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The Structure and Characteristics of International Development Cooperation in Agroforestry Over the Past 30 Years: 1988-2019

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Abstract

Food security and climate change continue to be the most critical issues in many parts of the world, particularly in developing countries. Researchers and decision-makers from all over the world have worked to find solutions to these problems so as to secure sustainable agriculture and climate resilience simultaneously. Agroforestry, which combines tree management with crop or animal production, has been recognized for its potential to promote food security, long-term economic growth, and environmental protection, and official development assistance (ODA) for agroforestry has increased over the past few decades.

This study utilized a content analysis with quantitative and qualitative data regarding international agroforestry development cooperation from 1988 to 2019. It aims to achieve a better understanding of the structures and characteristics of ODA for agroforestry across time and region. A total of 607 projects were obtained from the OECD Creditor Reporting System.

The results reveal three characteristics of international development cooperation in agroforestry. First, agroforestry ODA represents global environmental policy coherence. The primary environmental policies acknowledge the crucial role of agroforestry in addressing environmental and climate change issues and concerns. Moreover, agroforestry ODA has broadened and diversified its agenda, contributing in particular to environmental and climate change policies represented by the Rio Markers. Second, three distinct agroforestry ODA pathways based on cooperation and recipient types are identified. Pathway A targets green, inclusive, and participatory ODA with a strong emphasis on climate change and biodiversity and involves small-scale flows from a bilateral donor to an individual country. Pathway B shifts from a bilateral donor to multiple recipients with a medium scope, focusing

on green ODA with a strong emphasis on comprehensive environmental goals. Pathway C connects a multilateral donor to an individual country on a large scale in pursuit of a distinct outcome for climate change mitigation or adaptation. Lastly, there have been distinctive regional strategies for agroforestry utilization based on geographical characteristics. The African region takes an energy-centered approach, while the Latin American region focuses on a business-centered approach. The Asia-Pacific region develops agroforestry with a forest community-centered approach.

This research gives a comprehensive and empirical look at what agroforestry aid is and how it works. The development of agroforestry ODA has been influenced by three factors: environmental policy coherence, distinct pathways, and a regional approach. This study helps comprehend the structures and regional characteristics of agroforestry ODA. It also provides the necessary foundation for stakeholders in international development cooperation to utilize agroforestry to advance sustainable development and mitigate climate change.

Keyword : Agroforestry, Development Cooperation, Official Development Assistance, Environmental Policy Coherence, Aid Pathway, Regional Approach

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Table of Contents

Abstract ..... **i**

List of Tables ..... **v**

List of Figures ..... **vi**

1. Introduction **1**

1.1. Research Background 1
1.2. Research Objectives 4

2. Literature Review **5**

2.1. History of Agroforestry Research 5
2.2. Agroforestry ODA Research 10

3. Theoretical Background **11**

3.1. Global Environmental Governance 11
3.2. Development Cooperation 16

4. Research Design and Methodology **21**

4.1. Content Analysis 21
4.2. Data Sources 22
4.3. Data Collection 24
4.4. Analytical Framework 26

5. Results **31**

5.1. Financial Resource in Agroforestry ODA 31
5.2. Actors in Agroforestry ODA 34
5.3. Agenda in Agroforestry ODA 45

6. Discussion.....57

6.1. Environmental Policy Coherence in Agroforestry ODA.....57

6.2. Agroforestry ODA Pathways 61

6.3. Regional Approach to Agroforestry ODA 70

7. Conclusion.....85

Reference.....87

Abstract in Korean.....99

List of Tables

TABLE 1. A SUMMARY OF AGROFORESTRY RESEARCH THEMES BY PERIOD 7
TABLE 2. AN EXAMPLE OF AGROFORESTRY PROJECT DATASET 24
TABLE 3. CATEGORY SYSTEM 29
TABLE 4. COMPARISON BETWEEN BILATERAL AND MULTILATERAL DONORS (1988-2019) 35
TABLE 5. TOTAL COMMITMENT TO AGROFORESTRY ODA BY DONORS (1988-2019) 37
TABLE 6. AID AGENCIES FOR AGROFORESTRY ODA OF BILATERAL DONORS (1988-2019) 39
TABLE 7. TOTAL COMMITMENT TO AGROFORESTRY ODA BY RECIPIENTS (1988-2019) 41
TABLE 8. CHANGE OF KEY PURPOSES DURING THE THREE PERIODS 48
TABLE 9. KEY PURPOSES OF AGROFORESTRY ODA BY REGION (1988-2019) 51
TABLE 10. COMPARISON BETWEEN AGROFORESTRY PATHWAYS BY ANALYTICAL DIMENSIONS 68
TABLE 11. ENERGY-CENTERED AGROFORESTRY ODA PROJECTS IN AFRICA 74
TABLE 12. BUSINESS-CENTERED AGROFORESTRY ODA PROJECTS IN LATIN AMERICA 79
TABLE 13. FOREST COMMUNITY-CENTERED AGROFORESTRY ODA PROJECTS IN ASIA 82

List of Figures

FIGURE 1. FOREIGN AID AS PROCESS 17
FIGURE 2. ANALYTICAL FRAMEWORK FOR AGROFORESTRY ODA 26
FIGURE 3. ODA FLOWS BY ACTOR PERSPECTIVE 28
FIGURE 4. ANNUAL COMMITMENT TO AGROFORESTRY ODA (1988-2019) 31
FIGURE 5. ANNUAL COMMITMENT TO SELECTED SECTORS AND TOTAL (1995-2019) 33
FIGURE 6. GROWTH RATE OF SELECTED SECTORS AND TOTAL ODA 33
FIGURE 7. NUMBER OF AGROFORESTRY ODA DONORS AND RECIPIENTS 34
FIGURE 8. ANNUAL COMMITMENT TO AGROFORESTRY ODA BY COOPERATION TYPE 36
FIGURE 9. RECIPIENTS BY REGION (A) AND INDIVIDUAL (B) (1988-2019) 40
FIGURE 10. RECIPIENT TYPE: (A) OVERALL AND (B) BY COOPERATION TYPES (1988-2019) 43
FIGURE 11. A CHANNEL OF DELIVERY BY COOPERATION TYPE (1988-2019) 44
FIGURE 12. SECTOR AND PURPOSE DISTRIBUTION OF AGROFORESTRY ODA (1988-2019) 46
FIGURE 13. SECTOR DISTRIBUTION BY PERIOD 47
FIGURE 14. SECTOR DISTRIBUTION BY REGION (1988-2019) 49
FIGURE 15. AGROFORESTRY ODA WITH CLIMATE OBJECTIVES (2000-2019) 52
FIGURE 16. AGROFORESTRY ODA WITH BIODIVERSITY OBJECTIVE (2000-2019) 53
FIGURE 17. AGROFORESTRY ODA WITH DESERTIFICATION OBJECTIVE (2000-2019) 53
FIGURE 18. AGROFORESTRY ODA WITH ENVIRONMENTAL OBJECTIVE (1997-2019) 55
FIGURE 19. AGROFORESTRY ODA WITH GENDER OBJECTIVE (1997-2019) 56
FIGURE 20. AGROFORESTRY ODA WITH PDGG OBJECTIVE (1997-2019) 56
FIGURE 21. CLIMATE-RELATED AGROFORESTRY ODA (2000-2019) 60
FIGURE 22. OVERLAPPING OF CLIMATE AND BIODIVERSITY-RELATED AGROFORESTRY ODA (2000-2019) 60
FIGURE 23. A SUMMARY OF AGROFORESTRY ODA PATHWAYS 63
FIGURE 24. A SUMMARY OF REGIONAL APPROACH TO AGROFORESTRY IN ODA 84

1. Introduction

1.1. Research Background

In the coming decades, developing countries will have a tremendous challenge: increasing agricultural production in order to feed a growing population while simultaneously reducing levels of poverty and hunger. The effects of climate change, on the other hand, make this endeavor even more challenging (Garrity et al., 2010). The conversion of forests to farmland has been sped up to enhance agricultural productivity, which has led to a worsening of deforestation and forest degradation as well as the occurrence of other natural disasters. The global community has been discussing issues on how to alleviate poverty through more sustainable ways of producing food and livelihoods, all while protecting the world's forests and the environment (Mbow, van Noordwijk, et al., 2014).

Agroforestry is a form of intensive land use that intentionally combines woody plants (trees and shrubs) into the process of agricultural or animal products in order to maximize the ecological and economic advantages derived from the land (Merwin, 1997). According to Palma (2006), agroforestry is characterized by a high degree of complexity and heterogeneity resulting from the interaction of trees, crops, and animals, which leads to a diversity of ecosystem services. In this context, agroforestry is getting attention as a potential means of accomplishing a variety of policy objectives, including food security, energy supply, climate change mitigation, biological diversity, and landscape restoration (Boffa, 1999; Garrity, 2004; Hillbrand et al., 2017; Makumba et al., 2007; Mbow, Smith, et al., 2014; Mbow, van Noordwijk, et al., 2014; Scherr & McNeely, 2012).

With the creation of the Millennium Development Goals (MDGs), which were the predecessors of the current Sustainable Development Goals (SDGs), high-level discourse placed eradicating poverty and protecting the environment on an equal "goal" level (van Noordwijk et al., 2018). As a result, multipurpose land uses like agroforestry were able to gain more acceptance as a practical solution to inequality in income, loss of natural resources and irresponsible land use (Bowyer et al., 2016).

As the multifunctional benefits of agroforestry have been addressed by various scholars (Garrity et al., 2010), governments in developing countries are striving to establish strategies and policies to utilize and expand agroforestry for sustainable forest management and poverty alleviation. In spite of the efforts made and the benefits it offers, agroforestry has not been extensively adopted in many developing countries. It might have been because of the poor performance of agroforestry technology, the political and socioeconomic environment, or simply the refusal of farmers to plant trees on agricultural land (Mbow, van Noordwijk, et al., 2014; Ndlovu & Borrass, 2021).

Meanwhile, international cooperation to promote agroforestry in developing countries is growing, and the international community is actively supporting agroforestry activities in developing countries through Official Development Assistance (ODA) funds, essentially under international development cooperation. According to the Organization for Economic Cooperation and Development (OECD) statistics, the first international development cooperation for agroforestry was initiated when Sweden supported Kenya in 1988.

Although it is evident that agroforestry activities on a global and national scale are increasing, few studies have explored, in detail, how official development assistance (ODA) resources for agroforestry are being spent, which countries are benefiting from these expenditures, or the potential for new resources to contribute to the development and strengthening of agroforestry systems in developing

countries. This is due to the following challenges: 1) Agroforestry essentially slips between sectors as it encompasses agriculture, forestry, land use, water management, and the environmental protection, 2) Due to the intrinsic attribute, there is no obvious institutional or policy home for agroforestry at international and national levels, and 3) In addition, agroforestry is not categorized by a specific sector under the aid system.

As a result, agroforestry has been studied with a focus on particular practices and projects in limited areas or regions. Rarely is it examined on a global scale. Therefore, it is essential to have a solid and comprehensive understanding of the various financial flows currently being directed toward agroforestry in order to successfully support agroforestry with sustainable funding. This study attempts to address some of the issues raised above by using statistical information collected by the Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD/DAC).

1.2. Research Objectives

The primary objective of this research is to examine how agroforestry ODA is allocated across countries, and specifically focus on structures and characteristics of agroforestry ODA projects. For this purpose, this paper presents three questions:

1. How are ODA resources spent for agroforestry?

2. Who are involved in agroforestry ODA?

3. What purpose and policies does agroforestry ODA target?

This paper has seven chapters. The first chapter provides an overview of this study's context. In the second part, a review of the relevant literature is presented, focusing on agroforestry and official development assistance. The third chapter describes the theoretical background of the research. The fourth chapter specifies the research design and methodology. The fifth chapter contains the result of the above four questions. In the sixth chapter, the characteristics of agroforestry ODA in terms of resource, actors, and agenda are analyzed and discussed. The seventh and last chapter provides a summary of the research's findings, as well as its limitations and recommendations for the future.

2. Literature Review

2.1. History of Agroforestry Research

Since the establishment of the International Council for Research in Agroforestry (ICRAF) in 1977, agroforestry has developed into a distinct field that is receiving considerable attention and is beginning to be studied as a scientific agenda (Liu et al., 2019). Since then, the concept and research of agroforestry have gone through a paradigm shift from biophysical and socioeconomic perspectives to policy ones (Noordwijk et al., 2016), as summarized in **Table 1**.

Initially, in the 1980s, agroforestry research focused on agroforestry's concept, potential, databases, and methodology. Empirical research also investigated the interactions of trees, soil, crops, and livestock, as well as agroforestry systems and multipurpose trees (Montambault & Alavalapati, 2005; Nair, 1998; Noordwijk et al., 2016). Particularly, the studies examined land restoration in relation to erosion and nutrient depletion in soil management (Young, 1997), an inventory of existing agroforestry systems around the world, definition, and terminology (Nair, 1985). In the same way, Cannell et al. (1996) discussed about ten agroforestry hypotheses that focused on the biophysical effects and benefits.

In the 1990s, research on the socioeconomic aspects of tropical agroforestry began to emerge and has been deepened in the continuation of studies on soil fertility and biophysical aspects (Nair, 1998). Socioeconomic studies focused for developing countries on food security, generating income for small-holder farmers, and reducing poverty from the perspective of livelihoods (Buck et al., 1998). Furthermore, its scope was expanded into a landscape level considering ecosystem services that

agroforestry provides (Jose, 2009; Tomich et al., 2005). Specifically, Sanchez (2000) investigated the trade-offs between agroforestry's carbon sequestration and farmer profitability, as well as food security.

Discourse of agroforestry moved into policy level in the 2000s. Despite the growing studies and attentions on agroforestry, the concept encountered numerous institutional and policy barriers to disturb its accelerated adoption (Ndlovu & Borrass, 2021). In this regard, Bernard et al. (2019) reviewed policy gaps and opportunities for expanding agroforestry in sub-Saharan Africa. The study claimed that the successful adoption of agroforestry requires an enabling policy, legal and institutional environment that support the scaling up process.

In the meantime, a meta-analysis of agroforestry research papers argued that although policy and institutional research have steadily increased after the introduction of agroforestry, research based on empirical data is insufficient and does not provide specific evaluation and grounds for planning and implementing agroforestry projects (Ndlovu & Borrass, 2021). According to another report, the number of agroforestry-related articles within the Asia-Pacific region is still a relatively small portion of the global research, even though it has increased quickly. As a result, the author suggested doing more focused and thorough studies to overcome the geographic gaps. (Shin et al., 2020).

Table 1. A summary of agroforestry research themes by period

Title	Main Findings
Meta analysis on Agroforestry Research	
Trends and features of agroforestry research based on bibliometric analysis (Liu et al., 2019)	- The main keywords are changed from 'intercropping', 'alley cropping', and 'multipurpose trees' to 'carbon sequestration', 'ecosystems', and 'climate change'. - Research themes are various across regions due to their characteristics.
A systematic map of agroforestry research focusing on ecosystem services in the Asia-Pacific region (Shin et al., 2020)	- Silvorable systems such as plantation crop combinations, tree management, and habitat for species are evident throughout the Asia-Pacific region. - About 60% of all publications studied the cases of India, China, Indonesia, and Australia.
(1980s) Agroforestry Concept and Biophysical Studies	
Classification of agroforestry system (Nair, 1985)	- Agroforestry systems can be classified and grouped by their structure (agrisilviculture, silvopastoral, and agrosilvopastoral), function (productive and protective), socio-economic scale and level of management (commercial, intermediate, or subsistence), and ecological spread (lowland humid tropics, arid and semi-arid tropics, tropical highlands, etc.).
The state of the art of agroforestry diagnosis and design (Raintree, 1987)	- Agroforestry diagnosis and design (D&D) has been developed with a larger diagnostic scope, a more extensive technological design stage, a variable scale, a more conscious relationship with the land user's aims, and stronger emphasis on the iterative nature of the D&D process. - The D&D must expand beyond agroforestry itself to explore its potential contribution to rural well-being by looking into other facets of rural development.
The central agroforestry hypothesis: the trees must acquire resources that the crop would not otherwise acquire (Cannell et al., 1996b)	- It revisits the tree-crop interaction equation regarding resource capture and presents that physical yield improvements from agroforestry can only be anticipated when resource uptake by trees and crops is complementary.
Agroforestry for soil management (Young,	- It provides a summary of the current state of knowledge on agroforestry for soil

1997)	management in support of its ability to limit run-off and erosion, preserve soil organic matter and physical properties, and increase nutrient cycling.
(1990s) Socioeconomic Studies	
The costs and benefits of agroforestry to farmers (Current et al., 1995)	- It discovers that the profitability of agroforestry can be a major incentive for farmers to embrace it. - The successful projects have partnered with local communities, responding to local needs and desires, and providing farmers with a diverse selection of species and techniques. Technology transfer has proven to be both affordable and beneficial when using demonstration plots and para-technicians.
Socioeconomic research in agroforestry: progress, prospect, priority (Mercer & Miller, 1998)	- Socioeconomic studies are gradually expanding in scope and quality. - The recent trend shows more rigorous statistical analyses of bigger data away from literature reviews, qualitative and merely descriptive quantitative research with small sample sizes. - Future research is expected to concentrate on enhanced economic evaluations, policy studies at the local, national, and regional levels, and theoretical and practical assessments of agroforestry adoption decisions.
Agroforestry in sustainable agricultural systems (Buck et al., 1998)	- It investigates the environmental and social factors influencing how trees function and perform in agricultural production systems. - It provides important new research on the economics of agroforestry and the interactions between the conventional forest business, governmental policies, and property rights.
Linking climate change research with food security and poverty reduction in the tropics (Sanchez, 2000)	- In comparison to cropland or grassland practices, agroforestry activities sequester three times more carbon per hectare. - The reduction of poverty occurs when farmers switch to growing high-value tree or vegetable crops. Sequential agroforestry on low-productivity croplands is anticipated to triple the carbon stock in the system in 20 years.

