Foreign, Commonwealth & Development Office

Evidence Review

Sustainable livelihood options for the Territorios Forestales Sostenibles (TEFOS) programme

Produced by Tetra Tech International Development

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Executive Summary

TEFOS is a six-year programme that seeks to contribute to stabilising and reducing deforestation rates in conflict-affected areas in Colombia. TEFOS has three pillars of work: 1) to strengthen land registry systems to incentivise sustainable land management; 2) to strengthen the criminal justice system to tackle environmental crime in deforestation hotspots; and 3) to create and promote innovative, sustainable economic opportunities for communities. Pillars 1 and 2 are currently operational. Pillar 3 is expected to be operationalised in 2023 with £9.9m earmarked for it.

The overall purpose of the Evidence Review is to inform the UK Government appraisal process for Pillar 3, by producing assessing the evidence for different sustainable livelihood options and the opportunities and challenges of implementing these in pilot areas alongside ongoing interventions.

Most TEFOS municipalities still face violence, poverty, illicit economies, and institutional weaknesses that hinder local development and economic growth. Around 60% of TEFOS municipalities are part of the Territorially Focused Development Programme (Programa de Desarrollo con Enfasis Territorial, PDET) a fifteen-year planning and management instrument that aims to strengthen community organisations, achieve rural development, and prevent recurring violence with support from international cooperation initiatives (ART, 2021).

This Evidence Review identified a large volume of information, scattered over many themes and based on a diversity of experiences and geographies across TEFOS target municipalities. In addition to documented evidence many of the findings in this report rely on a combination of personal experience and perceptions from key informants, field observations and insights from local stakeholders. The review allowed for an analysis of the strength of the evidence for each of the proposed livelihood options.

Main Results

The review identified feasible sustainable livelihoods options in five general categories: i) Agroforestry systems with species such as cacao, rubber, heart of palm, cacay, sacha inchi, timber trees including balsa and crops for food security, ii) Sustainable Forest Management (SFM) for the production of timber and non-timber forest products such as acai berry and cacay, iii) Sustainable livestock farming that includes agro-silvopastoral or silvopastoral systems, iv) Nature-based tourism, and v) Fish farming.

Each identified livelihood option has its own unique characteristics. While some options are not suitable for certain areas, the evidence also suggests that a combination of different options could contribute to the development of a sustainable production strategy at the farm level, leading to an overall impact at landscape level. A combination of livelihood options could also contribute to the recovery and maintenance of water and soils, ecosystem services and the reduction in particular of small-scale deforestation. Cocoa and nature-based tourism are value chains most likely to promote greater participation by women and young people.

In terms of regional suitability of livelihood options, this not only depends on the biophysical conditions and the type of stakeholders, but also on issues such as labour availability, cultural issues, infrastructure, and accessibility. The report highlights specific issues for each value chain.

Interventions focused on the production of cocoa, acai berry, cacay, SFM and nature-based tourism have the strongest potential to deliver value for money (VfM). All of these depend on leaving the forest in place, thereby helping to reduce deforestation on a small scale. Interventions aiming to develop value chains in a sustainable manner can also in by provide ecosystem services and bring value-added processes (income, infrastructure development and capacity building) to the regions and families involved. Cocoa and acai also contribute to food security of local families including Indigenous peoples and Afro-Colombian groups.

A common barrier across value chains is to promote collective solutions to problems. Interviewees suggested that this could happen through groups of individual producers or companies participating in common production or marketing efforts, thereby increasing their negotiating power and accessing markets in ways that they could not be expected to achieve on their own. This could also lead to stronger environmental results, to the extent that collective participation helps to promote good agroecological practices, avoid small scale deforestation and maintain existing forest.

There are many existing programmes, projects, partnerships, and organisations, supported mostly by development cooperation agencies with the potential to extend or modify their current work plans and link with TEFOS interventions. The Autonomous Regional Corporations (CARs) in their role as environmental authorities are key protagonists for sustainable livelihood options in Colombia as project partners, as well as the ministries of environment (MADS), agriculture (MADR), commerce, industry, and tourism (MINCIT), national parks agency (PNNC) and other state agencies, as well as regional and local governments in target areas.

Main Discussion Points

The review allowed for an analysis of the strength of the evidence found for each of the proposed livelihood option with different results in each case, depending on the existing practical experiences, the available information, and its quality. The cocoa and sustainable livestock value chains have the strongest evidence in terms of the volume and robustness of the available information, plus the strengths of both value chains regarding field implementation, the attractiveness for private investors to mobilise finance, and the profitability of investments (VfM). The other value chains have less complete evidence but nevertheless enough for their consideration as viable options with potential for successful interventions in TEFOS target areas.

Each identified livelihood option has its own unique characteristics, and from the existing evidence base, it cannot be assured which one will provide the best opportunities. The combination of different value chains at landscape and farm level, will possibly enable the diversification of products and income sources, minimising impacts related to seasonality and market issues.

The discussion section addresses the potential of the different livelihoods options, economy and market considerations, livelihoods options for different stakeholders and territories including detailed information for TEFOS municipalities, Value for Money (VFM) and additionality, potential negative effects of the interventions, enabling conditions, and opportunities, barriers, and key success factors for the adoption of alternative livelihoods for each value chain analysed. This section ends with an analysis of the complementarity with existing initiatives that could partner and/or complement TEFOS interventions.

Main Conclusions

Livelihoods options and the relation with agents of deforestation

- There are many sustainable livelihood options, each suitable for specific stakeholder groups, biophysical and geographic conditions. A combination of livelihood options could be used to engage different stakeholder groups, minimise risk, and promote positive complementary impacts at landscape and farm levels.
- While the identified sustainable livelihood options should have positive environmental outcomes, many do not automatically guarantee the conservation of forests, biodiversity, and provision of ecosystem services. Initiatives to combine livelihood practices with forest conservation and restoration commitments should therefore be incorporated into programming at farm and landscape levels.

Enabling Conditions

- The promotion of a local development approach allowing multiple local stakeholders to be part of a process that enables collaboration and partnerships among producers, traders' associations and other private parties is important to enable the successful take-up and sustainability of livelihood options.
- Providing small producers with means of production is crucial to encourage engagement in ways which accord with their needs. This should be achieved by aiming to avoid negative impacts related to the production of a single product, such as lack of market access and damage to production due to climate events, among others.

Public policies and complementariness with existing initiatives

- Most of the potential activities that TEFOS could support to promote sustainable livelihoods are already being undertaken by other stakeholders. However, in most cases these are undertaken at a small scale (plot or farm level) or by focusing on specific links in value chains. There is often a lack of a coherent, collaborative approach for implementation at scale or one that is aligned with overall sustainable development and forest conservation policies.
- The extent to which livelihood interventions are currently supported in TEFOS target areas varies. Cocoa, sustainable forest management and tourism are supported by many initiatives whilst there are fewer initiatives for cacay, acai, sacha inchi and rubber. In addition, Meta, Guaviare, and Caquetá receive the majority of attention from international donors as well as from national development agencies. Central Orinoquia, eastern and southern Amazon, on the other hand, receive less support and there is hardly any support in the Bajo Cauca and Urabá Antioqueño regions.

Main Recommendations

This Evidence Review includes specific recommendations for improvements to each value chain, as well as other general recommendations that aim to guide future TEFOS Pillar 3 activities. These are based on lessons learnt from past and current initiatives and views from key informant interviews.

Livelihoods options and relationships with agents of deforestation

- There is a complex relationship between the successful implementation of sustainable livelihood options and efforts to combat deforestation. TEFOS should carefully consider this complexity along with the overall environmental and socio-economic sustainability of the different options. This implies careful consideration of (combinations) of livelihood options in different areas in the areas in front of, at and behind the deforestation

front. On many occasions, livelihoods will need to be accompanied by additional incentives or commitments to conserve biodiversity or protect forests. This highlights the need for Pillar 3 interventions to be coordinated with TEFOS Pillars 1 and 2.

- Apart from promoting livelihood options based on their potential positive impact on deforestation and biodiversity conservation, it would be beneficial to define and pursue environmental benefits such as soil management, pollination, cultural values, and water management among others. There are several co-benefits that can be generated through livelihood options such as gender equity, women's and youth empowerment, social inclusion, Indigenous peoples rights and needs, food security and health issues.

Enabling conditions

- Creating and strengthening local technical capacities are key to implementing field activities in a sustainable way and improving local stakeholders administrative and managerial skills, along with local governance. Supporting local producer organisations, cooperatives, associations, and various stakeholders along the supply chain rather than just targeting individual farmers has been found to help promote greater technical and administrative capacities, promote additionality in relation to existing initiatives and help ensure impact at scale.
- The promotion of a common understanding between local public and private stakeholders can help to stimulate locally owned development plans, based on local resources and competitive advantages.

Public policies and complementarity with existing initiatives

- Considering the unequal geographic distribution of current cooperation initiatives, targeting underrepresented livelihood options and value chains in regions that have received less support such as the coastal area, Arauca, Guaínia and Putumayo would enable the development of sustainable livelihood options at scale and across TEFOS municipalities. There are, however, logistical and strategic challenges with running initiatives in these areas which would need to be addressed.
- TEFOS could align with and complement PDET roadmaps for development planning, promoting sustainable production, forest restoration and conservation activities and local initiatives, especially in remote areas where there are few international donor projects.

Structure of the report

The rest of this report is structured as follows:

- Sections 1 and 2 provide an overview of study aims and the methodology.
- Sections 3 outlines some of the key aspects of the social and political context impacting on the options for promoting livelihoods.
- Section 4 reviews 9 separate value chains, defining the relevant products, markets, environmental and social benefits, potential to develop markets and generate income, the barriers to supporting their development at scale, knowledge gaps, existing interventions in the field and recommendations for the TEFOS programme.
- Section 5 discusses a range of issues across all of the value chains, including the quality of evidence, their overall potential, economy and market considerations, how different options might support different stakeholder groups, value for money and additionality, potential negative effects, and complementarity with existing interventions.
- Sections 6 and 7 draw conclusions and make general recommendations for other livelihoods initiatives in Colombia and elsewhere.
- The annexes provide the terms of reference for the study, references, a summary of key informant interviews, the diagram for the TEFOS theory of change and a list of coffee growers associations.

1. Introduction

TEFOS is a six-year programme that seeks to contribute to stabilising and reducing deforestation rates in conflict-affected areas in Colombia. TEFOS has three primary pillars of work: 1) to strengthen land registry systems to incentivise sustainable land management; 2) to strengthen the criminal justice system to tackle environmental crime in deforestation hotspots; and 3) to create and promote innovative, sustainable economic opportunities for communities. Pillars 1 and 2 are currently operational. [1] Pillar 3 (creating and promoting innovative, sustainable economic opportunities in TEFOS' target areas) is expected to be operationalised in 2023 and £9.9m has been earmarked for its implementation.

The overall purpose of the Evidence Review is to inform UK Government's International Climate Finance (ICF) appraisal process for Pillar 3, by producing a systematic evidence assessment of sustainable livelihood options and the opportunities and challenges of implementing these in pilot areas alongside ongoing interventions.

1 Pillar 1 is implemented by the World Bank and Pillar 2 is implemented by UNODC, with funding agreements signed in August 2020 and February 2021, respectively.

The review considered a range of forest and land use activities delivered by UK ICF programmes and other donors, as well as other relevant funds delivered by government (national and regional) agencies, research institutions and Non-Governmental Organisations (NGOs) across Colombia.

2. Methodology

The Evidence Review was undertaken as a Rapid Evidence Assessment complemented with Key Informant Interviews (KIIs) and a field validation exercise. The methodology for this task is presented in the Evidence Review Protocol which can be found in Annex 1 of this report. The availability of relevant peer-reviewed papers was limited compared to the amount of grey literature and in practice less information than planned was obtained through published work. The Evidence Review relied heavily on project reports, KIIs and observations during field validation, according to the following methodology:

Document review: Livelihood options were identified through a secondary review of existing interventions supported by different agencies; this was complemented with academic literature, aiming to identify and describe potential sustainable land use alternatives. After the initial assessment of all available literature, more than one hundred documents were considered relevant, based on the Evidence Review Protocol criteria, and were reviewed in detail. These documents included published peer-reviewed articles, grey literature, policy documents, and evaluation reports from similar programmes. The full list of references is presented in Annex 2.

The literature included in the review was selected based on the following criteria:

- Time period: study or experience undertaken within last 15 years.
- Intervention objective: promotion of sustainable livelihoods to generate a sustainable increase in income for a broad target population and/or providing alternative sources of income for populations involved in activities related to deforestation.
- Intervention location: rural or semi-rural area in Colombia or in other countries in tropical Latin America.
- Target population: rural or semi-rural populations, Indigenous peoples, Afro-Colombian communities and other ethnic minorities in Colombia.
- Nature and scale of impact: the nature of the impact must be at least partly described in quantitative terms; impacts identified should provide

potential benefits for substantial numbers of people, rather than just neighbourhood-level effects (unless these could be replicated across many areas).

- Research type/methods: peer-reviewed and non-peer reviewed research, including policy studies, technical reports, academic articles, papers presented at conferences and evaluation reports.

Key informant interviews: The document review was complemented with semi-structured KIIs with 84 key stakeholders at national and local level. KIIs included delivery partners of TEFOS, the UK embassy team, the BEIS programme team, stakeholders in other international cooperation initiatives, Indigenous peoples and Afro-Colombian leaders[2], national and local governmental institutions, and the wider donor community. An initial list of key stakeholders was identified in the Evidence Review Protocol. Additional informants were added based on the literature review, references from key stakeholders or other interventions identified during field visits. KIIs enabled the study team to gather further information (including reports and data) and gather insights about other ongoing initiatives, their successes and how TEFOS could complement or up-scale these.

Annex 3 contains the details of the different stakeholder groups interviewed. while the KII guiding questions are presented in Annex 1 (Appendix 2 of Annex 1).

Field validation: After the initial secondary evidence analysis was completed, the team made four field validation trips to corroborate and test emerging findings with a non-representative sample of prospective beneficiary communities, including local field practitioners in a sample of the 20 municipalities and 2 national parks targeted by the TEFOS programme. Field visits enabled the team to validate the feasibility and applicability of sustainable alternatives, and to hear first-hand accounts of beneficiaries' perceptions and experiences. The consultancy team gathered information via field observations, KIIs and meetings with key stakeholders including local producers, private initiatives, and local institutions.

Due to different practical reasons (public order, distance, ongoing internal Free, Prior and Informed Consent - FPIC - process), field visits to some of TEFOS municipalities including national parks and meetings with Indigenous peoples at target areas were not possible. Instead, the study team visited additional municipalities with similar conditions, meeting with several local communities and leaders in the different municipalities visited and with members of the Inga Indigenous peoples in Mocoa, Putumayo. Internal processes at the PNNC

[2] The Organisation of Indigenous peoples of the Colombian Amazon-region (OPIAC) gender and family leader was interviewed.

(Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales, UAESPNN) were another factor that limited visits to national parks and other protected areas. Table 1 lists the departments and municipalities the study team visited; the municipalities in italics correspond to the TEFOS (Pillar 1) municipalities; the others are neighbouring municipalities with similar conditions to TEFOS municipalities.

Table 1: Departments and municipalities visited within TEFOS landscapes (TEFOS municipalities in italics).

Landscape	Departments	Municipalities
Western Amazon/Andes-Amazon-Orinoquia transition	Caquetá	Albania, Florencia, Montañita and San Vicente del Caguán
Western Amazon/Andes-Amazon-Orinoquia transition	Meta	Cumaral, Mesetas, Restrepo, San Martín, Villagarzón and Villavicencio
Central Amazon	Guaviare	San José de Guaviare
South Amazon	Putumayo	Mocoa, Villagarzón and Puerto Guzmán

Source: Compiled by authors.

The information gathered through the literature review, the KIIs and the field visits enabled the study team to identify the most viable sustainable livelihoods options including ongoing initiatives in TEFOS target areas that could be extended under TEFOS Pillar 3.

The main methodological limitations were difficulties visiting all TEFOS target areas as planned and being unable to interview Indigenous peoples and Afro-Colombian stakeholders in those areas. These were mitigated through the review of additional documentation, substitute KIIs with Indigenous peoples and Afro-Colombian leaders, and the triangulation and validation of information from other sources by the study team expert. However, some biases in the information reviewed and the focus of the study team may still be present.

3.Key political and socio-economic considerations

The 2016 Peace Agreement between the Colombian Government and the Revolutionary Armed Forces of Colombia (Fuerzas Armadas Revolucionarias de Colombia, FARC) ended a five-decade-long civil war. However, the Peace Agreement has not put an end to conflict entirely. Most TEFOS departments and municipalities still face violence, poverty, illicit economies, and institutional weaknesses that hinder local development and economic growth.

Conflict and violence continue, fuelled by drug trafficking and competition among a complex constellation of actors, including the left-wing guerrilla (Ejercito de Liberación Nacional, ELN) that is not part of the Peace Agreement, FARC dissident groups and former paramilitary right-wing groups. Instability in Venezuela, with whom Colombia shares a porous border, further complicates the forecast. In the last couple of years, escalating violence, including massacres and murder of social and environmental leaders or activists, has resulted in an increasing number of internally displaced persons. The reorganisation of drug-trafficking operations, land grabbing and illegal mining within a changing landscape of illegal actors and environmental degradation have added new challenges to achieving durable peace. The marked deterioration in socio-economic conditions brought about by the COVID-19 pandemic further stoked social discontent and unrest, leading to increased political polarisation and diminished trust in government (IISS, 2022).

Presidential elections, taking place in May 2022, may complicate the political situation. Colombia's Peace and Reconciliation Foundation has reported 163 victims of electoral violence since March 2021 (Insightcrime, 2022). This equates to one government official, political candidate, pre-candidate, or political activist being killed, attacked, or threatened every two days. Some of these incidents are likely perpetrated by organised criminal groups. Arauca, Bajo Cauca in Antioquia, and Putumayo reported dynamics related to crime, which are likely to intensify in the run-up to elections.

One of the few projects the government has been implementing following the Peace Agreement is the Territorially Focused Development Programme (Programa de Desarrollo con Enfasis Territorial, PDET) (Bravo, 2021). PDET is a fifteen-year planning and management instrument that aims to strengthen community organisations, achieve rural development, and prevent violence recurring in regions affected by violence (ART, 2021). As outlined in Table 2 below the PDET programme operates across 20 of the TEFOS target municipalities.

The PDET programme includes 16 sub-regions, and 170 municipalities in 19 departments. Around 57% of the PDET municipalities host rural populations experiencing multidimensional poverty. PDET has its own roadmap with several governmental instruments and financial mechanisms to support PDET territories and regional and local institutions. Support from international cooperation initiatives to PDET territories and municipalities complement governmental support (ART, 2021).

Table 2. TEFOS municipalities classified as PDET and non-PDET.

PDET			**Non PDET**		
No.	**Departments**	**Municipalities**	**No.**	**Departments**	**Municipalities**
1	Antioquia	Carepa*	21	Antioquia	El Bagre
2	Antioquia	Chigorodó*	22	Antioquia	Segovia
3	Antioquia	Mutatá*	23	Antioquia	Zaragoza
4	Arauca	Tame	24	Antioquia	Peque*
5	Caquetá	Cartagena del Chairá***	25	Antioquia	Ituango*
6	Caquetá	Puerto Rico	26	Córdoba	Montelíbano*
7	Caquetá	San Vicente del Caguán***	27	Córdoba	San José de Ure*
8	Caquetá	Solano***	28	Córdoba	Tierralta*
9	Guaviare	Calamar***	29	Guaínia	(ANM) Morichal **
10	Guaviare	El Retorno	30	Guaínia	(ANM) Pana Pana **
11	Guaviare	Miraflores***	31	Guaínia	(ANM) Puerto Colombia **
12	Guaviare	San José del Guaviare***	32	Guaínia	Inírida
13	Meta	La Macarena			
14	Meta	Mapiripán			
15	Meta	Mesetas			
16	Meta	Puerto Concordia			
17	Meta	Uribe			
18	Meta	Vistahermosa			
19	Putumayo	Puerto Guzmán			

20	Putumayo	Puerto Leguízamo			

*Areas where cadastre will be updated only in National Parks jurisdiction.

** Areas not defined as municipalities (área no municipalizada).

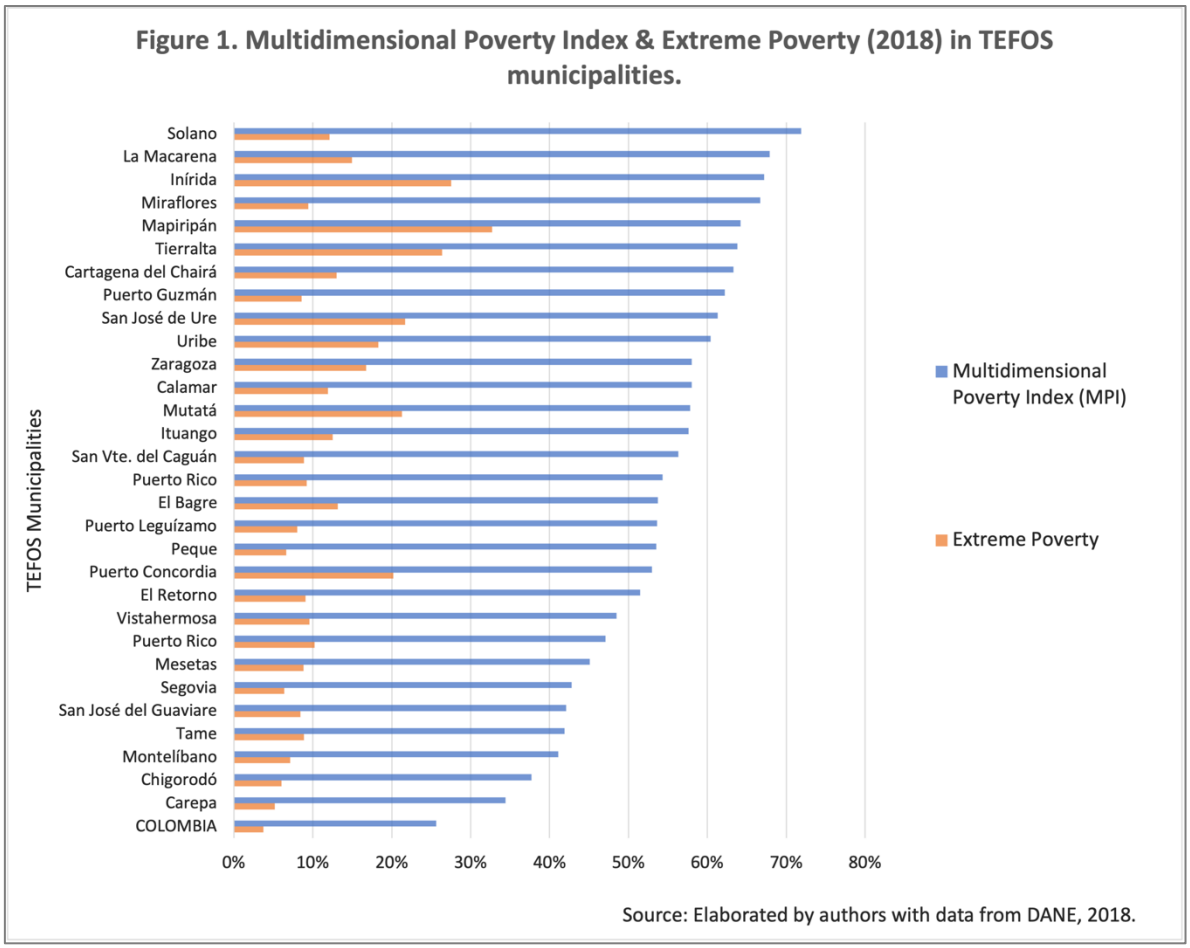
*** TEFOS will cover the cadastre outside Chiribiquete National Park.

Source: Compiled by authors with data from ART, 2021.

Taken together, two indicators provide an overview of the current socio-economic situation in TEFOS target municipalities: the Multidimensional Poverty Index (MPI) and the data on Extreme Poverty. The MPI is one of the indicators used by the Agency for Territorial Renewal (ART) to monitor PDET the development of municipalities and territories[3]. The MPI assesses broader social and health aspects of poverty in five dimensions: i) Household education, ii) Childhood and youth, iii) Labour, iv) Health and v) Access to household utilities and living conditions. The Extreme Poverty data classifies households with two or more indicators of unsatisfied basic needs as extremely poor (misery condition) [4] (DANE, 2022). Figure 1 illustrates the MPI and the Extreme Poverty data in TEFOS municipalities in 2018, comparing TEFOS target areas with the Colombian national average.

[3] The multidimensional poverty index is compiled from a regular Quality of Life Survey (Encuesta Nacional de Calidad de Vida, ENCV) carried out by DANE.

[4] The Unsatisfied Basic Needs methodology seeks to determine, with the help of a few simple indicators, whether the basic needs of the population are met. The indicators selected are: i) Inadequate housing, ii) Households with inadequate services (drinking water, sanitation), iii) Critically overcrowded housing, iv) Households with school-age children not attending school, and v) Households with high economic dependency (DANE, 2022).



Alt text for Figure 1:

Bar chart showing multidimensional poverty index (MPI) and extreme poverty (2018) in TEFOS municipalities. Three TEFOS municipalities with highest MPI: Solano (71%), La Macarena (68%), Inirida (67%). Three TEFOS municipalities with the highest extreme poverty: Mapiripan (32%), Inirida (28%), Tierralta (26%).

All TEFOS target areas have a MPI higher than 33%. This means that all households in TEFOS municipalities are considered poor with multiple unsatisfied needs. A portion of the population is simultaneously multidimensionally poor and income-poor, which is a condition of double vulnerability that requires a greater effort with comprehensive and intensive interventions and policies. For example, the municipalities of Puerto Concordia and Mapiripan (Meta); Mutatá (Antioquía); San José de Ure and Tierralta (Córdoba); and Inírida (Guainía) are all TEFOS targeted areas that are multidimensionally poor and income-poor and therefore require special attention.

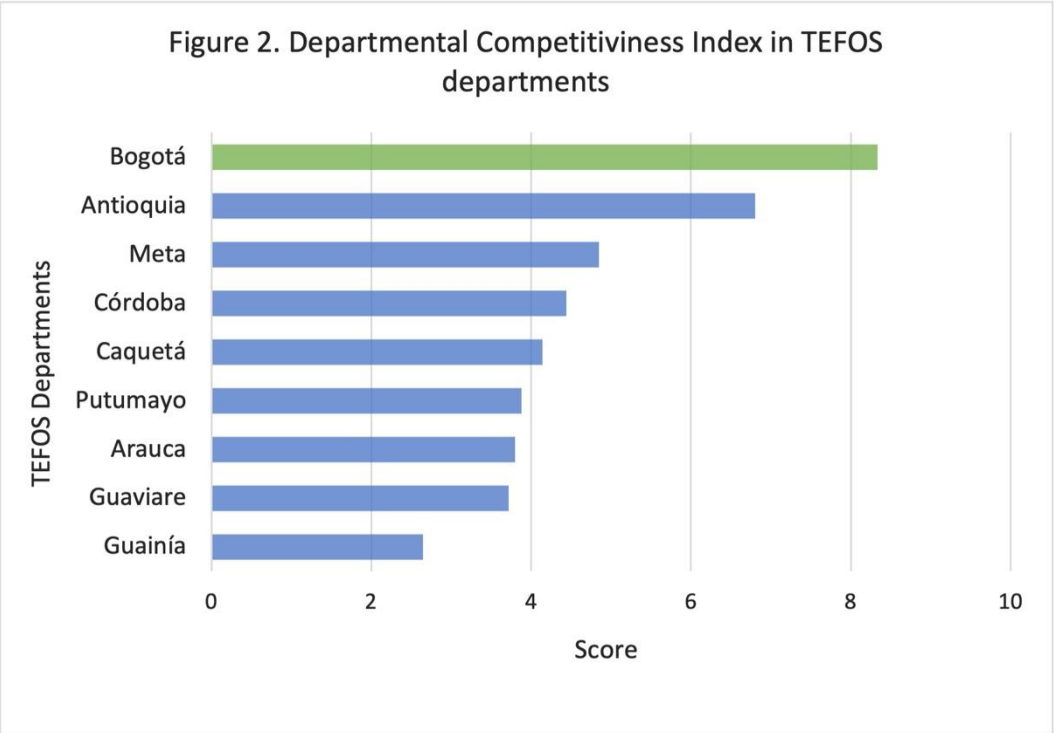
The Monetary Poverty Index is another indicator that assess the socio-economic situation of the Colombian population. When a person does not have enough resources to guarantee a basic 2,100 calories a day diet, they are considered to be under the monetary poverty line. The national per capita monetary poverty line in 2021 was COP$ 354,031 per person per month (around US$ 88/person/month). The national per capita extreme monetary poverty line in 2021 was COP$ 161,099 per person per month (around US$ 40/person/month) (DANE, 2022). While this indicator is only calculated for some departments[5], available data for TEFOS departments is displayed in Table 3.

Another socioeconomic indicator is the Departmental Competitiveness Index[6] 2021 that assesses the microeconomic and macroeconomic foundations of departmental competitiveness, defined as the set of institutions, policies and factors that influence productivity. The index is made up of 13 pillars that address four factors: i) Enabling conditions, ii) Human capital, iii) Market efficiency, and iv) Sophistication and Innovation (Universidad del Rosario, 2021). Figure 2 shows the Departmental Competitiveness Index 2021 for TEFOS departments including the index for Bogotá as comparative benchmarking.

Figure 2 shows that Antioquia has a high Departmental Competitiveness Index, comparable with that of Bogotá. Here, it should be noted that the Department of Antioquia has 125 municipalities, some of which have strong economies, such as Antioquia's capital Medellín. While Antioquia has high average Departmental Competitiveness Index scores, these averages are not representative of TEFOS municipalities in that department. For all other TEFOS departments, the index provides an overview of the broader context. This could facilitate or impede successful livelihoods interventions that go beyond agricultural production, considering the different links of the value chains that include transformational process, marketing, and sales.

5 In the case of Antioquia and Meta, the departmental Monetary Poverty Index does not represent the poverty conditions of TEFOS municipalities in such departments, since their departmental capitals and some municipalities have very good socio-economic indicators that influence the departmental average data.

6 The 2021 Departmental Competitiveness Index is the result of the adaptation and technological update of the Global Competitiveness Index (GCI) of the World Economic Forum (WEF), applied to the context of the territorial competitiveness of the departments of Colombia.



Alt text for Figure 2:

Bar Chart Departmental Competitiveness Index in TEFOS Departments. Highest Departmental Competitiveness Index scores in the following departments: Bogota (8.5), Antioquia (6.8), Meta (5)

A more granular analysis of the Departmental Competitiveness Index provides valuable information for decision-making. Figure 3 below, summarises the five pillars that facilitate successful livelihoods interventions in TEFOS target municipalities. This analysis suggests that information and communication technology, the business environment, and innovation and business dynamics are necessary conditions to help producer associations, start-ups, and businesses to thrive across all TEFOS municipalities. Despite its significant value, the index does not measure income distribution or redistribution. Instead, it assumes that increased competitiveness and economic growth translate into better socio-economic conditions, without considering other factors.

