

Underspending on irrigation in Brazil

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From the World Bank's BOOST data, we have identified significant underspending in the agriculture sector as a concern across the globe, particularly in irrigation. In a series of briefs, we explore why irrigation spending fell short of budgeted allocations in five countries and how this affected outcomes. Here we examine irrigation spending in **Brazil** over seven years, from 2010 to 2016, and review information on nonfinancial performance on the period covered by the last multi-year plan: 2012-2015.

Extent and nature of deviations of the irrigation budget

By all measures, the data suggest the federal government's irrigation budget in Brazil was significantly underspent every year over the period 2010-2016.

Table 1: Deviations of the federal irrigation budget, 2010-2016 (R\$ million, unless otherwise specified)

Year	Budgetary expenses			Expenditure Arrears			Deviation 3*
	Approved (Inicial)	Paid (Pago)	Deviation 1*	Registered (RP inscrito)	Paid (RP pago)	Deviation 2*	
2010	635.3	155.3	-75.6%	530.0	292.4	-44.8%	-29.5%
2011	561.5	133.7	-76.2%	574.7	222.3	-61.3%	-36.6%
2012	627.2	146.1	-76.7%	511.1	166.4	-67.4%	-50.2%
2013	830.5	123.7	-85.1%	563.4	172.6	-69.4%	-64.3%
2014	587.2	128.1	-78.2%	610.1	227.4	-62.7%	-39.5%
2015	401.9	80.4	-80.0%	628.0	191.5	-69.5%	-32.3%
2016	329.0	98.9	-69.9%	428.7	120.3	-71.9%	-33.4%

* Deviation 1 looks at percent difference in annual budgetary expenses, deviation 2 in paid arrears compared to registered arrears (excluding those that have yet to be processed), and deviation 3 in actual expenditure including arrear payments compared to the approved budget.

Source: World Bank BOOST database; Brazil's *Painel do Orçamento Federal*.

The basic data: For our analysis we used figures from BOOST.¹ And, we double-checked and made sure these numbers matched up with those recorded in the comprehensive budget database maintained by Brazil's Ministry of Planning, [Painel do Orçamento Federal](#).²

Accounting for arrears: The basic figures from these databases do not account for arrear payments, made against commitments carried over from previous years. As expenditure arrears can be huge in

¹ In BOOST we examined subfunction "607 - Irrigation" in function "20 - Agriculture"; spending on this subfunction is also recorded in "18 - Environmental Management" and in "28 - Special Charges", but irrigation expenditures in both of these latter functions are small and account for less than 0.5% of the budget altogether.

² The Federal Budget Panel's database reports on the lion's share of irrigation spending via the program "2077 - *Agropecuária Sustentável*" (Sustainable Agriculture) and the objective "0175 - complete implementation, improve management, recover and modernize existing public irrigation projects." We recognize that other irrigation goals and expenditures on irrigation may be listed under different programs, but they appear to constitute a very small proportion (< .1% of expenditures) of irrigation spending and are not considered in our analysis.

Brazil, many budget analyses focusing on the country add arrear payments to yearly budget execution.³ This provides a more complete picture of the funds that are spent each year, especially for programs like irrigation, in which arrear payments represent more than half of financial transactions each year.

Accordingly, we look at irrigation budget deviations from three different angles: 1) between annual allocation and spending, 2) between registered and paid arrears, and 3) between actual expenditures including arrear payments against the approved budget.⁴ In all cases, percent deviations are negative and large.⁵ The data on expenditure arrears are supplemented from [SIGA Brasil](#) – an information system on the federal public budget that allows wide and easy access to the data of the Integrated System of Financial Administration and to other databases, available through the Senate website.

Where is the underspending? The data suggest that the capital budget accounts for much of the underspending in irrigation over the period 2010-2016. Excluding arrears, the category on investments was underspent by an average of 86%, losing 26 percentage points as a share of expenditure versus its share of the irrigation budget. Including arrears, it was underspent by an average of 48% and lost seven percentage points. Within the capital budget, capital transfers to the federal district, states and municipalities – which on average accounted for 20% of the total irrigation budget – were especially underspent, with an overall execution rate of less than 1% excluding arrears and of 20% including arrears. It is difficult to break down the budget further by economic classification, however, as the majority of the irrigation budget – 98% of the recurrent budget and 78% of the capital budget – is coded as “90 - Direct Applications”, which simply denote spending incurred by the budgetary unit (as opposed to transfers to other institutions).

