Chapter 4
Global Environmental Governance and ODA from Japan to Brazil

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4.1 Introduction

Japan and Brazil have been historical partners in development cooperation/assistance and share important political diplomatic ties. In the field of International Relations (IR), cooperation is defined as the mutual adjustment of government policies through a process of policy coordination (Martin 1993, p. 434). In this work, we look specifically at international cooperation and consider it as joint projects and programs that are carried out within the framework of Official Development Assistance (ODA) from Japan to Brazil. Even though ODA refers primarily to relations between countries, non-state and subnational actors have actively participated either as beneficiaries or as agents in projects and programs.

Global environmental governance is understood as a multi-layered and multi-dimensional process in which diverse actors participate. These actors can be state and non-state and involve institutional arrangements from the global to the local level; they include individuals, organizations, or networks that respond to global environmental challenges by trying to set agendas, establish norms and rules, implement action programs or policies at the local, national or international levels (Rosenau 1992; Young 2000; Biermann et al. 2009; Gonçalves and Inoue 2017). The multilateral environmental agreements (MEAs) are essential parameters for global governance that specify principles, norms, rules, and procedures which have been widely

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agreed upon. Brazil and Japan have been actors in multilateral negotiations and diplomacy, both have signed important MEAs dealing with climate change, biodiversity, desertification, persistent organic pollution, etc., and both have committed to the Sustainable Development Goals (SDGs). State and non-state actors, international organizations, and Non-Governmental Organizations refer to MEAs when setting their policy directions, such as ODA projects and programs.

However, previous studies on development cooperation/assistance have not fully explored the dimension of "environmental sustainability" and how multilateral environmental commitments guide development cooperation or are implemented through it. This is an important dimension of global environmental governance that is often overlooked, and its real impact on environmental sustainability is yet to be identified and assessed. There has also not been much attention paid to the relationship between global level MEA commitments and what has been actually implemented through ODA programs and projects on the ground. Previous studies already described the purpose and significance of the Japanese government's assistance to Brazil both on agriculture and space technology programs (Dantas 2019), and the specific programs and results of JICA's assistance to Brazil on sustainable agriculture (Hosono et al. 2016, 2019). In this sense, we aim at analyzing ODA programs and projects between Japan and Brazil by using this encompassing notion of global environmental governance.

More specifically, we will identify Japan's ODA program and projects in Brazil to examine whether they can be considered a response to global environmental commitments. We will also scrutinize two cases at the local level: PRODECER (The Japanese–Brazilian Cooperation Program for Cerrados Development) in Paracatu, Minas Gerais, and SAF (Agroforestry Systems) in Tomé-Açu, in Pará. We will identify the actors and processes to analyze to what extent development cooperation between Japan and Brazil can be related to global environmental and sustainable development commitments. Our goal is to understand the challenges to boosting international cooperation that promotes sustainable development and what policies are needed to do so.

Through literature review, document analysis, and interviews, we identify development cooperation programs and projects implemented until 2020 to create a broad overview of the trends and how environmental sustainability is discussed relative to other areas. Then, we analyze the cases at the local level (PRODECER in Paracatu and SAF in Tomé-Açu) to examine whether they can be related to global environmental governance processes, and more specifically, to what extent these respond to MEA commitments by both countries.

The chapter has three sections after this introduction. The first section focuses on the Inter-state/bilateral level of governance processes. The second section identifies Brazil's and Japan's main foreign policy positions related to environmental issues and MEAs. Then, it outlines the historical background of the cooperation in environmental sustainability between Brazil and Japan and discusses the guidelines (policy directions/orientation/goals) of Japanese ODA and the cooperation framework agreed between both countries (what is negotiated/agreed upon during the Comistas—Bilateral Cooperation Commissions). This section also systematizes the

available data about ODA. In other words, it sheds light on the changes in Japan–Brazil relations that occurred after the transformation of Japan's ODA budget to Latin American countries. The third section deals with the subnational-local level to analyze two cases of bilateral programs and projects: PRODECER (Paracatu, MG) and Agroforestry Systems (Tomé-Açu, PA) using the global environmental governance analytical framework. Finally, the conclusion section provides lessons learned from cooperation in environmental sustainability between Brazil and Japan.

4.2 Multilateral-Global Dimension/Level

Multilateral environmental agreements (MEAs) are a set of conventions, accords, agreements among nation-states to promote environmental sustainability and sustainable development. Examples ranged from the well-known United Nations Framework Convention on Climate Change and related Paris Agreement to those less known, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Instruments like the Convention on Biological Diversity and the 2030 Agenda on the Sustainable Development Goals are also included. This set of legal documents expresses different types of commitments, both binding and non-binding, resulting from global mobilizations that have included a broad diversity of actors at the global level.

The global level is more comprehensive than national state actors, encompassing state and non-state, subnational, and local actors from the public, private, and civil society sectors. MEAs are important because they establish global collective principles, norms, rules, procedures, and action programs.

4.2.1 Conceptual Lenses—Global Sustainability Governance

Our analytical framework considers governance as a global–local process composed of multiple actors, governmental and nongovernmental (state, civil society, and market) from global to local (global, international, national, subnational, local) which can be multilevel or polycentric (Ribeiro 2022, forthcoming). From an IR perspective, our framework blurs the distinction between external and internal, or the domestic and international levels, established by neorealism (Waltz 1979; Mearsheimer 2001). Governance processes include the establishment of agendas, making, implementing, and adjudicating rules, and setting goals and programs of action (Young 2000; Biermann et al. 2009; Avant et al. 2010) to deal with global collective issues.

Therefore, global environmental governance is understood as a multi-layered and multi-dimensional process in which diverse actors take part. Using it as an analytical framework, we aim to shed light on multiple levels of analysis, diverse actors, power relations, and the three sustainability dimensions (ecological-environmental, social, and economic) to assess ODA between Japan and Brazil. More specifically, we

consider global commitments established on MEAs as the goals or parameters for global governance processes. By doing so, we analyze Japanese ODA programs and projects in Brazil, asking to what extent they contribute to realizing these global commitments and goals.

4.2.2 Brazil's and Japan's Positions in the Global Environmental Arena

The Brundtland's Commission final report, "Our common future," influenced various global actions related to the environment and development, including the creation of the United Nations Conference on Environment and Development (UNCED) in 1992 (WCED 1987). The Rio 1992 Conference was considered a landmark for global environmental governance when major international environmental agreements were signed. In this conference, the Rio Declaration, the Agenda 21, Convention on Biological Diversity (CBD), and United Nations Framework Convention on Climate Change (UNFCCC) were signed by 156 countries, including Brazil and Japan. By this time, the concept of sustainable development was beginning to take root, and this too was to have significant impacts on Brazil and Japan's foreign environmental policy.

