



Inter-Ministerial Coordination and Current Legal Framework for Agroforestry Policy Development in Belize



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Abbreviations and Acronymns

AF	agroforestry
AFS	agroforestry system
BAHA	Belize Agriculture Health Authority
BAS	Belize Audubon Society
BENIC	Belize National Indigenous Council
BELTRAIDE	Belize Trade and Investment for Development
BFREE	Belize Foundation for Research, Environment and Education
BLPA	Belize Livestock Association
CATIE	Tropical Agricultural Research and Higher Education Center (acronym in Spanish)
CARDI	Caribbean Agricultural Research and Development Institute
CC	Climate change
CEO	Chief Executive Officer
CTCN	Climate Technology Center and Network
CBO	Community-based organization
CGA	Citrus Growers Association
COL	Community Outreach and Livelihoods
DoA	Belize Department of Agriculture
DoC	Belize Department of Co-operatives
DoE	Belize Department of Environment
e.g.	for example
ERI	University of Belize Environment Research Institute
EIA	Environmental impact assessment
FAO	United Nations Food and Agriculture Organization
FDC	Friends of Development and Conservation
FD	Belize Forestry Department
GDP	Gross Domestic Product
GoB	Government of Belize
GHG	Greenhouse gasses
GEF	Global Environment Facility
i.e.	such as
IICA	Inter-American Institute for Cooperation in Agriculture (acronym in Spanish)
INAB	National Institute of Forest (acronym in Spanish)
MFFESD	Ministry of Fisheries, Forestry, Environment and Sustainable Development
MMRF	Maya Mountain Research Farm
MMNFR	Maya Mountain Northern Forest Reserve
NAIC	National Association Indigenous Council
NAFP	National Agroforestry Policy
NCCO	Belize National Climate Change Office
NDC	National determined commitment
NGO	Non-governmental organization
NWC	National Women's Council
PACT	Protected Areas Conservation Trust
PES	State program in Costa Rica (acronym in Spanish)
PFB	Program for Belize
PINFOR	Guatemalan Forest Incentive Program
RBCMA	Rio Bravo Conservation and Management Area



REDD+	Reducing Emissions from Deforestation and Degradation Plus
SDG	Sustainable Development Goal
SIB	Statistical Institute of Belize
SIRDI	Sugar Industry Research and Development Institute
TA	Technical assistance
TCGA	Toledo Cacao Growers Association
TFCGA	Trio Farm Cacao Growers Association
TIDE	Toledo Institute for Development and Environment
UB	University of Belize
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change



Introduction

The Tropical Agriculture Research and Higher Education Center (CATIE) is providing technical assistance to “develop an integrated and comprehensive agroforestry policy framework that will aid in mainstreaming this form of land use countrywide, providing practical knowledge and skills to the national team (National Climate Change Office, the Agriculture Department and the Forest Department) to understand and use a tested and successful process to develop a National AF Policy for Belize”.

As requested in the terms of reference for this assistance, Output 3 “Inter-ministerial Coordination & Review of the Current Legal Framework to Identify Gaps and Opportunities for Policy Development” comprises the analysis and main results of three activities:

Activity 3.1 Initial joint meeting with the Agriculture, Forest and Environmental Departments to perform the key initial ideas on the National AF Policy (NAP) development and identify main key actors by sector involved in the promotion/management of AF systems (AFs) in Belize.

Activity 3.2 Gathering & review of existing environmental and forestry law.

Activity 3.3 Review of study cases to identify lessons learnt regarding gender mainstreaming in AF policies.

AF systems are “multifunctional systems” that can provide a wide range of economic, socio-cultural and environmental benefits. Agroforestry aims to increase or maintain production and farming system productivity by reducing agricultural inputs, reducing production cost and diversifying production with possible tree products such as food, fodder, timber, other building materials and fuelwood. AFS may also create new opportunities for small-scale forest-based enterprises and employment, which in return assist in reducing rural poverty and improving human health and nutrition.

In addition, agroforestry can provide a range of environmental services such as soil fertility, wind barriers, restoration of degraded land, water conservation, reduction of soil erosion, and biodiversity, resulting in strategies that are convenient for climate change mitigation and adaptation.

Forest cover in Belize has been declining since the 1980’s. Forest Cover has decreased from 68.03% in 2000) to 61.76% in 2018, which stands at a total 1,365,197 ha. Meanwhile, forest cover change due anthropogenic and natural disturbances has been estimated at approximately 5,228 ha. Forest cover has steadily declined due to unsustainable economic activities such as slash-and-burn agriculture, aquaculture, illegal



logging, and livestock production. Furthermore, the forests are being degraded by the continued extraction of valuable timber, for example rosewood (*Dalbergia stevensonii*).

As an essential input into the development of a National AF Policy for Belize, this document focuses on the salient topics, considerations and recommendations for mainstreaming agroforestry development. Accordingly, some stakeholders are identified to obtain information, specific suggestions and possible priorities relevant to the development of the policy. This is complemented by an analysis of the current environmental and forestry laws and policies, i.e. Forestry Policies, Environmental Policy and others, of Belize to identify opportunities and constraints to the mainstreaming of AF. Finally, some case studies are used to identify lessons learnt while implementing AF and in addition gender mainstreaming in AF policies.

