and of R\$ 34,885,427,817.87 in 2016.					
8.3) *Net Operating Revenue (NR) refers to revenue from sales and services; to operating revenue (transfers received, other operating revenue and partnerships); and to the result of revenue minus budgetary and extra-budgetary expenses, deducting any discounts, sales taxes and service taxes (ICMS and ISS), refunds, adjustments made on the gross revenue from sales and services, federal tax rectifications, and other fiscal deductions.					
8.4) **All the Actions of Relevant Social Interest are available on http://bs.sede.embrapa.br/2016/acoes/html/busca2016.html .					



Average internal
rate of return of

38,2%

Investing in technology is really worth it. We evaluated the returns of investments carried out by Embrapa in the generation of the monitored and evaluated technologies since 1997, year of release of the first Social Report, as adopted by farmers. This return indicates high profitability. The internal rate of return (IRR) of these investments was estimated at 38.2%.

Each Brazilian Real
invested generated

BRL 11.37

to Brazilian
society

A Social Profit of BRL 34.88 billion was calculated for 2016, due to the economic impacts of 117 technologies and about 200 cultivars included in the Social Report. Relating this Social Profit to the Net Operational Revenues (NR) in 2016 the relationship is 11.37. This indicates that considering only the NR in 2016 and the Social Profit obtained the annual turnover was more than 11 times that investment.





1,106

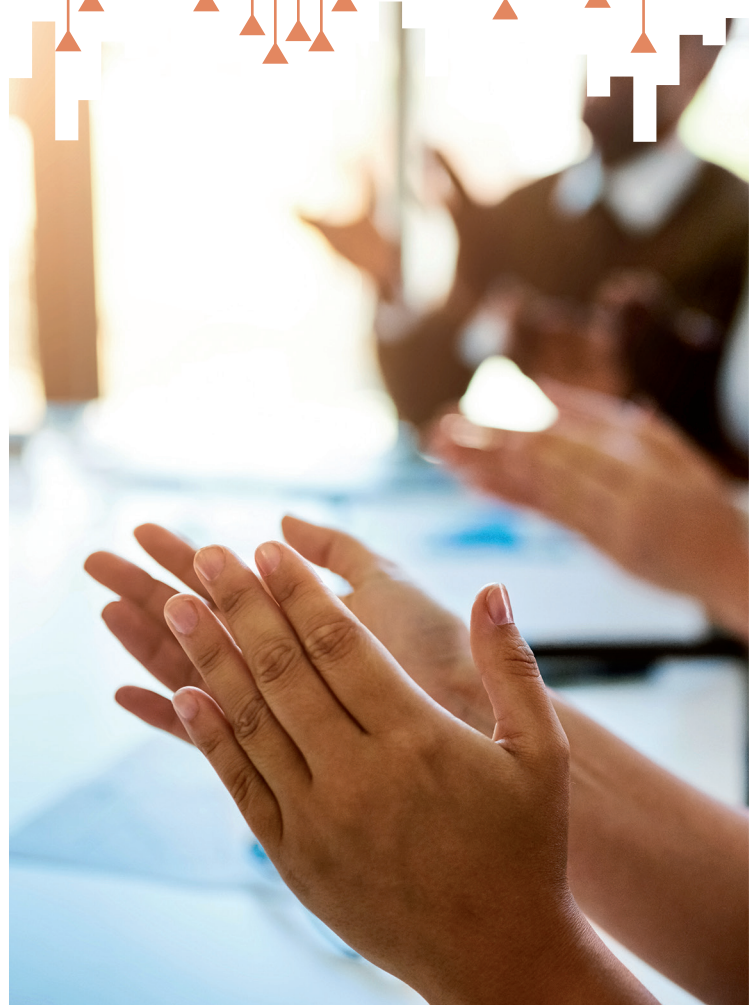
Actions of Relevant Social Interest and 63 awards and honours

Embrapa is recognized not only by the generation of technologies but also by its involvement in solving Brazilian problems. In 2016 this recognition materialised by receiving 63 awards and honours by the institution and its employees. Its social responsibility is reflected in more than 1,000 actions contemplating several issues of which 29% promoted gender or race equity, 10% food security and productive inclusion and 43% professional training and technological updating.

New jobs created in 2016

43,229

The generation of new jobs arising from the use of Embrapa technologies is another indicator attesting its high social return. This is a baseline figure, as it refers to new jobs generated by the technologies assessed in this report. Since the Corporation has developed and transferred thousands of technologies, products, and services to Brazilian society throughout the course of its history, such impact on the number of jobs created each year is much higher.



Our history goes through here

This is the 20th edition of the Embrapa Social Report. It is a landmark in the history of the Corporation, whose trajectory goes through here. Since its creation in 1997, the Social Report annually registers the main actions carried through by the institution's research centers in benefit of its collaborators, of the communities nearby and the whole Brazilian society.

Beyond registering its current performance in Brazil, the Social Report presents the impact of the main technologies developed by Embrapa and transferred to the society. These are cultivars of more productive plants, more nutritious or resistant to pests and/or weather conditions; animal breeds more prolific animals or adapted to the most diverse environments; new machinery, equipments and production systems; programs and computer applications; new processes of cultivation, disease controls; geographic information systems to map regions and monitor land use. These are some examples of the most diverse technological solutions produced by Embrapa and that had been registered for 20 years in this publication.

As expected, this edition continues presenting relevant information about Embrapa's contribution to the national society. Initially, because it is a special number, there is a brief history about the emergence of this Social Balance with a survey of its methodological evolution. Also the first results of a broad study of the Brazilian scientific production are addressed. In addition to some indicators on the adoption in

Brazil of the Crop, Livestock, Forests Farming Integration System (ILPF), developed by Embrapa are presented. Special emphasis is given to a new perspective of analysis of agricultural research impacts focusing on wealth gains in rural areas, given the role that Embrapa had on that in recent decades.

In the specific sections on impacts several success stories are described. Within the framework of public policies is the demarcation of the socio-geographic region of the Matopiba by the Territorial Strategic Intelligence Group (GITE), which is already contributing to the sustainable development of that region. As for the topic productivity, the success story selected is the passion fruit cultivars developed by Embrapa Cerrados. The hydrothermal treatment of mangoes created by Embrapa Cassava and Tropical Fruits allowed earnings in the range of 1.4 billion dollars in exports in the last 25 years. The assai palm tree management system implemented by Embrapa Eastern Amazon allowed riverine populations to double their production with very few resources.

Other success stories are sweet potato BRS Amelia cultivar produced by Embrapa Temperate Agriculture which fell in the taste of many Brazilians and has expanded to several other states; as well as the BRS Estribo Sudan grass cultivar developed by Embrapa South Livestock and partners who, in addition to being more productive, already bring benefits to about of 8,000 properties in Rio Grande do Sul.

Another significant experience is the Araucarias Roads project, created by Embrapa Forests which generates income for small farmers, contributes to environmental protection and contributes to aesthetics of Southern Brazil landscape. Meanwhile, in Northeastern Brazil, the Route of the Lamb program organizes the production of sheep and goats and generates more employment and income. Added to these results the recognition, by the Brazilian and international societies, of the many works developed by Embrapa's collaborators, which yielded 63 awards and honours.

Results like these justify continually the existence of Embrapa's Social Report. This publication would not make sense without all this performance highlights and also would not be possible without the dedication of the more than 300 employees involved in its preparation. It is thus a great effort which depicts the commitment of our staff in the construction of the economic, social and environmental sustainability of Brazilian agriculture.

Embrapa's Executive Board



Photos: Cynthia Araujo

Embrapa's Social Report: 20 years of history and new perspectives

One of the big questions that usually presents itself to public research institutions, both in Brazil as in other countries, is the need to justify their existence to administrators, legislators and the society at large. This happens because the research activity requires large long-term investments to produce, often, slow maturation results. A large part of the annual budget comes from government resources, and the sale of technologies, products and services usually, represent a small fraction of the total budget.

Facing this reality, questioning from Government and opinion leaders and various social sectors are unavoidable: What is the real value of these institutions to society? Which and where are the results that these institutions should generate? What are the environmental, social and economic impacts of the work performed by them? Among the solutions found to answer these questions is the creation and publication of Social Reports.

In the history of Embrapa, the Social Report is the result of the convergence of two processes: the evaluation studies of impacts

in the 80's and the profound organizational changes that have occurred in the corporation after 1990, which lead to the setting up of a communication policy. Both processes are closely linked to the institution profile and trajectory, created in 1973 as a public corporation under private law. Its creation was motivated by the development model adopted by Brazil at that time, aimed at the replacement of imports with the increase of its agricultural production.

Technology Impact Assessment

Due to its model of state-owned corporation, Embrapa has always been asked by the Federal Government to assess the impacts of its results as to highlight the high level returns of public investments. Thus, in the early 80's the first impact assessment studies were launched, based on estimates of production of basic seeds (for cultivars) and by Embrapa's local or regional research teams for technologies studies. Since then, the corporation has become increasingly demanded by the Government to justify the results of its activities.

In the first two decades, the theoretical orientation adopted in these impact works was based on the economic dimension, in search of returns generated by the technologies. However, from the year 2000, this approach was expanded to a multidimensional vision, with initial focus on three dimensions of impact: economic, social and environmental. This work went on to involve all Embrapa research centers with the adoption of a common methodology for economic assessment as to the environmental and social impact assessments called Ambitec, developed by Embrapa Environment. This multidimensional approach to social, environmental and economic impacts of a technology has become a trademark of Embrapa's Social Report and a major factor that differentiates it from other existing impact assessment tools.

The origins of the Social Report

A Social Report is a document published annually by public and private organizations, for their internal and external audiences, bringing together a collection of information about its projects, benefits and social actions. Through this publication they demonstrate what they do for its professionals, dependents, employees, communities and society in general. It is a strategic tool created to evaluate and present the social responsibility of the institutions. The first international initiatives in this sense dates back to the mid-20th century, but its adoption in Brazil received a great boost with the emergence, in 1993, of the Citizenship action against poverty and for life, also known as the Campaign Against Hunger.

Led by the sociologist Herbert Jose de Souza, through the Brazilian Institute of Social

and Economic Analyses (Ibase), this campaign promoted an approximation with a part of the business sector to relevant Brazilian social problems. This articulation happened through the COEP - Committee of Entities in the Fight Against Hunger and For Life, created by the Federal Government bringing together various Federal institutions, such as Embrapa. In 1997 the Ibase and the COEP conducted a campaign to promote the voluntary disclosure of Social Reports on the part of companies. In the same year, Embrapa prepared the first edition of its Social Report and published it in April 1998, during the corporation's anniversary week.

