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EXPLORING ENABLING CONDITIONS FOR IMPLEMENTING AGROFORESTRY SCHEMES: AN APPLICATION OF Q METHODOLOGY TO THE PERUVIAN AGROFORESTRY CONCESSION SCHEME

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Abstract

Agroforestry has evolved from a land use management system that combines trees with crops towards policy solutions to promote rural development, conservation, and land restoration. In Peru, the Agroforestry Concession (AC) Scheme seeks to integrate small-scale family farmers encroaching on public forest land into the formal economy to improve local livelihoods while controlling deforestation. This research aims to contribute to the identification of the AC scheme's enabling conditions of success by implementing a Q methodology. Q methodology is a qualitative and quantitative statistical research approach designed to uncover subjectivity among people. Through face-to-face interviews and online software, a set of 43 enabling conditions were sorted by 18 stakeholders involved in the AC scheme with different profiles. Four discourses on enabling conditions were identified and analysed to understand participants' points of view. The first one (F1) represented participants favouring farmers' legal security, accompaniment, and simple processes. The second (F2) has a profit-oriented view. In the third (F3), participants believed in the importance of political will and the scheme's aggregated value. In the fourth (F4), participants favoured strengthening farmer-government relationships while improving institutionally. Results revealed that i) participants lack a shared vision, ii) short-term outcomes were prioritised as a strategy to overcome current barriers hindering the registration process and the scheme's sustainability, and iii) participants imagined the AC Scheme in the future as a market or agroecology-oriented instrument. To develop a ToC for nationally scaling-up the AC Scheme, a more comprehensive discussion of the implications of the local contexts where the scheme will be implemented is necessary for stakeholders to have a shared understanding of what is more appropriate.

Key words: Agroforestry, small-scale family farmers, scaling-up, Q-methodology, Peru.

Astratto

L'agroforestazione si è evoluta da un sistema di gestione del territorio che combina alberi e colture a soluzioni politiche per promuovere lo sviluppo rurale, la conservazione e il ripristino del territorio. In Perù, il regime di concessioni agroforestali (AC) cerca di integrare nell'economia formale i piccoli agricoltori familiari che invadono i terreni forestali pubblici, per migliorare i mezzi di sussistenza locali e controllare la deforestazione. Questa ricerca si propone di contribuire all'identificazione delle condizioni di successo dello schema AC attraverso l'implementazione della metodologia Q. La metodologia Q è un approccio di ricerca statistica qualitativa e quantitativa progettato per scoprire la soggettività delle persone. Attraverso interviste faccia a faccia e un software online, sono state selezionate 43 condizioni abilitanti da 18 stakeholder coinvolti nel programma di AC con profili diversi. Sono stati identificati e analizzati quattro discorsi sulle condizioni abilitanti per comprendere i punti di vista dei partecipanti. Il primo (F1) rappresenta i partecipanti che privilegiano la sicurezza giuridica degli agricoltori, l'accompagnamento e la semplicità dei processi. Il secondo (F2) ha una visione orientata al profitto. Nel terzo (F3), i partecipanti credono nell'importanza della volontà politica e del valore aggregato del sistema. Nel quarto (F4), i partecipanti sono favorevoli al rafforzamento delle relazioni tra agricoltori e governo e al miglioramento istituzionale. I risultati hanno rivelato che i) i partecipanti non hanno una visione condivisa, ii) i risultati a breve termine sono stati considerati prioritari come strategia per superare le attuali barriere che ostacolano il processo di registrazione e la sostenibilità dello schema e iii) i partecipanti immaginano lo schema AC in futuro come uno strumento orientato al mercato o all'agroecologia. Per sviluppare un ToC per l'espansione dello schema AC a livello nazionale, è necessaria una discussione più completa delle implicazioni dei contesti locali in cui lo schema sarà implementato, affinché le parti interessate abbiano una comprensione condivisa di ciò che è più appropriato.

Parole chiave: Agroforestale, piccoli agricoltori familiari, scaling-up, metodologia Q, Perù

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Abbreviations and acronyms

AC Scheme	Agroforestry Concession Scheme
AGF	Agroforestry
ARFFS	Regional Forest and Wildlife Authority
CSA	Climate Smart Agriculture
DEMA	Management Declaration Document
EFFPs	Environmentally Friendly Farming Practices
LULUCF	Land-Use, Land-Use Change, and Forestry
MINAM	Environment Ministry
MINAGRI	Irrigation and Agriculture Ministry
MSF	Multi Stakeholder Forums
NDC	National Determined
OECD	Organisation for Economic Cooperation and Development
PAS	Silvopastoral Protection Zones
PES	Payment for Ecosystem Services
PCA	Principal Component Analysis
REDD+	Reducing Emissions from Deforestation and forest Degradation
SDGs	Sustainable Development Goals
SERFOR	National Forest and Wildlife Service
OSINFOR	Forest and Wildlife Resources Supervision Agency
ToC	Theory of Change
ZR	Restoration Zones
ZTEs	Special Treatment Zones

1. Introduction

1.1. Background

Agroforestry (AGF) has evolved from a land use management system combining trees with crops to a policy alternative to tackle poverty and climate change adaptation and mitigation issues in many countries (Noordwijk et al., 2019). Yet its potential to provide large-scale impacts has been undermined due to low adoption rates, which are directly related to policy issues as land use management regulators (D. C. Catacutan et al., 2017). Such problems are related to inefficient policy processes to formulate and implement interventions, which directly jeopardise the long-term sustainability of an initiative. Therefore, AGF initiatives not only depend on an efficient policy process but also on governments' capacities and a policy environment that facilitates AGF adoption at large scales. Such a process is known as scaling up. Scaling-up refers to expanding, adapting, and sustaining successful policies, programs, or projects in different places and over time (Hartmann & Linn, 2008). It occurs at horizontal and vertical dimensions (IRR, 2000). Horizontal scaling out or adoption spreads geographically by reaching higher populations; it requires adapting knowledge and innovation to different users and farm-scale variation in biophysical, economic and institutional contexts (Coe et al., 2014; Makate, 2019). In comparison, vertical scaling up, known as institutionalisation, involves vertical movements across institutional levels to involve different stakeholder groups in its expansion process (IRR, 2000).

There is a gap in the literature on AGF impact evaluations due to prolonged and non-linear timeframes and multiple AGF approaches suitable for different contexts (Hughes et al., 2020). Thus, literature on scaling up agroforestry (AGF) policies has been focused on challenges and barriers to understanding low adoption rates (Coe et al., 2014) or to a lesser extent, to analyse vertical scale-up conditions based on study cases. Lessons from vertical scaling-up experiences and analysis can be taken from AGF, climate smart agriculture initiatives in Africa, and other nationally implemented instruments. Some of those lessons refer to key enabling areas in scaling up literature and evaluation studies of flagship Payments for Ecosystem Services (PES) cases in Costa Rica, Mexico, and Ecuador. They are about accountability, coordination, flexibility in institutions and legal frameworks, participation, transparency, equity, political will, institutional capacities, and financial resources (Abegunde et al., 2019; Bernard et al., 2019; Chazdon et al., 2021; Corbera et al., 2009; Hinojosa, 2017; Huber-Stearns et al., 2017; Kusters et al., 2022; Makate, 2019; McLain et al., 2021; Rodriguez-Ward et al., 2018; Simelton et al., 2017a; Sulistyawan et al., 2019; vonHedemann, 2019a). On the contrary to enabling areas, scholarship has identified a wide range of enablers (enabling conditions) applicable to

different conservation initiatives, yet they are context-specific (Rice et al., 2020). Enabling conditions contribute to collaborative governance arrangements that facilitate the implementation of conservation initiatives by informing on causal assumptions that affect interventions' ability to produce the desired outcomes (Rice et al., 2020).

Discourses are among the highest leverage points in system analysis, and their analysis is considered the start-up of policy-oriented AGF research (Noordwijk et al., 2019). As defined by Maarten Hajer in Stevenson (2019), discourses represent a specific group of ideas, concepts, and categorisations produced, reproduced, and transformed in practices reflected in physical and social realities. As a policy research tool, discourses can be analysed qualitatively and quantitatively through statistical techniques, such as the Q-methodology. Analysing subjectivity, Q-methodology uncovers discourses among stakeholders (Watts & Stenner, 2012). Hence, by applying Q-methodology, it is possible to identify discourses that inform policymakers on subjective perceptions of human-nature relationships and related issues (Barry & Proops, 1999), which facilitates the identification of leveraging points useful to induce change on a specific subject.

Q-methodology is a versatile tool applied to different fields (Churruca et al., 2021; Sneegas et al., 2021). In the context of environmental policy, it has been used in many areas. For instance, to analyse natural resources management instruments, policy appraisal, acceptability, and conflict resolution (Barry & Proops, 1999; Pinillos et al., 2021; Stevenson, 2019; Zabala et al., 2018); landscape approaches barriers in Indonesia (Langston et al. 2019); perceptions of multistakeholder forums in the Peruvian Amazon (Sarmiento Barletti et al., 2022); and challenges and opportunities to reduce deforestation in the tropics (Nijnik et al., 2014).

This study implements a Q-methodology to understand stakeholders' discourses on the more critical enabling conditions required to implement the AC Scheme in Peru successfully. It is developed under the AgroFor Project – An Institutional Consortium Promoting Agroforestry Concessions. The AgroFor project supports the Government of Peru in strengthening the institutional and regulatory framework, developing technical assistance services, and promoting incentives. Hence, conditions of success were identified on institutional, financial, technical and sustainability subjects by hypothetically identifying 13 enabling areas that facilitated or hindered the success of similar land use policies. Further, hypothetical enabling conditions were defined according to experts' interviews. In total, 43 enabling conditions were identified and categorised according to the enabling areas. Results contribute to understanding participants' vision of what scaling up the AC Scheme entails and exploring whether their opinions aligned with the identified areas and related enabling conditions.

First, a review of the AC Scheme context in Peru is given. Then, a summary of the methodological approach used to implement the Q-methodology, followed by a description and comparison of the four discourses identified. Lastly, an analysis in terms of the results' implications for scaling up the scheme and recommendations for a participatory Theory of Change event that ICRAF, SPDA and GGGI will develop under the framework of the AgroFor Project.

1.2. Problem statement

CIFOR-ICRAF[1] have advised policy makers in Peru by developing knowledge on the potential of agroforestry systems and identifying gaps that must be overcome. Based on pilot projects developed in San Martin and Ucayali states, Luque & Robiglio, (2021); Pokorny et al., (2021); and Robiglio & Reyes, (2016) found that agroforestry potential is high, but it is constrained by socioeconomic issues, directly related to policy processes and the governance system in Peru, as has been revealed for other conservation initiatives by Kowler et al., (2016) and Zamora et al., (2021). The Consortium for the Promotion of the Agroforestry Concessions in Peru formed by ICRAF, GGGI and SPDA through the AgroFor project[2] seeks to support the government in creating the required technical, financial, institutional, and legal conditions for implementing the AC scheme at a national scale. However, due to the AC scheme is aimed to be implemented at a national scale, there is a need to better understand what the scaling-up process requires. That is the reason why enabling conditions specific to the context in which the scheme aims to be implemented must be identified. This study aims to support the development of a Theory of Change of the Agroforestry Concessions Scheme by identifying conditions of success. Findings will contribute to a participatory Theory of Change that will be carried out by the Consortium for the Promotion of the Agroforestry Concessions in the framework of the AgroFor project.

[1] CIFOR-ICRAF is a research institute that works in partnership with governments, academia, civil society, and private companies to deliver solutions to the five major global challenges. https://www.cifor-icraf.org/about.
[2] The AgroFor project Constortium funded by NICFI and NORAD, and developed by ICRAF, SPDA, and GGGI.

2. Review of literature

2.1. Agroforestry (AGF) systems

AGF as a land-use system was identified about five decades ago. Still, it has been a traditional practice of combining trees, crops, and animals for thousands of years (D. C. Catacutan et al., 2017). From that time, it has evolved from a land-use management system to a policy alternative. This section presents AGF concepts at different scales and a literature review on agroforestry scaling up.

2.1.1. AGF Concepts

AGF has been defined at multiple scales at which interactions between crops and trees are analysed. Leakey (1996, 2012, 2014) and Somarriba (1992) in (Noordwijk et al., 2019) provide definitions at the plot, landscape, and policy levels. At the farm scale, agroforestry is a land use system and a management system for which trees and crops are arranged spatially for management purposes. At a landscape scale, it is a dynamic and ecological natural resource management system that integrates trees on farms immersed in agricultural landscapes, and diversifies, and sustains production to improve social, economic, and environmental conditions for land users. At the policy level, it refers to land use that combines aspects of agriculture and forestry, including the agricultural use of trees. The latter definition is broader because it aims to address all the complexity that implies the integration of both sectors and to avoid policy domain segregation.