Belize's Country Profile

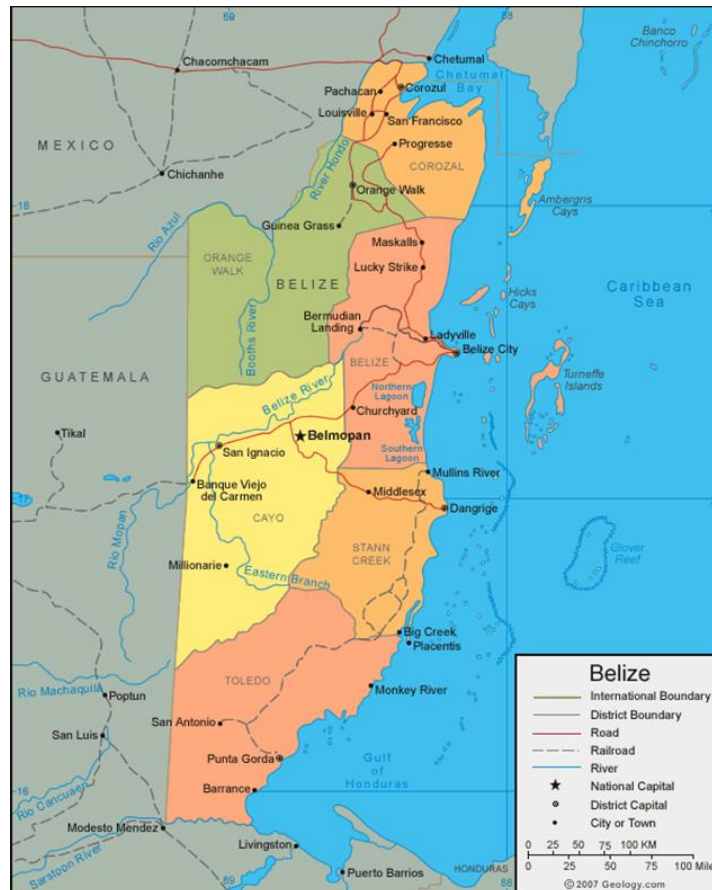
Belize is a small subtropical country (22,966 km²) which was occupied solely by the Maya people before the arrival of the European and British colonizers (Mitchel et.al, 2017). Belize, formerly known as British Honduras, is located on the east coast of Central America facing the Caribbean Sea (15°53'-18°30'N; 87°15'-89°15'W). The country is bordered on the West and South by Guatemala and North by Mexico (Fig. 1). The western, southwestern and southern part of the country holds the "Mayan Mountains", whereby the entire coast and northern part of the country corresponds to the "low plains" (Rosa Cruz, 2010; FAO 2018).

Belize has three distinct physiographic regions: i) the flat northern lowlands, with a complex mosaic of lowland, semi-deciduous feet, savannahs, freshwater rivers and wetlands, with saltwater lagoons and mangroves along the coast; ii) the southern coastal plain that supports the tropical pine and broadleaf forest; and iii) the Maya Mountains of granite quartzite's and shales. Some seventy ecosystems have been identified within these broad categories (Salas &Shal, 2015).

The country holds approximately 1,014 native species of vertebrates and 3,411 native species of plants. The forest cover is estimated in 60% of land area. Over 100 protected areas cover 35% of the country's total land area and 10.6% percent of the country's total sea area allowing in total protected areas to cover 22.8% of country's national territory (Kay & Avella, 2010).



FIGURE 1. ADMINISTRATIVE & POLITICAL MAP OF BELIZE



The country is populated with more than six different ethnic groups each with its unique cultural traditions and languages (Kay & Avella, 2010). Belize's current estimated population is 408,487 inhabitants. From these 44.71% (182,663) live in urban areas, while 55.28% (225,824) live in rural areas (SIB, 2019). Belize has a small economy and it mainly depends on agriculture and tourism, these account for more than half of Belize's economy, whereby contribution alone from agriculture is 13.6% of GDP (SIB, 2019; GoB, 2015).

Anthropogenic pressures are the main reason for the disappearance of species and ecosystems. However, the conservation of species in protected areas have only achieved limited success. As a result, this has shed light on the importance and necessity of practicing sustainable consumptive use approaches, which combine production and conservation functions for conserving biodiversity in human-dominated landscapes (Shibu, 2012).



AF can play a major role in conserving and enhancing biodiversity from farms to the landscape level both in tropical and temperate regions of the world (Shibu, 2012). It is a form of land use that can increase productivity, diversify production and improve ecological sustainability. These benefits are achieved when forest recommendations respond to the particular conditions of each farm, of each production system and of each farmer (Somarriba, 1998).

AF covers between 200 and 357 million ha in Latin America, including 14-26 million ha in Central America, and three million smallholders cultivate at least 80% of the cacao under shaded tree canopy (Somarriba et al., 2012). In Latin America this practice has penetrated multiple sectors and has now been included in the agendas of the international community, in national laws, institutions and policies, science and technology and has been practiced by farmers, ranchers, and other land users (Somarriba et al., 2012). For example, as a way to comply with the Nationally Determined Contributions (NDCs) in forest management, AF has been considered as a practice that can assist in obtaining sustainable forest management. AF practices are known in Belize; however, their implementation has been fragmented and sporadic.

In an attempt to mainstream AF, the Government of Belize (GoB) has granted an AF concession in the Maya Mountain Forest Reserve to the Ya'axché Conservation Trust (YCT) and Trio Farmers Cacao Growers Association. This is the first AF concession to be granted and the program focuses on cacao farming but also includes secondary crops such as plantains, honey and vegetables. Another organization where AF practices are put in place are at the Belize Foundation for Research and Environmental Education (BFREE), they have developed certified organic shade grown cacao and coffee in their Belize Cacao-based AF Projects. Friends for Conservation and Development (FCD) also conduces preservation and outreach actions in partnership with local groups and other NGOs. The Belize Livestock Association (BLPA) has also signed a collaborative agreement with CATIE to implement climate smart livestock practices.

AF systems are increasingly recognized as alternative land-use systems for sustainable development and have been mentioned in various international meetings as a way to confront climate change (Hain, 2014). However, AF continues to face challenges today. These challenges include unfavorable policy incentives, inadequate knowledge dissemination, legal constraints and poor coordination among the multiple sectors to which it contributes. As a result, its potential contribution to the economy and to the sustainable development goals (SDGs) has not been fully recognized or capitalized on. Various initiatives are needed to promote the benefits of AF in Belize.



Inter-Ministerial Coordination: Agriculture, Forest and Environment Departments

Description of Task

The proposal for the development of a National Agroforestry Policy came to light due to the Ministry of Fisheries, Forestry, the Environment, and Sustainable Development (MFFESD) and the National Climate Change Office (NCCO) recognizing the importance of such an innovative tool that could assist Belize to adapt to climate change (CC), reduce greenhouse gasses (GHG) emissions, manage forest resources in a sustainable manner, in addition to the other multiple benefits that could be generated thereof. Noteworthy and successful ventures in AF, such as the one between Ya'axché Conservation Trust and the Trio Farmers Cacao Growers Association, also influenced the decision to move forward with it.