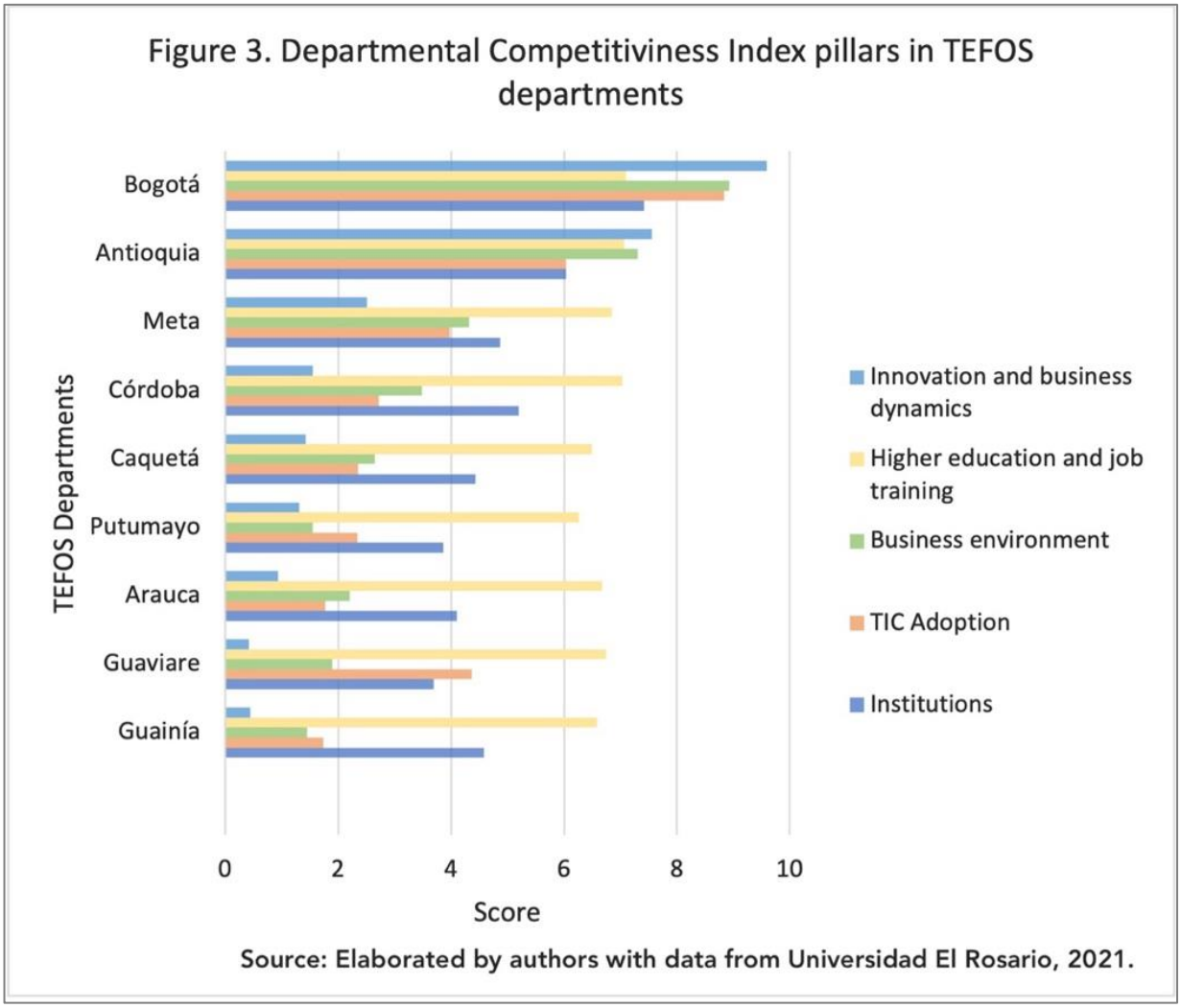
Table 3. Monetary Poverty Index and Extreme Monetary Poverty Index (2019-2020-2021) in some TEFOS departments.

Department	Monetary Poverty Index		Extreme Monetary Poverty Index	
	2019	2021	2020	2021
Antioquia *	29,30%	29,80%	10,03%	7,03%

Caquetá	48,80%	44,80%	13,06%	9,20%
Córdoba	54,20%	58,60%	21,20%	22,10%
Meta *	32,70%	33,80%	15,40	9,30
COLOMBIA (national average)	35,70%	39,30%	15,10	12,20

* In the case of Antioquia and Meta, the departmental Monetary Poverty Index does not represent the poverty conditions of TEFOS municipalities since their departmental capitals and some municipalities have very good socio-economic indicators that influence the departmental average.

Source: Compiled by authors with data from DANE, 2022.



Alt text for Figure 3: Bar Chart Departmental Competitiveness Index by pillars in TEFOS Departments: Innovation and business dynamics, Higher education and job training, Business environment, TIC adoption, Institutions.

TEFOS theory of change

The Evidence Review aligns with the programme-level theory of change (ToC) of TEFOS, which can be found in Annex 4 of this report. The programme's theory of change assumes that the promotion of alternative livelihoods will help reduce the force of one of the main drivers of deforestation. During this Evidence Review, the validity of this assumption was evaluated. Most deforestation occurs at the "deforestation frontier" or "frontera agrícola" where forest is illegally cleared, by emerging groups of settlers. This is largely promoted by external agents/financiers and possibly facilitated by those with local political and economic interests[7]. This model of deforestation occurs in areas where land tenure is informal. Most of the time, forestland is cleared and replaced by extensive cattle grazing, rather than being carefully managed, because it generates quick profits and is sometimes used as a means of laundering money[8]. TEFOS's work on sustainable livelihoods is crucially supported by the other pillars of the programme. TEFOS's plan to tackle deforestation holistically – by providing opportunities for sustainable livelihoods at the same time as establishing the rule of law and strengthening tenure rights is key to changing behaviour and transformation in these territories.

4. Most promising types of sustainable livelihood interventions

The Evidence Review identified nine value chains, that have a high potential to be considered in TEFOS. The following criteria were considered in selecting livelihood options included in these value chains:

- currently applied in TEFOS municipalities or with potential to be applied (according to biophysical and socioeconomical conditions);
- sustainability (environmentally positive, economically profitable, socially inclusive);
- potential to reduce deforestation and/or support landscape restoration[9];
- adequate level of information available;

7 For further information see: https://360-grados.co/investigaciones/64-la-deforestacion-tras-la-carne-que-comemos-en-bogota ; https://www.semana.com/nacion/articulo/quien-gobierna-en-la-amazonia-por-rodrigo-botero/585256/

8 See, for instance, Ganadero José Bayron Piedrahita es condenado por lavar dinero del narcotráfico | EL ESPECTADOR

9 As a condition to work on the promotion of sustainable livelihoods options, some organisations and public agencies establish Zero Deforestation Agreements with local stakeholders/beneficiaries. These agreements promote livelihood options at the same time that they conserve forests and stop deforestation (Bruner et al., 2020).

- practical experience in Colombia, preferably in post-conflict zones;
- promising domestic and international market development;
- potential to generate family income, food security, jobs, health; and
- potential to generate high Value for Money (VfM).

A relatively complete set of evidence was gathered for i) Sustainable livestock farming, ii) Asaí (Euterpe oleracea & E. precatoria), iii) Cocoa (Theobroma cacao), iv) Nature-based tourism, v) Sustainable forest management, vi) Rubber (Hevea brasiliensis), vii) Sacha inchi (Plukenetia volubilis) oil, viii) Cacay (Caryodendron orinocense) oil, and ix) Coffee (Coffea arabica L.). In addition to these nine, a group of three options was identified (heart of palm, aquaculture, and balsa tree (Ochroma pyramidale)) for which there is insufficient information available about its effectiveness or little experience of implementation in Colombia.

Each livelihood intervention or value chain presented in the remainder of this report has a significant amount of evidence (at least 10 documents) and there was a common agreement among interviewees that all are viable options. The evidence base suggest that these might be promising options that require further field research.

The Evidence Review does not suggest any order or priority among different options. While there are options that are implemented at a larger scale or represent a larger market, each option has its own opportunities and challenges. Therefore, in this report the livelihood options/value chains are presented in alphabetical order and a comparative analysis of potential and challenges for implementation is presented in the discussion section. For each proposed value chain, the following is provided:

- a description of the nature and scale of production and markets
- opportunities and constraints including barriers and a brief analysis of the strength of evidence for each value chain
- existing interventions

The information presented for some value chains is robust and extensive, while for others there is minimal or low-quality evidence and further research is required.

Acai Berry

1. Overview of the nature and scale of production and markets

Description

The collection of acai berries or naidi[10] has become a supplementary source of income for many small-holders and Indigenous families in Colombia. It is a non-timber forest product (NTFP) that grows in a palm tree (Euterpe precatoria Mart.) located in forests of the Amazon and Colombian Pacific regions. It is found in flood plains, alluvial areas, and deforested areas in a natural regeneration process sometimes within family farms.

In the Department of Caquetá, the collection of acai berries is performed mainly by small-holder harvesters who sign agreements with the owners of the land to extract the fruits. Small agro-industries promote and accompany this process by providing training, techniques, and tools for the harvest of the fruit (García et al., 2018a).

In Guaviare, fruit harvest and post-harvest activities are carried out by three groups of actors: i) small-holders associated to Asoprocegua[11] who carry out the activity directly or through fruit collectors; ii) groups of non-associated fruit collectors, usually hired by Asoprocegua, and iii) members of the Nukak Makú, Guayaberos, and Tucanos Indigenous communities, who, due to their greater experience and agility in these activities, have become the main group of collectors (García et al., 2018b).

Recently, acai has also been planted in agroforestry systems in deforested areas in Putumayo using the species Euterpe oleracea[12] with a higher production yield, mixed with chontaduro palms (Bactris gasipaes), timber trees and plantain (Naturamazonas, n.d.). Harvesting in these plots has not yet started.

Markets

Due to the informality of their exploitation, there is no data on production areas or volumes of Acai (García et al., 2018b; Naturamazonas, n.d.). Regarding food security, it is estimated that between 970 and 1,450 tons of fruit are produced

10 Name used in the Colombian Pacific.
11 Association of agriculture and livestock producers for the economic change of Guaviare (Asoprocegua). Its partners are engaged in the stockbreeding activity and the commercialisation of acai berry and other NTFPs on a smaller scale.
12 Euterpe oleracea is the acai berry species used in the Brazilian and Bolivian plantations. It is characterized by its production of several stems that produce an average of 120 kg of fruits per plant, while E. precatoria produces a single stem and an average of 5.7 kg of fruit per plant (Lorini, 2017).

per year for self-consumption in the Amazonian Trapeze, the southernmost portion of the Amazon department (Aranguren et al., 2014).

Research and knowledge on the therapeutic and health benefits associated with the consumption of acai berry have led to an increasing demand of the product in international markets at an annual growth rate of 14% (P4F, 2022). The consumption of foods that use acai berry pulp or lyophilised powder has increased significantly in the domestic market. There is also an increasing demand for superfoods. According to the evidence, large companies like Corpocampo invested in acai plantations, as well as private stakeholders in Brazil and Bolivia, to supply the growing demand.

Brazil is the largest producer and exporter of acai berry in the world. In Brazil, the chain has focused on the development and commercialisation of the E. oleracea. It is estimated that about 1.2 million tons of fruit were produced in 2015, roughly 143% growth when compared to 2005 (Bentes et al., 2017; cited by García et al., 2018b). Most of the fruit is obtained from plantations that extend along 135,695 hectares of land, producing 1.01 million tons of fruit, with an average yield of 7.46 tons/ha. The remaining volume comes from extractive systems (Bentes et al., 2017; cited by García et al., 2018b; Hegger, 2020).

In recent years, Bolivia also started to participate in the world market, with the commercialisation of lyophilised acai berry by two companies established in Santa Cruz, which export the product to Colombia[13], New Zealand, Germany, Brazil, and Slovenia, among others (Lorini, 2017).

2. Opportunities and constraints

Environmental and social benefits

A perennial palm tree can increase canopy cover and limit soil degradation, erosion, and sedimentation, as well as improve soil health, while also supporting biodiversity conservation and maintaining ecological integrity at the landscape level (GCF, 2021). The development of the acai berry value chain gives value to the standing forest, which helps to reduce deforestation on a small scale, consolidate forest areas and generate ecosystem services. The commercialisation of the fruit can become a source of supplementary income for small-holder families and Indigenous communities associated with the forest.

Potential for income generation, market development and value for money

The growing demand for acai in the national and international markets, linked with its high nutritional value and nutraceutical properties, is a phenomenon that

13 The importation of acai from Bolivia is a sign that the national production is not enough for the domestic market.

deserves attention since it entails an important opportunity for local organisations, private companies, and start-ups.

In Guaviare, the main actor in the value chain is Asoprocegua, which reported an increase in the commercialisation of acai berry, from 9 tons in 2014 to 80 tons in 2017 (García et al., 2018b). Table 4 contains data associated with the links of the Guaviare acai berry value chain, the participating actors, and the prices of the different products.

The domestic market offers some products that use acai berry as a raw material, the prices of which show the added value associated with the transformation process. For example, the lyophilised acai berry produced by CorpoCampo has a retail price of COP$ 500 per gram of acai berry[14], while acai berry infusions produced by Selvática have an approximate price of COP$ 600 per gram of dry acai berry mixed with other plants[15].

Table 4. Data associated with the acai berry value chain in the Department of Guaviare during 2017.

Product	**Value Chain Link**	**Actors**		**Price***
		Supply	**Demand**	**COP$/Kg**
Freshly picked fruit **	Harvest & post-harvest	Asoprocegua partners, Indigenous communities and non-associated collectors	Asoprocegua	800 to 1,000
Clean and frozen fruit	Fresh fruit commercialisation	Asoprocegua	BioGuaviare (company associated with Asoprocegua)	1,400
Pulp	Primary transformation into pulp	BioGuaviare (company associated with Asoprocegua)	Restaurants, ice cream parlours, and others (located outside the department)	8,500 to 9,500

14 https://www.amapuri.com/category-product/acai/lyophilized/
15 https://ekilibrio.com.co/producto/infusion-de-acai-x12-unds/?v=42983b05e2f2

* There is no cost data to quantify the profits received at each link of the chain.

** CorpoCampo pays collectors COP$ 1,000/kg.

Source: Compiled by authors with data from García et al., 2018b.

Barriers for implementation (at scale)

The main barriers involved in the production and marketing of acai berry include (Castro et al., 2015; García et al., 2018a; García et al., 2018b):

- High extraction, handling and transport costs of fresh fruit because it is highly perishable, and the extraction sites are often far away from roads and collection centres.
- Lack of an adequate infrastructure for the transportation of fresh fruit and pulp to the distribution, processing, or commercialisation sites since it must be frozen in both cases.
- Similarly, lack of infrastructure to produce pulp, which generates added value to the fruit.
- Need for strengthening the entrepreneurial and commercial capacities of local producer organisations.
- Little information on the supply of fruit, which needs to be used as an input for decision-making in relation to potential sales.
- Lack of an equal distribution of benefits between producers that carry out fruit extraction or other processes in the value chain.
- Lack of access to technologies and trained personnel for the development of final products with added value, to ensure that the generation of value remains within the region.
- Overlapping regulations and insecurity of land rights for settlers in Indigenous reserve areas.
- Competition of large-scale and cheaper cultivation of the fruit in Brazil and Bolivia (Hegger, 2020; Lorini, 2017).

Knowledge gaps

Despite the increasing demand for acai in domestic and international markets, there is little evidence on the strength of market demand, and its attractiveness for private investors to mobilise finance for this value chain. There is also a lack of data on costs associated with this value chain, information is available on prices for Guaviare, that would provide evidence on the profitability of investments (VfM) and its impact as an additional economic income source for local families.

3. Overview of existing interventions[16]

Initiatives supported by development cooperation agencies, NGOs and universities

Several national and international organisations support and strengthen producers' associations and start-ups linked with the acai berry value chain in the Colombian departments of Guaviare, Caquetá and Putumayo[17], as well as in the Pacific region. These interventions integrate activities such as: i) good practices for handling and collecting the fruit, including palm management plans; ii) infrastructure adaptations for improving fruit harvest, stocking, and transformation processes; and iii) support for acquiring permits required for the exploitation, handling, and preparation of foods that use acai berry (García et al., 2018b).

To date, interventions are mainly implemented by public institutions, NGOs, and international cooperation organisations such as USAID, FAO and GIZ who provide resources to strengthen the acai berry production chain (García et al., 2018b). In the Colombian Pacific, the UK and USAID have been the main promoters of these value chains: the UK funded the Partnership for Forest (P4F) initiative, while USAID funded the Paisajes Conectados (completed) and Páramos y Bosques (ongoing) projects.

Private sector initiatives

CorpoCampo is the biggest private company working in the acai berry value chain. CorpoCampo provides technical assistance to berry collectors in Putumayo, including small-holder, Afro-Colombian and Indigenous families. Aiming to respond to growing demand, they planted acai in agroforestry systems. CorpoCampo has four pulp production points in Cauca, Nariño, Valle del Cauca, and Putumayo, generating 180 direct jobs for female heads of households, benefitting about 1,200 families. Around 90% of the sales of CorpoCampo are exported, generating an average of US$ 3 million per year, a small figure compared to other products managed by the company (García et al., 2018b).

AJE Group[18] is working with Corpocampo in the acai value chain to produce natural juices for the national and international market.

16 Focused on TEFOS target areas.
17 Interventions outside TEFOS scope have also been reported in the departments of Amazonas, Chocó, Cauca, and Nariño.
18 AJE is a Peruvian multinational beverage company with a presence in 23 countries in Latin America, Asia and Africa. It is the fourth largest company in terms of sales volume in the non-alcoholic beverage category. It's recognized for its commitment to sustainable development. For more information: https://www.ajegroup.com/sostenibilidad/revolucion-natural/

The other main stakeholder in the Amazon region is Asoprocegua, a non-profit organisation that comprises 178 families from the surroundings of San José del Guaviare. Recently, Visión Amazonia gave Asoprocegua a new collection and processing centre for acai berry and other NTFPs, located on the outskirts of San José del Guaviare that will enable Asoprocegua to process approximately 400 tons of fruit per year. As part of the engagement with Visión Amazonia, their members signed Conservation Agreements, committing to protect an area of 7,075 hectares (Visión Amazonia, 2020). Through these voluntary, non-binding agreements Asoprocegua commits to carry out forest conservation, agricultural border closure and non-deforestation actions, to reduce greenhouse gas emissions (Bruner et al., 2020).

In Caquetá, the start-up Productos de Asaí is focused on the artisanal and small-scale production and commercialisation of acai berry pulp, reporting production of less than 3 tons per year (García et al., 2018a).

The transformation and commercialisation of products based on acai berry pulp is mainly carried out by four private companies: Alsec, Selvática, Sierra Nevada and CorpoCampo. Acai berry pulp is used for direct consumption and as a raw material, either as pulp or as lyophilised powder (which preserves the properties of the fresh fruit) for various food products. It is also used as an ingredient in cosmetic and pharmaceutical products (Castro et al., 2015; Naturamazonas, n.d.).

The domestic market offers some products that use acai berry as a raw material, the prices of which show the added value associated with the transformation process. For example, the lyophilised acai berry produced by CorpoCampo has a retail price of COP$ 500 per gram of acai berry[19], while acai berry infusions produced by Selvática have an approximate price of COP$ 600 per gram of dry acai berry mixed with other plants[20].

4. Recommendations

Recommendations for TEFOS target areas

An exercise carried out by the Amazonian Scientific Research Institute, SINCHI. recommended providing continuous support to strengthen community organisations to guarantee their participation in the acai berry value chain (Castro, et al., 2015). Training and technology transfer are fundamental to enable community organisations to design and implement management plans that guarantee a sustainable production process.

19https://www.amapuri.com/category-product/acai/lyophilized/
20https://ekilibrio.com.co/producto/infusion-de-acai-x12-unds/?v=42983b05e2f2

In the Department of Guaviare, between 2017 and 2018, Visión Amazonia developed a sectoral strategy for the NTFP chain, with an agri-environmental and zero deforestation approach. As a result of this exercise, four intervention axes were proposed for the acai berry chain: i) regulations, licenses and management plans; ii) access to differentiated markets through more inclusive business models; iii) access to technologies; and iv) the role of institutions creating an enabling environment (García et al., 2018b). The study recommended to give greater attention to access of differentiated markets through more inclusive business models, and access to technologies.

Strengthening local institutions will also be crucial, since they create conditions for investment, economic interaction and trade, reducing the risk of social and political instability and conflict (Rodríguez-Pose, 2013). Table 5 presents recommendations to address the main barriers that limit the extension of the acai berry value chain within TEFOS target areas. Those recommendations have been developed based on the existing evidence base, key informants' interviews, field validation trips and the authors perspectives.

Table 5. Recommendations to address the main barriers that limit the acai berry value chain in TEFOS target areas

Main Barriers	Recommendations
High fruit extraction, handling and transport costs, since it is a highly perishable fruit, and the extraction sites often are far from the roads and collection centres.	Strengthen local producer organisations' technical, managerial, and business capacities (training). Strengthen community organisations to guarantee their participation in the acai berry value chain.
Lack of an adequate infrastructure for the transportation of frozen fresh fruit and pulp to the distribution, processing or commercialisation sites.	Provide access to technologies according to local stakeholders needs (they already know their needs) in terms of infrastructure and skills required to add value to their production. Strengthen local organisations/associations' technical, managerial and business capacities (training).
Lack of infrastructure for the production of pulp, which is an alternative for generating an added value to the fruit.	Provide access to technologies. Strengthen local organisations/associations' technical, managerial and business capacities (training).

Limited information on the supply of fruit, which is needed to support decision-making in relation to potential sales.	Training and technology transfer, formulation and application of management plans that guarantee a sustainable production process. Support regulations, licenses and management plans. Strengthen local organisations/associations' technical, managerial and business capacities (training). Consider the productive capacity of the palm at the time of harvesting the fruits, to maintain the health of the palm population.
Lack of an equal distribution of benefits between producers associated to carry out the fruit extraction or other processes of the value chain.	Strengthen local organisations/associations' technical, managerial, and business capacities (training). Strengthen community organisations to guarantee their participation in the acai berry value chain and prevent weakening of the social structure.
Lack of access to technologies and trained personnel for the development of final products with added value, to ensure that the generation of value remains within the region.	Provide access to technologies. Provide access to differentiated markets through more inclusive business models. Strengthen local organisations/associations' technical, managerial, and business capacities (training). Strengthen community organisations to guarantee their participation in the acai berry value chain.
Overlap of regulations and the titling of land of settlers in Indigenous reserve areas in Caquetá.	The role of institutions. Link with TEFOS pillar 1.
Brazil and Bolivia as competitors.	Provide access to differentiated national and international markets through more inclusive business models (differentiated markets will get a better price while Brazil and Bolivia usually target bulk or mass markets since they manage bigger amounts.) Strengthen local organisations/associations' technical, managerial and business capacities (training).

Source: Compiled by authors.

Cacay

1. Overview of the nature and scale of production and markets

Description

Cacay (Caryodendron orinocense) is a promising native species of the forests of the Colombian Amazon and Orinoquia regions, that has the potential to become a supplementary source of income for many small-holder and Indigenous families and in turn gives value to the standing forest. Currently, the cacay nuts are mostly harvested from wild trees, mainly in the departments of Meta, Vichada and Caquetá. Its nut is considered a “super food” due to its high nutritional value and intense flavour. Cacay nuts are currently mainly used in the cosmetics and food sectors (García et al., 2018).

Markets

The cacay value chain is controlled by two private companies: i) Kahai based in Villavicencio, and ii) Tacay Natural Oils, based in San Martín, both in the Department of Meta. These companies buy the wild fruits from small-holder and Indigenous families to transform them into oil and cosmetics for national and international markets. They are also marketing cacay cosmetics in the domestic market.

Kahai purchases the fruit from 200 small-holder and Indigenous families, while Tacay sources its supply from 400 families. The growth of the market for their products and the seasonally varied supply has led these companies to look for alternatives for the supply of cacay as a raw material, and to develop their own crops. Kahai reports that it has 650 hectares of plantations (Kahai, 2022), while Tacay has a plantation of 50 hectares (Tacay, 2022).

Kahai and Tacay companies and some small start-ups offer a market alternative for cacay fruits sourced from the three departments where it is found in high quantities, including conflict-affected areas. Both established companies reported similar amounts of sales. Kahai reported the export of three tons of cacay oil per year mainly to the United States and Europe (World Bank, 2018). Tacay produces approximately 3,000 litres of oil per year and considering the current demand, it plans to produce 40,000 litres in 2025, exporting almost all its production to European markets (Tacay, 2021). While there is no data on the demand side, anecdotal evidence from interviews suggests growing demand from international markets that the companies identified in the evidence documents cannot fulfil.

2. Opportunities and constraints

Environmental and social benefits

Cacay is a canopy tree and its conservation and planting (preferable in agroforestry systems but also as a monoculture) can be linked to forest conservation and productive restoration schemes. Small-holder and Indigenous families, who are aware of the cacay fruits' value, protect the tree and its surrounding forest, supporting the provision of ecosystems services. Cacay is relatively high-value per kilogram and the possibility of storing the fruits offers an advantage for farmers in remote areas (Fontanilla-Díaz et al., 2021).

The cultivation of cacay is considered a cost-effective alternative to substitute illicit crops and eradicate poverty (Fontanilla-Díaz et al., 2021). It provides a profitable livelihood to counteract the production of illegal crops in the Orinoquia and Amazon regions. The potential for obtaining a higher and more stable income can also incentivize farming communities to further protect the local environment (World Bank, 2019).

Potential for income generation, market development and VfM

Tacay pays COP$ 3,000 per kg of fruits placed at their facility. A mature tree produces an average of 250 kg per year and a maximum of 800 kg according to data provided by Tacay. People collect the fruits from trees on their own farms but also from trees located in open forest areas. To generate an income close to a minimum monthly wage, a person will need to harvest an average of 24 trees per year. Cacay tree fructifies only between December and February, and not all collected fruits meet the quality standard required for trade. The profitability of planted trees is higher. Kahai (2022) reports that a hectare of cacay crop[21] can generate more than a Colombian minimum monthly wage for about 50 years. If planted in agroforestry systems, cacay could be mixed with sacha inchi, passion fruit, pineapple, and corn. According to the same data source, an average planted tree takes between five to six years to start producing fruits.

Barriers for implementation (at scale)

The main barriers identified for the cacay value chain are as follows:

- Supply of the fruit from natural forest fails to meet the growing demand, especially because of its seasonal supply, as per anecdotal evidence from interviews.

21. 241 trees can be established on one hectare of cacay, at a cost of COP$ 7.2 million (Kahai, 2022).

- Lack of knowledge of the tree's value: according to local stakeholders in many cases standing trees are felled and used for firewood, because the value of its fruits is unknown to the land user.
- Only a few players are integrated into the cacay value chain. This can lead to a monopoly and limit the entry of other actors into the value chain.
- Labour shortages are a constraint for the seasonal harvest as well as for the cultivation of perennial crops such as cacay in the Colombian Altillanura, a subregion of the Orinoquia, located in the Departments of Meta and Vichada (Fontanilla-Díaz et al., 2021).

Knowledge gaps

Despite the attractiveness of and innovation in this value chain, there is a lack of evidence about the size and strength of the national and international market demand, and the attractiveness for private investors linked with its potential to mobilise private finance. There is also a lack of clear data on real costs and benefits for cacay collectors, and those working in processing, marketing and sales to provide solid evidence on the profitability of investments (VfM) and the real impact of cacay as an additional economic income source for local families.

3. Overview of existing interventions[22]

Initiatives by development cooperation agencies, NGOs and universities

Once the private sector assessed the potential of the cacay industry, international cooperation initiatives started to work on strengthening the value chain and cacay cultivation in the Departments of Caquetá and Meta. In 2019, the Amazon Conservation Team, with funding from Colombia Sostenible, supported the establishment of 140 hectares of agroforestry systems with cacay as an ecological restoration and sustainable production strategy in the Municipalities of Belén de los Andaquíes and San José del Fragua, of the Department of Caquetá, benefiting 170 small-holder and Indigenous families (Colombia Sostenible, 2020; Colombia Sostenible, 2021). USAID, NESsT and WWF also support cacay production (Barney, 2021). Currently, the Germany Agency for International Cooperation (GIZ) supports the links between cacay producers and the private sector in Meta, as well as strengthening local associations.

22 Focused on TEFOS target areas.

Private sector initiatives

The development of the cacay value chain is mainly carried out by private companies, which have developed their own processes for producing oil, finding a market, and subsequently, establishing crops. The growing demand for cacay oil offers a market alternative for its harvesters and cultivators and the private sector is the main processor and marketer of the nut. As there are established companies and start-ups, there is space for several more stakeholders to access the cacay market.

Kahai and Tacay are the main cacay traders, both located in Meta. Smaller companies include CaryO, located in the Municipality of San Martín (Meta), which commercialises and exports cacay oil (CaryO, 2022). Chamorro Benavides SAS – Inzunai, an enterprise located in La Hormiga, Valle del Guamuéz in Putumayo, has a cosmetics line that includes cacay oil, and an agricultural line that commercialises cacay grafted seedlings, (Alvares et al., 2018). In Villagarzón, Putumayo, Bioincos is an Indigenous peoples owned enterprise that processes and produces natural Amazonian oils. The company buys cacay from 200 Indigenous families from the Emberá, Pastos and Inga peoples that supply cacay fruits and other NTFPs as raw material. This initiative is supported by USAID, NESsT and WWF (Barney, 2021).

Local organisations that work with NTFPs are beginning to collect cacay to produce oil mostly for the domestic market. In Caquetá, the second-tier association called Agrosolidaria Florencia, made up of two local organisations, buys the fruits from its members and produces the cacay oil. They have a strong professional team, an agro-industrial processing plant and offices in the city of Florencia (Calderón et al., n.d.).

4. Recommendations

Recommendations for TEFOS target areas

Recommendations have been developed based on the existing evidence base, key informants interviews, field validation trips and the authors perspectives.

The cacay value chain should be strengthened to meet the growing demand for cacay oil and to promote more equitable access to the costs and benefits associated with this value chain by supporting the entry of new stakeholders. Table 6 contains recommendations to address the main barriers that limit the extension of the cacay value chain within TEFOS target areas.

Strengthening local organisations and start-ups working with cacay and other NTFPs on technical and administrative issues, will enable these organisations to develop sustainable businesses models introducing greater competitiveness

in this value chain. It is also important to support and promote local stakeholders' associativity for new producers' organisations or start-ups.

Table 6. Recommendations to address the barriers that limit the cacay value chain within TEFOS target areas.

Main Barriers	Recommendations
Wild production supply of the fruit that fails to meet its growing demand.	Strengthen local capacities to harvest, handle and transport the fruit. Support the establishment of cacay plantations as an alternative for ecological-productive restoration schemes and agroforestry systems, jointly with ongoing restoration initiatives. Target small-holder and Indigenous families in TEFOS municipalities
Poor valuation of tree so it is felled for firewood.	Generate awareness, through education and capacity building, of the value of the cacay tree and its fruits and its potential to generate an additional economic income.
Cacay value chain integrates few players.	Strengthen technical and administrative skills of local associations working with NTFPs including cacay which will enable them to develop sustainable cacay businesses introducing greater competitiveness in the value chain. Support local stakeholders' associativity for new producers' organisations or start-ups according to local demand.
Labour shortages in the region are a key constraint for the cultivation of perennial crops such as cacay.	Geographical differentiation: avoid labour-intensive practices (plantation & processing) in areas with labour shortages.

Source: Compiled by authors.

Recommendations for extending or scaling up existing interventions

In the Departments of Caquetá, Meta, and Putumayo there is potential to scale up the collection of wild cacay, generating awareness of the value of this tree and its potential to generate an additional economic income as a strategy to stop the tree being cut down. The capacities of small-holder and Indigenous families in TEFOS target areas to harvest, handle and transport the fruit should also be strengthened through education and capacity building.

The establishment of cacay plantations as an alternative for ecological-productive restoration schemes, agroforestry systems and even as a

monoculture should be supported jointly with ongoing restoration initiatives in TEFOS municipalities in Caquetá, Meta, and Putumayo.

Small companies and start-ups like CaryO in San Martín del Meta, Bioincos in Villagarzón, Putumayo, the Chamorro Benavides SAS (Inzunai) enterprise located in Valle del Guamuez, Putumayo as well as Tacay as a medium-size company in Meta could become key partners to scale up activities associated with production, processing, commercialisation, and consumption of cacay oil and other cacay-based products. TEFOS could support them to strengthen their technical and managerial skills.

Cocoa

1. Overview of the nature and scale of production and markets

Description

The production of cocoa (Teobroma cocoa) in agroforestry systems enables small-holder and Indigenous families from TEFOS target areas to develop sustainable activities or livelihoods that generate income.

In Colombia, cocoa is cultivated in monoculture of highly productive clones and in agroforestry systems with mostly fine-flavour varieties and a lower productivity per hectare. While the first is mostly implemented in the Inter-Andean valleys and coastal flats, the agroforestry system can mostly be found in the Amazon lowlands and the Orinoquia, including in post-conflict areas. There is a dispersion of producers in the territory, especially in the Amazon region, which in many cases has a negative effect on the commercialisation of cocoa. Here, cocoa is produced by families distributed in remote areas.

At the national level, cocoa is typically produced by small holders with an average cultivation area of 3 hectares per family (MADR, 2021a). In the Departments of Caquetá and Guaviare, cocoa is cultivated on slightly larger plots ranging between 5 and 15 hectares (Charry, et al., 2017).

The zoning map for the commercial cultivation of cocoa, developed by MADR with the technical support of UPRA, shows that the physical, socio-ecological, and socio-economic conditions of the 20 TEFOS municipalities and 2 national parks [23] make them suitable for the development of commercial cocoa

23The municipalities of Puerto Leguízamo in Putumayo and San José de Ure in Córdoba are not suitable for the commercial cultivation of cocoa, according to the zoning carried out by MADR (2019).

cultivation. This classification does not include legally excluded zones[24] (MADR, 2019a). The suitability data for each department is shown in Table 7.

