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PAYMENT FOR ENVIRONMENTAL SERVICES

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INTRODUCTION TO THE DECARBONIZATION CHALLENGE

Brazil, as one of the largest countries in terms of biodiversity and natural resources, faces a unique challenge in the transition to a low-carbon economy. Although it has a predominantly renewable energy matrix, especially hydroelectric power, the country still faces high greenhouse gas (GHG) emissions, mainly due to deforestation, changes in land use and unsustainable agricultural practices. In this scenario, it is imperative to adopt public policies that encourage sustainable practices and promote environmental conservation.

Among the various economic tools available, Payment for Environmental Services (PES) stands out for its innovative and inclusive approach. The main objective of this instrument is to financially reward individuals or communities who carry out environmental preservation actions, such as protecting forests, restoring degraded areas and maintaining water resources. In addition to promoting sustainability, PES has significant potential to mitigate climate change, while generating social and economic benefits.

PAYMENT FOR ENVIRONMENTAL SERVICES IN THE BRAZILIAN CONTEXT

PES is an economic policy that directly remunerates those who conserve or restore ecosystems, recognizing the economic value of the environmental services provided, such as carbon sequestration, regulation of the hydrological cycle and protection of biodiversity. In Brazil, Law 14.119/2021, which instituted the National Policy for Payment for Environmental Services , represents an important milestone for the consolidation of this tool. This legislation establishes guidelines for the implementation of PES programs, including criteria for selecting beneficiaries, funding sources and monitoring methods.

However, despite legislative progress, the application of PES in Brazil still faces significant challenges. The lack of consistent funding, the absence of robust monitoring systems and the difficulty of coordination between the different levels of government are some of the main obstacles to the expansion of this policy. In addition, it is necessary to ensure that PES programs are accessible to all, especially the most vulnerable populations, such as traditional communities and indigenous peoples.

PAYMENT FOR ENVIRONMENTAL SERVICES (PES) AS A SUSTAINABILITY STRATEGY IN BRAZIL

Public governance plays a central role in the implementation of decarbonization policies, including Payment for Environmental Services (PES). In Brazil, public governance has gained prominence since the administrative reforms of the 1990s, which sought to improve efficiency and transparency in public management. These advances are fundamental to ensuring that PES programs are implemented effectively and that their benefits are distributed equitably.

Good public governance is guided by principles such as transparency, accountability, participation and efficiency. These principles are essential to the success of PES, as they ensure that resources are used appropriately and that beneficiaries have an active voice in the formulation and implementation of programs. In addition, strategic leadership and administrative control, highlighted by the Federal Court of Auditors (TCU) as key elements of governance, are fundamental to integrating PES into public decarbonization policies.

PES also presents itself as a solution for aligning economic incentives with environmental objectives. It creates new income opportunities for farmers, traditional communities and indigenous peoples, while contributing to the conservation of ecosystems and essential environmental services. These actions strengthen long-term economic resilience, reducing the costs associated with natural disasters and climate change. However, securing consistent, long-term sources of funding is a crucial challenge. Public-private partnerships, carbon credits and access to global climate funds, such as the Green Climate Fund, are promising alternatives to ensure the economic sustainability of PES.

In addition, integrating PES with other public policies can boost its benefits. Tools such as the Rural Environmental Registry (CAR) and Degraded Area Recovery Plans (PRADs) are examples of how PES can complement existing initiatives, promoting the restoration of degraded areas and encouraging water conservation practices. However, institutional fragmentation and a lack of coordination between different levels of government remain significant barriers.

Case studies also offer valuable insights. Costa Rica is a model of success in the application of PES, showing how diversified funding and effective governance can boost environmental programs. In Brazil, the Conservador das Águas Project in Extrema (MG) highlights the effectiveness of PES at the local level, promoting economic and social benefits for farmers while improving water quality.

Education and communication are fundamental pillars for the advancement of PES. Environmental education campaigns can engage local communities and increase adherence to the programs. In addition, the inclusion of PES-related topics in school curricula and the training of public managers are strategies that strengthen local capacities to implement and monitor these initiatives.

Finally, the future of PES in Brazil depends on legislative advances, technological innovation and social engagement. Technologies such as remote sensing and blockchain can transform the monitoring and transparency of programs, while strengthening global PES

networks can position Brazil as an international leader in promoting sustainable practices. The integration of these strategies is essential to meet the challenges of climate change and promote more balanced and inclusive development.