In the mid-1980s, Brazil gradually changed its views on environmental issues. It initially rejected these issues in multilateral conferences, like the 1972 Stockholm United Nations Convention on Human Environment, considering it a problem for Northern rich countries. However, in 1989 Brazil offered to host the United Nations Conference on Environment and Development and was then active in negotiating and signing climate and biodiversity conventions; it also blocked the establishment of a legally binding document on forests.

Since the Rio 1992 Conference, Brazil has had a mixed profile in the global environmental arena (Viola and Gonçalves 2019), moving from veto to proposition in sensitive issues like forest management (Carvalho 2012); playing a leadership role in other areas, such as biodiversity (Lovejoy and Inoue 2013); and being actively involved in climate negotiations through coalitions like BASIC either by blocking or forwarding resolutions (Hochstetler and Viola 2012). Brazil has therefore been a relevant actor in the construction of the global environmental government architecture by actively participating in negotiations of multilateral environmental agreements (MEAs), but its roles and types of participation have been highly variable (Hochstetler and Inoue 2019; Viola and Gonçalves 2019).

On the other hand, Japan was heavily criticized by the international community as "an economic animal" or "environmental outlaw" in the mid-1980s. However, the end of the Cold War fundamentally changed global politics and opened the window for global cooperation (Sakaguchi et al. 2021). Japan has also become an increasingly active supporter of global environmental agreements and a major funder of bilateral environmental initiatives (Schreurs 2018). One of Japan's first attempts to engage in multilateral action toward addressing global environmental problems was with

the establishment of the Brundtland Commission in 1984 under the UN General Assembly. The Japanese government proposed the establishment of the commission and made a substantial financial contribution toward it (Schreurs 2018, pp. 76–77). In 1989, Japan pledged to provide a considerable amount of environmental official development assistance (ODA) at the G7 Arch summit and the 1992 Rio Summit. The conference had major impacts on Japan's foreign and domestic environmental policies. It seemed that Japan would evolve from a reactive to proactive state (Calder 2003); it took a leadership role in building an agreement on the 1997 Kyoto Protocol.

The United Nations Conference on Sustainable Development (Rio+20) was held in Rio de Janeiro, Brazil, from June 20, 2012 to June 22, 2012. Following the adoption of the outcome document "The future we want" at Rio+20, the United Nations General Assembly adopted "the 2030 Agenda for Sustainable Development" in 2015. This agenda consists of 17 global goals and 169 targets that should be achieved as SDGs by 2030; their development was the first time that the international community discussed environmental, social, and economic development in an integrated way. Prior to that, environmental and developmental goals were handled separately. The outcome document "The Future We Want" confirmed the importance of integrating the three elements of the environment, society, and economy (Dodds et al. 2017).

Meanwhile, Japan has struggled to find the Post-Kyoto Protocol negotiations. The Japanese government manifested its potential to the fullest and participated in building a better society to achieve sustainable development worldwide. In Rio+20, Japan presented three specific initiatives toward creating a "Green Future": (1) Future City, (2) Green Cooperation Volunteers, and (3) cooperation to reduce risk from catastrophic natural disasters (MOFA 2012a), based on the understanding of "human security."[1]

4.3 Japan's Cooperation Trajectory and "Green" ODA to Brazil

4.3.1 Historical Overview

Japan's recovery from the Second War was steady and relatively fast, with the country becoming an economic power and an important international player in several arenas, including development cooperation. After significant international criticism in the 1970s and 1980s, Japan increased its ODA contributions and became a large financial supporter of major international organizations. During the 1970s, both Japan's status as a developed country and the accompanying responsibilities were recognized by both Japan and other members of the developed world. JICA (the Japan International Cooperation Agency) was established in 1974.

An issue of burden-sharing and the US wanted Japan to do more in economic cooperation. To comply, Japan decided to double its ODA budget in 1977 (Kato 2016).[2] Japan's ODA continued to expand in volume and develop in its range of

activities during the 1980s. In 1989, it became the world's top ODA donor, surpassing the United States. However, since the economic downturn of 1991, the Japanese government has faced a more difficult budgetary environment, and further expansion of financial contributions was limited (Funabashi and Ikenberry 2020).

In 1992, after the end of the Cold War, Japan formulated the ODA Charter and charged the ODA with the area of social development in developing countries. The Japanese government was conscious of contributing to international interests in Brazil in particular through urban poverty and medical measures. The continued decline of Japan's ODA during the post-Cold War was largely because of the prolonged recession and the alarmingly high level of public debt (Kato 2016). The ODA Charter was revised for the first time in 11 years by a Cabinet decision on August 29, 2003; at that time, the environment was considered to be a global issue. The balance between the environment and development continues to be the first of the principles of development cooperation of ODA.

During the 2000s, JICA became an independent administrative institution and was merged with the ODA loan department of the Japan Bank for International Cooperation (JBIC) (Kato 2016). JICA emphasized support for African countries, which have the greatest need for economic development, and stated that ODA toward Asian countries would place greater emphasis on national interests from a geopolitical perspective and the strength of historical and economic ties.

Figure 4.1 shows the evolution of total ODA from Japan between 1967 to 2019 (OECD 2021a).[3]

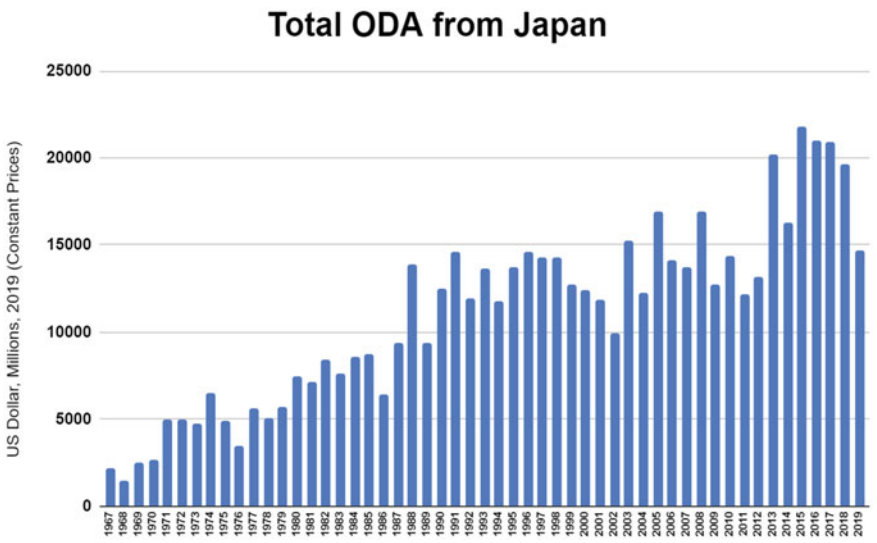

Fig. 4.1 Total cooperation for international development, 1967–2019 (Millions of dollars) (*Source* OECD 2021a)