The YCT, an NGO dedicated to environmental conservation, works on 770, 000 acres of land known as The Maya Golden Landscape, manages three protected areas and works along with eight rural communities. As part of this work, YCT had expressed the interest of developing AF as an alternative production within a protected area. Due to the fact that these communities lie next to a protected area and there is no other land available for production, YCT and the Trio Farmers Cacao Growers Association requested a concession permit to produce sustainable AF products within this area (Cho, 2019). The Trio Farmers Cacao Growers Association is a private, for-profit community-based organization (CBO) registered in 2015 in the community of Trio. Members organized together starting in 2010 to seek access to land in Maya Mountain North Forest Reserve (MMNFR), a part of the Maya Golden Landscape, to support their livelihoods. TFCG is Ya'axché's associate and comanager in the MMNFR cacao agroforestry concession (Beaton, 2019).

Since GoB at the time did not have the political framework or any other instrument which speaks to a production concession within a protected area, the government saw the need to develop a license giving the YCT and the CBO the opportunity to develop and produce sustainably within the protected area (Cho, 2019).

This was the initial and inspiring phase which led the Chief Executive Officer (CEO) of MFFESD along with the NCCO to appreciate the need to encourage and accommodate these types of political frameworks to implement anthropogenic systems with supervision in the context of a National AF Policy (NAFP) for Belize. The expectation is that such policy can help farmers to produce and work the land legally, in a sustainable manner and at the same time reduce deforestation within the country (Cho, 2019).



At the initial stage of the Technical Assistance, a kick-off meeting was held with stakeholders of the Forest Department (FD), Department of Agriculture (DoA) and Department of the Environment (DoE), among other stakeholders that play an important role in the forest, environmental and agricultural sector. In the meeting two topics were discussed:

- i. Definition of AF, the objective of the technical assistance, and the general idea of what the NAFF is all about, gaps and limitations of implementing AF and AF policies, and other topics that should be considered before developing the NAFF; and
- ii. Analysis and identification of key stakeholders who can promote and mainstream NAFF policy.

Other stakeholders were also consulted when a team of experts from CATIE were conducting technical workshops in Belize on Climate Smart Agriculture and during the South-South Exchange held in Costa Rica. Some of the participants were from the DoA, FD, DoE, NCCO and the YCT.

Additional contact names were collected from these meetings with the CEO and with the assistance from the NCCO with the following objectives:

1. To develop the key ideas and identify the main actors by sector to develop an AF policy.
2. Update a list of main actors/roles involved in AF in Belize.
3. Identify barriers/gaps and limitations that can affect the implementation of AF practices in Belize.

Methodology

1. As mentioned in the description of task, the Climate Smart Agriculture meeting, South-South Exchange and the kick-off meeting were held in sequence with technicians of the different entities in Belize. A short, semi-structured questionnaire was used to interview them at the end of each activity. Additionally, with the guidance of the CEO of MFFESD, potential stakeholders were identified for the kick-off meeting with the CEO.
2. A total of 61 persons were interviewed. These persons were officials and extension staff of the Department of Agriculture, Sugar Research and Development Institute (SIRDI), Donaus Consultant, BLPA, Belize Audubon Society (BAS), Caribbean Agricultural Research Development Institute (CARDI), YCT, Program for Belize



(PFB), the Inter-American Institute for Cooperation in Agriculture (IICA) and among others.

3. The questionnaire given to each interviewee was to identify other stakeholders, perceived benefits, limitations, gaps, and barriers that affect the implementation of AF system in Belize. It is important to note that AF is a practice that has recently been implemented or has been implemented but has not been identified as an AF system per se; however, stakeholders do have some influence on the practice.
4. At the kick-off meeting, a group discussion started which led to the identification of main stakeholders in the AF sector along with its respective gaps, opportunities and limitations as well.
5. All information was collected and transferred in a small database where table of frequencies were used for the report.
6. Secondary literature review was done to assist in meeting the objectives established in **Output 3- Activity 3.1.**

Results

List of Actors and their role

Based on the kick-off meeting held, a list of stakeholders was elaborated as presented in Table 1.

Role of the entities listed:

Belize Forest Department (FD) is a governmental department which encourages the multi-sector integration for the planning and management of activities and actions that directly affect the existing forest resources. They are responsible for overseeing forest resource use and protection. Its main task includes granting permits and forestry licenses and collecting taxes for forest resource use. In commitment with the YCT, the FD ensures sustainable production of cacao within the Maya Mountain North Forest Reserve and protects the riparian forest.

Lands and Survey Department under the National Estate Section is primarily responsible for the management of all national lands (except lands within protected areas). This also includes other lands that may be exchanged or otherwise acquired by the GoB. Its function includes processing of land applications such as leases, purchases and transfers, providing land revenue collection services that may include: annual land tax, annual rent on leases, purchase prices on the sale of national lands, license fees associated with the use of the seabed and river bank, among others. Other responsibilities involve the use and administration of forests because the lands department are responsible for land allocation and distribution.



TABLE 1. LIST OF STAKEHOLDERS IDENTIFIED

Stakeholders	Sector
Forest Department	Government of Belize
Lands Department	Government of Belize
Agriculture Department	Government of Belize
Department of The Environment	Government of Belize
Belize Agricultural Health Authorities (BAHA)	Government of Belize
CARDI	Regional Institute
Belize National Indigenous Council (BENIC)	Institute
IICA	International Institute
UNDP-GEF 6	United Nations
Development Finance Corporation (DFC)	Finance Institution
Atlantic Bank	Finance Institution
Selva Maya	Projects
Ya'axché Conservation Trust	NGO
Friends for Conservation & Development	NGO
Belize Audubon Society	NGO
PACT	Statutory Body
Program for Belize	NGO
Belize Foundation for Research & Environmental Education (BFREE)	NGO
Maya Mountain Research Farm	NGO
Toledo Institute for Development and Environment (TIDE)	NGO
Shipstern Conservation and Management Area	NGO
Sustainable Harvest International	NGO
Maya Leaders Alliance	NGO
Sarstoon Temash Institute for Indigenous Management (SATIIM)	NGO
Belize Department of Co-operatives	Ministry of Agriculture
Sugar Industry Research and Development Institute (SIRDI)	Statutory body, Min Agric
Belize Livestock Producers Association	Association
Livestock Marketing Association	Association
Toledo Cacao Growers Association (TCGA)	Association
Trio Farmers Cacao Growers	Association
National Association Indigenous Council (NAIC)	Association
Belize Citrus Growers Association (CGA)	Association
Citrus Products of Belize Limited	Private Sector
Tex-Bel Farms	Private Sector
Galen University	Academia



Stakeholders	Sector
University of Belize- Belmopan Campus	Academia
University of Belize- Central Farm Campus	Academia

In order for exploitation of timber to occur in Belize, the logger must process a certification of land tenure and must be debt free from all taxes before he/she can proceed with the process of applying for a permit to manage and harvest timber trees within the country.