Socioeconomic research in agroforestry: a decade in review (Montambault & Alavalapati, 2005)	- The literature review reveals a persistent trend toward growing geographic and analytical diversity. - There are some geographical and thematic gaps that have been identified, such as the underrepresentation of temperate areas, the lack of studies on gender and property rights, and the use of technologies like riparian buffers.
(2000s) Agroforestry Adoption and Policy Studies	
Taking stock of agroforestry adoption studies (Pattanayak et al., 2003)	- The analysis demonstrates that the adoption of agroforestry is influenced by preferences and resource endowments. However, risk, biophysical, and resource variables are most likely to influence human adoption.
Policy gaps and opportunities for scaling agroforestry in sub-Saharan Africa: Recommendations from a policy review and recent practices (Bernard et al., 2019)	- Despite the significance and prevalence of agroforestry practices, several barriers prevent their quick adoption, particularly in areas where they have a lot of potentials. - Establishing a regulatory, legal, and institutional framework that facilitates the scaling-up process is essential for the successful adoption of agroforestry.
Promises and potentials do not grow trees and crops. A review of institutional and policy research in agroforestry for the Southern African region (Ndlovu & Borrass, 2021)	- Although the concept of agroforestry is institutionalized in research and practice, a more policy- and institution-centered approach is necessary for its development.

2.2. Agroforestry ODA Research

Up until recently, there was not much attention to agroforestry aid in the literature for two reasons. First, it is because of a limited focus on sectoral aid. Although the importance of doing a more in-depth sectoral analysis of international aid has been underlined (Peiffer & Boussalis, 2015; Thiele et al., 2007), a few studies on sectoral aid have actually been carried out; climate adaptation aid (Betzold & Weiler, 2018); health aid (Shiffman, 2008a; Piva & Dodd, 2009; Kibira et al., 2021); energy aid (Kim, 2019); food aid (Neumayer, 2005); agricultural aid (van Dijk, 2011). Secondly, as agroforestry is not classified as a sector in the aid tracking system and is implemented under other sectors such as agriculture, forestry, and environment, very few studies solely focused on agroforestry aid or international agroforestry cooperation.

3. Theoretical Background

3.1. Global Environmental Governance

Concepts of Global Governance

Governance is defined by the Commission on Global Governance as "the sum of the many ways that individuals and institutions, public and private, manage their common affairs." "It is a continuing process through which conflicting or diverse interests may be accommodated, and cooperative action may be taken." The Commission on Global Governance (1995) further elaborates on *global governance*, which has been understood as intergovernmental interactions involving NGOs, citizen movements, multinational corporations, and the global capital market (Commission on Global Governance, 1995).

There is still disagreement over the exact definitions of global governance, as stated by various authors (Dingwerth & Pattberg, 2006; Gupta, 2005). Due to this, it is sometimes unclear what exactly constitutes global governance or what its essential elements are. However, Biermann & Pattberg (2008) have identified three distinct approaches to understanding "global governance," and these approaches are also relevant to the more specific concept of global environmental governance.

First, global governance is understood analytically, reflecting the current sociopolitical phenomenon. This idea of global governance emphasizes non-hierarchical steering mechanisms and the participation of private, for-profit, as well as non-profit, actors in modern international politics. In the body of literature, "global governance" is defined as "governing without sovereign authority,

relationships that transcend national boundaries (Finkelstein, 1995)," "a shift of the location of authority in the integration and fragmentation (Weiss, 2000)," and "the pursuit of goals through the exercise of control with transnational consequences (Rosenau, 2009)."

Second, global governance is viewed as a solution to the problems caused by globalization and as a tool that politicians must create and use. In other words, a programmatic approach is used to understand global governance. The German Parliament claims that global governance is a solution to issues that require significant restructuring of the international institutional landscape (Bundestag, 2002; Smouts, 1998). Smouts views global governance as a standard setting for building a better world rather than a reflection of the current international system (Smouts, 1998). Another academic argues that the goal of global governance is to provide more systematic and dependable solutions to social and political problems that are too complex for individual states to handle effectively (Gordenker, 1995).

Finally, a critical viewpoint, which adopts the programmatic definition but does not use its affirmative connotation, is used to understand global governance. According to post-Fordist and neo-Marxist authors, the goal of global governance is to support the ruling class in resolving the economic and political crises brought on by post-Fordist neoliberal social changes (Brand, 2003). Other authors analyze global governance through the prism of North-South power struggles. For instance, the Geneva-based South Centre warned against institutionalizing "global governance" in 1996, arguing that doing so would amount to endorsing the rule of the powerful few over the many weak (South Centre (South Commission), 1997).

Key Characteristics of Global Environmental Governance

Global Environmental Governance is where global governance and environmental issues meet (Commission on Global Governance, 1995). Within the field of environmental and resource politics, it has three crucial characteristics: new actors, new institutions, and fragmentation (Biermann & Pattberg, 2008). The first two characteristics are examined in this study to better understand agroforestry ODA from the standpoint of global environmental governance.

The first distinguishing feature is the emergence of new types of organizations and actors in addition to national government. In recent decades, both the number of actors and their involvement in global environmental governance have increased significantly. Governments are no longer the only entities working on issues like forest management and biodiversity conservation; there are also intergovernmental organizations, non-governmental organizations (NGOs), networks of scientists, corporate actors, and other new types of organizations (Biermann & Pattberg, 2008). Recent research has shown that many of international organizations work independently to generate and share knowledge, build strong arguments about environmental problems and the best ways to solve them, influence negotiations with their input and expertise, and put solutions into action on the ground (Barnett & Finnemore, 2012; Biermann & Siebenhüner, 2009). The Intergovernmental Panel on Climate Change (IPCC), started not by the government but by international groups like the World Meteorological Organization and the United Nations Environment Programme, is a typical example (Biermann & Pattberg, 2008). NGOs take on an expanded role in setting agendas, formulating rules and regulations, overseeing state commitments, and informing governments and the public about the activities of their own diplomats (Betsill & Corell, 2001; Higgott et al., 2000; Keck & Sikkink, 1998). Also, the new role of experts or scientists is pronounced in global environmental policy (Hoppe & Dunn, 2001). On the other hand, business actors currently play a more direct and visible role in international environmental decision-making and negotiation (Falkner, 2017; Falkner et al., 2005).

It is notable that new institutions and mechanisms have emerged that differ from the conventional types of legally binding pacts negotiated between states. Global environmental issues call for a global environmental institution to which nations would cede some of their sovereignty (Esty, 1994). In this light, new institutions, such as multilateral treaties and conventions, newer and more efficient international organizations, and various new financial mechanisms, are created and promoted to reduce the reliance of existing international regimes on the willingness of states (Biermann & Pattberg, 2008). For instance, the Kyoto (1997) and Montreal (1987) protocols were emerged in radically different political environments. (Gareau & DuPuis, 2009). Countries agreed to the Montreal Protocol during a time when they held a view that a sovereign state would manage public resources on behalf of "the public." The Kyoto Protocol, in contrast, was developed during a time when people tended to distrust government management and favor "neoliberal" private solutions (Bailey, 2007). This indicates a shift from command-and-control to market-based solutions (Bumpus & Liverman, 2008). Likewise, the agreements that came out of Rio highlighted a more market-oriented precautionary approach, which mirrored the gradual transition from public to private forms of governance (Gareau & DuPuis, 2009).

Furthermore, a transition from intergovernmental system to public-private and private-private cooperation occurs as an increasing number of non-state actors formally participate in rulemaking and implementing institutions in global governance (Higgott et al., 2000; Pattberg, 2005a). Forest Stewardship Council is one example of a private institution that successfully acts as a standard-setting body without direct involvement of governments (Pattberg, 2005b).

This study supports the programmatic approach to global governance even though there is yet to be an obvious solution to this conceptual diversity. In accordance with global environmental governance, agroforestry ODA will be perceived as a political and institutional response to cross-border social and

environmental issues. This research will also examine the key characteristics of global environmental governance within the context of agroforestry ODA.

3.2. Development Cooperation

Definition of Development Cooperation

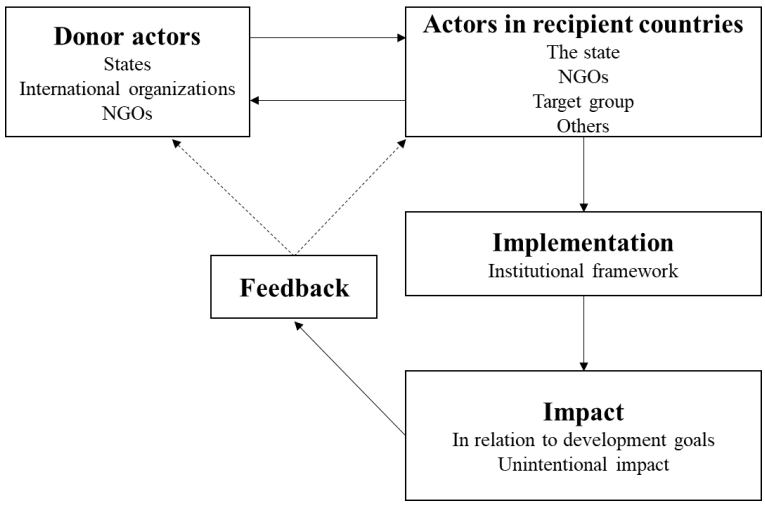
Currently, the rules and principles of development cooperation are established within the framework of the Organization for Economic Cooperation and Development (OECD), which has its own development committee, also known as the Development Assistance Committee (DAC), in charge of tasks related to development cooperation, also called Official Development Assistance (ODA). For foreign aid to be deemed as development cooperation by the DAC of the OECD, it must be given to developing countries, be conducive to sustainable economic growth or the improvement of living standards and take the form of grants or concessional loans[1]. These specific definitions serve as the study's focal point as it aims to examine the structures and characteristics of agroforestry ODA.

Aid Delivery Process

As depicted in **Figure 1**, the process of international development cooperation can be seen to start with the involvement of the donor actors. The process then shifts to the efforts made by the donors to formulate development strategies and plans. The actors who represent the donor and the recipient may occasionally collaborate to develop these strategies and plans. The obvious next step is to implement development strategies and achieve the desired results. The recipients themselves are key players in this context (Degnbol-Martinussen & Engberg-Pedersen, 2003).

[1] https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/officialdevelopmentassistancedefinitionandcoverage.htm (accessed on 25 October 2022)

Figure 1. Foreign aid as process



Adapted from foreign aid as process of Degnbol-Martinussen & Engberg-Pedersen (2003)

Actors in International Development Cooperation

The modern landscape of development cooperation is characterized by the large number of actors that provide development assistance through the provision of concessional financing or the sharing of their expertise (Gore, 2013). According to Gore, this kind of assistance is given to developing countries by five main groups of actors: 1) the OECD DAC donor countries, 2) non-DAC government providers of development cooperation, 3) global funds, 4) private foundations, and 5) international non-governmental organizations (Gore, 2013). Among them, non-DAC government providers are further divided into three categories: 1) non-DAC countries, such as Eastern and Central European nations, that are instituting new aid initiatives that comply with DAC norms of the OECD, 2) South-South providers who do not consider themselves to be donors and do not like the term "donors," such as India, China, Brazil, and Venezuela, and 3) Arab donors, including Saudi Arabia and

Kuwait, who are at ease using the term “donor,” but do not adhere to DAC standards (Zimmermann & Smith, 2011).

These different donors’ financial contributions provide a general indication of their relative importance in the global context of development cooperation (Gore, 2013). During the first few decades of development cooperation, OECD members provided most of the world’s official development assistance (ODA) (Fejerskov et al., 2017). OECD DAC donor countries continue to dominate development assistance. However, since the financial crisis of 2010, net aid disbursements from DAC member countries have decreased. In contrast, financial assistance from non-DAC sources has been growing much more quickly than that from DAC member countries (Gore, 2013). Furthermore, non-state actors have been stepping up their financial support (Fejerskov et al., 2016).

According to another researcher, the actors can be categorized into different groups based on the chain of aid delivery, which links a donor to a beneficiary in the recipient country through a number of interconnected intermediary organizations. For example, eight key actors are identified in the system of development cooperation: 1) donor government, 2) recipient government, 3) other donors, 4) donor’s international development agency, 5) sectoral ministries and agencies within the recipient government, 6) third-party implementing organizations, including NGOs and private consultants and contractors, 7) organized interest groups and civil society organizations within the donor and recipient countries, and 8) target beneficiaries (Gibson et al., 2005). They place each one in their appropriate set of relationships, which is not a linear chain, but rather an octangle that emphasizes the interrelationships between the aid actors.

Development Agendas

The number and complexity of development agendas have generally increased. The previously formulated agenda is rarely replaced by new ones. Instead, there has been a trend for donors to keep adding new agendas for development cooperation (Degnbol-Martinussen & Engberg-Pedersen, 2003).

Currently, development cooperation activities are driven by three different types of goals. The first and most traditional type is to assist developing countries in gaining more economic independence. The second goal, which has become more important since the Millennium Development Goals (MDGs) were set up, is to end extreme poverty and ensure everyone has a minimum standard of living by filling in certain gaps in human development. The provision of global public goods is the third category of goal. These include security, which is largely dependent on preserving fragile states and preventing post-conflict countries from relapsing into war; the decrease in dangers caused by infectious diseases; the promotion of biodiversity and the reduction of dangerous climate change; and the spread of environmental practices that lessen the burden on the world's ecological systems. (Gore, 2013; Severino & Ray, 2009). The main concerns of OECD DAC donors, NGOs, and international funds are the achievement of the global agenda for ending poverty and rights-based approaches, as well as, to a degree that is very hard to measure, the realization of global public goods. On the other hand, South-South development cooperation aims to advance economic growth by enhancing national productive capacities (Severino & Ray, 2009).

Other scholar divides development agenda into four dimensions: economic (growth, structural change, and independence), social (fight against poverty, equal opportunity, and human development), environmental (sustainable resource management at national and global level), political (independence, capacity development, and democratization). The economic development agenda have

existed from the start of the official donors, but over time, they have been given varying emphasis in relation to the social agenda. Environment and political agenda have become increasingly prominent since the late 1990s (Degnbol-Martinussen & Engberg-Pedersen, 2003).

As this research investigates agroforestry ODA, relevant actors within the aid system and various agendas that agroforestry targets will be analyzed.

4. Research Design and Methodology

4.1. Content Analysis

Structures and characteristics of agroforestry ODA were identified using a content analysis approach. *Content analysis* as a research method is a systematic and objective way to describe and measure phenomena (Downe-Wamboldt, 1992; Krippendorff, 1980). It is a research method that provides information, new ideas, a representation of facts, and a useful guide for action that links context-relevant, repeatable inferences from data (Krippendorff, 1980).

Content analysis can be done with either qualitative or quantitative data and either inductively or deductively (Elo & Kyngäs, 2008). The authors say that inductive content analysis is recommended when there have been no previous studies on the subject or when knowledge is scattered. Deductive content analysis, on the other hand, is often used when the researcher wants to test existing data in a new setting (Catanzaro, 1988). Regardless of the inductive and deductive ways, content analysis mainly works by putting the many words of data into much smaller content (Burnard, 1996; Weber, 1990).

The process for inductive analysis can be broken down into three main steps: preparation, organization, and reporting. (Elo & Kyngäs, 2008). Choosing the unit of analysis is the first step in the preparation phase (Cavanagh, 1997; Guthrie et al., 2004; McCain, 1988). The unit can be a word or a theme (Polit & Beck, 2004). A researcher attempts to interpret the data during this process in order to understand what is happening (Morse & Field, 1995) and to obtain a sense of the whole (Burnard, 1991; Tesch, 2013). The next step is to organize the data. This procedure involves

open coding, categorization, and abstraction. After open coding, the lists of categories are grouped under higher-order headings (Burnard, 1991; McCain, 1988). Grouping data aimed to reduce the number of categories by combining similar or different ones into larger, higher-order categories (Burnard, 1991; Downe-Wamboldt, 1992). Abstraction means coming up with categories that can be used to describe the research topic in a broad way (Burnard, 1996; Polit & Beck, 2004; Robson, 2002). Each category is named using content-characteristic words. Subcategories with similar events and incidents form categories, and categories form main categories (Burnard, 1991; Robson, 2002).

If a deductive content analysis is chosen, the research immediately begins by developing a categorization matrix and coding the data in line with the categories. All the data is looked at to see what it is about, then coded to see if it fits into or is an example of the categories (Polit & Beck, 2004).

In this study, both qualitative and quantitative data are thought of as content and is re-classified by the broad theme, which is a resource, an actor, or an agenda, based on an analytical framework. An inductive way of analysis is applied, focusing on qualitative analysis of the contents and their changes over time.

4.2. Data Sources

This study used the international aid data provided by the OECD CRS (Creditor Reporting System). The OECD has officially collected and analyzed aid statistics since 1967. This data is known to be highly reliable in the development sector as it includes 90% of all aid to developing countries and uses a standardized methodology (Patel et al., 2011). The OECD gathers data on official development assistance (ODA) and other official flows (OOF) from donor countries reporting their aid activities according to the policy and standards approved by DAC (Development Assistance

Committee). The CRS covers both bilateral and multilateral outflows and includes data from 30 DAC donor countries, 25 non-DAC donor countries, and 65 multilateral providers as of 2022 (OECD, 2022)[2]. Furthermore, the CRS is utilized as a tool for monitoring specific policy objectives such as gender, the environment, and climate change.

The CRS also offers information on aid commitments, which reflect donors' willingness and interests in a recipient country more accurately (Neumayer, 2003; White & McGillivray, 1995) than disbursements, since disbursements partly depend on recipients fulfilling certain conditions (Berthélemy, 2006). Given the qualities of this data source, the amount of aid commitments was utilized to construct and analyze the annual flow of agroforestry aid between donors and recipients. Although disbursement falls short of commitments for some countries and sectors, it is found that almost all commitments are met within 2 years on average (Hudson, 2013).

On the other hand, it is well known that CRS statistics are subject to several limitations. For example, the CRS database needs to be improved because donors do not always report all of their grants and loans; each grant can only be placed in one category depending on its primary aim, even though it funds multiple issues (Shiffman, 2008b).

However, the CRS data is commonly used in the context of development cooperation by governments, organizations, and researchers since it is recognized to be the finest accessible data source for tracking global aid flows with geographical and sectoral breakdowns (OECD/WTO, 2022). Additionally, because of its rigorous data validation procedures with agreed definition and extensive historical coverage,

[2] https://webfs.oecd.org/oda/DataCollection/Resources/DAC-CRS-CODES.xls

the CRS database is regarded as the most reliable source of data for statistical analysis of international aid flows and comparisons between countries (Petras, 2009).

4.3. Data Collection

This research assessed the OECD's April 2022 update of the 1988-2019 CRS database which is from the first introduction of agroforestry ODA to the most recent year at the time of the analysis. At first, the entire ODA data was downloaded from the OECD CRS for a 32-year period (1988-2019) and then key term, Agroforestry, was searched from descriptive parameters such as the title, short and long description of the ODA projects considering that agroforestry is not a coded sector in the CRS. Finally, 607 agroforestry ODA projects were identified according to distinct project number. **Table 2** is an example of selected dataset used for this research.