According to D. C. Catacutan et al., (2017), the AGF concept slowly evolved by incorporating new elements as new issues were identified at the plot, landscape, and policy levels. Such a shift started from a productive perspective and by including multiple typologies of AGF to broadening its emphasis to soil-tree-crop interactions, microclimatic effects of trees, bio-economic trade-offs, and systems diversification to reduce risks. Then, it continued by recognising issues associated with communities in the forests. This led to identifying common elements between the agriculture and forestry sectors' confluence and their interaction at a landscape level. Finally, institutional segregation of those sectors produced inconsistencies since policies ignored the intermediate nature of AGF and forced stakeholders to choose one side or the other even though the policies were not entirely applicable to their cases. Consequently, AGF became an alternative for reconciling land-use policies and directing public-private investments to achieve Sustainable Development Goals (SDGs).

Similarly, in Peru, a new AGF concept was proposed by ICRAF (2022) to make it applicable to the policy domain since the legally recognized concept ignored its multisectoral dimension.

CIFOR-ICRAF´s version opens the window for a broader range of productive systems, promotes articulation and alignment among sectors, and allows AGF to be recognized as a branch of the agriculture sector and included in both sector agendas (Leakey, 2017). Hence, to be effectively integrated at the policy level in Peru AGF is defined as "*land-use systems that combine agricultural and forestry activities; they consist of integrated management of woody species, crops and or animals in space and place at the same management unit to benefit their ecological, economic and social interactions*" (ICRAF, 2022).

2.1.2. AGF scaling-up

Scaling-up refers to expanding, adapting, and sustaining successful policies, programs, or projects in different places and over time; it involves a multidimensional process of change and adaptation (Hartmann & Linn, 2008) for instance, at horizontal and vertical dimensions (IRR, 2000). Horizontal scaling up (also known as scaling out or adoption) involves reaching more people and communities. Vertical scaling up (also known as institutionalization) entails making decisions at a higher level and expanding programs, policies or projects beyond the original participants and objectives, taking cognisance of the scope of interventions, quality of impacts and sustainability issues.

Literature on AGF includes a broad range of studies that vary according to the level of implementation, from the plot level to the landscape and policy levels. Such progress is well documented by Noordwijk et al. (2019) and Ramachandran N. through the book-series Advances in Agroforestry. Both authors synthesised research results and evaluations related to different aspects of AGF. Out of those topics, adoption conditions have been widely studied due to low adoption rates, which made it necessary to understand better context-specific interactions among ecological, social and economic factors that influenced farmers' decisions (Montes, 2017). Later, along with the evolution of AGF paradigms, research focused on better understanding how to scale up AGF adoption. However, little has been done due to low adoption rates. This section reviews the literature on adoption and vertical scaling-up conditions.

2.1.2.1. Horizontal scaling up AGF

Adoption (horizontal scaling up) at the farm level is defined as the degree of implementation of new management systems in long-run equilibrium when the farmer has complete information about the management systems and their potential (Feder & Umali (1993) in (Mercer, 2004). Following the economic theory, farmers will adopt AGF if the new system's expected benefit surpasses traditional land use, labour, and capital costs (Mercer, 2004). There is a large corpus of literature on adoption of AGF labelled as AGF or sustainable agriculture, agriculture with

tree-planting, climate smart agriculture (CSA), or environmentally friendly farming practices (EFFPs). Regional reviews are available for different continents. For instance, Porro et al. (2012), Somarriba et al. (2012) and Montes (2017) evaluated AGF in Latin American countries, the Amazonian region and South American tropical dry forests; Mozzato et al., (2018) analysed EFFPs adoption in Europe; and Abegunde et al., (2019) and Makate, (2019) CSA initiatives n Africa.

However, in most cases, studies directly addressed country-level issues. For instance, in Peru, Luque & Robiglio (2021) assessed adoption conditions and the capacities of regional authorities to provide those conditions and scale the program. In Vietnam, D. Catacutan & Naz (2015) and Simelton et al. (2017a) analysed enabling and limiting conditions for adoption and gender roles affecting such decisions. In sub-Saharan Africa, Meijer et al. (2015) present a analytical framework that combines intrinsic and extrinsic variables that affect farmer´s decision to adopt AGF and use it to assess a study case. In Zambia, through a 388 small-scale farmers survey, Gillian et al., (2016) found that despite farmers´ interest, weak capacities limited adoption rates. Different to other cases, in Tanzania, by applying a logistic regression, Jha et al., (2021) identified that land tenure and AGF inputs put at risk AGF initiatives.

Based on a review of three decades of research on AGF adoption, Amare & Darr (2020) found that studies have fallen short in increasing adoption rates since they have been limited to present a fragment of factors and contexts that affect AGF adoption. Hence, little contribution has been made to the advancement of knowledge since similar adoption conditions have been evidenced in most cases. Commonly cited and with a different level of importance that varied depending on the context, such adoption conditions are usually associated with ecological, technical, economic, and social aspects. More specifically, they are related to land tenure; tree tenure; technological species packages, seeds, fertilizers, and tools; assistance services; simple bureaucracy; capacity-building on technical, marketing, and managerial skills; land-taxes exceptions; access to information; access to markets; associativity; increments of incomes; and financial support to payments or microcredits.

Because adoption is affected by intrinsic and extrinsic factors that interact among them (Meijer et al., 2015), Amare & Darr (2020) proposed an analytical framework adapted from Rogers, 2003; Hekkert et al., 2007; Glover et al., 2016 that grouped those conditions into three levels named innovation, system, and household. Out of them, and more recently studied, is the role of system-level features and policies and regulations as crucial components that facilitate adoption conditions at small and larger scales. According to Place et al. (2012), adoption is a

policy issue because conditions are directly linked to policy. The author found that many failures in AGF initiatives were related to policy constraints in both formulation and implementation phases (Place et al., 2012). As Bernard et al. (2019) stated, aside from appropriate technologies, ensuring an enabling policy, legal and institutional environment is key to achieving AGF-based development impacts at scale. In other words, AGF benefits can be significant if institutionality is strengthened enough for society to decide to adopt AGF at scale (Makate, 2019). That is why governments´ capacity to provide adoption conditions at all geographical scales where AGF is being implemented is essential for broader adoption.

2.1.2.2. Vertical scaling up AGF

Due to AGF's potential to contribute to SDGs and climate change adaptation and mitigation international commitments (Noordwijk et al., 2019), interest in AGF at the policy domain is growing in governments to learn and better understand how to scale it up. As Peru, several countries in Asia, Africa and Latin America have introduced AGF into the government agendas in the way of local initiatives, regional programs, or national policies (D. C. Catacutan et al., 2017; Montagnini, 2017; Noordwijk et al., 2019; Ramachandran & Garrity, 2012). AGF has been implemented in multicultural contexts where knowledge addresses diverse ways to manage trees on farms, such as trees combined with crops, sustainable agriculture, natural regeneration management and smallholder tree growing on farms. Moreover, in some African cases, CSA initiatives refer to AGF, among other land use management techniques. CSA consists of agricultural systems that increase food security in the face of climate change, help farmers adapt to climate change impacts and mitigate climate change (Rosenstock et al., 2016).

The literature reviewed about scaling up AGF addresses gaps, barriers, and recommendations to overcome them through guidelines for decision-makers, reviews, and study cases about African, Asiatic and Latin American experiences. Guidelines for decision-makers were conducted by FAO (2013) and DC Catacutan et al. (2018). The former proposes ten actions governments must address to create an environment for AGF policies. Those actions include awareness campaigns; adaptation of legal frameworks; clarification of land tenure; creation or updating agricultural policies that include agroforestry; coordination for policy coherence and synergies; incentives for users; strengthening farmers' access to markets; and enhancing knowledge transfer; including local stakeholders; and improve governance systems. In contrast, the latter presents implementation considerations and a list of 14 principles in six categories. The last principle is about planning effective scaling-up and sustainability. It entails interventions to engage stakeholders and sectors; understand AGF scaling up potentialities and limits, ensure scaling requirements are understood and addressed at targeted sites, define a focus

for scaling up (technical, institutional or both), agree on modalities to scale and review scaling up approaches. Yet rather than a rule of thumb, such guidelines offer orientation from which a local-context analysis needs to take place to determine the more important conditions to scale-up AGF.

Regional reviews and study cases present common challenges that hinder a wider adoption and recommendations for achieving a more effective scaling-up. Identified barriers are related to three broad areas. They are financial and market incentives, access to finance in proper terms and conditions, and adequate policies with precise instruments and mechanisms for its operationalisation (Bernard et al., 2019; D. C. Catacutan et al., 2017; Franzel et al., 2001; Karlsson, 2018; Porro et al., 2012). Study cases from Colombia, India, and Vietnam provide examples of more specific barriers associated with those broad areas. In Colombia, Rodríguez et al. (2022) found the main obstacles were the lack of stable and differentiated markets influenced by local and regional economies; and the high costs of AGF systems establishment and maintenance. Pradhan's (2022) analysis revealed that farmers´ support during transition phases to build knowledge and capacities was weak in India. In Vietnam, Simelton et al. (2017b) found disincentivising aspects. For instance, inadequate technical, physical and market infrastructure; lack of financial support to invest in agroforestry; complicated AGF systems for all farmer groups; lack of commitment and continuity in policy intentions; and farmers' disconnection with markets information and dynamics.

Despite the challenges and barriers, governments may face when scaling AGF, interventions to address policy and institutional challenges are critical. That is because land use management is directly related to policies and institutions since policy frameworks define their roles and responsibilities; thus, when institutions and policies are effective, adoption challenges are overcome, and AGF sustainability is more likely (Bernard et al., 2019). On the contrary, policy and institutional gaps translate into barriers to adoption, which might jeopardise AGF's sustainability. Even with a favourable policy environment, the level of private investment to sustain the AGF must be higher than the social level required for AGF policies to be sustainable on time (Mercer, 2004).

As an alternative to those obstacles, policy reforms have been commonly implemented in countries where AGF has become part of government agendas (Porro et al., 2012). For instance, in Niger, farmers were awarded tree tenure; in Kenya, a new Farm Forestry rule required farmers to have a 10% tree cover; in Guatemala, procedures for timber harvesting were simplified in agroforestry systems; and in Brazil, an agroforestry strategy was updated in a

participatory way (D. C. Catacutan et al., 2017). Such reforms are complemented with specific actions that will improve the policy environment and institutionality, as well as finance, incentives, and market conditions.

According to Arvola et al. (2020); Meijer et al. (2015); Montes (2017); and Porro et al. (2012), policy and governance solutions would contribute to overcoming adoption challenges which ultimately contribute to achieving scaled AGF impacts. Alternatives to increase scaling up effectiveness have been discussed by academics around eight major topics markets, value chains, producers´ organizations, financing, incentives, policy environment, extension services, and scaling-up research (Bernard et al., 2019; Kakhobwe et al., 2016; Karlsson, 2018; Montes, 2017; Porro et al., 2012; Pradhan, 2022; Rodríguez et al., 2022; Simelton et al., 2017a). Some of those alternatives are to improve farmers´ access to market information; develop new value chains; implement PES schemes; promote innovative extension services; involve cooperatives; research on scale-up approaches; leverage AGF with national and international commitments; implement cross-sectoral AGF policy frameworks constituted by national policies, strategies, and action plans to include AGF in the political agendas and improve vertical and horizontal coordination; implement land and tree tenure reforms; and ensure an enabling market policy environment that creates new value chains and provides or facilitates investment, and credit access.

2.2. Q-Methodology in Political Science

Developed by William Stephenson in 1953, Q methodology is a research approach designed to uncover subjectivity by understanding the viewpoints of a single person or group of people regarding a specific and localised event, topic, situation or issue. According to the author, subjectivity is a behaviour that responds to personal perceptions, conceptions, and feelings. Following abductive logic, the Q methodology enables understanding a variety of discourses regarding how individuals interpret their behaviour and understand the society and environment where they live (Barry & Proops, 1999). Maarten Hajer (1995) in Stevenson (2019) defines discourses as a specific group of ideas, concepts, and categorizations produced, reproduced and transformed in practices reflected in physical and social realities.

Discourse analysis is an essential tool for public policy studies that have evolved over the last decades along with multiple conceptual approaches and methods (Leipold et al., 2019). They are one of the highest leverage points identified in systems analysis and interact with policy debates by influencing goals, settings and paradigms (Noordwijk et al., 2019). Discourses

become essential in policy design because they offer evidence-based knowledge to design policies. However, policy design is usually limited to a small group of policymakers' interpretation, thus being informed by a broader range of stakeholders' perceptions contributes to more holistic and inclusive policy processes (Amaruzaman et al., 2017).