Belize Department of Agriculture (DoA) aims to provide an environment that will increase production and productivity, promoting investment, and encouraging private sector involvement in agribusiness enterprises in a manner that ensures competitiveness, quality production, trade and sustainability. Their main role is to develop and transfer environmentally friendly technologies that make agricultural activities more sustainable and competitive.

The Agriculture Department has not been promoting AF systems per se, but they do promote integrated farming systems, which to some extent are linked to AF. Promoting integrated farming systems is a technology which allows agriculture to become more sustainable and competitive. With this system the Agriculture Department has encouraged farmers to utilize some types of AF practices such as: live fencing, disperse tree, home garden, cacao under forest and coffee under forest.

CARDI aims to make critical interventions with respect to cross-cutting issues as they impede sectoral growth and hinder agro-industry development, through climate smart agriculture and technologies that seek to make agriculture more resilient.

IICA is a specialized agency for agriculture of the Inter-American system that supports the efforts of member states to achieve agricultural development and rural well-being. They work in areas such as technology and innovation for agriculture, agricultural health, food safety and quality, international agricultural trade, family farming, rural development, natural resources management and the bio-economy.

UNDP-GEF 6- Small Grant Programme embodies the very essence of sustainable development by "thinking globally, acting locally". They provide financial and technical support to projects that conserve and restore the environment while enhancing people's well-being and livelihoods. The GEF has funded at least 380 forest-related projects since 1992 and they have invested over US\$9.5 billion for sustainable forestry. The fund has improved on almost 30 million ha of forest landscapes for multiple benefits and services, restored 500,000 ha of forest lands and prevented the release of at least 128 million tons



of CO₂e and have enhanced the management of 28 million ha of protected areas in forest landscape.

YCT empowers and builds climate-resilient communities, protects wildlife, soils, forests, rivers, and the reef for a sustainable future in Belize. Their Community Outreach & Livelihoods (COL) program has taken important approaches to get farmers to adopt new practices resulting in changes in attitudes and behaviour. The COL program has successfully implemented climate-smart farming practices, such as the first cacao AF concession in Belize, beekeeping and *Inga* alley cropping.

The BAS is an environmental organization protecting Belize's natural resources while educating the public about their value and sustainable use.

The Protected Area Conservation Trust (PACT) manages Belize's national protected areas system and provides grants for the protection, conservation, and enhancement of the natural and cultural treasures of Belize.

The Program for Belize (PFB) aids in the conservation of biodiversity and promotes the sustainable development of Belize through proper management of the Rio Bravo Conservation and Management Area (RBCMA) to conserve forested land and other natural ecosystems in north-western Belize threatened with deforestation and fragmentation.

Belize Foundation for Research and Environmental Education (BFREE) is an organization which strives to successfully integrate scientific research, environmental education, conservation and create sustainable development opportunities for alternative livelihoods for Belizeans. They founded the Belize Cacao-based AF Restoration Project in 2012. The program encourages farmers to implement shaded AF as an opportunity by providing tools which facilitate these farmers to explore AF as an option for production.

Maya Mountain Research Farm (MMRF) is an organization which works with the intersection of agriculture and ecology. They work along with communities in the foothills of the Maya Mountains hoping to build an evolving economy based on AF and permaculture systems. AF systems have been implemented using fruit trees, timber, tree legumes, herbaceous perennials and medicinal crops, as well as home gardens which in return help in rebuilding soils structure and fertility.

The Sugar Industry Research and Development Institute (SIRDI), statutory body under the Ministry of Agriculture, is the technical arm of the Sugar Industry of Belize, whose task is to carry out research, to innovate and to improve the quality and yields of sugarcane productivity and to contribute to improving the competitiveness of the industry.



Belize Department of Co-operatives (DoC) empowers people through the transfer of knowledge, the promotion of collective participation, and furtherance of self-sufficiency for the socio-economic development of Belize.

Toledo Cacao Growers Association (TCGA) aims to improve the socio-economic standard of living of its members through competitive and diversified system of production that incorporates sound ecological practices through AF practices by producing cacao under shaded trees (timber trees), along with intercropping leguminous trees, plantains and other staples

Trio Farmers Cacao Growers Association (TFCGA)- a private, for-profit CBO registered in 2015 in the community of Trio. Members organized together in 2010 to seek access to land in MMNFR to support their livelihoods by implementing cacao AF practices through an AF concession.

The YCT and TFCGA are the first entities working together and are pioneering a community AF concession model in a natural reserve. As mentioned before there are few organizations that are actively participating in implementing AF practices, meanwhile there are other organizations which are interested and play some roles and support this practice.

University of Belize- the Faculty of Science and Technology program is oriented towards addressing scientific, technological, and environmental issues, including agricultural needs of the country. This is achieved by working in collaboration with other stakeholders, creating research and internship opportunities for students.

BLPA is a private non-profit organization established under the Meat and Livestock Act Chapter 214. The goal of the BLPA is to provide the livestock industry and all its stakeholders with oversight at the national and governmental levels and provide access to both new local and international markets. They also provide and disseminate new technology and information via extension officers, training, education initiatives and projects such as "Improving Productivity and Resilience to Climate Change in Livestock Systems". This program seeks to improve productivity, to increase resilience to climate change, and at the same time to reduce greenhouse gas emissions on small and medium-scale farms through the promotion of silvo-pastoral (AFS) innovation.

Although some of these entities do not currently play a direct role in AF, they may potentially have an influence in the implementation of AFSs because from a technical standpoint, although AFSs may usually be considered from only an agricultural perspective, in reality it has a direct and indirect influence on the economic, social, environmental and health needs, thus impacting many other sectors. AFSs tends to have more of an agricultural practice because it is a system that does not fully depend on the



production of trees (commercial tree plantation), it is a system that also include food production whether it is for auto consumption or commercial purposes. The AFS provides spaces for the production of vegetables, other food crops, legumes, tuber, milk, meat, etc.

This means that there is frequent communication between farmers, various organization such as YCT, BLPA, PFB, including the Ministry of Agriculture through its extension service program; because of the production system farmers frequently seek technical guidance from these entities like the Ministry of Agriculture and NGOs through their extension services, while others may offer guidance on commercial strategies for farmers to sell their products. Meanwhile there are other organizations and entities that may not provide a direct influence on the development of AF systems, but they do contribute through research and development such as the education sector like UB-Environmental Research Institute (ERI) and the Faculty of Agriculture. This is also a very important branch because it contributes technical and scientific knowledge to the academy, which will later be used to improve AF systems not only in the country, but which may also have some influence in countries with similar climates.