FEDECACAO reports that 2,250 cocoa producers distributed in 18 of the TEFOS municipalities (see Annex 5) are linked to local associations involved in commercialisation, processing and sales. However, based on observations made during the field visits and considering the total number of hectares planted vs reported per average farm size, the study team considers that this might be an underestimate. This is because there are a significant number of families in the TEFOS municipalities that are engaged in cocoa cultivation but are not organised into associations.

In general terms, it is reported that Colombia generates yields below its full potential (Charry, et al., 2017). Its average yield for the year 2021 was 0.46 tons/ha (MADR, 2021a). Specifically, for the Department of Arauca, which produces 8% of the national cocoa production mostly from monocropping systems, the highest yield per hectare was reported at 0.66 tons/ha. Antioquia which produces 9% of the national cocoa production reported 0.44 tons/ha. In the Department of Meta (predominantly agroforestry systems) 0.30 tons/ha have been reported (MADR, 2021a). Hajek (2021) reports that with financing, improved practices, and better genetic material, annual productivity of agroforestry cocoa systems based on fine-flavour cocoa could be increased from the current 0.70 to 0.90 tons/ha to around 1.5 tons/ha. Another important condition for improving yields and avoiding environmental degradation is the implementation of sustainable soil and water management practices.

Table 7. Areas (ha) with physical, socio-ecosystemic and socio-economic conditions that are suitable for commercial cocoa planting within TEFOS municipalities

Department	**Municipalities**	**Area (ha)**
Bajo Cauca & Urabá Antioqueño regions		
Antioquia	Carepá, Chigorodó, El Bagre, Ituango, Peque, Segovia & Zaragoza,	142,002
Córdoba	Montelíbano & Tierralta	161,035
Amazon & Orinoquia regions		
Arauca	Tame	135,978

24 Zones in which the development of cocoa production for commercial purposes is not permitted by law.

Caquetá	Cartagena del Chairá, Puerto Rico, San Vicente del Caguán & Solano	587,236
Guainía	Inírida, Morichal, Pana & Puerto Colombia	7,784
Guaviare	Calamar, Miraflores & San José del Guaviare	177,356
Meta	La Macarena, Mapiripán, Mesetas, Puerto Concordia, Uribe & Vistahermosa	406,016
Putumayo	Puerto Guzmán	81,980

Source: Compiled by authors with data from MADR (2019a).

While the yield in tons per hectare has remained stable over the last 60 years the total annual production of cocoa has increased due to the expansion of the planted area. The total cocoa production increased from 36,731 MT in 2000 to 60,535 MT in 2017 (Charry, et al., 2017). Data from the MADR (2021a) estimates a cultivated area of 193,953 hectares and a production of 65.174 MT in 2021.

Markets

In 2021, dry cocoa bean exports reached 11,689 tons, equivalent to US$ 29,915,322, which represents growth of 4.9% compared to 2020 (FEDECACAO, 2022). Cocoa-based product exports reached 14,647 tons, equivalent to US$ 95,496,857, where chocolate represented 70.0% of exports, while cocoa butter represented 17.9% of exports (FEDECACAO, 2022). Around 65,000 families depend on the cocoa value chain, which generates 167,000 direct and indirect jobs and covers a total area of 188,000 hectares (MADR, 2021a).

More than 80% of the national cocoa production is purchased by Casa Luker and Nutresa (owner of the Compañía Nacional de Chocolates), two Colombian companies that supply most of the domestic market while also exporting cocoa beans, butter, powder, paste and chocolate. Both adhere to the world price set by the International Cocoa Organisation (ICCO), which is above the prices paid in most cocoa-producing countries in the world (Charry, et al., 2017). There is a domestic demand for cocoa and its associated products, which are elaborated with "ordinary" cocoa, which constitutes the main market for most producers in the country. The two largest companies and most of the internal market are supplied by the monocropping systems with productive clones. In TEFOS conflict-affected areas, these can be found mostly in the coastal area (Bajo Cauca-Urabá Antioqueño).

Small chocolate manufacturers and exporters of cocoa beans and chocolate handle smaller volumes, and in many cases, pay better prices to producers even though they are much more sensitive to fluctuations in international prices (Charry, et al., 2017). Many of these attain added value because they develop

their own chocolate brands and own marketing lines. This, however, can lead to a diffused and untargeted market. This market is associated with the agroforestry system in the Amazon but also in Orinoquia.

With regard to the fine-flavour cocoa, MADR reports that 95% of the Colombian cocoa has been catalogued by ICCO (Ratified in the 2019 ICCO Committee) as having a fine flavour and aroma (MADR, 2021a). Although Casa Luker and Nutresa tend to bulk-buy their cocoa, they have now created product lines aimed at special market niches. Cocoa Hunters is an example of a small and relatively new company that focuses on artisanal chocolate 'from bean to bar' for the national market. According to some specialists, this niche market is not likely to be of relevance to most producers in the country since it is very small compared with the overall national market for coffee (Charry, et al., 2017).

2. Opportunities and constraints

Environmental and social benefits

The cultivation of cocoa in agroforestry systems within the Colombian Amazon region has been consolidated as a sustainable production alternative that contributes to the generation of ecosystem services, including the improvement of soil conditions and the reduction of greenhouse gas emissions (Rodríguez, et al., 2021). One of the most common arrangements integrates cocoa, as the main crop, with plantain and timber species as sub-crops. Another popular model in Caquetá is the combination of rubber, as the main crop, alongside cocoa and plantain. In both systems, short-term crops that can be used for self-consumption and sale are integrated with the cocoa which can be harvested after 2 or 3 years (Barrera et al., 2017).

In the TEFOS municipalities of Antioquia, approximately 80% of the cocoa crops are sown in production systems associated with plantain (cocoa monocropping with temporary shadow); 15% are monoculture without any associated crops; and 5% are in agroforestry systems with other crops such as avocado, coffee, cassava, fruit and timber trees. According to UAESPNN, around the Paramillo National Park, Indigenous peoples and farmers tend to plant cocoa in association with fruits such as chontaduro, borojó and finger banana. The combination of cocoa with rubber trees is also quite common. In the Municipality of Tierralta, Córdoba about 97% of the cocoa crops are associated with plantain (FEDECACAO, 2021).

Some public organisations and agencies, including regional autonomous corporations (CARs), require the signature of Zero Deforestation Agreements as a condition for the development of activities with local producers. These are voluntary, non-binding agreements that establish commitments to conduct forest conservation, agricultural border closure, and non-deforestation actions

that entail the reduction of greenhouse gas emissions (Bruner et al., 2020). Other positive results include the reactivation of the local economy, the empowerment of women and youth groups, and capacity-building in matters related to associativity and sustainable human development (Charry, et al., 2017, & Instituto SINCHI, 2017).

Potential for income generation, market development and value for money

The cultivation of cocoa is an income generating alternative for small-holder and Indigenous families, since it has a guaranteed market even in remote areas (Charry, et al., 2017). Cocoa is also considered a potential substitute for illicit crops (Avila et al., 2018). Cocoa promotes the generation of ecosystem services, especially if it is part of agroforestry systems (Barrera et al., 2017). Therefore, evidence suggests that the agroforestry system is the cocoa system that provides most environmental and social benefits, particularly fine flavour cocoa varieties which require more species (diversity, food security) and have a potential for higher income per hectare. On the other hand, these varieties require more technical input and production capacity (FAO & MAATE, 2020; Hajek et al 2021).

Climate-smart cocoa from the Ecuadorian Amazon Forest

In the Ecuadorian Amazon, cocoa production has been carried out in agroforestry systems using a climate-smart agriculture approach with three main objectives: i) the sustainable increases in productivity and income of producers, ii) adaptation and resilience to climate change, and iii) the reduction and/or absorption of greenhouse gases.

The production takes place within the Amazonian chakra, a traditional agroforestry system of the Kichwa Indigenous peoples that seeks to guarantee food security and maintain patches of primary and secondary forests. Cocoa processing and chocolate production is carried out by Indigenous communities, who are planning to create their own label to identify their chocolate as Chakra Chocolate (FAO & MAATE, 2020

According to data obtained from Charry, et al. (2017), in 2016, conflict areas accounted for 46.10% of the cocoa sown area and 34.20% of the area that is under cocoa production, respectively, with an average production of 0.24 tons/ha. In the areas that have been most affected by the conflict, such as the Departments of Caquetá, Meta, Putumayo, and Antioquia, as well as in the Departments of Arauca and Guainía, cocoa represents a profitable and environmentally friendly economic alternative within the current context.

The direct costs for the establishment of one hectare of cocoa in the first year in an agroforestry system (cocoa plantation with transitional shade of plantain and permanent shade of timber trees), adds up to COP$ 12,374,460[25] of which 53% is invested in inputs (1,200 cocoa seedlings 1,200 plantain seedlings and 160 timber trees, among others), 41% in labour (approximately 127 labourer-days) and 6% for the purchase of tools necessary for cultivation. Cocoa trees become productive after five years (MADR, 2021a).

Considering an average yield of 0.46 tons/ha, an average farm size of 3 hectares, using the 2020 average price of COP $8,173 per kilo, a family could get a gross income of COP$ 11,278,740 per year or COP $939.895 per month, equivalent to almost 93% of the minimum official monthly wage.

Certifications and standards play a role in differentiating cocoa markets and securing premium prices. However, CacaoBarometer (2018) reports that "none of the standards have been able to significantly contribute to farmers achieving a living income, or even to lift farmers out of structural poverty" (Ferrini et al., 2020). Certifications can be an important differentiator for consumers that look for fair trade, organic, and biodiversity-friendly products, but they do not necessarily bring a benefit to producers. Indeed, according to conversations with stakeholders during field visits, in many cases certifications are perceived as an additional cost and effort that is not always renumerated in the payment producers receive.

Barriers for implementation (at scale)

The main barriers involved in the production and marketing of cocoa, particularly in TEFOS-targeted areas include:

- The small cultivation areas, some located far away from the cocoa collection and purchasing centres, constitute a barrier. In many cases, this is associated with the low prices paid to producers.
- Gaps in prices paid to producers located in remote areas that are far away from purchasing centres and/or post-harvest collection and management centres with little access to market and price information
- The majority of existing producers in the Orinoquia have planted cocoa on a small scale to provide a supplement rather than a main source of income. As a result, these plantations are typically not managed professionally (pruning, fertilisation, irrigation, pest and disease management), resulting in low productivity. In addition, cocoa beans are not consistently fermented and dried, resulting in varying levels of quality (Climate Focus, 2019).

25 During 2021, the exchange rate US$-COP was approx. 1:3500

- The competitiveness of the sector in the first stage of the value chain is being threatened by environmental factors that limit productivity, such as the ageing of crops and seeds, inadequate genetic material, excess or deficit of shade, poor tree structure, and the presence of pests and diseases (Ferrini, et al., 2020).
- Competitiveness is further threatened by the limited technical assistance that is available and weaknesses of producer associations (Charry, et al., 2017).
- Colombia and other cocoa-producing South American countries are exposed to high levels of soil cadmium, particularly in the Amazon region, which can have a negative effect on the profitability of the cocoa sector (Ferrini et al., 2020). In January 2019, a new European Union regulation on cadmium in chocolate went into effect, with a potential for impacting the entire cocoa supply chain. According to some experts, the effects will be disproportionately felt by cocoa farmers in South America.[26]
- The prices paid for the cocoa beans are lower in places that are not traditional cocoa producers' areas, such as remote areas, post-conflict areas, and Indigenous communities' areas. The lower price reflects the cost of collecting and transporting cocoa to purchasing or collection centres, as well as the producers' lack of information on the cocoa prices and markets (Charry, et al., 2017).

Knowledge gaps:

In general, the cocoa value chain has a large amount of robust evidence on techniques, markets, and social characteristics. Knowledge gaps are very specific and mostly relate to phytosanitary management and cadmium management.

3. Overview of existing interventions[27]

Initiatives from development cooperation agencies, NGOs and universities

According to Charry et al. (2017), the main types of interventions, supported mainly by the National Government through the provision of funds, and by regional or local agencies and international cooperation organisations, include the following activities: i) Cultivation of cocoa in agroforestry systems, ii) post-

26 https://www.worldcocoafoundation.org/blog/the-impacts-of-new-eu-cadmium-regulations-on-the-cocoa-supply-chain/
27 Focused on TEFOS target areas.

harvest cocoa management, iii) Creation and strengthening of associativity around the cocoa production process, and iv) Exploration of market niches.

The World Bank's Biocarbon Fund in the Orinoquia supports 242 cocoa farmers for the Municipalities Mapiripán, Mesetas, Puerto Concordia, Uribe and Vistahermosa in the Department of Meta, and 757 in Tame, Arauca (Climate Focus, 2019).

The Cocoa, Forests and Peace initiative, led by the Alisos Foundation, the Rainforest Alliance and the Wildlife Conservation Society (WCS), brings together various public, private and international cooperation organisations, including 40 associations and cooperatives of producers and marketers from Antioquia, Caquetá, Córdoba, Guaviare, and Putumayo, and a series of alliances that could serve as a platform for TEFOS interventions. This initiative is part of the Zero Deforestation Agreement for the cocoa chain supported by UK PACT.

As part of the USAID-funded BioREDD+ Projects Portfolio, the Afro-Colombian community council Consejo Mayor Indígena de Mutatá, located in the Municipalities of Mutatá (Department of Antioquía) and Río Sucio (Department of Chocó, out of TEFOS scope) is implementing a cocoa initiative with support of the Páramos & Forest USAID Project. In Mutatá and Chigorodó, 110 hectares of cocoa are supported by FAO and USAID (Territories of Opportunity project). A group of women led the establishment of cocoa plantations, processing and transformation into chocolates, aiming to reach the international market, as an alternative activity to avoid deforestation within their territories. In the north of Antioquia/South of Córdoba, cocoa initiatives are supported by the Colombia Sostenible Fund (European Union), the German development bank (KfW) and ACDI-VODA.

Private sector initiatives

Chocolate Cordillera is a Latin-American brand of Grupo Nutresa that offers chocolates and other products based on fine-flavour cocoa, reporting sales of US$ 2.8 billion in 2016, reaching 72 countries. Around 51% of their cocoa comes from farms in Colombia where they pay around 90% directly to farmers. They are committed to sustainable practices in their facilities (Chocolate Cordillera, 2022).

Cocoa Hunters offers technical assistance to cocoa producers in Arauca offering their customers the "bean to bar" experience. In addition, a series of small-scale companies, start-ups such as Chocomets, and producers' associations invest in individual cocoa brands, mostly targeting individual export lines to Europe and the Middle East. While there are no figures on the number of companies or export volume, this is clearly an emerging yet scattered market.

4. Recommendations

Recommendations for TEFOS target areas

Based on the existing evidence base, key informant interviews, field validation and the authors perspectives, it is suggested that TEFOS works with three of the four links of the cocoa value chain: production, processing, and commercialisation. In terms of production, a focus on the recovery and improvement of existing crops, and on the implementation of good agricultural practices is recommended. This includes the drying of cocoa beans, which improve crop yields and the quality of the cocoa. For farms located at great distances from the cocoa bean collection or purchase centres, it is recommended to focus on improving their drying infrastructure, and to analyse the possibility of supporting the establishment of collection centres at reasonable distances from farms and production centres. Technical assistance or expansion should be specific to the different agroecological areas where interventions are developed.

Another opportunity is strengthening and, where necessary, creating associations around the cocoa production. Local organisations that group producers must have the technical and administrative capacities necessary to manage, commercialise, and process cocoa (especially in the case of groups that wish to commercialise their own chocolate instead of selling it to wholesale buyers). At all times it is suggested to join efforts with ongoing actions, especially with private actors, and to focus on local capacity-building.

The smallholder associative model linked to sustainable production standards has great potential to integrate and sustain bioeconomy practices in cocoa. Since formal association is a precondition for the management of internal control and traceability systems. This model would, in most cases, include the production and trade of certified products. Marketing and processing companies can induce associative suppliers to produce deforestation-free cocoa if market demand or local policies support this change. Good practices include: (1) improving density (about 1,100 cocoa trees/ha), (2) introducing the right mix of cocoa varieties for optimal productivity and quality through grafting, (3) effective combination of low emission fertilisers based on soil analysis, (4) introducing commercial timber species in the medium and long term, and (5) intelligent integrated pest management (Hajek et al. 2021).

To better understand the potential of agroforestry and land tenure security to create economically and environmentally robust livelihoods, Pokorny et al. (2021) analysed a series of informally settled small-scale cocoa farmers in the Peruvian Amazon. The study shows that less than 20% of the households have managed to establish economically robust livelihoods on a robust natural production basis. Farm size, specialisation in cocoa, and participation in

associations positively influenced the economic performance of the households but had little effect on the quality of natural resource management and on the capacity to conserve forests. To harness the potential of cocoa farming requires long-term support well adapted to local specificities. The legal recognition of sustainable land-use practices on public forest land is a meaningful step. To effectively address deforestation, however, requires broader integrated approaches that go far beyond the promotion of sustainable land-uses (for instance the approach of the TEFOS programme, which combines measures on livelihoods, land formalisation and criminal penalties). Table 8 summarises a series of recommendations to address the barriers that limit the cocoa value chain.

Table 8. Recommendations to address the barriers that limit the cocoa value chain within TEFOS target areas.

Main Barriers	**Recommendations**
Small cultivation areas are located in remote and distant places from the cocoa collection and purchasing centres.	Improve isolated producers' community or group drying infrastructure. Analyse the possibility of supporting the establishment of collection centres at reasonable distances from farms and production centres.
Gaps in prices paid to producers located in remote areas with little information about markets and prices.	Technical assistance or expansion should be specific to the different agroecological areas where interventions are developed.
Most producers have planted cocoa on a small scale to provide a supplement rather than a main source of income. These plantations are typically not managed professionally resulting in low productivity (specific to Orinoquia but also applies to other regions).	Technical assistance, specific to the different agroecological TEFOS target areas, should focus on the recovery and improvement of existing crops, and on the implementation of good agricultural practices.
Competitiveness threatened by environmental factors that limit productivity, such as the ageing of crops and seeds, inadequate genetic material, excess or deficit of shade, poor tree structure,	Technical assistance, specific to the different agroecological TEFOS target areas, should focus on the recovery and improvement of existing crops, and on the implementation of good agricultural practices.

and the presence of pests and diseases.	
Exposure to high levels of soil cadmium that can have a negative effect on the profitability of the cocoa sector.	Support ongoing research initiatives jointly with Agrosavia and CIAT.
Cocoa beans are not consistently fermented and dried, resulting in varying levels of quality.	Technical assistance should focus on the implementation of good agricultural practices including drying of cocoa beans leading to improved crop yields and quality.
Pop-up of chocolate brands lead to a diffused and untargeted market	Strengthen and create, where necessary, associativity around the cocoa production. Local organisations grouping producers must have the technical and administrative capacities necessary to manage, commercialise, and process cocoa. At all times it is suggested to join efforts with ongoing actions, especially private actors, and to focus on local capacity-building.

Source: Compiled by authors.

Recommendations for extending or scaling up existing interventions

The most interesting partners for TEFOS that work in this value chain, include local producer organisations and small private companies that are interested in the commercialisation of cocoa with added value. The Cocoa, Forests and Peace initiative, led by the Alisos Foundation, would be a positive model to follow (and scale). Also, models such as the one implemented by Chocomets, as well as the work developed by the APCAM Association, the first in the whole Meta Department and the second in the Municipality of Mapiripán, could be extended with TEFOS support. Another model that could be replicated is the one used by Cocoa Hunters in Arauca and other regions.

In the Urabá Antioqueño, USAID-funded activities with the Afro-Colombian community council Consejo Mayor Indígena de Mutatá, provide a basis for TEFOS to extend or up-scale their activities reaching other local communities in nearby territories.

The main recommended actions to extend existing interventions, include: i) Support the recovery and improvement of existing cocoa plants, including the provision of technical assistance; ii) Cluster local producers' organisations in order to reach premium and niche markets; and iii) Strengthen local processing and transformation capacities, and connect producers with market opportunities.

Coffee

1. Overview of the nature and scale of production and markets

Description

Colombia is the third largest global producer of coffee, and the largest producer of Arabica coffee (Coffea arabica) with around 3.5 million hectares planted through almost the entire mountainous territory of the country. Arabica coffee is generally planted between 1,200 and 1,850 metres. Within TEFOS target areas, Antioquia[28], Caquetá, Meta and Putumayo are the departments with more suitable conditions for coffee production, in the eastern departments, coffee can only be grown in the Andean foothills (FNC, 2022; Hajek, et al., 2021).

The Federación Nacional de Cafeteros (FNC - Colombian Coffee Growers Federation) is the main stakeholder in the coffee value chain. It is a private non-profit union that gathers 540,000 coffee producers' families (federated and non-federated). Ninety-six percent of all producers are smallholders (up to 5 ha), 3% are medium-sized (from 5 to 10 ha) and 1% are large producers (more than 10 ha). FNC provides extension services to its associates, buys their produce, and sells it on the national and international market. FNC's main activities focus on scientific research (through their scientific institute: Cenicafé) and technological development, sustainable marketing and creation of value, transfer of technology to coffee growers, advertising and promotion, sustainability projects and national register of coffee exporters. They also implement an environmental management strategy at farm level that includes prevention of water pollution, reforestation, soil, and biodiversity protection, among others (FNC, 2021a).

In 2019 FNC implemented social, economic, and environmental projects worth US$ 71 million and US$ 46 million in 2020. In 2020, 67% of resources came from national or international[29] organisations, including the General Royalty System (SGR), public partnerships led by the municipal and departmental committees, and budgets of municipal and departmental administrations (FNC, 2021a). The FNC focuses its main attention and presence in the Andean coffee-growing area (also known as central coffee region) and covers two TEFOS municipalities in Antioquia (Ituango[30] and Peque) with its full benefits package. In the eastern departments, FNC has offices in Florencia, Mocoa and Villavicencio, where they offer extension services and buy coffee from local

28 Antioquia is the main coffee producer department in Colombia, however only two of TEFOS municipalities (Ituango and Peque) are formally engaged in coffee production through the FNC.
29 In 2020 FNC raised US$ 10 million from international partners.
30 The FNC reports 1,799 coffee growers; 1,963 farms and 2,191 hectares of productive area in Ituango municipality and 1,595 coffee growers; 2,344 farms and 1,121 hectares of productive area in Peque municipality, both in Antioquia.

producers. Their presence in the Amazon and Orinoquia regions is notably less than in the Andean departments.

Markets

In 2020, coffee growers managed to harvest a crop worth US$ 2.4 billion, the largest in 20 years. This figure is explained by the 13.9 million 60 kg bags harvested (with a productivity of 19.8 bags/ha[31]), a good international coffee price and an average quality premium for Colombian coffee of US$ 283 per load of 125 kg of dry parchment coffee (FNC, 2021a). Coffee contributed with 1% to national GDP and 15.30% to agricultural GDP (Salazar, 2021). It generates 2 million direct jobs, equivalent to 12% of national employment (FNC, 2021b). The value of cumulative exports for the last 12 months up to February 2022 is estimated at US$ 3.3 billion (Office of the Government Advisor on Coffee Affairs, 2022). During 2020 the main destination of Colombian coffee exports is North America (USA and Canada), with a 47.70% share. The European market is the second destination accounted for 30.70%, while the Asian market share was 15.30% (FNC, 2021a).

As a result of higher international coffee prices, the quality premium and the COP exchange rate averaging, the domestic reference price in March 2020 reached a record high of US$ 356 per 125 kg load of dry parchment coffee, whereas average price in 2020 was US$ 283 (FNC, 2021a). This shows the volatility of the price even at the domestic market.

Since 2019, FNC manages the Coffee Fund Stabilisation Price that contributes to stabilise the income of Colombian coffee producers directing the resources captured by exports to re invested them for the benefit of coffee growers. The Fund has two main stabilisation mechanisms: i) Price Stabilisation: this seeks to compensate the producer when the price of coffee in Colombia has taken extremely low values, and ii) Income Stabilisation: this seeks to remunerate the producer when the expected income from the sale of his harvest may be affected by climatic, natural or sanitary effects, or by early sales negotiations (FNC, 2022).

Domestic coffee consumption has grown steadily in the last years. In 2020, the number of bags of green coffee consumed in Colombia grew round 23% compared to 2017 consumption (FNC, 2021a).

31 An average productivity of 1.18 tons/ha.

2. Opportunities and constraints

Environmental and social benefits

According to Hajek et al. (2021) the Andean-Amazon countries are focusing on the premium coffee market and many producers are adding value to their production by embracing certification and organic production paradigms. These countries have large areas of idle land located in landscapes with current growing conditions fit for producing premium coffee beans that are highly competitive in global markets.

The smallholder associative model linked to sustainable production standards has the greatest potential to integrate and sustain climate benefiting bioeconomy practices in coffee micro- agroforestry. With financing and better practices, annual productivity could increase from the current 0.65-0.90 tons/ha to around 0.13 tons/ha (Hajek, et al., 2021). Sustainable production helps avoid soil erosion and degradation, especially in the Amazon region where local stakeholders practicing soil conservation could generate a better income or final price. However, unsustainable options are usually cheaper in the short term and evidence suggests that new interventions should provide support to address additional expenses related to sustainable production challenges.

Potential for income generation, market development and value for money

The Andean Amazon countries could take advantage of new market opportunities but may require specific policies and strategies to ensure that expansion of coffee farmlands take place in climatically and ecologically suitable areas to ensure Deforestation Free Production (Hajek, et al., 2021). On the other hand, the suitability of new non-traditional areas with adequate environmental conditions for coffee cultivation has been investigated by Cenicafé, which identified the Municipality of Chigorodó in the region of Urabá Antioqueño and the Departments of Arauca and Meta at the Orinoquia region within TEFOS target areas as suitable (Leibovich & Llinas, 2013).

Colombia traditionally is producing Coffea arabica but due to its altitude and climate requirements it is not possible to produce arabica coffee in most TEFOS areas except in the Andean foothills. Research identified that the Orinoquia is an attractive region for the cultivation of Robusta coffee[32], a species that can be grown in lowlands and has demand from the international market for the production of instant coffees. The main reasons include its extension, the cost of land, and that it would not compete with the production of arabica coffees in the Mountainous zone (Leibovich & Llinas, 2013). These authors mention several advantages of Robusta coffee over other products that have been

32 Currently only Coffea arabica is produced in Colombia.

developed in the eastern plains: while it does not have the same premium price as arabica coffee varieties, it does not require huge productive areas to be competitive and it can be produced in small family farm units. Furthermore, there is an important coffee production tradition in the country to feed new developments.

Barriers for implementation (at scale)

The main barriers for coffee production in TEFOS target municipalities include:

- TEFOS municipalities receive less local stakeholder training, knowledge, extension services and benefits than the central coffee region.
- Coffee from non-traditional coffee growing areas lack business opportunities including access to special markets even when it has the right features to access them.
- Weak local governance of coffee producers and its associations and committees.
- Prices are not stable and depend on the international market.
- Some coffee growers use large amounts of agrochemicals which negatively impact biodiversity, water conservation and greenhouse gas emissions.

Knowledge gaps

Despite coffee being one of the main agricultural products and income sources in Colombia, with more than half a million families of coffee growers, there is a lack of information about coffee production and its value chain in non-traditional areas such as the Amazonia and Orinoquia regions. This lack of evidence hinders the assessment of the profitability and environmental impact of coffee in TEFOS municipalities.

Data on productivity, environmental features around the production, good agricultural or agroecological practices, associativity, local governance, and costs associated to this value chain, are needed to assess the cost-effectiveness of investments (VfM) and the environmental and economic impacts of the value chain in TEFOS target areas.

3. Overview of existing interventions[33]

Initiatives from development cooperation agencies, NGOs, and universities

In the Municipality of Uribe (Meta) the association of coffee growers Asocafeurmet, created in 2010, is an example where more than 130 local families, including Nasa and Paez Indigenous communities, decided to replace coca with coffee in a conflict-affected area. USAID supported them with basic infrastructure and the FNC included them in the municipalities classified as coffee-growing, giving these local families increased investment in infrastructure and resources to support producers (Hacemos memoria, 2022).

The FNC in partnership with USAID's Commercial Alliances Programme works in the conflict-affected municipalities of San Vicente del Caguán and Florencia, Caquetá with 876 coffee-growing families within the Nespresso AAA Sustainable Quality Programme that aims to build a high-quality green coffee supply chain that contributes to sustainability of the sector and improves living conditions of producer communities, respecting and protecting the environment (FNC, 2021a). Under this programme, the single-origin coffee Esperanza de Colombia will be available in 18 countries (FNC, 2019).

Private sector initiatives

Coffee arrived in Caquetá around 50 years ago. Today there are six coffee producing municipalities Puerto Rico, Florencia, El Doncello, El Paujil, La Montañita and San Vicente del Caguán, which together produce 2,000 tons of coffee annually, 90% of which is exported, making coffee an important economic income source. Caquetá coffee, recognised as Amazon coffee, is commercialised in different countries through the well-known Juan Valdez Stores[34]. Some of these municipalities are considered marginal areas for coffee production so there is no information or research on coffee production in these areas (Dussán, 2017).

4. Recommendations

Recommendations for TEFOS target areas

- Strengthen the managerial and business skills of local organisations and technical committees.
- Strengthen community organisations by developing the necessary capacities and strengths to support and promote their participation in the coffee value chain and prevent weakening the social structure.

33 Focused on TEFOS target areas.
34 Juan Valdez Stores belong to the Colombian Coffee Growers Federation.

- Training, technology transfer, formulation and application of management plans that guarantee a sustainable production process, including extension services to promote agroecological and environmentally friendly coffee production practices.
- Link local producers' organisations and technical committees to the FNC to give them access to the benefits provided by the FNC to coffee growers in other parts of the country, including access to special markets; special coffee prices when prices drop or harvests are affected by climatic, natural or sanitary issues, access to credit, extension services and social benefits, among others.
- Promote dialogue with the FNC and authorities on the possibility of developing trials with Robusta coffee in the areas previously identified as suitable.

Coffee farmers in the Amazon region are a heterogeneous group, with low access to financing and credit. Working with intermediary financial institutions with a proven track record of growth in the sector will be essential to reach them. High quality or low-cost extension assistance will have to go hand in hand with financing to facilitate the incorporation of agroforestry models and Deforestation Free Production agreements (Hayek et al, 2021). Table 9 contains recommendations to address the main barriers that limit the extension of the coffee value chain in TEFOS target areas.

Table 9. Recommendations to address the main barriers that limit the coffee value chain at TEFOS target areas.

Main Barriers	**Recommendations**
Local stakeholders training, knowledge, extension services and benefits received is asymmetric between TEFOS municipalities and those in the central coffee region.	Strengthen local organisations and committees' technical, managerial and business skills (training).
Coffee from non-traditional coffee growing areas lack business opportunities including access to special markets even when it has the right features access these.	Strengthen local organisations and committees technical, managerial, and business skills (training). Promote links between coffee growers in TEFOS target areas with the FNC.
Weak local governance of coffee producers and its associations and committees.	Strengthen local organisations and committees' technical, managerial and business skills (training). Strengthen community organisations by developing the necessary strengths to

	guarantee their participation in the coffee value chain and prevent weakening the social structure.
Prices are not stable and depend on the international market.	Strengthen local organisations and committees technical, managerial, and business skills (training). Promote links between coffee growers in TEFOS target areas with the FNC.
Some coffee growers use large amounts of agrochemicals with an impact on biodiversity, water conservation and greenhouse gases emissions.	Training, technology transfer, formulation and application of management plans that guarantee a sustainable production process. Extension services to promote agroecological practices.

Source: Compiled by authors.

Recommendations for extending or scaling up existing interventions

The work carried out by Asocafeurmet[35] associates, a group of 130 families that decided to grow coffee instead of illicit crops, in the Municipality of Uribe, Meta could be strengthened and extended by TEFOS.

The ongoing partnership between the FNC, USAID and Nespresso AAA Sustainable Quality Programme in San Vicente del Caguán and Florencia, Caquetá, could be extended to other coffee -growing families or replicated in other TEFOS municipalities to support building a green coffee supply chain and promote the single-origin coffee Esperanza de Colombia.

The work done by coffee growers in the Department of Caquetá, in the Municipalities of Puerto Rico, Florencia, El Doncello, El Paujil, La Montañita and San Vicente del Caguán could be supported and up scaled by TEFOS in other municipalities with suitable conditions for coffee production.