Applying Q-methodology makes it possible to identify discourses that inform policymakers on subjective perceptions of human-nature relationships and related issues (Barry & Proops, 1999). Hence, Q-methodology helps find mutually accepted solutions in policy issues by i) clarifying perspectives, ii) identifying competing problem definitions, solutions, and agreement points, and iii) providing information to shape policy solutions (Durning, 2005). In the case of environmental governance research, it was first mentioned in 1999 (Barry & Proops, 1999). Since then, it has been a tool to inform sustainability practices and policies applied to diverse fields such as land use, wildlife conservation, agriculture, water resources management, and sustainable conservation, among others (Sneegas et al., 2021). Notably, in the context of conservation, it has been applied to analyse natural resources management options, critical reflection, policy appraisal and acceptability, and conflict resolution (Zabala et al., 2018). Also, to inquire into policy debates on conflicting topics (Barry & Proops, 1999; Pinillos et al., 2021; Stevenson, 2019).

2.2.1. Applications of Q-methodology

2.2.1.1. Policy debates

Q-methodology has been applied to analyse policy debates on complex concepts. For instance, Stevenson (2019) evaluated a broad group of stakeholders from different countries with multiple profiles to understand perceptions about sustainability and economic development visions and how both concepts could be addressed as a strategy to improve inclusive and representative debates, decision-making and governance. During a workshop with experts, Nijnik et al. (2014) found a lack of alignment among international, national, regional and stakeholders' views on Reducing Emissions from Deforestation and forest Degradation (REDD+) potential, which was helpful because it uncovered a need to find tailor-made solutions supported by stakeholders involved in REDD+ participatory. Lo (2016) analysed climate change debates in Hong Kong to understand better the transition in environmental policy discourses in a different context. The author found that public climate change concern was not embedded in a straightforward narrative of social and institutional transformation, hence governments and policies needed to nurture climate citizenry. Discourses on policy debates contribute to better-tailored policies because they inform policy makers on how policy issues are understood and the underlying reasonings.

2.2.1.2. Policy acceptability

Q-methodology has reconciled economic development and conservation issues that hinder policy acceptance and performance. For instance, in South America, the expansion of the agricultural frontier has threatened forest conservation. Analysis to understand perspectives on policy acceptability of sustainable land use instruments that are in between both sectors were carried out by Brannstrom (2011) and Pinillos et al. (2021) in Brazil, Vargas et al. (2019) in Colombia, and Huaranca et al., (2019) in Argentina. Brannston et al. analysed farmers' and environmentalist discourses on environmental governance in a region of expanding agriculture. Findings revealed that Cerrado was seen as a source of water for rivers or as a granary. In contrast, a similar study by Huaranca et al. (2019) revealed that socio-environmental issues were affected by some environmental governance processes that promoted debates in favour of influential stakeholders' interests.

Another example of policy acceptability is farmers' perceptions of Legal Reserves in Paragominas, Brazil and their relation to agricultural intensification. Pinillos et al. found contrasting views among participants. One group was interested in relocating Legal Reserves to enable agriculture intensification; the second group did not recognise Legal Reserves´ benefits in social welfare, and the third only cared about market demands regardless of the conservation instrument. Likewise, Vargas et al. explored how the conservation and development relationship was understood to make-decision on how a PES-scheme should be designed to avoid trade-offs and ensure the scheme's acceptability. Results from those studies revealed a diversity of discourses that vary depending on socio-economic factors. Still, overall, they suggest the need for awareness creation and participatory and transparent mechanisms ensure inclusive, innovative, and diverse policies suitable to population targets and able to reconcile conservation and development.

2.2.1.3. Policy implementation

Q-methodology has been developed to foresee barriers preventing instruments from achieving the desired impact. In Indonesia, Langston et al. (2019) interpreted discourses to identify from experts which barriers prevented sustainable landscape management in Indonesia. Insights from this study revealed that corruption, lack of transparency and accountability were the main constraints and that efforts should be focused on strengthening weak governance. Likewise, Amaruzaman et al. (2017) identified barriers contributing to the gap between the National Green Development Plan aspirations and the reality on the ground. Lack of coordination among governance levels and poor understanding of agricultural ecosystem services to promote green agriculture were the main barriers. By supporting policy formulation with scientific knowledge

and addressing gaps based on each factor contributing to those gaps, Amaruzaman et al. proposed a set of recommendations to improve the implementation of green agriculture initiatives in Indonesia. Similarly, in Peru, Sarmiento Barletti et al. (2022) evaluated how Multi-Stakeholders Forums (MSF) operate to learn from discourses and propose strategies to construct more equitable and effective MSF. The study evidenced that participants believed in MSF, but at the same time, they were demotivated because of risks and inequality.

2.2.1.4. Analysis of natural resources management strategies

In addition to policy analysis, Q-methodology applies to understand land use dynamics and stakeholders' underlying causes to define land-use change trajectories. For instance, Orozco-Aguilar et al. (2021) analysed cocoa cultivation in Nicaragua and Peru to understand under which circumstances cocoa is a driver of deforestation or reforestation. Landscape configuration, governance, management and commercialisation models, and farmers´ knowledge where key aspects that enabled and limited tree cover change. Results demonstrated various social, economic, and political stressors and drivers specific to each country produced different landscape cultivation patterns. In both cases, cocoa could switch from deforestation to reforestation, depending on events along the value chain. Insights from this study help address better deforestation-related issues associated with cocoa farming in Latin America.

2.2.2. Knowledge gaps and limitations

Despite knowledge developed in policy analysis for different subject areas, most literature reviewed focused on understanding issues such as gaps, barriers, contentious discourses, among others. However, a knowledge gap was evident in discourse analyses about enabling conditions for promoting land-use policies since no case was found on AGF, only with few examples were identified on other topics. For instance, Gannon et al. (2022) assessed enabling conditions and barriers to understand trade-offs and synergies to promote development in East African corridors by applying Q-method and an imaginary identification of the SDGs future. Yet, Peenstra & Silvius (2017) only assessed enablers to integrate sustainability in projects effectively. Analysing enabling conditions can be a more effective way to address sustainability issues to induce a transformative change. Scientific discourses have focused on issues and quick fixes rather than on underlying causes, which is why there is a need to examine the roots of those issues and identify a solution-oriented approach (Abson et al., 2017).

Limitations of the Q methodology in the socio-environmental field were analysed by Sneegas et al. (2021) through a bibliometric review of 277 papers. The more common was researchers' subjective knowledge and heterogeneity in methodological approaches due to flexibility. It has

led to omissions about the research approach, for instance, decision-making to build the Q-set and select the P-set, preventing the method from replicating.

3. Methodology

3.1. Context of the Agroforestry Concession Policy in Peru

3.1.1. The agriculture and forest sector in Peru

This section describes forest loss and degradation dynamics and their relationship with family agriculture based on the National Strategy of Forest and Climate Change - ENBC (MINAM, 2016), the National Strategy of Family Agriculture (MINAGRI, 2015), and the Diagnostic Study of Family Farmers in the Peruvian Amazon by (Robiglio et al., 2015).

Peru is the second country with the highest extension of Amazonian forests and the fourth with primary forests (FAO, 2015 in (MINAM, 2016)). At a national level, forests occupy 56.9% of the country's extension and represent an important carbon reservoir. However, increments in deforestation and forest degradation during the last decades have threatened their conservation. From 2001 until 2021, 2,376,055 ha were deforested, of which the highest peak was reached in 2020 with 203.272 ha of forests cut (MINAM, 2022). According to the National Strategy of Forest and Climate Change - ENBC (MINAM, 2016), conversion to small-scale agriculture (plots <5 ha) was responsible for 77% of deforestation between 2001 and 2014; while an additional 20% occurred for establishing semi-industrialised crops, e.g. coffee, cocoa and palm oil, and infrastructure development. It was an emergent pattern with cleared plots of 50 to 500 ha by that time. During the same period, 45% of deforestation and degradation occurred in forest lands without any category of use, where agriculture was the leading cause of forest loss. Direct and indirect reasons for deforestation have been identified. The main direct causes are agriculture expansion, illegal extractive activities, and infrastructure development of communication, power, and extractive industries. The main indirect causes are demographic, economic, technological, political-institutional, and cultural factors.

As stated in the National Strategy of Family Agriculture (MINAGRI, 2015), in Peru, the majority of farmers (83%) work in family farming units that represent 97% of the country's total productive units. Within those plots, farmers allocate 40% of the land for commercialisation and self-consumption with multiple economic activities, such as cropping, livestock, forest management, rural industry, artisanal fishing, aquaculture, and apiculture. Among the characteristics of family farmers, 57% are older than 45 years old, 40 to 60% lack land titles, 41% complement their incomes with other activities, only 7% have received technical assistance, and 41% have irrigation infrastructure.

In the Amazon region, family farmers were characterised by Robiglio et al., (2015). According to the author, they count for more than 90% of producers classified in each subregion (Yunga

Fluvial, Selva Alta and Selva Baja) according to the land extension they manage (Table 1), which counts for 50% of deforested lands with an approximate extension of 20% of fallows. Agriculture production in the Amazon covers almost 20% of national agriculture through small-scale family farmers, who distribute their production to self-consumption and economic crops. Nearly half of Yunga Fluvial and Selva Alta's farmers specialise in coffee, while in Selva Baja, production is more diverse with cocoa, palm oil, livestock, and self-consumption products. Farmers from Selva Baja crop cassava, plantain, corn, and rice, for self-consumption and commercialisation in other subregions of the Amazon.

Table 1. Small and medium producers based on extension

Subregion	Small producers	Medium producers
Selva Alta and Yunga Fluvial	0-10 ha	10-50 ha
Selva Baja	0-15 ha	15-115 ha

Conversion from forest to agriculture land is a legal or illegal process that responds to different patterns depending on the subregion where they occur (Robiglio et al., 2015). Overall, it starts with timber extraction, for which loggers open forest roads, used by illegal loggers to extract selectively or migrants to establish annual crops. In the case of the later, they can be managed as fallows or become permanent crops or pastures. Conversion to coffee, cocoa, palm oil, or coca is the more common change driven by favourable market conditions and by the technical and institutional contexts of the region, along with a high informality level manifested in coca crops, land encroachment and land traffic.

In Peru, the Land Classification Regulations for its Major Use Capacity has five broad categories of use; they are suitable lands for transitory cultivation (A), permanent crops (C), pastures (P), forestry production (F), and protection (X). According to Law No. 29763, land use change, land titling and possession certificates are prohibited in public domain lands with greater capacity use of forest (F) or protection (X) with or without forest cover (Reyes & Robiglio, 2018a). According to the Forest Zoning, which will be implemented in Amazonian states, those lands will be classified as Restoration Zones (ZR) and Special Treatment Zones (ZTEs) formed by Agroforestry and Silvopastoral Production Zones (PAS), among others. A significant proportion of small and medium-family farmers are in ZTEs and within them, in areas with high forest cover and districts with active deforestation dynamics (Robiglio et al., 2015).

Family farmers are in an intermediate position between forest and agriculture sectors because i) they implement agricultural activities, in many cases combined with trees management, and ii) they are in the expansion frontier between agriculture and forests. Such a situation positions them unfavourably, hindering their participation and inclusion in public policies (Robiglio et al., 2015). The AC scheme, regulated by Law No. 29763, was proposed to promote sustainable forest management, conserve and restore forests and their related ecosystem services (Robiglio et al., 2015) and improve family farmers' livelihood opportunities (Claus et al., 2019) located in forest (F) and protection (X) land.

3.1.2. The Agroforestry Concession (AC) Scheme in Peru

The AC Scheme is a legal mechanism created by the Forest and Wildlife Law (LFFS No. 29763) Art. 58 of 2011. It is regulated by Supreme Decree No. 020-2015-MINAGRI and implemented based on a technical guideline, approved in 2017 through the Executive Management Resolution No. 081-2017-SERFOR. It consists of a 40-year renewable lease granted a maximum extension of 100 ha to farmers who encroached on forest or protected public lands (ZTEs category). As a legal mechanism, it aims to formalise informal smallholder economic activities (agriculture, forestry, animal husbandry, among others) to avoid agriculture frontier expansion and promote agroforestry and sustainable production practices adoption (Claus et al., 2019). It has the potential to conserve 450.000 ha of Amazonian forests, restore at least 20% of deforested lands, and mitigate around 20% of the country's GHG emissions associated with the Land-Use, Land-Use Change and Forestry (LULUCF) sector (Robiglio et al., 2018). Hence, through this mechanism, the government seeks to address environmental degradation and provide legal and social support to improve smallholder farmers' livelihoods (Luque & Robiglio, 2021).