In addition to this, AFS also provide benefits such as reduction of pressure on forest, they also recycle nutrients in soil through deep rooted trees, they improve microclimate (improving of soil moisture, water retention, improves water table), improves soil fertility and soil properties. Therefore, producing agricultural crops and growing trees can allow the utilization of resources more efficiently.

Gaps and Limitations

Consulting literature on AFSs in Belize, Kongsager (2017) conducted a study in the Toledo district, where he identified various barriers/gaps and limitations that can affect the adaptation or implementation of AF practices such as alley cropping. These barriers/gaps and limitations are: lack of land tenure, lack of market access, lack of trust within the communities, lack of capacity building, lack of technology, deep-rooted traditions, among others.

Pontara (2019), also highlighted that he identified various barriers/gaps and limitations that can affect the implementation of AF practices in the Southern Belize. These barriers are: benefits are unsure, crops cannot grow healthy or bear under shaded trees, AF is seen as highly time-consuming: unfeasible for farmers with a second job, lack of market options to sell AF products, lack of knowledge and technology, among others.

Meanwhile at the meetings held, the TA team were able to identify limitations and gaps as well. These limitations and gaps for the implementation of AF practices and policy are negative impacts of climate change, natural disasters, lack of business and marketing



strategy to support communities, lack of sensitization and awareness on how AFSs can improve sustainable benefits livelihoods, lack of knowledge of ideal mix of species to put under production, lack of defined management on fire threats and response to these types of threats, no incentives to maintain communities engaged, lack of synergy among departments, no knowledge on implementation of AFSs (Table 2).

It should be noted that the results obtained from the meeting were very similar to those found by Kongsager (2017) and Pontara (2019). This indicates that the actors are very clear about the existing gaps regarding the implementation of AF system.

The following results were determined from the interviews and group discussion:

TABLE 2. OPPORTUNITIES AND LIMITATIONS IDENTIFIED BY STAKEHOLDER DURING THE GROUP DISCUSSIONS

Gaps/Limitations
Climate change, natural disasters
Lack of business & marketing strategy support for communities
Lack of sensitization and awareness on how AFS can improve & become sustainable benefits livelihoods
Limited knowledge of ideal mix of species to put under production
Define management on Fire Threats & response to these types of threats
No incentives to maintain communities engaged
No synergy among departments
No knowledge on implementation of AFS
Collection of baseline data information with cultural and traditional method of production in agriculture and livestock production in Belize
Poor enforcement & political will
No willingness to change lack of financial support & management & effective systems
No regulatory agencies and coordination
No profound technical support
No access to technology
Long-term system plant and investment

The following are opportunities identified by the stakeholders for the implementation of AF in Belize (Table 3)

TABLE 3. OPPORTUNITIES IDENTIFIED BY THE STAKEHOLDERS FOR AF IMPLEMENTATION IN BELIZE

Opportunities
REDD+ Project in Belize
Utilization of trees with important economic value
Sustainable production
Carbon sequestration
Attraction for financial benefits
Protection for buffer zones and improve water catchment
Soil conservation and temperature regulation

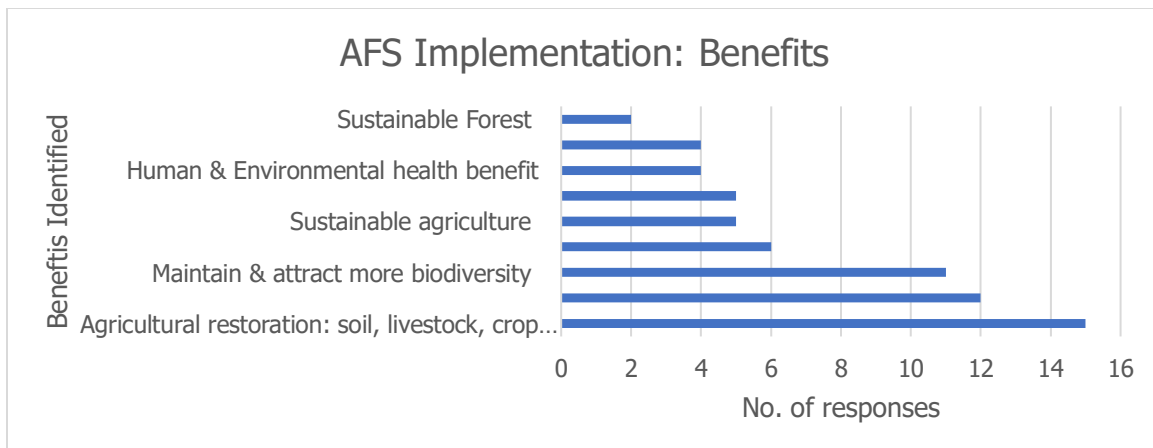


Biodiversity conservation and forest protection
Allow for synergies within departments, regulation and enforcement agencies
Strengthen resilience
Provide ecosystem services
Generate additional income for farmers
Sustainable land use management that will comply with the SDGs at a national level
Attract funding to support and implement these types of strategies
Incentives for adaptation to a NAP program
Livelihood opportunities for families
Alternatives for extra income
Diversify produce
Generate of healthy ecosystem
Provide food and employment

Benefits, Barriers and Incentives

These responses were identified through a small semi-structured interview/questionnaire from both the kick-off meeting and Climate Smart Agriculture meeting applied to extension staff of the NGOs, GoB and private sectors. When asked what benefits (Figure 2) can be identified from implementing AFS, most responses were that these systems can assist in the restoration/improvement of soil, livestock and crop production, carbon sequestration and carbon resilience. They also added that this can assist in maintaining and attracting biodiversity followed by diversifying produce and generating additional income.