Looking at administrative classification, BOOST data shows that the Ministry of National Integration is responsible for federal irrigation spending.⁶ Within this ministry, underspending was common across all departments but exceptionally large for general administration – where almost all of capital transfers are. In contrast, São Francisco and Parnaíba Valleys Development Company – which was responsible for 75% of recurrent expenditures in the subfunction – was increased as a share of irrigation budget in all 7 years. The pattern was less consistent for National Department of Drought Works, which was relatively overspent in 3 of the years assessed.

³ Arrear payments are not included in our BOOST analysis, mainly because it is a cross-country assessment and it would not be feasible to identify and resolve similar idiosyncrasies that exist in other countries. This is also the approach that PEFA takes in its assessment. “Considering that the purpose of an annual budget is to state the Government’s policy intentions for a given year, it may be argued that the results presented in Table 5 [i.e., excluding actual expenditures against carry-overs] are more relevant to assessing the Government’s ability to implement the budget as approved in any one year (page 22, <http://www.pefa.org/node/2511>).”

⁴ Approved budgets include expenditures that have been committed but not fully paid in previous years, but not those that are being processed. Unfortunately, arrears are not separated from new resources in approved budgets. We consider registered arrears to be programmed arrears in this brief.

⁵ The figures used in this brief include intra-budgetary operations, which are excluded in BOOST. They make negligible differences, amounting up to 1.3% for the approved budget, 4.8% for the executed budget, and 0.9 percentage points for the deviation (annual budgets only) in irrigation. BOOST also excludes debt amortization and refinancing, none of which is in the irrigation budget.

⁶ The ministry is called Ministry of Regional Development in the Panel; we assume they are the same, however, given the identical 5-digit code (53000). A small part of irrigation budget was also under the Ministry of Agriculture in 2012, but it was negligible at less than 0.1%.

Linking budget execution and nonfinancial target performance

For the irrigation sector

We looked at the government's main planning document. [Multiannual Plan, Plano Plurianual \(PPA\)](#), is prepared every 4 years and defines a set of priorities that guide the formulation of the annual budget. It also provides information on indicators for each program and goals for each objective. Irrigation budget in the current PPA serves the objective 0175, which is further broken down to 3 goals listed in Annex I: "009Z - implement 30 public irrigation projects," "00A5 - revitalize 46 irrigation infrastructures and support the transfer of management," and "00A8 - transfer the management of 5 public irrigation projects to the producers."

Brazil's Ministry of Economy, responsible for the monitoring and evaluation of PPA, also reports on the performance of each thematic program. Generally, they compare cumulative achievement in each year against the 4-year targets. The 2016 annual evaluation report notes that:

- For irrigated agriculture, there was "an increase of 199,000 hectares of area irrigated by private initiative."⁷ The report suggests that the government is on track for the goal of integrating 1.5 million hectares (04A4, under objective 1049), as it is consistent with the trend observed in the previous PPA. (page 272)
- For the implementation of public irrigation projects (009Z), investments were prioritized for the works that are ready to be completed by 2018. Part of the irrigation infrastructure in Pontal was completed with 3,683 hectares, and the "on-farm" part remains. Also, there was a 15% increase in physical execution of the Marrecas-Jenipapo project. (page 273)
- For the revitalization of irrigation infrastructures (00A5) and transfer of management of public irrigation projects (00A8), information about achievement is not provided. Instead, it is noted that "the aim was to recover the irrigation infrastructures so that the projects could irrigate the entire planned useful area" and that the goal requires more than 4 years given the complexities involved in the process. (page 273)

Details for each program and objective are provided in the annex. Quantitative goals achieved until 2016 are zero for both 00A5 and 00A8, and 009Z is listed as a qualitative goal.