After the subsidiary law was approved, efforts were made to understand the potential of this scheme and support its policy process. In 2016, World´s Agroforestry (ICRAF), through the project Support to the Development of Agroforestry Concessions in Peru (SUCCESS), developed two studies on the scheme's potential to restore degraded lands (Robiglio & Reyes, 2016) and stabilise Amazonian frontiers (Pokorny et al., 2021), and four modules on i) legal and technical management prescriptions for farmers (Robiglio & Mesía, 2018), ii) potential beneficiaries, geographical distribution and estimation potential to climate goals (Robiglio et al., 2018), iii) eligible areas identification (Reyes & Robiglio, 2018a), and iv) implementation methodology at the village and farm level (Reyes & Robiglio, 2018b). Moreover, the AgroFor project and two additional allied projects, PARA and Trees on Farms for Biodiversity, have

provided tools and knowledge to create an enabling environment for the AC Scheme. Some of their outputs are related to adoption conditions and the feasibility of regional authorities to scale-up AC (Luque & Robiglio, 2021); a more suitable agroforestry definition to be adopted in Peru (Robiglio et al., 2022); sustainable and zero deforestation coffee and cocoa market opportunities for family farmers (ANALPES Corporation, 2021); and diagnosis and gaps reduction of the granting and registration process (Robiglio, Reyes, Casalprim, Pérez, Torres, & Segura, 2021; Robiglio, Reyes, Casalprim, Pérez, Torres, Segura, et al., 2021).

Increasing deforestation rates (MINAM, 2022) and a food security crisis due to the COVID-19 pandemic in Peru (AgroFor, 2021a), along with the knowledge developed, have helped the AC scheme to gain attention in the last few years. Through its implementation, the Peruvian Government aims to comply with national commitments to land restoration, such as the 20*20 Initiative (WRI, n.d.), and climate change adaptation and mitigation activities associated with the Nationally Determined Contribution (NDC) (MINAGRI et al., 2018; MINAGRI & MINAM, 2018) and the national REDD+ Framework. The NDC has eight measures related to the LULUCF sector; out of them, two seek to control deforestation and are directly associated with agroforestry systems. The first is to grant rights over not categorized land in the Amazon, and the second is to promote agroforestry systems. On the other hand, NDC adaptation measures are articulated with the country's international commitments on SDGs and the Organisation for Economic Co-operation and Development (OECD). Additionally, the AC scheme contributes to implementing national agriculture and forest policies. For instance, it is associated with the National Agriculture Policy, the National Forests and Wildlife Policy, and with national strategies to implement those policies, such as the National Strategy of Family Agriculture, the National Strategy of Forest Restoration, and the National Strategy of Forests and Climate Change.

Despite the importance it has gained, AC implementation has not officially started. The first pilot contracts were granted in 2018 in the state of San Martin (AgroFor, 2021b), and up to June 2022, only 184 contracts had been awarded out of a 600-contract goal (Regional Government of San Martin, 2022). Pilot implementation has been carried out with the support of PNUD in San Martin and the AgroFor Consortium in San Martin, Amazonas, and Loreto states, where most beneficiaries are.

The following sections present technical aspects of the AC Scheme based on the Regulation for the Management of Forest Plantations and Agroforestry Systems (SERFOR, 2017).

Institutional context

SERFOR, OSINFOR and the ARFFS are the national and regional institutions responsible for the AC implementation. SERFOR designs the regulatory framework and implementation strategy. OSINFOR monitors the compliance of beneficiaries' co-responsibilities in terms of land management. ARFFS works locally during the registration, granting and monitoring phases.

Beneficiaries' co-responsibilities

Farmers must comply with six co-responsibilities. They are i) conserve cover of remnants, primary or secondary forests; ii) establish forest species for timber or non-timber production within productive systems; iii) implement conservation measures of soils, water springs, and streams; iv) conserve agroforestry systems cover and extend it if lower than 20% of the farm area; v) guarantee exotic species management without genetic and ecologic risks, and vi) pay two fees, one to keep the concession usufruct right, and the other to harvest forest and wildlife resources. The former consists of 0.5% of tax unit per hectare per year, which, as stated by Robiglio & Mesía, (2018) was PEN 2,075/year per 100 ha in 2018, a value considered high for farmers´ reality.

Incentives package:

The contracts have a duration of 40 years for an area no higher than 100 ha. Farmers acquire real guarantee rights. In other words, rights to establish, manage, harvest, and sell products obtained from agroforestry and forest plantations. For timber and non-timber products exploited from remnant forests, a Management Declaration document (DEMA) is required. Moreover, they get the right of legal cession position, transfer by testamentary succession, and mortgage.

Moreover, there are six additional direct and indirect incentives farmers can benefit from when adopting the AC scheme. They are i) access to promotion mechanisms and incentives for forestry and wildlife activities; ii) access to markets and funding services; iii) technical assistance and capacity building at the plot level; iv) implementation of innovative practices; v) discount harvesting fees according to the activities implemented by the farmer, and vi) discounts on the harvesting fee that consists of a one-year grace period and annual payments from the second year that will increase by 10% each year until reaching the 100%.

Potential beneficiaries' profile

Robiglio et al., (2018) described and analysed potential beneficiaries in the Amazon region. According to the authors, by 2012, there were 123,797 potential beneficiaries, of which 28% were in the Amazon region, mainly in San Martin, Amazonas, and Loreto states. Around half

of the identified potential beneficiaries have agroforestry systems of cocoa and coffee associated with trees or fruit trees plantations. The other half has coffee, cocoa, fruit tree plantations, fallows, and some remnants of forests. Complementary economic activities are the livestock of poultry breeding, guinea pigs, cattle, and pigs. Production is divided into self-consumption and commercialisation; approximately 81.4% of producers sell at least 50% of their production. It is characterised by low yield rates affected by the absence of technical assistance and advisory, which cover less than 10% of the producers. The most common profile of farmers corresponds to small producers oriented to sale with diversified livestock production within the property and without incomes from activities carried out on the property. Seventy-eight per cent of producers have small properties (Table 1) with an 8.3 ha average and a median of 3.5 ha.

3.2. Research approach

A Q-study methodological framework (Figure 1) was designed and implemented based on Watts & Stenner (2012).

3.2.1. Sampling selection (Q-set)

The sampling selection takes place by defining a population (concourse) from which a subsample (Q-set) representative of the population is taken. The concourse and the Q-set were determined by following a structured approach that consists of two steps, first the subject of study was broken into categories and subcategories of enabling areas, and then a context-specific concourse was elaborated based on experts' interviews.

First, formulation, management, and sustainability policy phases were selected as core themes in which enabling conditions must be addressed simultaneously by considering the relationship of AGF's success with policy processes. Then, considering the topics addressed by the AgroFor project, a review of literature was performed, focused on identifying specific areas in which barriers or enabling conditions influenced the success of similar land use and conservation instruments implemented in Latin America and Peru that required similar scaling-up efforts. Based on governance frameworks (ASEAN, 2018; Davis et al., 2013) and the three policy phases selected as core themes, findings were categorised into 13 categories named enabling areas (Table 2). Appendix I: Enabling areas shows enabling conditions and barriers identified from the review of literature from which enabling areas were drawn.

Table 2. Enabling areas identified per policy phase.

Policy phase	Enabling areas
Formulation	Institutions, legal frameworks
Management	Strategies, capacities, land management plans, information management systems, bureaucracy, centralised implementation, accountability, and transparency.
Sustainability	Incentives, markets and value chain, and entrepreneurship

Second, a sampling process of enabling conditions relevant to the AC Scheme was conducted by interviewing 29 experts with knowledge of the AC Scheme and forest governance issues in Peru. Interviewees were selected by conducting a stakeholder analysis and applying the snowball technique. Semi-structured interviews were conducted face-to-face and online, recorded, and transcribed with free, prior, and informed consent. A concourse of 100 hypothetical enabling conditions was elaborated from which a subsample of 43 statements representative of participants' opinions was selected. Finally, four researchers from CIFOR-ICRAF with knowledge of the methodology and the topic of interest reviewed the Q-set clarity, duplication, and wording.

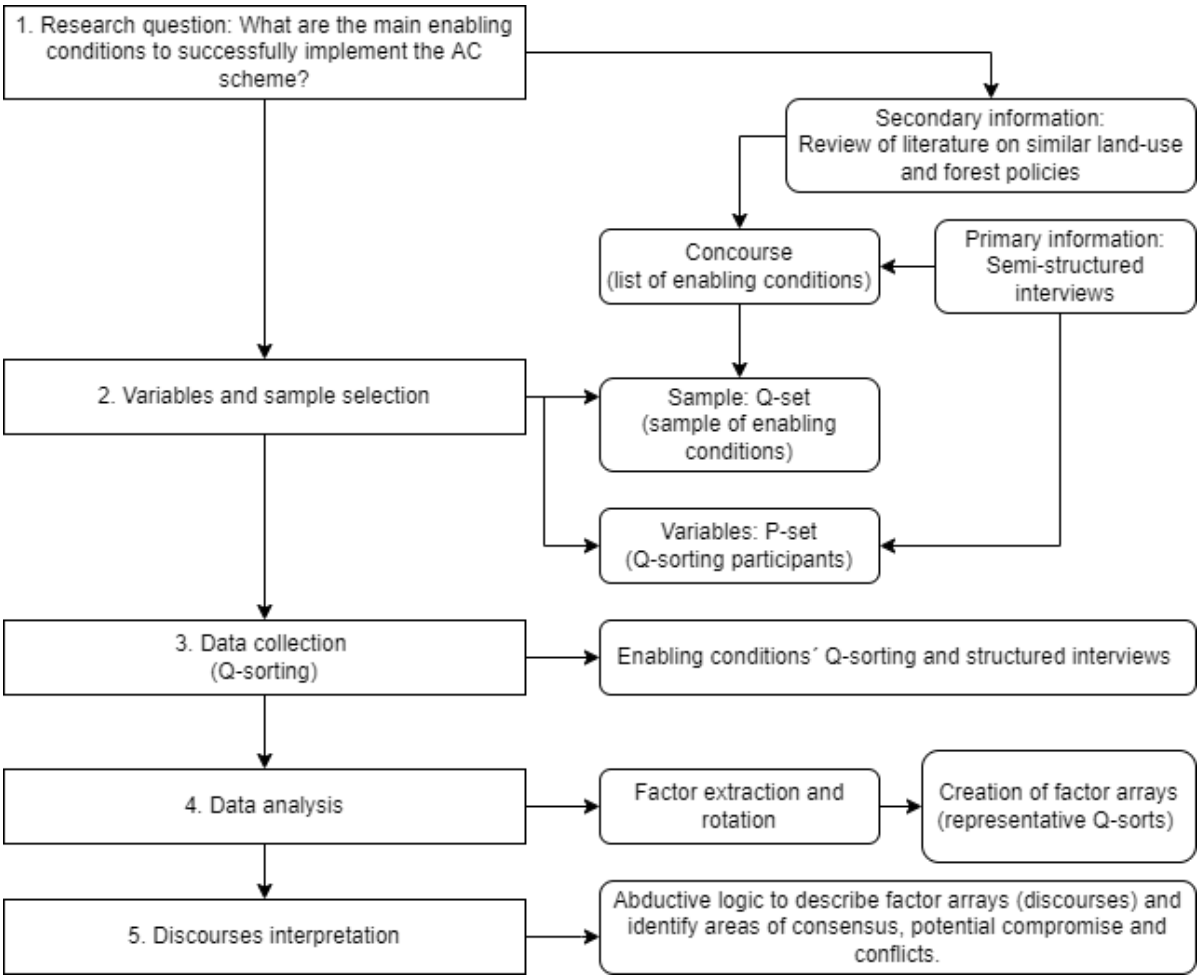


Figure 1. Methodological framework

3.2.2. Variables selection (P-set)

In the Q methodology, participants (P-set) are the variables. Their number must be lower than the Q-set and cover all points of view it addresses. Thus, to get a balanced and unbiased coverage of the different points of view found during the interviewing process, participants were strategically selected to consider only those with interesting, informative, and relevant opinions contributing to answering the research question. A P-set of 18 stakeholders was chosen from the list of 29 interviewees contacted to build the concourse. Participants belonged to national forest authorities, regional forest and agriculture authorities, NGOs, research institutions, coffee and cocoa export agency, and producer organisations.

3.2.3. Data collection

The sorting procedure was conducted face-to-face and online using Netlify[3], a backend server settled with the EQ-Configurator software that uses HTQML files and a Google Firebase to

[3] See the website to sort the enabling conditions online: https://cusafv2.netlify.app/#/

store data in real-time. Participants placed the Q-set over a grid (Figure 2) with a fixed, symmetrical, and almost normal distribution split into 11 agreement levels (completely disagree: -5 to completely agree: +5) on the more critical enabling conditions to implement the AC scheme. Statements were classified into three categories. Category 1, statements participants agreed; Category 2, neutral statements; and Category 3, statements participants disagreed. Then, they were placed according to the categories' order. Finally, participants were asked to give demographic information (name, occupation, and knowledge of the AC scheme), explain why the +5 and the -5 statements were selected and make recommendations on missing aspects.