The peculiarities of research institutions

The Embrapa Social Report is an adaptation of the model suggested by Ibase. The difference compared to the original proposal is due to the appropriateness of some of their indicators, then created specifically for for-profit organizations, together with the inclusion of socio-economic data of the technologies generated by the corporation already incorporated into the agribusiness production process. In the first case, although it was founded as public corporation to circumvent some bureaucratic restraints of the Brazilian public sector, Embrapa was not created to generate financial profits but rather the so-called "social profit" due to its contribution to the development of Brazilian agriculture. The biggest challenge of the Social Report consists, therefore, of demonstrating the role of agricultural research as a strategic effort for the country. To do this, one needs to incorporate to the publication, as well as social indicators, those indicators arising from studies of technologi-

cal impacts that already have been traditionally carried out since the 80's.

Due to this need to demonstrate data and evidence that Embrapa, as a public research institution, requires long-term investments to produce, in general, results of slow maturation, the Embrapa's Social Report has acquired its own characteristics. These characteristics distinguish it from the standard of most accountability publications currently in force in Brazil, such as the Ibase model itself, the Global Reporting Initiative (GRI) and the Ethos Institute models. Those are not suitable for the mission of public Sc&T institutions. In this case, Embrapa's Social Report has a well-defined profile: it is a document that, above all, is part of its accountability process to the Government and the Brazilian society about the returns of investments made in agricultural research.

The Embrapa model: national and international reference in Sc&T

Despite this narrower profile, this Social Report has been serving as a reference to many other similar research institutions, such as the Paulista Agency of Agribusiness Technology (APTA-SP), the Capixaba's Institute of Research, Technical Assistance and Rural Extension (Incaper), the Corporation for Agricultural Research and Rural Extension of Santa Catarina (Epagri) and the *Instituto Nacional de Investigacion Agropecuaria* (INIA) of Uruguay. In 2016, the *Corporacion Colombiana de Investigacion Agropecuaria* (Corpoica) went on to adopt the methodology of Embrapa's Social Report through an international cooperation agreement. It is already preparing to launch its first Social Report for the year 2017. Similarly, the institutions of agricultural research par-

ticipants to the Cooperative Program for the Technological Development of Agrifood and Agribusiness of Southern Cone (Procisur) are committed to adapt this same methodology to their respective realities, as is being handled by the Executive Secretariat of that program. In addition, in a recent study conducted by the Organisation for Economic Cooperation and Development (OECD), Embrapa's experience in the assessment of impacts of agricultural research and in the development of its Social Report was placed on the same level as similar initiatives of prestigious similar institutions from other countries such as the Agricultural Research Service (ARS/USDA) of the United States, the National Institute for Agricultural Research (INRA) of France and the Commonwealth Scientific and Industrial Research Organization (CSIRO) of Australia, or supranational institutions such as the 15 research centers of the international consortium of agricultural research (CGIAR). The OECD proposes in this document the formation of a working group to standardize these experiences at the international level.

This initiative by Embrapa to perform multidimensional impact assessment of its technologies, documented via the Social Report continuously for 20 years, can be considered a pioneering and successful experience in the context of national and international organizations of agricultural research. This success is largely due to its ability to incorporate in their editions, when needed, new themes and methodologies, in accordance with the ongoing transformations in the corporation's internal and external environments. In this sense, this Social Report can be considered a living organism, in permanent evolution.

Embrapa's Social Report methodology

Since the creation of the Social Report in 1997 its methodology has been enhanced in order to express with the greatest possible fidelity the results, benefits and impacts of the work developed by Embrapa in the communities, the market and the Brazilian society. As can be seen in Table 1, there was an evolution of the methodology, since the first editions that covered a limited number of impact assessments, such as the social actions developed by the corporation, the economic impacts of their technologies and its social profit. Over the period were added to the publication information such as the environmental and social impacts of technologies, the generation of jobs, awards and recognition by the society. More recently were incorporated the success stories, the estimation of the internal rate of return (IRR) of the technologies, the impact of public policies and the analysis of the corporation contributions to the scientific community. Also were included information about the actions of gender and race equity promotion held by the institution.

Completing 20 years the Social Report has reached its maturity and today is a synthetic document which highlights the impacts of Embrapa in multiple dimensions, applying a common methodology of economic impacts assessment that allows comparisons with previous years, as it follows a group of 100 technologies assessments developed and adopted, already consid-

Table 1. Embrapa's Social Report Evolution from 1997 to 2016:

Themes\Year	1997	2003	2008	2011	2014	2016
Social Actions	•	•	•	•	•	•
Net Operational Revenues (NR)	•	•	•	•	•	•
Operating Income (OI)	•	•	•	•	•	•
Economic Impacts	•	•	•	•	•	•
Social Profit	•	•	•	•	•	•
NR/Impacts	•	•	•	•	•	•
NR/Social Profit	•	•	•	•	•	•
Environmental Impacts		•	•	•	•	•
Social Impacts		•	•	•	•	•
Jobs Generated		•	•	•	•	•
Recognition from society		•	•	•	•	•
Success Stories			•	•	•	•
Internal Rate of Return - IRR				•	•	•
Impacts on Public Policies					•	•
Impacts on Scientific Knowledge					•	•
Gender/race equity actions					•	•
Wealth Valuation						•

ered success stories of the corporation. Such technologies are also evaluated from the point of view of the social and environmental impacts through common methodology called Ambitec. In this case, the assessment is based on 14 social criteria and 13 environmental criteria in field data collection, in a sample of at least 10 users of every technological innovation.

ILPF system is a success story in Brazilian agriculture

Photo: Gabriel Faria

Crop, Livestock, Forest Farming Integration System (ILPF)

Photo: Daniela Aguiar

Livestock, Forest Integration (IPF)

Photo: Pedro Alcantara

It registers today significant positive impacts on the economy, the society and the environment

Crop, Forest Integration (ILF)

Photo: Fabiano Bastos

Crop, Livestock Integration (ILP)

Main impacts of agricultural research

The year of 2016 was prolific enough to Embrapa and its partners, to record a series of benefits provided by the agricultural research. Among them is the increased production and visibility of Embrapa scientific production in relation to the global production of Brazilian science, the recognition of the results and the use of Crop, Livestock, Forests Farming Integration System (ILPF) developed by the corporation as well as the adding of a new indicator of impact of agricultural research to be used by Embrapa, which is the creation of wealth given the innovations generated by the corporation.

ILPF system makes Brazil more productive and reduces greenhouse gas emissions

Embrapa has just been recognised by the results and positive impacts of an unprecedented and revolutionary initiative first proposed over 30 years ago. This is the Crop, Livestock, Forests Farming System Integration (ILPF), initiated in the 80's (Barreirao and Santa Fe Systems) with crop-livestock integration experiments and, in 2000, with the aggregation of the forestry component. The viability of this technology demonstrated since his first experiments, linked to the success of its implementation in recent years, led to the creation, in 2012, of the IPLF fostering network comprised of 19 Embrapa units in partnership with the private sector. This network currently supports 97 Technological Reference Units (URT), that rely on the support of specific publications and

a unique theme page on the Internet (www.embrapa.br/tema-integracao-lavoura-pecuaria-floresta-ilpf).

In a recent study commissioned by the IPLF fostering network to the Kleffman Consulting Group and released by the magazine Globo Rural in November 2016, it was calculated that the area occupied with this technology in Brazil already reaches 11,500,000 hectares and offers several benefits. Among them, what stands out is the environmental component. These numbers show that Brazil did fulfil the international commitment undertaken at the United Nations Conference on Climate Change (COP 21) in December 2015, to incorporate 5 million hectares to the ILPF until 2030. In this way, the country contributes to a reduction in 37% of greenhouse gas (GHG) emissions until 2025 and 43% by 2030. This is because the ILPF is able to hijack 35,100,000 tons of carbon dioxide (CO₂) equivalent in the soil. Every 4 million hectares, there is a mitigation of 18 million to 22 million tonnes of CO₂ equivalent. The GHG reduction, however, is just one of the consequences of the adoption of the ILPF, which offers many other advantages.

The main feature of the Crop, Livestock, Forests Farming Integration System is the articulation of food production systems, fiber, energy, wood and non-wood products, made in the same area, on cultivation consortiums, in succession or in rotation, to optimize the biological cycles of plants and animals, and



Photos: Fabiano Bastos

their waste. This technology provides the maintenance and restoration of forest cover, recovery of degraded areas, adoption of good agricultural practices (GAP) and increased agricultural efficiency in the use of machinery, equipment and labor, enabling the generation of employment and income, as well as the improvement of social conditions in rural areas and the reduction of environmental impacts, including the reduction of GHG emissions. Under the productive aspect, the ILPF can provide up to four crops a year in the same area: soy, corn, beef and brachiaria, not counting a partial harvest of eucalyptus, when there is a forest.

Because of their economic, social and environmental benefits, the ILPF was included among the technologies that make up the plan for the consolidation of a low-carbon economy in agriculture (ABC), created by the Federal Gov-

ernment in 2010 and coordinated by the Ministry of Agriculture, Livestock and Food Supply (MAPA). In addition, resulted in the institution, in 2013, of a National Policy of Crop, Livestock, Forests Farming Integration. The ranchers and the middle-sized properties are those that adopted more this technology in its different possible arrangements: crop, livestock integration (ILP) crop, livestock, forest integration (ILPF), livestock, forest integration (IPF) and crop, forest integration (ILF). According to the survey, 10% of the farmers have adopted the full arrangement, with the forestry component. In the last five years, the adoption of the system grew 10% between ranchers and 1% between farmers. Among the ranchers, 82% adopted the ILP system, 9% ILPF and 7% IPF, and most of them are those who already deal with innovative technologies. The grain producers try to diversify production to increase profitability and



reduce the financial risks. In this group 99% adopted the ILP strategy.

Given the high adoption rate of the ILPF system today in Brazil, in more than 11 million ha, and the economic additional liquid gains observed by the ILPF Network, the impacts of this system tend to be among the most significant ever recorded in the Social Report. In the coming years efforts will be made within the framework of Embrapa and the ILPF Network in order to monitor such impacts, aiming at the valuation of their economic gains. In other words, the ILPF system generates a series of multidimensional impacts (economic, social and environmental) involving various production chains, that qualify

as another success story of the Brazilian Agricultural Research Corporation, Embrapa.

The role of research in rural wealth valuation

The 2016/17 harvest was a record, reaching approximately 220 million tons of grain. This production, according to the National Agriculture Confederation (CNA), should generate an income of around BRL 240 billion for the Brazilian economy, with extremely positive impacts, especially for the generation of foreign exchange and the control of the inflation. This strength of agribusiness shows another indicator of impact of agricultural research, not yet



Photos: iStock/ Embrapa archive

measured by Embrapa: valuing rural wealth in addition to income. This issue is already object of study by institutions like the United States Department of Agriculture and the World Bank.

For wealth valuation shall be considered the real gains that occurred on the values of the land, the buildings and improvements associated with the expansion of agriculture in the country. This phenomenon is already being discussed in world literature, and particularly by the United States Department of Agriculture, but the role of the Brazilian agricultural research institutions in that process hasn't been treated in depth as yet. Preliminary data collected by Embrapa about the valuation of

rural properties in Brazil in recent decades, indicate that the values of the lands passed from about 400 billion dollars in 1992 to more than 1.4 trillion dollars in 2015. On the other hand, it is estimated that, as a result of technological advances in the field, the values of machinery, of equipment and of the herd, evolved from about 200 billion to more than 700 billion dollars in the same period.