[35] For further information: https://hacemosmemoria.org/2021/08/05/sembrando-cafe-y-cosechando-paz-en-el-meta/

Nature-based tourism

1. Overview of the nature and scale of production and markets

Description

Colombia is well known as a biodiversity hotspot and nature-based tourism is of growing importance. Nature-based tourism includes all types of trips focused on nature, in which the main motivation is the observation and appreciation of biodiversity, accompanied by the culture[36] of local populations.

After the Peace Agreement between the government and the FARC (2016), many areas have improved public order, including in TEFOS regions such as Meta and Guainía and have seen an increasing number of visitors. Until 2019, Colombia saw an increase of 3% in the number of visitors, outperforming neighbouring countries[37]. At the same time, large areas of the country, including Putumayo and large parts of Guaviare, Caquetá, and Cordoba, remained inaccessible.

The public strategy for the tourism sector is based on developing differentiated and high-spending tourism markets, such as nature-based tourism, cultural tourism, convention tourism, and health and wellness tourism (MINCIT, 2018). The main challenge with this strategy is ensuring that biodiversity can be taken advantage in a sustainable way through scientific research and nature tourism.

Beyond the public sector (The Ministry of Commerce, Industry and Tourism - MINCIT in collaboration with the Ministry of Environment and Sustainable Development - MADS) several initiatives by international corporations have promoted nature-based tourism, particularly after the signature of the Peace Agreement in 2016. These have targeted support to local initiatives including training, infrastructure investment, marketing, and collaboration with protected areas for the regulation of visits.

As a conservation strategy to generate economic and productive alternatives to territories that depend on the quality of their ecosystems for its development the MINCIT, in coordination with MADS and UAESPNN, aims at promoting nature tourism in a sustainable way. They develop tourism activities in protected areas

36 The World Tourism Organisation (UNWTO) defines cultural tourism as “a type of tourism activity in which the essential motivation of the visitor is to learn, discover, experience, and consume attractions or tangible and intangible cultural products in a tourist destination. These attractions or products correspond to a set of distinctive material, intellectual, spiritual, and emotional characteristics of a society that encompasses the arts and architecture, historical and cultural heritage, culinary heritage, literature, music, creative industries and living cultures with their lifestyles and value systems, beliefs and traditions" (UNWTO, 2018).
37 https://www.mincit.gov.co/prensa/noticias/turismo/en-2019-el-turismo-en-colombia-rompio-records.

that have aptitude for this activity, as well as in areas with strategic ecosystems and emblematic natural attractions, such as the Amazon, the Pacific coast, the Orinoquia region and the Colombian Massif (MINCIT, 2018). The public ecotourism strategy is complementary to conservation and restoration strategies (Resolution 247 of 2007). The public nature-based tourism strategy in particular targets communities that encounter problems of land use, occupation, and tenure[38].

Markets

In 2021, the tourism sector, represented by hotels and restaurants, contributed 2.62% to the national GDP, which represents a slight increase compared to 2020 (2.54%), although it does not reach the values recorded before the pandemic (3.82% in 2019). In 2020 it generated 6.97% direct jobs compared to the national total, lower than the figures recorded in 2019 equivalent to 27.45% and 26.09% in 2018 (DANE, 2021; cited by CITUR, 2021). In 2021, 1,680,956 passengers arrived in Colombia (Colombian residents abroad, non-resident foreigners and passengers on international cruise ships), a slight increase compared to 2020 with 1,394,449 passengers, but a large decrease compared to 2019 (4,530,574 passengers) and 2018 (4,397,588 passengers) (CITUR, 2021). Even though the numbers are increasing, Colombia still receives fewer visitors (81 for every 1,000 inhabitants) than the average for Latin America and the Caribbean (175/1,000). According to MINCIT (2019; cited by Colombia Productiva, n.d.) one of the country's tourism products is nature. Nevertheless, in 2018 the main areas visited were the main cities (Bogotá, Medellín, Cartagena, Cali) and beaches. Only 3.70% of all tourism visited other regions and departments which include TEFOS target areas (excl. Antioquia). Table 10 details the number of non-resident foreigners visiting TEFOS departments between 2018 and 2021.

Table 10. Number of non-resident foreigners visiting TEFOS departments between 2018 and 2021.

Department	Year			
	2018	**2019**	**2020[39]**	**2021**
Antioquia *	379,102	438,530	138,351	183,433
Arauca	402	393	186	424
Caquetá	478	707	189	389
Cordoba	3,113	3,118	1,200	1,641

38 The State must start from the recognition of the presence of occupants in the areas of the Park System and in this sense make them participate in conditions of equity in the conservation process.

[39] Numbers in 2020 and 2021 were affected by the pandemic

Guainía	153	128	40	33
Guaviare	46	63	35	67
Meta	4,689	4,711	2,045	4,093
Putumayo	1,691	2,506	762	354

* Not representative of TEFOS target municipalities since Medellín, Antioquia departmental capital, is the second most visited city in Colombia.

Source: Compiled by authors with data from CITUR, 2022.

2. Opportunities and constraints

Environmental and social benefits

Ecotourism is defined as productive initiatives that favour local economies as well as the state of conservation of ecosystems (Myers, 2016). Considering the negative impact of extractive development strategies for the Amazon region it has been suggested that ecotourism would contribute to sustaining the biological and cultural diversity of the region (Hunt, 2022).

Potential for income generation, market development and value for money

Because of its incipient development in TEFOS areas, there is no data available on the potential positive effects on environmental conservation and social or economic benefits for local communities. However, from other areas in Colombia with a longer history of stable public order and tourism development (for example: Amacayacu, Tayrona Park and the central coffee region, including Los Nevados Natural National Park) there are clear examples of nature-based tourism that are an ally of conservation and have provided income to local people (Niño, 2017).

Barriers for implementation (at scale)

Several barriers for the effective and profitable implementation of nature-based tourism have been identified during the Evidence Review:

- Remaining public order issues. Some potential tourist areas are still inaccessible due to ongoing insecurity. This includes a large part of Putumayo (except for the westernmost part), Caquetá and Guaviare, the Bajo Cauca area, and Paramillo National Natural Park.
- Poor management of natural areas. In many post-conflict areas, there is active competition for the appropriation of landscape in the midst of ongoing tensions between legal and illegal groups, including money laundering that promotes deforestation and appropriation of natural parks, or disputes between private parties who want to charge a ticket for all "natural" attractions, creating a widespread uncertainty in the

management of natural areas and therefore for tourism development (Baptiste, 2021).

- Underdeveloped value chain. In areas where tourism is incipient, different elements of the value chain are not present or underdeveloped. Even when the attraction is there and agencies organise tours but there is no adequate lodging, means of transport and food services, the sector cannot develop.
- Tenure security. Tourism enterprises need long term tenure security if they are to invest in (expensive) tourism infrastructure and marketing. At Sierra La Lindosa in Guaviare rural and community tourism initiatives that are supported by the REM-Visión Amazonia Project exist but activities remain largely informal due to challenges of land tenure.
- Financing. Transforming agriculture-based communities into tourism providers requires considerable investments in training, infrastructure, and permits among other things. Communities need access to (soft) credits which are not always available, particularly in post-conflict areas which are considered high risk investments.
- Unclear nature tourism public policy. Guidance for the marketing of destinations, clear rules for tourist permits, environmental criteria for infrastructure and rules for competition, are lacking.
- Because the tourism market is still underdeveloped, and investments are insecure, most local entrepreneurs continue keeping cattle as an additional income source. This is evident in the areas around the Serranía de La Macarena Natural National Park. While most farmers that were visited during the field validation mentioned that income from tourism can disincentivise cattle ranching, there is also a risk that tourism income can be invested in more cattle. Also, tourism tends to be seasonal, peaking in dry seasons and public holidays. This means income is irregular and might be compensated by more stable incomes sources such as cattle ranching.
- Uncertainties related to COVID 19 continue to hamper travel. Given the public security situation in the country, tourism can be promoted only in a few areas of the TEFOS- targeted municipalities. This includes the area around La Macarena (Meta) and Puinawai (Guianía) national parks and the area close to San José de Guaviare (Sierra La Lindosa). In Mocoa and Puerto Asís, at the western part of Putumayo, there is considerable nature-based and ecotourism development, but this does not include TEFOS municipalities. Apart from La Macarena and Picachos, all protected areas associated to TEFOS municipalities (PNN Chiribiquete, PNN Paramillo and PNN La Paya) do not meet the ecotourism vocation

criteria of Resolution 531 of 2013[40]. The remoteness of these protected areas and the public order issues makes them unfeasible as tourist destinations. In addition, the Puinawai National Nature Reserve is officially not open for ecotourism although it is more accessible and has tourism in its buffer zone and in the Mavecure hills.

Knowledge gaps

Despite the environmental advantages of nature-based tourism to conserve the environment, there is a clear lack of quantitative and qualitative data on the environmental, social and economic benefits of this value chain, that would provide evidence on the viability of this livelihood option. There is also a lack of evidence on the attractiveness of this livelihood option to private investors. Mobilising private finance would be essential since tourism requires large investments for infrastructure development.

3. Overview of existing interventions[41]

Initiatives from development cooperation agencies, NGOs, and universities

In the municipalities of Moca and Villagarzón in Putumayo (outside TEFOS municipalities), the Global Green Growth Institute (GGGI) and Corpoamazonia are working on the implementation of a Nature-based Tourism Strategic Plan for Putumayo. They are supporting local stakeholders to strengthen the touristic offer by developing and implementing improvement plans to sustainably manage five touristic attractions, aiming to promote environmental sustainability, governance, and competitiveness among local stakeholders. As part of their work, they list touristic services, products, and visitors within their target area, reporting a maximum of 2,506 visitors in 2019 (CORPOAMAZONIA & GGGI, 2021).

In Cerro Azul, around 20 minutes from San José del Guaviare ancient rock paintings can be visited at Sierra de La Lindosa. The local community charges entrance fees and offers guides and lunch services. However, infrastructure is not very well developed. Most of their local guides are young local people studying to become professional guides. This initiative has received support from REM-Visión Amazonia and other international cooperation agencies. REM Vision Amazonia also supports small associations of private sector enterprises (see below).

In Tierralta, Córdoba there are some early-stage private initiatives of nature-based tourism promoting walking tours, local gastronomy, visits to Indigenous

[40] https://www.parquesnacionales.gov.co/portal/wp-content/uploads/2013/12/RESOLUCION-0531-DE-2013-ACTIVIDADES-EN-PARQUES-NACIONALES-ECOTURISMO.pdf
41 Focused on TEFOS target areas.

peoples communities, waterfalls and bird watching around Paramillo Natural National Park.

Private sector initiatives

La Serranía de La Macarena, Meta is one of the major nature-based tourist attractions of Colombia because of its Caño Cristales. This colourful river attracts thousands of visitors every year who all access it through La Macarena municipality. In the Municipality of La Macarena, there are several dozens of private tour operators that organise tours to Caño Cristales and other destinations. The volume of tourists has triggered the development of lodging and food business in the village and around with more than 650 local families directly involved. However, tourism in La Macarena is still largely informal and the Park Agency admits difficulties in managing and regulating visits to the different attractions.

In the northern and western part of the park, at the Municipalities of Mesetas and Uribe, tourism enterprises are emerging, targeting mostly river destinations such as waterfalls and rafting. Tourism is in its early stages here, so there is little marketing and lodging, transportation and food offers are still underdeveloped. NATUPAZ Tourism Corporation groups nine companies that provide tourist services around the Cañon del Guejar in Mesetas. They provide training for internationally certified professional services for nature and adventure tourism, generating 88 direct jobs that benefit around 250 families. NATUPAZ is a private venture but has received technical and financial support from GIZ and REM-Visión Amazonia.

At the buffer zone of the National Natural Reserve Puinawai, in the Department of Guainía, there are approximately seven tour operators that mainly offer tour packages for ecotourism, bird watching and sport fishing. Nature-based tourism is part of the thematic agenda built between the Parks Agency and four indigenous resguardos[42]. The service offered is community-based with local community members acting as guides and engaging in cooking, cleaning, river transportation, baggage carrying, etc. Within the Reserve there is unregulated tourism as well because the Reserve is formally not open for tourism activities. In PNN Paramillo, local start-ups have identified tourist attractions (páramo landscape, birdwatching) but these have not proceeded because of the public order situation.

42 There are 29 indigenous communities within the RNN Puinawai. The overlapping indigenous reserves are the Cemarí Reserve along the Inírida River, the Upper Guainía River Reserve, the Middle Guainía River Reserve, and the Cuyarí-Isana Reserve.

4. Recommendations on implementing the intervention effectively

Recommendations for TEFOS target areas

Supporting interventions to promote nature-based tourism as a livelihood option needs a comprehensive approach. It requires intervention at all parts of the value chain, as no part can develop on its own. According to local stakeholders and field observations, individual farmers and local communities might have interest in developing tourist enterprises but need training and financing on all aspects of tourism (guidance, transport, food preparation) and administration (financial planning, permits, taxes, marketing, security management). In addition, transport and lodging services need to be established, financial tools need to be available, and marketing of the tourist destination needs to be done collectively. Finally, local policy needs to create an enabling environment for nature-based tourism through protecting the natural attractions, combining destinations, facilitating permits, and promoting the different parts of the value chain.

To support nature-based tourism in Putumayo, GGGI and Corpoamazonia (2021), recommend to: i) Generate basic information for decision making, ii) Support territorial planning of nature-based tourism activities, iii) Strengthen sustainable management and operation of nature-based tourism activities, iv) Improve nature-based tourism offer, v) Support capacity building processes (including training of local guides, support local stakeholders associations, especially those with young people and women participation, development of technical and managerial skills), and vi) Position specific nature-based tourism attractions and destinations. These recommendations could be extended to other areas in the Amazon region.

Table 10. Recommendations to address the barriers that limit the nature-based tourism value chain at TEFOS target areas.

Main Barriers	Recommendations
Poor management of natural areas	Collaboration with CAR and other environmental agencies of local governments to connect tourism strategies with other environmental management strategies and enforce spatial planning.
Underdeveloped value chain	Comprehensive focus on all elements of value chain, articulation of individual initiatives.
Tenure security	Coordinated implementation of Pillar 3 and Pillar 1
Financing	Provide (soft) credits, particularly in post-conflict areas through solidarity schemes with national banks.
Unclear nature tourism public policy	Support to public agencies in regulation, strategies, and plans.

Remaining public order issues	Careful planning of tourism activities in secure areas; coordinated implementation of Pillar 3 and Pillar 2 of TEFOS.
Uncertainties related with COVID 19	Businesses must develop dynamic capabilities, keep up with the adoption of technology and innovations including new business models and strategies that adapt to the external changing conditions.

Source: Compiled by authors.

Recommendations for extending or scaling up existing interventions

A recommended intervention strategy for TEFOS to promote nature-based tourism, within its target areas, could be based on three major lines of work, complementary to ongoing initiatives:

- Promote the development of key elements of the nature-based tourism value chain, including tourism operators, specialised and bilingual guides, service providers (food, transportation, and lodging) and marketing.
- Provision of financial tools like soft credits and incentives to develop the required infrastructure and the necessary human skills to operate them.
- Strengthen public policy strategies regarding tourism promotion, control, and security[43].

These strategies should focus on specific regions where there is a combination of tourist attractions, accessibility and a positive (and likely long term) public order situation. The areas around the Serranía de La Macarena and Puinawai parks, and San José del Guaviare comply with those characteristics where TEFOS activities could be extended later. In these regions, GIZ, WWF and USAID supported projects have created capacities that can be strengthened, connected and scaled.

Awake Travel, one of the biggest nature-based tourism operators could be a key partner for TEFOS. They connect travellers with local hosts to offer nature and conservation trips working with over 300 local hosts in more than 60 destinations, including Serranía de La Macarena and Puinawai parks, and San José del Guaviare attractions. They are recognised for promoting a fair benefit sharing with local stakeholders (Awake Travel, 2022). Other key partners could include USAID funded Amazonia Vital Project, WWF, GIZ and Economic Cooperation and Development (SECO) - Swisscontact Foundation.

43 Stakeholders interviewed at the field are in favour of tourism although some recognize that it cannot be developed in their villages or municipalities due to security reasons and/or lack of the required infrastructure.

Rubber

1. Overview of the nature and scale of production and markets

Description

The rubber tree (Hevea brasiliensis) is cultivated in agroforestry systems usually mixed with cocoa and wood species, but also can be cultivated with corn, plantain, pineapple, and amazon fruits like cupuaçu and arazá. It is also cultivated as a monoculture.

Natural rubber production is a sustainable livelihood alternative due to its potential for reforestation, which has been supported by international, national, departmental, and local efforts since 1965. The value chain was strengthened by the Colombian Institute for Agrarian Reform, the Competitivity Agreement in 2010, and the recognition of the value chain by MADR in 2012 (Ramírez et al., 2018).

There are five main rubber production zones in Colombia located in the following regions:

- Cacao-rubber belt (Antioquia and Córdoba) with 7.514 ha.
- Centre of Magdalena (Caldas, Cundinamarca, and Tolima) with 2,966 ha.
- Middle of Magdalena (Santander and Norte de Santander) with 10.005 ha.
- Amazon region (Putumayo, Caquetá, and Guaviare) with 7.406 ha.
- Orinoquia region (Meta and Vichada) with 33.069 ha.
- Other regions: 554 ha.

Colombia has around 61,514 hectares planted with rubber, distributed in 15 departments. The Department of Meta holds the bigger participation with 46.20% of the rubber production. The third producer is Antioquia with 19.60%. The departments of Caquetá, Córdoba, Guaviare, and Putumayo are also rubber producers (Martínez, 2021; MADR, 2021b). Table 11 shows planted and productive areas, and production and yield of rubber in TEFOS departments in 2019.

Table 11. Planted area, productive area, and productivity of rubber in TEFOS departments (2019).

TEFOS Department	Planted area (ha)	Productive area (ha)	Production (t)

Antioquia	3,408	1,022	1,431
Caquetá	3,697	971	1,456
Córdoba	2,197	659	923
Guaviare	775	116	140
Meta	12,261	7,172	9,324
Putumayo	338	89	87

Source: Compiled by authors with data from MADR, 2021b.

Markets

National rubber production has been increasing during the last six years, from 10,800 tons in 2013 to 13,107 tons in 2019 (Martínez, 2021). Domestic consumption was around 22,000 tons, with the difference between domestic production and consumption met with imports (MADR, 2021b). The Colombian rubber sector has competitive advantages since natural rubber has strong national and international demand. However, as all global commodities, its price depends on the international market and is particularly volatile. For example, during the last ten years the rubber price has oscillated between 125 and 350 JPY/kg. There are several possible reasons for this volatility, including supply shortfall, low-levels of stock, high levels of supply, low levels of demand e.g., during Covid-19 in 2020) and high levels of demand (Srisuksai, 2020).[44]

Actors in the Colombian industrial sector mention that despite being interested in buying the national product, they have, for years, met their raw material requirements through Guatemalan importers and producers. This guarantees them favourable prices with volumes, delivery times and qualities adapted to their needs (Mehta, 2016). At the regional level, Brazil and Guatemala are the main producers of rubber in Latin America. International demand for natural rubber latex increased due to COVID 19 and the associated need for more protection elements and medical supplies (Analitik, 2022).

According to OEC portal, in 2020 Colombia exported US$ 1.43 million of natural rubber in other forms to USA; US$ 8.57 million of TSNR to Brazil, Malaysia, Chile, Peru and Mexico; and US$ 859.000 of natural rubber latex to USA, Panama and Ecuador. At the same time Colombia imported US$ 1.20 million in natural rubber in other forms from Brazil, Malaysia, and China mostly; US$ 9.80 million of TSNR from Indonesia, Brazil, Guatemala, Vietnam and Italy; and US$

[44] During the last 10 years, the rubber price has oscillated between 125 and 350 JPY/kg with high prices in 2013, 2017 and 2021 and low prices in 2016 and 2019-2020 (https://tradingeconomics.com/commodity/rubber). Its variability has several reasons for its volatility, for instance: supply shortfall, low levels of stock, high levels of supply, low levels of demand (e.g., COVID in 2020) and high levels of demand (Srisuksai, 2020).

10.6 million in natural rubber latex from USA and Panama. (OEC, 2022a; OEC, 2022b; OEC, 2022c).

2. Opportunities and constraints

Environmental and social benefits

Rubber cultivation cannot be considered a single productive chain but must be considered as part of a long-term agricultural plan. During the seven years of the rubber tree maturation period, farmers need other sources of income that enable them to cover the maintenance costs of rubber cultivation (Nuñez et al., 2017). Planted in agroforestry systems, it contributes to the generation of ecosystem services and crops for local consumption.

Potential for income generation, market development and value for money

The cultivation of natural rubber is a productive activity with a duration of up to 35 years, which generates an important contribution to permanent and formal rural employment. For each four hectares of rubber cultivation, one direct job and three indirect jobs are generated annually (MADR, 2021b).

The recommended management practices are expensive, usually, producers use fewer inputs and wages for maintenance. Therefore, the maintenance cost can decrease between 10% and 20%. However, the absence of good agricultural practices has a negative effect on yields. In those farms where only family labour is used for maintenance and harvesting activities (which is common in Caquetá), families could obtain an income of COP $2,268,716 per year or COP$ 189,015 per month. A family requires 3.9 hectares to generate a minimum wage per family (Ramírez et al., 2018).

The dry rubber production in Colombia is mainly exported for the tire industry. Caquetá, Meta, and Santander have processing plants to produce Technically Specified Natural Rubber (TSNR) while Antioquia has a latex processing plant.

Barriers for implementation (at scale)

A study carried out by Fedesarrollo & USAID (Núñez et al., 2017) prioritised the following barriers for the rubber value chain:

- Access to production and marketing means.
- Information and knowledge as the technical assistance provided is intermittent, which is related to the opening and closure of State and international cooperation programs.
- The production quantity and quality, since small scale sales do not provide a bargaining power or market access.

- Commercialisation is the biggest challenge for rubber producers since it involves a complex process that requires the standardisation of rubber quality, commitment in the implementation of good agricultural practices, and guarantee of minimum production quantities (Ramírez et al., 2018).
- Abandoned rubber plantations. According to local stakeholders the abandonment of some plantations is related with market volatility, the lack of labour (among others illegal crops pay higher prices for labour). See table 11 for details.
- Another barrier is that despite the domestic demand and interesting in buying the national product, national companies have, for years, met their raw material requirements through Guatemalan importers and producers.

Knowledge gaps

Despite the fact that the rubber is relatively established in these territories, there is little evidence on the strength of market demand for national rubber, the attractiveness for private investors to mobilise finance for this value chain, and the profitability of new investments (VfM).

3. Overview of existing interventions[45]

Initiatives by development cooperation agencies, NGOs, and universities

The rubber production initiatives identified in Caquetá and Guaviare have been active for around 20 years. During this time, they have received different support at different times, specifically from development cooperation agencies. Visión Amazonia supports local producers' organisations Asoheca and Asocap in Caquetá that group together 115 families and 1,024 hectares under conservation agreements. Asoheca has its own processing plant that buys rubber from its associates and produces technically specified natural rubber called TRS20, composed by 100% natural latex, for the international market. In Guaviare, Visión Amazonia supports Asoprocaucho with 126 families and 1,919 hectares under conservation agreements. There is also potential to support the rubber value chain in the TEFOS municipalities in the departments of Antioquia and Córdoba.

Private sector initiatives

Puerto Rico and San Vicente del Caguán are TEFOS municipalities in Caquetá with the largest rubber cultivated area in the department. Neighbouring Doncello municipality also host important rubber plantations but is just outside TEFOS target area. The total number of rubber producers in the department is

45 Focused on TEFOS target area.

estimated at 1,216 with an average area of 4.4 hectares per farm (Ramírez et al., 2018).

4. Recommendations

Recommendations for TEFOS target areas

To support local rubber producers and its associations, TEFOS could focus on the bottlenecks of production, commercialisation and processing or transformation as a key step to strengthen the rubber value chain. The trends of the domestic and international rubber market and the alternatives for producers in TEFOS target areas should be investigated (Ramírez et al., 2018).

Considering the large amount of rubber area planted that is currently unproductive, TEFOS could support the recovery and improvement of existing rubber plantations, including the enhancement of rubber agroforestry systems with the inclusion of productive crops, cocoa, and wood trees. One of the main causes of the rubber plantations abandonment is related to labour shortages.

Technical assistance should be provided, targeting groups of producers (associations and committees) rather than individual farmers aiming at promoting an effective collective action at scale. It is also necessary to strengthen the associations' administrative, managerial, and financial skills. Table 12 shows the main barriers and recommendations for the rubber value chain.

The participation in special markets through inclusive businesses (such as Fair Trade) can buffer the risk of price fluctuation. To achieve this, the country's rubber producers must be more competitive (higher yields) in terms of traceability and quality (Mehta, 2016).

Recommendations for extending or scaling up existing interventions

The value chain model implemented by Asoheca in Caquetá could be extended to more rubber producers in the department municipalities and other neighbouring municipalities. Asoheca members prioritised the renewal of rubbers plantations, enlargement of the productive area (based on existing plantations) and technical assistance for new members as their main needs. The generation of information for decision making including national and international markets information could also be addressed by a TEFOS intervention. Asocap in Caquetá and Asoprocaucho in Guaviare, as well as other local producers' associations in Antioquia and Cordoba could be supported by TEFOS targeting their needs to strengthen the rubber value chain.

Table 12. Main barriers and recommendations for the rubber value chain in TEFOS target areas.

Main Barriers	Recommendations
Commercialisation is the biggest challenge since it involves a complex process that requires strong associativity to standardise rubber quality, commitment in the implementation of good agricultural practices, and guarantee of minimum production quantities (Ramírez et al., 2018).	Support local rubber producers and associations to improve commercialisation and processing or transformation. Investigate the trends of the domestic and international rubber market and the alternatives for producers in TEFOS target areas (Ramírez et al., 2018). Support the recovery and improvement of existing (currently unproductive) rubber plantations, including the enhancement of rubber agroforestry systems with the inclusion of productive crops, cocoa, and wood trees. Strengthen producers' associations administrative, managerial, and financial skills.
Access to production and marketing means.	Strengthen producer associations' administrative, managerial, and financial skills. Support the recovery and improvement of existing (currently unproductive) rubber plantations, including the enhancement of rubber agroforestry systems with the inclusion of productive crops, cocoa, and wood trees. Strengthen producer associations' administrative, managerial, and financial skills.
Information and knowledge because of varying technical assistance.	Technical assistance targeting groups of producers (associations and committees) rather than individual farmers aiming at promoting an effective collective action at scale.
The production quantity and quality.	Technical assistance targeting groups of producers (associations and committees) rather than individual farmers aiming at promoting an effective collective action at scale. Strengthen producer associations' administrative, managerial, and financial skills.

Source: Compiled by authors.

Sacha inchi

1. Overview of the nature and scale of production and markets

Description

Sacha inchi (Plukenetia volubilis L.) is emerging as a sustainable green business. Since it has a short planting cycle it is used as an alternative substitution crop (Díaz et al., 2019). It is known for adapting to various agro-climatic conditions. The implementation of agroforestry systems using native Amazonian species such as sacha inchi, cupuaçu (Theobroma grandiflorum) and cocoa (Theobroma cacao) are part of the actions that have been prioritised by the National Ecological Restoration Plan to curb the degradation of ecosystems (Instituto SINCHI, 2019a).

Sacha inchi has also been identified by the Comprehensive National Program for the Voluntary Substitution of Illicit Crops (PNIS), as an alternative to the cultivation of illicit crops given how quickly it fructifies and due to its permanent harvest during the year (Instituto SINCHI, 2019a).

Markets

Sacha inchi is found in the North and West of the Amazon basin (Kodahl & Sørensen). The largest producers are located in the Department of Putumayo with 282 hectares, followed by Valle del Cauca, Caquetá and Antioquía. The Amazon and Orinoquia regions report 621 hectares, located in Casanare, Caquetá, Meta, Putumayo, and Vichada, with an average yield of 2.8 tones/ha (MADR, 2019).

MADR (2019) estimates that there are about 2,300 producers, distributed in 2,000 productive units, 99% of which report that they manage the crop using an organic agriculture approach. Sacha inchi is used in agroforestry arrangements in conjunction with other species of commercial value, such as cupuaçu, plantain, cocona, acai berry, and timber species, which are a source of food for fauna and fix nitrogen. Sacha inchi oil and seeds are little known in the domestic market, as well as their nutritional properties, which means that the national demand is low (Instituto SINCHI, 2019a).

Between 2014 and 2018 production increased from 119 hectares cultivated in 2014 to 1.100 hectares in 2018, with an average yield of 3.18 tons of seeds per hectare. National production exceeds 2,400 tons of sacha inchi seeds per year (MADR, 2019). During field visits several stakeholders mentioned a lack of market opportunities which led to producers abandoning their plantations. However, the research team did not find evidence of this in the literature

reviewed. This may be because of the incipient nature of the sacha inchi development in Colombia.

Globally, the largest producer and exporter of sacha inchi is Peru (Kodahl & Sørensen, 2021). In 2021, sacha inchi based products exports, including oil, snacks and roasted seeds, reached an amount of US$6 million FOB, exported mostly to USA and Taiwan (PromPeru, 2021a; PromPeru, 2021b). Peru is also the main buyer of Colombian sacha inchi seed production (Instituto SINCHI, 2019a). Colombia applied certain lessons from Peru on cultivation and processing techniques.

2. Opportunities and constraints

Environmental and social benefits

Since it is a climbing plant, sacha inchi is usually cultivated with the support of live fences that can provide habitats for other organisms, increasing biodiversity. Due to its nutritional and agronomic attributes, it has attracted increasing attention in recent years. In Meta department, sacha inchi crops constitute an entrepreneurship option for many families looking for a legal and profitable economic alternative to illicit crops or low profitable cattle and help to strengthen the social fabric during the post-conflict period because of the organisation, joint learning and required joint market access development (Gómez & Montaña, 2019).

Thanks to its excellent nutritional properties, sacha inchi also has the potential to support food security and alleviate malnutrition on a local scale. Sacha inchi oil has a valuable composition, good sensory acceptability and has numerous potential applications in gastronomy, medicine, and cosmetics. Seeds can be consumed roasted and salted as a snack or used in different preparations (Kodahl & Sørensen, 2021).

Potential for income generation, market development and value for money

There are several private initiatives and start-ups dedicated to the cultivation of sacha inchi and production of oils and roasted seeds. However, there is no information available about its profitability or the demand for sacha inchi products in domestic and export markets.

A case study carried out in Piura, Peru reveals that considering an initial price of around US$ 2.40 per kilogram of product, the profitability is 73% higher than the opportunity cost of capital, ensuring economic benefits for the farmers (Santillan, 2018).

Barriers for implementation (at scale)

The main barriers identified for the sacha inchi value chain are:

- Little-known product in the domestic market, linked with low demand and consumption.
- Limited access to domestic market channels at local, regional, and national level.
- Low development of agronomic production alternatives and technological packages, including rudimentary phytosanitary management schemes (MADR, 2019b).
- Lack of quality parameters to facilitate the establishment and promotion of stable commercial relationships and channels (MADR, 2019b).
- Many families that currently cultivate sacha inchi lack the required technical capacities and have not received government support, despite this being offered under the PNIS (unfulfilled commitments of peace agreement; Gómez & Montaña, 2019).
- Underdeveloped export processes.
- Dependence on Peru as the main buyer of Colombian sacha inchi and largest producer and exporter of sacha inchi.

Knowledge gaps

Access to the domestic market is a major barrier. According to the evidence, this could be partially related to the lack of marketing skills of the stakeholders involved in this value chain on the one hand and the lack of acceptance of sacha inchi based products in the domestic market on the other hand. Information on this is scarce and non-conclusive.

There is a lack of data on real costs and profits for stakeholders working in the different steps of the value chain, especially those at farm level, to provide solid evidence on the profitability of investments (VfM) and the real impact of sacha inchi as an additional economic income source for local families.

3. Overview of existing interventions[46]

Initiatives from development cooperation agencies, NGOs, and universities

Colombia Sostenible has funded local organisations in Córdoba, Guaviare, Caquetá, and Putumayo to cultivate sacha inchi and protect the forest through conservation agreements (Colombia Sostenible, 2021).

46 Focused on TEFOS target areas.

In 2021, Colombia Sostenible supported the establishment of 94 hectares of sacha inchi in the municipalities of Montelíbano, Puerto Libertador y San José de Uré en Córdoba benefiting 94 local families. The funding agreement includes the establishment of Zero Deforestation Agreements to protect 30 hectares of forest. ExportSacha is working with the beneficiary families' association to strengthen technical and managerial skills, including the implementation of a technological package aiming to increase productivity and achieve an organic certification to reach Saudi Arabian markets (Colombia Sostenible, 2021).