Table 2. An example of agroforestry project dataset

Category	Contents (Example)
Year	2019
Donor	United States
Agency Type	Extending Aid Agency
Agency Name	Department of the Interior
Recipient	India
Income Group	LMICs
Channel Type	NGOs and Civil Society
Channel Name	Aaranyak
Flow Type	ODA Grants
Bi/Multi	Bilateral
Aid Type	Project-type interventions
Commitment	$60,220
Project Title	Conservation of Tiger, Rhino, Elephants and Hoolock Gibbons in Kaziranga-Karbi Anglong Landscape using

	Participatory Natural Resources Management (PNRM) Approach by Forest Dependent Indigenous Karbi Tribe in Kohora River Basin in India							
Sector	General Environment Protection (410*)							
Purpose	Biodiversity (41030*)							
Long Description	It is the necessary to ensure alternative mode of protection to habitats in Karbi Anglong Hills and the biological corridors to Kaziranga National Park as the indigenous Karbi tribe is not in favor of the creation of a Wildlife Sanctuary fearing loss of land rights and natural resources. Project will engage communities using traditional knowledge and appropriate technology to design sustainable and adaptive PNRM models for habitat conservation and reduce human disturbances. Beneficiaries will be trained for improved homestead agroforestry, sustainable harvest of Non-Timber Forest Products (NTFP), value addition and marketing of products.							
Rio Marker**	Biodiversity		Climate Change Mitigation		Climate Change Adaptation		Desertification	
	2		0		0		-	
General Policy Marker	Gender	Environment	PDGG	Trade	RMNCH	DRR	Nutrition	Disability
	0	2	0	0	0	0	0	-

Source: OECD CRS database

Note 1: LMIC (Low-Middle Income Country); PDGG (Participatory Democracy and Good Governance); RMNCH (Reproductive, Maternal, Newborn and Child Health); DRR (Disaster Risk Reduction)

*Note 2: *CRS (Creditor Reporting System) codes*

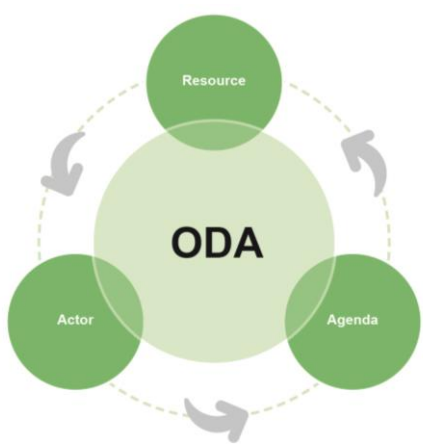
*Note 3: ** Markers grade: '2' – Principal objective, '1' – significant objective, '0' – not targeted, '-' – not screened*

4.4. Analytical Framework

For the content analysis, three key aid analytical dimensions – Resource, Actors, and Agenda as shown in **Figure 2** – are investigated at the global, regional, and national levels. This analytical framework is developed based on components of the Policy Arrangement Approach (PAA) and the structure of existing ODA data. The policy arrangement approach, which is defined as the temporary stabilization of the content and organization of a policy domain (Arts et al., 2000), has four dimensions: resources, actors, discourse, and rules of the game (Arts et al., 2006). The scholar says that it is used to describe institutionalization in terms of these four interconnected dimensions. The ODA as one of the international policy domains can be described using the policy arrangement approach: ODA funds as resources; providers, recipients, and implementing partners as actors; policy objectives as discourse; and OECD guidelines and definitions as the rules of the game.

In light of this, each dimension in the analytical framework is classified by a relevant category describing the thematic details of each project's content. By applying this framework with each dimension, it is expected to have a comprehensive and systematic understanding of agroforestry ODA, which will help answer the research questions.

Figure 2. Analytical Framework for Agroforestry ODA



Resource

The financial resources are transferred from donors to developing countries in the form of both commitments and disbursements. A commitment is a firm written obligation made by a government or official agency to provide resources in a set amount under certain financial terms and conditions for the benefit of a recipient country or multilateral organization. Commitments quantify the intentions of donors and enable for tracking of funds allocated to certain objectives and recipient countries. They fluctuate with the evolution of aid policies and reflect how donors' political pledges are converted into action. As a result, they provide a signal of future flows (OECD/DAC, 2021). As explained in the section of 4.2. data source, this study will look into the change of commitment to agroforestry ODA to understand an overall trend of financial flow, the willingness of the donors and future prospect for agroforestry, which supports to find the answer to the research question 1.

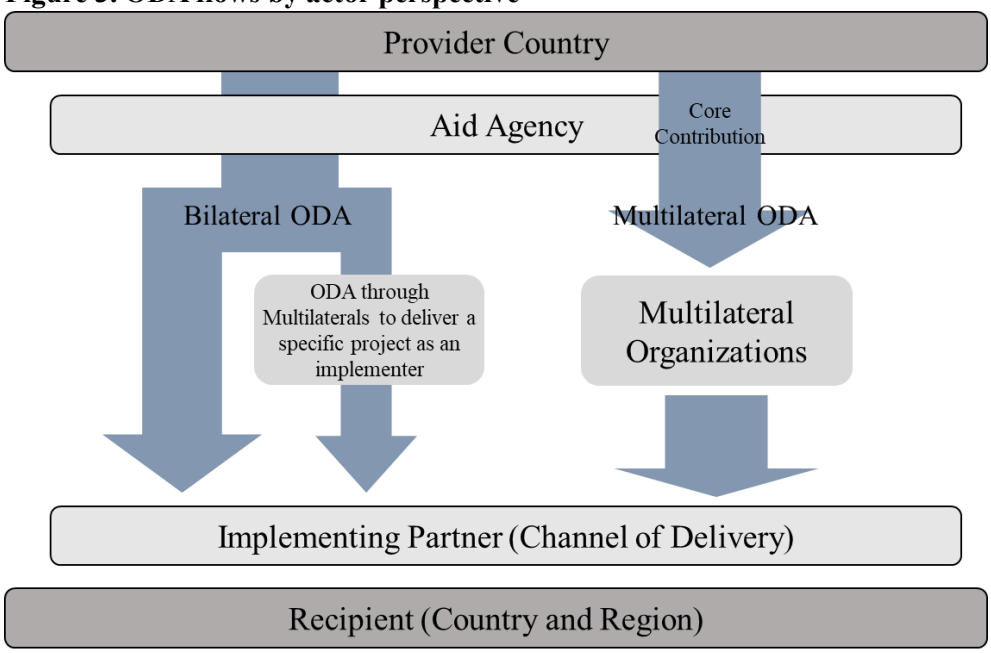
Actors

The four main category for actors, **(1) donor, (2) donor's aid agency, (3) implementing partner, and (4) recipient** will be analyzed for this study.

Actor-centered ODA flows are illustrated in **Figure 3**. Bilateral ODA shows flow from provider country directly to official sources in the recipient country via aid agency and implementing partner. Implementing entity, a channel of delivery, is comprised of NGOs, multilateral organizations, possibly recipient country governments, development finance institutions, and public-private partnerships. Funds channeled through multilateral organizations are categorized as bilateral flows when they are intended by the provider country to a developing country or to specific purpose programs and funds controlled by the organization. Multilateral ODA, on the other hand, refers to core contributions from provider country to multilateral

agencies, which are subsequently used to support the agency's own initiatives (Gulrajani, 2016). Actor analysis will help to address the research question 2.

Figure 3. ODA flows by actor perspective



Source: Adapted from OECD CRS, Resource flows in DAC statistics – the global picture[3]

Agenda

Agenda analysis is done with regard to the sector, purpose, and policy objectives. According to OECD DAC guidelines, all ODA should be allocated to a sector and a specific purpose after addressing the question, "Which specific areas of the recipient's economic or social structure is the transfer intended to foster?". The following are the broad categories that are included in the DAC sector classification:

[3] https://www.oecd.org/dac/financing-sustainable-development/development-finance-data/faq.htm (accessed on 24, October 2022)

social infrastructure and services (education, health, population, water government, and civil society), economic infrastructure and services (transport, communications, energy, banking and finance), production (agriculture, forestry, fishing, industry, mining, construction, trade, tourism), multisector/cross-cutting (general environment protection, other multisector including urban and rural development), and non-sector allocable (general budget support, humanitarian aid). Since agroforestry is an integrated way to reach multiple goals (Agroforestry Network, 2018), it is expected that looking into the sector and purpose category will show the various aspects of agenda around agroforestry. This analysis will be conducted with the CRS purpose codes.

Furthermore, the agenda analysis can be made better by adding information about the policy objectives of aid based on the marker system This system is designed to promote mainstreaming specific policy objective in all sectors. The scoring suggestions (principal and significant) show how likely it is that the program's objective is central to its design (principal) or that the program has other main objectives but has been designed or adjusted to help meet the relevant policy concerns (significant).

Based on the above analytical framework, **Table 3** shows the category system used to put all the agroforestry ODA projects in the extracted data into three aid dimensions.

Table 3. Category system

Analytical Dimensions	Category	Sub-Category
Time	Year	Committed Year
	Period	Period 1 (1988-1999)
		Period 2 (2000-2009)
		Period 3 (2010-2019)
Finance	Commitment amount	-

Actor	Donor	Bilateral	
		Multilateral	
	Agency	Main aid agency	
		Extending aid agency	
		Local government	
		Financial institutions	
	Recipient	Africa	
		Latin America	
		Asia-Pacific	
	Implementing partner	NGOs and Civil Society	Donor county
			Developing country
			International
		Teaching or Research Institutes	
		Public Sector	Donor government
			Recipient government
		Private Sector	In recipient country
			In third country
		Multilateral Organizations	United Nations
			Others
Agenda	Sector	All 49 sectors including agriculture (311), forestry (312), general environment protection (410), other multisector (430), industry (321), energy generation (232) etc.	
	Purpose*	All 295 purposes including agricultural policy and administrative management (31110), forestry development (31220), biodiversity (41030), rural development (43040) etc.	
	Policy markers	Rio markers	Biodiversity
			Climate Change Mitigation
			Climate Change Adaptation
			Desertification
		General policy markers	Gender Equality
			Aid to Environment
			Participatory Democracy / Good Governance (PDGG)
			Trade Development
			Reproductive, Maternal, Newborn and Child Health RMNCH)
			Disaster Risk Reduction (DRR)
			Disability
			Nutrition

※*Purposes are subject to the corresponding sectors of the CRS coding system.*

5. Results

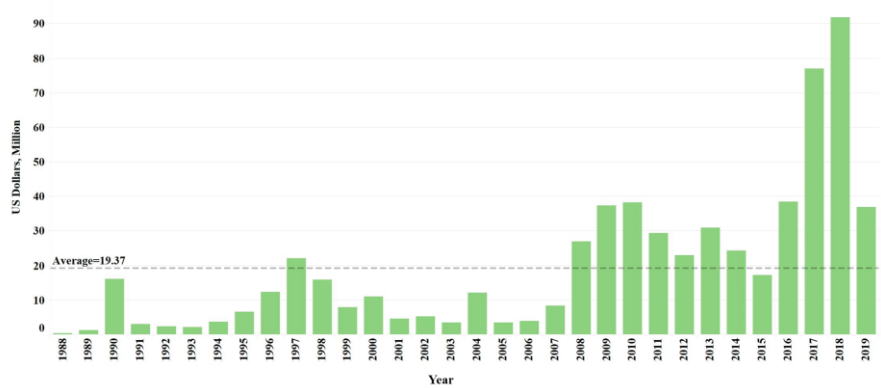
5.1. Financial Resource in Agroforestry ODA

5.1.1 Absolute Commitment

As shown in **Figure 4**, the annual commitment to agroforestry ODA exhibited an increasing trend since 1988 with some fluctuation. Since the OECD CRS data was recorded, the first agroforestry project was reported by Sweden with USD 0.42 million committed in 1988. Agroforestry ODA commitments increased by 15.51% on average, reaching an all-time high of USD 91.93 million in 2019. The average commitment is USD 19.37 million for the last 32 years.

Most notably, the greatest growth occurred in three different periods which are in the early and mid-1990s, the mid and late 2000s, and the 2010s respectively. It increased by 55.50% from USD 2.42 million in 1992 to 22.03 million in 1997, by 60.93% from USD 3.54 million in 2005 to USD 38.21 million in 2010, and by 74.67% from USD 17.25 million in 2015 to 91.93 million in 2018.

Figure 4. Annual commitment to agroforestry ODA (1988-2019)



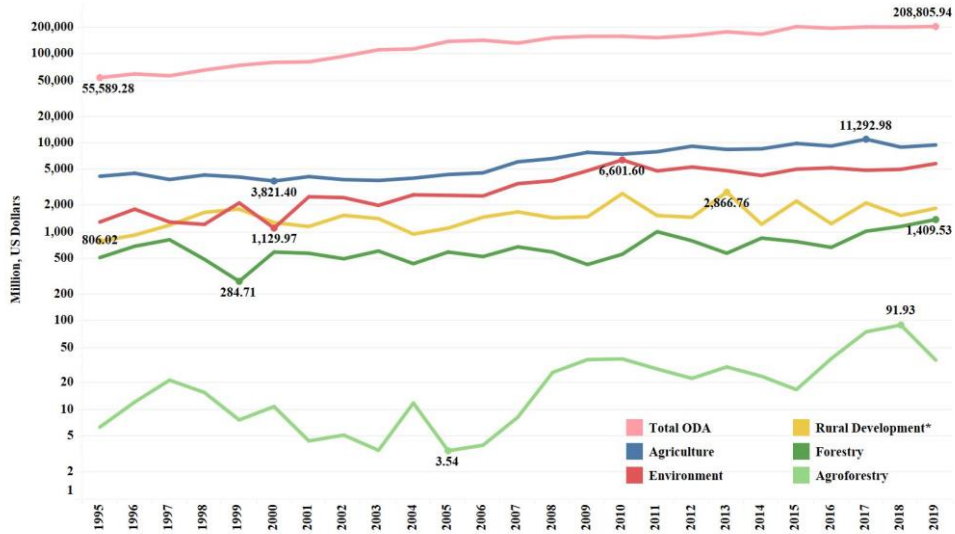
5.1.2 Relative Commitment

Among all 49 sectors of the CRS coding system, the sectors of "agriculture (purpose code 311)", "forestry (312)", "other multisector (430)", and "general environment protection (410)" are the most distinguishable. **Figure 5** contrasts agroforestry ODA with the selected sectors and the overall ODA.

The relative share of agroforestry ODA has grown over time, even if it still remains a very small portion of total ODA. Commitment to agroforestry ODA increased from USD 6.54 million (0.012% of total ODA) in 1995 to USD 91.93 million (0.045% of total ODA) in 2018. Furthermore, the commitment to agroforestry from 1995[4] to 2019 increased faster than the selected sectors and the total with some fluctuation. While the annual average agroforestry ODA growth rate is 7.49%, the ones of agriculture, forestry, rural development, environment, and total ODA are 3.44%, 4.18%, 3.61%, 6.50%, and 5.67%, respectively **(Figure 6)**.

[4] The period 1995-2019 was used for this analysis due to the data availability and accessibility. CRS data on commitments from 1995 are made available for viewing in OECD Stat and via QWIDS. Although the earlier commitment data is available for download, OECD calls attention to the gap in the coverage for some donors and years.

Figure 5. Annual commitment to selected sectors and total (1995-2019)



※*Rural Development (43040) is selected from Other Multisector (430) for a relevant analysis, as Other Multisector is an assembly of diverse cross-cutting agendas such as urban development, disaster risk reduction, and so forth.*

Figure 6. Growth rate of selected sectors and total ODA

Year	Total ODA	Agriculture	Forestry	Rural Development*	Environment	Agroforestry
1996	10.09%	8.04%	34.08%	17.05%	39.34%	91.21%
1997	2.41%	-4.09%	25.91%	23.03%	-0.03%	83.56%
1998	6.76%	1.10%	-1.51%	28.19%	-2.05%	34.81%
1999	8.27%	-0.50%	-14.27%	23.08%	13.16%	4.71%
2000	8.27%	-2.44%	2.89%	10.08%	-3.11%	11.23%
2001	7.05%	-0.14%	1.87%	6.52%	11.51%	-5.80%
2002	8.23%	-1.23%	-0.45%	10.02%	9.43%	-2.92%
2003	9.44%	-1.35%	2.14%	7.56%	5.53%	-7.25%
2004	8.61%	-0.54%	-1.74%	2.04%	8.12%	7.17%
2005	9.83%	0.46%	1.44%	3.42%	7.15%	-5.95%
2006	9.20%	0.81%	0.23%	5.81%	6.31%	-4.18%
2007	7.74%	3.17%	2.34%	6.52%	8.63%	2.16%
2008	8.27%	3.59%	1.10%	4.77%	8.57%	11.50%
2009	7.93%	4.51%	-1.28%	4.58%	9.94%	13.29%
2010	7.40%	3.90%	0.57%	8.56%	11.31%	12.49%
2011	6.67%	4.05%	4.28%	4.23%	8.61%	9.86%
2012	6.62%	4.68%	2.59%	3.71%	8.73%	7.70%
2013	6.81%	3.94%	0.62%	7.30%	7.65%	9.04%
2014	6.09%	3.81%	2.69%	2.32%	6.54%	7.17%
2015	6.83%	4.34%	2.08%	5.33%	7.08%	4.97%
2016	6.28%	3.79%	1.26%	2.17%	6.90%	8.81%
2017	6.15%	4.46%	3.15%	4.60%	6.28%	11.86%
2018	5.86%	3.33%	3.56%	2.93%	6.11%	12.18%
2019	5.67%	3.44%	4.18%	3.61%	6.50%	7.49%

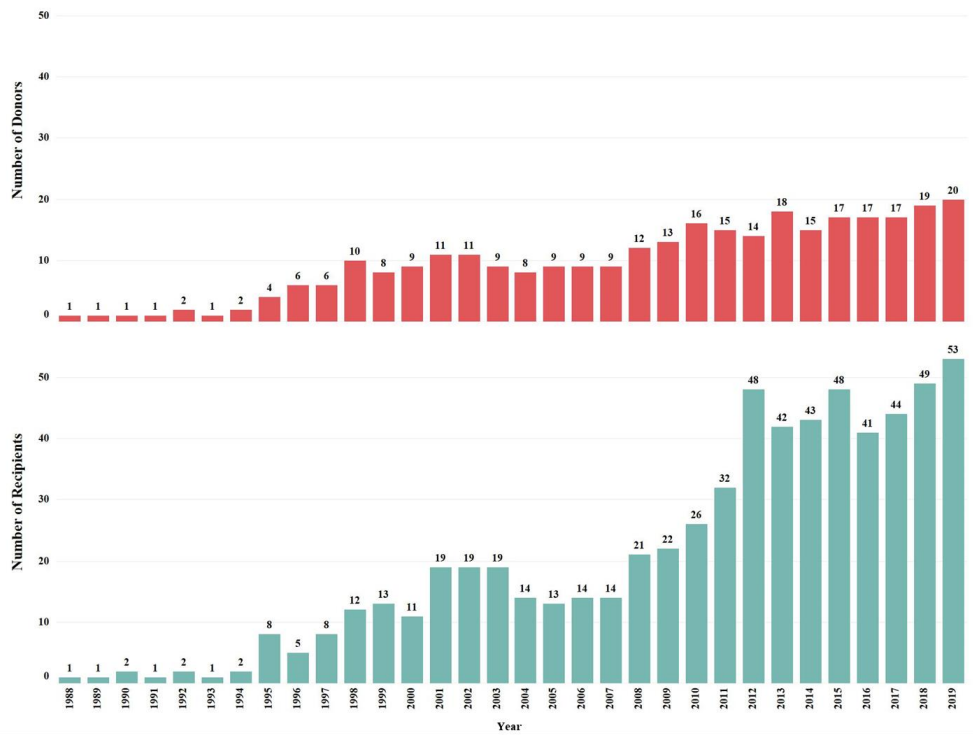
※*Rural Development (43040) is selected from Other Multisector (430).*

5.2. Actors in Agroforestry ODA

5.2.1 Proliferation of Donors and Recipients

Over time, not only the volume of agroforestry ODA, but also the number of donors and recipients increased. In the case of donors, it began with one donor in 1998 and increased to a maximum of 20 donors in 2019, while the number of recipients increased from one recipient country in 1998 to 53 recipients in 2019 **(Figure 7)**. From 1988 to 2019, a total of 29 donors and 72 recipients have been identified.