Although these estimates still require further analysis, which it turns out preliminarily is that the contribution of agricultural research is at the heart of this valuation. An example in this impact is the modernization of agriculture in the region of the Cerrado with due appreci-

ation of the lands. If Embrapa is directly linked to the transformation of this biome in a national barn with the incorporation of many of its technologies, then the institution also holds an important role in the increase of prices of rural farms in terms of wealth.

From this evidence, it is clear that the subject of wealth valuation should be explored in feature Social Reports, including on the grounds of public recognition of this phenomenon evidenced by institutions such as the CNA, particularly on the relationship between agricultural research and wealth valuation in Brazil, which has occurred in recent decades. Thus, in the future, this new indicator should join to traditional economic impacts derived from the generation of additional income with the adoption of Embrapa's technology, as well as the environmental impact (reduction in the use of agrochemicals and in the emission of gases, for example) and social (jobs, among others).

Impact of Brazil's scientific production on Web of Science and the Embrapa's contribution

In 2016, Embrapa's Secretariat of Management and Institutional Development (SGI) conducted a comprehensive study on the Web of Science with the aim of evaluating the corporation's contribution to Brazilian scientific production. For that purpose, researchers analysed 354,000 Web of Science (WoS) records published between 2005 and 2015, whose authors indicated Brazil in their affiliation. All articles including review articles were analysed. Both types are referred to as "articles". The numbers of this Brazil sample indicate an important growth in national production coming

out of 17,414 articles in 2005 to overcome the barrier of 20,000 articles in 2007, of the 30,000 in 2009 and of 40,000 in 2013, reaching 43,386 articles in 2015.

Of the top ten places in the production of articles in Brazil just two institutions, Embrapa and Oswaldo Cruz Foundation (Fiocruz), are not universities. Among the top 50 places, 39 are higher learning institutions in Brazil, seven are Brazilian non-university institutions and four are foreign organizations. The non universities Brazilian institutions, in addition to the two institutions already mentioned, are APTA-SP, the National Institute for Space Research (INPE), the National Nuclear Energy Commission (CNEN), the National Institute for Amazonian Research (INPA) and the Brazilian Center for Physics Research (CBPFis-BR). Of the four foreign institutions, two are institutions of higher learning, Harvard University and the University of Illinois and the other two are funding institutions, the National Council for Scientific Research (CNRS) of France and the Superior Council of Scientific Research (CSIC-SPA) of Spain.

The University of Sao Paulo (USP) produces the biggest quantity of scientific papers in Brazil, responding for more than the double of the production of the second institution, the Paulista State University (Unesp). The following are the University of Campinas (Unicamp), Federal University of Rio de Janeiro (UFRJ), Federal University of Rio Grande do Sul (UFRGS), Federal University of Minas Gerais (UFMG), Federal University of Sao Paulo (Unifesp), Federal University of Santa Catarina (UFSC) and Federal University of Parana (UFPR).

See more details in Table 2 aside.

Table 2. Production of articles per year by the first 50 Brazilian institutions and foreign partners from 2005 to 2015.

	Organisation\Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
1	USP-Univ Sao Paulo	4,381	4,905	6,066	6,832	7,258	7,369	7,815	8,472	8,645	8,867	9,177	79,787
2	UNESP	1,312	1,486	1,995	2,454	2,661	2,759	3,135	3,276	3,438	3,687	3,647	29,850
3	Unicamp	1,726	1,965	2,059	2,355	2,371	2,511	2,549	2,826	2,915	2,867	2,971	27,115
4	UFRJ	1,490	1,584	1,852	2,034	2,147	2,220	2,309	2,600	2,653	2,773	2,799	24,461
5	UFRGS	1,024	1,149	1,427	1,915	1,852	1,976	2,140	2,321	2,424	2,564	2,528	21,320
6	UFMG	908	1,079	1,249	1,525	1,549	1,634	1,854	2,103	2,228	2,243	2,366	18,738
7	Unifesp	640	778	1,063	1,235	1,340	1,482	1,517	1,672	1,743	1,753	1,773	14,996
8	Embrapa	478	561	834	1,043	1,080	1,102	1,290	1,350	1,489	1,513	1,466	12,206
9	Fiocruz	523	645	786	1,011	1,128	1,160	1,180	1,252	1,302	1,406	1,425	11,818
10	UFSC	485	551	648	841	905	1,020	1,056	1,202	1,321	1,325	1,440	10,794
11	UFPR	454	519	666	816	916	953	1,067	1,241	1,281	1,356	1,400	10,669
12	UFV	360	455	545	735	860	874	998	1,035	1,067	1,095	1,090	9,114
13	UnB-BR	430	442	585	633	783	809	869	983	1,055	1,060	1,177	8,826
14	UFPE	448	447	518	659	732	780	896	1,008	1,055	1,071	1,113	8,727
15	UFSCar	491	508	565	712	747	740	797	955	946	1,018	1,003	8,482
16	UFC	375	392	507	570	703	697	811	929	966	907	975	7,832
17	UFSM	271	339	437	669	689	711	827	853	985	935	1,042	7,758
18	UERJ	338	378	513	670	649	677	763	779	902	830	898	7,397
19	UFF	311	354	485	591	636	628	758	817	909	914	977	7,380
20	UEM	259	322	361	534	537	532	614	654	709	747	794	6,063
21	UFBA	308	303	403	453	470	543	589	615	735	724	781	5,924
22	UFLA	175	186	343	443	544	514	636	647	609	655	636	5,388
23	UFG	196	181	223	375	438	514	563	632	730	752	751	5,355
24	UFPB	196	207	288	332	432	484	512	606	632	710	703	5,102
25	UFRN	214	229	259	316	349	411	492	591	626	764	796	5,047
26	UFPEl	113	139	231	368	373	433	481	494	623	658	724	4,637
27	UFU	154	186	241	310	395	407	482	521	622	589	621	4,528
28	UEL	151	194	299	351	353	409	448	539	612	555	610	4,521
29	UFPA	141	169	206	242	320	351	461	457	580	530	588	4,045
30	APTA-SP	171	189	369	336	363	350	436	361	375	382	386	3,718
31	UFES	105	131	154	220	278	317	391	469	516	539	561	3,681
32	Univ PUC RS	158	229	247	300	266	348	357	374	381	405	402	3,467
33	UFRPE	69	91	160	243	329	363	395	429	425	408	443	3,355
34	URJF	84	113	140	185	203	246	325	492	463	488	594	3,333
35	Univ PUC RJ	204	222	230	250	245	251	267	348	382	411	389	3,199
36	INPE-BR	257	247	244	271	279	271	288	275	296	346	257	3,031
37	UFABC		1	48	154	219	277	372	472	495	466	514	3,018
38	CNEN	236	236	249	279	265	287	261	312	291	343	255	3,014
39	UFRRJ	95	96	183	267	267	265	327	332	330	369	355	2,886
40	CNRS-FR	135	139	121	134	146	223	290	430	358	390	478	2,844
41	UFMT	59	69	102	123	216	241	295	300	400	411	452	2,668
42	Univ Harvard	104	99	133	141	163	170	231	357	379	385	501	2,663
43	UFS	46	67	115	132	141	231	299	320	372	402	392	2,517
44	UFCG	98	86	135	137	220	222	254	276	305	358	307	2,398
45	UTFPR	35	58	70	102	153	155	220	282	369	377	537	2,358
46	CSIC-SPA	65	76	78	93	93	154	249	362	325	380	452	2,327
47	INPA-BR	99	108	123	174	207	197	219	262	291	321	310	2,311
48	UENF	130	133	172	224	223	240	247	222	212	228	265	2,296
49	CBPFis-BR	121	113	133	158	119	146	197	322	312	317	322	2,260
50	Univ Illinois	99	82	97	114	122	158	252	345	298	316	367	2,250

The characteristics of the Brazilian scientific production

A curious fact in this survey is that the Brazilian scientific articles present in an international database such as the WoS are in absolute majority published in the English language. In the latter case, 85% of 354,000 articles were written in English, 14% in Portuguese and 1% in other languages.

In terms of countries involved in the production of these items the list includes, in order, the United States, United Kingdom, France, Germany, Spain, Italy, Canada, Portugal, Argentina and Australia. See more details in Table 3 below.

Table 3. Production of articles per year by the 30 main countries partners from 2005 to 2015.

Country\Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
1 United States of America	1,959	2,168	2,506	2,767	3,023	3,205	3,598	4,201	4,519	5,093	5,598	38,637
2 United Kingdom	664	706	833	867	922	1,033	1,264	1,578	1,739	1,896	2,229	13,731
3 France	718	764	764	936	1,025	1,141	1,227	1,605	1,634	1,785	1,994	13,593
4 Germany	645	684	706	782	785	974	1,161	1,407	1,499	1,678	1,863	12,184
5 Spain	306	409	480	610	684	829	1,019	1,371	1,493	1,734	2,028	10,963
6 Italy	326	424	418	490	534	644	777	1,015	1,197	1,349	1,587	8,761
7 Canada	370	382	401	560	671	612	730	911	995	1,129	1,323	8,084
8 Portugal	207	300	236	374	418	494	649	883	963	1,137	1,261	6,922
9 Argentina	346	357	401	512	492	538	622	727	716	790	862	6,363
10 Australia	163	183	226	259	313	349	434	705	797	910	1,062	5,401
11 Netherlands	208	220	216	286	323	351	454	672	685	825	925	5,165
12 China	149	140	130	169	206	306	423	646	680	772	858	4,479
13 Switzerland	123	168	186	194	224	306	454	670	665	672	812	4,474
14 Mexico	145	169	175	223	236	282	361	455	571	557	615	3,789
15 Chile	141	168	193	208	249	277	340	458	482	579	662	3,757
16 Russia	178	173	178	204	199	257	353	542	511	556	586	3,737
17 Colombia	85	105	126	212	221	299	405	507	505	528	667	3,660
18 Japan	208	237	204	204	219	266	348	419	429	510	563	3,607
19 India	134	135	157	168	199	258	336	387	448	553	576	3,351
20 Belgium	117	136	156	169	201	265	333	382	441	508	595	3,303
21 Sweden	135	151	164	210	188	231	283	438	424	462	543	3,229
22 Poland	69	82	80	97	113	167	294	477	456	459	490	2,784
23 Czech Republic	76	105	87	116	121	152	259	424	354	355	425	2,474
24 Austria	63	80	74	85	114	174	247	387	347	381	414	2,366
25 Denmark	56	76	75	81	95	133	189	314	305	353	470	2,147
26 South Korea	80	80	89	105	134	177	228	288	297	283	315	2,076
27 South Africa	44	51	48	81	84	114	172	281	294	304	370	1,843
28 Greece	26	43	36	41	43	114	180	336	303	297	340	1,759
29 Turkey	26	34	40	37	39	89	162	323	298	358	351	1,757
30 Hungary	34	53	48	52	52	109	180	309	274	284	340	1,735

The four most cited Brazilian articles were published between 2005 and 2012 and have more than 3,000 citations. The first was published in 2008, in the New England Journal of Medicine, a scientific journal of the United States. This scientific journal has an even better score: the fourth most cited article and other three articles between the ten most cited are published by it. The other scientific journals in this select level are: Physics Letters B, from the United Kingdom, with two articles (the second and the third most cited), Ecography, Science and Lancet with an article each. Brazilian institutions taking part in these four most cited articles are USP, with two articles; Unesp, UFRJ, Rio de Janeiro State University (UERJ), Federal Universities of Juiz de Fora (UFJF), of Sao Joao del Rei (UFSJR), of the ABC (UFABC), the CBPFis-BR, the Brazilian National Council for Scientific and Technological Development (CNPq) and Santa Casa de Sao Paulo Hospital (Hosp Sta Casa SP) with an article each.