Private sector initiatives

ExportSacha, also called Sacha Inchi Consortium, is a group of 14 private companies, most of them owned by local farmers, focused on the exportation of sacha inchi oil, protein power, snacks and roasted seeds with international standards and requirements. They have associated companies located in Arauca, Antioquia, and Córdoba, among others, benefiting more than 400 families (ExportSacha, 2022).

There are several local organisations and start-ups producing, processing, and selling sacha inchi oil and seeds in TEFOS target areas. The main producers' associations are located in Meta, Vissacha, Sacha Paz and Aspromacarena. They also work on marketing and commercialisation. Inkalia, the brand name of Industries Montecamoa, is an important oil producer in the region. Chamorro Benavides SAS – Inzunai enterprise, located in La Hormiga, Valle del Guamuez, Putumayo, produce and sell sacha inchi oil, seeds, and grafted seedlings (Alvares et al., 2018). AGROINCOLSA S.A.S, ASOPROSAOP and COOPISACHÁ, located in In Puerto Caicedo, Putumayo, partnered to channel greater benefits to its associates (Muñoz, 2019). Kattalei is a start-up located in Mocoa, Putumayo that uses sacha inchi as one of its main ingredients for vegan cosmetics development.

Asoproagro, a local producer association with 40 members, supports the establishment of sacha inchi as part of agroforestry systems, to supply their new warehouse and processing plant outside San José del Guaviare, donated by Visión Amazonia. Agrosolidaria Florencia, in Caquetá is also buying sacha inchi from its associates to produce oil and roasted seeds in their own facility.

4. Recommendations

Recommendations for TEFOS target areas

There is a need to strengthen the industrialisation process in the sacha inchi value chain and support market development.

Technical assistance targeting local associations and groups of producers along with the implementation of a technological package could improve productivity

and therefore income for farmers. According to Gómez and Montaña (2019) the creation or strengthening of partnerships and associations among small producers will facilitate the link with actors dedicated to buying the production, which helps to guarantee the commercialisation of the sacha inchi at the farm level.

MADR (2019) identifies four major challenges: 1) strengthening the value chain; 2) consolidation of products and markets that use the raw material; 3) promotion of research for the development of productive alternatives; and 4) promotion of the certification of traceability, quality, and safety protocols.

TEFOS could work, in partnership with ongoing initiatives and start-ups, providing technical assistance to improve sacha inchi productivity and access to markets. Technical capacity building activities should take place at demonstration or pilot farms targeting associations or groups of producers, using a very practical approach, so farmers will be able to replicate on their own what they learn. The methodology of trainer of trainers could be used to increase local technical capacities.

Local stakeholder organisations must also strengthen their administrative and business skills including accounting, supplying, marketing and management of technology, necessary to manage, commercialise and sell their products. Table 13 contains recommendations to address the main barriers that limit the extension of the sacha inchi value chain.

Recommendations for extending or scaling up existing interventions

The main barrier for sacha inchi value chain is a lack of market development for Colombian production. Therefore, TEFOS could work on strengthening small companies and start-ups like Vissacha, Sacha Paz, Aspromacarena and Montecamoa in Meta; Inzunai in Putumayo; Asoproagro en Guaviare; and Agrosolidaria en Caquetá, among others. These could become key partners to work with in the replication and extension of activities associated with production, processing, commercialisation, and consumption of sacha inchi and its products.

Table 13. Recommendations to address the barriers that limit the sacha inchi value chain at TEFOS target areas.

Main Barriers	Recommendations
Low commercialisation including little knowledge of marketing channels, potential buyers, and minimal advertising.	Partnerships or associations among small producers facilitate the link with actors dedicated to buying the production of sacha inchi, to guarantee the commercialisation of the product and the generation of income for farmers.

	Consolidation of products and markets that use sacha inchi as raw material. Strengthen local producers' organisations managerial and business skills (training).
Sacha inchi oil and seeds are little known in the domestic market, as well as their nutritional properties, which means that the national demand is low.	Marketing campaign detailing the stories behind the cultivation of sacha inchi and the nutritional and environmental benefits of the oil and the seeds. Consolidation of products and markets that use sacha inchi as raw material.
Incipient exportations processes. Dependence on Peru as the main buyer of Colombian sacha inchi and largest producer and exporter of sacha inchi.	Partnerships or associations among small producers facilitate the link with actors dedicated to buying and exporting sacha inchi, to guarantee the commercialisation of the product and the generation of income for farmers. Strengthen local producer organisations' managerial and business skills (training).
Many families that currently cultivate sacha inchi lack the required technical capacities.	Technical assistance targeting local associations and groups of producers, along with the implementation of a technological package, could improve productivity and therefore income.
Low technology development for managing and processing the crop.	Technical assistance targeting local associations and groups of producers, along with the implementation of a technological package, could improve productivity and therefore income. Promotion of the certification of traceability, quality, and safety protocols.
Rudimentary phytosanitary management schemes.	Technical assistance targeting local associations and groups of producers, along with the implementation of a technological package, could improve productivity and therefore income. Promotion of the certification of traceability, quality, and safety protocols.

Source: Compiled by authors.

TEFOS could support the creation or strengthening of partnerships or local associations of small producers to facilitate links with bigger enterprises, like ExportSacha who are dedicated to buying, processing, selling and exporting, sacha inchi products. It could also have a key role in the promoting of a marketing campaign with the stories behind the cultivation of sacha inchi and the nutritional, cosmetic and environmental benefits of the oil and the seeds, as a way to reach the domestic market and support start-ups developing sacha

inchi-base food products like Inkalia, Inzunai, Asoproagro and Agrosolidaria Florencia; and Kattalei and other cosmetics start-ups.

Sustainable Forest Management (SFM)

1. Overview of the nature and scale of production and markets

Description

Sustainable Forest Management (SFM) is defined as a dynamic and evolving concept, which aims to maintain and enhance the economic, social, and environmental values of all types of forests, for the benefit of present and future generations[47].

SFM results from a rational planning process based on the forest characteristics assessment. Planning is prepared by organisations, private companies, or individual professionals with the participation of forest dwellers and other local stakeholders according to national regulations. Sometimes, local customary norms are also considered. SFM is considered as an alternative to keep forests standing and reduce deforestation, maintain ecosystems' functionality in the long-term, and allow the harvest of timber and NTFPs.

As an economic activity based on standing forest management, SFM is a fundamental element of Reducing Emissions from Deforestation and Forest Degradation (REDD) strategies and projects, herewith creating potential for the domestic and global carbon market.

Markets

Colombia has 59.7 million hectares of natural forest (52,3.0% of the total territory) of which around 66% are located in the Amazon region (Visión Amazonia, 2020). Despite this wealth, the country does not supply its domestic timber market because Colombia has a relatively poorly developed timber industry: both legal and illegal timber is imported from countries like Peru and Chile. At the same time, forest areas are being rapidly transformed through the establishment of illicit crops, land grabbing, new infrastructure, illegal mining and especially by the expansion of the agricultural frontier mainly for inefficient cattle ranching (Visión Amazonia, 2020).

A study on forest economics carried out as part of the Green Growth Mission indicates that it is impossible to know the exact productive potential of natural

47 https://www.fao.org/forestry/sfm/en/

forests and existing plantations in Colombia, the volume of timber processed in the national industry, and the number of jobs generated by the sector. However, they estimated a total of 3.8 million cubic meters processed in 2013, of which 25% came from natural forest and 75% from plantations with a contribution of 0.60% to national GDP and 2.90% to agricultural GDP (ONF Andina, 2018).

The Legal Wood Pact promoted by MADS and FEDEMADERAS, groups more than 500 initiatives that aim to contribute to stop deforestation and promote a forestry economy based on the goods and services of the forests (MADS, 2022). Since the start of it Legal Wood Pact in 2009, Colombia has seen sales of legal timber grow from US$ 500,000 in 2011 to US$ 13 million in 2018, with sustainable forestry now considered a key growth area for the economy (Selibas, 2020).

2. Opportunities and constraints

Environmental and social benefits

SFM is widely considered as a key tool for forest conservation and economic and social development of local communities (Yepes, 2019). SFM gives value to the standing forest and interventions related to the development of this value chain can be expected to generate additionality in terms of the consolidation of forest areas and the provision of ecosystem services and its associated biodiversity, limiting soil degradation, erosion and sedimentation, maintaining water quality, and maintaining landscape integrity.

The integration of local and customary norms, with technical guidelines according to the current regulations, offers an opportunity to Indigenous peoples, local farmer families and forest dwellers to harvest timber and NTFPs generating a supplementary economic input, and providing value to standing forest.

Besides environmental and economic benefits, SFM has a series of social benefits related with a positive collective action, strengthened local organisations, training of leaders and gender equity actions, among others (Visión Amazonia, 2020). Local governance and organisational issues are key especially if the intervention aims to work with the entire value chain integrating harvesting, transformation, marketing, and sales. SFM is integrated in the Colombian REDD+ strategy as part of the principle of sustainable development and green growth (Gobierno de Colombia, 2017).

Potential for income generation, market development and VfM

A planning exercise by Visión Amazonia (2020) based on Los Puertos cluster Forestry Management Plan[48] shows an annual profitability of around COP$ 286,825,775 for timber harvesting of 2,499.62 m3 of unprocessed wood in an area of 220 hectares[49]. This represents an income of COP$ 1,039,224 per family per month, which is higher than the monthly minimum wage equivalent to COP$ 1,000,000 per month. Table 14 shows the main costs and income from the unprocessed wood, the amount that goes to local families and other data.

Table 14. Projection of revenues and costs of unprocessed wood SFM in Los Puertos cluster.

Item	Amount (COP$)	Observations
Production income (unprocessed wood)	1,374,560,000	220 hectares
Production costs (management plan, licenses, technical assistance, transportation, cutting and tools)	1,087,743,225	220 hectares
Profitability	286,825,775	220 hectares
Amount to distribute among 23 families per year	12,470,686	COP$/year
Amount to distribute among 23 families per month	1,039,224	COP$/month

Source: Compiled by authors with data from Visión Amazonia, 2022.

If the same volume of timber has a primary transformation process (sawmilling and drying), profits increase around 64% and local families would receive COP$ 2,893,963 per month, which is almost twice the minimum wage. According to the Management Plan, a percentage of the profits should be invested in forest-related activities (Table 15)

Table 15. Projection of revenues and costs of primary processed wood SFM in Los Puertos cluster.

Item	Amount (COP$)	Observations

48 Los Puertos Forestry Management Plan has a forest management unit of 8,239 hectares with a harvestable forest area of 6,200 hectares. Annual cutting units of an average of 220 hectares and a 25 year rotation to secure the forest regeneration and growth (Visión Amazonia, 2020).

49 This planning exercise doesn´t include the timber and NTFPs transformation centre costs.

Production income (unprocessed wood)	2,283,595,600	220 hectares
Production costs (management plan, licenses, technical assistance, transportation, cutting and tools)	1,484,861,767	220 hectares
Profitability	798,733,833	220 hectares
Amount to distribute among 23 families per year	34,727,558	COP$/year
Amount to distribute among 23 families per month	2,893,963	COP$/month

Source: Compiled by authors with data from Visión Amazonia, 2022.

SFM in Guatemala´s Maya Biosphere Reserve

In the Multiple-Use Zone of Guatemala's Maya Biosphere Reserve, the usufruct rights to timber and NTFPs were granted through concession agreements to 12 community organisations and two private timber companies in the late 1990s and early 2000s. After more than a decade, some concessions are successfully managing forests for multiple uses while others have had limited success or failed completely.

Current estimates of aggregate annual revenue are more than US$ 13,000,000 from certified timber. Harvest and management activities for timber and NTFPs have been reported to generate more than 3,000 jobs annually, representing more than 300,000 person-days. The average annual income per concession member was US$ 1,140 including dividends and wages. This is equivalent to approximately six months of average income for rural Petén, entailing an average of only 39 days of labour (Radachowsky et al., 2012)

Barriers for implementation (at scale)

Several barriers to effective and profitable SFM have been identified:

- The classical regional and local development vision that does not integrate forest into local economies but rather considers forests an obstacle for economic development and growth.
- The unclear legal situation of some forest dwellers related to land tenure and forest use rights.
- Unclear public policy regarding forest harvesting. Currently MADS is not supporting SFM activities even though it promotes the Legal Timber

Pact[50] and the Autonomous Regional Corporations (local environmental authorities) have been actively promoting SFM as a sustainable livelihood option.

- Large informality and illegality of the domestic timber market, resulting in high prices for legal timber that cannot compete with the low prices of the illegal timber market.
- At the Department of Amazonas, the lack of control over timber imports allows the entry to Leticia of Peruvian timber without clear origin. As a result, Colombian timber producers have to compete with the prices of illegal timber from Perú. This lack of control could create a perverse incentive for legal timber producers in Colombia to look for ways to cut costs through unsustainable practices (EIA, 2019).
- Long distance from the forest where timber and NTFPs are harvested to roads and population centres. This leads to high transportation costs that need to be integrated into the price of timber.
- Lack of quality in the forest management plans, government transparency, and high levels of bureaucracy (Rodríguez-Piñeros, et al., 2018).
- Forest legislation is part of a comprehensive national legal system that does not consider the wide variety of forest types that require different forestry practices and serve several social needs, with an impact on forest compliance (Rodríguez-Piñeros, et al., 2018).

Knowledge gaps:

There is a lack of evidence regarding income generation, market figures and VfM since the data provided refers to a planning exercise that does not have the strength to be used as evidence on the profitability of investments (VfM) and its potential to mobilise private finance. Also, paradoxically, in a biodiverse country like Colombia there is still only a limited number of timber and non-timber species used. This is caused by limited knowledge about many species and unfamiliarity of the market. Research in those areas can help increase the economic potential of standing forests.

50 https://www.minambiente.gov.co/bosques-biodiversidad-y-servicios-ecosistemicos/pacto-por-la-madera-legal-contra-la-deforestacion-y-en-favor-de-los-bosques/

3. Overview of existing interventions[51]

Initiatives from development cooperation agencies, NGO, academy

Visión Amazonia and WWF are committed to the implementation of forestry development clusters (núcleos de desarrollo forestal)[52]. Defined as areas located in the deforestation frontier, with accelerated deforestation processes, an important forest stock, river or land access, and actual and future market opportunities. The forest component is the main economic activity but not the only one, offering an integral vision of territorial development required to ensure economic growth, social inclusion, environmental protection, and to make the use of timber and non-timber resources part of a real conservation strategy (Visión Amazonia, 2020).

Vision Amazonia offered a three-year transitory incentive (Incentivo Forestal Amazónico - IFA) to local stakeholders aiming to work in the forestry clusters. The incentive is an additional income for farmers, and it is intended to guarantee economic resources while the timber and NTFPs transformation centres along with its business plans are ready to operate. However, SFM activities are currently on standby due to a lack of clarity in current public policies. Vision Amazonia worked with local stakeholders in Orotuyo, Solano, Caquetá; Los Puertos in Calamar, Guaviare; and Nueva Ilusión in Cartagena del Chairá, Caquetá (Visión Amazonia, 2022).

GIZ seeks to strengthen forest governance promoting forestry roundtables at departmental level, with participation of multiple stakeholders at Caquetá and Meta. They also support the timber value chain in Cartagena del Chairá and Solano, Caquetá, aiming to connect the different actors that take part in the value chain.

In the municipalities of Segovia, Chigorodó and Apartadó in the Urabá Antioqueño, WWF implements the project Strengthening Forest Governance in Colombia, financed by the IDB. It aims to develop forestry clusters including the preparation of forest management plans, the provision of equipment, the creation of community business and links with markets.

FAO currently supports community forestry (based on SFM principles) at two Indigenous peoples' territories in Yurumangui, Valle del Cauca. It is expected that the wood purchased by Red Faisán from the Yurumanguí River Basin

[51] Focused on TEFOS target area.

[52] The development of forestry clusters is a process of participatory consensus building among multiple stakeholders, including small-holders, Indigenous and Afro-Colombian organisations, regarding economic and environmental alternatives to halt deforestation and restore degraded areas. This is a key activity that allows to empower all institutional and community actors and focus on a common well-being for all.

Community Council will undergo physical and mechanical tests and be made into guitar prototypes using varying combinations of different tree species by the master luthiers of Red Faisán. These prototypes will then be tested acoustically in a recording studio by sound engineers. This will enable the identification of the optimal wood composition and will eventually create a value chain centred on music and natural forests in the Pacific region of Colombia (UN-REDD, 2021).

In 2004 the Cabildo Mayor Indígena de Chigorodó, fully aware that the exploitation and commercialisation of forest only benefited a few non-indigenous intermediaries, took the decision to adopt SFM as a means to control the use and management of natural resources within the Embera Indigenous peoples territory. They developed a Forestry Management Plan for 60,000 hectares, created an indigenous cooperative grouping 28 communities, and received WWF and USAID support. Key successes include the recognition of the need of a sustainable management plan and licenses to harvest timber. Capacity building processes enabled Indigenous peoples to create the necessary skills to lead the sustainable forest management process to control their territory improving local forest governance. One of the main learnings from this initiative was that only the leaders took part in the capacity building processes, taking decisions on behalf of the community without consulting all its members, which led to a lack of support of the ongoing processes and the need to rethink its internal processes (IICA, 2014).

4. Recommendations

Recommendations for TEFOS target areas

- Promote activities that highlight standing forest value, like NTFPs harvesting and payments for ecosystem services and REDD+ projects. Since the last two are outside of TEFOS' scope, these could be done through a partnership with ongoing initiatives.
- Support processes to strengthen legal/regulatory issues and enforcement as well as the policy framework required to promote and implement SMF activities.
- Promote local and national forest governance strengthening with the participation of multiple stakeholders.
- Link the different steps of the value chain, especially timber demand and supply.
- Promote the development of forestry clusters, including wood collection and transformation centres, within forest management areas.
-

Table 16. Recommendations to address the barriers that limit the SFM value chain within TEFOS target areas.

Main Barriers	Recommendations
The development vision does not integrate forest into local economies and sees it as an obstacle for development and economic growth.	Promote activities that highlight standing forest value, like NTFPs harvesting and payments for ecosystem services and REDD+ projects (since the latter two are outside of TEFOS scope, could be done through a partnership).
Vague legal situation related to land tenure and forest use rights.	Support processes to strengthen legal/regulatory issues and enforcement. Promote local and national forest governance strengthening with the participation of multiple stakeholders.
Unclear public policy regarding forest harvesting.	Support processes to strengthen legal/regulatory issues and enforcement. Promote local and national forest governance strengthening with the participation of multiple stakeholders.
Informality and illegality of the domestic timber market, resulting in high prices for legal timber that cannot compete with the low prices of the illegal timber market.	Support processes to strengthen legal/regulatory issues and enforcement. Promote local and national forest governance strengthening with the participation of multiple stakeholders. Link the different steps of the value chain, especially timber demand and supply.
Long distance from the forest to roads, markets, and population centres.	Promote the development of forestry clusters within forest management areas. Link the different steps of the value chain, especially timber demand and supply.
Lack of quality in the forest management plans and government transparency, and high levels of bureaucracy (Rodríguez-Piñeros, et al., 2018).	Strengthen technical and managerial capacities of local stakeholder organisations.
Forest legislation is part of a comprehensive national legal system that does not	Support processes to strengthen legal/regulatory issues and enforcement.

consider the wide variety of forest types, with an impact on forest compliance (Rodríguez-Piñeros, et al., 2018).	Promote local and national forest governance strengthening with the participation of multiple stakeholders.

Source: Compiled by authors.

Recommendations for extending or scaling up existing interventions

The initiatives developed by Vision Amazonia, WWF and FAO provide the basis for the development of new forestry clusters building on their experience to up-scale ongoing activities. It also provides the basis for working on SFM as a sustainable livelihood that gives value to standing forest, generates economic inputs for forest dwellers including small-holders and Indigenous families, promotes local stakeholder associations and governance. SFM could be implemented in large, forested areas in TEFOS municipalities within the Amazon, Orinoquia, and coastal regions.

The WWF, IDB-funded project implemented in the municipalities of Segovia, Chigorodó and Apartadó in the Urabá Antioqueño will be finishing next year opening an opportunity for TEFOS to complement and extend WWF's engagement there.

Payments for ecosystem services and REDD+ projects are also viable alternatives, mentioned by several local stakeholders, for forest conservation and sustainable management even though both are outside of TEFOS' scope. The Amazonia Vital, a USAID-funded project, is planning to work on SFM linked with REDD+ and other financial mechanisms for forest conservation. The ART is carrying out pre-feasibility studies for REDD+ projects in the Amazon region with support from USAID and UNDP.

Sustainable Livestock Management

1. Overview of the nature and scale of production and markets

Description

Livestock farming is the major land use in Colombia and in all TEFOS municipalities, in terms of the area of land used. Cattle ranching is widely recognised as a major agent in deforestation since most deforested areas are used in extensive livestock farming schemes. At the deforestation frontier, cattle ranching is usually seen as a way of grabbing land (Nepstad et al., 2013; Armenteras et al., 2013; Rico, 2017).

According to the 2016 Colombian National Agricultural Survey, more than 37 million hectares in Colombia (32% of the entire national territory) are dedicated to livestock farming. More than half of this area is not considered to have the environmental characteristics that would make it suitable for grazing (DANE, 2016; cited by Ferrini et al., 2020). Antioquia, Casanare, Córdoba, Meta, and Caquetá are the main livestock departments with 48% of the total heads of livestock (MADR, 2020).

In established livestock farming areas (deforested a considerable time ago and converted into an agricultural landscape in mosaic with forest patches and other natural vegetation) sustainable livestock farming has the potential to contribute to the conservation of natural resources through the adoption of environment-friendly production systems. These systems improve livestock productivity, reduce soil degradation, and promote its restoration, rehabilitation, and recovery, along with the conservation of biodiversity.

Most livestock farming in the Colombian Amazon does not meet environmental sustainability or animal health criteria. According to Instituto SINCHI (2019b) livestock farms in the Amazon region are of marginal productivity, generate soil compaction, erosion and few jobs and business opportunities.

Markets

The livestock sector contributes 1.04% to the national GDP and 21.80% to the agricultural and livestock GDP[53]. It generates 1.06 million direct jobs equivalent to 6.00% of national employment. The size of the livestock sector is three times the size of the coffee sector (MADR, 2020).

In 2021, meat, livestock and dairy exports exceeded US$ 427 million, a 50.60% increment compared to the 2020 figures (FEDEGAN, 2022)[54]. According to Dueñas (2022), the high demand of meat increased its price by 33% nationwide.

2. Opportunities and constraints

Environmental and social benefits

Sustainable livestock farming is based on a combination of good management practices. Management practices are comprised of: (i) farm planning, (ii) rotation (iii) improved grassland management, (iv) silvopastoral systems including fruit and timber trees, (iv) improved herd management, (v) improved food (included for emissions reductions through enteric fermentation) and (vi)

53 The agricultural and livestock GDP contributes with 6.08% of the national GDP (MADR, 2020).

[54] According to Dueñas (2022) hand in hand with the increased demand, the need to find and adapt lands for livestock has skyrocketed, which has caused the deforestation of protected areas, such as national parks and forest reserves of the Second Law.

use of improved cattle genetic quality. Other elements associated to sustainable livestock farming include farmer association, conservation agreements and value chain improvement through collective milk transport and storage, cheese production, etc.

The use of silvopastoral systems enable increasing tree cover and carbon dioxide sequestration, improving biodiversity, improving the soil quality, and increasing the productivity of farms. Silvopastoral systems also efficiently complement the biodiversity conservation function of forests, and together they help to recover the local flora and fauna in areas used for livestock (World Bank, 2020a; World Bank, 2020b).

Sustainable livestock projects usually link the support provided to farmers to a voluntary arrangement to conserve and/or restore the remaining forest in their farms, which is usually done through the signature of a conservation agreement.

The Climate Smart Livestock Project implemented by FAO Ecuador

The Climate Smart Livestock Project was a GEF project implemented by FAO Ecuador in partnership with the Ministries of Agriculture and Environment.

The project achieved important results related to: the reduction of direct greenhouse gases emissions; the design and creation of a green credit line in a State Bank for financing climate-smart livestock practices; the development of online tools for measuring the greenhouse gases emissions reduction and adaptive capacity of farms; together with the generation of affirmative actions aimed especially at small land owners, women heads of households, and women leaders of livestock, in order to help to eliminate obstacles that hinder their development (FAO, 2020).

Sustainable livestock strategies are frequently connected to climate change adaptation and mitigation and have been included in national policies. The Cattle Farming Nationally Appropriate Mitigation Actions is a public policy whose purpose is to direct the sector towards low-carbon practices through the integration of environmental, social and economic sustainability elements. It seeks to promote the adoption of sustainable livestock methods on 36 million hectares of 15 departments, including Arauca, Antioquia, Caquetá, Córdoba and Meta. Changes in the use of land in farms are mainly based on the adoption of silvopastoral systems and the release of land for other productive uses (Gobierno de Colombia, 2021).

Potential for income generation, market development and value for money

All TEFOS departments, including areas affected by the conflict, are characterised by the presence of livestock activities. In the Amazon and Orinoquia, double-purpose livestock activities are predominant, focused on milk production, which in most cases is used for local consumption and the production of cheese (World Bank, 2020a).

Pilot tests are being conducted in 16 farms of the Colombian Caribbean region on the Sustainable Livestock Label (which is part of the Colombian Environmental Label), in the product category denominated Cattle and Buffalo Sustainable Livestock. The seal, launched in September 2021 by MADS and MADR in alliance with FEDEGAN, is an eco-label that is obtained on a voluntary basis, which differentiates products that have a better environmental performance. One of its objectives is to strengthen the environmental sustainability of the livestock sector by making production systems compatible with the preservation of natural resources (ICONTEC, 2022).

In the Orinoco Piedemont region, the Colombian Sustainable Livestock Project[55] valued the investment of the technical assistance offered to producers using the ratio: "Stockbreeder Investment/Donor Investment (US$)" with a positive balance. It was concluded that for each dollar invested by the project, the producer leveraged US$ 6.90 as investment in silvopastoral systems, and US$ 2.00 in intensive silvopastoral systems. The producers' matching investment consisted mainly of the labour required for making and managing arrangements inside the farms (World Bank, 2020b).

The Colombian Sustainable Livestock Project promoted the establishment of different silvopastoral arrangements together with the provision of free technical assistance at the farm level and the payment of incentives for biodiversity and carbon sequestration to those who established intensive arrangements. A training system was also developed through private nurseries and technology validation in demonstration farms. 684 families participated in the whole project and 35,219 hectares were intervened, distributed in 10 municipalities, sensitising about 1,085 people. This resulted in the establishment of 6,414 hectares of silvopastoral systems, which, in turn, achieved increments in the stocking (+36%) and milk production (+5%) rates. 201,210t CO2e were captured, in addition to other benefits associated with production, biodiversity,

55 The Colombian Sustainable Livestock Project was implemented jointly by the Global Environmental Fund (GEF), the UK Government, the Federación Colombiana de Ganaderos (FEDEGAN), The Nature Conservancy (TNC), the Fundación Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria (CIPAV), and the Fondo para la Acción Ambiental, under the supervision of the World Bank. It was developed in five regions, assisting a total of 4,100 producers throughout the country.

ecosystems, and avoided deforestation. The project also had an impact on the education and training of technicians and professionals, leaving installed capacities in the territory (BEIS, n.d.; World Bank, 2020b; Galindo et al., 2017).

Barriers for implementation (at scale)

In addition to the advantages to individual farmers to adopt sustainable livestock management systems (increased yield, improved of ecosystem services and increasing demand for deforestation free beef) the main barriers to the adoption of silvopastoral systems mentioned by local stakeholders and also reported in the literature include:

- Producers have difficulties accessing funding to invest in technology.
- Limited knowledge regarding changes required at farm level, availability of seeds and other inputs
- Impact of climate change including severe weather events
- Lack of labour, especially in areas where alternative economic activities (including illegal ones) are more lucrative
- Lack of training and specialised technical assistance in most cases related to low technical expertise at local level
- Unclear land tenure (Sandoval et al., 2021 & Ferrini et al., 2020)

Despite the accumulated expertise through projects that have been implemented, sustainable livestock practices have been limited to probably a few thousand farmers and hectares nationally. CIPAV, the organisation with the longest standing experience, explained that during 15 years in Caquetá they supported 500 farms. While the average farm size is between 20 and 50 hectares, most farms apply sustainable practices to only a few hectares due to cultural issues and/or the cost related with sustainable practices implementation. This effect is limited considering the annual tens of thousands of hectares in the department where deforestation has made place for cattle raising.

Also, it should be considered that currently, because of the requirements for technical knowledge and investment, sustainable livestock management takes place in established farms. It can protect existing forest cover in the agricultural landscapes and increase biomass through restoration. At the same time, it is hardly applied in areas of current deforestation where extensive cattle farming is introduced to claim presence and therefore it cannot be considered an alternative to the actual, large-scale deforestation.

3. Overview of existing interventions[56]

Initiatives from development cooperation agencies, NGO, academy

The main types of interventions, supported mainly by international cooperation and non-governmental organisations, implement livestock-to-silvopastoral conversion systems pilots, integrating trees, shrubs, live fences, and fodder crops, which are planted with improved pastures to increase the tree cover and improve the biodiversity and soil quality, and increase the land productivity (World Bank, 2020a).

Several ongoing initiatives promoting sustainable livestock management provide a solid platform for collaboration. This includes:

- Alliance for Sustainable Livestock, a partnership that includes FEDEGAN, the Centre for Research in Agricultural Production Systems (CIPAV), The Nature Conservancy (TNC) and the International Centre for Tropical Agriculture (CIAT).
- Biocarbon project implemented by the World Bank and the Ministry of Agriculture and Rural Development (MADR).
- Implementing sustainable agricultural and livestock systems for simultaneous targeting of forest conservation for climate change mitigation (REDD+) and peace-building in Colombia Project, funded by IKI and implemented in Caquetá, by the Alianza Bioversity International – CIAT, CIPAV and the NGO Patrimonio Natural.
- Amazonia Vital Project, funded by USAID.
- GANSO a partnership between Climate Focus and CIAT focused on conversion of traditional livestock systems to sustainable systems.

Private sector initiatives

Grupo Éxito[57] with the technical support of WWF Colombia and UK PACT, made a commitment to make its suppliers of standing livestock respect the agricultural frontier, forest cover, and biodiversity, and to implement practices that will lead to a sustainable livestock conversion. The GANSO Platform, which is specialised in livestock transformation led by Climate Focus and CIAT, will monitor more than 46,000 ha, about 28% of which have forest cover (El Espectador, 2022).

56 Focused on TEFOS target areas.
[57]Grupo Éxito is the largest retail company in the country.

To fulfil the national goal of zero net deforestation by 2030, Zero Deforestation Agreements have been developed[58] to reduce deforestation in the meat and milk supply chains. The meat chain is constituted by Asobrangus – Angus Azul, Grupo Takami (restaurants), Prestige Colombia, and Carnatural SAS (Cero Deforestación Colombia, 2019).

The dairy chain constitutes of the companies Alquería, Grupo Takami (restaurants), Comité Departamental de Ganaderos del Caquetá, Hermanos Rausch (restaurants), and four cheese production industries from Caquetá: Distrialimentos del Occidente S.A.S, Camoti S.A.S, La Arboleda, and Lácteos del Hogar. These cheese production industries concentrate in about 36 routes that collect about 52,500 litres of milk produced daily by 852 producers (Cero Deforestación Colombia, 2019; Alliance Bioversity-CIAT, 2021). The companies that signed both agreements are committed to sustainable livestock practices. However, some of them are in a transitioning process. They will mobilise private financing to develop actions to fulfil their sustainability commitments and reinforce their market access.

In the Municipality of Cumaral, Department of Meta, the World Bank Biocarbono Project (which also includes UK funding) is currently working with the La Catira Dairy Industry in the conversion of the dairy value chain. This company supports all if its 60 suppliers to adopt sustainable livestock management practices and to reduce greenhouse gases emissions, to become more sustainable until the zero-deforestation goal is achieved.

In Caquetá the collective brand Quesos del Caquetá, groups six local cheese producers (three of them signed Zero Deforestation Agreements) from Florencia, El Paujil, Montañita, Puerto Rico and San Vicente del Caguán municipalities, that implement sustainable livestock practices and conserve the forest. Their cheese has a designation of origin given by the Superintendence of Industry and Commerce in 2011. They belong to the departmental stockbreeder's association called Comité Departamental de Ganaderos del Caquetá.