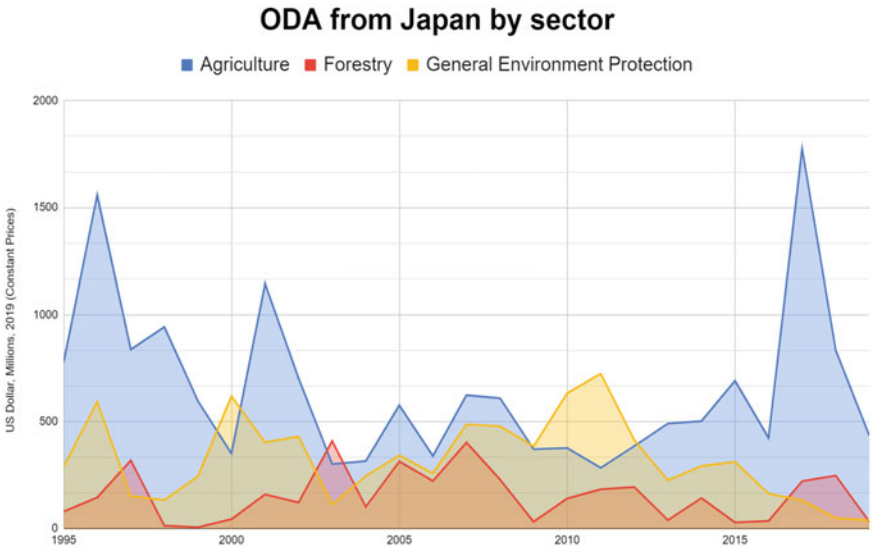

Fig. 4.2 ODA from Japan by selected sectors: Agriculture, forestry and general environmental protection, 1995–2019 (Millions of dollars) (*Source* OECD 2021a)

Figure 4.2 demonstrates the evolution of total ODA from Japan between 1995 and 2019 in three sectors related to the purposes of this study, namely agriculture, forestry, and general environmental protection.[4] In most of those years, the ODA spent in the sectors of forestry and general environment protection was lower in relation to the amount directed to the agricultural sector, except in 2000, 2003, 2009, 2010, 2011, and 2012. The referred disparity is also verified in the highest amounts spent in each sector: USD 409 million for the sector of forestry in 2003; USD 723 million for general environment protection in 2011; USD 1.7 billion for agriculture in 2017 (OECD 2021a).

ODA has also been identified as an instrument for the implementation of the Liberal Democratic Parties (LDP) government whose economic policy was called "Abenomics" (MOFA 2012b). With these policy orientations, the government revised the ODA Charter for the second time in 2015. The new document, now titled Document Cooperation Charter, emphasizes the role of ODA as a meditation for other actors that engage in development cooperation (Kato 2016).[5]

4.3.2 Japan–Brazil Development Cooperation

Brazil and Japan have been historical partners in development cooperation/assistance. Since the start of ODA to Brazil–Japan has closely engaged with issues faced by Brazil through the provision of support for sustainable growth in Brazil in a variety

of fields (MOFA 2020). For example, in 1973, the US embargo on soybeans led Japan to pursue diversification of countries from which they could import food. Japanese ODA, therefore, combined the Brazilian government's goal of economic development of inland areas in the country and the Japanese goal of food security by increasing the production of grains. Projects initially included not only the agricultural field such as the development of Brazil's Cerrado, but also an investment for the Usiminas steel plant project and technical cooperation in environmental conservation. Since the 2000s, the Japanese government has also provided support to improve the abilities of relevant government agencies, such as improving the technology of satellite images, and have helped to control and prevent environmental crimes such as deforestation.

Since 2010, ODA policy toward Latin American countries has become a low priority because most Latin American countries already achieved a certain degree of economic development. ODA projects in Brazil also covered social development: urban issues and environmental and disaster prevention measures, South–South cooperation, third-country cooperation with Latin America and African countries with Brazil as a partner.

In 2019, JICA's development cooperation in Brazil celebrated its 60th anniversary. These figures shed light on the changes in Japan–Brazil relations that occurred after the transformation of Japan's ODA budget to Latin American countries.

Figure 4.3 demonstrates the evolution of ODA disbursements from Japan to Brazil in the period between 1998 and 2019 (OECD 2021b).[6]

With an average amount of USD 64.8 million dollars between 2018 and 2019, Japan was positioned as the third largest donor of gross ODA for Brazil, after Germany and France (OECD 2021c). Figure 4.4 shows the number of projects carried

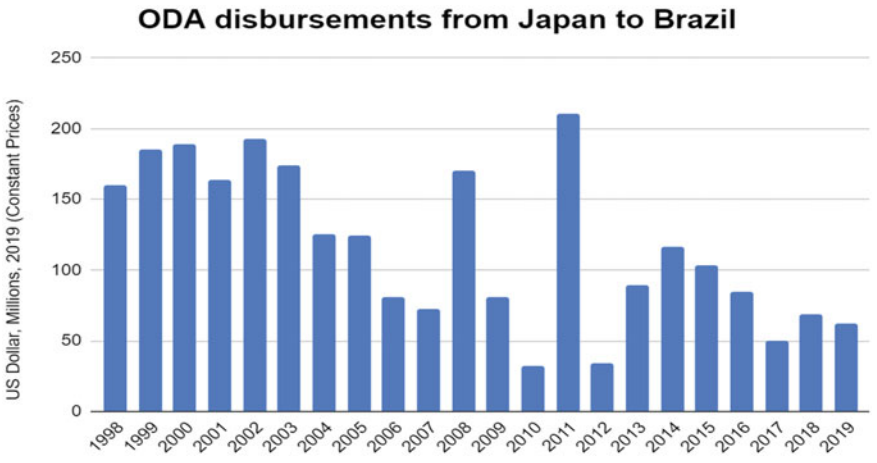

Fig. 4.3 ODA disbursements from Japan to Brazil, 1998–2019 (Millions of dollars) (*Source* OECD 2021b)