The following are brief references of these four articles:

- » (3825) Llovet, Josep M. et al. Sorafenib in advanced hepatocellular carcinoma; NEW ENGLAND JOURNAL OF MEDICINE; JUL 24; 2008
- » (3516) Aad, G. et al. Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC; PHYSICS LETTERS B; SEP 17; 2012
- » (3338) Chatrchyan, S. et al. Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC; PHYSICS LETTERS B; SEP 17; 2012

- » (3332) Shepherd, FA. et al. Erlotinib in previously treated non-small-cell lung cancer; NEW ENGLAND JOURNAL OF MEDICINE; JUL 14; 2005.

As to the funding institutions, the CNPq, the Coordination for the Improvement of Higher Education Personnel (Capes), the Sao Paulo State Research Foundation (Fapesp), the Minas Gerais State Research Foundation (Fapemig), the Rio de Janeiro State Research Foundation (Faperj) and the Funding Authority for Studies and Projects (Finep) appear in the top six places followed by the European Community, the National Institutes of Science and Technology (INCTs), the National Science Foundation of the United States (US NSF), the National Institute of Health of the United States (US NIH), the Government of Spain and the Rio Grande do Sul State Research Foundation (Fapergs).

IMPACT

Public policies

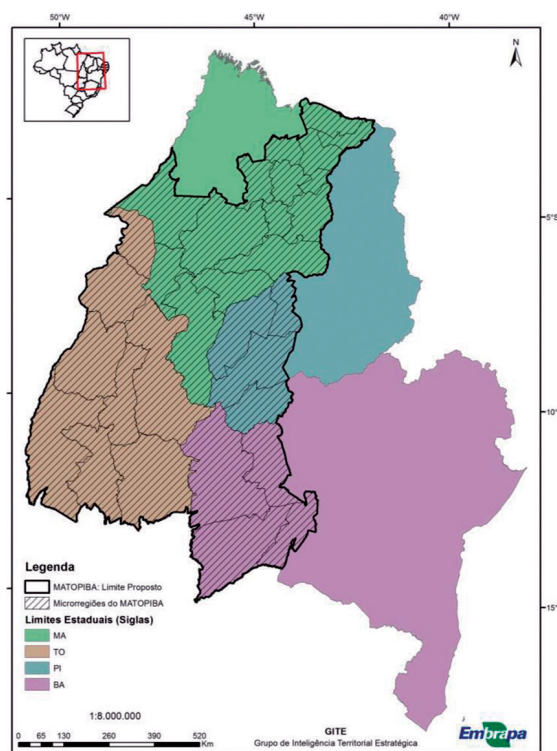


Photo: Evaristo Eduardo de Miranda

Knowledge and technologies that support the formulation and implementation of public policies in the form of laws, decrees, normative instructions, governmental programs, plans and actions at municipal, state, regional, national, and international level.

Definition of the Matopiba Region opens the way for the implementation of public policies

The socio-geographic region of the Matopiba (an acronym of the initials of the states of Maranhão, Tocantins, Piauí and Bahia) is characterized by the agricultural frontier expansion based strongly on high productivity technologies. Its geographical boundaries, however, still lacked accuracy, but it was essential to support public and private policies in the region. To meet this need, an agreement between the National Institute of Colonization and Agrarian Reform (INCRA) and Embrapa, through the Territorial Strategic Intelligence Group (GITE), allowed a series of numerical and cartographic procedures, supported by the use of satellite images. As a result of this effort, the area of the Matopiba went on to match the boundaries of 31 IBGE geographical microregions, that bring together 337 municipalities and represent a total of about 73 million acres. It encompasses 324,326 agricultural establishments, 42 conservation units, 28 indigenous lands, 865 land reform settlements and 34 quilombo areas. This demarcation led to the creation by the Presidency of the Republic in 2015 of the Regional Development Agency of the Matopiba, to promote the sustainable economic development of the agricultural and livestock production activities, benefiting a rural population of about 2 million inhabitants. The Territorial Strategic Intelligence System (SITE), structured by the GITE, gathers numeric, cartographic and



iconographic data collections integrated into Geographic information systems (GIS) supported in spatial databases from various public institutions. Generally this data is organized into five dimensions: nature, lands, agriculture, socio-economical and infrastructure. In the case of Matopiba, this dataset is available at the address <http://mapas.cnpm.embrapa.br/matopiba2015/>.

More information: www.bs.sede.embrapa.br/2016

IMPACT

More productivity



Photo: Breno Lobato

Technologies that contribute to increasing the average productivity of national agriculture and the food supply for the Brazilian population. Besides the economic impact, the table includes the Internal Rate of Return (IRR) and social and environmental impact indices for the technologies, which can range from -15 to +15, obtained according to the perception of a sample of farmers that adopted each technology.

New cultivars of passion fruit are tastier and generate employment and income in the countryside

Brazil is the world's largest producer and consumer of passion fruit, with yearly production close to 700,000 tons. This culture finds its economic and financial viability in small areas, making it attractive for the family farmer to achieve professionalization, while its consumption, fresh or industrialized, is already integrated in the Brazilian diet, in addition to the demands of the pharmaceutical, ornamental plants, and cosmetics industries. However its productivity is considered low, at around 14 tons per hectare. To facilitate the agribusiness of passion fruit, Embrapa Cerrados has developed, in recent years, new hybrid cultivars of high productivity, high physical and chemical quality of fruits and greater tolerance to diseases. Among these cultivars are hybrids of passion fruit BRS Yellow Giant and BRS Savan-

nah Sun. Their productivity under conditions of Cerrado have surpassed 40 tons per hectare per year in properly managed orchards, and they can be grown practically in all states and regions of the country. According to Embrapa Products and Market since their launch in 2008, it is estimated that the cultivation of these hybrids has involved an area of 8,000 hectares, corresponding to 15% of the national cultivated area of passion fruit. In 2016 approximately 2,400 hectares were planted, benefiting farmers in 590 properties, which generated approximately of 5,000 direct jobs as well as 10,000 indirect, and BRL 400 million in the wholesale market.

More information: www.bs.sede.embrapa.br/2016



Photo: Flavio Pagnam

IMPACT

More productivity

Social Report
20 years

Technologies	Embrapa Unit
Recommendation of forage peanut for pastures in Acre state	Acre
Recommendation of chemical control for the black sigatoka in the long banana cultivar D'Angola in Acre	Acre
BRS 366 Jaburu acerola cherry cultivar	Tropical Agroindustry
BRS 226 Early Dwarf Cashew Clones	Tropical Agroindustry
Use and operation of Sunn hemp in production system of sugarcane	Western Agriculture
New banana tree cultivars for Amapa state	Amapa
Management of native floodplain assai palm groves for fruit production	Amapa
Bragantino food production system	Amapa
BRS Para assai berry cultivar	Eastern Amazon
Cassava crop productivity trio	Eastern Amazon
Management of native bees in hive boxes in the Amazon region	Eastern Amazon
Management of native assai palm groves	Eastern Amazon
Vermin control for goats and sheep in the Semi-arid region	Goats and Sheep
Agrosilvopastoral production system for the Caatinga region	Goats and Sheep
Confinement lamb finishing	Goats and Sheep
Agricultural gypsum in soybean crops in the Cerrado region	Cerrado
Agricultural gypsum in maize crops in the Cerrado region	Cerrado
Agricultural zoning	Cerrados/Agricultural Informatics
BRSIPR Bel potato cultivar	Temperate Agriculture
BRS Amelia sweet potato cultivar	Temperate Agriculture
Herbaceous cotton cultivars for the Brazilian Cerrado	Cotton
Castor oil plant cultivars for the Brazilian Northeast - BRS 149 Nordestina and BRS 188 Paraguassu, BRS Energia and BRS Gabriela	Cotton
Severe frost-tolerant Eucalyptus benthamii	Forestry
Integrated management of wood wasp in Pinus crops	Forestry
Marandu grass cultivar	Beef Cattle
Mombassa grass cultivar	Beef Cattle
Piatan grass cultivar	Beef Cattle
Tanzania grass cultivar	Beef Cattle
Panicum maximum cv Massai cultivar	Beef Cattle
Campo Grande Stylosanthes cultivar	Beef Cattle
Superior Nelore bulls assessed by the Geneplus Program for natural mounting	Beef Cattle
Integration of dairy cattle with crops and forestry	Dairy Cattle
Virus-free garlic	Vegetables
"Amarela de Senador Amaral" yellow arracacha cultivar	Vegetables
Nagai tomato cultivar	Vegetables
Embrapa's Technological Information Agency - Ageitec	Agricultural Informatics
Agricultural Weather Monitoring System - Agritempo	Agricultural Informatics
Coffee harvester	Instrumentation
Technologies for the sustainability of the Local Productive Arrangement of Pineapple in the semi-arid of Bahia - Vale do Paraguassu (Itaberaba)	Cassava & Tropical Fruits
Kiris - variety of cassava root rot resistant	Cassava & Tropical Fruits
Formosa - Bacteriosis-resistant cassava variety	Cassava & Tropical Fruits
BRS 1503 Millet	Maize and Sorghum
Campo Limpo chemical herbicide applicator	South Livestock
Assisted introduction of the Booroola gene in sheep flocks	South Livestock
BRS Estribo Sudan grass cultivar	South Livestock
Coffee variety BRS Ouro Preto	Rondonia
Watermelon production system in Roraima central-northern region	Roraima
Correction of soil in soybean	Soybeans
Underground dams: a sustainability option for the Northeastern Semi-Arid	Soils
Tomatec - Ecological tomato production system	Soils
Planning, management, and operational standards for hog production	Swine and Poultry
Embrapa 051 freerange laying hen	Swine and Poultry
PET Trap	Coastal Tablelands
Oat cultivar BRS Centaur	Wheat
Total	

