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**ENVIRONMENTAL REGULATION AND NATIONAL
DEVELOPMENT: THE ROLE OF THE BRAZILIAN
FEDERAL COURT OF AUDIT**

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ABSTRACT

Environmental regulation is a tool used by governments to correct market failures that lead the private sector to undervalue natural resources, and thus, cause its degradation. Those regulations usually impose burdens on businesses in a way that affects their competitiveness. But, if well designed, regulations can lead to innovation and efficiency in the use of natural resources. Decision makers have a range of regulatory principles to use in order to ensure that the system of environmental regulations is effective, proportionate, coherent, clear and implemented in a way that minimizes the burden on businesses and society at large. This paper explains how those principles should be applied through the regulatory cycle, and presents a proposal to the Brazilian Federal Court of Accounts to conduct evaluations in a way that contributes to assuring environmental regulatory quality.

Keywords: environmental regulation, regulatory impact analysis, regulatory quality.

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INTRODUCTION

Governments pursue national development as a way to improve and sustain the well being of the habitants of the country. A wide range of both economic and social indicators must be considered when national development is being measured. In Brazil, the improvement in employment rates and the reduction of income inequalities have been the main measures used by the federal government to assess the development of the country.

To achieve national development it is necessary that the resources of a country be managed well, including natural resources. If the positive economic growth is obtained along with environmental degradation, it may impose several costs to society. The degradation of the environment directly affects the welfare of the people, so that the welfare benefits of economic growth are at least in part undermined. The costs of environmental degradation are not evenly shared among groups in society. The poor may suffer a disproportionate share of the negative consequences of environmental destruction, whereas the wealthy are likely to obtain most of the short-run benefits of such destruction (López et al, 2006).

The environment is being pressured due to a “market failure”, where the costs of environmental resources are not properly considered. To minimize this problem, governments use a range of policy tools such as regulation. However, environment regulations can restrict activities and impose burdens on companies, as a result negative economic effects can occur, harming citizens welfare.

The dilemma of reconciling environmental protection with economic and social development has been observed in the audits conducted by Brazilian Federal Court of Accounts (TCU) in the past ten years, since the institution decided to continuously address the environmental performance of then federal government. Through the time, TCU has increased the value of its analysis, focused on environmental policies. This analysis goes beyond traditional audit approaches based on economy and efficiency to an analysis of

effectiveness, including the assessment of governance capacity for environmental public policies.

In the current organization chart, the Department of Environment and Agriculture is under the National Development Coordination. A challenge posed to the Department right now is to comprehend and report the contribution of environmental policies to national development.

TCU has been put a lot of effort into overseeing economic regulations, especially in the infrastructure and essential services sectors. The results of these analyses have been recognized by the society because they alter the costs to the consumer, to the consumer's benefit, and the quality of the services provided. However, few reports actually address the impacts of environmental regulation on business and, as a consequence, in national growth.

Environmental regulation usually imposes burdens on businesses in a way that affects their competitiveness. But on the other hand, if well designed, regulations can also be used as a tool to encourage businesses to develop greener products and services. Businesses can benefit from the certainty that regulation offers, which can, in some instances, lead to a better deal for consumers.

Thus, the main objectives of this paper is to discuss manners to assure environmental regulatory quality, and to present an opportunity to the Brazilian Federal Court of Accounts contribute to this process through its mandate.

In the first chapter, environmental regulation theory will be discussed along with best practices regarding regulatory quality. Then, the second chapter presents the principles of regulation adopted by the United States Government, and applied by the Environmental Protection Agency (EPA) in its regulatory matters, as well a summary of an audit conducted by the Government Accountability Office (GAO) on the Agency's use of the tool of regulatory impact analysis. Finally, we will discuss in chapter three how the theory of environmental

regulation and the US experience can be useful to develop an approach to regulatory analysis for the Brazilian Federal Court of Accounts.

1. ENVIRONMENTAL REGULATION

1.1 Economics and the environment

Environmental problems can be approached through an economic perspective. According to economic theory, market systems generate pollution and degrade the environment because many natural inputs into the production of goods and services such as air and water are underpriced. Because these resources aren't owned, in the absence of regulation or legal protection for the victims of environmental degradation, businesses will use them up freely, neglecting the external costs imposed on others, generating a negative externality. An externality occurs when the activity of a person or firm directly affects the welfare of another in a way that is not reflected in the market price (Rosen and Gayer, 2014).

According to Jacobs (2012), the "natural capital" has been undervalued both in economic theory and practice because it has been largely unpriced, provided as an apparently free gift of nature. Many of the environment's functions occur as common or collective goods without property right, which is a different behavior than other factors of production; therefore, the private incentive to value them properly in economic terms is absent.

This situation is described by economics as a "market failure" (Jacobs, 2012). Markets fail when they do not take into account the full value of the activities within them. The production and consumption decisions that economic actors take are distorted, as a result, relative to those they would take if the environment were properly valued. As a consequence, natural resources tend to be over-exploited, and ecosystems that provide valuable services, such as wetlands and forests, are allowed to be degraded, or destroyed. Resources are used inefficiently, with an excessive generation of waste and pollution. And

the amenity, health and cultural value of natural environments are under-appreciated (Jacobs, 2012).

Actually, society recognizes that the environment acts as a form of capital in three ways: it provides resources, it assimilates wastes, and it performs various “environmental services”, which sustain life, including climatic regulation and ecosystem health.