We also looked at the [2015 evaluation report](#), which concluded the previous PPA and included 4 indicators for the program "2013 - Irrigated Agriculture." The evaluation report notes that early on, there was some improvement in the first indicator "intensity of the use of irrigated agriculture infrastructure in public irrigation projects," which measures area in production as a share of area with implanted infrastructure. The share had risen to 62% in 2013-2014 from 59% in 2012 but fell to 55% in 2015; this decline is attributed to a drought (page 25). The report then explains that 3 other indicators – area equipped with infrastructure for use in irrigation, percentage of area harvested that applies irrigation techniques, and total irrigated area in Brazil – cannot be assessed due to issues with data collection (i.e., Census was not carried out).

⁷ Our analysis is based on Portuguese reports translated to English. We could not clarify why area irrigated by "private initiative" is considered as a part of the government target.

Program 2013 in the PPA 2012-2015 is divided into multiple objectives that include 23 goals, 20 of which are quantitative and listed in the Table of Goals for the program (page 33-37). According to the table, achievement over the PPA period was zero for 11 goals, and below 50% of planned targets for 4; above 50% for 3; and exceeded 100% for 2.

Table 2: Achievement rate of 2012-2015 PPA targets for program 2013 - Irrigated Agriculture

Objective	Quantitative goal (target in bold)	Achieved	Rate
0128 - Regulate the legal framework of the National Irrigation Policy, etc.	Register 100% of private sector irrigators	0%	0%
	Register and maintain the data of 100% of the irrigators of public irrigation projects	0%	0%
0163 - Improve irrigation and credit policies aimed at expanding the irrigated area, etc.	Provide R\$ 4 billion for lines of credit for irrigated agriculture	R \$ 3.3 billion	82%
0171 - Promote and strengthen the research, technological development and innovation aimed at irrigated agriculture	Consolidate 4 research networks and technology transfer in irrigated agriculture (e.g., water & agriculture, vegetables)	1 network	5%
	Contract 30 incremental studies on different topics related to the development of irrigated crops, methods and systems of irrigation and drainage	31 studies	103%
	Implement 25 demonstration projects in irrigation and drainage	15 projects	60%
0175 - Complete the implementation of the necessary steps to make feasible the production of existing public irrigation projects, revitalize the infrastructures for common use and promote the exploration of areas already established in accordance with environmental legislation for the transfer of management	Finish the infrastructure to expand the irrigated area to 148,920 ha	26,844 ha	18%
	Build infrastructure to support production in 44 public irrigation perimeters	0 perimeter*	0%
	Implement land regularization of 61 public irrigation projects	7 projects	11%
	Obtain the environmental compliance of 61 operating perimeters	43 areas	70%
	Revitalize the infrastructures of common use that attend 117,234 ha	0 ha	0%
	Transfer management of 18 public irrigation perimeters	1 area	6%
0176 - Promote training for irrigated agriculture in partnership with governmental, non-governmental institutions and private initiative	Train 20,000 irrigators for the application of irrigation and drainage techniques	0 irrigator	0%
	Train 4,000 higher level professionals	0 professional	0%
	Train 6,000 middle-level professionals	0 professional	0%
0180 - Promote Technical Assistance and Rural Extension (ATER)	Provide ATER services in the areas of irrigated agriculture of 8,000 family farmers who fit into PNATER	0 unit	0%
	Provide ATER services to 30,000 small producers of public irrigation projects	42,960 producers	143%
0543 - Enable the administration, etc. to the production of social interest perimeters	Revitalize 40 enterprises of social interest	0 enterprise	0%
0544 - Promote the implementation of new projects for higher added value production	Extend irrigated area to 88,239 ha	0 ha	0%

0545 - Encourage the expansion of the use of potentially irrigable areas	Expand area irrigated by the private sector in 100% over the next 4 years	0%**	0%
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* The table notes that the evaluation of this goal is difficult, as its product fits in the activities related to other objectives.

** The table notes that achievement and its correlation with government actions cannot be quantified due to limited data.