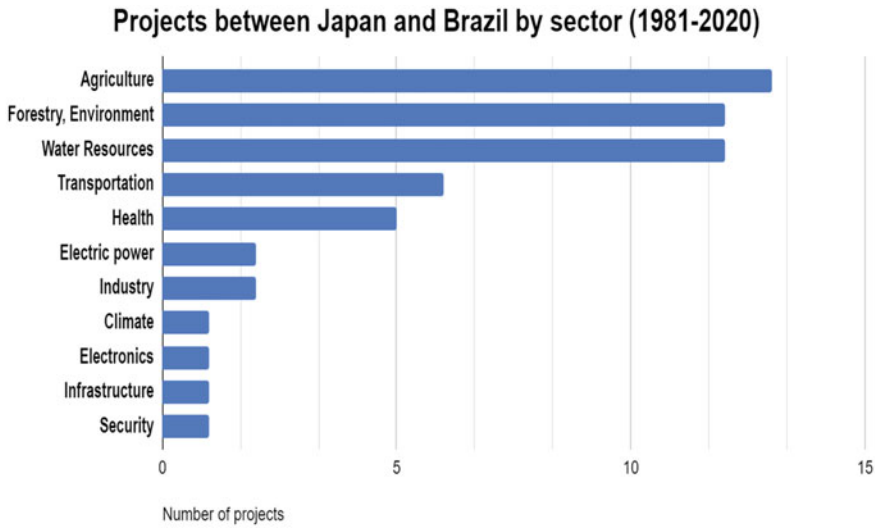

Fig. 4.4 Projects between Japan and Brazil by sector, 1981–2020 (number of projects) (*Source* JICA 2021a, b, c)

out in Brazil with ODA from Japan in the period from 1981 and 2020 by sector (JICA 2021a, b, c).[7]

Brazil considers itself a dualist country; this means that it provides cooperation for international development including technical cooperation, humanitarian assistance scholarships, and contributes to international organizations (Hochstetler and Inoue 2019; Purushothaman 2021), while still receiving ODA. The Brazilian government has also worked towards the SDGs 2030. According to the 2019 Sustainable Development Report, Brazil has reached Goal 7 (Affordable and Clean Energy), but Goal 3 (Good Health and Well-Being), Goal 8 (Decent Work and Economic Growth), Goal 10 (Reduced Inequalities), and Goal 16 (Peace, Justice and Strong Institutions) have not been achieved. JICA believes that it is necessary to support the achievement of Goal 14 through sewerage projects in Brazil.[8] Therefore, the ODA budget tends to expand to accommodate cooperation with Japanese companies planning to promote their relationships with Brazilian government agencies and Nikkei society.

4.3.3 The Environmental Dimension in Japan–Brazil's Development Cooperation

The Paris Agreement was created at the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) in 2015. It recommends the implementation and support of Reduction of Emission from Deforestation and Forest Degradation (REDD)+, which is the most important framework for efforts in

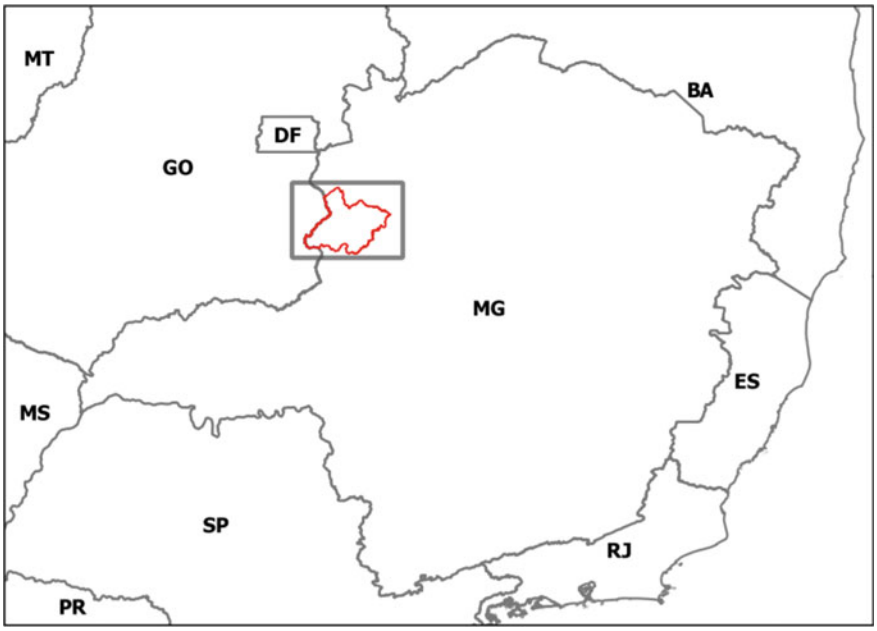

Fig. 4.5 Paracatu, Minas Gerais (*Source* IBGE 2017)

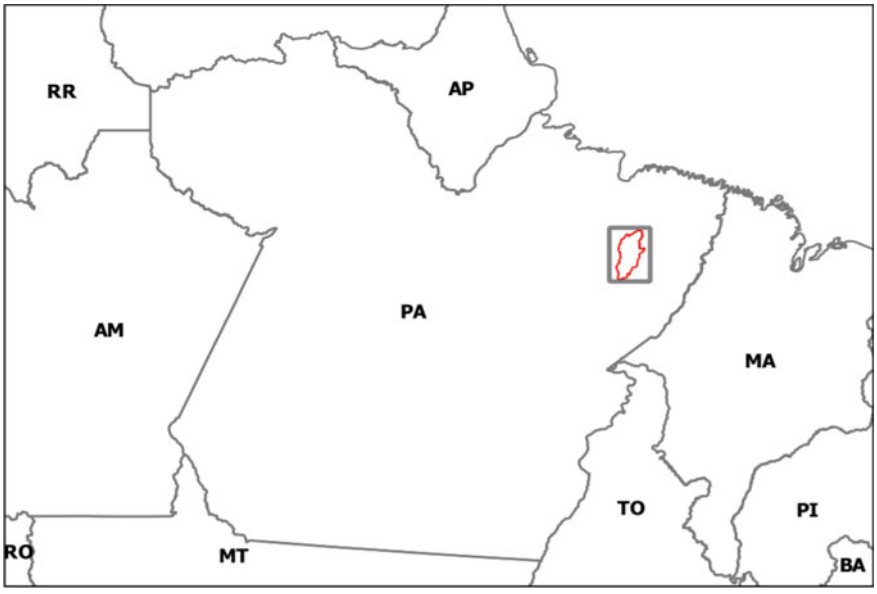

Fig. 4.6 Tomé-Açu in Pará (*Source* IBGE 2017)

the field of forests and natural environments in the international community. Under the Paris Agreement, developed countries promised to fund climate change mitigation and adaptation measures in developing countries.