Figure 7. Number of agroforestry ODA donors and recipients



5.2.2 Donors in Agroforestry ODA

Cooperation Types: Bilateral and multilateral

From 1988 to 2019, bilateral cooperation accounted for the majority of the commitment to agroforestry ODA. 74.91% (USD 464.22 million) of the total commitment came through the bilateral donors, while 25.09% (USD 155.52 million) came through the multilateral donors. 20 bilateral donors supported 550 projects with an average of USD 0.84 million per project, while 9 multilateral donors contributed to 57 projects with an average of USD 2.73 million per project. The maximum commitment of each group was USD 27.85 million by Netherland for South of Sahara Africa region in 2009, and USD 55.00 million by IFAD for Haiti in 2017 **(Table 4)**.

Table 4. Comparison between bilateral and multilateral donors (1988-2019)

	Bilateral	Multilateral	Total
Total commitment (Million USD)	464.22	155.52	619.74
Total proportion (%)	74.91	25.09	100.00
Number of donors	20	9	29
Number of projects	550	57	607
Average project size (Million USD)	0.84	2.73	1.02
Maximum commitment (Million USD)	27.85	55.00	-

Since the late 1980s, bilateral donors have gradually increased their support for agroforestry ODA projects with some variations, whereas multilateral donors, although providing intermittent support, have not actively supported agroforestry ODA until the later 2010s **(Figure 8)**.

Figure 8. Annual commitment to agroforestry ODA by cooperation type

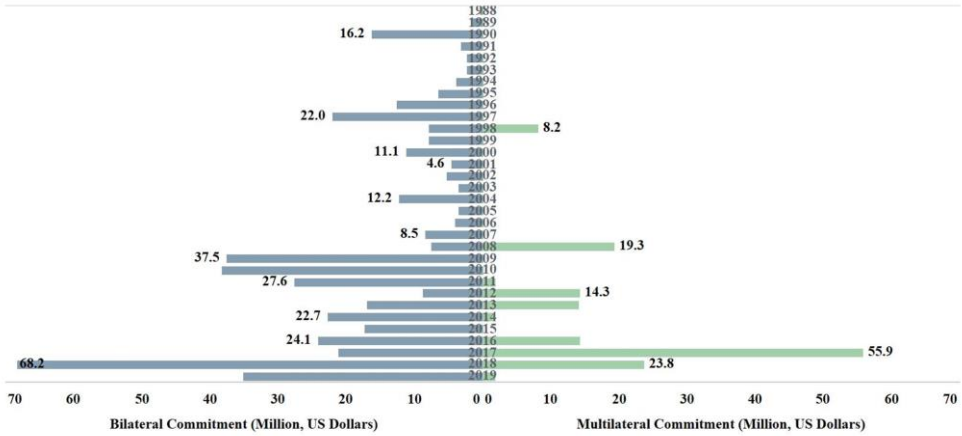


Table 5 shows agroforestry ODA from each of the 20 bilateral donors and 9 multilateral donors from the higher volume. Canada, the largest donor, provided USD 123.13 million for agroforestry projects for 32 years, accounting for 19.89% of the total agroforestry ODA, followed by Sweden (USD 52.93 million, 8.55%), the Netherlands (USD 48.10 million, 7.77%), Germany (USD 44.64 million, 7.21%), the United States (USD 42.58 million, 6.88%), Switzerland (USD 36.03 million, 5.82%), and Finland (USD 24.99 million, 4.04%). On the other hand, most of the multilateral funding comes from a small number of donors, including the Inter-American Development Bank (IADB), International Fund for Agricultural Development (IFAD), Climate Investment Funds (CIF), Global Environment Facility (GEF), and EU Institutions, which account for 99.89% (USD 154.9 million) of multilateral agroforestry ODA reported in the OECD CRS. In addition to the aforementioned donors, agroforestry ODA flows are reported to the OECD by the Food and Agriculture Organization (FAO), International Development Association (IDA), Global Green Growth Institute (GGGI), and African Development Bank (AfDB).

Table 5. Total commitment to agroforestry ODA by donors (1988-2019)

Bi/Multi	Donor	Commitment	
		Million, USD	%
Bilateral	Canada	123.13	19.89
	Sweden	52.93	8.55
	Netherlands	48.10	7.77
	Germany	44.64	7.21
	United States	42.58	6.88
	Switzerland	36.03	5.82
	Finland	24.99	4.04
	Norway	18.62	3.01
	Korea	15.40	2.49
	Denmark	14.06	2.27
	Australia	13.90	2.24
	Belgium	8.36	1.35
	United Kingdom	7.94	1.28
	Ireland	6.01	0.97
	Italy	2.77	0.45
	Spain	2.73	0.44
	Japan	1.57	0.25
	Austria	0.38	0.06
	Czech Republic	0.05	0.01
	New Zealand	0.04	0.01
	Total	**464.22**	**74.91**
Multilateral	IADB	59.05	9.53
	IFAD	38.38	6.19
	CIF	24.10	3.89
	CEF	18.99	3.06
	EU Institutions	14.34	2.31
	FAO	0.28	0.05
	IDA	0.16	0.03
	GGGI	0.13	0.02
	AfDB	0.09	0.01
	Total	**155.52**	**25.09**
Grand Total		619.74	100.00

Aid agencies

While multilateral donors except EU institutions do not utilize aid agencies, bilateral donors take four types of aid agencies: main aid agencies, extending aid agencies, local government, and development finance institutions. For bilateral cooperation, the main aid agency is primarily played by official aid agencies, foreign ministries, and aid departments, while the extending aid agencies include research institutes, universities, and sectoral ministries. Global Affairs Canada, which serves as the Ministry of Foreign Affairs in Canada, is classified as an extending aid agency. Local governments include autonomous governments and local ministries, and development financial institutions include national fund.

Although the institutions or ministries within each country that will serve in the capacity of the aid agency vary, it is clear that each country uses a different kind of aid agency to support its ODA programs for agroforestry. Most countries supported agroforestry ODA through their main aid agency, while Germany primarily utilized extending aid agencies (95.46% of its total agroforestry ODA). Canada, Australia, the United Kingdom, Italy, and Austria also made substantial use of extending aid agencies. Meanwhile, Spain supported 89.49% of its total agroforestry ODA funds through local governments, and Belgium utilized 68.81% of its agroforestry aid. Finland is the only country that has used national funds to support agroforestry ODA **(Table 6)**.

Table 6. Aid agencies for agroforestry ODA of bilateral donors (1988-2019)

Agency Type	Example of Agency	Donor countries	Share
Main aid agencies	Development Agency/Authority/Foundation Ministry of Foreign Affairs Department for International Development and cooperation	Canada, Sweden, the Netherlands, US, Switzerland, Finland, Norway, Korea, Denmark, Australia, UK, Ireland, Italy, Japan, Austria, Czech Republic, New Zealand	71.42%
Extending aid agencies	International Development Research Center Public Universities Ministry of Food and Agriculture Ministry of Education and Research Ministry of Environment Ministry of Business, Energy, and Industry Ministry of Business, Innovation and Skills Ministry of Tourism Ministry of Foreign Affairs (e.g. Global Affairs Canada)	Germany, Canada, Australia, UK, Italy, Austria	25.15%
Local governments	Autonomous governments Regional Ministries	Spain, Belgium	1.88%
Development Finance Institutions	National Fund	Finland	1.43%
Others	-	-	0.12%

5.2.3 Recipients in Agroforestry ODA

In the last 32 years, funds for agroforestry ODA projects have been given to 72 out of 156 individual countries and multiple recipients as a regional program. In the African region, 29 countries received USD 264.21 million (42.63%), while 23 countries in Latin America received USD 236.25 million (38.12%). In the Asian region, 20 countries received USD 104.04 million (16.79%). Haiti ($87.45M, 14.11%) is the largest beneficiary of agroforestry ODA, followed by Honduras ($44.68M, 7.21%), Kenya ($26.78M, 4.32%), Zambia ($26.05M, 4.20) and Tanzania ($21.04M, 3.40%). The Philippines took the lead in Asia with USD 23.92 million (3.86%). Africa absorbed most of the regional program funds for agroforestry **(Figure 9, Table 7)**.

Figure 9. Recipients by region (a) and individual (b) (1988-2019)

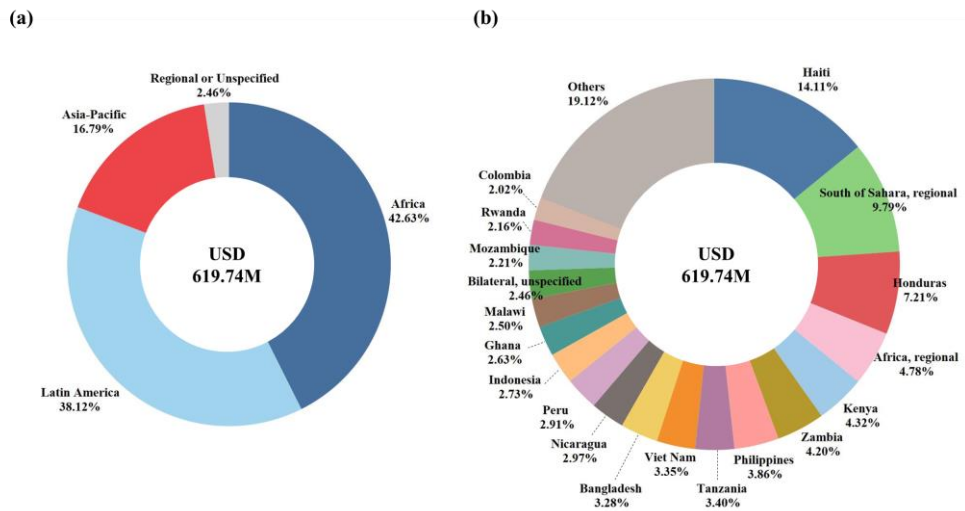


Table 7. Total commitment to agroforestry ODA by recipients (1988-2019)

Region	Recipient	Commitment	
		Million, USD	%
Africa (29 individual countries)	Kenya	26.78	4.32
	Zambia	26.05	4.20
	Tanzania	21.04	3.40
	Ghana	16.31	2.63
	Malawi	15.48	2.50
	Mozambique	13.69	2.21
	Rwanda	13.40	2.16
	Senegal	12.14	1.96
	Ethiopia	6.33	1.02
	Mali	5.48	0.88
	DR Congo	5.01	0.81
	Benin	2.43	0.39
	Burkina Faso	2.03	0.33
	CAR	1.71	0.28
	Cameroon	1.49	0.24
	Niger	0.87	0.14
	Uganda	0.72	0.12
	Somalia	0.65	0.10
	Guinea	0.47	0.08
	Comoros	0.38	0.06
	Burundi	0.34	0.05
	Tunisia	0.28	0.05
	Guinea-Bissau	0.28	0.05
	Madagascar	0.16	0.03
	Mauritius	0.15	0.02
	Côte d'Ivoire	0.13	0.02
	Gambia	0.08	0.01
	Eswatini	0.04	0.01
	Togo	0.03	0.00
	Regional programs	90.27	14.57
	Total	**264.21**	**42.63**
Latin America (23 individual countries)	Haiti	87.45	14.11
	Honduras	44.68	7.21
	Nicaragua	18.38	2.97
	Peru	18.05	2.91
	Colombia	12.55	2.02
	Jamaica	9.37	1.51
	Bolivia	8.70	1.40
	Brazil	7.74	1.25
	Guatemala	7.07	1.14

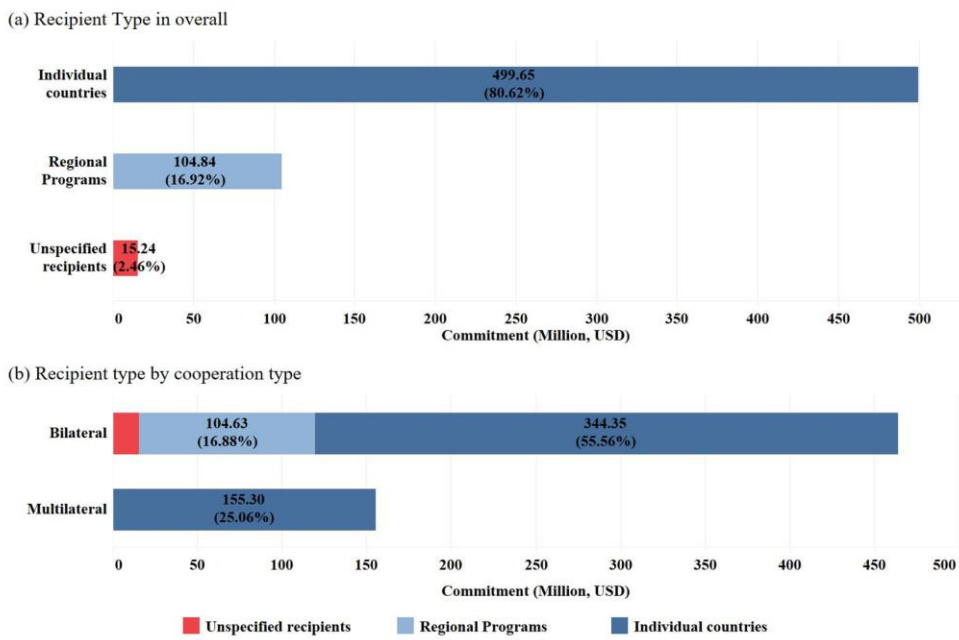
	Cuba	2.96	0.48
	Mexico	2.71	0.44
	Ecuador	2.14	0.35
	Dominican Republic	1.88	0.30
	El Salvador	1.00	0.16
	Costa Rica	0.20	0.03
	Belize	0.19	0.03
	Panama	0.03	0.00
	Argentina	0.0026	0.00
	Regional programs	11.15	1.80
	Total	**236.25**	**38.12**
Asia-Pacific (20 individual countries)	Philippines	23.92	3.86
	Vietnam	20.75	3.35
	Bangladesh	20.31	3.28
	Indonesia	16.90	2.73
	Nepal	4.09	0.66
	Pakistan	3.35	0.54
	Timor-Leste	2.44	0.39
	DPRK	1.59	0.26
	Samoa	1.33	0.21
	Lao PDR	1.09	0.18
	China	0.96	0.15
	Vanuatu	0.92	0.15
	Myanmar	0.88	0.14
	Solomon Islands	0.79	0.13
	India	0.76	0.12
	Cambodia	0.16	0.03
	Fiji	0.14	0.02
	Malaysia	0.13	0.02
	Thailand	0.08	0.01
	Micronesia	0.02	0.00
	Regional programs	3.42	0.55
	Total	**104.04**	**16.79**
Unspecified	Unspecified	15.24	2.46
	Total	**15.24**	**2.46**
Grand Total		619.74	100.00

Recipient types: Individual and regional programs (Multiple recipients)

Figure 10 (a) represents the total agroforestry ODA flows by recipient types. Overall, individual countries received the highest proportion of agroforestry ODA,

reaching USD 499.65 million (80.62%). USD 104.84 million (16.92%) was allocated for regional programs, while USD 15.24 million (2.46%) was given to unspecified recipients. On the other hand, as **Figure 10 (b)** demonstrates, there are variations in how donors commit their agroforestry ODA to various recipient categories based on the types of cooperation — bilateral and multilateral. While bilateral flows significantly support both individual countries as well as regional programs, multilateral flows are primarily directed toward individual countries.