FIGURE 2. BENEFITS IDENTIFIED FOR THE IMPLEMENTATION OF AF SYSTEM

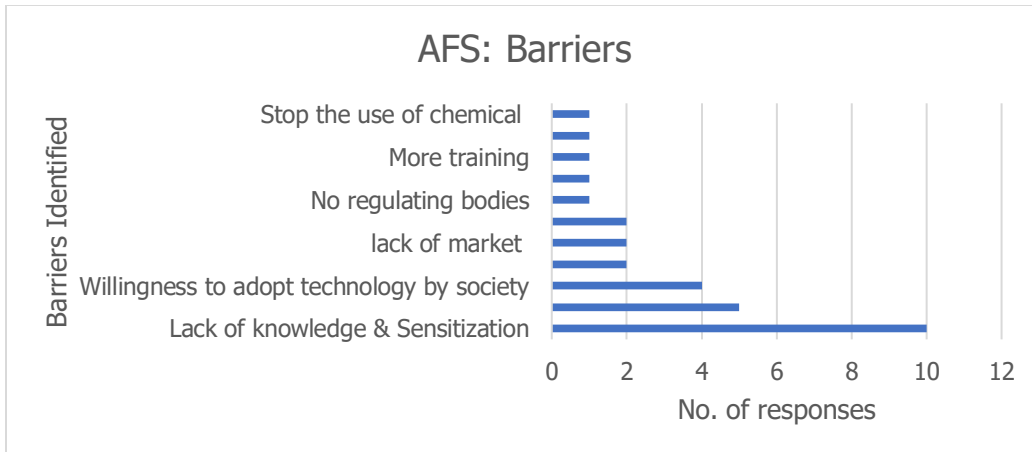


The team asked the interviewees to identify barriers that they encounter when it comes to the implementation of AFS; most identified lack of knowledge and sensitization on AFSs as a barrier that can affect its implementation. This is followed by lack of a funding



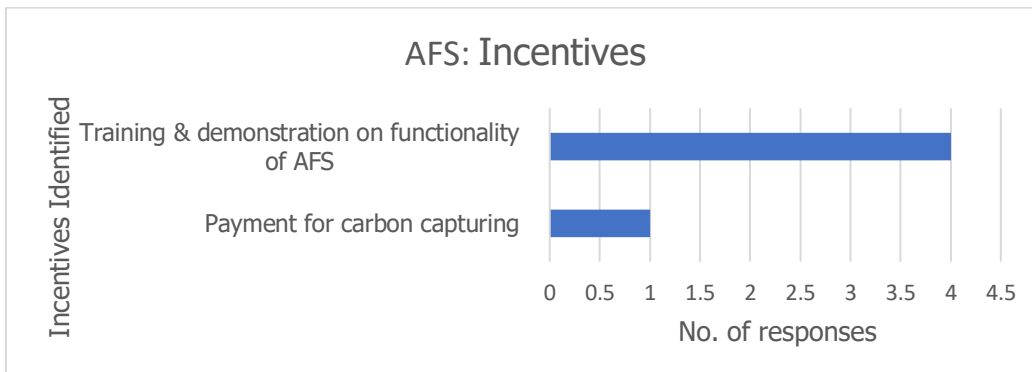
program and incentives for the implementation of AFSs, and the willingness to adopt this technology by society.

FIGURE 3. BARRIERS IDENTIFIED FOR THE IMPLEMENTATION OF AFS IN BELIZE



Finally, the team asked what incentives (Figure 4) can be identified to motivate actors to implement AFSs in Belize. Most responses were to provide training and demonstration on functionality of AFS to other farmers through farm model, so that farmers can get the one on one experience and benefits of having the AFSs in their farms.

FIGURE 4. INCENTIVE IDENTIFIED FOR THE IMPLEMENTATION OF AFS



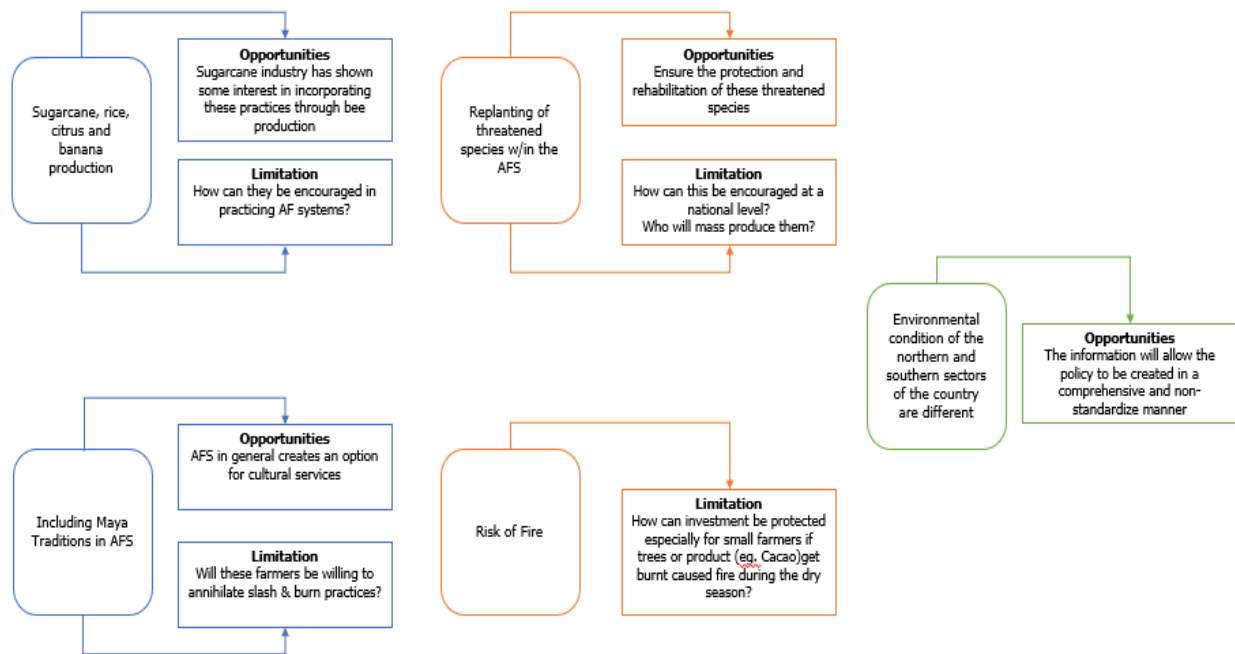
It is important to note that not all technicians were able to identify what incentives can be used as motivation for farmers to implement AFSs. Therefore, this result shows that there is a need to have more consultations in order to determine what these incentives could be. This will need to be done with other actors who will be interviewed in the future. This consultation will not only help with the identification of what types of incentives



would be adequate to implement but also how to keep farmers motivated considering adversities such as yearly hurricane, seasonal bush fire, etc.