An emerging theory in economics called “green growth” (Jacobs, 2012) argues that current patterns of economic growth are *prima facie* sub-optimal. They misallocate resources between the different factors of production. They under-invest in natural capital, and over-invest in activities that cause its degradation. If these systematic market failures were corrected, growth might be higher. Indeed, in many countries the environmental costs of using natural resources are not just underpriced, but their exploitation is actually subsidized. Such subsidies further distort production and consumption decisions away from their optimal path (Jacobs, 2012).

Governments can use a range of policy tools, including regulation, to support a transition to a green economy. The Organisation for Economic Co-operation and Development (OECD) uses the term regulation to refer to the diverse set of instruments by which governments set requirements on businesses and citizens. Regulations include laws, formal and informal orders and rules of subordination issued by all levels of government, and rules issued by non-governmental or self-regulatory bodies, to whom governments have delegated regulatory powers. Regulations fall into three categories:

- Economic regulations: to intervene directly in market decisions such as pricing, competition, market entry or exit.
- Social regulations: to protect public interests such as health, safety, the environment, and social cohesion.

- Administrative regulations: administrative formalities through which governments collect information and intervene in individual economic decisions (OECD, 1997).

Environmental regulations, which are the focus of this paper, can restrict activities and impose changes in people's and companies' behavior and technology. The economic effects of environmental regulations may be secondary concerns or even unexpected, but can be substantial. Environmental regulations affect private sector areas such as industry, services, retail, and wholesale commerce based on the environmental impact they cause.

To set regulations or even adopt other non-regulatory approaches to improve environmental performance of private sector, policy makers need to understand the environmental impacts associated with the activities undertaken by each sector. The following are the main areas subject to environmental regulations:

Use of toxic substances – toxic substances are characterized by the potential of causing serious harm to human health, health to other living things, or environment. Unacceptable harm ought to be prevented, rather than compensated. The regulation of toxic substances exposes some of the hardest problems in risk-assessment and risk-management, which are the harm-causing potentials of human activities are shrouded in uncertainty, difficult to assess and expensive to reduce (Percival et al, 2013).

Air pollution control – the ultimate source of air pollution problems are heavily rooted in the combustion of fossil fuels for energy in electrical generating units, automobiles and industries. Governments require a complex set of regulatory approaches to manage diverse harmful substances, from different sources of air pollution. These approaches are based on the establishment of sectorial technology-based standards and emissions limitations.

Water quality – The sources of water pollution are diverse. In addition to point sources- polluted runoff from agriculture, urban areas, logging operations and mines-

nonpoint source pollution also comes from cross-media transfers, like the deposition of air pollutants such as mercury and nitrogen into waters. Governments can impose controls of discharge from point sources and set up standards for treatment of industrial wastewater, and other water quality based controls.

Waste management and pollution prevention – Regulatory policy has been used to influence practices and to mitigate environmental contamination. Waste is generated by virtually every entity at nearly every stage of extraction, production and consumption process of goods. Because all pollution is a form of waste, whatever affects the generation and management of waste affects the nature and scope of pollution problems (Percival et al, 2013).

Natural resources exploitation – specific sectors based on natural resource exploitation, such as oil and gas, forestry, fisheries, water management and mining, are bounded by specific regulations. Usually the exploitation of natural resources is conditional, and based on environmental licenses and permits and a variety of management rules.

Land use – land use patterns influence the severity of water and air pollution problems, the health of ecosystems and its biodiversity, and overall quality and amenity of human life. For those reasons, governments regulate land use in a way that affects private real state use. Zoning regulation, building codes and the establishment of permanent protected areas inside private property are some of the existing tools (Percival et al, 2013).

Rosen and Gayer (2014) explain that the traditional regulatory approach to environmental regulation is based on command-and-control regulations. These policies require a given amount of pollution reduction or other environmental mandates, with limited or no flexibility, with respect to how they may be achieved. A technology standard is a command-and-control regulation that requires firms to install or adopt a certain technology to clean up their emissions or change any environmental impact. Firms are violating the law if

they reduce environmental impact through any other means, no matter how effective these other means might be. A technology standard provides firms no incentive to look for cheaper ways to improve environmental performance. A performance-standard is a type of command-and-control regulation that sets environmental goals for each firm. The firm frequently has the flexibility to meet this standard in any way it chooses, so this type of regulation can be more cost-effective in some cases (Rosen and Gayer, 2014).

Incentive-based regulations provide polluters with financial incentives to reduce pollution. Emissions fees and cap-and-trade systems¹ are examples of this kind of regulation. This approach allows polluters considerable flexibility in how to reduce their emissions. This approach increases the opportunity cost of polluting, forcing polluters to take into account the marginal external damages associated with their behavior. An incentive-based approach is possible only if emissions or other kinds of environmental performance can be monitored. When it's impossible or very expensive to keep track of emissions, a technology standard might be more efficient, because it is relatively easier to monitor whether a firm has installed a technology (Rosen and Gayer, 2014).

According to Dechezleprêtre and Sato (2014), the conventional business perspective suggests that environmental regulations damage the economic performance of regulated industries because they increase production costs, leading to lower productivity or profitability. They argue that:

Proponents of this view suggest that polluting industries in open economies will tend to gravitate towards regions with lenient environmental policy. In the short term, uneven environmental regulations could lead to reduced exports from regions with relatively ambitious policies. If businesses believe that some countries will always have more stringent environmental regulations, they may move manufacturing capacity to countries with relatively lax policies in the long run. These concerns are as old as environmental regulations themselves (Dechezleprêtre and Sato 2014).