Figure 10. Recipient type: (a) overall and (b) by cooperation types (1988-2019)

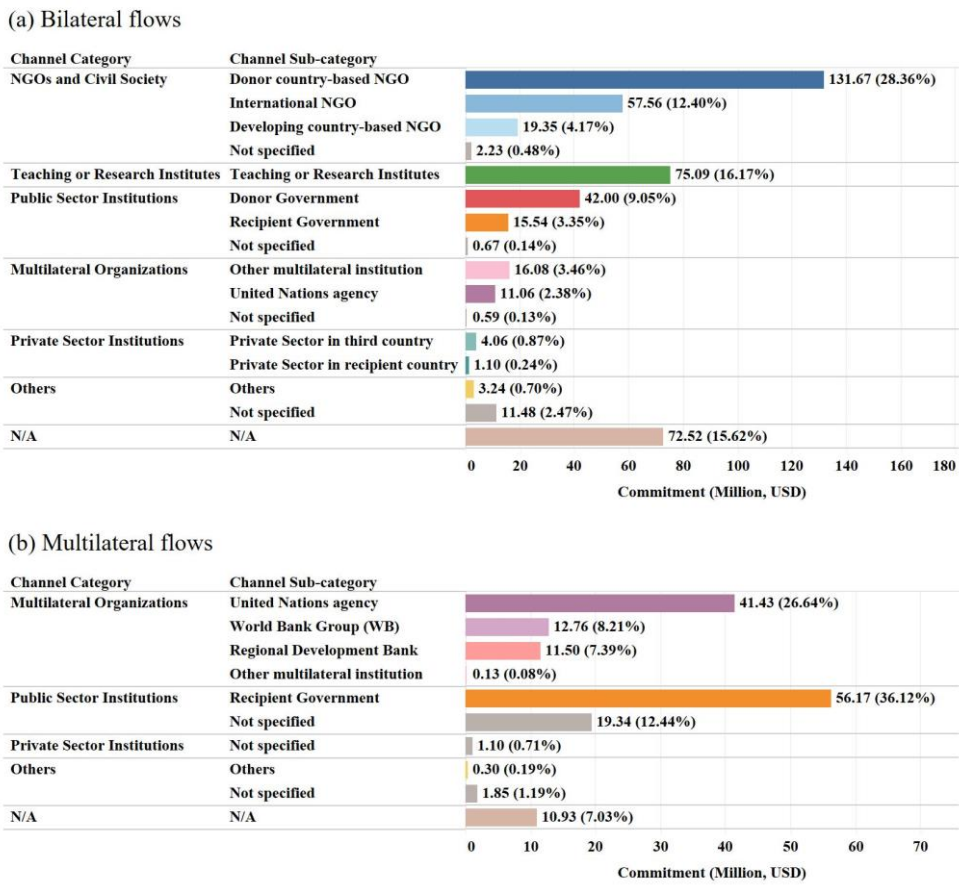


Implementing Partner (Channel of delivery)

Implementing partner gives some indication of who is actually spending dollars committed financing agroforestry development. The main channel of delivery for bilateral ODA appears to be "NGO and Civil Society", especially by donor-country based NGOs. A total of 45.41% goes through NGOs and Civil Society, followed by Teaching or Research Institutes (16.17%), Public Sector Institutions (12.54%),

Multilateral Organizations (5.97%), and Private Sector Institutions (1.11%). Only 7.75 % ($ 35.98M) of agroforestry aid is managed by recipient country governments, private sector firms, and NGOs combined, whereas donor governments and donor-country based NGOs received USD 173.67 million, which accounts for 37.41% of the total bilateral agroforestry aid **(Figure 11 (a))**. In terms of multilateral agroforestry ODA, UN agencies, such as FAO and UNDP, play a key role in the implementation of agroforestry ODA project. In contrast to bilateral agroforestry ODA, the recipient government stands out as a channel of delivery **(Figure 11 (b))**.

Figure 11. A channel of delivery by cooperation type (1988-2019)



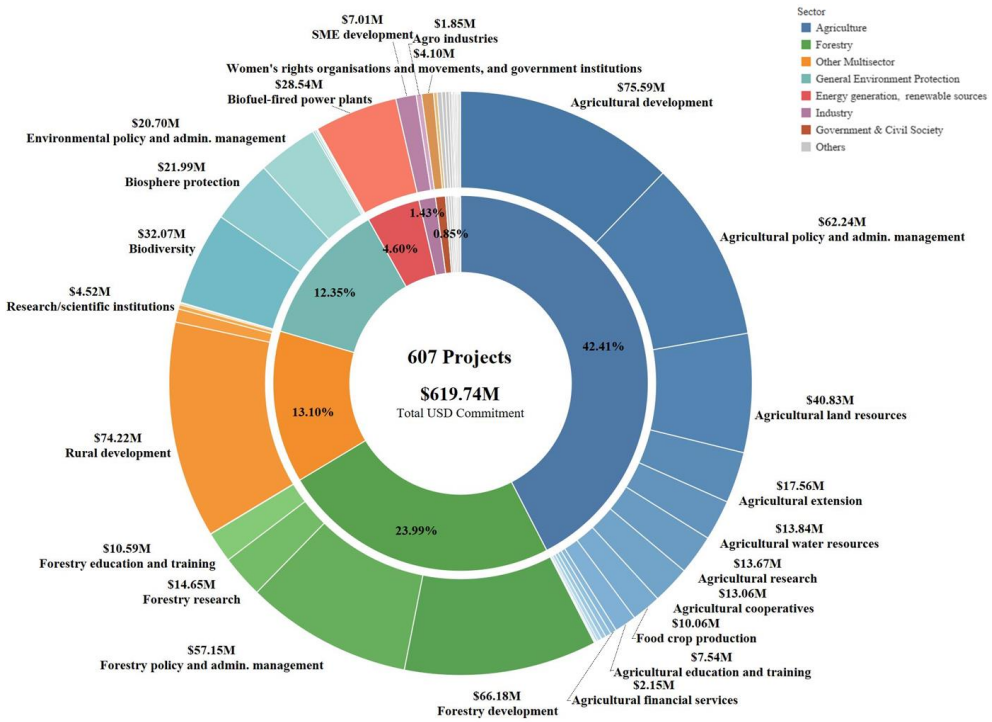
5.3. Agenda in Agroforestry ODA

5.3.1 Sector and Purpose

Sector and Purpose Distribution

607 agroforestry projects that were reviewed in this study were divided into 8 main sectors, and each sector were disaggregated by several intended purposes, according to the OECD CRS coding system. The sector categorization includes agriculture, forestry, other multisector, general environment protections, energy generation & renewable sources, industry, government & civil society, and others. As shown in **Figure 12**, the most productive sector is agriculture (42.41%), followed by forestry (23.99%), other multisector (13.10%), and general environment protection (12.35%). Although the purposes of aid in each sector vary depending on the characteristics of each sector, sectoral development makes up the largest portion in agriculture, forestry, and other multisector, and policy and administrative management accounts for the second largest in agriculture and forestry.

Figure 12. Sector and purpose distribution of agroforestry ODA (1988-2019)



Sector and Purpose Evolution in Three periods

Figure 13 represents how the sector was spread out over three periods, providing an overview of the evolution of sectors during the past three decades. For the initial period, agroforestry was addressed primarily by the agriculture (59.12%) and forestry (37.10%) sectors. However, it expanded to incorporate other sectors such as other multisector, energy generation in period 2, and industry, and government & civil society in period 3. Additionally, it made a substantial contribution to energy generation in period 2 (23.80%) and environment protection in period 3 (17.62%).

Figure 13. Sector distribution by period

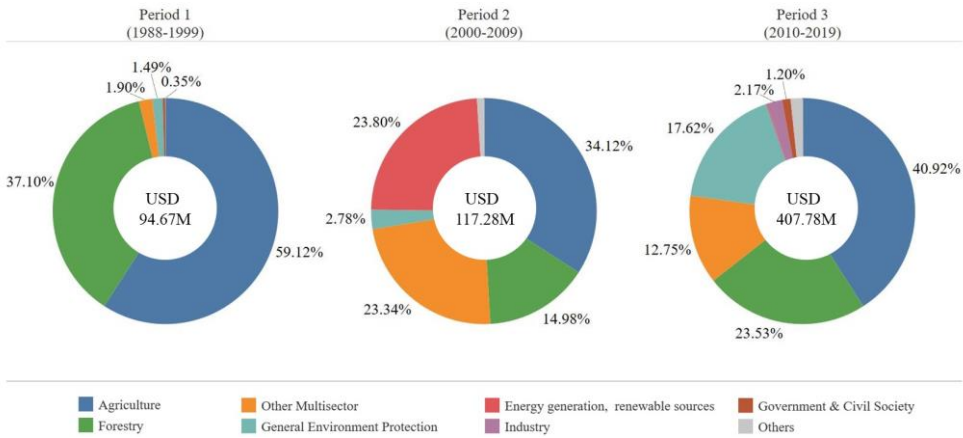


Table 8 shows how the key purposes of agroforestry ODA change within the assigned sector. Over time, the purpose of agroforestry has become diversified. Specifically, several new purposes emerged in period 3: agricultural cooperatives, financial services, industrial and export crops in the agriculture sector, and disaster risk reduction, food security policy and administrative management in the other multisector, and some others in the industry and government & civil society sector. Furthermore, its purposes have evolved within the sector. In agriculture, for example, the focus of agroforestry has shifted from managing resources to building businesses or value chains through cooperatives, financial services, and industrialization. This change is also strengthened by SME development and agro-industries in the industry sector. In the general environment sector, the idea has been expanded to include biosphere protection, which means controlling air pollution and protecting the ozone layer, as well as site preservation, which means protecting unique cultural landscapes and sites that are valuable for their history or education. Also, sector development has moved on to policy and administrative management, which includes strengthening sectoral laws, regulations, and economic instruments, as well as building the capacity of institutions.

Table 8. Change of key purposes during the three periods

Sector	Period 1 (1988-1999)	Period 2 (2000-2009)	Period 3 (2010-2019)
Agriculture	Agricultural development Agricultural land resources Agricultural water resources	Agricultural land resources Agricultural extension Agricultural development	Agricultural policy and admin. management Agricultural development Agricultural cooperatives* **New: financial services, industrial and export crops, agricultural services, plant and post-harvest protection and pest control*
Forestry	Forestry development	Forestry policy and admin. management Forestry development	Forestry policy and admin. management Forestry development Forestry research
Other Multisector	-	Rural development	Rural development **New: Disaster Risk Reduction, Food security policy and administrative management*
General Environment Protection	-	Biodiversity	Biodiversity Biosphere protection Environment policy and admin. management **New: Site preservation*
Energy generation	-	Biofuel-fired power plants	-
Industry	-	-	SME development* Agro-industries*
Government & Civil Society	-	-	Women's rights organizations and movements* Democratic participation and civil society

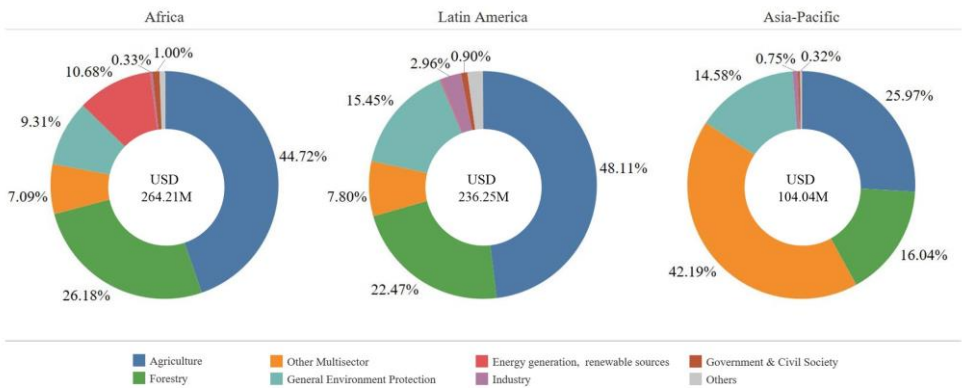
**: newly emerging purposes*

※Note: Each sector's purposes are listed in ascending order of importance.

Sector and Purpose Variation by Region

Figure 14 depicts the distribution of sectors by region, giving an overview of how the focus of sectors differs depending on the geographical context. In Africa and Latin America, agroforestry is mostly addressed by the agriculture and forestry sectors. For Asia-Pacific, however, rural development makes up the largest share (42.19%) of all agroforestry aid. In addition, every region has a distinct sectoral focus. For example, agroforestry receives significant attention under the energy generation sector (10.68%) in Africa, whereas the industry sector (2.96%) is noticeable in Latin America.

Figure 14. Sector distribution by region (1988-2019)



In alignment with the sector distribution, the main focus of each region's purposes is different, and the unique purpose shows up based on the location. As shown in **Table 9**, the main purpose of the agriculture and forestry sectors is slightly different by region. In Africa and the Asia-Pacific region, the funds for agroforestry are used to develop the designated sector and support natural resource management. In contrast, much more is spent on the sector's policy and administrative management in Latin America. In Africa, environmental policy and administrative management are a priority, and environmental research is also uniquely funded within the general environment protection sector. On the other hand, more attention

is paid to biodiversity in the Asia-Pacific region, and biosphere protection and site preservation are exceptional in Latin America.

Regarding distinct purposes by region, livestock and food security policy and administrative management are noticeable in Africa. At the same time, Latin America has plant and post-harvest protection and pest control, agricultural inputs, agricultural alternative development, and disaster risk reduction that are not found elsewhere.

Table 9. Key purposes of agroforestry ODA by region (1988-2019)

Sector	Africa	Latin America	Asia-Pacific
Agriculture	Agricultural development Agricultural land resources Agricultural water resources *Livestock**	Agricultural policy and admin. management Agricultural development *Industrial and export crops, Plant and post-harvest protection and pest control, agricultural inputs, agricultural alternative development**	Agricultural development Agricultural land resources
Forestry	Forestry development Forestry policy and admin. management Forestry research	Forestry policy and admin. management Forestry development	Forestry development Forestry policy and admin. management Forestry research
Other Multisector	Rural development Research/scientific institutions *Food security policy and admin. management**	Rural development *Disaster risk reduction**	Rural development
General Environment Protection	Environment policy and admin. management Biodiversity *Environmental research**	Biosphere protection Biodiversity Environment policy and admin. management *Site preservation**	Biodiversity Environment policy and admin. management
Energy generation	Biofuel-fired power plants	-	-
Industry	-	SME development Agro-industries*	-
Government & Civil Society	Women's rights organizations and movements	Women's rights organizations and movements Democratic participation and civil society	-

**: Purposes that appear only in the corresponding region*

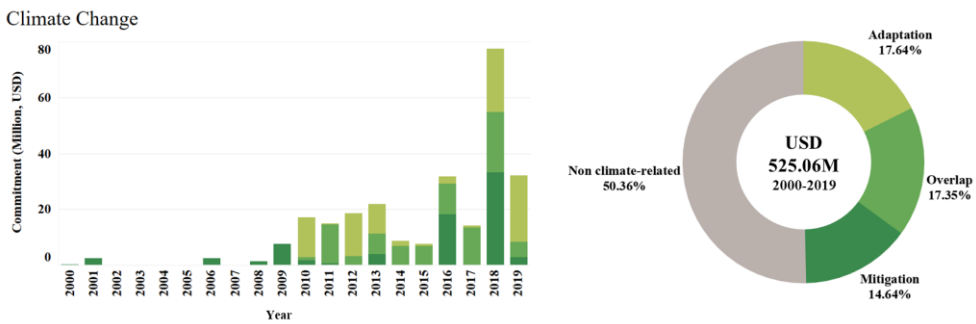
※Note: Each sector's purposes are listed in ascending order of importance.

5.3.2 Rio Markers

Climate Change

As depicted in **Figure 15**, since the adoption of the Rio Maker methodology in 2000 for mitigation and in 2009 for adaptation, agroforestry ODA commitments with climate-related objectives have increased, albeit with some fluctuations. From 2000 to 2019, 49.64% of agroforestry ODA commitments included climate-related objectives. Of all agroforestry ODA, 31.99% is focused on mitigation, which compared to 34.99% for adaptation, while 17.35% included both objectives. In 2019, 87.08% of agroforestry commitments included climate change objectives with a focus on climate adaptation (78.99%), climate mitigation (22.56%), and at least one of these objectives (14.48%). About one-third of climate-relevant agroforestry ODA has action on climate change as its principal objective, while the remaining two-thirds has it as a significant (secondary) objective. Agroforestry ODA significantly supports the implementation of climate-related activities when compared to the proportion of bilateral ODA with climate objectives of DAC members in 2020 (33.4%) (OECD, 2022).

Figure 15. Agroforestry ODA with climate objectives (2000-2019)



Biodiversity and Desertification

Agroforestry ODA contributes to multiple environmental objectives. It pursues other Rio-related objectives in addition to climate-related ones. Since 2010, biodiversity and desertification have been actively pursued in agroforestry as seen in **Figure 16** and **17**. Between 2000 and 2019, more than one-fourth of agroforestry ODA was directed toward biodiversity, and about 20% toward desertification. More than 45% of agroforestry ODA related to biodiversity pursues it as a primary objective, whereas the majority of agroforestry ODA related to desertification pursues it as a significant objective.

Figure 16. Agroforestry ODA with biodiversity objective (2000-2019)

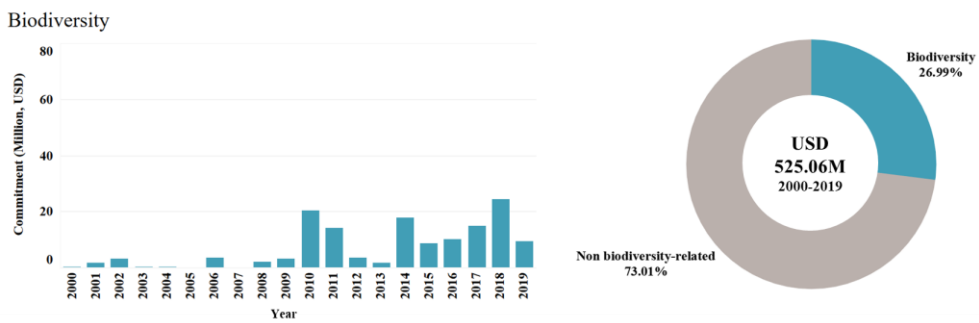
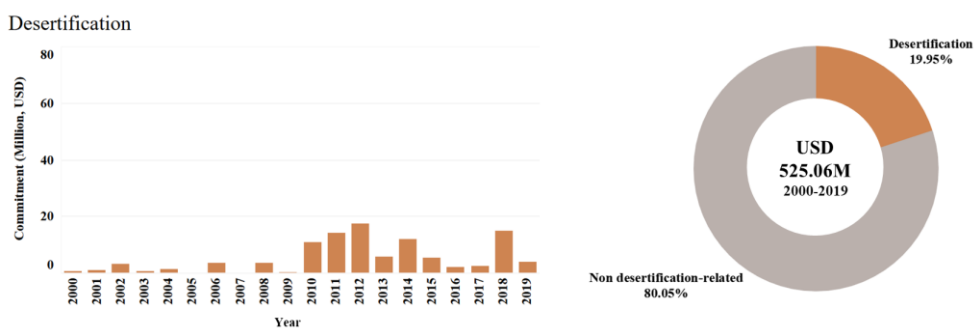


Figure 17. Agroforestry ODA with desertification objective (2000-2019)



5.3.3 General Policy Markers

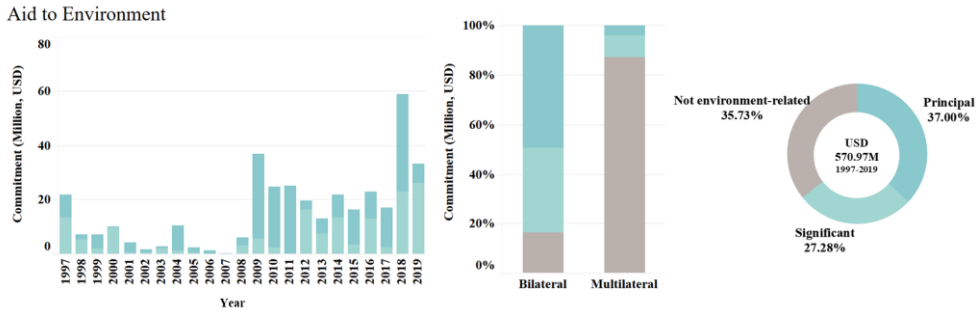
Among 8 general policy markers[5] of the CRS, Aid to Environment, Gender Equality and Participatory Democracy/Good Governance are most visible in agroforestry ODA. These policy objectives demonstrate that agroforestry provides various benefits and serves multiple functions for human society and the environment.