	Year of adoption	Area of Adoption	Unit of Measurement	Embrapa's participation (%)	Social Impact	Environmental Impact	IRR %	Economic Impact (BRL)
	2001	137,600	Hectare	70	1.29	2.01	13.96	174,686,584.82
	2016	1,674	Hectare	60	1.69	1.16	16.95	4,844,422.08
	2012	716	Hectare	50	8.73	na	na	1,559,448.00
	2002	2,500	Hectare	70	8.32	na	na	1,881,250.00
	2014	22,745	Hectare	70	1.29	2.56	na	16,031,963.37
	2010	400	Hectare	40	2.46	0.86	na	7,440,000.00
	2002	6,700	Hectare	40	2.68	-0.14	34.69	45,399,200.00
	2010	1,400	Hectare	50	0.90	1.09	na	3,955,000.00
	2005	30,865	Hectare	70	0.51	na	24.00	80,715,339.29
	2007	7,410	Hectare	70	1.80	na	78.92	9,920,137.50
	2007	5,200	Boxes	70	0.46	1.67	na	98,280.00
	1999	59,671	Hectare	50	1.16	-0.04	na	111,960,398.95
	1987	420,000	Head	5	2.69	-0.42	na	309,540.00
	2005	800	Hectare	35	2.93	2.76	na	163,010.07
	2001	210,000	Head	12	5.75	2.47	na	1,503,768.63
	1996	1,141,523	Hectare	60	0.90	0.27	31.79	417,954,948.17
	1996	184,539	Hectare	60	0.96	0.28	35.03	73,669,814.19
	1997	57,671,800	Hectare	30	na	na	na	3,695,191,059.17
	2013	150	Hectare	70	na	na	5.10	418,950.00
	2011	873	Hectare	70	0.32	-0.09	37.80	24,432,290.40
	1992	5,000	Hectare	60	3.85	0.97	15.20	1,440,000.00
	2000	15,000	Hectare	70	2.14	-0.77	7.70	6,016,500.00
	1999	13,800	Hectare	70	0.68	1.54	33.00	4,269,720.00
	1995	1,000,000	Hectare	50	0.72	0.73	67.84	181,005,000.00
	1984	17,190,176	Hectare	50	0.54	0.60	na	2,708,054,376.16
	1994	5,817,393	Hectare	60	0.79	0.04	46.50	2,416,219,278.19
	2009	4,660,393	Hectare	35	0.69	0.68	21.20	267,310,821.69
	1991	1,447,689	Hectare	70	2.26	-0.46	44.70	261,898,521.6
	2001	1,800,086	Hectare	85	70	1.40	na	201,495,326.5
	2001	745,962	Hectare	70	1.80	1.33	29.50	90,847,728.13
	1996	3,457,440	Head	50	2.45	-0.18	na	98,481,720.96
	2007	3,200	Hectare	50	3.23	0.88	na	3,888,640.00
	2002	1,275	Hectare	60	1.99	0.67	39.30	11,704,500.00
	1999	9,450	Hectare	60	0.44	0.70	na	102,797,100.00
	2012	1,582	Hectare	50	0.58	0.41	na	96,478,999.21
	2004	na	na	70	5.46	2.63	17.80	288,802.27
	2007	na	na	60	3.02	3.39	23.60	1,380,953.12
	2004	30,850	Hectare	20	1.52	-1.05	na	15,983,385.00
	1995	286	Hectare	60	0.59	na	17.10	1,042,264.08
	2003	3,693.58	Hectare	60	na	0.42	8.94	763,592.41
	2003	2,291	Hectare	60	1.04	0.90	9.01	1,441,426.45
	2014	102,600	Hectare	70	0.43	0.96	52.02	25,928,456.40
	2009	78,500	Hectare	45	1.49	2.18	na	1,923,446.25
	2009	26,500	Head	50	2.33	0.10	62.00	2,090,982.50
	2013	434,000	Hectare	50	1.95	0.74	72.00	24,345,230.00
	2013	1,000	Hectare	70	1.53	0.74	75.83	4,550,000.00
	2000	350	Hectare	10	0.87	-0.41	84.00	274,715.00
	1980	29,926,710	Hectare	40	na	na	na	2,646 320,195.29
	2006	3,402	Hectare	60	4.30	2.80	8.80	1,028,764.80
	2012	12	Hectare	50	1.40	2.50	35.70	567,000.00
	2011	193,000	Head	10	6.20	1.40	na	760,950.75
	2000	1,436,800	Head	25	2.85	0.26	24.50	5,977,088.00
	2004	1,174	Hectare	70	2.11	1.13	na	97,315.75
	2012	21,921	Hectare	70	na	0.24	24.47	14,770,846.30
13,873,579,051.50								



IMPACT

More value



Photos: Fernanda Birolo

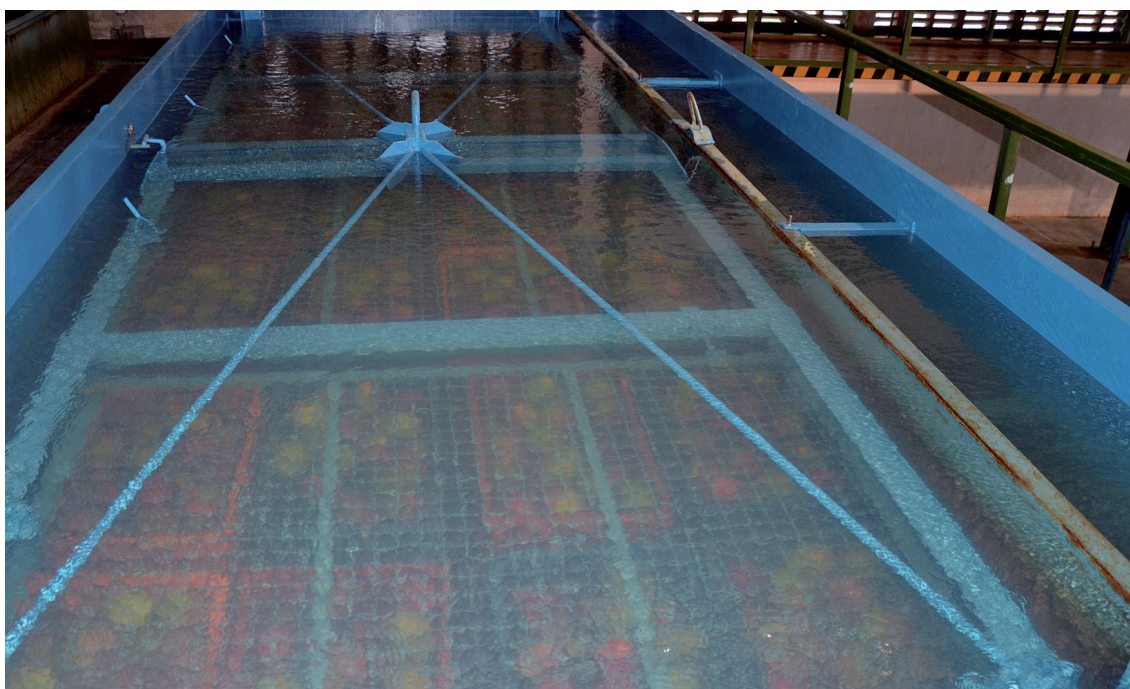
Technologies that transform traditional products, increasing their price per unit and generating more income for farmers. Besides the economic impact, the table includes the Internal Rate of Return (IRR) and social and environmental impact indices for the technologies, which can range from -15 to +15, obtained according to the perception of a sample of farmers that adopted each technology.

Hydrothermal treatment of the mango fruit generated BRL 1.4 billion in exports over 25 years

The control of fruit flies (*Anastrepha* spp. and *Ceratitis capitata*), in general, is still very dependent on the use of pesticides, with strong impact on the population of natural enemies, and on the final quality of various products. The main fruit importers markets fresh, including Japan and the United States, are closed to countries which adopt conventional systems of control of fruit flies. To resolve this problem, Embrapa Cassava and Tropical Fruits, in conjunction with the University of Sao Paulo (USP), the Association of Producers and Exporters of Fruits, Vegetables and Derivatives from Sao Francisco Valey (Valexport) and private companies, developed and approved at the United States Department of Agriculture (USDA) the "hydrothermal treatment of Brazilian Mango" enabling, since 1991, fruit exports

to those countries. This treatment consists of immersing in water at 46 degrees C per 75 or 90 minutes, the fruits with weights up to 425 g and 426 to 650 g, respectively, with the goal of killing eggs and/or larvae of fruit flies present on the mangoes. Since the beginning of its adoption in 1991, mango exports increased 17.2% due to the opening of the North American and Japanese markets to Brazilian fruits, generating a revenue of BRL 1.4 billion, or US\$ 403,100,000 in the last 25 years. Only in 2015, 471 tons of this fruit exports generated more than 47,000 jobs in its production and processing chain of mango, being the states of Bahia and Pernambuco responsible for about 80% of the total exports.

More information: www.bs.sede.embrapa.br/2016



IMPACT More value

Technologies	Embrapa Units	Year of adoption
Good practices for Brazil nut production in natural forests in the Amazon region	Acre	2011
BRS 226 early dwarf cashew clone	Tropical Agroindustry	2002
BRS 366 Jaburu acerola cherry cultivar	Tropical Agroindustry	2012
Tangential flow microfiltration to obtain clarified cashew juice	Tropical Agroindustry	2012
BRS 200 Marrom, BRS Verde, BRS Rubi, BRS Safira and BRS Topazio colored cotton cultivars	Cotton	2002
Computational system for forest management - Sisplan	Forestry	1995
SisEucalipto - Software for managing and precision management of eucalyptus plantations	Forestry	2000
Embrapa kit for manual milking	Dairy Cattle	2007
Immunotherapy against equine pythiosis	Pantanal	1998
Cassava chips	Semi-Arid	1997
Tomatec - Ecological tomato production system	Soils	2012
Embrapa 051 freerange laying hen	Swine and Poultry	2000
Dwarf barley cultivars: BRS Elis, BRS Caue, BRS Brau, BRS Sampa and BRS Manduri	Wheat	2009
BRS Lorena grape cultivar	Grapes and Wine	2002
BRS Violeta grape cultivar	Grapes and Wine	2007
Embrapa's muscat grape cultivar	Grapes and Wine	1997
Niagara Rosada grape cultivar for tropical regions	Grapes and Wine	1999
New cultivars BRS Vitoria and BRS Isis to the medium San Francisco river	Grapes and Wine	2012
Total		

	Area of Adoption	Unit of Measurement	Embrapa's participation (%)	Social Impact	Environmental Impact	IRR %	Economic Impact (BRL)
	22,122	Hectare	50	1.92	2.72	na	73,998.09
	2,500	Hectare	70	8.32	na	na	1,884,750.00
	716	Hectare	50	8.73	na	na	17,025,048.00
	na	Equipment	50	8.74	na	na	60,000.00
	120	Hectare	70	0.66	-0.12	na	161,280.00
	1,450,000	Hectare	70	0.76	0.50	na	723,644,250.00
	1,300,000	Hectare	70	na	na	na	840,994.700,00
	1,572,900,000	Hectare	50	2.02	0.19	na	62,916,000.00
	2,973	Hectare	50	0.47	0.09	na	2,083,562.26
	4,290	Hectare	70	2.42	0.89	53.60	9,009,000.00
	12	Hectare	50	1.40	2.50	35.70	12,000.00
	1,436,800	Head	25	2.85	0.26	24.50	786,792.50
	80,123	Hectare	65	0.11	-0.13	41.28	21,494,810.90
	395	Hectare	70	na	na	34.03	20,339,257.05
	630	Hectare	70	na	na	17.70	4,584,195.00
	465	Hectare	70	na	na	24.60	14,789,287.80
	950	Hectare	70	na	na	48.40	27,928,670.00
	640	Hectare	70	na	na	81.80	34,742,400.00
	1,782,530,001.60						

IMPACT

Lower costs



Photos: Ronaldo Rosa

Technologies that provide agricultural, livestock and forestry activities with competitiveness by reducing production costs. Besides the economic impact, the table includes the Internal Rate of Return (IRR) and social and environmental impact indices for the technologies, which can range from -15 to +15, obtained in accordance with the perception of a sample of producers that adopted each technology.