Furthermore, during the discussion on the key initial ideas for the development of the AF policy, stakeholders who attended the meeting not only identified the barriers, limitations and incentives, they also mentioned and emphasized that the team should take into consideration certain topics while developing the NAFP for Belize (Figure 5). The topics mentioned by the stakeholders and should be considered are: sugarcane, rice, citrus and banana production, including Mayan traditions into AFSs, replanting of threatened species within the AFSs, fire risk, and environmental conditions of the northern and southern regions of the country that are different.

FIGURE 5. TOPICS TO BE CONSIDERED AT THE MOMENT OF DEVELOPING THE NAP



Understanding and taking into consideration these topics will assist in making the policy a document that is very realistic to the needs and challenges that the farmer faces on a daily basis.

This will allow the document to be developed in a strategic manner that not only complies with the necessities of the farmer but it can also comply with the necessities of the GoB and other institutions. This is very important to understand because if the document is not developed in a realistic manner; then the farmers will have no willingness to implement these AFSs. Therefore, the development of the policy needs to be applicable and flexible in such a way that the farmer can easily comprehend and eventually



implement the AFS in Belize. This will assist in obtaining the results (conserving forests and building resilience against climate change) that are expected from implementing strategies like AFS.

Conclusions

Comparing the authors in this literature review to the information determined in the meetings (South-South Exchange, Kick-Off meeting and Climate Smart Agriculture meeting), they all have shown similar results. Stakeholders do understand that there is a possibility to adopt new technologies, in this case, AF systems. However, they also understand and have identified that there are barriers/gaps/limitations that can affect the adoption and execution of the AFSs and policy.

With the help of the meeting and participation of the informants/actors (different technicians) the team was able to get ideas and understand their perspectives on the implementation of AFSs and where they stand. This also gives an indirect feedback on the position of the farmers, because the technicians and organizations are the ones who work directly with them and are able to provide insight from field experiences.

Understanding what are the barriers/limitation/gaps and knowing who are key stakeholders/actors the team can adequately identify strategies that can be used to confront these barriers and know which organization may be able to assist in eliminating these barriers through awareness, i.e. presentations, farmer field school training, incentivize academia and other research centres to develop research that will foster innovation in AF, and subsidize farmers to participate in AF to increase forest cover and other desirable outputs.

In addition, it also helps the team to understand how well the technicians perceive benefits from AFSs. Thus, this can make the promotion and implementation of AFS easier. On the other hand, more consultations are needed in order to determine what type of incentives can be used for the promotion, implementation and maintenance of AFSs in the country.

Recommendations

To develop the NAFP it is advisable to consider the flexibility of the policy framework, meaning that the NAFP and AF concept should be adapted to the understanding of the local communities countrywide. Belize is a culturally diverse country with many ethnic groups that have deep-rooted traditions, especially in the Mayan culture (Pontara, 2019). Once this is defined, all actors will be involved to agree on the definition of the concept so that all are on the same page at the initial phase of the development of the policy.



If the policy is developed with a strict/rigid or unrealistic framework there is a possibility that the policy framework will be ignored and rejected. Therefore, it is crucial to understand what the barriers are and what this means to them especially from a financial point of view and how the policy can correct these barriers that were identified by the actors. Pontara (2019) states that within the Mayan context it is also advisable that the GOB seeks to promote AF and at the same time re-discover and include ancient AF practices which can eventually help increase acceptance level of this concept, especially by the Mayan population.

Current Legal Framework

According to Detlefsen et.al (2011), Belize is directly dependent on its forest resources since the 1970's -1990's, the forest sector's GDP has ranged from 2.3% to 2.7 % and since then, it has been constant at 0.5%. In 2013, the forestry and logging industry contributed about BZ\$ 5.65 million in domestic export of sawn wood and also contributed economically to the tourism sector, particularly for ecotourism and construction. The country's protected areas have also contributed economically to the nation through employment of protected area managers, rangers, park wardens, among others. This has also generated foreign exchange through grants and donations for the conservation of these protected areas. The FD is one of the oldest institutions of the country, established in 1935.

Presently, the scope of the management has changed from forest exploitation and administration to biodiversity management, social and community forestry. Forest management now promotes participatory forest governance, value added production and diversification of forest use. This tries to capture stakeholder participation and inclusion in management, promote income generation from forest products, and diversified use of multiple timber species (Forest Department, 2020).

Timber extraction in Belize began in early 1655 with the exportation of logwood (*Haematoxylum campechianum*) to England. In the 1920's a selective logging of elite species such as: cedar (*Cedrela odorata*) and mahogany (*Swietenia macrophylla*), represented about 80% of total product exports and in 1963 only represented 15% of exports (Vidal, 2012). This was due to change in activity based on agricultural exports such as sugar cane, citrus, mango, papaya, banana and cacao (Sabido, 2007).

Regrettably, harvesting of forest for timber, agriculture exploitation and many other factors have caused pressure on forest cover through forest degradation not only in Belize but around the world. As a result, forest degradation has caused various adversities such as flooding, loss of water sources, desertification, soil erosion, increased presence of



greenhouse gases in the atmosphere, among other effects. AF practices have become a strategy that can be used to adapt to and mitigate climate change.

Additionally, it has been developed and implemented in Central America in order to reduce pressure on forests and provide an alternative source of timber, especially for small scale farmers (Detlefsen et.al, 2011; Vidal, 2012).

Forest Department

The mission of the department is to foster Belize's economic and human development by effectively enforcing relevant policies and regulations for the sustainable management of its natural resources through strategic alliances and efficient coordination with relevant stakeholders (GoB, 2016).

The Belize FD (2020) supervises 4 programs which are: Forest Sustainability Services Unit, Protected Areas Program, Wildlife Conservation Program and the Public Outreach Program.

The Forest Sustainability Services Unit is responsible for the implementation of the approved policies and legal procedures applicable to the management and use of the forest resources throughout the entire country. These policies and legal procedures are put into action through a number of instruments as determined by the Forest Act (Chapters 213 and 213s) which are the Substantive and Subsidiary Laws of Belize (GoB, 2016). In addition to this, the Forest Department has developed a forest policy due to the fact that Belize's forest and natural resource base are one of the cornerstones of the economic future. The Forest Policy seeks "A thriving and integrated forest sector, where forests of Belize are valued for their significant economic, socio-cultural and environmental benefits and are sustainably managed for the lasting benefit of the nation" (Forest Department, 2015).