4. Recommendations

Recommendations for TEFOS target areas

The Colombian Sustainable Livestock Project was characterised by the high cost of the customised technical assistance services that were provided at the farm level. The lesson learnt from the Project was that it is advisable to use

[58]More than 100 private-sector organisations, civil society entities (NGOs), and the Ministries of Environment and Sustainable Development, the Ministry of Agriculture and Rural Development, and the Ministry of Industry, Trade and Tourism have developed the Zero Deforestation Agreements, which are multi-stakeholder platforms that aim to reduce deforestation in the cacao, milk, meat and palm supply chains (Cero Deforestación Colombia, 2019).

livestock intervention models that promote an effective collective action by groups of producers (associations, committees of stockbreeders, etc.) to maximise the benefits of the technical assistance and other services provided, and to develop differentiated market strategies that will lead to better prices, among other benefits.

A study carried out in the Department of Caquetá indicates that there is a threshold of silvopastoral practices that, once adopted, generate a better profitability. Likewise, being part of some conservation agreement and having access to credit, produce relevant positive effects like soil and other ecosystem services maintenance, and access to new markets (Sandoval et al., 2021).

According to Jara-Rojas et al. (2020), the decision to adopt silvopastoral practices is influenced by access to and use of credit, location, and the implemented livestock system. Herd size and participation in development projects that involve tree planting have a positive influence on the adoption and intensity of agroforestry practices, while the variable linked with presence of water springs tended to boost the intensity of adoption. Social capital and networking can play a crucial role in spreading agroforestry as a sustainable practice (Jara-Rojas et al., 2020).

Recommendations for extending or scaling up existing interventions

The enabling environment is key to the feasibility of extending or scaling up sustainable livestock practices in TEFOS target areas. This requires the development of technical and managerial capacities at the regional and local levels, the creation of clusters and networks between producers (supply), service and inputs providers, companies and private businesses that transform and sell meat, milk and derived products, and retailers, and ensuring access to financing mechanisms. Table 17 outlines recommendations to address the main barriers that limit the extension of the sustainable livestock value chain.

Table 17. Recommendations to address the barriers that limit the sustainable livestock value chain at TEFOS target areas

Main Barriers	Recommendations
Upfront costs are high, and producers have difficulties accessing funding to invest in technology.	Finance livestock conversion activities at pilot farms, so that the government, multilaterals, and banks can then allocate resources to scale it by financing producers directly. Partner with Visión Amazonia that is already working on financial mechanisms and incentives targeting local stakeholders.

The decision to adopt agroforestry practices is influenced by the access and use of credit, location, and the implemented livestock system.	Finance livestock conversion activities at pilot farms, so that the government, multilaterals, and banks can then allocate resources to scale it by financing producers directly. The diffusion of agroforestry practices technologies might be increased among farmers who have adopted and who are potential adopters, and social capital and networking can play a crucial role in spreading agroforestry as sustainable practice (Jara-Rojas et al., 2020). The creation of clusters and networks between producers (supply), service providers, companies and private businesses that transform and sell meat, milk and derived products, retailers, etc. will contribute to create a sustainable value chain that generates economic value.
Impact of climate change including severe weather events.	Technical assistance targeting groups of producers (associations, committees of stockbreeders, etc.), rather than individual farmers aiming at promoting an effective collective action at scale.
Limited knowledge regarding changes required at farm level, availability of seeds and other inputs.	Technical assistance targeting groups of producers (associations, committees of stockbreeders, etc.), rather than individual farmers aiming at promoting an effective collective action at scale.
Lack of labour in areas where alternative economic activities are more lucrative.	Promote the implementation of non-intensive labour sustainable livestock practices as part of the technical assistance provided.
Lack of training and specialised technical assistance in most cases related with low technical expertise at local level.	Technical assistance targeting groups of producers (associations, committees of stockbreeders, etc.), rather than individual farmers aiming at promoting an effective collective action at scale. Training of trainers.
Unclear land tenure.	TEFOS pillar 1
Maximising spatial extension implies prioritising support for a fewer number of producers with better economic conditions and larger farms; while maximising poverty reduction implies prioritising	Synergies and trade-offs between multiple objectives should be considered, and the allocation of funds and the selection of beneficiaries should be optimised to balance partially competitive objectives, such as the scaling up of sustainable livestock and the fight against poverty. The creation of clusters and networks between producers (supply), service providers, companies and

the support for a greater number of poorer producers with smaller farm.	private businesses that transform and sell meat, milk and derived products, retailers, etc. will contribute to create a sustainable value chain that generates economic value.

Source: Compiled by authors.

Given that the currently implemented work on sustainable livestock has provided useful technical but only local-scale impacts, TEFOS should concentrate on scaling these up. TEFOS could work in partnership with other ongoing initiatives, providing technical assistance targeting local and regional organisations that group producers[59] like associations, committees of stockbreeders, etc. aiming to promote an effective collective action towards sustainable livestock at local level. Technical assistance activities should take place in local demonstration or pilot farms targeting groups of producers rather than individual farmers, using a very practical focus, so farmers will be able to replicate on their own what they learn. The methodology of trainer of trainers could be used to increase local technical capacities. Local stakeholders' organisations must strengthen administrative and business capacities, creating skills related to accounting, supplying, marketing and management of technology necessary to manage, commercialise and sell their products.

The creation of local and regional clusters of producers, service providers (inputs, seeds, seedlings, and others), companies and private business to link supply and demand, will contribute to creating a sustainable value chain, supporting sustainable land use practices that create economic value. Some of the main advantages of creating clusters include sharing first-hand information, a network of contacts in the value chain, innovation and training, collaborative economy, greater bargaining power and greater collective action.

To extend sustainable livestock in TEFOS target areas will require access to financing mechanisms through public and private banks and international cooperation and development projects. Visión Amazonia will be the main partner for this since it is already working on financial mechanisms and incentives targeting local stakeholders.

TEFOS and other cooperation and development projects could finance livestock conversion activities at pilot farms, so that the government, multilaterals, and banks can then allocate resources to scale it by financing producers directly.

Livestock traceability is an additional element in the sustainable livestock value chain, that refers to the geographic location where the animals were born and raised, which can be used to verify that it does not come from deforestation

59 Based on the Colombian Sustainable Livestock Project lessons learnt, technical assistance at farm or stockbreeder level is not recommended.

sites. Regional and local producer clusters could use this tool to have access to special deforestation-free markets in Colombia and abroad.

A study developed by CIPAV & World Bank (2021) proposes the use of teak and gmelina in silvo-pastoral systems in the Department of Córdoba, which requires a large initial investment that will be recovered in a period of four to seven years and has reported increments ranging from 16% to 233% in different production variables when compared to traditional production systems. This model could be replicated in the Municipalities of Montelíbano, San José de Ure and Tierralta, Córdoba.

Several ongoing initiatives promoting sustainable livestock management provide a solid platform for collaboration. This includes:

- Alliance for Sustainable Livestock, a partnership that includes FEDEGAN, the Centre for Research in Agricultural Production Systems (CIPAV), The Nature Conservancy (TNC) and the International Centre for Tropical Agriculture (CIAT).
- Biocarbon project implemented by the World Bank and the Ministry of Agriculture and Rural Development (MADR).
- Implementing sustainable agricultural and livestock systems for simultaneous targeting of forest conservation for climate change mitigation (REDD+) and peacebuilding in Colombia Project, funded by IKI and implemented in Caquetá, by the Alianza Bioversity International – CIAT, CIPAV and the NGO Patrimonio Natural.
- Amazonia Vital Project, funded by USAID.
- GANSO a partnership between Climate Focus and CIAT focused on conversion of traditional livestock systems to sustainable systems.
- Private companies on the demand and supply side of the livestock value chain.
- Local livestock farmers associations and committees in TEFOS municipalities and departments.

Private stakeholders, including large companies demanding meat and dairy products from TEFOS territories, and local livestock farmers' associations and committees, should be a focus of the intervention since they have the capacity to introduce changes towards the sustainability of the livestock value chain. The companies that signed Zero Deforestation Agreements, Grupo Éxito and other private actors working on sustainable livestock are potential key partners for extending existing interventions with TEFOS support.

The experiences implemented by La Catira Dairy Industry and its suppliers in Meta, and the collective brand Quesos del Caquetá could be replicated with other companies in TEFOS target areas.

Other livelihoods options

This section explores three other livelihood options: heart of palm, balsa tree and aquaculture. These value chains have very limited evidence or have not been implemented in Colombia and therefore require further field research and potential piloting to build the evidence base.

Heart of palm

Bactris gasipae is a domesticated native palm tree common in family farms and orchards. The edible part of the interior of the trunk (tender stem or heart of palm) and the chontaduro fruit are part of the diet of Amazonian and Pacific coast local stakeholders (CORPOICA, 2008). It can be planted in monocultures or in agroforestry systems with acai (NATURAMAZONAS, n.d.).

According to MADR, a total of 3,791 hectares were harvested in Colombia in 2017, producing 36,378 tons of palm heart (in comparison: in Ecuador -a much smaller country- cultivation started in 1987 and in 2009 already reached 17,000 hectares). The production of this fruit is concentrated in the Departments of Nariño (outside TEFOS scope) and Putumayo. In Putumayo, the main buyer is CorpoCampo (buying 90% of production) which sells to restaurants in Colombia and customers abroad. The other buyers (10%) sell to retail supermarkets. The availability of information for this value chain is limited due to the fact that is in the process of formalisation (NATURAMAZONAS, n.d.).

Another heart of palm species that is reaching international markets is Euterpe oleracea that plays a relevant role in the economy of several rural areas in South America, including the Pacific lowlands of south-western Colombia. Although its palm heart does not reach the market levels reached for plantations of Bactris gasipaes, its trade has remained active since it was first introduced in Brazil in the 1970s (Vallejo et al., 2016). Planeta CHB in Vigía del Fuerte, Antioquia is a micro-enterprise in the region that sustainably harvests the Euterpe palm. Partnerships for Forest (P4F) supported them in the construction of a business plan to obtain other strategic clients and advance to the scaling-up phase (Rojas, et al., 2020).

Balsa tree

Ochroma pyramidale, commonly known as the balsa tree, is a large, fast-growing tree native to the Americas. It is the only member of the genus Ochroma. It grows rapidly, reaching nearly 30 metres in under 15 years, but

rarely lives beyond 35 years. It grows well in secondary forest but can also be planted in plantations (KEW, 2022).

The tree is valued across the world for its strong but light wood, used for the construction of pallets for wind generators, automobiles, trucks, and boats. Balsa wood has among other qualities great capacity for thermal and acoustic insulation, given its low weight, its ease of gluing and the minimal movement of water between its cells. It is also used worldwide in model aircraft and architectural models. Over 95% of balsa wood comes from Ecuador where it is grown in dense plantations. There is an exponential global demand for balsa wood and it became a 'hot' commodity in Ecuador with the country exporting $402 million in 2020 according to data from the central bank; quadrupling in only 5 years (Cazar Baquero, 2021). This productive alternative is beginning to be explored by Colombian farmers, particularly in the South, who in many cases sell their production to Ecuadorian companies.

Aquaculture

Aquaculture is the breeding, raising, and harvesting fish, shellfish, and aquatic plants. Fishing and aquaculture occur along the Pacific and Atlantic coasts of Colombia, as well as in the inland waters, notably in the major watersheds of the Magdalena, Amazonia, Orinoquia and Sinú rivers where fish is harvested for food consumption and for the ornamental market. Both industrial and artisanal fleets operate on the coasts, while fishing in inland waters is essentially artisanal. Aquaculture production is largely dominated by inland freshwater pisciculture (FAO, 2016).

Traditionally, freshwater fish farming in TEFOS region (Meta, Guaviare, Córdoba, and Antioquia) is done with exotic species (mainly Tilapia Oreochromis spp.). Fish farming with exotic species is not considered environmentally sustainable because of the risk of introducing aggressive non-native species in natural water streams. One of the fish species that is native to Colombia and cultivated broadly is cachama (Piaractus brachypomus). However, this species is native to the Orinoco basin but cultivated in many other basins where it is considered exotic (Parrado Sanabria, 2012). Colombia produces 170,000 tons of fish from farming annually (2020), of which 74% is trout or tilapia, 19% is cachama and only 7% are "other" (but not only) native species[60].

TEFOS target areas Guaínia and Guaviare have high potential for aquaculture due to their geographic conditions. The Universidad de la Amazonia and the Instituto SINCHI carry out early research on aquaculture in the Amazon region.

60 Data published by MADR https://sioc.minagricultura.gov.co/Acuicultura/Documentos/2020-12-30%20Cifras%20Sectoriales.pdf

There are positive experiences elsewhere with native fish farming, particularly in Brazil and Peru with paiche or pirarucú (Arapaima gigas) (Mongabay, 2015; Koo et al, 2017).

5. Discussion

Quality of evidence

The desk-based component of the Evidence Review revealed that there is a large volume of information, scattered over many themes and based on a large diversity of experiences. While there was a significant amount of documented evidence (peer-reviewed publications, technical reports, toolkits, etc.) found, this was considered as still relatively small given the diversity of practices, initiatives, experiences and geographies across TEFOS target municipalities. As such, in addition to documented and published evidence many of the findings in this report rely on a combination of personal experience and perceptions from key informants, field observations and insights from local stakeholders. Data on production, marketing, stakeholders, export, costs, and profitability of the value chains income is scattered and except for cocoa and livestock, many value chains lack the necessary data for decision making and private investment.

The review allowed for an analysis of the strength of the evidence found for each of the proposed livelihood options with different results in each case, depending on the existing practical experiences, the available information, and its quality. The cocoa and sustainable livestock value chains have the strongest evidence in terms of the volume and robustness of the available information, plus the strengths of both value chains regarding field implementation, the attractiveness for private investors to mobilise finance, and the profitability of investments (VfM). The other value chains have less complete evidence but nevertheless enough for their consideration as viable options with potential for successful interventions in TEFOS target areas.

The coffee value chain required a different approach. There is a wealth of academic and practical information on traditional coffee production areas (Andean coffee-growing area) but there is a lack of information, especially peer-reviewed and other science-based documents, for non-traditional areas such as the Amazonia and Orinoquia regions. This lack of evidence meant that the evidence review was unable to assess some key elements of the coffee value chain such as its profitability and social and environmental impacts in TEFOS municipalities.

Regarding information gaps, there is a lack of data on costs and benefits to assess the profitability for the different stakeholders involved in the acai, cacay, sacha inchi, rubber and SFM value chains. There is information available on prices related to the acai value chain, but not on costs to calculate its profitability. In the case of SFM there is some data from planning exercises but there is a lack of complete accurate data on the timber domestic market. Despite the growing market for acai, sacha inchi and cacay, there are no figures about the national and international markets demand. This is also the case for ecotourism in TEFOS target areas.

With the exception of the cocoa and sustainable livestock value chains, there is little concrete evidence on the attractiveness for private investors and its potential to mobilise private finance from a business perspective. For coffee, there is a gap on information about its suitability and environmental impact specifically in TEFOS target areas. The social, economic and environmental impact are hardly documented for eco-tourism.

Livelihoods options and the relation with agents of deforestation

This evidence review identified feasible sustainable livelihoods options in five general categories:

1. Agroforestry systems with species such as cacao, rubber, heart of palm, cacay, sacha inchi, timber trees including balsa and crops that are important for food security.
2. Sustainable forest management for the production of timber and NTFPs such as acai berry and cacay[61].
3. Sustainable livestock farming that includes agro-silvopastoral or silvopastoral systems with different types of trees.
4. Nature-based tourism.
5. Fish farming.

Each identified livelihood option has its own unique characteristics, and from the existing evidence base, it cannot be assured which one will provide the best opportunities. Possibly, the combination of different value chains at landscape and farm level, will enable the diversification of products and income sources, minimising impacts related to seasonality and market issues. The potential of the different value chains is detailed in Table 19.

61 Balsa is a pioneer species in secondary forest. Experience from Ecuador shows it can be planted in agroforestry systems but also be harvested in secondary forests. Therefore, it can be considered as part of agroforestry and SFM practices

Not all production systems can be applied to each territory, but a combination of different options will contribute to the development of a sustainable production strategy at the farm level with an impact at landscape level. A combination of livelihood options will also promote conservation mosaics that will contribute to the recovery and maintenance of water and soils, ecosystem services and the reduction of (particularly) small-scale deforestation. According to the P4F´s Transformative Change Evaluation (Nelson et al., 2021) some root causes are beyond the national scale and require different types of interventions (e.g., in the UK, due diligence requirements for traders and buyers, and similar rules for investors are required to catalyse shifts in investment towards sustainable forests and land use).

According to the programme-level ToC of TEFOS (Annex 4), the promotion of sustainable livelihoods options is considered an alternative to avoid deforestation at the "deforestation frontier" or "frontera agrícola". As mentioned in the political and socio-economic context section, most deforestation occurs in areas where land tenure is not formalised, and cattle is introduced as a way to (illegally) occupy land. Deforestation actors are not likely to change their behaviour if they have access to sustainable alternatives, because they are moved by a purely short-term economic motivation to grab the land and are not driven by longer-term investments in sustainable activities. They usually implement extensive livestock farming as a way of demonstrating land possession without a real interest in the activity itself. Sustainable livestock farming is considered a good alternative beyond the deforestation front where farmers have the time, technical and financial capacity required for farm transformation. This might lower the pressure on the deforestation front if aligned with the other pillars of the TEFOS ToC that are key to ensure the rule of law is applied and land tenure security is promoted.

Several selected livelihood alternatives (sustainable livestock, cocoa, coffee, rubber) have been mostly successful in areas that already have been deforested and situations where land rights are secured. A potential explanation for this is that most alternatives need considerable investment and time to generate returns, so there needs to be enough tenure of land-use security as well as an overall good public order situation, which TEFOS' pillars 1 and 2 (already being implemented) are aiming to achieve. Therefore, these options are mostly apt for land users behind the "deforestation frontier" where only small-scale actual deforestation takes place. While in these areas there is no direct relationship to large scale deforestation, it does help to create a more sustainable economy "behind the frontier" herewith taking away some of the drivers of people to move to the deforestation front and (re)engaging in opportunistic forest clearing and occupation with cattle.

Another set of livelihoods (nature-based tourism, forest management and NTFP) focuses on standing forest which targets forest dwellers including Indigenous peoples and Afro-Colombian communities and settlers with longer occupation history. This can provide an added value to standing forest but their rights to use the forest and their integrity and security needs to be ensured.

Potential of different livelihoods options

The evidence reviewed in this report suggests that there are three livelihoods options which have the most potential to be replicated and/or scaled. These are: i) agroforestry systems with species such as cacao, rubber, cacay, timber trees and crops for food security; ii) sustainable forest management for the production of timber and NTFPs such as acai berry and cacay; iii) sustainable livestock farming; and iv) nature-based tourism[62]. Some options have a notably increasing market demand (acai, cacay, balsa, tourism) but possibly with a cap, while others have a more stable market with almost unlimited demand (rubber, cocoa, coffee, livestock, timber). The integration of different value chains will generate short, medium, and long-term economic, social and environmental benefits for local actors implementing interventions at the level of individual farms or collective lands from Indigenous peoples or Afro-Colombians groups.

According to Westermann et al. (2018), value chains have two characteristics that make them suitable for reaching a large number of farmers:

- They provide a mechanism for linking multiple actors around a common objective by creating space for dialogue, knowledge exchange and capacity building, and strengthening negotiation capacities. Value chains can act as a delivery mechanism for government and private extension services, credit, and subsidy programmes.
- They provide market-driven demand (often towards green and more organic products) that may provide a demand-led strategy for adoption of technologies and practices. Scaling up sustainable value chains or introducing practices and technologies into existing ones may be an efficient way to reach large numbers of farmers with reduced transaction costs. However, strategies based on value chains may not be appropriate for the informal sector or for agricultural production for household consumption.

Despite the large number of initiatives that are implementing and promoting the proposed value chains, we can assume that they have not yet achieved their full potential impact because of the small scale of implementation and the relatively

62 Because of insufficient evidence, the "other" options (balsa, fish farming, and heart of palm are not included in this list

low levels of adoption by farmers. Therefore, there is a continued need to work not only to technically improve livelihood options and strengthen technical and administrative capacities of local farmers and farmer communities, but also to improve products' quality, market access, market development and scaling.

Similarly to the UK funded "Partnership for Forest" evaluation[63], this Evidence Review found that most sustainable livelihood options have been promoted by numerous initiatives and interventions, but almost always at the local scale (plot, farm or individual enterprise). This is especially true for the value chains associated to cacay, sacha inchi, fish farming and acai. Cocoa and coffee which are applied by many producers nation-wide still require scaling-up with regards to improved practices, larger production volumes and market access of sustainable systems. While livestock is by far the largest current land use in Colombia, the sustainable livestock systems supported by conservation and development initiatives are applied at plot level and only on several hundreds of farms, while the potential in TEFOS municipalities is in the range of tens of thousands. Therefore, TEFOS strategies could potentially make the biggest win by scaling-up through association support, market development, demand-side incentives (for example: deforestation free beef, premium chocolate, legal timber) and adequate commercial planning policies to overcome existing barriers.

Economy and market considerations

The evidence reviewed suggests that livestock and coffee are sectors with the greatest potential to mobilise private finance and to promote access to markets. However, there is little information available about the mobilised private finance and market access for any of the analysed value chains within TEFOS target areas. In addition, there is an important number of small businesses and start-ups that seek to commercialise sustainable, biodiversity-friendly, value-added products based on acai, cacay, coffee, cocoa and sacha inchi, mobilising private finance and aiming to reach national and international markets. However, these markets are not disaggregated in economic statistics.

The following figures below refer to the national level:

- The livestock sector contributes 1% to the national GDP and 22% to the agricultural and livestock GDP[64]. It generates 1 million direct jobs equivalent to 6% of national employment (MADR, 2020). In 2021, meat,

63 https://partnershipsforforests.com/wp-content/uploads/2021/11/EM-study12-Transformative-Change-Paper.pdf
64 The agricultural and livestock GDP contributes with 6.08% of the national GDP (MADR, 2020).

livestock and dairy exports exceeded US$ 427 million, a 51% increment compared to the year 2020 figures (FEDEGAN, 2022). There are no economic figures about the importance or market of sustainable livestock practices.

- In 2020, coffee growers harvested a crop worth US$ 2.4 billion, the largest in 20 years (FNC, 2021a). Coffee contributed 1% to national GDP and 15% to agricultural GDP (Salazar, 2021). It generates 2 million direct jobs, equivalent to 12% of national employment (FNC, 2021b). The value of cumulative exports for the last 12 months up to February 2022 is estimated at US$ 3.3 billion (Office of the Government Advisor on Coffee Affairs, 2022). There are no economic figures about sustainable, premium organic or agroecological coffee.
- In 2021, dry cocoa bean exports reached US$ 30 million and cocoa-base products US$ 95 million (FEDECACAO, 2022). Around 65,000 families depend on the cocoa value chain, which generates 167,000 direct and indirect jobs (MADR, 2021a). There are no specific figures about sustainable, organic or agroecological cocoa production, neither for fine flavour nor agroforestry systems cocoa.
- Despite being a relatively new product, acai berry has shown a great potential to mobilise private finance and promote access to markets. The demand for acai berry and related products shown in Asoprocegua increased production from 9 to 80 tons between 2014 and 2017 demonstrating the potential of this market. CorpoCampo has four acai pulp production centres, providing 180 direct jobs for female heads of households, benefiting about 1,200 families and generating an average of US$3 million per year (Garcia et al., 2018b).
- The cacay value chain is relatively new and is managed mainly by two private companies, located in Meta, that process the fruit to obtain oil and sell it mostly to the international market. Both companies invested in cacay plantation to supply the increasing international demand. No specific economic data were reported.
- The SFM value chain generates low private investment, while the timber has to compete with illegal and informal timber from domestic sources as well as from neighbouring countries. A study on forest economics estimates a total of 3.8 million cubic meters of timber processed in 2013, of which 25% came from natural forest and 75% from plantations with a contribution of 0.60% to national GDP and 2.90% to agricultural GDP (ONF Andina, 2018).

Livelihoods options for different stakeholders and territories

Not all identified livelihood options are suitable for all stakeholder groups and geographies. Their suitability depends on the biophysical and socioeconomic conditions of the environment and stakeholders. According to the document review and KIIs including those with Indigenous peoples and Afro-Colombian leaders, Indigenous peoples and Afro-Colombian groups in Colombia are mostly applying activities that target the use of standing forest. The favoured options by Indigenous peoples and Afro-Colombian groups interviewed hence include SFM, acai and cacay harvesting as well as nature-based tourism in specific areas like Guainía. Cocoa is another common activity in Indigenous peoples and Afro-Colombian communities. The evidence reviewed suggests support for these options would need to focus on developing facilities for production and harvesting activities, along with measures to promote market access, given that most collective territories are located in remote sites.

In general, forest-based activities (with exception of tourism) appear to be more suitable for local communities living in or close to forest areas because they require less investments and start-up time. Agroforestry practices with cocoa, coffee, sacha inchi and sustainable livestock can be initiated at a small-scale and are therefore apt for small-holders and individual farmers and their associations in already deforested areas. To best support these activities, further support is needed for technical skills and investment facilities along with a secure access to markets. Activities that demand investment planning and complex skill sets and implementation at medium scale such as rubber plantations and nature-based tourism would be more applicable to individual land holders with a longer occupation history, a certain level of education, proximity to roads and larger villages or cities and with investment capacity (either with own capital or access to credits).

The value chains with more participation from women and youth groups, are cocoa and nature-based tourism. In the case of cocoa, women's and youth groups work throughout the value chain from planting to marketing. However, special interest from women and youth was observed in the generation of added value through the production and commercialisation, mostly at local level, of chocolates and related products such as sweets and desserts.

Women and youth groups interviewed showed great interest in nature-based tourism as an activity that contributes to the generation of economic income (probably higher than field labour activities) and at the same time to the conservation of nature and landscapes. Both stakeholder groups showed particular interest in training to become professional tourist guides, cooks and

chefs. Young people were particularly attracted to the diverse skill set needed, including technology, marketing, language skills and the contact with people from other areas. Bilingualism and investment capacity were repeatedly mentioned as constraints that need to be addressed.

Table 18 summarises the sustainable livelihoods options that have been reviewed in this report, alongside an assessment of their applicability to the TEFOS municipalities within each department, considering biophysical and socioeconomic factors. In terms of regional suitability of livelihood options, this not only depends on the biophysical conditions and the type of stakeholders, but also on issues such as labour availability, cultural issues (history or adaptation potential of certain options), infrastructure and accessibility issues. In summary:

- Sustainable forest management can in principle be applied to all areas with large areas of standing forest. The same goes for sustainable livestock management which has the potential to be applied in all areas where there currently is livestock management.
- Because of its aptitude to be cultivated in considerable range of tropical conditions, cocoa has the potential to be applied to all TEFOS departments as well. However, because of the focus of application in agroforestry systems with fine-flavour varieties, there is more acceptance of this in the Amazon departments rather than the Bajo Cauca, Urabá Antioqueño or Orinoquia.
- Acai and cacay harvest should be concentrated in areas where these are already being farmed and value chains are already in place, due to the existence of the human skills and infrastructure required. This is the case in Caquetá, Meta, and Putumayo for cacay and Caquetá, Guaviare, Guainía, and Putumayo for acai.
- Because of its specific altitude and soil requirements and its labour requirements, coffee is cultivated in specific areas only. This is the case in TEFOS municipalities in Antioquia, Córdoba, Caquetá, and Meta.

Table 18. Principal sustainable livelihoods options and their applicability to each TEFOS department (referring to TEFOS municipalities within each department).

Sustainable livelihoods options	TEFOS Departments*							
	Antioquia	Arauca	Caqu	Córdoba	Guainía	Guaviare	Meta	Putumayo

			et á					
Acai			X		X	X		X
Cacay			X				X	X
Cocoa			X		X	X	X	X
Coffee	X		X	X			X	
Nature-based Tourism					X	X	X	
Rubber	X		X	X		X	X	X
Sacha inchi		X	X		X	X	X	X
SFM	X	X	X	X	X	X	X	X
Sustainable livestock	X	X	X	X	X	X	X	X

* Refers to TEFOS municipalities within each department.

Source: Compiled by authors.

- Rubber is currently cultivated on large scale in Antioquia, Córdoba, Arauca, Meta, and Caquetá, and has the potential to be grown in Putumayo and Guaviare as well, in areas with good road access and labour availability.
- Nature-based tourism needs attractions, accessibility, skilful personnel, basic infrastructure, and a good public order situation. This is currently only found in parts of TEFOS municipalities in Meta, Guaviare, and Guainía.

Value for Money (VFM) and additionality

Value for Money is defined by the UK National Audit Office as the “optimal use of resources to achieve the intended outcomes.” While bearing this in mind, it is important to take a realistic and proportionate approach to VfM assessment especially in programmes such as TEFOS which operate in areas of uncertainty, with multiple influences on the intended outcomes and at times significant risks to delivery outside the control of the programme team. The VfM assessment includes: Economy, Efficiency, Effectiveness and Equity. Where feasible, it should assess cost effectiveness (Tetra Tech, 2022). The economy criterion of VfM refers to how much money was or is being spent and for what. The efficiency criterion links the inputs purchased to outputs. An efficiency

assessment considers the costs per unit of input and output at the required quality. 'Effectiveness' assesses how outputs are used to deliver outcomes which are often more long-term. 'Equity' finally addresses the question whether the money is spent fairly, with doing no harm as the minimum standard (Tetra Tech, 2022).

A full quantification of economy for VfM or even basic monetisation of TEFOS' potential interventions for Pillar 3 is not feasible. This is due to a range of factors including:

- Impacts on long term outcomes will not be observed for several years.
- Some of the social and environmental impacts cannot be valued in monetary terms, especially the learning and network effects.
- The complexity of the programme and its socio-economic-environmental impacts mean that there are other factors influencing immediate and long-term outcomes.

Based on the information gathered and limitations of publicly available data, it is only possible to present an indicative partial assessment of VfM, based on the team's insights. This considers that the production of cocoa, acai berry, cacay, SFM and nature-based tourism have the most promising VfM. They give value to the standing forest which helps to reduce deforestation on a small scale. In turn, interventions aiming to develop value chains in a sustainable manner can be expected to generate additionality in terms of maintenance of forest areas and the provision of ecosystem services, bringing the value-added processes (economic income, infrastructure development and capacity building mainly) to the regions and families involved. Cocoa and acai also contribute to food security of local families including Indigenous peoples and Afro-Colombian groups.

The premium price paid for sustainable fine-flavour cocoa, compared to cocoa bulk prices, is considered as financial additionality. In the case of sustainable livestock, a silvopastoral system pilot, achieved increments in animal stocking of 36% and 5% in milk production, besides GHG emissions reductions, can also be considered as additionality.

Potential negative effects of the interventions

All of the livelihoods options assessed in this evidence review have potentially negative environmental and social effects. Some of the main negative effects and possible mitigations for these, informed by field observations and interviewees during the evidence review, are detailed below:

- Planning and implementing actions focused on farms or plots level would limit the results at the landscape level and therefore the impact in terms of forest conservation and avoided deforestation. Using a landscape approach to plan and implement interventions can be helpful in addressing this potential negative effect.
- If producers, especially small-scale producers, only engage in one productive activity there is a risk that at a given moment production could suffer negative impacts such as lack of market or product saturation, production damage due to climate change, or a short shelf life especially for organic delicate products transported over long distances These potential negative impacts could be reduced by implementing a combination of alternatives at the farm and landscape levels.
- The establishment of cocoa, coffee, acai berry and cacay plantations and agroforestry systems, including several species, should be done only in previously deforested lands, to avoid further deforestation for the establishment of agroforestry systems driven by an economic motivation. Any intervention promoting productive activities could be complemented with conservation agreements at the landscape level.
- SFM activities, if not properly planned and implemented, could lead to forest degradation and valuable timber and nontimber species could be lost. Any SFM plan requires proper planning, monitoring and evaluation.
- Economic income from sustainable livelihoods interventions could be used for local stakeholders to invest in promising activities that contribute to deforestation like unsustainable livestock management. A clear long term landholder commitment about sustainable land use would help reduce this risk besides raise awareness and secure the possibility of having income sources from sustainable livelihoods without affecting forests and biodiversity.
- On community lands at Indigenous peoples or Afro-Colombian communities, it is important to have the approval of the whole community before starting an intervention, to avoid conflict and risks of violence towards beneficiaries.
- Implementing capacity building processes only with community leaders and decision makers could lead to a lack of support and commitment from local stakeholders at the community level. To reduce this risk, it is important to set up capacity building processes including local actors at grassroot level.
- All value chains and livelihoods interventions visited in the field do not have as active participation of women and youth, compared to men’s participation. However, it is important both groups are supported during capacity building for reasons of equity and inclusion.