Management technology doubles the production of assai and benefits riverine communities in the Amazon

The assai palm (*Euterpe oleracea* Mart) is a plant native to the Amazon. The Brazilian State of Para is the main centre of natural dispersion of the species. This palm tree stands out among the various plant resources for its abundance and for producing food for local populations, as well as being the main source of raw material for the hearth of palm agroindustry in Brazil. Management technology of the assai palm, developed by Embrapa Eastern Amazon, is based on the removal of plants from shrubs and trees of low commercial value, which spaces are occupied by assaizeiros plants from seed or transplanted from nearby, or yet enriched with the planting of other species of commercial interest, conciliating, rational and balanced environmental protection with economic performance. Its adoption, does not require the use

of inputs or the use of machinery, and is able to double the productivity of the assai palm in relation to traditional practice. Launched in 1999, this technology received support from various institutions: The Executive Secretariat of Science, Technology and Environment, the Amazon Development Agency, the Amazonia Bank, the Project in Support of the Development of Agricultural Technology to Brazil and the Corporation of Technical Assistance and Rural Extension of the State of Para. The technology adoption is currently being enlarged to 59,000 hectares, mainly in the states of Para and Amapa. Its economic benefit to the region in 2016 was approximately BRL 112 million.

More information: www.bs.sede.embrapa.br/2016



IMPACT

Lower costs

Technologies	Embrapa Units	Year of adoption
Recommendation of the Digital Forestry Exploration Model - Modeflora	Acre	2008
Renovation of pastures with high infestation of water couch grass	Acre	2012
Black pepper cropping with gliricidia as an alive stake	Eastern Amazon	2005
Confinement lamb finishing	Goats and Sheep	2001
Biological nitrogen fixation in soy crops in Brazil	Cerrados/Soybean/ Agrobiology	1981
BRSIPR Bel potato cultivar	Temperate Agriculture	2013
Piatan grass cultivar	Beef Cattle	2009
Campo Grande Stylosanthes cultivar	Beef Cattle	2001
Strategic cattle tick control	Dairy Cattle	1997
Integration of dairy cattle with crops and forestry	Dairy Cattle	2007
Virus-free garlic	Vegetables	2002
Nagai tomato cultivar	Vegetables	2012
Embrapa's Technological Information Agency - Ageitec	Agricultural Informatics	2004
Library automation and information retrieval system - Ainfo	Agricultural Informatics	1991
Interactive system of support to environmental licensing - Sisla	Agricultural Informatics	2008
Agricultural weather monitoring system - Agritempo	Agricultural Informatics	2007
Integrated pineapple production in Tocantins	Cassava and Tropical Fruits	2005
Agricultural spraying assessment system - Gotas software	Environment	2014
Method of evaluation of impacts of agricultural technological innovations - Ambitec Agro	Environment	2000
Reduction of bull-to-cow ratios in Pantanal region	Pantanal	1999
Production techniques applied to the extensive beef cattle production system in Pantanal	Pantanal	1999
Sara: Software for analysis of risk of parasitic and anthelmintics resistance in sheeps	Southeast Livestock	2014
BRS Estribo Sudan grass cultivar	South Livestock	2013
Campo Limpo chemical herbicide applicator	South Livestock	2009
Integrated mango production	Semi-Arid	2001
Integrated fine table grape production	Semi-Arid	2001
Integrated pest management in soybean crops (MIP-SOJA)	Soybeans	2011
Tomatec - Ecological tomato production system	Soils	2012
Embrapa 051 freerange laying hen	Swine and Poultry	2000
Embrapa MS115 boar	Swine and Poultry	2007
Alternative seedling production system	Coastal Tablelands	2004
Total		

Area of Adoption	Unit of Measurement	Embrapa's participation (%)	Impact Social	Environmental Impact	IRR %	Impact Economic (BRL)
8,313	Hectare	70	1.82	2.18	6.00	1,444,397.00
3,820	Hectare	70	1.57	0.65	12.20	534,800.00
140	Hectare	60	1.77	2.00	7.47	1,084,440.00
210,000	Head	12	5.75	2.47	90.20	127,058.40
33,251,900	Hectare	40	0.78	1.18	84.00	14,661,826,770.80
150	Hectare	70	na	na	5.10	169,375.50
838,001	Hectare	35	0.69	0.68	21.20	12,230,624.60
745,962	Hectare	70	1.80	1.33	29.50	52,702,961.26
2,945,800	Head	45	1.26	1.32	na	12,407,709.60
3,200	Hectare	50	3.23	0.88	na	2,352,000.00
1,275	Hectare	50	1.99	0.67	39.30	6,856,950.00
1,582	Hectare	50	0.58	0.41	na	14,242,011.42
na	na	70	5.46	2.63	17.80	5,831,378.77
na	na	70	0.52	-0.17	19.8	18,480,105.95
na	na	70	0.88	1.03	14.21	853,112.17
na	na	60	3.02	3.39	23.60	524,458.90
279	Hectare	50	3.65	2.34	na	428,530.05
240	Downloads	70	1.40	1.30	64.6	538,836.48
na	na	70	1.27	0.00	na	107,879.94
1,102,938	Head	70	2.07	0.05	na	37,166,933.00
4,636,150	Head	70	2.08	0.05	na	51,510,594.00
25,146	na	70	1.05	1.49	na	193,448.18
42,000	Hectare	50	1.95	0.74	72.00	14,470,680.00
48,750	Hectare	45	1.49	2.18	na	680,501.25
18,488	Hectare	30	7.77	2.57	69.8	12,889,833.60
14,268	Hectare	30	8.14	2.58	70.2	33,181,660.80
332,519	Hectare	70	0.14	0.55	na	13,663,205.71
12	Hectare	50	1.40	2.50	35.70	34,472.16
359,200	Head	25	2.85	0.26	24.50	422,060.00
533	Head	70	0.72	0.32	na	4,167,527.00
1,174	Hectare	70	1.97	1.48	43.10	230,664.00
14,961,354,980.54						

IMPACT

More production in new areas



Photo: Alberi Noronha

Technologies that enable production activities to be initiated or resumed in areas that were either previously considered unsuitable due to a lack of adequate technologies. Or where traditional systems are no longer competitive. Besides the economic impact, the table includes the Internal Rate of Return (IRR) and social and environmental impact indices of the technologies, which can range from -15 to +15, obtained in accordance with the perception of a sample of producers that adopted each technology.

Sweet potato BRS Amelia, more tasty, strengthens the food security and increase farmers' income

The sweet potato is one of the most nutritious and versatile vegetable, being produced throughout the year in most of the Brazilian production regions and traditionally cultivated for consumption of households. In recent years it also became part of the menu of a new consumer profile, of urban origin, in his/her search for healthier eating habits. Despite the increase in demand, this culture is still marked by low productivity and high rate of disease due to the use of not adapted plants. Concerned by its great potential in generating income and food, Embrapa Temperate Agriculture developed the cultivar of sweet potato BRS Amelia to fill these important gaps diagnosed in the production chain. When cooked or baked, its peel comes off easily from the pulp; its texture is moist and sticky, soft and extremely sweet. Its average productivity is 32 tons per hectare, i.e. 2.36 times higher than the average production in Brazil, besides re-

ducing 50% of post-harvest losses and raising farmers' earnings by as much as 60% of average prices. Since its release in 2007, the production of 210,000 seedlings allowed in just five seasons, that BRS Amelia to occupy about 10% of the planted area in the Rio Grande do Sul State and stretches to other regions of the South, Southeast, Northeast and North. Today it is present in 8 Brazilian states (Rio Grande do Sul, Santa Catarina, Parana, Sao Paulo, Minas Gerais, Bahia and Roraima). Its cultivation is estimated to have produced 41,000 tonnes in an area of 1,300 ha in the different Brazilian regions and generated an agricultural income (consumption and marketing) total of US\$ 100 million to benefit 40,000 family farmers and traditional communities, that can raise their economic gains up 472% when trading in organic food fairs.

More information: www.bs.sede.embrapa.br/2016



Photo: Paulo Lanzetta

IMPACT

More production in new areas

Technologies	Embrapa Units	Year of adoption	Area of Adoption	Unit of Measurement
Fungicide application on the axil of the second leaf of banana plants to control Black Sigatoka	Western Amazon	2008	81	Hectare
Intensive tambaqui production in excavated tanks	Western Amazon	2003	2,050	Hectares of water surface
Virus-free garlic	Vegetables	2002	1,275	Hectare
"Amarela de Senador Amaral" yellow arracacha cultivar	Vegetables	1999	9,450	Hectare
Recommendation of dwarf silver banana cultivation in the irrigated perimeter of the Formoso Project – Bom Jesus da Lapa (BA)	Cassava and Tropical Fruits	1994	5,950	Hectare
Full Bucket Program	Southeast Livestock	1996	27,718	KL
ILPF systems techniques	Southeast Livestock	2009	861,140	Hectare
Sustainable agroforestry systems (SAF's)	Roraima	2015	6	Hectare
Watermelon production system in Roraima central-northern region	Roraima	2000	350	Hectare
Underground dams: a sustainability option for the Northeastern Semi-Arid	Soils	2006	502	Hectare
Tomatec - Ecological tomato production system	Soils	2012	9	Hectare
Climate risk zoning for corn in Sergipe	Coastal Tablelands	2004	88,478	Hectare
Total				

Embrapa's participation (%)	Social Impact	Environmental Impact	IRR %	Economic Impact (BRL)
70	6.11	-0.20	13.56	453,600.00
70	8.27	-0.73	59.82	21,525,000.00
10	1.99	0.67	39.30	4,437,000.00
60	0.44	0.70	na	44,887,500.00
60	0.43	0.10	na	92,016,285.90
70	3.71	2.89	na	53,330,106.67
10	2.32	2.18	63.00	13,387,282.44
20	1.55	-0.46	na	12,649.76
10	0.87	-0.41	84.00	420,000.00
60	4.30	2.80	8.80	151,804.80
50	1.40	2.50	35.70	981,000.00
60	2.16	-1.71	89.30	7,317,484.51
				238,919,714.08

IMPACT

Cultivars by Embrapa and partners



Photo: Manuela Bergamin

Calculated impacts of the participation of cultivars generated by Embrapa and partners on the domestic market for cotton seeds, irrigated rice, dryland rice, beans, maize, soybeans, sorghum and wheat.