ECONOMIC EFFICIENCY OF PES

One of the main advantages of PES is its economic efficiency, as it directs financial resources to actions that generate clear and measurable environmental benefits. Unlike other policies, such as subsidies or taxes, PES is based on the principle of "those who conserve, receive", ensuring that resources are allocated more effectively.

Programs such as Bolsa Verde, implemented in Brazil between 2011 and 2018, demonstrated the potential of PES to reduce deforestation in critical areas such as the Amazon. This program offered quarterly payments to poor families living in environmental preservation areas, encouraging sustainable practices. Studies indicate that Bolsa Verde has contributed to reducing deforestation in priority regions, while at the same time improving the living conditions of beneficiary families.

Furthermore, PES is particularly efficient in regions where the opportunity costs of conservation are low, i.e. where economic alternatives to conservation, such as agriculture or livestock farming, generate relatively modest financial returns. In these cases, PES payments can be sufficient to incentivize conservation, generating significant impacts with relatively low investments.

EQUITY AND SOCIAL INCLUSION

PES also stands out for its ability to promote social equity by directly benefiting those who play a crucial role in environmental conservation. In Brazil, traditional communities, indigenous peoples and small farmers are often the main guardians of natural ecosystems. However, these populations often face significant economic and social challenges, including a lack of access to markets, credit and public services.

By offering regular payments for environmental services, PES can generate an additional source of income for these communities, contributing to poverty reduction and strengthening economic resilience. In addition, PES can help to value the traditional knowledge and sustainable practices of these populations, promoting a fairer and more inclusive integration between environmental conservation and economic development.

However, to ensure that the benefits of PES are distributed equitably, it is essential to adopt clear and transparent criteria for selecting beneficiaries. In addition, it is necessary to invest in training and technical assistance so that the most vulnerable communities can fully participate in PES programs.

ENVIRONMENTAL SUSTAINABILITY AND CO-BENEFITS

The main objective of PES is to promote environmental sustainability by encouraging practices that reduce GHG emissions and increase carbon sequestration. However, the benefits of PES go beyond climate mitigation, encompassing a wide range of environmental, social and economic co-benefits.

For example, forest conservation not only captures carbon, but also protects biodiversity, regulates hydrological cycles and prevents soil erosion. Similarly, restoring degraded areas can improve soil quality, increase agricultural productivity and strengthen ecosystem resilience to climate change.

These co-benefits make PES a particularly attractive tool for formulating integrated public policies that seek to balance the objectives of economic development, social inclusion and environmental sustainability. However, in order to maximize these benefits, it is essential to

implement effective monitoring and evaluation systems that ensure that the environmental services contracted are actually provided.

IMPLEMENTATION CHALLENGES

Despite its potential, the implementation of PES in Brazil faces several challenges. One of the main obstacles is the lack of sustainable funding. Although Law No. 14.119/2021 provides for the creation of a national fund for PES, its operationalization still depends on significant fundraising efforts, both nationally and internationally.

Another challenge is the administrative complexity involved in managing PES programs. From identifying and selecting beneficiaries to monitoring environmental results, PES implementation requires a robust and well-coordinated institutional infrastructure. However, many regions of Brazil, especially in rural and remote areas, lack the technical and administrative capacity needed to implement PES programs effectively.

In addition, coordination between the different levels of government and sectors of society is essential to guarantee the coordination and effectiveness of public policies related to PES. This includes integrating PES with other policies and programs, such as the Rural Environmental Registry (CAR) and plans to recover degraded areas.

EXAMPLES OF SUCCESS IN BRAZIL

Brazil already has successful examples of PES, which can serve as a model for expanding this policy. One such example is the Water Producer Program, coordinated by the National Water Agency (ANA). This program encourages water conservation practices in strategic river basins, offering payments to farmers who adopt measures such as the recovery of riparian forests and sustainable soil management.

Another example is Bolsa Verde, mentioned earlier, which has demonstrated the potential of PES to reduce deforestation and improve living conditions in conservation areas. In addition, local initiatives, such as the Water Conservancy Project in Extrema (MG), show how PES can be successfully implemented at municipal level, generating significant environmental and economic benefits.

RECOMMENDATIONS FOR THE PUBLIC ADMINISTRATION

To maximize the impact of PES, it is essential that the public administration adopts measures to strengthen its governance and financial sustainability. This includes creating public-private partnerships, raising funds international and investing in monitoring technologies such as remote sensing and artificial intelligence.