More narrative analysis around nonfinancial target achievement over the previous PPA period is offered:

- The 2015 report highlights the conclusion of the goal “elaborate and approve the new legal framework of the National Irrigation Policy.” Many other accomplishments noted in the text are also those in legal or regulatory process and framework (e.g., establishment of working groups, forums, and committees), not listed in the table of goals. (page 26-27)
- The Marrecas-Jenipapo project is mentioned also in the report: “Some projects have not yet been completed but are in an advanced stage of execution. The Marrecas-Jenipapo project, for example, expected to be completed by the beginning of 2016, is at 63% execution. As soon as the budget and financial issues are resolved, the works must be resumed (page 28).” The project was not completed as expected, however, and its execution rate reached only 78% in 2016, as previously suggested.
- Other projects named in the report include those that were prioritized and contributed to the achievement of 26,844 hectares shown in the table above (i.e., started using irrigation for food production). There were only 7 such projects: Baixio de Irecê, Pontal Sul, Salitre, Várzeas de Sousa, Tabuleiros de Russas, São João, and Jacaré- Curitiba. 3 revitalization projects in “advanced execution” are also discussed: Bebedouro, Nilo Coelho, and Formoso. (page 28)
- For the objective 0176, the Table of Goals notes that all 3 goals were not prioritized in the implementation process. Provision of ATER services to family farmers was also not prioritized; and while the other goal regarding ATER was more than met, the number of small producers served each year was consistently reduced over the PPA period, from 14,371 in 2012 to 8,013 in 2015. The report notes that this was because “ATER’s hiring throughout the PPA was adjusted to budget availability.” (page 29 and 35-36)
- Low achievement rate for several goals is attributed to the complexities involved in the process of infrastructure projects in irrigation, which have implications on the time and cost required for their completion. In fact, the report concludes its section on program 2013 by noting that: “...most of the actions that contribute to the increase of the irrigated public area in the country require a reasonable period of time to be implemented because of the complexity they have, especially with regard to the construction and revitalization of irrigation infrastructures. Thus, several actions initiated in the PPA 2012-2015 will be concluded during the new PPA cycle (page 31).” Similar explanations are repeated in the 2016 report, as previously noted.

For selected projects

For a closer look we focus on the previous PPA and objective 0175, as (1) it is still in effect, (2) it seems to relate most directly to the indicators “area equipped with infrastructure for use in irrigation” and “total irrigated area in Brazil,” and (3) it has six goals (compared to 1 to 3 under other objectives).

Discerning impact: The relationship between the rates of budget execution and target achievement is difficult to build at the project level, largely due to lack of nonfinancial data. Volume 3 of the annual evaluation report and the Panel show that available resources in 2015 were used mainly to complete implementation of infrastructures in Baixio de Irecê, Pontal, and Salitre. Together, these initiatives were executed at a total of R\$ 19 million, or 33% of their approved budget (excluding arrear payments), in 2015. In contrast, no payment was made for 17 of 27 initiatives under the same objective, and 6 other initiatives together spent R\$ 1 million, or merely 5% of their budget. Project 12OB - *Transferência da Gestão de Perímetros Públicos de Irrigação* was the only other initiative for which budget execution was relatively significant, both in its size (R\$ 7 million) and in terms of the rate (31%).⁸

The three projects that were completed in 2015 accounted for 12,911 ha of 26,844 ha, or 48% of the total hectares, that were achieved over the PPA period 2012-2015 under the goal to “finish the infrastructure to expand the irrigated area.” Unfortunately, targets for individual projects are not available. Assuming that all 7 projects that were prioritized and implemented achieved 100% of their targets, we find that their average underspending was smaller at 73% compared to 85% for 4 other projects that are highlighted as having advanced but not yet completed. Looking at the 11 projects together, we find that their total budget was underspent by 74% over the PPA period – compared to 81% for the total irrigation budget (all figures exclude arrears):

Table 3: Irrigation achievement and extent of budget execution: selected projects over 2012-2015 (in \$R million, unless otherwise specified)