The environmental dimension in Japan–Brazil's development cooperation is relevant to the conservation of the Amazon rainforest which is closely related to mitigating greenhouse gas emissions (GGE). In recent years, peatland management and blue carbon conservation (carbon absorbed and stored in coastal ecosystems such as mangroves and seaweed beds) have also attracted attention. JICA implemented a project to utilize Advanced Land Observing Satellite (ALOS) images to help protect the Brazilian Amazon rainforest and combat illegal deforestation (cooperation period 2009–2012).

The Japanese government has also provided support to improve the capabilities of relevant government agencies, such as better technology for satellite images, and has achieved results in the control and prevention of environmental crimes, such as deforestation. Furthermore, cooperation with third world countries and a partnership with Nikkei communities have been proposed. An Amazon field museum project that JICA supported also began in 2019. This project aims to contribute to the sustainable development of local communities by conducting research, conservation, and dissemination activities.

Projects carried out in Brazil with ODA from Japan have become increasingly related to the environment and sustainability since the United Nations Conference on Environment and Development (UNCED), which occurred in 1992 in Rio de Janeiro.

According to JICA's data (2021a, b, c), no activities related to the environment took place between 1981 and 1991, but projects in parallel fields were identified. A total of eight projects were carried out in that time; four in transportation, three in agriculture and agricultural civil engineering,[9] and one in electricity.

Between 1992 and 2011, marked by changes in Brazilian environmental legislation, before the signing of the new Brazilian Forest Code—Law nr. 12.651/2012, 10 projects out of a total of 42 were carried out in the areas of environment, forestry, and forest conservation, representing approximately 23.80% of all projects. Half of these projects (5) were expressly related to the Amazon biome. Between 2012 to 2020, six projects were underway or under discussion, two of which were related to environment preservation, specifically the Amazon. The two initiatives analyzed in the next section, PRODECER, and SAF, are not included in the data presented in Fig. 4.4 and subsequent paragraphs since both started prior to the time interval with available data.

4.4 Subnational–Local: PRODECER in Paracatu and Agroforestry Systems in Tomé-Açu

This section analyzes two cases of bilateral cooperation, namely the Japanese–Brazilian Cooperation Program for Cerrados Development—PRODECER (Paracatu, MG) and Agroforestry Systems—SAF (Tomé-Açu, PA), which were carried out in two different Brazilian biomes, the Cerrado and the Amazon rainforest. It focuses on the subnational–local levels using the global environmental analytical framework.

As we mentioned, global environmental governance is understood as a multi-layered and multi-dimensional process with diverse actors. These two sample cases are significant both because they demonstrate how the environmental agenda has been incorporated into cooperation practice and because they illustrate how MEAs and GEGs are implemented in bilateral cooperation projects.

4.4.1 PRODECER: Report on Environmental Sustainability

PRODECER, created by a joint statement signed in 1974 and implemented in three stages from 1979 to 2001, aimed to stimulate an increase in the global food supply and contribute to development in the Cerrados region, a biome that occupies approximately 25% of the Brazilian territory.

According to a report jointly published by Brazil's Ministry of Agriculture, Livestock and Supply (MAPA) and JICA, the main features of PRODECER included the participation of the Brazilian and Japanese public and private sectors; the development of colonization poles with the settlement of medium-sized farmers that were supported by cooperatives; creation of a binational company—Agricultural Promotion Company (Campo)—for the implementation of the Program; and strict attention paid to the environment, with innovation on issues such as "mandatory forest reserves in condominiums" and "encouraging modern soil conservation methods" (BRAZIL and JICA 2002, R-8).

The numerous studies on PRODECER characteristics and impacts can be separated into two groups. The first group is comprised of studies that focus on the positive repercussions of the program for the relations between Brazil and Japan, for food supply in the world and for economic development and agricultural modernization in the country, including socioeconomic improvements in inland regions. The second group, which is supported by the official history of the program,[10] includes research that criticizes the repercussions of PRODECER in the form of land concentration, rural exodus, social conflicts, environmental degradation, indebtedness, bankruptcies, and cultural changes in rural communities, among others.[11]

In official report, PRODECER was positively evaluated in terms of efficiency, achievement of its objective, impact, and adequacy of the initial planning and sustainability. Regarding sustainability, the report highlights the "multiple effects of PRODECER's direct impact on local communities and the indirect impact on

regional and national economies and agriculture and, finally, on the global food supply." To sustain these multiple effects, it recognized the need for "sustainable use of incorporated agricultural areas" and "maintenance of their spreading effects" (Brazil and JICA 2002, R-12).

However, the report also refers to the negative impacts of the Program, especially regarding deficiency in energy and transport infrastructure, indebtedness of farmers, and environmental problems, such as the reduction of the area's native vegetation and depletion of water resources. The section on prospects for the development of the Cerrados includes challenges related to environmental preservation, ecosystem protection, and sustainable agricultural development. It is recommended that the preservation of biodiversity be focused on by a combination of ecological corridors,[12] protection of the indigenous population and their land, and the awareness of producers about the importance of environmental preservation. This should include compliance with Brazilian environmental legislation related to agricultural production activities, such as rules on the protection of native and riparian forests, installation of irrigation equipment, and handling of chemical fertilizers and pesticides.

4.4.1.1 PRODECER in Paracatu, Minas Gerais

PRODECER started in the municipality of Paracatu, located in the Northwest region of the state of Minas Gerais, which has native vegetation typical of the Cerrado. The municipality's soil has been exploited for mining since the eighteenth century, while more technology and machinery became common in agriculture. It was implemented on a large scale in the second half of the twentieth century, stimulated by government plans and programs such as PRODECER. The location hosted the majority of projects carried out under the Program, five out of a total of 21 projects, and received the largest number of producers settled, 147 out of a total of 717 producers. In 2002, 97 out of a total of 466 producers settled in all locations remaining residing in the areas of the municipality where the projects were held (Brazil and JICA 2002; Sant'Anna 2018).