¹ In a cap-and-trade system the government sets the level of aggregate emissions, emission allowances are distributed to polluters, and a market is established in which allowances may be bought or sold (EPA, 2014).

The Harvard Professor Michael Porter articulated an alternative view. Porter (1995) argues that regulation, properly conceived, does not necessarily drive up costs. Environmental regulations can, on the other hand, lead private firms and the economy, as a whole, to become more competitive internationally by providing incentives for environmentally friendly innovation that would not have happened in the absence of policy.

Although the focus of this research is regulation enforced by governments, it is recognized by worldwide experience that there is other appropriate responses to the combat the depletion of natural resources, such as collective action arrangements, privatization, market forces and liability systems (Percival et al, 2013). Alternative options to regulation should always be addressed in the phase of seeking alternative solutions to environmental problems.

For instance, market forces can respond more quickly and are more flexible than government regulations in discouraging consumption of products that cause environmental damage. But, markets are only effective when consumers are sufficiently well informed about the link between a product and environmental damage, in order to induce the marketing of less damaging substitutes. In this case, the government, through regulatory legislation, can require information disclosure from the companies about their activities (Percival et al, 2013).

1. 2 The regulatory cycle

According to OECD (2012), the regulatory policy defines the process by which a government, when identifying a policy objective, decides whether to use regulation as a policy instrument, and proceeds to draft and adopt a regulation through evidence-based decision-making.

The regulatory cycle, or process, is the arena in which a law is translated into policy, and it involves at least three stages: Planning/design, implementation/enforcement and evaluation/ review.

As a primary concern, governments need to determine what activities warrant regulatory attention due to their potential to cause harm. Society is willing to accept risks because the actions that involve the risks also provide benefits. Since it is impossible to eliminate all risk, regulators attempt to focus regulatory activity on the most significant risks. Risk assessment is necessary but rarely sufficient for establishing effective policy to address identified risks. Sound policy decisions must also weigh other factors, such as those related to economics, engineering, ethics, law, and politics. For example, in order to test whether any proposed governmental policy actually improves overall welfare, economics recommends that such policy be subjected to a cost-benefit analysis, to compare the social benefit of the policy to its opportunity cost – the social value foregone when the resources in question are moved away from alternative economic activities into the specific project contemplated by the policy (Percival, 2013).

In the planning phase in the United States, for example, Congress decides which regulatory strategy to employ. The environmental statutes generally identify regulatory targets by defining the jurisdictional reach of the authorities they delegate to agencies. Congress also usually specifies the bases for control and types of regulation agencies may create to implement the environmental laws. To translate the environmental laws into regulations, administrative agencies must choose a regulatory alternative within the policy space established by law, and propose regulations. Many interest groups seek to influence how agencies create and implement the environmental statutes, including environmental groups, regulated industries, Congressional Committees and Executive Office of the

President. Parties disappointed by agency decisions routinely seek to resolve their disputes in the federal courts (Percival et al, 2013).

The essential components of the design stage of regulation are summarized in Figure 1.

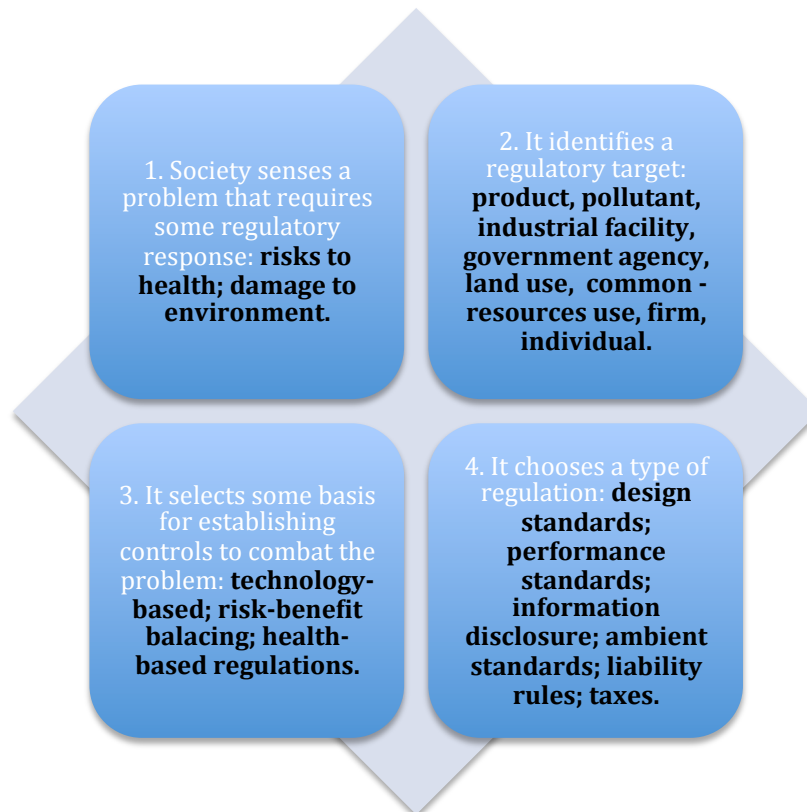


Figure 1: Design stage components for environmental regulation (adapted from Percival et al, 2013)

The OECD's Council on Regulatory Policy and Governance (OECD, 2012) recommended that countries should integrate the Regulatory Impact Assessment (RIA) into the early stages of the policy process for the formulation of new regulatory proposals.