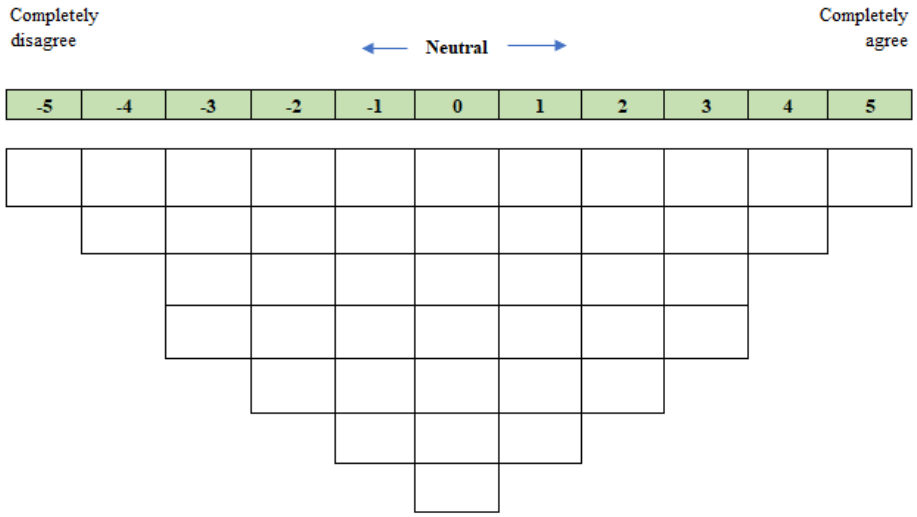


Figure 2. Q-sort

3.2.4. Analysis

Respondents' scores were arranged in an 18*43 matrix and analysed using Ken-Q Analysis software which carries out a factor analysis. First, factors were extracted through a Principal Components Analysis (PCA) that accounts for study variance into eight factors. Second, a subset of the more statistically relevant factors was selected to keep for factor rotation. Three criteria to determine how many factors rotate were assessed; eigenvalues (EG) above 1, changes in the percentage of explained variance, and the presence of at least two significant factor loadings above 0.39 (at $p \leq 0.001$). Factor loading means the extent to which the viewpoint of a specific participant (Q-sort) is explained by the factor in which it is. Third, the Varimax Rotation method was used due to its objectivity to optimise the study variance explained by the four factors selected. When rotating, more Q-sorts might become significant for any given

factor, which helps explain its viewpoint better. Fourth, factor estimates were created to form arrays, also known as Q-sorts archetypes. They represent the factor statements' arrangement and are built by assessing each Q-sort's contribution to the final estimate and considering Q-sorts that significantly loaded only one factor.

Results were interpreted to outline discourses characteristics and differences. Facts for creating explanatory discourses were taken from factor arrays, themes, and interviews analyses by using an abductive logic based on those facts. Special attention was given to distinguishing statements and extreme opinions to create discourses and differentiate them. Distinguishing statements are ranked significantly different among factors and help identify solid positions. Moreover, bipolar participants that contradicted factors' opinions were individually interpreted. Factors were compared among them to outline similarities and differences. To facilitate the analysis, statements were reclassified into three broader categories named i) shared agreement/disagreement (all agree or disagree at different degree: -5 to -2; +2 to 5+), ii) potential shared agreement/disagreement (at least two agree/disagree and the remaining are neutral), and iii) polarised perspectives (positive and negative scores).

Note that this is an exploratory study in which factors' members do not represent real groups; thus, discourses are not related to actual conflict resolution processes. The hypothetically selected participants were analysed to elucidate views and associations of opinions about a hypothetically defined set of enabling conditions (Q-set) needed for scaling the AC Scheme. Results from this study will contribute to a participatory ToC as an example of participants' vision on scaling up the AC Scheme. Hence, the more critical enabling conditions identified represent a starting point for a more comprehensive discussion in which a broader range of stakeholders will participate to brainstorm similar or additional conditions of success and expected outcomes.

4. Results

Overall, participants classified most enabling conditions in Category 1 (agree). Nevertheless, they were forced to prioritise them by selecting the more crucial ones. Diverse opinions were associated with the four more representative factors discourses that explain 51% of the study variance (Table 3). A solution that explain 35 to 40% or above of the study variance is considered a sound solution (Kline (1994) in (Watts & Stenner, 2012). **Error! Reference s ource not found.** illustrates archetypal factors' Q-sorts.

All participants were significantly loaded, i.e., associated with one of the four factors. Table 3 shows factors loadings and participants type. F2 and F3 had five participants each, while F4 had three; out of them, F2 and F4 had one participant negatively loaded, called "bipolar". They had opposite viewpoints and were analysed individually. In contrast, F1 and F4 participants have similar backgrounds. In the case of the former, all of them work with sustainable land use management and conservation and have experience in multidisciplinary regional processes. While the latter have participants from different organisations, they interact directly on the field with family farmers from a productive or incentive-research perspective. F2 and F3 have participants from national and regional institutions and NGOs.

Table 3. Factor matrix with defining sorts flagged

Q-sort	Participant type	Factor 1	Factor 2	Factor 3	Factor 4
1	Conservation NGO	0.1577	-0.591*	0.5514	0.1142
2	Regional institution	0.0037	-0.2248	0.2137	0.377*
3	Regional institution	-0.0935	0.1054	0.6066*	-0.1167
4	Producers' association	0.0647	0.5514*	0.3522	-0.2716
5	Research organisation	0.3132	-0.0353	-0.1823	0.7099*
6	Sustainable production NGO	0.5557*	0.0416	-0.1638	0.5057
7	Environmental Law NGO	0.183	-0.1905	0.5334*	0.3991
8	Environmental Law NGO	0.0104	-0.0072	0.5363*	-0.0196
9	Sustainable production NGO	0.2579	-0.1538	-0.1177	-0.7542*
10	Research organisation	0.7133*	0.1251	0.0242	0.0431
11	Conservation NGO	0.5065*	0.1398	0.3302	0.2332
12	Intergovernmental organisation	0.1338	0.369	0.465*	0.2014
13	Environmental Law NGO	0.2752	0.5558*	0.0643	0.2271
14	National institution	0.0772	0.6332*	0.0795	-0.2582
15	National institution	0.2117	0.4722	0.7037*	0.0661
16	National institution	-0.0227	0.7868*	0.0219	0.1173

Q-sort	Participant type	Factor 1	Factor 2	Factor 3	Factor 4
17	Research organisation	0.6483*	-0.1013	0.2321	-0.1749
18	Research organisation	0.6645*	0.0827	-0.0554	0.0125
Explained variance (%)		13	14	13	11

*Q-sorts loaded significantly on a given factor.

4.1. More and less important enabling conditions

Normalised Z-score indicates statements' correlation level with a specific factor. From a Q-set of 43 statements, the more (+4 to +5) and the less (-4 to -5) critical enabling conditions were identified, as shown in Table 4. Overall, the more important are related to the sustainability aspects of the scheme, while the less relevant to the formulation phase. The three more relevant were i) simplify bureaucracy (F1, S24), ii) fast delivery of attractive incentives (F2 and F4, S35), and iii) design of legal frameworks based on farmers' context (F3, S9). In comparison, the three less important ones were i) agriculture and forestry compatibility study (F1 and F4, S20), ii) multistakeholder participation for designing legal frameworks (F2, S5), and iii) locally centralising the AC scheme implementation (F3, S23).

Table 4. More and less important enabling conditions identified.

Factor	More important enabling conditions (+4 to +5)	Z-score
1	24. Simplify administrative procedures to make it easier for the AC scheme users to comply with co-responsibilities and exercise their rights.	2.91
	30. Provide assistance to farmers before, during and after the AC scheme registration in technical, productive, commercial, and bureaucratic aspects	1.84
	25. Government institutions involved in the AC scheme implementation should exchange the same information to ensure a transparent and efficient process.	1.33
2	35. The AC scheme incentives should be delivered quickly and be more attractive than those farmers receive if they would get a land title*	2.13
	41. Producer organisations with AC users must be strengthened to achieve institutional, commercial, and productive sustainability	1.61
	36. Train farmers in theoretical and practical topics of agroforestry systems management	1.6
3	9. Design the AC scheme legal framework based on the local context of family farmers	1.64
	34. Access to public incentive programs is prioritised for the AC scheme users*	1.54
	7. The AC scheme should be included as a priority in the forestry, environmental and agricultural sectors public policies	1.17
4	35. The AC scheme incentives should be delivered quickly and be more attractive than those farmers receive if they would get a land title*	2.13
	34. Access to public incentive programs is prioritised for the AC scheme users*	1.91
	28. Family farmers' trust with government institutions should be strengthened	1.75
Factor	**Less important enabling conditions (-4 to -5)**	**Z-score**

Factor	More important enabling conditions (+4 to +5)	Z-score
1	20. Carry out an agricultural and forestry compatibility study to determine the configuration of agroforestry systems and their management*	-1.89
	4. Regional directorates coordinate among them regional goals scope based on concerted development plans and regional strategic plans.	-1.56
	42. AC users must be associated to be able to market their products	-1.46
2	5. Regional and local governments and civil society organisations participate in and influence the AC scheme legal framework formulation process under established processes	-1.89
	10. There should be updates in forestry and agricultural sector public policies to facilitate the AC scheme implementation	-1.75
	8. There should be an institution that oversees coordinating and articulating everything related to the AC scheme (legal framework design, implementation, monitoring and evaluation) *	-1.65
3	23. Centralise the AC scheme implementation through offices located in district or regional municipalities with trained personnel	-2.67
	8. There should be an institution that oversees coordinating and articulating everything related to the AC scheme (legal framework design, implementation, monitoring and evaluation) *	-2.12
	1. Strengthen and formalise regional permanent political tables to use them as places for multisectoral coordination and articulation	-1.89
4	20. Carry out an agricultural and forestry compatibility study to determine the configuration of agroforestry systems and their management*	-2.13
	22. Define granted farms' internal zoning to determine the different land use systems	-2.03
	39. Purchasing agreements must be negotiated with Government or private institutions	-1.75

4.2. Factors' association

Cross-factor analysis revealed divergent opinions represented by statistically insignificant correlations. Table 5 shows that for all cases, correlation values were below the statistically significant limit (0.39 at $p<0.001$ and 0.29 at $p<0.05$). That is aligned with the fact that participants shared opinions only with three statements similarly scored with low rankings (S19, S23, S27). Instead, potential shared views to agree or disagree were polarised positions that predominated. Twenty-one conditions ranked similarly by at least two or three-factor, while the remaining kept neutral, and 19 ranked differently by all factors and distributed among the three policy phases considered (Appendix II: Q-set).

Table 5. Factors' correlation

Factor	1	2	3	4
1	1.00	0.11	0.27	0.15
2	-	-	0.25	-0.03
3	-	-	-	0.11
5	-	-	-	1.00

4.3. Factor interpretation

Factor 1: Farmers' legal security through simple processes and accompaniment is the key

Factor 1 had an eigenvalue of 3.4 and explained 13% of the study variance. The only group rated higher a more straightforward scheme and multidisciplinary farmers' assistance services (S24, S30, S21, and S11). On the other hand, it was the only one that rated lower enabling conditions that might become barriers because of technicalities or because they are beyond the AC scheme fundamentals, e.g., those related to technical plans, institutional management, and products commercialisation (S12, S42, and S4).

For this group simplifying administrative procedures (S24, +5) is a determinant condition for motivating the AC scheme adoption. Simple bureaucracy impacts multiple aspects such as simple and understandable legal frameworks that reflect through simple procedures and an adequate legal framework implementable at scale. When that happens, the implementation of the AC scheme becomes easier for governmental authorities and farmers who can have a clear perspective on their benefits (S31, +3). In terms of operationalisation aspects, it is missing to ensure an efficient and transparent exchange of information with other institutions (S25, +4); and constantly assist farmers in any part they might need support (S30, +4). Complemented with socialisation campaigns (S29, +3) and a participatory design of the land use management plans (S21, +3), farmers will be motivated, which will also help them build confidence in the mechanism. Factor 1 considers irrelevant enabling conditions that become barriers, such as technical studies (S20, -5) or are out of the scheme's scope, such as joining producer associations (S42, -4) and vertical and horizontal coordination (S4, -4).

Factor 2: Ensuring increments of farmers' profitability is crucial for succeeding

Factor 2 had an eigenvalue of 2.4 and explained 14% of the study variance. Participants in this group had a solid perception of the importance of farmers' profitability. This was the only group that rated higher on building farmers' technical capacities and product commercialisation (S36, S37, S42, S32).

For them, the most critical condition is the fast delivery of attractive incentives (S35, +5). They favoured, as fundamental as any other discourse, farmers' theoretical and practical training on AGF systems management (S36, +4) and market access (S37, +3). Undoubtedly, improving production and commercialising it through producers' organisations (S42, +3) will improve farmers' welfare (S32, +2). However, it is not enough to join producers' organisations but to strengthen them to achieve institutional, commercial, and productive sustainability (S41, +4).