The first PRODECER project in Paracatu—the pilot project of the program—was called *Novo Mundo*. Started in 1980 and structured through a partnership between Campo and Cotia Agricultural Cooperative (CAC), it was carried out in a total area of 23 thousand hectares (ha). The selection of areas for the project was based on analysis of aerial photographs and local research on topography, vegetation, hydrography, and roads, with the intention of identifying and confirming suitable conditions for mechanized agriculture. The areas which were close to rivers, with abundant vegetation, were designated as common natural reserves to be preserved (Hosono and Hongo 2016).

The main products cultivated within the *Novo Mundo* project were soybeans, corn, coffee, and beans. Other cultivated products included watermelon and cotton. The average area of the lots was between 800 and 1000 hectares (ha), with planted areas between 800 and 900 ha; the natural reserve area of 200 ha. The project was characterized by direct planting[13] by more than 50% of farmers, rotation between

soybean and corn crops, and implantation of irrigation equipment—central pivot—for coffee cultivation (BRAZIL and JICA 2002).

The next PRODECER project in Paracatu, still within the first phase of the program,[14] was *Entre Ribeiros I*. The project started in 1983, was developed through a partnership between Campo and the Agricultural Cooperative of Paracatu Valley (Coopervap) and included a total area of 10,315 ha.

The main products cultivated were soy, corn, pumpkin, tomato, pepper, beans, and garlic. Other products included pineapple, banana, carrot, and potato. The average area of the lots was 300 ha, with a planted area of 120 ha and a natural reserve area of 60 ha. Similar to the previous project, *Entre Ribeiros I* was characterized by rotation between corn and soybean crops and the implantation of central pivot in 3,000 ha of the planted area (Brazil and JICA 2002; Santos 2007).

Between 1985 and 1993, during the second phase of PRODECER, three projects were initiated in Paracatu, all of them supported by Coopervap, namely *Entre Ribeiros II*, in a total area of 10,843 ha; *Entre Ribeiros III*, area of 5,953 ha; and *Entre Ribeiros IV*, area of 3,984 ha. The projects were carried out without irrigation equipment in places where agricultural production was difficult due to conditions of low water availability (Brazil and JICA 2002).[15] According to the official report, the introduction of irrigation equipment contributed to reducing the damage caused by short mini droughts in the rainy season, known as *veranicos,* as well as facilitated "the consolidation of the crop rotation system, resulting in diversification" (Brazil and JICA 2002, pp. 3–29). Studies on PRODECER projects in Paracatu mention the establishment of crop irrigation systems by central pivots in the face of adverse climatic conditions, especially drought periods that hampered agricultural production (Pimentel and Botelho 2007; Santos 2007; Inocêncio 2010; Sant'Anna 2018). Agricultural producers who participated in PRODECER in Paracatu reported that the irrigated area led to higher productivity, making it possible to obtain two harvests per year. However, their debt accrued as the financing of pivots was affected by the high interest rates and inflation of the so-called lost decade (Sant'Anna 2018).

Furthermore, in a study on the impact of irrigation in the region of the *Entre Ribeiros* hydrographic basin, whose agriculture usage was stimulated by the *Entre Ribeiros* project, Santos (2007, p. 1) clarifies that agricultural production in this area occurred "dissociated from proper management, both with regard to land use and to water catchment in order to supply irrigation systems." Abstractions without proper technical care caused the process to produce scarcity in the area, which led to an intervention by the Public Prosecution Service (*Ministério Público*) demanding the readjustment of irrigation practices. During interviews with producers, they revealed, to a large extent, awareness of the water issue, given the evidence of the risk of compromising their activities and productivity levels. They recognized the existence of environmental problems and their responsibility in the process and indicated "distance between what irrigators do and the role of environmental bodies" (Santos 2007, p. 77).

This study draws attention to the associativism among producers which facilitated the organization of initiatives to structure the readjustment of irrigating practices and reduce excessive abstraction and water losses. The role of the Association to the Support to Entre Ribeiros Producers (AAPER) is highlighted in its efforts to encourage farmers to optimize the use of water and to mediate possible conflicts (Santos 2007).[16] The associativism among producers and their families is also highlighted in the studies by Pimentel and Botelho (2007)[17] and Sant'Anna (2018), which focus on the perspectives of people of Japanese origin (Nikkei).

Returning to the environmental issue, in the research conducted by Pessôa (1988, p. 9), "environmental degradation of proportions not yet dimensioned" was already mentioned among the effects of PRODECER. Santos (2007) indicates that research on the relationship between environmental preservation and sustainable agricultural practices was secondary compared to occupation, deforestation, and production, which is confirmed by the official report of the Program (Brazil and JICA 2002).

In the period from 1974 to 1999, studies were carried out within the scope of technical-scientific cooperation projects aimed at agricultural development in the Cerrados. Until 1992, research focused on techniques for rational use of the soil–plant-water system and grain cultivation. With the recognition of environmental impacts,[18] because of the accelerated process of agricultural occupation, the need to "evaluate natural resources and increase research that aimed at the balance between agricultural development and environmental preservation, promoting the practice of sustainable agriculture" was indicated (Brazil and JICA 2002, pp. 4–2). After 1994, studies were carried out in the areas of plant protection, soil fertilization, remote sensing, production systems, water quality, agricultural machinery, disease, and pest control. In addition, sustainable agricultural technologies were developed with an emphasis on environmental conservation. While cooperation in research was promoted, the project was called "Cerrados environmental monitoring" was carried out from 1992 to 2000, with the goal of assessing the environmental impact of the agricultural development process in the areas where the program was implemented. Indicators related to soil erosion, volume, and quality of water, vegetation, and insects were monitored.