Aid to Environment

Figure 18 demonstrates that the prioritization of environmental considerations is most apparent when examining the evolution of agroforestry ODA flows. The environment objective received agroforestry ODA worth USD 21.99 million at the time this marker was first introduced in 1997, and since 2009, this amount has increased significantly. From 1997 to 2019, 64.27% of agroforestry ODA had an environmental focus, comprised of 37.00% of agroforestry ODA commitments related to projects with a primary objective, and 27.28% of agroforestry ODA commitments related to projects that do not primarily target the environment but include a significant environmental focus. Bilateral donors are more active in funding the environmental objective, as evidenced by 83.51% of their commitments.

[5] Gender Equality, Aid to Environment, Participatory Democracy / Good Governance, Direct assistance to poverty reduction, Trade Development, Reproductive, Maternal and Neonatal Health (RMNCH), Disaster Risk Reduction, Inclusion and empowerment of people with disability, Nutrition

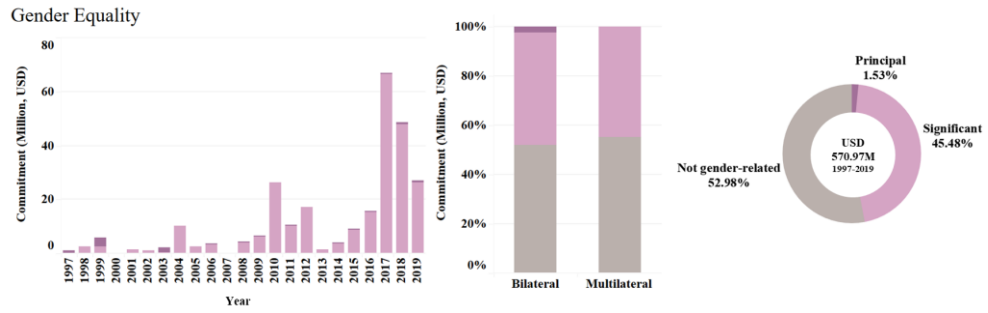
Figure 18. Agroforestry ODA with environmental objective (1997-2019)



Gender Equality

The commitment of Agroforestry ODA to gender equality has grown consistently since the marker's debut in 1997, and in the 2010s gender equality marker received more support (**Figure 19**). From 1997 to 2019, 47.02 % of ODA for agroforestry was directed toward promoting gender equality. One of the distinctive features of gender-related agroforestry ODA is that the majority of them have an action to promote gender equality as its secondary objective. In other words, even though agroforestry ODA is not primarily driven by or motivated by the pursuit of gender equality, agroforestry activities help to mainstream gender equality. At comparable rates, both bilateral and multilateral donors support gender equality through agroforestry ODA.

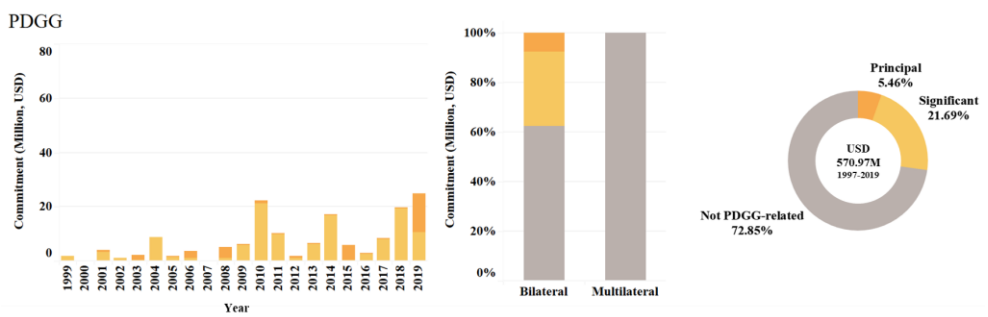
Figure 19. Agroforestry ODA with gender objective (1997-2019)



Participatory Democracy / Good Governance (PDGG)

Despite the PDGG marker's introduction in 1997, the first evidence in support of PDGG did not appear until 1999. Since then, with yearly fluctuations, the emphasis on this objective has increased. In 2019, PDGG-related agroforestry ODA reached a record high, with more than half of it serving as the primary objective. Between 1997 and 2019, one-fourth of all agroforestry ODA was allocated to PDGG, of which 5.46% was designated as the primary and 21.66% as the secondary. It is evident that only bilateral donors supported the PDGG (**Figure 20**).

Figure 20. Agroforestry ODA with PDGG objective (1997-2019)



6. Discussion

6.1. Environmental Policy Coherence in Agroforestry ODA

This study shows that international funding for agroforestry increased between 1988 and 2019, with a sharp rise in the three periods, the early and mid-1990s, the mid-2000s, and the mid-2010s. Not only the volume but also the agendas that agroforestry ODA targets became diversified. This growth and diversification of agroforestry occurred around the time that various international agreements, including the Rio Conventions, Kyoto Protocol, and Sustainable Development Goals, all agreed or entered into force. These policies are in line with increased commitment to agroforestry in the aid system. This is due to the potentials of agroforestry accomplishing the global environmental goals. In this regard, agroforestry ODA represents environmental policy coherence, as agroforestry plays a crucial role in addressing the challenges and achieving the agreed-upon goals.

Global Environmental Goals

International environmental conventions have recognized the value of agroforestry as a viable solution to various demands of developing countries like food security, afforestation and reforestation, and climate change adaptation and mitigation. In light of the role of agroforestry, the following three major events related to the Rio Conventions, the Kyoto Protocol, and the Paris Agreement, are examined.

The Rio Conventions of 1992 marked a sharp increase in the importance of global environmental governance, including several conventions and mechanisms that have direct and indirect relevance for agroforestry (Bowyer et al., 2016; Swallow et al., 2006). Agenda 21, the resulting document of the Rio Conventions, directly addresses agroforestry as a key strategy for combating deforestation, managing fragile ecosystems, promoting sustainable agriculture and rural development, and conserving biological diversity (UN, 1992). The followings are extracts from the original document:

"For combating deforestation, ensure the sustainable management of all forest ecosystems and woodlands, through improved proper planning, management and timely implementation of ***silvicultural operations*** *(Chapter 11)"*

"For managing fragile ecosystems, promote technologies of vegetative conservation measures for erosion prevention, in situ moisture management, improved cropping technology, fodder production and ***agroforestry that are low-cost, simple and easily adopted by local people*** *(Chapter 13)"*

In accordance with the Kyoto Protocol, which adopted in 1997 and came into force in 2005, agroforestry was acknowledged as a kind of afforestation and reforestation that contributes to the reduction of greenhouse gases (GHGs) (Abbas et al., 2017; Albrecht & Kandji, 2003; Ramachandran Nair et al., 2009; Takimoto et al., 2008). The Kyoto Protocol enables developed countries that have made a commitment to reducing GHGs emissions to support mitigation projects in developing countries as an alternative to what is typically more expensive in their own countries by introducing three market-based mechanisms: the Clean Development Mechanism, Joint Implementation, and Emissions Trading (Ramachandran Nair et al., 2009). Since the majority of agroforestry practitioners

are subsistence farmers in developing countries, there is a promising chance for these farmers to profit financially from the practice if the carbon captured through agroforestry activities is sold to developed countries. As a result, the Kyoto Protocol's market-based approach has increased interest in agroforestry as a potential carbon sequestration strategy (Bumpus & Liverman, 2008; Ramachandran Nair et al., 2009).

The year 2015 was a milestone year for multilateralism and the formulation of international policies, as it resulted in the adoption of numerous key accords. At the COP 21 Climate Change Conference in Paris (2015), much focus was placed on advancing global climate change mitigation policies and land-use systems (Gordon et al., 2018). As a result, more attention has been paid to agroforestry as a potential option for accomplishing nationally determined contributions in accordance with the Paris Agreement (Handa et al., 2020; Platis et al., 2019). In addition, it is generally recognized that agroforestry practices may qualify as Reduced Emissions from Deforestation and Forest Degradation (REDD+) activities (Minang et al., 2014), which are articulated in Article 5 of the Paris Agreement, where Parties reaffirmed their encouragement to carry out REDD+ activities (United Nations, 2015).

Environmental Policy Coherence

The research findings serve as a representation of the environmental policy coherence in agroforestry ODA. The commitment to agroforestry ODA under the environment sector was increased in Period 3 (2010-2019) and its agenda gradually diversified **(Figure 13)**. In addition, agroforestry ODA with environmental objectives, particularly with environmental objectives as the primary objective, increased significantly **(Figure 18)**.

Moreover, the analysis on the Rio markers provides an indication of the high degree of mainstreaming in development cooperation portfolios for environmental objectives. **Figure 21** shows an increase in both absolute and relative commitment to climate-related agroforestry ODA from 2000 to 2019. Regarding the overlap of the Rio Markers, **Figure 22** shows that the environmental policy goals are addressed comprehensively within the agroforestry ODA. This phenomenon leads to conclusions about environmental policy coherence in agroforestry ODA.

Figure 21. Climate-related agroforestry ODA (2000-2019)

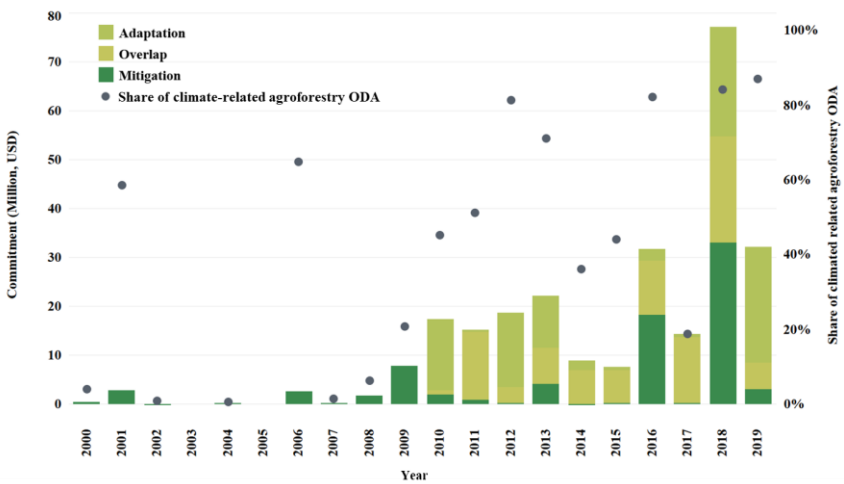
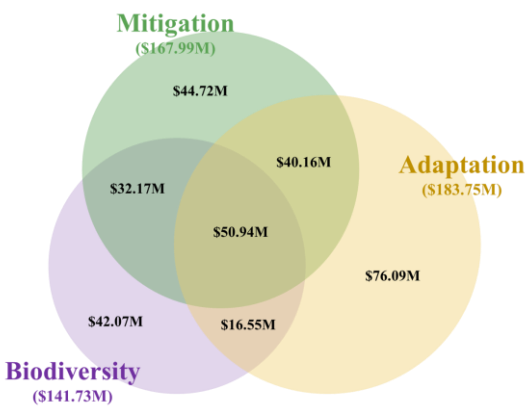


Figure 22. Overlapping of climate and biodiversity-related agroforestry ODA (2000-2019)



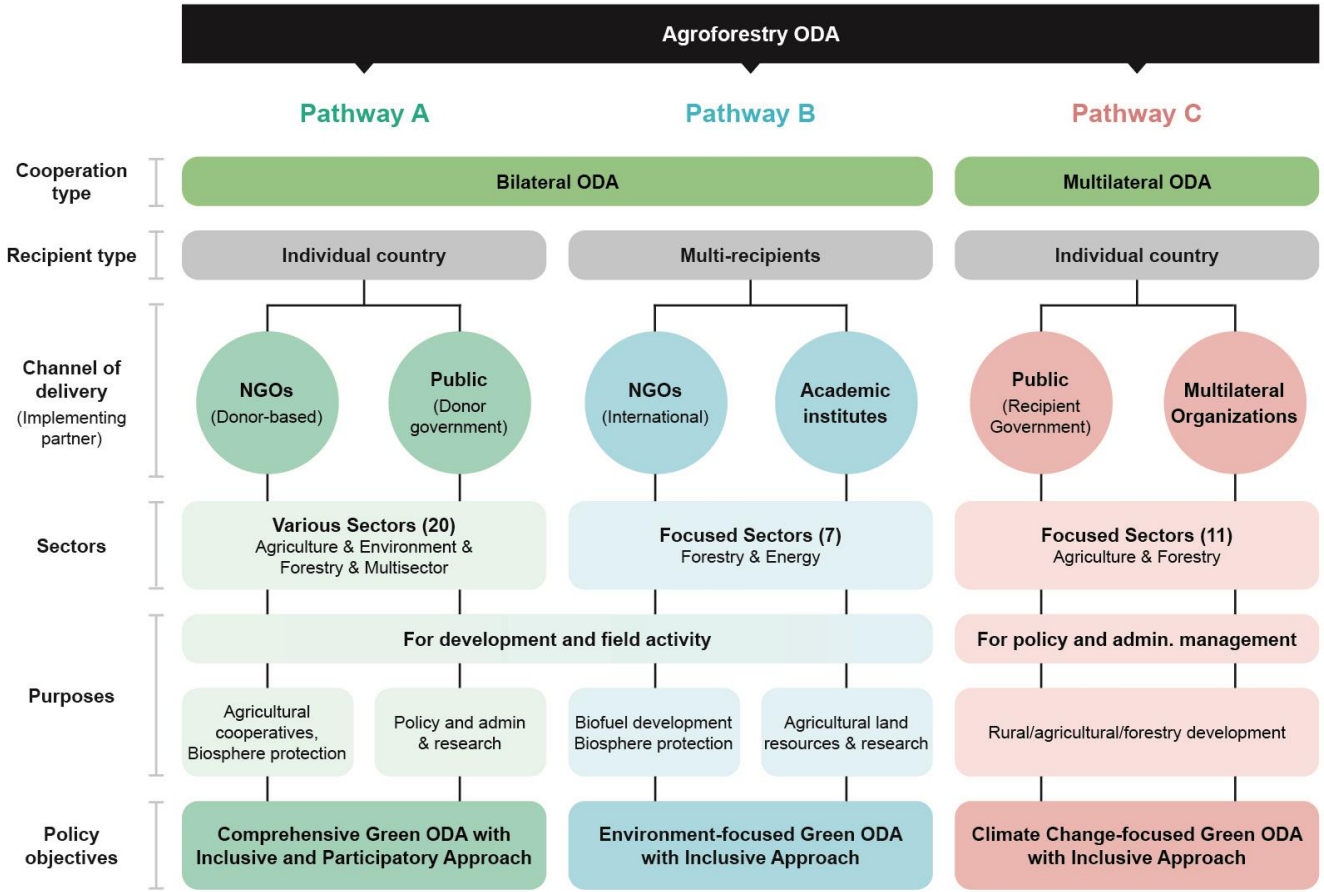
6.2. Agroforestry ODA Pathways

Technically, ODA flows are distinguished using the terms "bilateral" and "multilateral" by the cooperation type. According to the OECD, bilateral transactions are those that are carried out directly between a donor and a developing country, whereas a multilateral contribution can only be made by an international organization whose operations fully or partially support development. This flow becomes an integrated part of the assets of the recipient, making it impossible for a donor country to trace or specify its purposes. Between 2008 and 2013, DAC countries disbursed over 75% of ODA bilaterally, including multi-bi assistance, and about 25% multilaterally, as assessed by two-year averages with variances between donors (Gulrajani, 2016). In the meantime, ODA flows reach final recipients through either individual countries or regional programs.

In the 1990s, bilateral cooperation was the primary source of agroforestry ODA and gradually grew, whereas multilateral cooperation emerged in the late 2000s and significantly increased in the late 2010s. This phenomenon is consistent with the features of the new global environmental governance, which include new institutions and mechanisms (Biermann & Pattberg, 2008). As climate change issues have become a global priority, multilateral agreements such as the Kyoto Protocol and the Paris Agreement are deemed significant, and a transition away from state sovereignty occurs (Gareau & DuPuis, 2009). In addition, new actors, particularly NGOs and the academic community, play a significant role in agroforestry, another characteristic of contemporary global environmental governance (Betsill & Corell, 2001; Higgott et al., 2000; Keck & Sikkink, 1998). Since the late 2000s to the present, NGOs and civil society organizations have played a crucial role in the implementation of agroforestry projects. In this regard, agroforestry ODA primarily supported field-level and community-based interventions. In addition, teaching or research institutes expanded their responsibilities.

Under the impact of new global environmental governance, agroforestry ODA has three different pathways, as depicted in **Figure 22**. Each pathway has distinct resource, actor, and agenda characteristics. They are **Pathway A** from a bilateral donor to a single country, **Pathway B** from a bilateral donor to multiple recipients, and **Pathway C** from a multilateral donor to an individual country. In agroforestry ODA, the flow from a multilateral donor to multiple recipients is barely discernible (0.03% of the total agroforestry ODA).

Figure 23. A summary of agroforestry ODA pathways



6.2.1 Pathway A: From bilateral to individual country

As represented in **Table 10**, more than half of agroforestry ODA (55.56%) goes through Pathway A, which favors smaller-scale support with an average of $0.75 million per project from a bilateral donor to a single country.