RIA is an *ex ante* assessment, aimed to be used either as a tool or a decision process regulatory tool that examines and measures the likely benefits as well as costs and effects of new or changed regulations. It includes benefit cost analyses that consider the welfare impacts of regulations, taking into account economic, social and environmental impacts

including the distributional effects over time, identifying who is likely to benefit, and who is likely to bear costs. It also includes a consideration of alternative ways of addressing the public policy objectives, including regulatory and non-regulatory alternatives to identify and select the most appropriate instrument, or mix of instruments, to achieve policy goals. RIAs should, in most cases, identify approaches likely to deliver the greatest net benefit to society, including complementary approaches such as a combination of regulation, education and voluntary standards (OECD, 2012).

RIAs should communicate information supporting regulatory decisions and enable a third party to understand how the agency arrives at its conclusions. Transparency of the regulatory system is essential to a stable and accessible regulatory environment that promotes competition, trade, and investment, and helps insure against undue influence by special interests. Transparency reinforces the legitimacy and fairness of regulatory processes. Transparency involves a wide range of practices, including standardized processes for making and changing regulations; consultation with interested parties; plain language in drafting; publication and codification. Transparency thus serves to make rules easy to understand and contributes to predictability and consistency of the implementation and appeals processes (GAO, 2014).

A meaningful involvement of stakeholders in the regulatory process means that all players have access and opportunity to participate in decisions about activities that can affect their environment and/or health. More important is the guarantee that the public's contribution will be considered in the decision-making process and really influence the regulatory agency's decision.

1. 3 Implementation and enforcement of environmental regulation

If a given regulation is to achieve its goals, it must induce compliance. Thus it is critical that environmental laws include enforcement provisions that create incentives for compliance, otherwise companies and individuals will be tempted to disobey the rules.

According to OECD (2009), the understanding of the factors that determine compliance helps governments design more effective regulations and compliance assurance programs. Traditional environmental economics theory assumes that regulated entities are rational when making compliance decisions, and in doing so, they decide whether to comply or not based on the balance between expected compliance costs (i.e., expenses for technological and management improvements to meet environmental requirements) and non-compliance costs (i.e., value of monetary penalties, civil liability, and so forth). It means that if entities realize that is “cheaper” to violate a requirement, they would do so. Under this theory, competent authorities must raise the “costs” of non-compliance by raising the probability of detection of an offense (via intensive compliance monitoring); making non-compliance responses swift, certain, and fair; imposing penalties high enough to outweigh non-compliance benefits; and raising awareness of enforcement actions (OECD, 2009).

Effective environmental compliance assurance involves a combination of the three following tools (OECD, 2009):

- *Compliance promotion* – Any activity that encourages compliance but does not involve sanctions for non-compliance (e.g., information dissemination, technical assistance, and regulatory and financial incentives).

- *Compliance monitoring* – Collecting and analyzing information on compliance statuses. Compliance monitoring may include governmental inspections, audits or investigations, monitoring of ambient environmental quality, self-monitoring and reporting by regulated entities, and citizen monitoring.

- *Enforcement* – A set of actions that the government or third parties take in response to non-compliance with environmental requirements to compel the offender to return to compliance and remediate the damage resulting from the violation, as well as to impose sanctions on the offender.

OECD (2009) states that environmental compliance assurance can contribute to building good governance since it strengthens public confidence in the policies and institutions responsible for environmental safety, conservation and access to natural resources. When businesses perceive that no company obtains a competitive advantage from its non-compliance, it generates a predictable investment climate based on the rule of law, thereby stimulating economic development and innovation, and enhancing markets for environmental goods and services.

1. 4 Review and evaluation of environmental regulation

The last stage of the regulatory cycle is evaluation. Regulation seeks to make improvements in real situations by changing individual or organizational behavior in ways that generate positive impacts in terms of solving societal and economic problems. At its most basic level, regulation is designed to work in the following manner: It is implemented, which leads to changes in the behavior of individuals or entities targeted or affected by regulation, which ultimately leads to changes in outcomes, such as amelioration in an underlying problem or other (hopefully positive) changes in conditions in the world.

Evaluating and reviewing regulation therefore entails an inquiry after regulation has been put in place as to how it has changed behavior and, ultimately, its impacts on conditions in the world. To ask how well regulation is working is really to ask about its impacts, both those that are positive and negative (Coglianese, 2012).

Several policy criteria should be considered when evaluating the success of regulatory or non-regulatory approaches. These include environmental effectiveness; economic efficiency; savings in administrative, monitoring and enforcement costs; inducement of innovation; and increased environmental awareness (EPA, 2014).

Coglianesse (2012) explains that an evaluation can also focus on the regulatory policy, that means the procedures and practices that govern the regulatory process itself. The author explains what regulatory policy comprises:

Regulatory policy includes transparency and consultation rules, such as requirements for public notice of proposed regulations, public access to key meetings, or disclosure of relevant information relied upon by governmental decision makers. Regulatory policy also includes processes for certain types of planning and analysis to be conducted prior to a regulatory decision, such as regulatory impact analysis, cost benefit analysis, impacts on small businesses or local governments, or paperwork burden analysis. Regulatory policy can also include a variety of other rules that structure regulatory decision making, such as regulatory budgets, —pay-as-you-go or —one-in-one-out mandates, or requirements for legislative authorisation of certain regulations initiated at a ministry or agency level.