In addition, it is crucial to ensure that PES programs are designed in a participatory way, involving local communities and other relevant actors. Transparency and accountability are also fundamental to the success of PES in Brazil, ensuring that resources are used efficiently and that the expected results are achieved.

COMPARISON WITH OTHER ECONOMIC INSTRUMENTS

Compared to other economic instruments, such as taxation and regulated markets, PES has unique advantages, especially in terms of social inclusion and environmental preservation. While taxation can be unpopular and regulated markets require complex institutional structures, PES is a more straightforward and flexible approach that can be adapted to different regional contexts.

However, the effectiveness of PES depends on consistent funding and a robust institutional design that guarantees equity and environmental sustainability. In addition, it is important to complement PES with other policies and instruments in order to maximize its impact on decarbonizing the economy.

PUBLIC GOVERNANCE AND THE ROLE OF THE ADMINISTRATION IN SUSTAINABILITY

Public governance plays a central role in the implementation of decarbonization policies, including Payment for Environmental Services (PES). In Brazil, public governance has gained prominence since the administrative reforms of the 1990s, which sought to improve efficiency and transparency in public management. These advances are fundamental to ensuring that PES programs are implemented effectively and that their benefits are distributed equitably.

PRINCIPLES OF GOOD GOVERNANCE

Good public governance is guided by principles such as transparency, accountability, participation and efficiency. These principles are essential to the success of PES, as they ensure that resources are used appropriately and that beneficiaries have an active voice in the formulation and implementation of programs. In addition, strategic leadership and administrative control, highlighted by the Federal Court of Auditors (TCU) as key elements of governance, are fundamental to integrating PES into public decarbonization policies.

GOVERNANCE CHALLENGES IN THE ENVIRONMENTAL CONTEXT

However, the implementation of environmental policies in Brazil faces significant governance challenges. Institutional fragmentation, a lack of coordination between the different levels of government and a shortage of financial resources are obstacles that hinder the effective implementation of PES. To overcome these challenges, it is necessary to strengthen institutional capacities, promote intersectoral cooperation and invest in technologies that facilitate the monitoring and evaluation of results.

ECONOMIC SUSTAINABILITY AND PES

Economic sustainability is one of the fundamental pillars for the transition to a low-carbon economy. In this context, PES offers an innovative approach to aligning economic incentives with environmental objectives, promoting sustainable development.

POSITIVE ECONOMIC IMPACTS

PES can generate positive economic impacts on several fronts. On the one hand, it creates new income opportunities for farmers, traditional communities and indigenous peoples, encouraging sustainable practices. On the other hand, by conserving ecosystems and environmental services, PES contributes to long-term economic resilience, reducing the costs associated with natural disasters, climate change and environmental degradation.

SUSTAINABLE FINANCING

One of the main challenges for the economic sustainability of PES is to guarantee consistent, long-term sources of funding. In addition to public resources, it is essential to mobilize the private sector and the international community to finance PES programmes. This can be done through public-private partnerships, market mechanisms such as carbon credits, and access to global climate funds such as the Green Climate Fund.

INTEGRATION OF PES WITH OTHER PUBLIC POLICIES

To maximize its impact, PES must be integrated with other policies and programs related to sustainability and decarbonization. This integration is essential to create synergies and avoid overlaps or conflicts between different initiatives.

RURAL ENVIRONMENTAL REGISTRY (CAR)

The Rural Environmental Registry (CAR) is an important tool for implementing PES in Brazil. By mapping rural properties and their conservation areas, the CAR provides essential data for identifying potential PES beneficiaries and monitoring compliance with the commitments made. However, it is necessary to strengthen oversight and transparency in the use of the CAR, ensuring that it is used effectively to support environmental conservation.

DEGRADED AREA RECOVERY PLANS (PRADS)

Degraded Area Recovery Plans (PRADs) can also be integrated into PES, encouraging the restoration of degraded ecosystems. By offering payments for environmental services, PES can complement PRADs, making environmental recovery more economically viable for landowners.

CASE STUDIES AND LESSONS LEARNED

Case studies of successful PES programs in Brazil and other countries can offer valuable lessons for the expansion of this policy. In addition to the examples already mentioned, such as Bolsa Verde and the Water Producer Program, other cases can illustrate different approaches and challenges.