When it comes to the involvement of actors, both the main aid agency and the extending aid agency play an important role in Pathway A. The majority of projects are implemented by NGOs and civil society organizations (47.31%), particularly those based in donor countries. Public institutions (14.65%), primarily donor governments, come in second.

In terms of the agenda, Pathway A is more diverse than other pathways by including 20 different sectors. The largest sector receiving commitment is agriculture (43.61%), which is followed by environment (18.80%), forestry (16.32%), and other multisector (15.92%). Government & Civil Society is the only sector that stands out in Pathway A, among others. With regard to the purposes, this pathway gives priority to sectoral development and activities on the ground. Specifically, the main focus is on the development of the rural, agricultural, and forestry sectors, along with forestry and environmental policy and administration management. This result fits with the traits of implementing partner of this pathway, even though the reasons for the different purpose focus are not clear. As mentioned, Pathway A involves more interaction with NGOs and civil society groups, which commonly offer activity-centered work at the field level as service providers (Banks & Hulme, 2012). On the other hand, public-sector institutions like donor governments typically concentrate on institutional or policy work at the national level due to their very nature.

Pathway A is most concerned with climate change policy in relation to Rio markers. About 40% of the agroforestry ODA in this pathway supports climate change adaptation and mitigation, and more than 50% contributes to one of these two objectives. With contributions totaling 39.46%, it also strongly supports biodiversity. Furthermore, 80.14% of this pathway contributes to the objective of aid to environment. In this regard, this pathway pursues green ODA with much emphasis on climate change and biodiversity. In addition, this pathway places a lot more emphasis on gender and PDGG than other ones, demonstrating that it supports strong inclusive and participatory ODA.

6.2.2 Pathway B: From bilateral to multiple recipients

With 16.88% of the total commitments coming from Pathway B, the average project size is $1.40 million, which is double that of Pathway A and roughly half that of Pathway C. In other words, the projects along this pathway are on a medium scale in terms of their size.

In Pathway B, NGOs and civil society organizations play a big role (43.74%), just like they did in Pathway A. However, compared to Pathway A, this pathway actively involves international NGOs. The second-largest partner is teaching or research institutions (20.91%) in this pathway.

Pathway B focuses on a few sectors. The most significant sector is forestry, which accounts for 36.24% of all agroforestry ODA in this pathway, followed by energy (26.62%), agriculture (16.89%), other multisector (10.47%), and environment (9.46%). Similar to Pathway A, it puts a lot of effort into sector development and fieldwork. More than a quarter of this pathway is directed toward

forestry development, and a further quarter toward biofuel production. Furthermore, research activities are prominently supported along this pathway. In light of this, implementing partners and the targeted purposes may be in line with one another, as was mentioned in Pathway A. Academic institutions pursue research-centered purposes, while NGOs and civil society organizations pursue field activity-centered purposes depending on the nature of each partner.

This pathway somehow strongly supports climate change mitigation and adaptation, biodiversity, and desertification. However, "aid to environment" is the most prominent objective that this pathway contributes to. Environmental outcomes are promoted by 97.69% of the agroforestry ODA in this pathway, with 73.81% designated as the primary and 23.88% as the secondary. In this respect, this pathway also aims for green ODA, but with a greater emphasis on environmental issues in general. In some measure, it supports gender equality and PDGG.

6.2.3 Pathway C: From multilateral to individual

Pathway C represents one-fourth of the total commitment to agroforestry ODA and provides the largest project, averaging $3.17 million per project from a multilateral donor to a single country.

In this pathway, there is no distinct aid agency working for the donor; rather, the multilateral organization functions as the aid agency. Public institutions, particularly recipient governments, play a significant role in the implementation of projects as a delivery channel. This contrasts with Pathway A, where donor governments are the primary project implementers. Among multilateral organizations, UN agencies or funds are the most prominent delivery channel along this pathway.

Although this pathway supports 11 sectors, which is more than Pathway B, it highly concentrates on agriculture (58.52%) and forestry (28.77%), which account for 87.29% of all agroforestry ODA in this pathway. This pathway is more concerned with the policy and administrative management of agriculture and forestry in terms of its intended purposes.

Policy-related activities include planning and programming of the designated sector, assistance to the relevant ministries, and capacity building and advice for institutions. It explains why public institutions, especially recipient governments, are the primary implementers of agroforestry ODA along this pathway. Regarding policy objectives, it is interesting that there is no overlap between climate change mitigation and adaptation objectives. In other words, the projects in this pathway aim to either mitigate or adapt to climate change. This distinction demonstrates that agroforestry is utilized for a specific purpose, despite the fact that it provides multiple functions and advantages. Moreover, in contrast to other pathways, there is no contribution to biodiversity and the least contribution to desertification. Moreover, this pathway only addresses a small portion of the overall environmental objective and does not address PDGG at all. In the meantime, gender equality is supported along this path to a significant degree.

Table 10. Comparison between agroforestry pathways by analytical dimensions

Analytical dimensions		Bilateral Cooperation		Multilateral Cooperation
		Pathway A (Individual Country)	**Pathway B (Multiple Recipients)**	**Pathway C (Individual Country)**
Resource	Commitment	$344.35 million	$104.63 million	$155.30 million
	Share of Commitment	55.56%	16.88%	25.06%
	Project scale	Small scale (Average $0.75/project)	Medium scale (Average $1.40/project)	Large scale (Average $3.17/project)
Actor	Aid agency	- Main aid agency (66.58%) - Extending aid agency (31.43%)	- Main aid agency (84.24%)	- Multilateral organization (92.73%)
	Channel of delivery (Implementing partner)	- NGOs and civil society (47.31%) → Donor country-based NGOs - Public Sector (14.65%) → Donor government	- NGOs and civil society (43.74%) → International NGOs - Teaching or research institutes (20.91%)	- Public Sector (48.48%) → Recipient government - Multilateral organizations (42.39%) → UN
Agenda	Sector	20 sectors including - Agriculture (43.61%) - Environment (18.80%) - Forestry (16.32%) - Multisector (15.92%) - Industry (1.97%) - Government & Civil Society (1.49%)	7 sectors including - Forestry (36.24%) - Energy (26.62%) - Agriculture (16.89%) - Multisector (10.47%) - Environment (9.46%)	11 sectors including - Agriculture (58.52%) - Forestry (28.77%) - Multisector (9.84%) - Industry (1.19%) - Environment (1.06%)

	Purpose		48 purposes including - Rural development (15.14%) - Agricultural development (14.55%) - Biodiversity (9.10%) - Forestry development (7.04%) - Forestry policy and admin management (6.26%) - Agricultural land resources (6.16%) - Environmental policy and admin management (5.24%)	16 purposes including - Forestry development (27.46%) - Biofuel-fired power plants (26.62%) - Agricultural land resources (9.99%) - Biosphere protection (7.31%) - Forestry research (6.52%) - Rural development (6.51%) - Agricultural research (5.14%) - Research/scientific institutions (3.96%)	12 purposes including - Agricultural policy and admin management (35.56%) - Forestry policy and admin management (20.33%) - Agricultural development (16.39%) - Rural development (9.84%) - Forestry development (8.44%) - Agricultural land resources (5.89%)
	Policy objectives	Mitigation	38.41%	32.48%	20.36%
		Adaptation	40.94%	32.70%	25.00%
		Overlap of M&A	22.62%	30.07%	0.00%
		Climate Change	56.73%	35.11%	45.37%
		Biodiversity	39.46%	28.41%	0.00%
		Desertification	21.20%	24.68%	12.46%
		Environment	80.14%	97.69%	12.87%
		Gender	54.01%	30.00%	44.71%
		PDGG	42.80%	20.41%	0.00%

※*The proportion in the actor and agenda section is calculated based on committed amount of the corresponding pathway.*

※*The proportion in policy objectives section is calculated based on the time each marker was introduced.*

6.3. Regional Approach to Agroforestry ODA

A number of scholars have discovered the cross-sector benefits of agroforestry. This study also demonstrated agroforestry's multi-layered functions through agenda analysis. Thematically, Africa, Latin America, and Asia displayed various agroforestry development strategies (Somarriba et al., 2012). According to Somarriba, agroforestry research and development (R&D) in **Africa** concentrated on figuring out how to produce food year-round, primarily grains, in dry and semiarid regions. Researchers in Africa investigated agroforestry from an agronomic point of view. They looked at farming practices and how improved fallows, intercropping, and hedgerows help woody perennials maintain soil fertility. It was encouraged to plant trees and shrubs in crop fields to improve soil fertility and maintain crop yields (Buresh & Cooper, 1999; Kang, 1993). In the meantime, the **Latin American** approach to agroforestry developed from an emphasis on commercial agriculture, multi-strata systems, and livestock farming with tree crops (Somarriba et al., 2001). Moreover, its approach incorporated a strong focus on biodiversity conservation than any other region (Vandermeer & Perfecto, 2005). In Argentina, Chile, Bolivia, and Paraguay, for example, commercial silvopastoral systems and practices have been studied in detail. Also, shaded tree-crop systems involving coffee and cacao as commodities have received high consideration (Somarriba et al., 2012). In an effort to lessen soil degradation caused by slash-and-burn agriculture, Andean countries with vast humid Amazonian forests have prioritized improved fallows in their agroforestry research (Alegre et al., 2005). Additionally, attention was given to silvopastoral systems to restore degraded grasslands (Arevalo et al., 1998) and multi-strata systems to lower net emissions of greenhouse gases (Palm et al., 2002). In **Asia**, on the other hand, the most important agroforestry research was conducted from a “forestry perspective.” Its primary emphasis was placed on tree-crop-based systems at the forest end of the continuum between agriculture and forest. For instance, extensive research has been conducted on rubber and damar agroforests

(Somarriba et al., 2012). Furthermore, in Southeast Asia, where there are numerous people, food production systems based on both home gardens and conventional land fallowing and mulching techniques got a lot of R&D investment (Cairns, 2007). According to the research on agroforestry practices in the Asia-Pacific region, silvorable systems, particularly plantation crop combinations and tree management and habitats for species have received greater attention than agrosilvopastoral and silvopastoral systems (Shin et al., 2020).

There are similarities and differences between the regional approach to agroforestry in ODA and that of earlier studies. As implied by the term "agroforestry," all regions exhibit similar traits related to agriculture and forests. On the other hand, the agroforestry approach in ODA has specific or concentrated characteristics depending on the geographical context. This section will describe the sector-specific approach and highlight the regional characteristics of agroforestry ODA based on the findings of the sector and purpose analysis.

6.3.1 Energy-centered approach in Africa

Africa, in contrast to other regions, has a higher share of agroforestry ODA for the energy sector following agriculture and forestry **(Figure 14)**. The Netherlands contributed the majority of the agroforestry ODA for energy generation through regional programs in Burundi, the Democratic Republic of Congo, and Rwanda during Period 2 (2000–2009). Sweden, Germany, Finland, and Canada primarily provided energy-centered agroforestry ODA for resolving Africa's energy issues during Period 3 (2010–2019).

As shown in **Table 11**, the primary objectives and activities of agroforestry ODA for energy generation include creating alternative means, like briquettes, improving cooking stoves to use energy more efficiently, establishing woodlots to increase the supply of fuelwood for a growing population, producing crops for biofuel and utilizing agroforestry waste to generate electricity.

This energy-centered agroforestry ODA is related to Africa's high demand for wood fuel consumption. According to FAO data, wood fuel consumption accounts for between 61% and 86% of primary energy in the various African sub-regions, with households accounting for the majority of this consumption from 74% to 97% (Amous, 1999). Since 1980, the fuelwood crisis has received attention in most southern African countries, but it has not gone away (Luoga et al., 2000). In fact, by the late 1990s, Africa has the highest per capita wood fuel consumption (0.89 m^3/year) in comparison to other regions (e.g., Asia: 0.3 m^3/year) (Amous, 1999).

FAO projections also show that the demand for wood fuel in Africa will continue to expand with usage trends varying by region (Broadhead et al., 2001). According to Arnold et al. (2006), the total amount of fuelwood consumed in Asia, which makes up nearly half of the world's wood fuel, is falling from roughly 822.5 million m^3 in 1970 to 547 million m^3 in 2030. This is because consumption in South Asia has reached or is nearing its peak, and there has been a noticeable decline in China and much of East and Southeast Asia since the 1980s. Moreover, the overall consumption of fuelwood has only been slowly increasing in South America, where it is less significant as a fuel source. On the other hand, the consumption is still rising fairly quickly in Africa, despite a slowing growth rate from about 261.1 million m^3 in 1970 to 544.8 million m^3 in 2030, where fuelwood use per person is much higher than in Asia. Also, the consumption of charcoal in Africa is expected to more than double between 2000 and 2030 at a rate that is comparable to demographic growth.

In 2030, it is anticipated that Africa will consume 46.1 million tons of charcoal overall, more than twice as much as South America and seven times as much as Asia.

Similar issues of wood fuel consumption are addressed by energy-focused agroforestry ODA projects. For instance, from 2009 to 2011, the Netherlands funded one of the largest projects for energy generation, “Sustainable Energy through Woodlots and Agroforestry in the Albertine Rift (SEW)”, for Burundi, Rwanda, and the Democratic Republic of the Congo. The households in the target areas heavily rely on biomass as their primary energy source, particularly for cooking. In Burundi, wood sources account for 96% of energy consumption, 3% comes from petroleum products, and 5% comes from electricity. In the DRC, wood and charcoal are pretty much the only sources of energy for heating and cooking. Most of them are illegally taken from the Virunga and Walikale National Parks. The need for building materials, the influx of refugees, and population growth have all led to an explosion in the exploitation of these forests. Nearly 80% of the energy used in Rwanda is from firewood and wood for charcoal, with peat and agricultural waste making up the remaining 6%. The only other energy sources are petroleum fuels (11%), which are used to make diesel for power plants, and hydroelectricity (4%). Together, firewood and charcoal make up more than 98% of the energy used for cooking in urban and close to 100% in rural areas (IFDC, 2011).

To sum up, an energy-centered strategy for agroforestry ODA has been developed, taking into account the energy needs of recipients in Africa. Woodlots, energy-efficient cooking stoves, alternative fuels like briquettes, and other resources were made available to satisfy the population's high demand for wood fuel consumption. These initiatives support household income generation while halting forest degradation and deforestation, reflecting the multiple beneficial aspects of agroforestry.

Table 11. Energy-centered agroforestry ODA projects in Africa

Year	Donor	Recipient	Objective and/or Activity
2019	Canada	Senegal	Create and market biomass **briquettes for fuel** / Produce crops for **biofuel**
2016/2019	Germany	Rwanda	Provision of **fuelwood** for the local population in the marginal zones
2018	Sweden	DRC	Creation and promotion of sustainable energy sources for urban and peri-urban
2014/2016	Finland	Tanzania	Charcoal substitute (**briquette**) production and **improved cook stove** production
2014	Spain	Ghana	Feasibility study on decentralized **electricity** seize with **agroforestry waste**
2012/2014	Finland	Tanzania	Energy efficient / wood-fuel **saving cook stoves**
2008/2012	Finland	Kenya	Establishment of woodlots for **charcoal, fuelwood**, and pole production Manufacture and marketing of **fireless cookers** and energy **efficient wood stoves**
2008/2010	Japan	Regional (Kenya, Tanzania, Uganda)	Research on bioenergy (**fuelwood**) provision within agroforestry systems in East Africa
2009	Netherlands	Regional (Burundi, DRC, Rwanda)	Sustainable energy production through **woodlots** and agroforestry
2005/2006	IDA	Burundi	To reduce Burundi's need for imports of timber, timber substitutes and **fuel**
2001	Netherlands	Kenya	Case study on best practices of Kenya **Wood-fuel** and Agroforestry Program
2001	Austria	Ethiopia	Agroforestry-based **fuel wood** planation

※*Note: Key words in bold*

6.3.2 Business-centered approach in Latin America

Agroforestry ODA is utilized from a wide range of business and industry perspectives in Latin America. The total size of agroforestry ODA projects under the industry sector is 8–9 times bigger in Latin America than the continents of Africa and Asia. Even in the agricultural sector, business-based purposes like agricultural cooperatives, agricultural financial services, and industrial and export crops are predominant in Latin America. This business-centered agroforestry ODA was supported mainly by Canada, the IADB, Norway, Spain, and the United States for Honduras, Haiti, Peru, the Dominican Republic, and other countries during Period 3 (2010–2019).

As shown in **Table 12**, among the major objectives and activities of the business-centered agroforestry ODA are building value chains for particular tree crops, like coffee and cacao, and enhancing the capability of farmer associations and cooperatives. Agroforestry-based vocational training and entrepreneurship education were also included.

This business-centered agroforestry ODA is relevant to the two most well-known agroforestry systems in Latin America: commercial silvopastoral systems and shaded tree crop systems. Agroforestry in Latin America, in particular, has developed as a result of a focus on commercial agriculture with tree crops like cacao and coffee (Somarriba et al., 2012). Coffee and cocoa are typically grown in the shade (Somarriba et al., 2012; Somarriba & López Sampson, 2018).

Coffee is considered important in Latin America due to both economic and ecological benefits. It is found that the few remaining forested areas in northern Latin

America are traditional coffee plantations (Perfecto et al., 2005). In particular, shaded coffee has been estimated to represent approximately 80% of the remaining forested area in El Salvador (Panayotou & Faris, 1997). It indicates that tree-crop systems contribute to the preservation of forests and the environment. At the same time, as of 2017, roughly half of the world's coffee is produced in Latin America, where it serves as the region's main export and source of foreign exchange (Harvey et al., 2021; Perfecto et al., 1996).

Latin America has better environmental conditions than other regions when it comes to production and marketing of tree crops in agroforestry systems. First of all, 34% of Latin America is geographically located in the humid tropics, a region characterized by high temperatures that are nearly constant, a dry season that lasts no longer than three consecutive months, and natural vegetation such as tropical rainforests or seasonal tropical forests. In particular, 58% of Central America[6] and 72% of the Caribbean[7] are humid tropical regions (Benites, 1990). According to the updated world map of the Köppen-Geiger climate classification, the dominant climate type for Africa is arid (57.2%), followed by tropical (31.0%) and temperate (11.8%). For Asia, the cold area (43.8%) is dominant, followed by arid (23.9%) and tropical (16.3%). South America, on the other hand, is mostly tropical (60.1% of the land area), followed by temperate (24.15%) and arid (15.0%) (Peel et al., 2007). In addition, acid soils, which account for about two-thirds of Latin America's humid tropics, are suitable for agroforestry systems such as tree crop plantations and fruit tree-based production (Benites, 1990). The climates and soils favor tree crops production in the region (Castañeda-Ccori et al., 2020).