BRS Estribo Sudan grass cultivar is more productive and benefits 8,000 properties in RS State

Cattle raising in southern Brazil is going through a moment of transition. Producers search, in meat production, the intensification of systems, with increasing use of cultivated pastures in addition to native ones. In milk production, many producers are seeking cost savings, with the expansion of the use of high pasture productivity and reduction in the use of feed concentrates. To meet this need Embrapa South Livestock, in partnership with the South-Brazilian Association for the Promotion of Forage Research and the Federal University of Rio Grande do Sul launched in 2013 the BRS Estribo Sudan grass cultivar. In addition to high productivity, this forage has high-capacity of tillering, presence of thinner stems,

flexible management for the conditions of continuous grazing or rotated, as well as a longer cycle of utilization. Due to these qualities this cultivar area of influence has been growing since its launch. During the 2015/16 harvest, it accounted for approximately 340,000 hectares in at least 8,000 properties in Rio Grande do Sul State and an economic benefit of BRL 77,000,000. For the 2016/17 harvest, it is expected that it will exceed 500,000 acres planted in at least 12,000 properties, with expansion in the states of Santa Catarina and Parana, and economic gains of BRL 110 million.

More information: www.bs.sede.embrapa.br/2016

Product	Total cultivated area 1,000 ha (A)	Total Production 1,000 ton (B)	Value of Production 15/16 Crop Year (C) (BRL1.00)	Economic Benefit Embrapa (D) (BRL1.00)
Cotton	954.70	3,225.30	6,998,901,000.00	3,187,149.87
Irrigated Rice	1,076.00	7,356.60	7,610,709,225.00	69,188,484.35
Dryland Rice	931.80	3,246.30	3,441,664,137.50	474,167,425.25
Beans	2,837.50	2,513.90	9,023,626,592.36	839,467,981.89
Maize 1 st harvest	5,387.70	25,853.60	14,535,470,243.56	14,387,508.73
Maize 2 nd harvest	10,534.80	40,840.70	22,961,549,111.11	95,269,839.03
Soybeans	33,251.90	95,434.60	110,692,206,675.00	1,450,360,822.24
Sorghum	579.00	1,031.50	535,618,668.05	11,247,992.03
Wheat	2,118.40	5,649.30	3,730,891,875.00	100,199,270.92
Total	57,671.80	185,151.80	179,530,637,527.58	3,057,476,474.30

Sources: (A, B and C) - Conab Assessment of 2014/2015 Crop Year - www.conab.gov.br - access on Feb 10, 2017 and Department of Rural Economy Parana State - www.agricultura.pr.gov.br/modules/conteudo/conteudo.php?conteudo=74 - access on Feb 10, 2017; (D) - Embrapa Estimates, Secretariat of Management and Institutional Development - SGI.

IMPACT

Society and the Environment



Photo: Daniel Derevecki

This measures social and environmental impacts for which economic impact estimates are not available, as well as cultivars whose economic impacts are listed in the previous table. The qualitative methodologies Ambitec-Social and Ambitec-Agro were used. Besides the economic impact, the table includes the Internal Rate of Return (IRR) and social and environmental impact indices of the technologies, which can range from -15 to +15, obtained in accordance with the perception of a sample of producers that adopted each technology.

Project Araucaria Roads increases the income of small producers, stimulates rural tourism and contributes to the environmental protection

The *Araucaria angustifolia*, known as Araucaria, Brazilian pine or Parana pine, is the species symbol of the southern region of Brazil. However, its intensive exploitation for decades, coupled with deforestation for agricultural expansion, caused strong population decline of the species. Along with it, several species of animals dependent on its pine nuts for the winter have become equally threatened. The solution found by Embrapa to this problem was to stimulate familiar producers of the states of Parana and Santa Catarina (area of occurrence of this species), with the support of public and private institutions of the region (state departments, institutes, universities and rural extension) to plant seedlings of Araucaria on the side of their properties along the roads. From the planting of 200 seedlings they receive BRL 5.00 for each, totalling an income of BRL 1,000 per year. The payment

for environmental services is carried out by the Group DSR-Solutions and Logistics Intelligence, which acquires the carbon sequestered by the trees to offset greenhouse gas emissions. That payment takes place annually until the trees fully completed their development in 15 years, when they will produce pine nuts that, marketed, maintains financial gains with the project. In addition to income to the producers, this work promotes the creation of green corridors alongside the roads, stimulates rural tourism and rehabilitation of ecosystems and increases tree populations for selecting genotypes for breeding programs at Embrapa. So far 68 rural properties in four municipalities were benefited with resources in the order of BR 300,000.

More information: www.bs.sede.embrapa.br/2016



Photo: Ivar Wendling

IMPACT

Society and the Environment

Technologies	Embrapa Units	Year of adoption
Green manure with black oats in mountain farming	Agrobiology	2011
Use of nitrogen-fixing forest leguminous in recovery of degraded areas	Agrobiology	1992
100% plant compost	Agrobiology	2014
Adding value to sweet potato crops in Rio de Janeiro state by introducing the Beauregard biofortified variety	Food Agroindustry Alimentos	2013
Consortium of green manures with maize culture in indigenous communities of Mato Grosso do Sul	Agriculture Western	2012
BRS Esmeralda upland rice cultivar	Rice and Beans	2013
BRS Estilo carioca type bean cultivar	Rice and Beans	2010
BRS Esteio commercial black bean cultivar	Rice and Beans	2014
BRS Pampa irrigated rice cultivar	Temperate Agriculture	2012
Technological innovations for the production system of pupunha and the palm heart's agri-food industry in the coast of Parana state	Forestry	2000
Biodigester septic tank	Instrumentation	2001
Electrostatic pneumatic spray nozzle to increase the efficiency of agrochemical application	Environment	2015
Embrapa Sisteminha: integrated food production	Mid-North	2013
BRS Tumucumaque cowpea cultivar	Mid-North	2014
BRS 310 hybrid grain sorghum seed	Maize and Sorghum	2005
BRS 1010 hybrid maize seed	Maize and Sorghum	2003
Mini dams for the containment of surface rain water	Maize and Sorghum	1996
Sara: Software for analysis of risk of parasitic and anthelmintics resistance in sheeps	Southeast Livestock	2014
Biodiversity and ecological transition of family farmers	Genetic Resources and Biotechnology	2010
Pollinators of cotton in Brazil	Genetic Resources and Biotechnology	2011
BRS Tracaja soybean cultivar	Roraima	2004
Cowpea production system with BNF adoption in Roraima croplands	Roraima	2006
Agroforestry systems (SAF's)	Roraima	2015
BRS 284 soybean cultivar	Soybean	2010
BRS 360RR soybean cultivar	Soybean	2013
BRS Parrudo wheat cultivar	Wheat	2013

	Impact Social	Impact Environmental	IRR %
	na	6.66	na
	na	na	7.35
	5.29	5.73	na
	na	2.04	na
	1.53	1.35	na
	0.38	0.03	28
	0.30	0.38	43
	0.36	0.21	na
	na	na	82.00
	7.27	1.56	72.90
	1.56	0.23	na
	1.89	1.69	na
	2.15	0.68	na
	0.14	-0.01	na
	na	1	35.42
	na	0.44	38.13
	3.86	1.48	na
	1.05	1.49	na
	2.96	1.98	na
	0.53	1.44	na
	1.31	0.69	18.67
	0.76	-0.42	20.3
	1.55	-0.46	na
	1.84	1.08	23.67
	1.85	1.09	na
	0.16	0.19	6.37

IMPACT

More jobs



Photos: Octavio Rossi de Moraes

Estimates of new jobs that were created in 2015 by farmers who adopted the technological solutions generated by Embrapa, in many segments of production chain; it only measures additional jobs in comparison with the previous year.

Route of the Lamb program organizes the production of sheep and goats and generates more employment and income in Northeastern Brazil

The creation of goats and sheep is one of Brazil's most traditional activities, but still faces many problems. Among them are the lack of organization and information of producers about production processes and commercialization of these animals, lack of slaughter inspection and difficulty of access to markets. To address these issues Embrapa Goats and Sheep, in partnership with the Ministry of National Integration (MI), proposed in the 2011 the Route of the Lamb Program targeting the organization of producers, together with a plan of innovation. The first pilot project of this program was implemented in the municipality of Taua (CE), with MI assistance and participation of partner institutions. For this there was the initial registration of 240 producers, who have received a Collective Termination Center of

Goats and Lambs with areas for confinement, fodder production, training of technicians and producers, and joint marketing of products. In addition, the producers were encouraged to create a monthly fair for marketing of animals. Add to these benefits the installation of two Technical Reference units aimed at monitoring the zootechnical results and economic benefits, showcasing technologies and prospect for demands. The result of this work was the expansion of the program in various states (Ceara, Minas Gerais, Pernambuco, Bahia and Rio Grande do Sul) involving 3,000 producers in an area of 200,000 hectares, in addition to become a reference for other similar initiatives in the country.

More information: www.bs.sede.embrapa.br/2016



IMPACT

More jobs

Technologies

Management of native floodplain assai palm groves for fruit production

New banana tree cultivars for Amapa state

Bragantino food production system

Fungicide application on the axil of the second leaf of banana plants to control Black Sigatoka

Intensive tambaqui production in excavated tanks

BRS Para assai palm cultivar

Productivity Trio

Management of native assai palm groves

BRS Estilo carioca type bean cultivar

BRS Esmeralda upland rice cultivar

BRS Esteio commercial black bean cultivar (*Phaseolus vulgaris* L.) - BRS Esteio

Confinement lamb finishing

Vermin control for goats and sheep in the Semi-Arid region

Agrosilvopastoral production system for the Caatinga region

SisEucalipto - Software for managing and precision management of eucalyptus plantations

Severe frost-tolerant *Eucalyptus benthamii*

Embrapa's Technological Information Agency - Ageitec

BRS 1010 hybrid maize seed

Production techniques applied to the extensive beef cattle production system in Pantanal region

BRS Estribo Sudan grass cultivar

Assisted introduction of the Booroola gene in sheep flocks

Campo Limpo selective chemical herbicide applicator

BRS Tracaja soybean cultivar

Cowpea Production System with BNF adoption in Roraima croplands

Integrated mango production

Integrated table grape production

Cassava chips

Embrapa 051 freerange laying hen

Embrapa MS115 boar

Total

Embrapa Unit	Unit of Measurement	Jobs
Amapa	Hectare	4,000
Amapa	Hectare	240
Amapa	Hectare	400
Western Amazon	Hectare	21
Western Amazon	Hectares of water surface	50
Eastern Amazon	Hectare	3,983
Eastern Amazon	Hectare	100
Eastern Amazon	Hectare	172
Rice and Beans	Hectare	684
Rice and Beans	Hectare	696
Rice and Beans	Hectare	36
Goats and Sheep	Hectare	274
Goats and Sheep	Head	600
Goats and Sheep	Head	100
Forestry	Hectare	60
Forestry	Hectare	210
Agricultural Informatics	na	2,297
Maize and Sorghum	Hectare	396
Pantanal	Hectare	488
South Livestock	na	12
South Livestock	na	10
South Livestock	na	12
Roraima	Hectare	24
Roraima	Hectare	424
Semi-Arid	Hectare	9,119
Semi-Arid	Hectare	13,122
Semi-Arid	Hectare	5,255
Swine and Poultry	na	408
Swine and Poultry	Head	36
		43,229

Recognition from society in 2016

63 awards and honours

In 2016, Embrapa's researchers, products, actions, and projects received 63 prizes and honours: 17 international, 6 national, 16 scientific, and 24 regional awards.