Using the evaluation results, decision makers shall periodically review its existing significant regulations to determine whether or not any such regulations should be modified, streamlined, expanded, or repealed so as to make the regulatory programs more effective or less burdensome in achieving the regulatory objectives (EPA, 2011).

2. THE US EXPERIENCE ON ENVIRONMENTAL REGULATORY QUALITY

2.1 General principles of regulation

The United States Environmental Protection Agency – EPA – is part of the executive branch of the US and has the mission to protect human health and the environment. The EPA is called a regulatory agency because Congress authorizes it to write regulations that explain the technical, operational, and legal details necessary to implement environmental laws. The EPA must follow the general principles established regarding regulatory systems in the

United States. The Executive Order² 13563 of January 18, 2011, issued by President Obama, states the following guidelines:

- The US regulatory system must protect public health, welfare, safety, and environment while promoting economic growth, innovation, competitiveness, and job creation.
- It must be based on the best available science.
- It must allow for public participation and an open exchange of ideas.
- It must promote predictability and reduce uncertainty.
- It must identify and use the best, most innovative, and least burdensome tools for achieving regulatory ends.
- It must take into account benefits and costs, both quantitative and qualitative.
- It must ensure that regulations are accessible, consistent, written in plain language, and easy to understand.
- It must measure, and seek to improve, the actual results of regulatory requirements (White House, 2011).

Agencies propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs (recognizing that some benefits and costs are difficult to quantify); tailor its regulations to impose the least burden on society, consistent with obtaining its regulatory objectives and taking into account, among other things, the extent it is practicable and the costs of cumulative regulations; select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity); to the extent feasible, specify performance objectives, rather than specify the

² Executive orders are official documents, numbered consecutively, through which the President of the United States manages the operations of the Federal Government. Available at https://www.whitehouse.gov/omb/inforeg_regmatters.

behavior or manner of compliance that regulated entities must adopt; and identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public (White House, 2011).

Agencies shall consider how best to promote the retrospective analysis of rules that may be outmoded, ineffective, insufficient, or excessively burdensome, and to modify, streamline, expand, or repeal them in accordance with what has been learned (White House, 2011).

2.2 EPA procedures of Regulatory Impact Analysis

The Executive Order 12866, from 1993, required federal agencies, including the EPA, to assess the economic effects of their economically significant rules—those with an annual effect on the economy of \$100 million or more or that have a material adverse effect on a sector of the economy; productivity; competition; jobs; the environment; public health or safety; or state, local, or tribal governments or communities—and prepare a detailed RIA.

In 2003, the Office of Management and Budget (OMB)³ delivered guidelines to federal agencies for conducting such regulatory analyses (Circular A-4). The guidance defines good regulatory analysis and provides the best practices for conducting such. In particular, the guidance provides for systematic evaluation of qualitative and quantitative benefits and costs, including their monetization.

The OMB defines regulatory analysis as a tool regulatory agencies use to anticipate and evaluate the likely consequences of rules. It provides a formal way of organizing the evidence on the key effects – good and bad – of alternatives that should be considered in

³ Part of US' executive branch, oversees the performance of federal agencies, and administers the federal budget. One of its missions is the coordination and review of all significant Federal regulations by executive agencies, to reflect Presidential priorities and to ensure that economic and other impacts are assessed as part of regulatory decision-making.

developing regulations. The motivation is to learn if the benefits of an action are likely to justify the costs or to discover which of various possible alternatives would be most effective (OMB, 2003).

According to the Circular A-4, a good RIA should include: (i) a statement of the need for the proposed action and an executive summary, (ii) an examination of alternative approaches, and (iii) an evaluation of the benefits and costs—quantitative and qualitative—of the proposed action and the main alternatives identified by the analysis (OMB, 2003).

Overall, OMB guidance states RIAs should measure the benefits and costs of a proposed action and the alternatives in comparable terms to ensure a reasonable determination of net benefits.⁴ When estimating net benefits, the guidance states that agencies should generally estimate benefits and costs that accrue to society in comparison with a baseline (generally describes the expected state of the world without the regulation), including those that accrue only to private entities. Private costs are those paid by a consumer or firm. Social costs include private costs plus any other external costs incurred by society resulting from the production or consumption of a good or service (OMB, 2003).

The document states that it is not always possible to express in monetary units all of the important benefits and costs, thus the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate. In such cases, decision-makers should exercise professional judgment in determining how important the non-quantified benefits or costs may be in the context of the overall analysis (OMB, 2003).

In addition to the OMB Circular A-4, the EPA has also developed its own guidance for conducting economic analyses that emphasizes and reaffirms the principles in the Executive Order and OMB guidelines as an important component in informing sound environmental policies.

⁴ Net benefits are calculated by subtracting total costs from total benefits.

The EPA's "Guidelines for Preparing Economic Analyses" (EPA, 2014) follows traditional economic practices and adopts conventional labels to distinguish approaches used to monetize benefits in the context of a typical EPA policy, program, or regulation, and answer questions on the efficiency and distribution of environmental regulations.

Three general categories are addressed in the document (EPA, 2014):

- The examination of net social benefits using a benefit-cost analysis (BCA);
- The examination of impacts on industry, governments, and non-profit organizations using an economic impacts analysis (EIA); and
- The examination of effects on various subpopulations, particularly low-income, minority, and children, using distributional analysis.

The EPA has the support of the National Center for Environmental Economics (NCEE) to analyze the economic and health impacts of environmental regulations and policies, and assists EPA by informing important policy decisions with economics and other sciences. The NCEE also contributes to and manages the EPA's research on environmental economics to improve the methods and data available for policy analysis.