[6] Central America: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama
[7] Caribbean: Antigua, Bahamas, Barbados, Belize, Cuba, Dominican Republic, French Guiana, Guadeloupe, Guyana, Haiti, Jamaica, Martinique, Netherlands Antilles, Puerto Rico, Sta. Lucia, Suriname, Trinidad/Tobago

As the market for tree crops like coffee and cacao has been constantly expanding, Latin America is a key player in the supply of these agricultural commodities (Castañeda-Ccori et al., 2020; Donovan, 2006; Harvey et al., 2021; Scott, 2016). As the biggest and closest importer of coffee and cacao from Latin America, the United States continues to play a critical role in the market (Donovan, 2006; Krishnan, 2017). The expansion of middle-class consumers of coffee and cacao, such as China, Brazil, and India, is also encouraging a number of Latin American countries to keep up their production of these products (Scott, 2016). They have determined that these commodities have the potential to diversify agricultural exports and boost the incomes of low-income households, which frequently dominate domestic production systems (Castañeda-Ccori et al., 2020; Scott, 2016). Additionally, the tree crop system of agroforestry is strongly promoted in the region by public policies, reflecting the ability of shaded coffee and cacao to lower greenhouse gas emissions and preserve biodiversity (Castañeda-Ccori et al., 2020; Somarriba & López Sampson, 2018)

In this context, a number of agroforestry ODA projects with a business-centered approach have been implemented. One of the largest projects is the Canada-Honduras Value Added Agroforestry Project (CAHOCA). It aims to help low-income members of 42 associative enterprises increase the scope of their product lines in eight profitable agroforestry industries: cocoa, coffee, honey, heart of palm, tilapia, tropical wood, furniture, and pine resin. Even during the pandemic, approximately 16,000 kilos of coffee were purchased from the members and will be sold in the American and Canadian markets, according to the annual report of the implementing partner, SOCODEVI (SOCODEVI, 2021). Another example is Creole Garden Revalorization project funded by Canada from 2019 to 2024. This project seeks to develop value chains in the coffee- and cacao-based agroforestry systems in Haiti's Sud department. This department is particularly vulnerable to climate change,

which exacerbates environmental degradation and directly impacts agricultural activities and the entire value chain.

In conclusion, agroecological factors and the demand for agricultural commodities from outside the region have influenced and continue to influence Latin America's social, economic, and land use decisions.

Table 12. Business-centered agroforestry ODA projects in Latin America

Year	Donor	Recipient	Objective and/or Activity
2018/2019	Canada	Haiti	Develop **value chains** in the **coffee- and cacao**-based agroforestry systems Women's economic empowerment by using the value chain approach in cacao, yam, and cassava, support **farmers' organizations**
2011/2019	United States	Dominican Republic	Support **agricultural cooperatives** to increase their harvest of **avocados and limes** Train **cacao** farmers in agroforestry and organic production
2018	Norway	Nicaragua	**Vocational training** on agroforestry and woodwork (Wawashang Agroforestry School)
2018	Canada	Guatemala	Improve agricultural entrepreneurship in **cardamom and turmeric** within **cooperatives**
2016 2017 2018	Canada	Honduras	Support **micro-enterprises** and strengthening the capacity of **farmers' associations** Socio-economic development of associative enterprises and the expansion of markets for agroforestry products: **cocoa, coffee**, honey, heart of palm, tilapia, tropical wood, furniture, and pine resin Support entrepreneurial women, promoting agroforestry **value chains** for local urban, and specialized markets and services
2014/2015	Spain	Honduras	Strengthening the **cocoa value chain**, associated with agroforestry systems
2011	IADB	Peru	Sustainable development of Peruvian **coffee**

※*Note: Key words in bold*

6.3.3 Forest community-centered approach in Asia-Pacific

In Asia-Pacific, the rural development sector accounts for more than 40% of agroforestry ODA, compared to just 7% in Africa and Latin America (**Figure 14**). The main contributors are the International Fund for Agricultural Development (IFAD), followed by Switzerland, South Korea, Canada, Germany, and Finland. The primary recipients are Vietnam, Bangladesh, the Philippines, Indonesia, and Nepal.

These recipient countries share the common feature of having a higher proportion of indigenous and forest populations. Around 140 million Southeast Asians rely on forests for survival, and they have created their own resource management systems based on cultural knowledge, customs, rules, and beliefs (Chao, 2012). Particularly, it is estimated that there are approximately 6-114 million forest people living in Bangladesh, 80-95 million in Indonesia, 25-30 million in the Philippines, 25 million in Vietnam, and 18 million in Nepal, which is accounts for about 50% of all forest people living in the Asia-Pacific region (Chao, 2012).

Farmers in mountain areas have to deal with challenges and opportunities: physical isolation, distance, transportation problems, climate and environmental risks, limited production, and diverse agroecological conditions (Denholm, 1991). Given the unique characteristics of mountainous areas, numerous agroforestry techniques are suitable, especially when taking into account the scarcity of available land, the need for conservation, and the pressure to increase production. It is consistent with Somarriba's assertion that agroforestry has been developed and studied from a forestry perspective, with a focus on the tree-crop system at the edge of the forest (Somarriba et al., 2012).

Moreover, this approach is in line with Social or Community Forestry developed in Asia and the Pacific region. In the 1980s, in response to local demands and extensive large-scale cutting down of trees in the state-owned forest, social forestry began in this region (RECOFTC, 2013). The fact that forests are largely under government control and that local communities are partially responsible for forest management in exchange for some benefits is a common characteristic of the majority of Asian countries (Manzoor Rashid et al., 2015). However, rising rates of deforestation have cast doubts about the state's capacity to manage forests and control their resources in a sustainable manner (Moeliono et al., 2017). According to (Gilmour, 2016) and (Purnomo & Anand, 2014), Social or Community Forestry was seen as a potential solution to problems with forest management and forest conflicts. In addition, the evolution of Social or Community Forestry programs in various countries was influenced by ideas of democracy and justice, as well as neoliberal concepts, and mounting proof that traditional practices can have a positive impact on conservation (Brosius et al., 1998; Chomba et al., 2015; Larson, 2012; McCarthy, 2005). By transferring ownership of forests from national governments to local communities, the social forestry model has gained popularity as a strategy to fight forest degradation (Bixler, 2014).

The agroforestry ODA project in Asia exhibits these characteristics, as shown in **Table 13**. The ethnic minority in the province with challenging mountainous terrain is the focus of the Pro-Poor Partnerships for Agroforestry Development Project in Vietnam. The Quirino Integrated Agricultural Development Project in the Philippines is also being carried out in an area with 80% mountainous terrain. The Nepali project aims to help the small ethnic communities living in the hills. The main purpose of these projects is poverty reduction through a community-based approach.

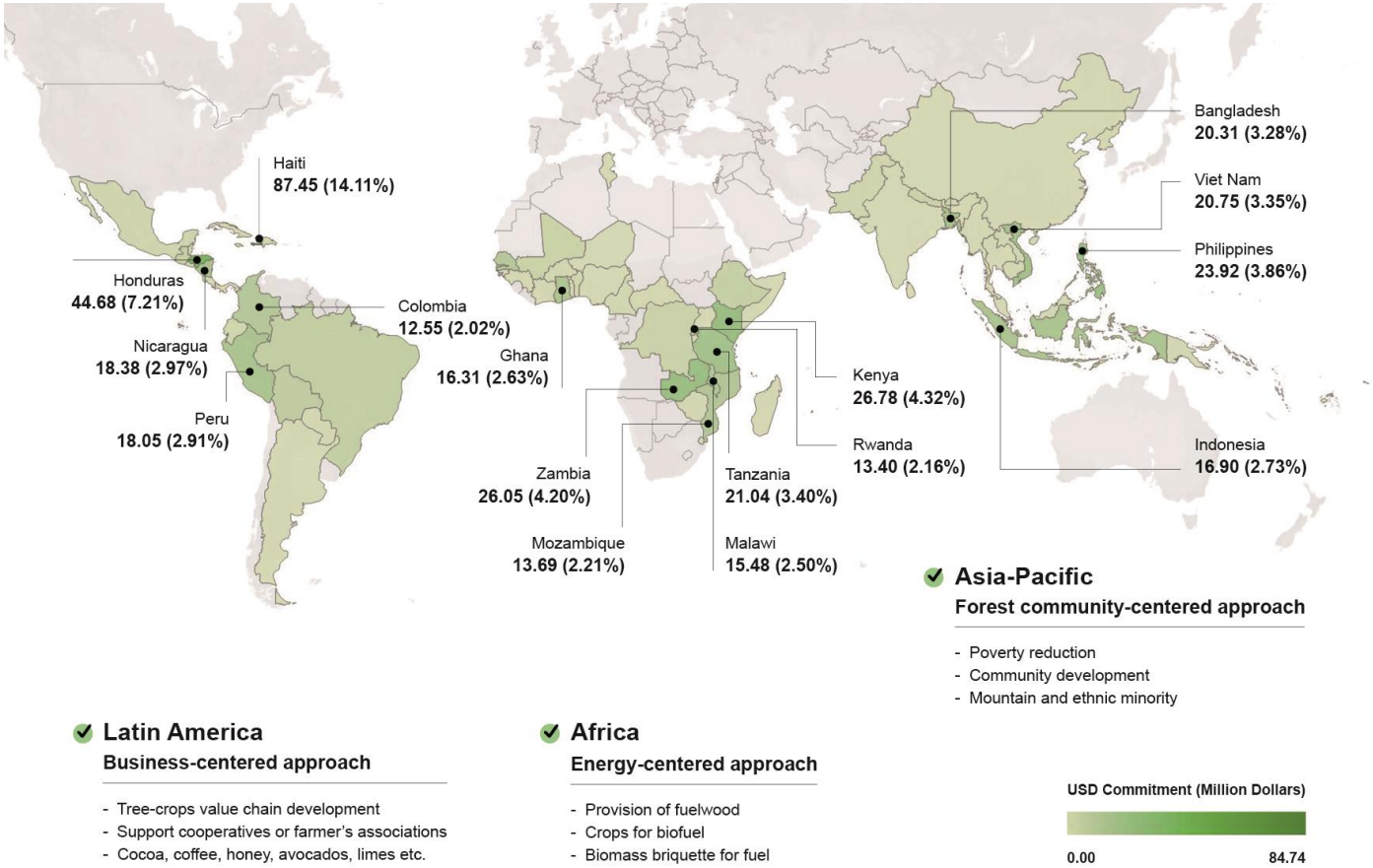
Table 13. Forest community-centered agroforestry ODA projects in Asia

Year	Donor	Recipient	Objective and/or Activity
2018	Korea	Philippines	Philippines Quirino Integrated Agricultural Development Project To **poverty reduction** and improvement of the quality of living standard by increasing farmers' income at **a mountainous area** (80%) Establishment of agroforestry based integrated farming model farm at **village level**
2011	Canada	Indonesia	Agroforestry and **Forestry** in Sulawesi: Linking Knowledge to Action To secure sustainable livelihoods for Sulawesi's smallholder farmers in **rural communities** by enhancing people's technical capacities; establishment of agroforestry-based enterprises
2010	Switzerland	Bangladesh	Market and value chain development; **community organization** and governance strengthened
2010	Finland	Nepal	**Mountain Community** development program Developing small **ethnic communities**: education on food production, income generating activities, agroforestry, supporting woman groups
2008	IFAD	Vietnam	**Pro-Poor** Partnerships for Agroforestry Development Project Target **ethnic minority** in the province with limited agricultural land and rugged mountainous terrain Develop sustainable hillside farming; **village forestry** management boards; **community development** fund
2007	Switzerland	Bangladesh	Livelihoods Empowerment & Agroforestry Project Micro-scale business planning and entrepreneurship development in context of **community-based organizations** to **reduce poverty** of small and marginal farmers of North-West Bangladesh

※*Note: Key words in bold*

Prior research has demonstrated that the African region prioritized food production through agriculture-focused agroforestry. Latin America, on the other hand, developed agroforestry based on livestock and commodity crops using a wide range of land and emphasized the environmental benefits of agroforestry, such as the preservation of biodiversity. In the meantime, forestry-oriented agroforestry has been implemented at the edges of mountainous regions in Asia. These approaches are similarly applied to or enhanced in agroforestry ODA, as depicted in **Figure 24**. Agroforestry was actively used in Africa to meet energy needs beyond the production of essential foods. Agroforestry was also encouraged in Latin America in terms of business expansion to boost sales and production of tree crops such as coffee and cocoa. In Asia, agroforestry was promoted as a means of alleviating extreme poverty in a mountainous region.

Figure 24. A summary of regional approaches to agroforestry in ODA



7. Conclusion

This study examined the structures and characteristics of agroforestry ODA through the three analytical dimensions: resource, actor, and agenda. Agroforestry ODA has been increasing since 1988, when the first agroforestry ODA project began. Its annual growth rate is higher than that of agriculture, forestry, general environmental protection, and even ODA as a whole. Its agendas have diversified over time, aligning with international environment policies and conventions, including the Rio Conventions, Kyoto Protocol, and Paris Agreement. Principal environmental policies recognize the importance of agroforestry in addressing environmental and climate change issues and concerns. Additionally, agroforestry ODA has grown, specifically contributing to environmental and climate change policy, as indicated by the Rio Markers. In this regard, agroforestry ODA represents environmental policy coherence at a global level.

Furthermore, agroforestry ODA shows the three distinctive aid pathways by cooperation and recipient types. Pathway A entails small ODA transfers from a single bilateral donor to one recipient country, with a focus on green, inclusive, and participatory aid for addressing climate change and biodiversity. Donor-country NGOs and governments are in charge of managing this pathway. Pathway B moves ODA from a bilateral donor to multiple recipients of medium scope that concentrates on green ODA and strongly emphasizes all-encompassing environmental goals. Projects along this pathway are implemented by international NGOs and academic institutions. Along Pathways A and B, sectoral development and fieldwork are mainly targeted. Pathway C establishes a large-scale connection between a multilateral donor and a single country in an effort to achieve a specified goal for climate change adaptation or mitigation. It is primarily concerned with the policy

and administrative management of the relevant sector which is led by recipient governments and multilateral institutions as a channel of delivery.

Lastly, three regional approaches to agroforestry ODA are identified. Africa has energy-centered approach to meet the high demands of wood fuel in the region. In Latin America, its geographical feature makes the region have business-centered approach by utilizing tree crops such as coffee and cacao. In Asia, a forest community-based approach is distinct as agroforestry has been developed around mountainous areas for indigenous and forest people to eliminate rural poverty.

Although this research provides meaningful findings, it is subject to several limitations. This research depends on the OECD CRS data reported by donors, and the donors do not report all grants and loans. In this regard, there might be some missing agroforestry projects, although the OECD CRS covers most of the aid around the world. In addition, this study does not include an in-depth analysis of each project as a case, as the aim was to offer a more comprehensive perspective. Based on this study, future research could focus on the effectiveness and impact of agroforestry ODA projects and conduct interviews with various actors to understand the governance of agroforestry ODA projects.

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Abstract in Korean

국 문 초 록

혼농임업 분야의 국제개발협력 구조와 지역별 특성

손정은

국제농업개발협력 전공

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식량 안보 문제와 기후 변화는 전 세계의 많은 지역, 특히 개발도상국에서 계속해서 가장 중요한 문제로 대두된다. 다양한 연구자들과 정책입안자들은 지속가능한 농업과 기후 복원력 제고 방안을 동시에 달성하기 위한 방안을 찾고자 노력해왔다. 이러한 상황 속에서 임업과 농축산업을 겸하는 집약적 토지 이용 체계인 혼농임업은 식량 안보, 기후변화 적응과 완화, 생물 다양성 증진, 에너지 공급 등 전 지구적 환경 문제 해결과 지속 가능한 개발 목표를 달성하기 위한 방안으로 주목받고 있다.

본 연구는 1988 년부터 2019 년 사이의 경제협력개발기구(OECD) 통계 보고 시스템(CRS)을 통해 획득한 607 개의 혼농임업 분야 공적 개발 원조(ODA) 사업을 분석 대상으로 하였다. 내용 분석법을 바탕으로 혼농임업 분야 공적 개발 원조의 자원, 행위자, 의제를 규명하고 시간과 지역별로 그 구조와 특성을 파악하였다.

연구 결과, 혼농임업 ODA 는 리우 협약, 교토 의정서와 같은 국제 환경 협약과의 정책 일관성을 보여주었다. 주요한 국제 환경 정책 및 협약이 강화되는 상황 속에서 혼농임업 ODA 가 증가하였으며, 기후변화 및 환경 정책에 기여하는 리우 마커 표기 사업도 증가하였다. 둘째, 협력 형태에 따라 세 가지 특징적인 제공 경로를 나타내었다. 경로 A 는 양자협력으로 공여국에서 수원국으로 자원이 이동하는 경로이며 공여국 NGO 와 정부를 중심으로 포용적이며, 참여적인 녹색 ODA 를 추구하였다. 경로 B 는 경로 A 와 유사하게 녹색 ODA 를 지향하나 보다 일반적인 환경 정책 달성을 목적으로 하였으며, 국제 NGOs 와 학계가 중심이 되어 대륙 프로그램을 지원하였다. 경로 C 는 다자협력으로 다자기구가 개별 수원국을 지원하는 경로로 수원국 정부가 사업의 수행 주체가 되어 기후변화 적응 또는 완화의 명확한 대응 목표를 가지고 지원되었다. 마지막으로, 혼농임업 ODA 는 지역적 특성에 따라 서로 다른 접근 방식을 보였다. 아프리카 지역은 에너지 중심의 접근법을 가지며 라틴 아메리카 지역은 비즈니스 중심의 접근법에 초점을 맞추었다. 아시아 지역은 산촌 공동체를 중심으로 혼농임업을 발전시켰다.

본 연구는 혼농임업 ODA 의 구조와 지역별 특성에 대한 이해를 돕고, 국제개발 협력의 다양한 이해관계자가 지속 가능한 발전과 기후 변화 대응을 목표로 혼농임업을 활용하는데 필요한 기초자료를 제공한다.

주요어: 혼농임업, 개발협력, 공적개발원조, 글로벌 거버넌스, 환경 정책 일관성, 원조 지원 경로, 지역별 접근

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