17 International Awards

- » **Technology transfer award 2016**, granted by the United States Agricultural Research Service (ARS) to researchers of Embrapa Genetic Resources and Biotechnology, Arthur Mariante, Eduardo Cajueiro and Samuel Paiva.
- » **French-Monar Latin American Award**, granted by the American Phytopathological Society Foundation (APS, Florida, USA) to the PhD project of fellow Renan Macedo, guided by a researcher at Embrapa Rice and Beans, Murillo Lobo Junior.
- » **Certificate of good practices** delivered to Embrapa Temperate Agriculture researcher, Fernando Rogerio Costa Gomes, by the United Nations Food and Agriculture Organization (FAO).
- » **Plaque of recognition by the Protein Research Foundation (PRF)**, from South Africa, to Embrapa Soybean researchers, Norman Neumaier and Marcelo Fernandes de Oliveira.
- » **Medal of the University of Burgundy of France** granted to Embrapa Grapes and Wine by the Unesco Chair of Wine Culture and Traditions.
- » **New Talents Award**, low carbon livestock category, granted by the World Bank, Future Forum, Minas Gerais State Research Foundation (Fapemig), Goiás State Research Foundation (Fapreg) and Central Co-operative of Farmers of Minas Gerais (CCPR), to the scholar Patrick Basheer, guided by Fabiana Villa Alves, researcher of Embrapa Beef Cattle.
- » **First place prize in the "Teaching, dissemination and transfer of technology" session**, of the Latin American Meeting of Rizobiologia (Relar), granted to the poster of Andre Mateus Prando, Arnold Barbosa

and Mariangela Hungria, researchers of Embrapa Soybean, and the extension workers from Emater, Fernando Teixeira de Oliveira and Nelson Harger.

- » **Best Posters of Public Health and Ethnopharmacology Session** of the VIII Ibero-American Symposium on Medicinal Plants and III Iberoamerican Symposium on Cancer Research, to Fernanda Ilkiu-Borges and Silvana Tavares Rodrigues, researchers of Embrapa Eastern Amazon.
- » **Ivo Giolito Award**, received by Marcelo Lazzaroto, from Embrapa Forests, in the X Brazilian Congress and IV Pan American Congress of Thermal Analysis and Calorimetry.
- » Selection of the project "Pupunha palm heart in family agriculture" by the United Nations Food and Agriculture Organization (FAO) to integrate its **platform of "Good practices for sustainable development"**.

6 National Awards

- » **Tribute by the Brazilian Association of Climatology (ABCLima)** to the researcher Eduardo Assad, of Embrapa Agricultural Informatics.
- » **Merit Award ABCZ** offered by the Brazilian Zebu Breeders' Association (ABCZ) to a researcher of Embrapa Satellite Monitoring, Evaristo Eduardo de Miranda.
- » **Honorable Mention of the Peter Muranyi Award** to the researcher of Embrapa Instrumentation Marcos David Ferreira granted by the Foundation of the same name.
- » **Von Martius Sustainability Award**, in the category, Technology to the project "Planting Waters", coordinated by the NGO *Iniciativa Verde*, together with Embrapa Instrumentation.
- » **Title of Doctor Honoris Causa** granted by Federal University of Reconcavo of Bahia to the retired Embrapa Soils researcher Paulo Klinger Tito Jacomine.
- » **Dalmo Catauli Giacometti Award**, assigned to the

retired researcher from Embrapa Grapes and Wine, Umberto de Almeida Camargo, in the IV Brazilian Congress of Genetic Resources.

16 Scientific Awards

- » **Award for Best Dissertation in Animal Production**, awarded by Northeastern Society of Animal Production (SNPA) at the XXV Latin American Congress of Livestock to animal science student Ana Claudia Alves Primo, directed by researcher Henrique Antunes de Souza, of Embrapa Goats and Sheep.
- » **First place in category Dissertation of Abrapcorp Award of Theses and Dissertations 2016**, granted by the Brazilian Association of Researchers of Organizational Communication and Public Relations to the analyst Joanicy Brito of Secretariat of Communications - Secom.
- » **ANCIB Award of Theses and Dissertations**, received by the analyst of Embrapa Satellite Monitoring Daniela Maciel Pinto, from the National Association for Research and Graduate Studies in Library and Information Science (ANCIB).
- » **Capes Award** to Ph.d. thesis of Priscilla da Silva Delabona, guided by the Embrapa Instrumentation researcher Cristiane Sanchez Farinas.
- » **Vale-Capes Award of Science and Sustainability** to master's thesis defended by Alfredo Augusto Pereira Xavier, guided by the researcher Deborah Marcondes, of Embrapa Instrumentation.
- » **Honorable Mention in the III Brazilian Congress of Rochagem (CBR)** granted respectively to researchers Clenio Nailto Pillon, of Embrapa Temperate Agriculture, and Eder de Souza Martins, of Embrapa Cerrados.
- » **Award for Best Technical Report**, granted by the Brazilian Embryo Technology Society (SBTE) to Pedro Henrique Nicolau Pinto, guided by Embrapa Goats and Sheep researcher Jeferson Ferreira da Fonseca.
- » **Prize for best work in the 2014-2016 period** by the magazines *Planta Daninha* and *Revista Brasileira de Herbicidas* to the researcher of Embrapa Soybean Dionisio Gazziero.
- » **Angelo Moreira da Costa Lima and Future of Earth Awards**, granted respectively by the Entomological Society of Brazil (SEB) and Rio Grande do Sul State Research Foundation (Fapergs) with the newspaper *Jornal do Comercio*, to the researchers Ricardo Antonio Panizzi, of Embrapa Wheat, and Jamir Luis Silva da Silva, of Embrapa Temperate Agriculture.
- » **Featured Work Award of the Subcommittee for Improvement, Industrial Aptitude and Seeds** of the 10th Meeting of the Brazilian Commission of Wheat and Triticale (RCBTT) awarded to researchers at Embrapa Trigo, Edina Regina Moresco, Joaquim Soares Sobrinho and Marcio So e Silva.
- » **Best full paper of the 7th Edition of the Brazilian Workshop of Agile Methods (WBMA)**, by Agile Alliance Brazil to the analyst Isaac Vacari of Embrapa Agricultural Informatics.
- » **Best work in the area of mass spectrometry** assigned at the 18th Meeting of Analytical Chemistry, to the pos-doc scholar Aline Fernandes, in partnership with the researchers Ana Rita Nogueira (Embrapa Southeast Livestock), Kevin Kubachka and Joseph Caruso (University of Cincinnati) and Julio Landero (FDA).

24 Regional Awards

- » **Chico Mendes Award** in the category State initiative, awarded by Elias Mansour Culture Foundation (FEM) to the Head of Embrapa Acre, Eufan Ferreira do Amaral.
- » **Medal of Merit** granted by the Regional Council of Engineering and Agronomy of Acre and Mutual/AC to Embrapa Acre.
- » **Water Guardians Trophy**, delivered by the Regulatory Agency for Water, Energy and Sanitation of the Federal

- District (Adasa) to the researcher from Embrapa Cerrados, Enoch Furquim Werneck Lima.
- » **Comenda Centenary of Joao Simoes Lopes Neto**, assigned to the researcher at Embrapa Temperate Agriculture Luis Eduardo Correa Antunes, by the Pelotense Academy of Letters (APL).
 - » **Seal of Accessibility, Silver category**, delivered by the Municipal Council of Persons with Disabilities and the city of Sobral to Embrapa Goats and Sheep.
 - » **Senator Nilo Coelho Medal**, given to researchers Jorge Ribaski, of Embrapa Forests and Lucia Helena Piedade Kiil, Marcos Antonio Drummond and Saulo de Tarso Aguiar, of Embrapa Semi-Arid, by the city of Petrolina (PE).
 - » **Comenda Felisberto Camargo**, delivered by the Brazilian Association of Sindhi Breeders to Rosangela Silveira Barbosa, researcher from Embrapa Semi-Arid.
 - » **Honour of the Legislative Assembly of the State of Mato Grosso do Sul**, in partnership with the Regional Council of Veterinary Medicine of Mato Grosso do Sul, to researchers of Embrapa Beef Cattle Rodrigo Gomes and Fabiana Alves.
 - » **Honour from the City of Campo Grande Legislature** for Embrapa Beef Cattle, in commemoration of its 39 years of existence.
 - » **Commemorative Plaque of the II Seminary Soil and Water** delivered to the researcher from Embrapa Satellite Monitoring, Evaristo Eduardo de Miranda, by the Corporation of Development of the Valleys of San Francisco and of Paranaiba (Codevasf).
 - » **Tribute to Embrapa Soybean**, granted by the Londrina Convention and Bureau at the First Meeting of Tourism Ambassadors.
 - » **Diploma of Legislative Merit of Honour**, awarded by City of Dourados Legislature (MS) to the analyst at Embrapa Western Agriculture Gessi Ceccon.
 - » **Diploma of Legislative Merit of Honour**, by the Mato Grosso do Sul State Legislature, to the researcher Marciana Retore of Embrapa Western Agriculture.
 - » **Title of Meritorious Citizen** assigned by the City of Dourados Legislature (MS) to the researcher from Embrapa Western Agriculture Milton Parron Padovan.
 - » **Prize at the 26th Congress of Animal Husbandry**, category Ruminants Production and Nutrition, received by the doctoral candidate Gisele Aparecida Felix, along with researchers Ubiratan Piovezan and Urbano Gomes Pinto de Abreu, of Embrapa Pantanal.
 - » **Comenda of Merit Fapeal**, granted by Alagoas State Research Foundation (Fapeal) to the researcher Antonio Dias Santiago, of Embrapa Coastal Tablelands.
 - » **Agronomist of the Year Award**, received by the Head of Embrapa Coastal Tablelands, Manoel Moacir Costa Macedo, by the Association of Agronomists of Sergipe (AEASE).
 - » **The Best of Agribusiness in 2016 Award**, category Revelation of Agribusiness of the Year, awarded by the Rural Union of Castanhal (PA) to Embrapa Eastern Amazon analyst Joao Paulo Castanheira Lima Both.
 - » **Tribute to Embrapa Southeast Livestock** at the opening of the Agribusiness Coopercitrus Fair (Fea-coop), in Bebedouro (SP).

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