Enabling conditions

According to Instituto SINCHI (2018), the implementation of sustainable production systems in the Amazon Region entails two main factors: i) ownership: farmers need to decide which arrangements are the most convenient for their farms and own the practices; ii) conservation commitments: by themselves, sustainable livelihood options do not necessarily translate into optimal environmental benefits. It is therefore essential to agree with the farmers their voluntary contribution for the conservation of the remaining forest or restoration of previously deforested areas. This can be done through conservation agreements and/or restoration commitments at the farm level to add efforts that generate positive visible changes and impacts at landscape level.

Conservation agreements programs aim to reduce deforestation or otherwise change behaviour with respect to the environment. Their effectiveness is considered in terms of additionality, meaning how much more conservation will happen because of the conservation agreements program compared with a business-as-usual scenario. Effectiveness also depends on the environmental importance of land enrolled, and contribution to social and related goals. Participation must be attractive to property owners, both in terms of enrolling land in the first place, and then meeting agreed-upon commitments (Bruner et al., 2020).

According to the evidence, to achieve a real change at the landscape level, offering attractive and viable livelihoods options to local stakeholders might not be enough. Additionally, it is important to set up environmental and forest conservation or restoration targets at the landscape level along with conservation agreements or payments for ecosystems services. Clear rules for common resources use including bans or enforcement of legislation also need to be in place.

According to Nelson et al., (2021) NTFP value chains are attractive to producers but competing livelihood activities such as illegal crops and deforestation remain strong competitors. Therefore, any additional interventions in the same landscape, would require strong monitoring systems which can provide early warning using satellite data, as well as rapid on the ground response capacity to reach landscape level impact.

When the community is part of its own development, a participation process should be triggered that promotes the execution of collaboration agreements between the main public and private actors of a territory. This will foster the design and implementation of an endogenous development strategy that will take advantage of the local or regional resources, values, and competitive

advantages (Quito et al., 2021). Collaboration agreements could include technical assistance; training in administrative and managerial skills; technical, legal, and administrative specialised advice for start-ups and local associations; provision of infrastructure and/or physical space like offices and warehouses; among others.

Opportunities and barriers to the adoption of alternative livelihoods

All proposed value chains, developed in a sustainable manner, have the potential to generate additionality in terms of forest and biodiversity conservation, provision of ecosystem services and avoidance of unsustainable production practices. They also offer the possibility to generate a supplementary economic income which in some cases can become one of the main sources of income for local families. The livelihood description section includes detailed opportunities and constraints for each value chain, accompanied by specific recommendations to overcome the main barriers. Table 19 summarises the different value chains, the main opportunities, barriers, key success factors and strength of evidence. There are several opportunities and barriers identified during this evidence review that are shared between different value chains:

- Production systems like SFM, acai and cacay harvest as well as nature-based tourism provide value to standing forest avoiding small scale deforestation. Cocoa production in agroforestry systems, SFM and NTFP harvesting including acai and cacay, along with nature-based tourism, offer great possibilities for forest dwellers, Indigenous peoples and Afro-Colombian groups in remote forest areas. The growing market demand for sustainable and deforestation-free products is an opportunity for all proposed value chains. Products with a high nutritional value and nutraceutical properties, like acai berry, cacay and sacha inchi offer an important opportunity for market development.
- The main barriers to overcome include the scale or size of production, lack of technical and managerial skills, geographic location of most TEFOS municipalities directly related with market access, and dynamics of producers' associations, clusters and partnerships. The scale or size of production is not always sufficient to demand fair prices and access to markets – either local markets through short commercialisation channels, or regional, national or international markets. Another barrier to be considered is the remote distance from farms and collective lands to roads and population centres.
- Small and medium-scale farmers working with sustainable livelihoods in TEFOS municipalities and nearby do not always have the required

technical (crop management, implementation of good practices, etc.) and administrative (basic finance, accounting, technology, marketing, etc.) knowledge and skills to run their activity in a cost-efficient way, limiting the environmental impacts and the ability to generate a regular stable economic income.

- Challenges of agricultural technology adoption related with scalability, include small-scale farmers' access to markets, credits, and appropriate information. Adoption is sometimes seen as a linear, binary, and individual decision when in fact the dynamics are much more complex, iterative and cyclic. A gap between researchers, policymakers and practitioners continues to exist despite efforts to disseminate, apply and scale up the results of research. Attention is being increasingly paid to the role of intermediaries and innovation brokers who can help to bridge this gap (Westermann et al., 2018).

A generally shared barrier is associativity. Associativity, understood as a group of individual producers or companies that, through their own free will, participate in a common production or market effort with clear objectives and benefits for all, helps to reduce these gaps by facilitating capacity building processes, increasing negotiation power, access to markets, or the possibility to reach an endeavour that one single producer or company cannot do on their own. In terms of environmental performance, associativity can act as a means of social control to assure the implementation of good environmental or agroecological practices, avoid small scale deforestation and maintain existing forest.

According to some interviewees, a common limitation of existing organisations and associations is that many were not created for production, marketing and commercialisation purposes and members decide to use existing (organisations or associations) legal structure for production, marketing and commercialisation, so their statutes do not allow for the development of all the actions inherent to a business, and their boards or managers are not always selected based on their managerial skills. These structures would need to be reformed to form legal established producer associations with the required characteristics and skills to boost business and generate a stable income source for their members.

Table 19. Potential of different value chains including the main opportunities, barriers, key success factors and strength of evidence.

Value chain	Opportunities	Barriers	Key success factors	Strength of evidence*
Acai	Growing national and	Lack of information about year or seasonal	Strengthen local associations	Medium

	international market Gives value to standing forest	productivity that affects supply contracts	Access to technology to add value to the acai at local level	
Balsa wood	Strongly increasing international demand. Extremely fast-growing tree both in forest and plantations	Little experience in Colombia Current demand might be temporary ("boom") Lacking knowledge and examples for management	Adoption of Ecuador' experience with plantations and harvest Access to international market for exportation	Low
Cacay	Growing national and international market Gives value to standing forest	Lack of information about the value of cacay fruits in the market Insufficient supply	Promote new initiatives around cacay value chain Plantation in restoration schemes to ensure supply	Low
Cocoa	Commodity with an established national and international market with a growing demand for premium quality Wide geographical range aptitude Easy to combine in agroforestry systems	Underproduction because of lack of technical capacity and/or assistance Presence of cadmium in Amazon soils Scattered supply of different chocolate brands that led to a diffuse and untargeted market	Train of local trainers to provide technical assistance Cadmium research Associate chocolate producers to have a better negotiation power Exportation of cacao and chocolates for special markets	Strong
Coffee	Commodity with an established	Traditional intensive use of agrochemicals	Adoption of an agroecological approach	Low

	national and international market with a growing demand for premium quality	Limited to specific altitudes and soils Labour intensive Strong national competition	through technical assistance Links between coffee growers and the FNC	
Heart of palm	Food security Easy to grow crop	Limited market Little experience in Colombia	Initial development Apply experiences from other countries	Low
Native fish farming	Small space needed Food safety Guaranteed market	Most fish farming in Colombia is based on exotic species and there is little experience with native species. Challenge of river contamination (food, antibiotics) Expensive infrastructure needed to make resilient farms	Promotion of native fish Development of profitable techniques	Low
Nature-based Tourism	Natural and cultural attractions Growing national and international market Linkage to protected areas	Lack of basic infrastructure, bilingual personnel, and marketing Remaining public order issues Complex value chain	Local capacity building (bilingualism) Market campaigns targeting national and international tourists Clustering of services along the value chain	Low
Rubber	Commodity with an established national and	Requires long period (7 years) to start production Harvest is labour intensive	Reactivate unproductive rubber areas Improvement of agroforestry	Medium

	international market Easy to combine in agroforestry systems	Fluctuating global prices sometimes dipping below profitability because of competition from other continents	systems with fast growing crops and wood species	
Sacha inchi	Fast growing and easy to handle	Limited market options	Create a national demand for sacha inchi oil, seeds and as an ingredient for food and cosmetics	Low
Sustainable Forest Management	Add value to standing forest Promotes forest dwellers, Indigenous peoples and other local stakeholders' association Diversity of products (timber & non-timber)	Usually, long distance of extraction sites from roads and population centres Lack of premium price for sustainable (legal) timber Competition from illegal and informal markets Unclear use rights	Demand values sustainable and legal timber Link demand (furniture, floors, building industries, among others) and supply Diversify NTFPs (acai, cacay, balsa)	Medium
Sustainable livestock	Established national and international market Most wide-spread land use so potential big wins Incipient demand for deforestation free meat and dairy	Lack of technical capacity and/or assistance Requires a considerable economic investment compared to BAU-livestock management No premium price for sustainable livestock meat or dairy products	Provision of funding and technical assistance to promote changes at farm level Up-scaling through association, regulation, and market demand Demand values sustainable meat	Strong

		Negative association of livestock with deforestation	and dairy products	

* In the section with specific description of each livelihood option, detailed information on the strength of evidence is provided. Strong evidence refers to the availability of information for all the links of the value chain including markets information; Medium evidence refers to the availability of information for most of the links of the value chain; Low evidence refers to new value chains with little information available or with little actual experience in Colombia.

Source: Compiled by authors.

The creation of local and regional clusters of producers, service providers (inputs, seeds, seedlings and others), companies and private business to link supply and demand, allows the creation of sustainable value chains, that promotes the generation and retention of economic value at the farm and local level. Recent empirical evidence shows that small and medium enterprises located in clusters have a competitive advantage with respect to isolated firms because of their higher collective efficiency (Pietrobelli & Rabellotti, 2004)

In rural isolated areas, like most TEFOS target municipalities, clustering, especially associated with the sustainable livestock and cocoa value chains, could provide several advantages like information and technology access, costs sharing, innovation and training, bigger bargaining power, access to markets and greater collective action. This would allow local and regional stakeholders to implement artisanal or industrial transformational processes, to add value to specific products, and retain such economic value at the local level.

The establishment of strategic partnerships is another way to create value and mutually beneficial business relations. Finding the right partner can help to reach potential customers and clients, which is especially important for new business and start-ups located in remote distant areas. Strategic partnerships can play a key role in marketing, especially of non-traditional products, and facilitate supply and technology access, among others.

Complementarity with existing initiatives

This section outlines existing partners for each value chain, including programmes, initiatives, partnerships, and organisations, supported by development cooperation agencies and NGOs; private companies, start-ups, and emerging private initiatives; governmental organisations, agencies and research centres; local, regional and national producers' associations and federations. These are summarised in Table 20.

Table 20. Main existing programmes, partnerships, and organisations working on sustainable livelihood options that could be implemented in TEFOS areas.

Programme, project, partnership, or NGO	Activities/Value chains	Geographic location (departments)	Main donor
Amazonia Vital project	Sustainable livestock Nature-based tourism REDD+ Payments for ecosystem services	Caquetá, Guaviare, Meta, and Putumayo	USAID
Centre for Research in Sustainable Agriculture Systems - CIPAV	Promotes the adoption of environmentally friendly livestock production systems to improve natural resources management and ecosystem services enhancement	Caquetá	Germany
Cocoa, Forest and Peace Initiative, a public-private partnership lead by Fundación Alisos (gathers around 85% of the value chain stakeholders including the biggest companies)	Promotes zero-deforestation cocoa production models that favours the protection and restoration of forest ecosystems	Antioquia, Caquetá, Córdoba, Guaviare and Meta	UK Tropical Forest Alliance World Economic Forum
Fundación para la Conservación y el Desarrollo Sostenible - FCDS	SFM value chain with Indigenous peoples Promotes Indigenous peoples	Caquetá, Guaviare, and Meta	Norway REM Vision Amauonia

	communities' governance strengthening Food security		
GANSO a partnership between Climate Focus and CIAT	Technical assistance and financial support centre, which helps farms to shift from inefficient livestock production to diversified and sustainable production systems that mix intensified livestock production with forestry plantations and agricultural crops, along with ecosystem restoration and conservation.	Meta	GIZ Germany International Finance Corporation
German Corporation for International Cooperation - GIZ	SFM with a focus on local forest governance Cacay harvesting	Caquetá and Meta	Germany
Global Green Growth Institute - GGGI	Nature-based tourism Sustainable livelihoods start-ups	Guaviare, Meta, and Putumayo	Norway
NATURAMAZONAS lead by Conservation International Colombia	Acai, cocoa, heart of palm, sacha inchi and timber trees nursery producing around 3 million plants per year Establishment of agroforestry systems Promotion of green business	Caquetá and Putumayo	Gran Tierra Energy (gas and oil company)

REDD+ Early Movers (REM) Vision Amazonia	Acai berry value chain Cocoa value chain Nature-based tourism Rubber value chain SFM value chain	Amazon region	Norway, Germany, and UK
WWF Colombia	SFM value chain with a focus on local forest governance strength, capacity building and marketing	Antioquia	IDB

Source: Compiled by authors.

There is another group of existing programmes, projects, partnerships, and organisations working in at least one of the proposed value chains, with a reduced scope compared to the ones listed above. These are:

- ACDI - VOCA
- Amazon Conservation Alliance
- Climate Focus
- Colombia Sostenible Fund
- Commercial Alliances Programme, an USAID funded programme
- Food and Agriculture Organisation of the United Nations - FAO
- International Centre for Tropical Agriculture - CIAT
- Rainforest Alliance
- Territories of Opportunity, an USAID funded project
- The Amazon Bioeconomy Fund, a regional project funded by the GCF and implemented by IDB
- United Nations Development Programme - UNDP
- Wildlife Conservation Society – WCS

Research centres like the SINCHI Institute, AGROSAVIA and CIAT play a key role in providing specialised technical assistance for the production, implementation and harvesting of good practices for the livelihoods reviewed.

AGROSAVIA and CIAT are already working on the cadmium research on Amazonian soils and its relation to cocoa production[65].

The Autonomous Regional Corporations (CARs) in their environmental authorities' role, play a key protagonist as project partners, as well as MADS, MADR, MINCIT, PNNC, UAESPNN, ART and other state agencies, as well as regional and local governments in TEFOS target municipalities.

National producer groups and federations represent its members at national and international level, promoting strategic alliances, access to markets and negotiation of fair prices. In some cases, they also support research and innovation, offer extension services and technical assistance. This makes them key partners for TEFOS, especially the regional or local representations based in TEFOS target areas. The main federations with potential to become project partners are: FEDECACAO, FNC, FEDEMADERAS, FEDEGAN, and the Colombian Rubber Federation.

There are some private companies, start-ups, emerging private initiatives, and producer associations that have the capacities and the potential to extend or modify their current work plans and activities, in TEFOS areas.

6. Conclusions

Livelihoods options and the relation with agents of deforestation

Promising livelihood options

- There are many sustainable livelihood options that could be suitable across TEFOS municipalities for a variety of stakeholder groups, biophysical and geographic conditions
- The application of **a combination of livelihood options can engage different stakeholder groups, spread risk, and have complementary impacts** on landscapes and farms.
- The evidence suggests that there is not one single livelihood option or combination of livelihoods that stand out as most promising. Suitability depends on the biophysical and socioeconomic context. Each of the livelihood options have benefits and challenges:

[65] See https://pdf.usaid.gov/pdf_docs/PA00WFRV.pdf

- **Sustainable livestock, rubber, cocoa, and coffee production require considerable investment and several years before a return on investment is obtained**. Their production therefore requires long term land tenure security.
- **Nature-based tourism also requires considerable long-term investments and is particularly sensitive to stability and public order**, as well as tenure security issues. Tourism also requires special infrastructure and service providers.
- **There are many natural and cultural attractions that could support nature-based tourism** in TEFOS municipalities that have become more accessible and secure after the peace process. Nature-based tourism also connects livelihoods to protected-area management. **However, ongoing security issues, limited access, and poor infrastructure and services make nature-based tourism a viable option in TEFOS targets areas Meta, Guaviare, and Guainía only.**
- Nature-based tourism in post-conflict areas is underdeveloped **because several elements of the value chain are lacking**, including food, restaurants, and transport services, as well as basic capacities such as bilingual guides, marketing, and administrative skills.
- **Acai and cacay harvesting present an additional source of income** for forest dwellers, Indigenous peoples and local communities and provide value to standing forest, **even without clear land tenure**.
- The growing national and international demand for **cacay and acai necessitates strengthening the entire value chain** in the Amazon departments, especially increasing access to technology to process the fruit for different purposes and retain value at local level. This would help to enable new stakeholders such as producers' associations, oil producing enterprises, start-ups, and food and cosmetic companies, among others, to enter the value chain.
- Cultivating acai and cacay in plantations could meet the increasing national and international demand for these crops. **Cacay, in particular, is a strong candidate for restoration schemes**. **For both cacay and acai, however**, **there is a lack of evidence on the profitability of the investment.**
- **Cocoa is an important potential sustainable livelihood alternative** and income source in all TEFOS regions, especially **because of a practically limitless international market**. This is

particularly true when it is cultivated in agroforestry systems using fine-flavour varieties that target the international premium chocolate market.

- Several different chocolate brands, mostly from the Amazon region, have emerged in recent years. While there are national efforts to consolidate national and international markets for premium chocolate, **the presence of many small companies and diffused brands results in an underperforming and poorly coordinated export market.**
- **Coffee** production offers an alternative livelihood in specific TEFOS municipalities. However, it **requires large investments and technical assistance** to help farmers adopt sustainable or agroecological practices.
- **Sacha inchi** substituted illicit crops in TEFOS municipalities in the Amazon and boomed after the Peace Agreement. However, it **lacks a clear market** and therefore, cultivation has dropped significantly recently. This creates **an opportunity for the development of an emerging domestic market** for Sacha inchi.
- **Rubber production** in plantations or agroforestry systems is a **long-term activity that requires considerable investment** and labour and is therefore **an alternative for settled landowners with clear land tenure and regions with a sufficient workforce**. Because it is a global commodity, its price depends on demand and supply from other countries in the world, which **harbours the risk that the global price can be lower than the production cost in Colombia**. Rubber cultivation can be a profitable and sustainable livelihood option when cultivated in agroforestry systems mixed with cocoa, timber species and crops for local consumption and food security which helps mitigate the risk of price fluctuations.
- **SFM has great potential as a sustainable livelihood for forest dwellers and Indigenous peoples in areas with standing natural forest**. Besides conserving the forest, it promotes local governance. There are many positive experiences of forest clusters (núcleos forestales) but there are also many challenges such as the unclear forest use rights, regulations for resource use, poor physical market access (roads, rivers) and mainly the competition with illegal and informal timber from within Colombia and neighbouring countries that keep timber prices low.
- Sustainable livestock offers an environmentally friendly alternative in all TEFOS departments. To date, most of the work has focused

on supporting individual farmers in several areas in Colombia, including Meta, Arauca, and Caquetá. While successful at the local level, this has not been replicated at a larger scale. **Scaling existing experiences in partnership with producers' associations will be crucial to its success.**

- Livestock farming can, however, contribute to the deforestation process. Therefore, **sustainable livestock farming as a livelihood option should be clearly differentiated (strategically and geographically) from the mostly illegal, extensive livestock ranching** undertaken on newly deforested land. Sustainable livestock practices should only be applied to established farms with clear tenure in areas behind the deforestation frontier.
- While livestock is associated with negative environmental impact, it offers an attractive livelihood to most farmers because of its quick profitability, secure market, and low technical and labour input. Most farmers use livestock along with other, more sustainable land use types. **Therefore, promoting more sustainable livestock systems is necessary for any landscapes management initiative.**
- **Less developed livelihood options such as heart of palm, native fish farming, balsa harvesting, or plantations could be piloted** to better understand their potential **in combination with different livelihoods options listed above.**

Livelihood options and deforestation

- **There are several livelihood options that add value to standing forest including SFM, acai, cacay and nature-based tourism. These can be a tool for forest conservation when combined with other activities such as land use security and overall public order. Other livelihood options are more suitable for agricultural landscapes that have been deforested for a long time. These include cocoa, coffee, rubber, sustainable livestock and fish farming.** These livelihood options are adequate tools in a general strategy to combat deforestation because they protect remaining forests and decrease the pressure on the deforestation frontier. However, none of the identified livelihood options can be considered a complete alternative for the mostly illegal livelihood practices currently employed along the deforestation front, which is based on land grabbing, clearing and extensive livestock ranching incentivised by profit and the need to demonstrate land possession.

- While the sustainable livelihood options identified above have positive environmental outcomes, many do not guarantee the conservation of forests, biodiversity, and ecosystem services. Therefore, several **initiatives around forest conservation and restoration commitments at farm and landscape levels should accompany support to these livelihood practices** to mitigate negative environmental outcomes.
- Economic activities based on standing forest such as SFM, nature-based tourism, NTFP extraction are part of the National REDD+ Strategy and may benefit from the international and domestic forest carbon market and related initiatives.

Economy and market considerations

- **There are few premium price options for sustainable products**. Different voluntary certifications are underway for all these products but are hardly translated into market value that reach the producers at farm level.
    - There is minimal space on the huge national cocoa market for premium chocolate; the national market is dominated by two large companies and many local producers sell their cocoa to these at a low market price.
    - The domestic and international coffee market is more developed, and difficult for small producers to gain market access, especially from non-traditional coffee producing areas, leading producers to sell coffee at low prices.
    - Sustainably harvested legal timber must compete with illegal and informal timber.
    - While initiatives exist for promoting deforestation-free beef, demand for these products is limited and does not yet receive a premium price.
- Several livelihood options (rubber, sustainable livestock, coffee, cocoa, fish farming, nature-based tourism) are labour-intensive or require specialised labour. **Although these livelihood options generate employment in many TEFOS target areas there is low availability of labour of adequate capacity**. Other labour activities related to some value chains (notably coffee, rubber, and livestock) are considered unsophisticated, low-paying jobs that are unattractive for many local workers.
- **For several products associated with sustainable livelihood options there are successful local enterprises** (CorpoCampo, ChocoMets,

Asoprocegua, Lácteos La Catira, Kattalei, Tacay, etc.) that promote the sustainability of the production and all the links of the value chain. These are working on a small-scale and require further support to be scaled up or replicated to other regions or departments.

- **There are positive initiatives underway to engage larger private sector companies (banking, consumer goods, retail and department stores) in sustainable value chains of several products (timber, beef, milk, acai, coffee, and cocoa).** While their work in connection to livelihood options compared with deforestation in post conflict areas is incipient, these initiatives could be transformative in scaling up and developing sustainable markets.

Value for Money (VFM) and additionality

- The growing activity in some of the identified markets suggests that the development of the value chains, training and other initiatives to improve sustainable livelihood options will deliver VfM. It is also assumed that sustainable livelihoods interventions will overcome some existing market failures in all value chains, through the improvement of infrastructure, production practices and yields, and the development of local stakeholders' skills, as part of its VfM approach.
- Additionality of future TEFOS-supported livelihood options should target forest conservation and ecosystem services provision, improved preferential prices due to sustainable production practices or premium quality, among others. An economic quantification of the sustainable livelihoods' interventions will not be feasible because the impacts are unlikely to be observed for several years, and social and environmental impacts cannot be valued in monetary terms.

Potential negative effects of the interventions

- To minimise negative environmental and social effects of interventions, it is key that beneficiaries, especially small producers, implement a combination of livelihood alternatives at the farm and landscape level.
- Intervention agreements to promote cocoa, coffee, rubber, sacha inchi, acai berry and cacay plantations and agroforestry systems, should only be promoted in previously deforested lands and accompanied by

Conservation Agreements to avoid further deforestation and enhance forest conservation at the landscape level.

Enabling conditions

Opportunities and barriers to adoption of alternative livelihoods

- The promotion of a local endogenous development approach allows multiple local stakeholders to be part of a process that activates collaboration and partnerships among producers, traders' associations and other private parties with NGOs and public agencies. This should foster sustainable value chains based on local or regional capacities, cultural and social values, resources, and competitive advantages. Evidence suggests that these activities can promote the generation and retention of value in TEFOS municipalities to secure sustainable livelihoods production while promoting conservation at the landscape level.
- Most local producers' associations lack the required technical, managerial, and administrative skills, and sometimes even the adequate statutes, to boost business, addressing not only the production phase but also transformation and value generation, marketing and commercialisation. Retaining economic value at local level would promote local economies' reactivation and social tissue regeneration.
- The scale or size of production, especially in remote municipalities, is too low to demand fair prices and access to markets. Therefore, the establishment of partnerships with highly specialised service providers offers an alternative to create value and win-win business relationships.
- Strong consolidated local producers' associations aligned with the right partners to implement specific tasks required for sustainable livelihoods production are key elements to boost local value generation and retention, as well as the replication and scaling up of certain interventions.
- Having production capacities and means of production will enable small-scale producers to engage in TEFOS interventions addressing a series of livelihoods options according to their needs, aiming to avoid negative impacts related to the production of a single product such as lack of market access and production damage due to climate change, among others.

Public policies and complementariness with existing initiatives

- There are several public policies, plans and regulations to support sustainable livelihoods **options but in a lot of cases they are not well known in rural areas or lack alignment and coordination with local institutions.**
- There are many sustainable livelihoods already being undertaken by other stakeholders (national NGOs, public agencies, initiatives of international cooperation, universities, research centres and government agencies, etc). **However, in most cases they focus on a small scale (plot or farm level) and specific elements of value chains, and there is a lack of coherent, collaborative approaches for implementation at scale** and as part of overall sustainable development and forest conservation policies. Future initiatives, such as TEFOS, should focus on addressing these barriers by upscaling ongoing sustainable livelihoods interventions, addressing all the steps of the value chain and supporting, complementing and aligning with key partners, promoting additionality, coordination and targeting positive local level impact. In addition, by clarifying land tenure and enforcement of rule of law, the work of TEFOS pillars 1 and 2 should contribute to enabling sustainable livelihood options.
- **Sustainable livelihood interventions receive varying kinds of support by ongoing initiatives in the different TEFOS target areas.** Cocoa, sustainable forest management and tourism are supported by many initiatives, but there are fewer interventions for cacay, acai, sacha inchi and rubber. Meta, Guaviare, and Caquetá host the majority of international cooperation and national development agencies' activities related to sustainable value chains. Central Orinoquia, eastern and southern Amazon have much fewer interventions and there is hardly any work in the Bajo Cauca and Urabá Antioqueño.
- **Private companies, start-ups, emerging private initiatives, and local producers' associations offer an opportunity for TEFOS to link with private actors and create strategic partnerships** to support ongoing initiatives aiming to extend or modify their current interventions to implement activities that complement TEFOS interventions.

7. Main recommendations

In addition to the recommendations included in the individual livelihood options analysis, this section outlines general recommendations based on an assessment of the existing evidence base, fieldwork validation visits and the key informant interviews. Lessons learnt from past and ongoing initiatives provide ideas on how to engage in relevant sustainable livelihood ongoing initiatives and successfully encourage stakeholders to shift to activities that protect standing forest, generate an income and promote the adequate use of land.

Livelihoods options and the relation with agents of deforestation

- There is a complex relationship between the successful implementation of sustainable livelihood options and combatting deforestation. **This suggests the need for carefully considered combinations of livelihood options which will need to vary in line with the areas for implementation**. In particular, different combinations are likely to be appropriate in areas of standing forest, compared to those in recently deforested areas behind the deforestation front, or where deforestation is actively in process. On many occasions, livelihood options will need to be accompanied by additional incentives or commitments to conserve biodiversity and protect forests.
- It is important to promote the development of a combination of different sustainable livelihood options in a comprehensive manner at the landscape level, **considering the conditions and capacities of the territory, the status of land tenure, the interests and skills of the different local stakeholders and the main barriers identified for each value chain.**
    - In previously deforested lands, agroforestry systems (cocoa, rubber, sacha inchi, heart of palm, coffee, cacay, and timber trees including balsa) and sustainable livestock raising provide alternatives for sustainable production. The best combination of options will depend on the geographic, biophysical, and socioeconomic conditions, as well as stakeholders' interests and skills.

    - Activities focusing on standing forest like SFM and NTFP harvesting including acai and cacay, along with nature-based tourism, offer great possibilities for forest dwellers, Indigenous peoples, and Afro-Colombian groups, especially in remote forest areas.
    - Conservation Agreements should be part of any intervention to avoid any further deforestation and promote forest conservation and restoration at the landscape level.
- Apart from promoting livelihood options based on their potential positive impact on deforestation and the potential for associated emissions reductions and biodiversity conservation, **it would be beneficial to define and pursue environmental benefits such as soil management, pollination, cultural values, and water regulation, among others**. Similarly, according to the evidence from previous and ongoing initiatives (detailed for each livelihood option), apart from creating secure income and livelihood security, **it is also important to consider social co-benefits** such as gender equity, women's and youth empowerment, social inclusion, Indigenous peoples rights and needs, food security and health improvement that could be generated through new initiatives.
    - Vision Amazonia interventions in the forest governance pillar include: forest resources technical planning for SFM at community level; technical, social and business support; environmental education and communication; financial support including a forest incentive linked with forest and biodiversity conservation; secure land tenure; implementation of other sustainable livelihoods options addressing their value chains and offering green credits; along with local authorities' strengthening. They work with Indigenous peoples including women and youth focusing on the improvement of the quality of life of the local people (Visión Amazonia, 2020a).
- The development of economic information for some of the potential livelihood options will contribute to develop a business case to secure the sustainability of the interventions in the long term.
- **Further economic information on the supply, demand and cost of sustainable livelihood options is required to understand and improve the sustainability of interventions.**

Enabling conditions

Capacity strengthening

- For all livelihood options, **attention should be paid to the creation and strengthening of local technical capacities** to implement field activities in a sustainable way, and to improve local stakeholders' administrative and managerial skills, and local governance capabilities. **To ensure impact at a larger scale, it is important to support local producer organisations, cooperatives and associations, and various stakeholders along the supply chain** – rather than targeting individual farmers—to improve technical and administrative capacities in the territories.
    - This approach could include the promotion of innovation processes and the development of capacities and technological transformation in all the proposed value chains in order to encourage the creation of added value by local organisations and businesses (for example, locally transform acai into lyophilised or freeze-dried powder or aromatic beverages so that it can be sold at around 500 times its price as a freshly picked fruit) so that this value remains in the territory and helps to reactivate local economies.
    - The greatest project investment in capacity strengthening could be dedicated to the private sector. Local organisations and private stakeholders will play a key role articulating change through its demand for sustainable products, services and value chains that will generate additionality in terms of ecosystem conservation and restoration.
- **Strengthening local and regional institutions is critical to the design, implementation, and sustainability of specific project strategies** because these institutions generate suitable conditions for investment and trade, as well as reducing social, economic and political risks. According to Rodríguez-Pose (2013) this does not mean however that projects have to go from "one size fits all" to purely "tailor made" context-specific policies.
- To promote long term sustainability of livelihood options, local actors, especially smallholders, should be provided with the means and capacities required to implement the combination of sustainable livelihood options that best suit them and to ensure linkages between all stakeholders in the value chain and access to markets.

Association, partnerships and clustering

- The promotion of a common understanding on priorities for economic development between local public and private stakeholders would trigger an endogenous development plan, based on local resources and competitive advantages. This could facilitate a focus on sustainable production according to the specific needs of the territories and their actors. This could include:
    - **Producers and stakeholders' associations could be supported to develop adequate legal structures** (statutes) that enable them to implement business-related activities and generate economic value.
    - To reduce the negative impact of excessive informal intermediaries in all value chains, **initiatives should work directly with the demand side or buyers (restaurants, retailers, exporters etc**) to strengthen their supplier development programmes by incorporating sustainable production approaches and improving market performance in the development of differentiated supply chains.
    - Beyond having a technical team providing agricultural extension and technical assistance services at field level, initiatives should make efforts to broaden implementation mechanisms by helping to develop a supply of specialised providers of technical assistance, forestry and agricultural extension services. This would strengthen and articulate the existing inputs and service providers in the territories and promote the creation of local and regional clusters linked with other sustainable production initiatives.
- The establishment of strategic partnerships could be encouraged since these can play a key role in marketing (especially of non-traditional products) and access to technology. This could be particularly important for stakeholders located in remote areas.

Scaling

- As identified in this report, one of the major challenges faced by the sector is how to apply sustainable livelihood options at scale. Plot-level technical development is being implemented by initiatives across TEFOS target areas, **however, there is an absence of interventions which target the financial, technological and market-related barriers to projects being implemented at scale**. This would require more focus on market development, managerial and business capacity building,

associativity, public policies for planning, regulation and promotion, and support to the private sector in supply and demand and through financial tools.