2.2.1 The GAO's review of the EPA activities

The United States General Accountability Office (GAO) was requested by Congress to review selected elements of economic analyses the Environmental Protection Agency (EPA) has used to support recent rulemaking.

To identify the economic analyses for review, the GAO identified a list of economically significant rules (see above threshold) that the EPA finalized in 2009 through 2011. From a list of 16 rules, auditors selected a nonprobability sample of seven recent rules and assessed them against key principles outlined in OMB Circular A-4 (GAO, 2014).

The GAO developed a checklist and for each RIA, two analysts (including one economist) independently reviewed the analyses and subsequently came to consensus about each element's adherence to OMB guidance. In addition, they considered whether the EPA clearly explained its analytical methods and interviewed selected economists with expertise in certain subject areas.

GAO found that EPA generally used the seven RIAs reviewed to inform decision making during the rulemaking process, but did not always adhere to OMB guidance for selected elements of these RIAs. According to EPA officials, the agency most commonly used these RIAs to facilitate an iterative process with management, identify effects of regulations, and communicate the information supporting EPA's regulatory decisions to Congress and the public. In addition, EPA's adherence to OMB guidance varied across selected elements of the RIAs reviewed: (i) statements of need and inclusion and usefulness of an executive summary; (ii) treatment of regulatory alternatives; (iii) estimation of benefits and costs; and (iv) treatment of uncertainty, assumptions, and descriptions of data quality (GAO, 2014).

GAO reported that EPA did not always provide or clearly present all of the information a reader might need to understand the analysis. OMB guidance states that RIAs should communicate the complex and technical information that supports EPA's regulatory decisions to Congress and the public. Specifically, RIAs should enable a third party to understand how the agency arrived at its estimates and conclusions. Because the RIAs reviewed did not always provide or clearly present key information—even after they went through several reviews within the agency—the RIAs' usefulness in providing readers with a clear understanding of the analyses that the EPA conducted varied (GAO, 2014).

GAO reported that the EPA faced challenges in two key areas—monetizing benefits and costs related to the primary purpose or key impacts of the regulatory actions, and

estimating the effects of its regulations on employment—that limited the usefulness of some of the estimates in its RIAs. There was some research to eliminate data gaps and enhance modeling capabilities to support monetizing additional benefits and costs, as well as some improvements in EPA’s approach for estimating employment effects, that were necessary to increase the usefulness of RIAs for understanding economic trade-offs among regulatory alternatives (GAO, 2014).

Some of the recommendations addressed to EPA in the report are (GAO, 2014):

- Enhance the agency’s review process for RIAs to ensure the transparency and clarity of information presented for selected elements in and across RIAs; and
- Identify and prioritize for research key categories of costs and benefits that the agency cannot currently monetize that, once monetized, would most enhance the agency’s ability to consider economic trade-offs associated with different regulatory alternatives; and
- Continue efforts to update and improve the agency’s approach to estimating employment effects.

2.3 EPA’s procedures for Regulatory Review

The Executive Order 13563 of January 18, 2011 determined that each US agency should each develop a plan to periodically review its existing significant regulations to determine whether any such regulations should be modified, streamlined, expanded, or repealed so as to make the agency’s regulatory program more effective or less burdensome in achieving the regulatory objectives.

In answer to this Executive Order, the EPA (2011) developed a plan to undertake and publish thirty-five priority regulatory retrospective reviews in the first five-year cycle. The

regulations were chosen with public involvement and the main criterion was the potential reduction of costs and burdens.

To conduct the reviews, the EPA developed a variety of questions under the principles listed by the Executive Order, as reproduced in the chart below.

EXECUTIVE ORDER 13563 PRINCIPLES	REVIEW QUESTIONS
Benefits justify costs	<ul style="list-style-type: none"> ▪ Now that the regulation has been in effect for some time, do the benefits of the regulation still justify its costs?
Least burden	<ul style="list-style-type: none"> ▪ Does the regulation impose requirements on entities that are also subject to requirements under another EPA regulation? If so, what is the cumulative burden and cost of the requirements imposed on the regulated entities? ▪ Does the regulation impose paperwork activities (reporting, recordkeeping, or third party notifications) that could benefit from online reporting or electronic recordkeeping? ▪ If this regulation has a large impact on small businesses, could it feasibly be changed to reduce the impact while maintaining environmental protection? ▪ Do feasible alternatives to this regulation exist that could reduce this regulation’s burden on state, local, and/or tribal governments without compromising environmental protection?
Net benefits	<ul style="list-style-type: none"> ▪ Is it feasible to alter the regulation in such a way as to achieve greater cost effectiveness while still achieving the intended environmental results?
Performance objectives	<ul style="list-style-type: none"> ▪ Does the regulation have complicated or time-consuming requirements, and are there feasible alternative compliance tools that could relieve burden while maintaining environmental protection? ▪ Could this regulation be feasibly modified to better partner with other federal agencies, state, local, and/or tribal governments?
Alternatives to direct regulation	<ul style="list-style-type: none"> ▪ Could this regulation feasibly be modified so as to invite public/private partnerships while ensuring that environmental objectives are still met? ▪ Does a feasible non-regulatory alternative exist to replace some or all of this regulation’s requirements while ensuring that environmental objectives are still met?
Quantified benefits and costs / qualitative values	<ul style="list-style-type: none"> ▪ Since being finalized, has this regulation lessened or exacerbated existing impacts or created new impacts on vulnerable populations such as low-income or minority populations, children, or the elderly? ▪ Are there feasible changes that could be made to this regulation to better protect vulnerable populations?