The Rio 1992 Conference contributed to the improvement of environmental legislation in Brazil. PRODECER followed the changes in this legislation in the third and last phase of the program, carried out in the states of Tocantins and Maranhão, from 1995 to 2001. At that time, each area was 1,000 ha and the projects had a nature reserve area expanded to 50% of the properties, mostly preserved as collective and grouped areas. In this phase, the introduction of irrigation equipment was programmed, based on the experience obtained in previous projects, and direct planting was performed intensively (Gonçalves 2018).[19]

Although PRODECER has officially demonstrated compliance with Brazilian environmental legislation and incorporated its changes in the third phase, especially in relation to the establishment of natural reserve areas, the program's sustainability was harmed in its environmental dimension by its negative environmental impacts, such as reduction and depletion of water resources, climate change, soil degradation and erosion, and the reduction of native fauna and flora. However, it was possible to

verify that the program achieved sustainability in its social dimension, in the form of associativism between producers who participated in the program and their families, including people of Japanese origin (Nikkei).

4.4.2 Agroforestry Systems: Report on Environmental Sustainability

During the 1980s, Agroforestry Systems (SAF) was founded in the municipality of Tomé-Açu, located in the North Region of the State of Pará, which has a wide range of Amazon and Cerrado biomes. SAF is a system that cultivates a combination of crops on a single land, contains at least one large tree, and uses both vertical and horizontal land production, also known as "agriculture in which people and forests live together." In Tomé-Açu, Pará, SAF is considered a practical example of technology transfer even for small non-Japanese farmers. JICA, the government of Pará, and the Agricultural Cooperative of Tomé-Açu (CAMTA) have collaborated to conduct training in Japan and abroad on SAF for Brazilian agronomists. Policy effects were confirmed through similar activities in other communities, both in Brazil and in other countries, such as Peru.

4.4.2.1 Agroforestry Systems in Tomé-Açu, Pará

The activities in Tomé-Açu have attracted the attention of international organizations such as the Food and Agriculture Organization of the United Nations (FAO), which operates in agriculture and social development, as a good example of sustainable development.[20] We can evaluate the character of SAF in Tomé-açu by using the global environmental governance analytical framework at a subnational–local level. Firstly, SAF contributes to global sustainable development by changing agricultural practices on the local level. SAF as Nikkei agriculture in the Amazon makes highly productive planted forests, complements the income of small farmers, and contributes to their rural settlement. It has attracted international attention in the field of environment and sustainability as a measure to boost sustainable development. The lessons from SAF-based trading also provide a wake-up call to an international trade that generates uneven resource distribution between developed and developing countries. Therefore, the SAF project-initiative in Tomé-Açu, with support from JICA, has promoted environmental, social, and economic sustainability and thus can be considered in tune with global goals and MEAs, although it still needs more time to know how it will persist over time and what the positive (or negative) impacts are for climate, biodiversity, and forest.

Secondly, the virtues of the Nikkei community with ethics, solidarity, and resilience were crucial to the successful development of SAF in Tomé-Açu. Japanese immigrants in Amazon have always been fraught with difficulties, but that is why

they were able to unite and develop their community (Saes et al. 2014). In general, we tend to think of human activities as destroying forests, but the ability of local communities to choose rich and proactive activities is a benchmark for maintaining a balance between economic development and forest conservation and creating a sustainable society where people and forests coexist in harmony from the perspective of global environmental governance. However, it cannot be denied that the success of the agroforestry activities in Tomé-Açú was coincidental in the history of community development by Japanese immigrants. If consumers try to demand an increase in primary product production through agroforestry farming, it will be difficult to maintain the current farming method, which was created by motivated people who had a narrowly intended result from the perspective of land use and labor costs.

In these senses, sustainable development risks promoting disorderly development without the creation, dissemination, and proper management of scientific knowledge. A simple binary conflict of environmental conservation or economic development has created problems because of short-term interests, lack of knowledge, and ideological conflict. For example, in the debate over forest conservation in the Amazon, the existence of poverty has long led to the claim of sustainable development along with environmental conservation, but this claim risks justifying widespread development (Nishizawa et al. 2005). On the other hand, if we pay attention only to protecting the forest, it will not be accompanied by benefits for the producers. In general, SAF, which attracts attention only from being considered "environmentally friendly," must be balanced by which social development of the region can be carried out at the same time in addition to the aspect of economic development in order to maintain sustainability (Masukata 2021).

4.5 Conclusion Lessons Learned from Cooperation in Environmental Sustainability

This chapter tried to shed light on the environmental dimension of Japanese ODA to Brazil–Japan's development assistance to Brazil is limited by the government's pursuit of both the national interest and international public goods. Quantitative data and the two cases demonstrate the incorporation of environmental norms into the practice of ODA. For instance, Cerrado agricultural development and cooperation in the Amazon area have been implemented in face of two global norms: food security and environmental conservation. This has been done through financial and technical cooperation. The former did not have any environmental provision in its original formulation, but as time went by, regulations about water, for instance, had to be considered. In the Amazon, most projects had an environmental dimension.

This chapter shows that Japanese cooperation with Brazil has changed over time and that both countries can maintain and consolidate cooperative relations even if

there are crucial transformations in the international arena. Global environmental governance norms have cascaded to ODA projects more slowly than we wished, but data and the evidence from case studies show that global commitments have a role in the direction of development assistance from Japan to Brazil. This is important and necessary to respond to global environmental challenges like climate change or biodiversity loss, though that may not be sufficient given the pace of global environmental change.

Along with incorporating global guidelines on the environment and sustainability in their policies and legislation, Brazil and Japan regarded these issues as priorities in their bilateral relations agenda. Environment and sustainability gained prominence in Japan's technical and financial cooperation with Brazil in the 1990s, following global consensus on the importance of policies and actions aimed at environmental preservation and responsibility. It is worth highlighting the pioneering efforts of Nikkei communities in the two cases analyzed at the subnational–local level, and the role of cultural values such as ethics, solidarity, resilience and associativism in conducting the initiatives.

The cooperation in environmental sustainability between Brazil and Japan is at a crossroads in the COVID-19 era. In March 2021, Brazil and Japan entered into the Tomé-Açu Memorandum of Cooperation Regarding Sustainable Use of the Amazon Region's Biodiversity (MOFA 2021b). The objective of this Memorandum of Cooperation (hereinafter referred to as "this MoC") is to further bilateral cooperation between the Participants for the promotion of agroforestry systems in the Amazon. Through the Memorandum, it is expected that cooperation on the sustainable use of agroforestry systems and biodiversity in the Amazon region will be further promoted. It also aims to promote science, technology, and innovation for joint research and encourage the exchange of experiences about sustainable use and the fair and equitable sharing of benefits that arise from the economic utilization of the Amazonian biodiversity (The Ministry of Foreign Affairs of Japan and The Ministry of Foreign Affairs of the Federative Republic of Brazil 2021).[21]

The inclusion of the 2030 agenda for Sustainable Development in the development cooperation between Brazil and Japan can also promote more comprehensive cooperation between the two countries in the near future. Bilateral cooperation aims to contribute not only to mutual benefits but also to international interests. Cooperative relationships with sustainable development goals will be the driving force for promoting international cooperation by addressing cross-border issues while maximizing each other's national interests.