- **Partnerships with cooperatives, local enterprises and producers' associations rather than individual producers in isolation will help to increase the scale of implementation and replication of successful livelihood options**. Supporting strong producer associations and the right partners to implement specific tasks in the promoted value chains are key elements to foster the replication and scaling up of interventions.
- Livestock raising is a crucial land-use system due to its omnipresence and impact on forests and with environmental conservation. It is the largest contributor to large-scale deforestation, as it is the first economic activity to be implemented after clearing the land. It is also an easy, quick, and profitable livelihood. This leads to its wide application, employed in conjunction with other livelihoods like tourism or the cultivation of cocoa or rubber. **Where livestock farming is established in the extant agricultural landscapes, it can be implemented in a more sustainable way, such as**:
    - Supporting the further development and application at scale of sustainable livestock farming.
    - Increased recognition that many land holders have livestock as a secure source of income, so elements of sustainable livestock farming should accompany other livelihood options.
    - Consider that extensive livestock ranching is directly associated with deforestation as illegal land use. **However, it must be recognised that it is unlikely that sustainable livestock farming principles will be sufficient or accepted by actors on the deforestation frontier.**
    - Alignment with public land use planning and private sector initiatives, such as zero deforestation beef, sustainable dairy chains decouple livestock from deforestation.
    - Adopting learning from previous initiatives such as the use of financial mechanisms package that includes access to knowledge, plants, technical assistance, and inputs to enable producers, including women and youth, as well as producer associations to undertake a sustainable land use transformation. **The combination of credits and other financial mechanisms with non-economic incentives are key to stimulating adoption.**

Complementarity with Existing Initiatives

- Livelihoods initiatives in the value chains identified in this report could be implemented to complement work from ongoing initiatives and organisations. This could involve integrating lessons from other initiatives, connecting and coordinating positive ongoing experiences, supporting these (technically, financially) where clear added value can be provided, replicating and/or scaling up these positive experiences, and starting new work only based on clear gap assessments:
    - Synergies with payments for ecosystem services and REDD+ initiatives could also be considered to promote specific standing forest-based livelihood activities, along with other sustainable livelihoods activities.
    - Initiatives could align and complement with other government economic development initiatives, such as PDET projects promoting sustainable production, forest restoration and conservation activities and local initiatives, especially in remote areas with few other international cooperation interventions.

ANNEX 1. Pillar 3 Evidence Review - Research Protocol

Introduction

This protocol sets out the plan for carrying out the Pillar 3 Evidence Review, focusing on the operational details for the research. The purpose, scope, methodology and timescales for the review have already been described in the Pillar 3 Evidence Review Concept Note agreed with BEIS. Therefore, this document makes only makes brief reference to the purpose and scope but will provide further detail on the implementation of the methodology.

Purpose and scope

The overall purpose of the Evidence Review is to inform BEIS' appraisal process for pillar 3, by producing a systematic evidence assessment that identifies pilot areas for the creation and promotion of sustainable livelihood opportunities, complementing activities under TEFOS pillars 1 and 2. The review will help ensure that selected pilot areas are context specific, well-targeted and aligned with other pillar activities. BEIS will use the review findings to inform the internal appraisal process which involves the assessment and selection of appropriate financial and delivery mechanisms for the implementation of pillar 3.

The review will consider a range of forest and land use activities being delivered by other UK programmes, other donor programmes, other relevant funds, government (national and regional) agencies, research institutions and Non-Governmental Organisations (NGOs) in Colombia (see Appendix 1).

Methodology overview

The review will be done by the TEFOS MEL Team and undertaken as a Rapid Evidence Assessment complemented with key informant interviews (KII) and a field validation exercise, along the lines described in the Concept Note.

The evidence review will start with a description of the political and socio-economic context in the target conflict-affected municipalities, and determine any potential enablers, barriers, risks for the promotion of sustainable livelihood opportunities. Sources for this will include economic, environmental and social statistics (National Department of Statistics) where relevant. The identification and analysis of the livelihood options will rely on secondary review of existing interventions by different agencies. This implies the revision of evidence sources such as published peer-reviewed articles, grey literature, policy

documents, and evaluation reports from similar programmes. This will be complemented with purposively sampled interviews with key stakeholders, including the agencies related to the initiatives mentioned in 1.2, as well as delivery partners of TEFOS, the UK embassy team, the BEIS programme team, and the wider donor community.

Once an initial analysis of the secondary evidence has been completed, field validation work will be used to corroborate and test emerging findings with a non-representative sample of prospective beneficiary communities including local field practitioners in a sample of the 20 municipalities and 2 national parks targeted by the TEFOS programme.

Research questions

Research question matrix

Question	Sub-question	Source of evidence
1. What are the key political and socio-economic considerations in TEFOS' target municipalities		Context analysis (document review – including statistical sources where available, news items) Key Informant Interviews (KII)
2.Which sustainable livelihood interventions are more likely to meet the UK's aims of reducing deforestation and improving development outcomes in conflict-affected areas in Colombia based on available evidence?	2.1 Which interventions have the most potential to be replicated and/or scaled in conflict affected areas?	KII Secondary review of existing interventions Field validation consultations
	2.2 Which interventions have the most potential to mobilise private finance and promote access to markets based in conflict affected areas[66]?	KII Document review Secondary review of existing interventions
	2.3 Which sustainable livelihoods options do Indigenous peoples and local	KII

66 We have interpreted this as being an indicator that interventions will be economically feasible. We have not interpreted as restricting our review only to those interventions which can definitely attract co-funding or investment from private parties.

	communities (IPLCs) consider most appropriate in each territory, and what recommendations do they make for implementing these effectively?	Field validation consultations
	2.4 Which interventions have the most potential to provide Value for Money (VFM) and/or additionality?	Secondary review of existing interventions Comparative analysis of profiled interventions Field validation consultations
3.What are the enabling conditions required for these interventions to work?	3.1 What are the specific current opportunities and barriers market, policy, financial) to entry for local communities (inc. Indigenous peoples, women/girls, and people with disabilities) in the identified (sub) sectors?	KII Secondary review of existing interventions Field validation consultations
	3.2 What are the general opportunities and barriers to adoption of alternative livelihoods in conflict-affected deforestation hotspots and how can they be overcome?	KII Secondary review of existing interventions Context analysis (document review, news items) Field validation consultation
4. Which existing programmes, initiatives, partnerships, and organisations have the potential to extend or modify their current interventions to implement livelihood activities in	-	Secondary review of existing interventions Discussions with programme teams of the most promising interventions / other stakeholders

the identified areas complementary to and within the timescale of the programme?		

Identification and review of secondary information

Indicative list of terms to be used when searching for documents

The review will use the following terms when searching for documents - this is a non-exhaustive list and may be added to e.g., where searches identify other promising terms:

Table 1 Search terms for the review

The terms: project; intervention; initiative; programme, combined with the following:		
rural livelihoods	sustainable livelihoods	forest products value chain
non-timber forest products value chain	sustainable agriculture value chain / sustainable forest management	agrobiodiversity products value chain
climate smart agriculture	climate smart livestock / Sustainable cattle-ranching	nature based solutions
ecotourism[67]	agroforestry	bioeconomy
	Colombia Peru, Brazil, Ecuador, Bolivia, Mexico, Central America, etc.	

Indicative list of databases / search engines

The online tools that will be used to carry out the search are Google Scholar, Academia.edu, Scielo scientific electronic library and specific online databases such as CDKN, World Bank climate knowledge portal and Colombian universities portals, DANE (Colombia national statistics authority).

67 With suitable qualifiers – e.g., “forest” or geographical terms in order to narrow down the search sufficiently

The research will concentrate on Colombian-focused documents, but it will also consider relevant publications and databases at regional (Latin America) and global level. Ecosystem-based Adaptation, Climate Smart Agriculture and Nature-based solutions websites will be reviewed[68] as well as the Panorama solutions for a healthy planet portal. Additional databases may be added during the search.

Approach to including documents in the study

The search will identify a significant number of documents, which will then be refined, using the following criteria to decide whether to include a given study in the assessment. The emphasis at this stage is on employing broad criteria for including studies in the review; some of these may need to be excluded at the detailed analysis phase if they prove not to be useful. Summaries/abstracts will be assessed against the inclusion criteria and if they meet these the full study will be reviewed in detail. Where abstracts/summaries do not contain information on all the inclusion criteria, a wider team decision will be made on inclusion. Inclusion criteria can be applied flexibly (more or less detailed) when the selection results too large or too narrow.

Table 2 Criteria for inclusion of studies in the review

Category	Criteria for inclusion in the study
Time Period	Study undertaken within the last 15 years
Intervention objective	Promoting livelihoods – promoting substantial, sustainable increase in income for a broad target population Providing alternative sources of income for populations involved in activities related to deforestation (non-essential criterion)
Intervention location	Colombia – any rural or semi-rural area – main exclusion is for interventions in large urban areas Other countries in tropical Latin America, with emphasis on areas in or close to forested areas (e.g., Peru, Brazil, Ecuador, Bolivia, Mexico, Central America)
Target population	Rural or semi-rural populations; Indigenous peoples, Afro-Colombian communities, and other ethnic minorities in Colombia.
Nature and scale of impact	The nature of the impact must be at least partly described in quantitative terms Impacts should have provided potential benefit for substantial numbers of people, rather e.g., than neighbourhood level effects (unless these could be replicated across many areas)

68 E.g. the International Impact Initiative for Impact Evaluation's Forest Conservation Evidence Map and Land Use Change and Forestry Evidence Map

Research type / methods	Peer-reviewed and non-peer reviewed research. May include policy studies, technical reports, academic articles, papers presented at conferences, evaluation reports etc.
Transparency of methodology	The study must be based on a systematic investigation of effects, with at least a summary of the methodology included in the document. NB A fuller assessment of the strength of evidence will also be made as part of the analysis of those studies that are selected for inclusion (see below).
Language of report	Spanish, English, Portuguese

Review of full documents

Once the initial selection of documents is done, full document reviews will be undertaken. This will involve reading the whole document and coding selected information from the text to profile the most promising types of intervention and to answer the key research questions. This will be undertaken using qualitative analysis software – Atlas TI or EPPI Reviewer – both of which are suitable packages for assessing large amounts of text and can be learned quickly. Tetra Tech has extensive experience of using both packages and training will be provided to the researchers for this purpose.

Text from the documents will be categorised using the following codes:

- Intervention sector / sub-sector [Sector]
- Barriers preventing vulnerable groups benefitting from opportunities to improve their income from existing livelihoods / generate new livelihoods [Barriers]
- Results of the intervention in terms of generating new sustainable income sources for vulnerable groups [Income]
- Main beneficiary populations [Beneficiaries]
- Results of the intervention in terms of reduced deforestation (where applicable) [Deforestation]
- Results of the intervention in terms of other improved development outcomes [Other outcome]
- Any negative effects of the intervention [Negative effects]
- Key success factors that enabled the success of the intervention success [KSFs]
- Information relevant to the replication or scaling up of the intervention(s) [Replication]
- Whether and how the intervention promotes access to markets [Markets]
- Whether and how the intervention mobilised private finance [Finance]
- Whether the intervention was judged to offer value for money [VFM]
- Whether the intervention was judged to be additional to what otherwise would have occurred [Additionality]
- Strength of evidence presented in the study [Strength]

Framework for synthesising information from identified interventions

We will use the coded analysis of studies to identify a short-list of types of interventions for BEIS to consider for pillar 3 implementation, to be further validated by KII and field visits. This short list will include a summarised (1-2 page) write-up for each intervention type, explaining what the intervention sets out to do, how and where it was implemented and with what kinds of results (environmental, economic, social), and what key success factors or barriers can be identified. This will provide information including the following (but reflecting the level of information available in the source documents).

- Area (e.g., at municipality level in Colombia)
- Sub-sector
- Type of intervention
- Intervention cost
- Type of beneficiaries
- Type of land tenure[69]
- Number of beneficiaries
- Types and distribution of impacts
- Increase in income, job-creation, poverty-reduction
- Distribution of impacts on disadvantaged groups (people living in poverty, women and girls, people with disabilities, Indigenous People)
- Environmental impacts - reduction in deforestation and other environmental impacts
- The scale at which effects were recorded - local, regional, national
- Any negative effects
- Long term sustainability of the intervention
- Description of factors that made the intervention a success
- Potential barriers
- Issues relevant to whether a similar intervention could be implemented in a TEFOS target area

We will also summarise results in an overall matrix, highlighting the most promising types of intervention to meet overall objectives for pillar 3 and the TEFOS programme more broadly.

Strength of evidence

The analysis will take into account the strength of evidence for the conclusions drawn by each study. This will be based on the criteria presented in the table below, which are drawn from guidance previously published by the FCDO[70].

Table 3 Assessing the strength of evidence

69 It will also be interesting to understand if lack of secure tenure rights is a barrier
[70] Department for International Development (2014), Assessing the Strength of Evidence

Criterion	Example of what this means in practice
Conceptual framing	The study acknowledges existing research and explains how its analysis sits within the context of existing work
Transparency	The study is transparent about the design and methods used
Appropriateness	The study design and methods are appropriate for the purpose. e.g., where claims are made that an intervention has led to specific results, there is an adequate explanation of this judgement
Reliability	Research has gathered data in a consistent way, with conclusions drawn on the basis of evidence
Cogency	A clear logical thread runs through the study, linking the conceptual framework to data, analysis and conclusions

Each study will be assessed against these criteria using the following scale: i) criterion is strongly met; ii) criterion is weakly met; iii) criterion is not met. This assessment will then be taken into account in answering the research questions and in relation to recommendations on particular types of intervention that BEIS might want to consider for pillar 3.

In some cases, it will be clear whether a study is robust (e.g., strongly meets all or most of the criteria) or not (does not meet or only weakly meets some criteria). However, we do not wish at this stage to be prescriptive about exactly how the strength of evidence will be used as in some cases a nuanced assessment may be needed (e.g., findings of a weaker study that might be rejected on its own are used, because they align with those of several more robust studies).

Interviews with key informants from stakeholder organisations

The secondary review of interventions will be complemented by a series of interviews with key informants with first-hand experience, knowledge and/or insights in relation to sustainable livelihood initiatives. The interviews and the document review will in practice be done in parallel. It is anticipated that these may identify further documents and shed light on the success or otherwise of particular interventions. In all cases the sources of the information will be referenced in the analysis.

A total of up to 25 interviews are expected with key informants at national level. Making use of the visits to some targeted municipalities, additional KIIs will take place at local level (local governmental agencies, NGOs; see section 8). The team will seek to carry interviews up to this number to generate broad information on the range of possibilities for the pillar 3 intervention. No

additional KIIs will be sought if the returns from doing so diminish substantially (e.g., interviewees reiterate points previously covered).

Key informants will include representatives from the UK embassy, the TEFOS programme team, stakeholders from the donor community, relevant officials in the Government of Colombia and key stakeholders from sustainable livelihoods initiatives in Colombia identified through the desk research. Key stakeholders from the donor community, research partners, implementors of the sustainable livelihoods initiatives detailed in Appendix 1 will be identified according to their role, the level of relevance and alignment between their own initiatives and TEFOS pillar 3 objectives, based on the results of the review of secondary information. A preliminary list of key informants is detailed in Appendix 1. Each key stakeholder will be contacted through an email message or phone message/call when appropriate, detailing the reason for contacting and requesting a virtual or face to face interview.

Individual semi-structured interviews will then be conducted using a set of guiding questions - see topic guides for KIIs in Appendix 2.

Information from KIIs will be analysed using the same qualitative analysis software used for the document review, based on the overall research questions and guiding questions for the discussions (Appendix 2). This will allow the identification of points of convergence or disagreement as well as illustrative comments to inform the findings. The information gathered will feed into the framework for synthesised information of intervention types produced after the document review.

Output from the secondary evidence review and stakeholder consultations

Analysis will be brought together in an interim report assessing various types of sustainable livelihoods interventions with the potential to be implemented in the TEFOS target areas. This will provide a key resource for the field validation which will be used to investigate further the potential for particular types of interventions to be implemented in particular locations.

Field validation

Method for field validation

Based on the information gathered from the literature review and key informants, six municipalities where sustainable livelihoods initiatives are being implemented will be selected for a field validation visit. Five site visits are proposed (plus one municipality as a backup, in case one of the original five cannot be visited). Site visits will be conducted by two team members, with oversight and quality assurance provided by the Team Leader. All site research will be conducted in Spanish.

Local stakeholders will be identified in collaboration with the UK embassy and their local partners (we will also seek the advice of the World Bank pillar 1 team). Local communities and Indigenous peoples' groups will be approached through local entities or local key informants (and are likely to include e.g., community leaders and environmental defenders). This will be organised and coordinated well in advance.

Semi-structured KIIs will be carried out with a sample of respondents including local government officials and field practitioners. The KIIs will focus on the applicability and limitations of specific livelihood opportunities that are potentially relevant to the region. See topic guides for KII in Appendix 2.[71]

A Focus Group Discussion (FGD) will be held with members of local communities (including Indigenous peoples), where discussion topics will identify potential benefits, relevance, and limitations of livelihood opportunities (see Appendix 2 for the FGD topic guide). FGDs will gather around five or six individuals at each site. We will make efforts to ensure a gender balance in these discussions by deliberately aiming to invite women and people of different ages (over the age of 18) and ensuring that all participants have a chance to contribute to the discussion.

One of the team members will act as a moderator or interviewer that will facilitate the discussion creating an environment that promotes the communication of different perceptions and points of view. Each focus group will last approximately 90 minutes, during which participants will be asked to discuss ten questions.

Where possible, observations of positive experiences will be carried out in the same locations as the focus groups, including visits to farms and plots. These will also provide the opportunity to obtain information on the behaviour, activities and processes used to improve livelihoods.

We will conduct two focus group discussions, at least five key informant interviews and carry out two field observations in each location to be visited.

Criteria for selecting the exact locations for field research

The main criteria to select locations (municipalities) for field research include: i) being representative of one of the TEFOS target regions, ii) being accessible, iii) having experience with successful implementation or pilot implementation of sustainable livelihoods initiatives, iv) having an acceptable level of security and

71 This activity contributes to KII in Section 6. The trips to targeted municipalities to do field validation with programme beneficiaries are used to do additional KII that otherwise had to be done through online meetings

v) having good local institutional contacts. The order of the criteria is not related to their importance or weight for decision making.

The following municipalities are proposed based on these criteria.

Table 1: Suggested TEFOS' target regions and municipalities for field validation

No.	Landscape	Natural National Parks	Proposed municipalities for site visits
1	Western Amazon/Andes-Amazon-Orinoquía transition	Putumayo, Caqueta, Meta departments; Cordillera de los Picachos, Serranía de la Macarena and La Paya National Parks	Macarena
2	Central Amazon	Guaviare and Caquetá, surrounding but excluding Chiribiquete National Park	San Jose de Guaviare
3	Eastern Amazon	Puinawai National Park	Irinida
4	Orinoquía	Tame municipality, Cocuy National Park	Tame
5	Lower Antioquia	Serranía de San Lucas and Paramillo National Parks	Chigorodó
6	South Amazon	Putumayo	Puerto Leguizamo/Puerto Guzmán (back-up options)

Criteria for identifying participants for key informant interviews and focus group discussions

Institutional research participants will include local environmental authorities (Corporaciones Regionales Autónoma - CAR), municipalities and other local organisations working on sustainable livelihoods with local stakeholders, either in the implementation of actions on the ground and/or on local public policies. The selection of key institutional stakeholders will be based on those present in the targeted municipalities.

The local environmental authorities and other local key informants will support the selection and contact of local communities, Indigenous peoples, families and other stakeholders. The main selection criteria will be their involvement in the implementation of sustainable livelihoods initiatives.

Ethical and safeguarding considerations for field validation work

The following considerations will be put in practice for the field validation work.

Consent

- The purpose of the research will be explained clearly to all participants. The researchers will take care not to raise the participants' expectations and explain that the research will not necessarily lead to a project being undertaken in the area.
- It will be explained to participants that there is no obligation for them to take part and that they can withdraw at any moment. It will also be explained that the write-up of the discussion will not name the individuals or attribute particular opinions to them and will only be used for the purpose of informing the wider research.
- Only adults aged 18 years and over will be invited to take part

COVID-19 risks

COVID-19 risks will be assessed before the start of any site-visit, based on information for the destination location and travel route. Should the COVID-19 risk be deemed acceptable, the following mitigation measures will be used:

All interviewers will be fully vaccinated against COVID-19

Interviewers wearing masks and carrying masks for participants to use during interviews

Interviewers using hand sanitiser and urging participants to do the same

Maintaining social distance during interviews and conducting group interviews with a maximum number of people (e.g., six) to ensure that social distancing is possible in the interview location.

Other considerations for interviewer safety

- Interviewers will make an assessment of the general security situation before travelling, including consulting the UK embassy, press, and local stakeholders with whom interviews have been arranged.
- Interviewers will avoid travelling alone in the evening or in the dark, or in neighbourhoods where they feel unsafe.
- An important point is to follow the guidance from local community contacts on how to enter and travel to those territories, as they will have the most reliable information (sometimes better than the military or police).
- Interviewers will always be vigilant during the interview and mindful of the external environment.

- Interviewers will refrain from disclosing their full names, addresses or other contact information to participants. They will present their identification if asked to do so and provide participants with more general contact information / further information about the project if they are asked for this.

Drawing conclusions from the research

Information from the field validation KIIs and FGDs will be compiled and systematised using qualitative analysis software, based on the evaluation and guiding questions. The analysis will allow identification of points of convergence or disagreement as well as illustrative comments to inform the findings. We will then compare and contrast the results with the review of secondary evidence, to triangulate with our other findings and strengthen the overall reliability and credibility of the findings.

We will then draw overall conclusions to answer the research questions and summarise the suitability of different options for pillar 3 sustainable livelihoods interventions. These will take account of the specific characteristics and context of the different TEFOS target areas (e.g., some interventions may be more appropriate for some areas than others). This will cover issues including the strengths and weaknesses of different approaches, likely benefits for different types of beneficiary groups, design considerations including how the interventions could be delivered, key success factors and constraints, potential to extend or scale-up existing initiatives etc.

During the process of drafting the final report we will hold an Emerging Findings seminar with the programme team and key stakeholders to discuss initial findings and confirm the structure and content for the final report.

Appendix 1: Sustainable livelihoods institutions and initiatives to be included in the review

Key Informant Interviews will include representatives from the following institutions and initiatives (additional initiatives can be added when conducting research).

UK-supported initiatives

Details of the lead implementing agency and key contacts will be obtained in the first interviews for the research with the British embassy and BEIS staff.

Initiative	**Lead implementing agency**
Conflict, Security & Stabilisation Fund initiatives in Colombia	

Prosperity Fund Colombia Programme	CAF
Newton Fund activities	
UK-PACT	
ISFL-Biocarbono Orinoquia	World Bank
Partnerships for Forests (P4F)	
Vision Amazonia	MADS

Other bilateral and multilateral development partners

Bilateral and multi-lateral development partners active in the environment and livelihoods space. The preliminary list includes:

- USAID
- Norway
- Germany
- France
- Switzerland
- Sweden
- European Commission
- IADB
- World Bank (from the other programmes outside TEFOS)
- Corporacion Andina de Fomento
- UNDP
- GIZ
- FAO

Colombian government agencies

Various Colombian public agencies have programmes targeting the environment and livelihoods space. The most relevant related to the TEFOS regions are:

- Ministry of Environment - MADS (including the International Affairs office, Forest division and Climate Change division)
- Ministry of Agriculture – MADR
- UPRA
- National Planning Department (DNP)
- Ministry of Industry, Commerce and Tourism (MinCIT)
- Fondo Acción
- Patrimonio Natural
- Fondo Nacional Ambiental
- National Natural Parks
- IAvHumboldt

- IDEAM
- Sinchi
- IIAP
- Agrosavia
- CARs

Academia

Several research institutions support the development of alternative livelihood options. A preliminary set includes:

- Universidad Nacional (Amazon University)
- Universidad Javeriana,
- Universidad de los Andes
- EAN (Escuela de Administración de Negocios) – (the embassy team has a robust environmental collaboration with them)
- The International Centre for Tropical Agriculture (CIAT)
- CIPAV

Non-Governmental Organisations

Many NGO's have important initiatives in the sustainable livelihood space. Some are related to the initiatives mentioned above, but many additional projects have generated important information and experience. The review will initially contact:

- Fundación Natura,
- WWF Colombia
- Conservation International,
- The Nature Conservancy
- Amazon Conservation Team
- Fundación para la Conservación y el Desarrollo Sostenible.
- GAIA
- WCS
- GGGI

Appendix 2: Topic guides for key informant interviews and focus groups

Key informant interviews (national and local level)

KII guiding questions
What are key political and socio-economic issues to consider in target municipalities?
Which type of interventions have the most potential to be replicated and/or scaled in conflict affected areas? Why?
Which interventions have the most potential to mobilise private finance and promote access to markets in conflict affected areas? Why?
Which sustainable livelihoods options do you consider most appropriate for Indigenous peoples and local communities' (IPLCs) territories? Why?
What recommendations do you have for implementing sustainable livelihoods options in IPLC territories?
What is needed to fully implement such options in their territories? (Capacities, supplies, technical support, among others)
What are the current barriers (market, policy, financial) to entry for local communities (inc. Indigenous peoples, women/girls, and people with disabilities) in the identified (sub) sectors?
What are the barriers to adoption of alternative livelihoods in conflict-affected deforestation hotspots and how can they be overcome?
Is the lack of capacities a barrier? If so, what type of skills or capacities are missing?
What existing programmes, initiatives, partnerships, and organisations have the potential to extend or modify their current interventions to implement livelihood activities in the identified areas within the timescale of the programme? Why do you think this?

All information obtained from interviewees will be confidential and to the extent possible will be supported with existing documentation.

Focus group discussions

Note that this topic guide will be revised once the results of the desk review and the types of interventions to be discussed are clearer.

The guiding questions presented below will be adjusted according to the different groups of stakeholders participating in the FGDs in order to guarantee their understanding, taking into account levels of literacy, language skills, logistical and cultural barriers. Notes will be taken for points in common among participants, as well as for what is not common or what stands out as different points of view. Special attention will be given to participants who remain quiet e.g., by encouraging their participation, asking them if they agree with what has been said by others, whether this accords with their own experience etc.

FGD guiding questions
Part 1: discussion of livelihoods issues in general
What kind of livelihood would provide a good living for people in this area?
What is preventing people from making a good living in this way at the moment?
What would need to change for people to be able to do this? [could prompt for: Fixed assets (including land, buildings for workshops or storing materials etc.) Financial support (e.g., loans) Training (technical & managerial capacities) Local organisations (Indigenous peoples or local communities) functions and capacities Connections with buyers or sellers Distance from markets Access to particular goods or services]
Do you have specific recommendations for implementing livelihoods projects in your territory?
Is there a lack of particular kind of capacity at community level to adopting more sustainable livelihoods? If yes, what kind of capacities?
Do you consider the lack of capacities at local (governmental and nongovernmental) institutions as a barrier to implement sustainable livelihoods alternatives? If yes, what kind of capacities?
Part 2: review of possible options for livelihoods projects Researcher outlines the key elements of up to three types of intervention
Would this kind of livelihoods project be suitable in an area like this?
What would need to happen for it to be successful?
What factors would prevent its success – how could these be avoided?
Would this kind of project help to reduce deforestation?

ANNEX 2. References

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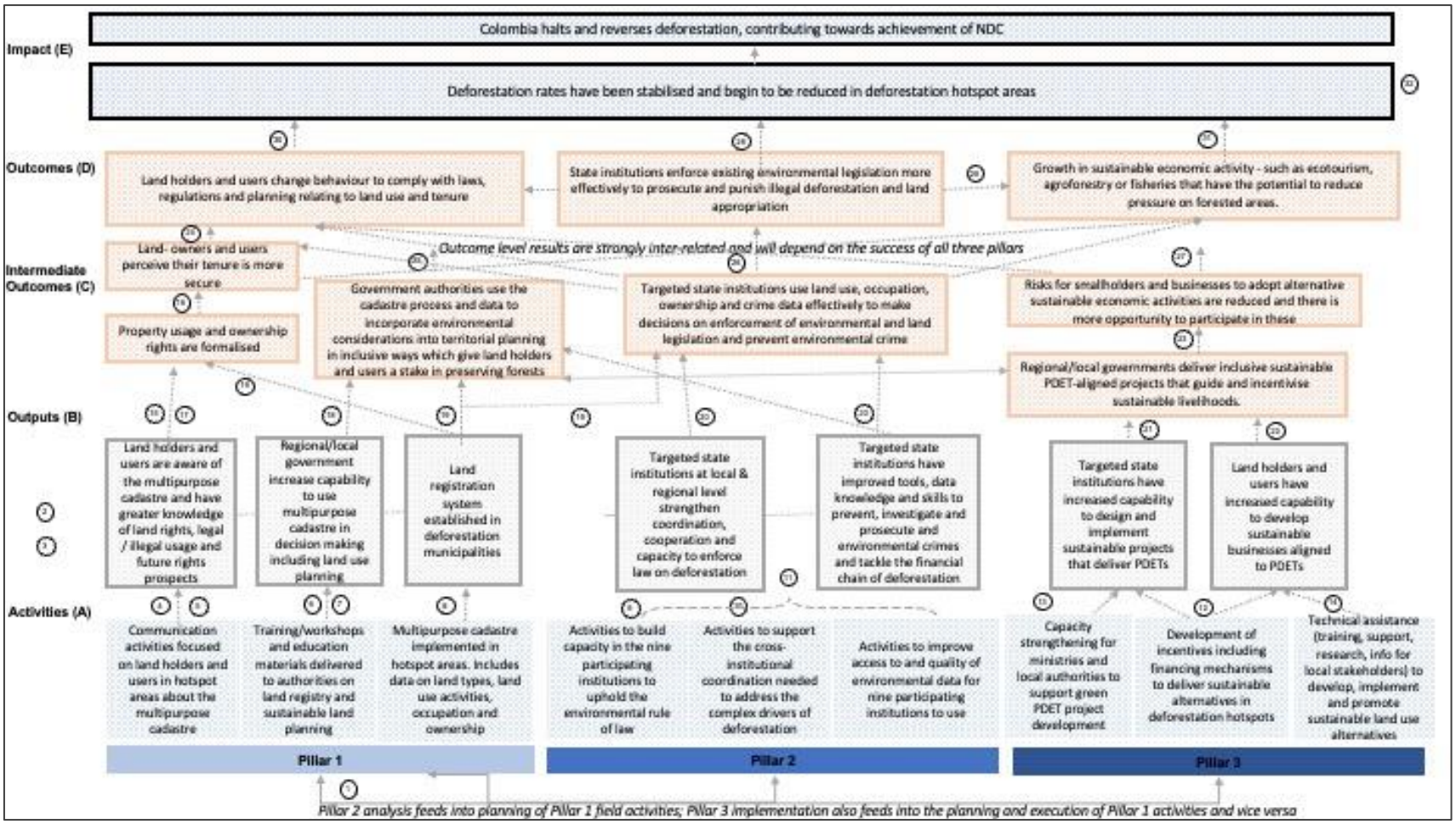
ANNEX 3. Summary of Key Informant Interviews (KII)

Type of stakeholder	Number of interviewees
UK supported initiatives	20
Other development partners	16
Colombian government agencies	18
Non-governmental organizations	21
Indigenous peoples and Afro-Colombian stakeholders	5
Private sector organizations	4
Total	80

ANNEX 4. TEFOS Theory of Change

The diagram summarises the TEFOS theory of change, as conceptualised in March 2022. The numbers refer to assumptions which are detailed in the April 2022 TEFOS MEL Project Inception Report.



ANNEX 5. Cocoa growers' associations linked with FEDECACAO

Department	Municipality	Number of Cocoa growers' associations
Antioquia	Carepa	103
Antioquia	Chigorodó	138
Antioquia	El Bagre	71
Antioquia	Ituango	None reported
Antioquia	Mutatá	61
Antioquia	Peque	None reported
Antioquia	Segovia	2
Antioquia	Zaragoza	40
Arauca	Tame	1.134
Caquetá	Cartagena del Chairá	None reported
Caquetá	Puerto Rico	55
Caquetá	San Vicente del Caguán	12
Caquetá	Solano	None reported
Cordoba	Montelíbano	None reported
Cordoba	San Jose de Ure	None reported
Cordoba	Tierralta	25
Guaínia	(ANM) Morichal **	None reported
Guaínia	(ANM) Pana **	None reported
Guaínia	(ANM) Puerto Colombia **	None reported

Guaínia	Inírida	None reported
Guaviare	Calamar	65
Guaviare	El Retorno	50
Guaviare	Miraflores	None reported
Guaviare	San José Del Guaviare	156
Meta	La Macarena	None reported
Meta	Mapiripán	9
Meta	Mesetas	31
Meta	Puerto Concordia	43
Meta	Uribe	12
Meta	Vistahermosa	234
Putumayo	Leguízamo	None reported
Putumayo	Puerto Guzmán	9

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** Area no municipalizada (these territories have not been officially declared as municipalities).