As argued by a respondent, the success of the AC scheme depends on profitability increments. This group distinguished from other discourses because they ranked lower in effective multistakeholder participation (S5, -5); legal frameworks simplicity (S11, -3); public policies updates (S10, -4); legal frameworks applicability to the local context (S9, -3); political will (S13, -3); and the AC scheme management centralisation (S8, -4). For them, what matters is to articulate institutions involved with AGF on a permanent and formal basis and monitor it through annual working plans to ensure an effective articulation (P14, P16). Contrary to that view, the participant who was bipolar considered that creating an enabling institutional and legal environment must be ensured before implementation. For him, sustainability aspects come along quickly and fluently when participation, political will, and adequate public policies are strengthened and complemented with operationalisation strategies.

Factor 3: Political will and an aggregated value are essential conditions

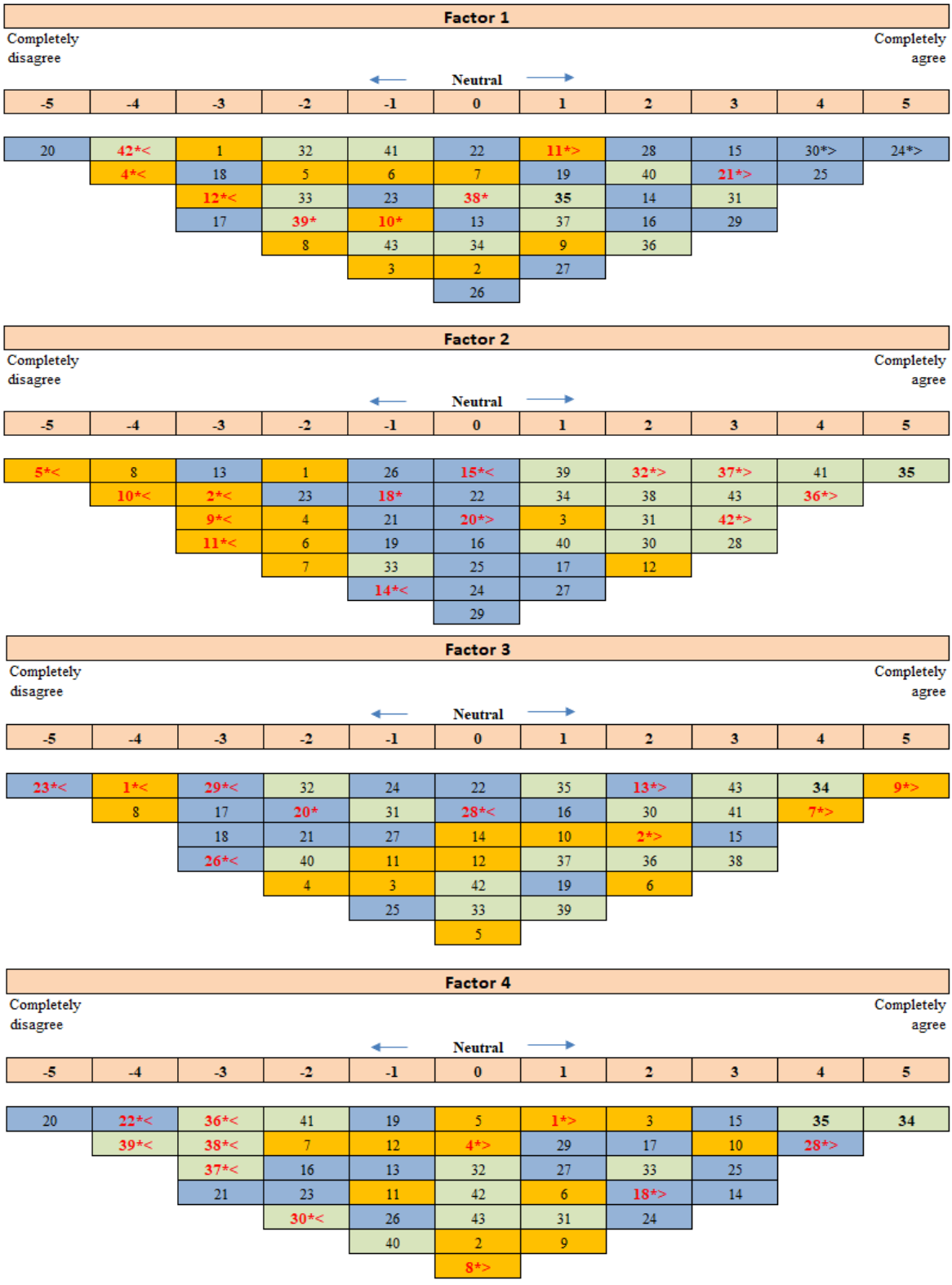
Discourse 3 had an eigenvalue of 1.9 and explained 13% of the study variance. This was the only group that rated higher enabling conditions affected by political wills, such as the scheme's legal framework, its inclusion in national public policies, and its fast implementation (S9, S7, S13, S2). For this group, designing the AC scheme legal framework based on farmers' context (S9, +5) is the starting point because it will make politicians aware of the importance of the scheme and the financial resources required (S15, +3) to implement it quickly at scale. That condition must be complemented with political will and robust incentives, for instance, by including the scheme in public policies (S7, +4), adding an aggregated value through prioritising farmers' access to subsidies (S34, +4), helping them with traceability procedures (S38, +3), joining and strengthening producer associations (S43 and S41, +3).

Contrary to other discourses, this group ranked lower on transparency, centralised offices, accountability, and participation in discussion tables (S23, S1, S26, S29, S28). District municipalities lack capacities because it is not feasible to centralise the AC scheme implementation through them (S23, -5), nor is it to make them responsible for socialisation campaigns (S29, -3). Moreover, for this group, strengthening regional discussion tables (S26, -4) and auditing and sanctioning governmental institutions (S18, -3) is not worth it because they require additional efforts, and their impact is not a determinant of the scheme's success.

Factor 4: Strengthen relationships with farmers while improving institutionality

Discourse 4 had an eigenvalue of 1.5 and explained 11% of the study variance. Participants in this group had a solid perception of the importance of incentives, trust and institutionality. They were the only ones who rated higher confidence, public policy updating, participation and

coordination (S1, S4, S8, S10, S18, S28). For them, incentives must be attractive and delivered quickly (S35, +5), regardless of their type (S30, -2; S36, -3) and markets conditions (S37, -3; S38, -3; 39, -4); the incentive they considered relevant was access to public subsidy programs (S34, +4). With the highest score, respondents considered it crucial to update public policies (S10, +3) and to strengthen farmers' trust in governmental institutions (S28, +4). This was the only group that did not negatively rank coordination among regional directorates (S4, 0) and scheme management centralisation (S8, 0). Those can be seen as transversal aspects that may have a positive impact as the scheme is implemented. Compared to other discourses, this group disagrees the most with operational elements, farmers' assistance, markets, and value chain-related conditions (S21, S22, S30, S36, S37, S38, S39). The design of land management plans (S21, -3), internal farms' zoning (S22, -4), and a compatibility study (S20, -5) might discourage farmers because the land use system they have defined is to be modified. Unlike that view, the bipolar participant considered technical and operational aspects more relevant, while incentives and institutional management were less applicable. For this participant, prioritising farmers who adopted the AC scheme to access public programs might create social conflicts with land title holders.



	Formulation-related enabling conditions	*	Distinguishing statement
	Management-related enabling conditions	>	Higher than in all the other factors
	Sustainability-related enabling conditions	<	Lower than in all the other factors

Figure 3. Archetypal factors' Q-sorts

5. Discussion

This study hypothetically identified 43 enabling conditions distributed in 13 enabling areas selected as inducing change areas throughout three phases of the AC Scheme policy process. To a degree, their importance was partially proved. Results revealed significant variability in participants' vision and expected outcomes from the AC Scheme implementation, which varied depending on participants' backgrounds and interests. Those findings provided insights into how the AC Scheme is perceived, ultimately contributing to a participatory ToC by helping identify the scheme's conditions of success and expected short, intermediate, and long-term outcomes.

5.1. More important enabling conditions

Generally, the more critical enabling conditions are part of sustainability aspects, followed by management and formulation. Farmers' motivation was central since it directly affects adoption rates and long-term sustainability. Hence, simple bureaucracy and legal frameworks adopted to local contexts were crucial. Moreover, depending on factor's vision, it might be reached through direct incentives or a combination of direct and indirect incentives. Nevertheless, most factors (F2, F3, F4) supported more direct incentives (S30, S34, S35, S36, S41) over indirect ones (S24).

Participants' opinions were associated with four factors that explain 51% of opinions' variability. Factor 1 believes that ensuring farmers' legal security through simple procedures and capacity building is the primary step towards a successful implementation. For them, facilitating processes is crucial for efficient implementation and broader adoption. Factor 2 has a profit-oriented focus towards the forest sector. They considered that increasing incomes is the most critical motivation why commercialisation is the basis for a successful implementation. Their reasoning was based on users' current needs regarding harvesting established plantations through the scheme. Factor 3 favours political processes at a national level in which a shared scheme's understanding facilitates a legal framework design based on farmers' context and the scheme prioritisation. It has a more transversal and integral view, in which success is reached through interventions at a national and local level. Factor 4 believes in farmers' transition based on trust and autonomy towards sustainable AGF management while intervening in political processes at a national level. This discourse is against profit-oriented views because it considers that many farmers still do not have the capacities and intentions to enter markets.

5.2. From shared to polarised perspectives

Overall factors did not associate among them. That demonstrates a lack of a shared vision about what must be done at the different stages of the scheme policy process. The extent of shared and polarised vision on agreement and disagreement for the more and less critical enabling conditions identified is further explained below.

Shared agreement and polarised views on positively ranked statements

Any statement was considered equally important. Yet, potential shared agreement was revealed for four statements (S25, S28, S35 and S34). Trust (S28) was supported (F1, F2 and F4) because the lack of it makes farmers averse to risk which directly influence adoption. Interoperable information systems (S25) ensure that AC registration is conducted efficiently as the first implementation stage. Fast delivery of incentives (S35) was accepted in general by all participants because they represent tangible and timely benefits for farmers, which influences their trust in the scheme, and, consequently, keeps them motivated. Finally, differentiating the AC scheme through exclusive access to public programs (S34) was partially accepted (F3 and F4) since it may create conflict with land title holders. There is a need to analyse the best strategies to generate an aggregated value for the scheme to respect social safeguards while helping motivate farmers' adoption.

Polarised views were evidenced for six of the more critical enabling conditions. Formulation-related conditions had different scores. Prioritising the AC Scheme in public policies (S7) was supported (F3) because, in that way, the scheme gains political recognition, which influences various aspects such as financial support. On management-related conditions, bureaucracy (S24) had low support. For some participants (F1 and F2), complex administrative procedures represent barriers to institutions and farmers. For others, it is not a priority because the Government is already simplifying it through Law No. 25035. On sustainability-related conditions, two approaches were evidenced. Profit-oriented requires incentives that contribute to increasing productivity (S36, S41), while agroecological oriented needs multidisciplinary incentives (S30) to help farmers transition towards formal economies of AGF-derived products, regardless of commercialisation interests. That can be explained by the fact that some respondents have had experiences in pilot projects implemented with two types of family farmers in two regions (Ucayali and San Martin) with different ecological and socio-economic characteristics. While some have established forest plantations that must be harvested soon, others are not interested in commercialisation due to a lack of capacity.

Shared disagreement and polarised views on negatively ranked statements

Any of the less critical conditions were equally ranked. However, potentially shared disagreement was found for most negatively rated statements. On management-related aspects, compatibility studies (S20) and centralised implementation (S23) had lower scores because their usefulness is unsure, and their implementation entails high efforts in terms of resources. Internal farm zoning (S22) was neutrally ranked by three factors (F1, F2 and F3) and rejected by one (F4). In that case, imposed technical processes may increase pressure on farmers, which may become barriers.

Concerning sustainability conditions, purchase agreements (S39) and producers' associations (S42) lack strong support because they are out of the scheme scope and considering them or not depends on the AGF approach implemented in each region where the scheme will be scaled up.

Although formulation-related conditions were included as a strategy to remove institutional silos by promoting a multisectoral view to manage regions, most participants rejected them. Potentially shared disagreement was found for centralised management (S8), participation through permanent tables (S1), regional directorates coordination (S4), and multistakeholder influence on legal framework design. Further, public policy updates (S10) were subject to polarised views since F3 and F4 agreed, while F1 and F2 disagreed. Such a finding makes to question whether participants' answers were based on a short, intermediate, or long-term vision. Multiple participants highlighted formulation-related conditions during the concourse-interviewing process. However, their importance was not reflected in the sorting when respondents did not prioritise them. Opponents justified their opinion based on what they considered feasible, like missing aspects or easily achievable results. In comparison, few allies thought of them as fundamentals to create an enabling policy environment or as transversal aspects that need attention as implementation advances. For them, the governance structure can be improved and being aware of what must change and asking for those changes are essential steps toward more effective management.