COSTA RICA: A MODEL OF SUCCESS

Costa Rica is often cited as an example of success in implementing PES. Since 1997, the country has had a national PES program that pays landowners for environmental services such as carbon sequestration and biodiversity conservation. This program has been financed by a combination of taxes on fossil fuels, international donations and voluntary payments from companies. Costa Rica's success demonstrates the importance of diversified funding and effective governance.

BRAZIL: WATER CONSERVANCY PROJECT

The Water Conservancy Project in Extrema (MG) is another inspiring example. This municipal program uses PES to encourage water conservation practices, such as the recovery of riparian forests and sustainable soil management. As well as improving water quality, the project has generated economic and social benefits for local farmers, highlighting the potential of PES to promote sustainable development at a local level.

THE ROLE OF EDUCATION AND COMMUNICATION

Education and communication play a crucial role in promoting PES and raising awareness about the importance of decarbonization. Environmental education campaigns can help engage local communities, increase adherence to PES programs and promote large-scale behavioral changes.

ENVIRONMENTAL EDUCATION

Including topics related to PES and sustainability in school curricula can encourage future generations to adopt more sustainable practices. In addition, training programs for farmers, traditional communities and public managers can strengthen local capacities to implement and monitor PES.

COMMUNICATION AND ENGAGEMENT

Effective communication is essential to increase the visibility of the PES and attract support from different sectors of society. This includes marketing campaigns, community events and the use of social media to publicize the benefits of PES and share success stories.

FUTURE PROSPECTS FOR PES IN BRAZIL

The future of PES in Brazil depends on a combination of factors, including legislative advances, technological innovation, sustainable financing and social engagement. As the country faces the challenges of climate change and environmental degradation, PES can become an increasingly relevant tool for promoting sustainability and social inclusion.

TECHNOLOGICAL INNOVATION

The adoption of advanced technologies, such as remote sensing, artificial intelligence and blockchain, can transform the implementation of PES, making monitoring more efficient and transparent. These technologies can also facilitate the integration of PES with other programs and public policies.

INTERNATIONAL EXPANSION

Brazil can also play a leading role in promoting PES at an international level, sharing its experiences and learnings with other countries. This could include participating in global PES networks, cooperating with international organizations and seeking global climate finance.

CONCLUSION

Payment for Environmental Services is a powerful tool for accelerating the decarbonization of the Brazilian economy by aligning economic incentives with environmental conservation. Its application in Brazil can generate significant benefits, both in terms of climate mitigation and social inclusion. Although it faces implementation challenges, these can be overcome through well-structured public policies underpinned by effective governance. Given the urgency of the climate crisis and the unique characteristics of Brazil, PES should be prioritized as a strategic instrument for the transition to a low-carbon economy.

REFERENCES

1. Brasil. **Lei nº 14.119, de 13 de janeiro de 2021.** Institui a Política Nacional de Pagamento por Serviços Ambientais e dá outras providências. Disponível em: http://www.planalto.gov.br/ccivil_03/_ato2019-2022/2021/lei/L14119.htm. Acesso em: 11 mar. 2025.

2. Costa Rica. **Programa Nacional de Pagamento por Serviços Ambientais.** Disponível em: https://www.fonafifo.go.cr/. Acesso em: 11 mar. 2025.

3. Agência Nacional de Águas. **Programa Produtor de Água.** Disponível em: https://www.ana.gov.br/. Acesso em: 11 mar. 2025.

4. Tribunal de Contas da União (TCU). **Referencial Básico de Governança Aplicável a Órgãos e Entidades da Administração Pública.** Brasília: TCU, 2014. Disponível em: https://portal.tcu.gov.br/. Acesso em: 11 mar. 2025.

5. Extrema (MG). **Projeto Conservador das Águas.**Disponível em: https://www.extrema.mg.gov.br/. Acesso em: 11 mar. 2025.

6. Organização das Nações Unidas (ONU). **Fundo Verde para o Clima.** Disponível em: https://www.greenclimate.fund/. Acesso em: 11 mar. 2025.

7. Ministério do Meio Ambiente. **Cadastro Ambiental Rural (CAR).** Disponível em: https://www.car.gov.br/. Acesso em: 11 mar. 2025.

8. Agência Internacional de Energia Renovável (IRENA). **Relatórios sobre descarbonização e economia de baixo carbono.** Disponível em: https://www.irena.org/. Acesso em: 11 mar. 2025.

9. Programa das Nações Unidas para o Desenvolvimento (PNUD). **Relatórios sobre governança e sustentabilidade.** Disponível em: https://www.undp.org/. Acesso em: 11 mar. 2025.