Open exchange of information	<ul style="list-style-type: none"> ▪ Could this regulation feasibly be modified to make data that is collected more accessible? ▪ Did the regulatory review consider the perspectives of all stakeholders?
Coordination, simplification, and harmonization across agencies	<ul style="list-style-type: none"> ▪ If this regulation requires coordination with other EPA regulations, could it be better harmonized than it is now? ▪ If this regulation requires coordination with the regulations of other federal or state agencies, could it be better harmonized with those regulations than it is now?
Innovation	<ul style="list-style-type: none"> ▪ Are there feasible changes that could be made to the regulation to promote economic or job growth without compromising environmental protection? ▪ Could a feasible alteration be made to the regulation to spur new markets, technologies, or jobs? ▪ Have new or less costly methods, technologies, and/or innovative techniques emerged since this regulation was finalized that would allow regulated entities to achieve the intended environmental results more effectively and/or efficiently?
Flexibility	<ul style="list-style-type: none"> ▪ Could this regulation include greater flexibilities for the regulated community to encourage innovative thinking and identify the least costly methods for compliance?
Scientific and technological objectivity	<ul style="list-style-type: none"> ▪ Has the science of risk assessment advanced such that updated assessments of the regulation's impacts on affected populations such as environmental justice communities, children or the elderly could be improved? ▪ Has the underlying scientific data changed since this regulation was finalized such that the change supports revision to the regulation? ▪ Has the regulation or a portion(s) of the regulation achieved its original objective and become obsolete? ▪ Does the regulation require the use of or otherwise impose a scientific or technical standard? If so, is that standard obsolete or does it otherwise limit the use of updated or improved standards?

Table 1 – Criteria for regulatory reviews (EPA, 2011).

The status of EPA's priority rulemaking, as well as information on the status of retrospective reviews of existing regulations, are published on the EPA's website.

3. PROPOSALS FOR TCU

As seen in the first two chapters of this paper, governments should work to ensure that the system of environmental regulations is effective, proportionate, coherent, clear and implemented in a way that minimizes the burden on businesses and society, in alignment with

the best principles of regulation. At the same time, environmental regulations are necessary to protect nature; otherwise private sector activities may lead to an irreversible depletion of resources.

In Brazil, several institutions at the federal level develop bylaw environmental regulation, as summarized in Table 2.

Institution	Status	Main issues subject to bylaw regulation
Ministry of environment – MMA	Central Authority	<ul style="list-style-type: none"> • Market-based instruments for environmental protection • Use of biodiversity • Fisheries activities (in cooperation with the Ministry of fisheries) • Environmental quality
Brazilian Institute for the Environment and Natural Resources - IBAMA	Executing Agency	<ul style="list-style-type: none"> • Procedures for environmental licensing of projects under federal competence • Environmental quality
National Water Agency - ANA	Regulatory Agency	<ul style="list-style-type: none"> • Use of water
Chico Mendes Institute - ICMBIO	Executing Agency	<ul style="list-style-type: none"> • Management and activities within protected areas • Use of significant caves
Brazilian Forest Service - SFB	Executing Agency	<ul style="list-style-type: none"> • Forest Concessions procedures • Logging operations standards
Ministry of Fisheries - MPA	Central Authority	<ul style="list-style-type: none"> • Fisheries exploitation • Fisherman permits • Aquiculture activities

Table 2 – Federal institutions responsible for bylaw environmental regulations in Brazil.

The Brazilian Federal Court of Accounts (TCU) has the constitutional mandate to oversee actions of the federal government in order to improve its performance. All of the Institutions listed in Table 2 are under the jurisdiction of the Department of Environment and Agriculture, which is under the National Development Coordination (SecexAmbiental).

The TCU has the institutional capacity to conduct audits and utilize other monitoring tools to improve environmental regulatory quality in Brazil. The mandate of TCU gives the institution a strategic position in the federal government to conduct independent evaluations that add value to it, and gives transparency to the environmental regulatory process.

Other Supreme Audit Institutions have been working to assure regulatory quality, as illustrated by the GAO report in Chapter 2. The TCU itself had some experience in the past in this topic, (e.g., the management of fisheries activities and concession of forests). Those audits, however, did not have a deep approach on the impacts of such regulations in national development.

The TCU has recently made a comprehensive assessment about regulatory governance in the infrastructure sector.⁵ The audit addressed the agencies' autonomy and the transparency of its decision making process, as well whether or not the agencies use assessment tools, such as RIA, to improve regulatory quality.

As described in this paper, environmental regulations have its specificities. Diverse institutions in Brazil, rather than regulatory agencies in *strict sensus*, issue them under the Brazilian administrative arrangement. Uncertainties of environmental risks to human welfare as well as difficulties in measuring costs and benefits in monetary terms makes environmental regulations design especially challenging.

Evaluations of regulatory quality can focus on the regulatory process or on specific regulation results. An evaluation of the regulatory process aims to improve and monitor activities, from the design stage to the evaluation stage of the regulatory cycle. The evaluations of results aim to identify the impact of the regulations in the broader world, to understand if it solved the problem it aimed to fix, and at what cost it came (i.e., cost-benefit analysis). This second type of evaluation is much more complex, and in order to be conducted in a meaningful and credible way, requires indicators to measure relevant outcomes of concern and research designs to support inferences about the extent to which a

⁵ Decision 240/2015 – TCU – Plenary, February 2015.

regulation under evaluation has *actually* caused any change in the measured outcomes (Coglianese, 2012).