5.3. Implications for vertical scaling-up

In the context of the AC Scheme, AGF systems are traditionally managed by family farmers through different types of practices (Robiglio et al., 2018). The main challenge for the Government is to vertically scale up the scheme because AGF is a common land use management system in Peru. Its objective is to secure family farmers' rights, insert them in formal economies, and improve production systems sustainability as a strategy to promote wider adoption and achieve large-scale impacts. However, findings from this study demonstrated that participants were not entirely aware of what scaling up the AC Scheme

entails. They were unaware of the specific relevance of vertical scaling-up for the scheme and did not recognise that scaling up is a process in which all fronts that affect the scheme must be addressed throughout the policy phases. Their scheme's vision focused on sustainability aspects and horizontal scaling up, with few exceptions. That explains why incentives and, to a lesser extent, related operational conditions were prioritised, while formulation-related conditions that represent vertical scaling-up aspects on institutional management and policy decision-making were secondary.

Results from this study contribute to acknowledging which vertical scaling-up aspects are relevant or irrelevant for the AC Scheme according to participants' points of view. Only legal frameworks based on local contexts and prioritisation of the scheme in sectoral public policies were considered necessary for implementation. In contrast, the centralised management scheme had the lowest score, followed by participation, articulation, and coordination. Thus, a lack of awareness is evident on the importance of articulation, coordination, participation, equity, and flexibility. As argued by interviewees, and based on literature on forest governance analysis (Kowler et al., 2016; Piu & Menton, 2013; Rodriguez-Ward et al., 2018; Zamora et al., 2021) and an evaluation study of the Forest and Climate Change National Program (MINAM, 2021), properly tackling those aspects would improve the likelihood of successfully scaling up the AC Scheme for many reasons.

Articulation is required with organisations and existing programs to achieve synergies and aligned common objectives (P14, P16; MINAM, (2021)). Horizontal and vertical coordination is necessary to align priorities among sectors and policies (L. Ruiz, personal communication, July 20th, 2022), successfully implement the scheme (Bernard et al., 2019), and reduce gaps between what is planned in cabinet and what happens on the ground (MINAM, 2021). It contributes to an integral management of regions. Participation is crucial to allow a co-learning process between farmers, researchers, and practitioners and for farmers to empower politically (Plieninger et al., 2020). Flexible institutions, policies and legal frameworks are required for the scheme to accept, adapt, and internalise variability in contexts where the scaling-up process takes place (Makate, 2019). Equity is crucial to formulate policies through participatory approaches and access to critical resources to ensure family farmers benefit and that their heterogeneity is addressed correctly (Abegunde et al., 2019; Corbera et al., 2009; vonHedemann, 2019b).

5.4. Implications for horizontal scaling up

On the contrary to vertical scaling-up issues, results evidenced that participants align with the literature on horizontal scaling-up (wider adoption). Horizontally scale-up aspects that contribute significantly to successful implementation were suggested by (Arvola et al., 2020; Coe et al., 2014; Kusters et al., 2022; Makate, 2019; Montagnini & Metzel, 2017; Zinngrebe et al., 2020a). They are prioritising AGF policies, simplifying bureaucracy, ensuring assistance services; offering indirect incentives; delivering tangible (direct) incentives quickly, and linking AGF schemes with complementary programs to provide additional benefits. Nevertheless, specificities on providing those conditions varied depending on what approach participants preferred for the AC Scheme, whether profit-oriented, focused on markets, or agroecologically oriented, focused on resilience. That is explained because respondents have had experiences with different farmers' profiles participating in pilot projects. While some are interested in commercialising cocoa, coffee, or wood, among other products, other farmers sustain their livelihoods mainly with self-consumption products, either because they lack the capacities or infrastructure to commercialise or farm extension and yield rates are low.

Considering that governments must have the capacity to provide adoption conditions to a broad range of participant profiles spread over distinct geographical locations, adoption conditions must be adjusted to local contexts. That is important because not all farmers are interested in commercialisation. Besides, depending on the Government's focus, the scheme's climate change mitigation and adaptation goals may be jeopardised if interventions are unsuitable for targeting population needs (Porro et al., 2012). Promoting AGF with a profit-oriented focus may benefit only a proportion of the target population, while encouraging AGF with an agroecological focus may discourage those more interested in economic returns. In the case of the AC Scheme, that fact may become a barrier if market approaches are prioritised over resilience. Most family farmers are not prepared to focus on commercialisation, e.g., farms' areas are small, between 0 to 10 or 15 ha, depending on the region; productivity rates are low, and less than 10% are associated with producer organisations (Robiglio et al., 2018). However, markets are necessary to increase farmers' incomes and welfare (D. C. Catacutan et al., 2017; Franzel et al., 2001; Karlsson, 2018; Rodríguez et al., 2022; Simelton et al., 2017a).

Considering the socio-economic conditions of most family farmers eligible for the AC Scheme in the Amazon region, the more suitable approach is the agroecological one. Its requirements are aligned with the scheme's objectives and some participants' opinions. They are secure land tenure rights, improve skills, motivation from tangible benefits, and market capacities to

provision short-circuit markets (Ollinaho & Kröger 2021). Agroecological approaches intend to support farmers' transition towards a diversified market to acquire autonomy from inputs and variability of commodities markets (Ollinaho & Kröger, 2021). As suggested by Porro et al. (2012), an alternative for Amazonian communities is a multi-chain approach in which production is improved and allocated in established (e.g. cocoa, coffee) and secondary markets (e.g. fruits, timber, non-timber forest products). Hence, such approach has advantages for both farmers and the Government. It helps farmers remove barriers related to agriculture inputs and commodities (Ollinaho & Kröger, 2021); incur lower transaction costs (Rodríguez et al., 2022); improve existing AGF systems, and build capacities on commercial and bureaucratic aspects. It will ultimately help them transition towards formal economies and commercialisation. Likewise, for governments, a social approach entails fewer efforts on management plans, lower implementation costs, and partially reduces the complexity of horizontal scaling up. Therefore, the Government can concentrate its efforts on addressing vertical scaling-up aspects.

Although a social approach is suitable for most farmers, those interested in commercialisation must benefit equally. That will depend on the government's capacity to decide whether to prioritise the more vulnerable farmers or to implement both approaches simultaneously. However, even if one approach is prioritised, farmers and location heterogeneity must be addressed by designing integral interventions to reduce trade-offs and ensure equity and social safeguards. Integral interventions are based on farmers' needs, context-specific adoption conditions, and customised packages of direct and indirect incentives (de Siqueira et al., 2017; FONAFIFO et al., 2012; Montoya-Zumaeta et al., 2021). Moreover, if simultaneous interventions are implemented, the government must create adequate market conditions and seek for allies to strengthen producers' organisations, which were out of the scheme´s scope. Complementary programs are useful (Zinngrebe et al., 2020b) to achieve multisectoral synergies. However, in Peru suitable programs to family farmers (PRECOMPITE, AGROIDEAS and Sierra y Selva Exportadora) have been criticised because of multiple bottlenecks that hindered services provision and selection processes by benefiting only a specific type of farmers (Cannock et al., 2016; MIDAGRI & Sierra y Selva Exportadora, 2020; Production Ministry of Peru, 2019).

5.5. Implications for the following stages of the scaling-up process

Setting the scene to scale up the AC Scheme vertically requires institutions to prioritise policy advocacy and political will through coalitions, institutional capacity development (knowledge, personnel, tools), short and long-term financial resources and flexibility (Makate, 2019). Also,

necessary arrangements on participation, coordination, and articulation must be identified and addressed to ensure an enabling environment.

Then, a scaling-up approach must be selected. As suggested, an integral approach with more emphasis given to vertical issues is more suitable to the scheme context. Similarly, a pathway must be defined by identifying the necessary interventions, mechanisms and outcomes that will lead to achieve the desired impact. Note that Monitoring and Evaluation are crucial at all stages, either when determining the innovation to be spread and when selecting the scaling-up approach to follow (horizontal, vertical or an integral approach), declaring success or deciding to adjust (Frake & Messina, 2018).

Following the scaling-up framework proposed by (Frake & Messina, 2018), the following stages for the AC Scheme are:

1. Conclude pilot projects, monitor, and evaluate lessons learnt and results.
2. Select the AGF approach, if agroecological or market-oriented and adjust the innovation according to locations where the scaling up will start. Then, monitor and evaluate scaling up progress and adjust the strategy if needed to improve the process continuously.
3. Select the most appropriate scaling-up approach, horizontal, vertical, or integrated. Then, monitor and evaluate the scaling-up progress and adjust the strategy if needed.

5.6. Recommendations for a participatory Theory of Change

Results from this study contribute to the first two steps of a participatory ToC, according to Key Stone Accountability (2009) methodology. In that sense, two recommendations are drawn from this study.

1. Select one vision of success:

Overall, the results revealed two possible visions of success among participants. One in which climate change mitigation goals are prioritised through forest plantations and conservation. It is not clear how adaptation goals will be achieved through that vision. Another in which farmers improve traditionally managed AGF systems, become autonomous from agriculture commodities, diversify their production, conserve forests, and restore degraded lands. At this stage dialogue is needed to define which is the vision of success for the scheme.

2. Mapping preconditions of success

Analysis of the enabling conditions addressed in this study demonstrated that participants based their choices on short-term outcomes, different AGF approaches, and a lack of understanding of what vertical scaling up entails as a process. Considering that and having a referent on the enabling areas prioritised, the following is recommended.

2.1. Explain what scaling-up entails to understand better all areas that need to be addressed and the processed involved.

2.2. Brainstorm enabling conditions having in mind the vision of success. Removing mental barriers is important because it was evident that participants conditioned their beliefs on what they considered achievable in the current governance structure of Peru.

2.3. Dialogue to agree on required enabling conditions for vertical scaling-up. At this stage, awareness is needed on the importance of governance, institutional and policy issues generally undermined by participants, which represent the basis for an efficacy vertical scaling-up process of national magnitude. As AGF is a traditional land use system, efforts should focus on being able to replicate processes.

2.4. Dialogue to agree on enabling conditions for horizontal scaling-up. The family farmers' context must be re-analysed to align the scheme goals with their current context. Ensuring legal rights and assistance services to improve sustainability and productivity according to already established AGF systems and by following a land use planning instrument. A flagship case is the PLUS program implemented in Bolivia which followed a more practical methodology and has been implemented in different regions of the country.

6. Conclusion

Through a discourse analysis on enabling conditions to implement the AC Scheme nationally, this study explored and analysed hypothetically identified enabling areas and conditions of success to understand stakeholders' vision of the scheme and the scaling-up process. Results contribute to a participatory ToC by providing a referent for what needs to be better understood in a more comprehensive discussion to define appropriate causal linkages between interventions and desired outcomes. The more important enabling conditions identified are related to simple bureaucracy, legal frameworks based on local contexts and timely delivery of tangible incentives impacting farmers' production, such as assistance services and prioritised access to public programs. Results indicated that participants' points of view are represented in four discourses. The first had an incentive view, the second an operational perspective, the third was focused on incentive and institutional aspects, and the fourth prioritised incentives and operational aspects. A lack of shared vision was evident due to low similarities among them.

Moreover, many respondents based their choices on short-term outcomes since they prioritised interventions that help overcome current barriers hindering the registration process and the scheme sustainability in regions where pilot projects are being implemented. Those interventions were related to horizontal scaling-up conditions, while vertical scaling-up issues, such as coordination, participation, and flexibility, were ignored. That reflects a lack of awareness of what scaling-up entails as a process and the relevance of vertical scaling-up issues for the AC Scheme. Given that family farmers already manage AGF systems, government efforts should be focused on developing capacities to replicate the implementation process in different regions with different realities. This study also helped uncover that participants' decisions were based on two AGF approaches related to how they imagine the AC Scheme in the future. They are agroecology and market oriented. However, according to family farmers' characteristics and to benefit more people, the most suitable approach for the AC Scheme is the agroecological one.

To develop a ToC for nationally scaling-up the AC Scheme, a more comprehensive discussion of the implications of the local contexts where the scheme will be implemented is necessary for stakeholders to have a shared understanding of what is appropriate for it. That is important for two reasons. First, to identify a vision of success, the more critical enabling conditions and the required short, intermediate, and long-term outcomes that will contribute to achieving large-scale impacts in different geographical contexts. Second, such clarity and common

understanding facilitate the identification of the more suitable AGF and scaling-up approaches, which is crucial for sustaining the scheme's long-term sustainability.