Code	Project	Achieved	Approved	Paid	Deviation	Paid + arrears	Deviation (w/arrears)
<i>PRIORITIZED PROJECTS OVER THE PPA PERIOD</i>							
5314	Baixio de Irecê	4,723 ha	168.8	35.1	-79.2%	62.4	-63%
5260	Pontal Sul	3,588 ha	91.2	7.1	-92.2%	63.5	-30%
1692	Salitre	4,600 ha	161.0	62.7	-61.1%	118.2	-27%
5246	Várzeas de Sousa	4,100 ha	0.4	0.0	-100.0%	4.7	+1,075%
1017	Tabuleiros de Russas	3,101 ha	66.1	30.7	-53.6%	73.9	+12%
1670	São João	3,582 ha	0.5	0.0	-100.0%	0.6	+20%
1622	Jacaré- Curitiba	3,150 ha	4.1	3.0	-26.8%	16.9	+312.2%
<i>Subtotal for 7 projects</i>		<i>26,844 ha</i>	<i>492.1</i>	<i>138.6</i>	<i>-71.8%</i>	<i>340.2</i>	<i>-30.9%</i>
<i>Average for 7 projects</i>		<i>--</i>	<i>--</i>	<i>--</i>	<i>-73.3%</i>	<i>--</i>	<i>+185.6%</i>
<i>OTHER HIGHLIGHTED PROJECTS</i>							
12FT	Marrecas-Jenipapo	63% executed	54.9	17.2	-68.7%	39.2	-28.6%
5330	Bebedouro	58% revitalized	7.8	0.1	-98.7%	2.4	-69.2%
5354	Nilo Coelho	70% revitalized	51.9	6.5	-87.5%	43.6	-16.0%
5368	Formoso	78% revitalized	24.1	3.2	-86.7%	16.5	-31.5%
<i>Subtotal for 4 projects</i>		<i>n/a</i>	<i>138.7</i>	<i>27.0</i>	<i>-80.5%</i>	<i>101.7</i>	<i>-26.7%</i>
<i>Average for 4 projects</i>		<i>--</i>	<i>--</i>	<i>--</i>	<i>-85.4%</i>	<i>--</i>	<i>-36.3%</i>
Total expenditure for all 11 projects mentioned			630.8	165.6	-73.7%	441.9	-29.9%
Total expenditure for subfunction “607 - Irrigation”			2,446.7	478.3	-80.5%	1,236.1	-49.5%

Source: BOOST and 2015 PPA evaluation report

⁸ BOOST data is not discussed because it does not have information on objectives; but approved and executed amounts for each project match the Panel and PPA report.

Arrears also seem to play a significant role in project implementation and performance. During the PPA period, arrears payment represented at least 44% and sometimes 100% of financial transactions in each of the projects above. This is not surprising, given the reasoning provided for falling behind the goals related to construction and revitalization of irrigation infrastructures. While it is understandable that these projects take a long time to complete, it does not seem sensible that PPA targets are set without any consideration of these known complexities and requirements. It is also likely that this has negative implication on other goals in the irrigation sector, especially given the declining trend in federal investments, as priorities need to be adjusted over the PPA period based on the availability of resources. In fact, changes in prioritization were provided as the reason for lack of achievement for not only other objectives (e.g., to promote training) but also the goal to implement land regularization.

Conclusion: A need for greater transparency

Both BOOST and Brazil's transparency portals show that federal investment on irrigation tends to be heavily underspent, even after accounting for expenditure arrears. Due to lack of detailed economic breakdown, however, we are unable to identify any subcategory in the investment budget (other than capital transfers) that is particularly affected by underspending.

While budget documents assessed in our analysis offer some useful nonfinancial data, we also find that project-level data are lacking – especially regarding the targets. Questions relating to specific outputs for the irrigation program also remain, due to lack of information. Many explanations provided for failing to meet performance targets also suggest that poor planning of infrastructure projects is an issue, but these explanations are often too generic to really justify deviations in performance. Still, we find at least some evidence that financial issues have hindered some projects from being executed fully or at all. We also find that projects, highlighted as success stories and having contributed to realization of some goals (albeit still under the target), were on average underspent by less than the overall irrigation budget.

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Documents consulted

- BOOST database: <https://bit.ly/2IHYgZl>
- Federal Budget Panel: <https://bit.ly/2nBH8NJ>
- SIGA Brasil: <https://bit.ly/2fsdiEz>
- 2016-2019 multiannual plan and 2016 evaluation report: <https://bit.ly/2XeCGI5>
- 2015 evaluation report for the 2012-2015 multiannual plan: <https://bit.ly/35kChRH>