I understand the primary responsibility for this second kind of assessment relies on the given regulatory agency. TCU could even point out in a process evaluation how the agencies are conducting the reviews to address the results of their regulations. Although TCU has the mandate to conduct impact analyses, in most of the cases it will need the support of specialists in order to deliver a technically reliable report.

Gaetani and Albuquerque (2009) claims that Brazil needs to develop capacities to better formulate, implement, and monitor public policies with a regulatory approach. They explain that the lack of capacities is uneven. In some fields, such as energy, telecommunications, and water management, Brazil has already developed some capacities. The same cannot be said about the areas of transportation, environmental policies, and media. Institutional building is another challenge. If the institutions are properly structured and coordinated, as well as if they are transparent and accountable, then they must be addressed.

In this sense, a primary contribution that TCU can make in the short term to improve regulatory quality in Brazilian institutions is to conduct audits with the goal of examining the regulatory process in key areas with a significant impact on business and users of natural resources. Likewise, TCU can deliver and monitor relevant recommendations to improve the process, and eliminate the weaknesses eventually found. Evaluation research has a vital role to play in a regulatory environment that values learning (Coglianese, 2012).

The checklist presented in Appendix I summarizes the best practices from the OECD literature and from the EPA guidelines, and can be used as a starting point during audits focused on environmental regulatory quality.

In conclusion, my proposal to the Environmental Department of TCU is to address the contribution of environmental policies to national development through the analysis of

environmental regulations and its impacts on regulated sectors. In order to do so, the TCU must:

- (i) Include in its planning the provision to develop an audit work plan with a number of products to address the status of environmental regulation governance in Brazil. The suggested focus is bylaw regulation, because this type is not subject to the same participatory process regularly conducted by Congress;
- (ii) Build capacities within the Department through study groups, seminars, specialists meetings and a partnership with the Coordination of Infrastructure from TCU;
- (iii) Create a network of specialists in environmental regulation to be consulted during audits. Since the topic demands a solid knowledge on economics and the environment, auditors need the advice of these specialists in order to build technically reliable reports;
- (iv) Conduct audits with two approaches: first in regulatory process and, in the medium term, on results of specific regulations;
- (v) Follow up with the results and continually improve its framework for regulatory analysis.

Once these recommendations are implemented, it is expected that TCU be recognized by major players from the environmental regulation arena in Brazil as a relevant stakeholder able to provide useful feedback to regulatory cycles through its evaluations.

APPENDIX I- CHECKLIST FOR ENVIRONMENTAL REGULATION ANALYSIS

Stages of regulatory process	Key principles	Research questions
Planning/ design	Identification of the problem	<ul style="list-style-type: none"> - Did the agency properly identify the problem that it intends to address? - Was the significance of the problem assessed? - Did the agency conduct risk assessments?
Planning/ design	Need for regulatory action	<ul style="list-style-type: none"> - Before recommending federal regulatory action, did the agency demonstrate that the proposed action is really necessary? - Did the agency demonstrate that a government intervention is likely to do more good than harm? (By comparing the desired scenario after regulation with a world without regulation)
Planning/ design	Seek alternatives	<ul style="list-style-type: none"> - Were options other than regulation considered? - If yes, what were the alternative approaches to command-control regulation?
Planning/ design	Transparency	<ul style="list-style-type: none"> - Did the agency give equal access to all stakeholders to participate in the discussions? - Can a third-party comprehend how the decisions were taken by the available documents? - Are the documents that guided the decision available to the public?
Planning/ design	Regulatory impact	<ul style="list-style-type: none"> - Who are the winners and the losers from the policy and associated economic changes? - Did the agency conduct <i>ex ante</i> assessments to estimate benefits and costs (economic and social) of the proposed regulation? - Does the agency have a unified methodology to estimate intangible costs and benefits in order to properly compare the regulatory options?
Implementation/ Enforcement	Compliance promotion	<ul style="list-style-type: none"> - Does the agency promote regulatory coherence through co-ordination mechanisms between the national and sub-national levels of government? - Were the rules properly communicated to affected organizations and individuals? - Does the agency provide guidance or other assistance in compliance?
	Enforcement incentives	<ul style="list-style-type: none"> - Does the chosen approach create incentives to firms to follow the rules, or it is “cheaper” to not follow it?
	Compliance monitoring	<ul style="list-style-type: none"> - How do the agencies design and implement compliance inspection plans? - To what extent do regulated entities comply with the regulation? - Does the agency analyze non-compliance with environmental requirement causes in order to improve policy design?
Review	Monitoring Systems	<ul style="list-style-type: none"> - Did the agency design include reliable indicators to measure the performance of regulations? - Does the policy instrument accomplish a measurable environmental goal? - Did the agency implement a monitoring system?
	Impact / cost benefit review	<ul style="list-style-type: none"> - Does the policy instrument reach the environmental goal at the lowest possible cost to firms and consumers? - What are the real impacts of the regulation on the overall economy (e.g., jobs, competitiveness, innovation)?
	Feedback	<ul style="list-style-type: none"> - Are the results of evaluations used to inform future regulatory decision-making?

Note: The checklist was developed by the author of this article based on the best practices found in the references listed from the OECD, EPA and GAO.

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