The limitations of this study are related to gaps associated with Q-methodology studies and the status of the AC Scheme. First, most of the progress on pilot projects have been done in San Martin, why many respondents based their choices having that state as a referent. Nevertheless, as rurality in Peru is diverse, it would be better to narrow the study by analysing a specific region, or specific dimension of the scaling-up process. Second, the selection of enabling conditions had a level of subjectivity since the Q-set was selected from the concourse, which was built mainly considering interviews. Participatorily designing the Q-set with the support of experts on the topic of study would contribute to identify key aspects mentioned in the literature from which respondents were not necessarily aware. That was the case for this study with regards on gender issues and equity. Third, due to the AC Scheme is still under the design phase, by the moment of surveying and sorting, there was uncertainty, lack of knowledge and in some cases misinformation on it. That had two implications for the study. On one hand, most farmers´ contacted did not know the scheme, why there could not participate in the sorting. That implied a biased selection of the P-set with perceptions captured from practitioners, policymakers, NGOs´ and researchers. While on the other hand, it was difficult for respondents to identify the more important enabling conditions. For instance, some participants did not understand some enabling conditions why their required clarifications during the Q-sorting. That is a limitation because what the literature on Q-methodology suggests is to avoid confusion in the Q-sets so that participants are completely sure of their points of views. In addition, not all respondents were experts on scaling-up policy instruments which affected how the research question was understood.

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Appendix I: Enabling areas

Subtheme	Subject of review	Country	Enabling condition - Barrier	Authors
Institutions	Government-led PES	Costa Rica, Guatemala, and Mexico	Centralised management by autonomous and flexible institutions that adapted over time management strategies based on lessons learnt	(Bollman & Hardy, 2014; Corbera et al., 2009; Le Coq et al., 2015; VonHedemann, 2019).
	Government-led PES	Mexico	Effective stakeholders' participation to make decisions and provide feedback on regulatory frameworks	Corbera et al., (2009)
	Forest Landscapes Restoration Agroforestry at landscape scale	Global review Indonesia, Honduras, Peru	Platforms and cooperation schemes are means for participation, coordination, and decision-making	(Duraiappah et al., 2014) (Chazdon et al., 2020)
	REDD+ governance	Peru	Fragmented cross-sectoral functions, conflicts among institutions, and a lack of clarity about roles and responsibilities hinder institutional coordination.	Kowler et al. (2016)
	Forest governance analysis	Peru	Forest authority's lacks interest in strengthening its internal procedures which affect regional institutions performance	Zamora et al., (2021)
	Agroforestry at landscape scale	Indonesia, Honduras, Peru	Local governments are bridging key actors in the governance of lands and forests but have been disregarded by political agendas	Chazdon et al., 2020
	Forest governance analysis Forest and Climate Change Program	Peru	Need for better coordination between levels of governance and sectors	(Rodriquez et al. 2018) (MINAM, 2021)
	Agroforestry policy	Vietnam	Lack of clear policy and programme support at the national level	(Simelton et al., 2016) Kowler et al. (2016)
Legal frameworks	Government-led PES Forest governance analysis	Costa Rica, Guatemala, and Mexico Peru	Legal frameworks frequently revised and updated	(Hinojosa, 2017; Le Coq et al., 2015, Corbera et al., 2009) Finer et al. (2014), Schleicher et al. (2017), and Shanee et al. (2015)
	REDD+ governance	Peru	Need for locally appropriate and acceptable rules	(Rodriquez et al. 2018)

Subtheme	Subject of review	Country	Enabling condition - Barrier	Authors
Strategies	Enabling cs	Peru	Lack of enforcement, supervision and monitoring on-site in enabling titles resulted in illegal logging	Finer et al. (2014), Schleicher et al. (2017), and Shanee et al. (2015)
Capacities	Government-led PES	Global review	Knowledge, technical expertise, financial resources, and stability of intermediaries' organisations enable PES implementation.	Huber-Stearns et al. (2017)
	REDD+ governance	Peru	Weak transference of human capacities and financial support has prevented regional governments from building technical knowledge and keeping the required human staff to execute their roles and responsibilities.	Kowler et al. (2016)
	Forest and Climate Change Program	Peru	High staff rotation hinders institutional capacity building.	(MINAM, 2021)
Land management plans	Government-led PES	Ecuador	Management plans focused on investment plans to improved livelihoods	(de Koning et al., 2011)
	Government-led PES	Mexico	Low quality of management plans in Mexico led to high rejection rates due to lack of technical knowledge	(Corbera et al., 2009)
Information management systems	CAR	Brazil	Municipal interoperable cartographic databases were integrated into the federal and national information systems.	(Biondo et al., 2017)
Bureaucracy	Private reserves	Peru	Complex and expensive processes delay the official designation of private reserves, especially when managed by local communities.	Shanee et al., (2015)
	Agroforestry at landscape scale	Indonesia, Honduras, Peru	Difficulties in registering trees for commercialisation is an important barrier to agroforestry	Zinngrebe et al., 2020
Centralised offices	Government-led PES CAR	Costa Rica Brazil	Local offices allow reducing landowners' transaction costs and ensuring permanent assistance services	(Hinojosa, 2017) (TNC, 2015)
Accountability	Forest governance analysis	Peru	A lack of internal control systems applied to forest national and regional authorities prevented improvements in legal frameworks and institutional performance.	(Zamora et al., 2021)
Transparency	Government-led PES	Costa Rica	FONAFIFO disseminated information on its official website, published application forms and executive documents online, and worked jointly with semi-autonomous governmental agencies or NGOs to execute outreach activities	(Bollman & Hardy, 2014)
	CAR	Brazil	A transparent mechanism that consists of permanent information centres for users' assistance and a user-friendly online platform	(Roitman et al., 2018; Verdasca & Lima, 2021)
Incentives	Government-led PES	Ecuador	Conditional payments on property extension, subsistence hunting and NTFP harvesting, autonomy for payments, and capacity building services	(FONAFIFO et al., 2012).

Subtheme	Subject of review	Country	Enabling condition - Barrier	Authors
	CFM	Guatemala	Recognition and enforcement of collective tenure rights, payments granted by governments, and three years of technical and managerial capacity building process supported by an NGO	(Butler & Current, 2022)
	CAR	Brazil	Transparency in the origin of products; social and environmental certifications; compensation market of forest areas through the Environmental Reserve Quotas (CRAs); market access; environmental diagnoses of properties; temporarily compliance of environmental crimes; financial and technical support for designing the PRAD and technical assistance for its implementation	(de Siqueira et al., 2017; TNC, 2015; World Bank, 2010)
	CAR	Brazil	Access to credits incentivises small farmers to deforest due to permanent access to credits	(Jung et al., 2022)
	Agroforestry at landscape scale Agroforestry Policy	Global review Vietnam	Financial benefits for the implementation of agroforestry systems	Zinngrebe, et al., 2020 Simelton et al., 2017
	Forest and Climate Change Program Agroforestry at landscape scale	Peru Indonesia, Honduras, Peru, Uganda	Articulate incentives with complementary instruments already existent in the territory	(MINAM, 2021) (Zinngrebe, et al., 2020)
Markets and value chains	CFM	Guatemala	CFM concessions in Peten were financially sustainable because the Government allowed them to commercialise timber from native trees	(Galloway & Stoian, 2007)
	CFM	Guatemala	Support from NGOs and research institutions to strengthen capacities to develop the value chain on-site and to commercialise products	(Galloway & Stoian, 2007)
	CFM	Global review	Legal frameworks that support market creation; market infrastructure and availability and access to market information;	FAO, (2016)

Appendix II: Q-set

What are the most important enabling conditions to implement the AC contract at a national level?

Type of statements: * Distinguishing statements; PC: statements with potential of compromise; C: conflicting statements; Cc: consensual statements.

Statements	Type	F1	F2	F3	F4
1. Strengthen and formalise regional permanent political tables to use them as places for multisectoral coordination and articulation	PC	-3	-2	-4*	1*
2. Governmental institutions (national and regional) must have a common understanding of the AC scheme's vision and legal framework	C	0	-3*	2*	0
3. The government should coordinate sectors, especially at the regional level, to manage regions with a transversal and multisectoral vision	PC	-1	1	-1	2
4. Regional directorates coordinate regional goals based on concerted development and regional strategic plans.	PC	-4*	-2	-2	0*
5. Regional and local governments and civil society organisations participate in and influence the AC scheme legal framework formulation process under established processes	PC	-2	-5*	0	0
6. There must be articulation and coordination between public policies prioritised by the different levels of government	C	-1	-2	2	1
7. The AC scheme should be included as a priority in the forestry, environmental and agricultural sectors' public policies	C	0	-2	4*	-2
8. There should be an institution responsible for coordinating and articulating everything related to the AC scheme	PC	-2	-4	-4	0*
9. Design the AC scheme legal framework based on the local context of family farmers	C	1	-3*	5*	1
10. There should be updates in forestry and agricultural sector public policies to facilitate the AC scheme implementation	C	-1*	-4*	1	3
11. The AC scheme legal framework should be more straightforward so that it is easier to understand, and the implementation should be fast and at scale	PC	1*	-3*	-1	-1

Statements	Type	F1	F2	F3	F4
12. Forest zoning allows the AC scheme to be granted in all subcategories of special treatment zones so that more farmers can participate.	C	-3*	2	0	-1
13. There must be political will at a regional or national level for the AC scheme implementation to be fast	C	0	-3	2*	-1
14. Government institutions must have technical capacities to be able to implement the AC scheme	PC	2	-1*	0	3
15. Sufficient funds must exist to implement the AC scheme	PC	3	0*	3	3
16. Permanently trained personnel must be ensured for the implementation of the AC scheme	C	2	0	1	-2
17. Monitoring and supervision are carried out based on strategies that are easy and quick to implement	C	-3	1	-3	2
18. Penalties must be adjusted according to family farmers' profile	PC	-3	-1*	-3	2*
19. Supervision must be carried out under an indicative approach during farmers' build capacities	Cc	1c	-1c	1c	-1c
20. Carry out an agricultural and forestry compatibility study to determine the configuration of agroforestry systems and their management	PC	-5	0*	-2*	-5
21. The management plans design of farms granted under the AC scheme is carried out with the farmers according to their capacities	PC	3*	-1	-2	-3
22. Define granted farms' internal zoning to determine the different land use systems	PC	0	0	0	-4*
23. Centralise the AC scheme implementation through offices located in district or regional municipalities with trained personnel	Cc	-1	-2	-5*	-2
24. Simplify administrative procedures to make it easier for the AC scheme users to comply with co-responsibilities and exercise their rights.	C	5*	0	-1	2
25. Government institutions involved in the AC scheme implementation should exchange the same information to ensure a transparent and efficient process.	PC	4	0	-1	3
26. Government institutions must be permanently audited and sanctioned when needed	PC	0	-1	-3*	-1

Statements	Type	F1	F2	F3	F4
27. Implement constant information diffusion campaigns under a gender approach in public institutions and local communities about the AC scheme and the regions' forest zoning	Cc	1C	1C	-1C	1C
28. Family farmers' trust in government institutions should be strengthened	PC	2	3	0*	4*
29. Involve district municipalities in information diffusion campaigns to have more presence in the territory	PC	3	0	-3*	1
30. Assist farmers before, during and after the AC scheme registration in technical, productive, commercial and bureaucratic aspects	C	4*	2	2	-2*
31. Farmers must have a clear perspective on how and when they can get the AC scheme incentives	PC	3	2	-1	1
32. The AC scheme incentives should increase the welfare of its users through investments in social aspects such as education or health	C	-2	2*	-2	0
33. Farmers should receive payments conditioned on compliance with the AC scheme co-responsibilities	C	-2	-1	0	2
34. Access to public incentive programs is prioritised for the AC scheme users	PC	0	1	4	5
35. The AC scheme incentives should be delivered quickly and be more attractive than those farmers receive if they would get a land title	PC	1	5	1	4
36. Train farmers in theoretical and practical topics of agroforestry systems management	C	2	4*	2	-3*
37. The State should facilitate the access of the AC scheme users to markets where they can commercialise their products	C	1	3*	1	-3*
38. Generate tools to verify the AC scheme products- derived traceability as a strategy to attract buyers who support sustainable and deforestation-free production	C	0*	2	3	-3*
39. Purchase agreements must be negotiated with government or private institutions	PC	-2*	1	1	-4*
40. Promote collective action at the village level to facilitate the AC scheme's sustainability	C	2	1	-2	-1

Statements	Type	F1	F2	F3	F4
41. Producer organisations with AC users must be strengthened to achieve institutional, commercial, and productive sustainability	C	-1	4	3	-2
42. AC users must be associated to be able to market their products	C	-4*	3*	0	0
43. AC users must join producer associations to benefit from regional governments, NGOs or international cooperation organisations initiatives	PC	-1	3	3	0