However, our global environmental governance framework indicates that one should always take a global–local perspective and that promoting sustainable policies (including the SDGs) might also have the negative effect of damaging the local environment. Development cooperation between two countries should always evaluate whether we are achieving agreement with citizens and social inclusion at the local level whilst contributing to global goals and commitments. Governments and corporations have strong desires to promote decarbonization and environmental protection,

but it often seems that they are putting their own and their country's interests first, and not paying attention to things that do not benefit them. We need to think about how we can achieve sustainable development in the true sense of the word, not just superficial and short-term "environmental protection" and "stable economic development."

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Notes

1. According to Key ODA policies at the Ministry of Foreign Affairs of Japan, human security is defined as the concept that advances the nation and community building through empowerment and protection of individuals to live happily and in dignity, free from fear and want. See MOFA (2021a).
2. The Japanese government acknowledged the country's food and natural resource insecurities, and hence the need to develop comprehensive security policies. Japan's ODA policy was modified. The shock occurred when Prime Minister Kakuei Tanaka made a visit to Southeast Asia in 1974 and was both political and diplomatic (Kato 2016).
3. The period selection was based on availability of data published in the statistics website of the Organisation for Economic Co-operation and Development (OECD), OECD.Stat.
4. The data source, OECD.Stat, provides figures of ODA from Japan by the three sectors separately from 1995 onwards. Until 1994, there is no data regarding general environment protection and the sectors of agriculture and forestry sectors are aggregated into "Agriculture, Forestry, Fishing."
5. The second Abe administration, which came to power in late 2012, embarked on a process of introducing a whole range of new policies, including, most importantly, national security and economic revitalization. The administration created a new National Security Strategy in December 2013, in which ODA was referred to as an important means of ensuring the security of the country (Kato 2016).
6. The period selection was based on availability of data published in OECD.Stat.
7. The majority of projects were held in the sectors of Agriculture (13), Forestry and Environment (12) and Water Resources (12), which accounted for approximately 66% of the total of 56 projects. "Forestry" and "Environment" were merged because projects in both areas focus on environmental and forest conservation.
8. Shinji Sato, Senior Representative of JICA, generally shared the undated information for use in our research and his associates conducted this interview at Brasília on 19th August 2019.
9. One of the projects in the area of agricultural civil engineering was the Program of Irrigation Equipment Financing (PROFIR), carried out from 1985 to 1992. This project's objective was to offer support to agricultural development through partial financing of the resources necessary to acquire irrigation equipment, such as central pivots, conventional sprinklers, and propelled sprinkler, for producers in the Cerrado region (BRAZIL and JICA 2002).
10. In general, this first group has its analysis based on written sources produced by Brazilian and Japanese governmental and business institutions, such as agreements, reports, speeches and other official documents about PRODECER (Brazil and JICA 2002; Harada 2013; Hosono et al. 2016).

11. The studies in this second group, in addition to considering written sources, incorporate oral reports from government authorities and producers and rural workers both participating and not participating in the program, as well as photographs and other unwritten sources (Pessôa 1988; Pires 1996, 2000; Duarte 1998; Osada 1999; Duarte and Theodoro 2002; Mendonça 2004; Pessôa and Inocêncio 2014).
12. Environmental protection areas where the displacement of plant and animal species is possible, in order to reduce the effects of fragmentation of ecosystems, separated by human interference (Brazil 2000).
13. According to the official report, the growth in the adoption of the technique contributed to reducing the production cost, protecting the soil from erosion, and favoring the development of microbiological activity, increase in the organic matter content, and water retention on the ground (Brazil and JICA 2002).
14. Paracatu held two out of four projects from the first phase of PRODECER, and all of them were developed in municipalities of the State of Minas Gerais.
15. According to the official PRODECER report published by the Brazilian government and JICA, three out of 15 projects from the second phase of the Program were developed in Paracatu. The other 12 projects were carried out in municipalities of the state of Minas Gerais, Goias, Bahia, Mato Grosso and Mato Grosso do Sul (Brasil/JICA 2002). In a publication on Coopervap's 50th anniversary, it was registered that Entire Ribeiros IV was aborted after its inception "because the money for its implementation was blocked by the F. Collor government" despite farmers' struggles (COOPERVAP 2013, p. 51).
16. AAPER was created in 1984, at the initiative of the agricultural settlers themselves, so that they could organize the production and commercialization of agricultural products when faced with differences with Coopervap. The experience of creating their own associations, carried out for *Entre Ribeiros I* project, was followed by the settlers of the projects *Entre Ribeiros II, III and IV*.
17. Pimentel and Botelho (2007, p. 2) discussed the relationship between the history of PRODECER and the life trajectory of farmers, who left other regions to develop an agriculture project in the associativism stemmed from their participation in the projects.
18. The appearance of pests and diseases, damage arising from the continuous succession of the same crop, climate change, soil degradation and erosion, reduction of native fauna and flora in the region, and destruction of the natural ecosystem are all mentioned as effects (BRAZIL and JICA 2002).
19. PRODECER's official report mentions that "significant advances were observed in the elaboration and establishment of legal norms aimed at environmental preservation in the development process" (Brazil and JICA 2002, pp. 5–34). At the time of the first and second phases of the program, the Brazilian Forestry Code of 1965 was in force, which had established the creation of legal reserves—the amount of native forest to be preserved—of 50% in the Amazon region and 20% in the rest of the country. After 1996, provisional measures increased the legal reserve in the Amazon region to 80%, while the legal reserve in the Cerrado within the Amazon was reduced to 35% and it was maintained 20% for the other biomes (Gonçalves 2018).
20. Alberto Oppata, president of CAMTA and his associates conducted several interviews at Tomé-Açú on 10th–11th March, 2020.
21. Japan launched a joint statement during the Japan–U.S. and Brazil Exchange (JUSBE) on November 10, 2020. Under this trilateral cooperation, Japan will seek to strengthen involvement in Brazil towards achievement of Sustainable Development Goals, without setting out a strong sense of opposition to China.

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