Since there is the need to focus on sustainable development, land use, sustainable forest management, biodiversity conservation, wildlife and protected areas management the Forest Policy was developed to give policy direction so as to ensure compatibility with the nation's economic development and to create, maintain and develop a national forest estate taking into consideration the need for agricultural development and the protection of the environment (Forest Department, 2015).

The policy is grounded on the Constitution of Belize and responds to the Belize's National Planning Framework- Horizon 2030. For the Forest Department, it is essential that the Forest Policy be aligned with recently developed national policies that speak to national development, agriculture, tourism, protected areas and their supporting strategies to



enable the fulfillment of a common goal that will benefit the nation (Forest Department, 2015).

Evaluation of legal aspects

Rosa-Cruz (2011), revised the current political-legal framework in the forest sector, to identify its implication on the use of the timber resource, mainly for small and medium farms with AF systems (with emphasis on silvopastoral systems) in the Cayo District.

Most forest belongs to State's property and harvesting of these is conducted through logging permits granted by the government. This is done through a management plan, where the FD verifies the capacity of the logger to harvest timber and the capacity of forest to supply the expected timber production (Rosa Cruz, 2011).

However, the FD has limited technical staff to address the country's forestry activities and the forest policy, and regulations do not allow the promotion of sustainable timber use in silvopastoral systems) (Detlefsen et.al, 2011) or any other AF per se.

Types of License to harvest forest produce

The Forest Act established the following categories of licenses and permits through which forest resources may be authorized for extraction. These license types are: Long Term Forest Licenses, A Petty Permit, Community Forest Initiatives, Forest License for Sustained Yield and Forest License not on Sustained Yield.

The sustainable forest management program in Belize, is the core of all Long-Term Forest Licenses. The duration of this extends from twenty to forty years. A management plan is developed, and it informs what species and volumes are expected to be harvested for the duration of the license. An Annual Plan of Operation is prepared and submitted for the review and approval of the plan by the Forest Department (Guerra, 2020).

Meanwhile the Community Forest Initiative is part of the overall process of adapting forestry and forest management to make it more responsive and relevant to the needs and interests of rural people with a stake in the forest (Guerra, 2020).

Permit to camp, reside and cultivate in a nature reserve

In October 2015, a co-management Agreement for Maya Mountain Northern Forest Reserve (MMNFR) was signed between YYCT and the FD (YCT, 2016). A permit to reside, cultivate or camp in a forest reserve where permission was granted to the YCT to cultivate on 379 ha of land situated inside the MMNFR for a period of 15 years. This permit is granted along with certain conditions in which the permit holder must abide by: i) the area of cultivation must be clearly be demarcated, ii) assist Forest Officers in prevention and extinction of fires and other forest offences within the MMNFR, iii) if the conditions are breached, the permit maybe cancelled within three months' notice and all property



maybe forfeited to GoB, iv) if the permit issued is subject to any supplementary conditions and agreed upon then the permit holder must ensure that they abide to the supplementary conditions (GoB, 2014).

Supplementary Conditions include: Description of demarcated area, Administration, Purpose and Scope of the Permit, Allowable and Prohibited Activities, Forest Inventory and Topographic Survey, Forest/AF Management Plan, Royalties and Fees, Ecological consideration and requirements

AF Initiative with Ya'axche Conservation Trust and Trio Farmers Cacao Growers Association

The Trio Farmers Cacao Growers Association (TFCGA) is a registered cooperative under Chapter 313 of the Cooperative Societies Act in 2011 (YCT, 2016). The TFCGA contacted YCT in 2012 to seek assistance for cultivation in the MMNFR with the purpose of practicing AF (YCT, 2016).

Thus, a co-management Agreement for the MMNFR was signed between YCT and the FD. The objective is to ensure the management of the MMNFR AF concession in a manner which brings sustainable economic development to the Trio Community, while reducing current threats to biodiversity and habitat loss due to illegal and unsustainable agricultural developments within the reserve, thereby maintaining critical water catchment and flood regulation functions within and outside the reserve (YCT, 2016).

Commitment by Trio Farmers Cacao Growers Association, Ya'axché and Forest Department

The commitment between all parties is to ensure sustainable practices and production within the forest reserve, as well as to protect riparian forests. In addition to this, those who are working the land have committed to protect and preserve the forest reserve as well as protecting the soil from abrasive practices such as slash and burn, and not conducting any application of chemicals within the production area. Meanwhile, the commitment from the organization, YCT, is to ensure that the farmers are well trained on integrated farming, farm plan and design etc., sustainable agriculture production, conflict and project management, community-based forest management initiatives and to assist in providing material and stipends to farmers for the implementation of these practices, among others. Commitment by the FD includes monitoring compliance with the conditions of the agreement established and concession permit, report and document any incidents and noncompliance, and conduct regular meetings with YCT and FD, among others (YCT, 2016).



Findings from the revision of the forest law are found in Table 4. The findings described in the table are points found in the law and policy document and recommendations are pointers on what can be done to improve findings.



TABLE 4. FINDINGS, OPPORTUNITIES, LIMITATION & RECOMMENDATION FOUND IN THE FOREST LAW AND POLICY

Objective: Analysis of current Forestry and Environmental policies and laws in Belize					
Forest Policy, Timber Industry Act and Forest Act and Regulations					
Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Law				
	Forest Act Laws Chap 213 Revised Edition 2003	Forest regulation for trees Forest (protection of tree) regulations - Primary hardwoods i.e. mahogany, cedar and teak - Secondary hardwoods include any other tree not defined as primary - Softwoods, i.e. tree of any indigenous species and trees of coniferous class that have been introduced into Belize.	None	Forests play a major role in the planetary recycling of carbon, nitrogen and oxygen and influence temperature, rainfall and other climatic conditions while regulating the quality and quantity of freshwater systems,	Based on this AF is a strategy that can be used for the reduction of carbon emissions which can be accomplished through the national AF policy.
		No person shall convert the types of trees mentioned above into lumber without having a Licence in accordance with Rule 5 of the Forest Rules	Where do commercial and AF farms fit into this regulation	Promote the planting of forest trees in commercial plots/farms designed for its purpose	The law needs to be amended so that it can give room for harvesting in commercial farms
		Harvesting can only occur if the Chief Forestry Officer issues a permit	License only speaks for harvesting from natural forest	License only speaks for harvesting from natural forest. There is room for the law to speak to	None



Objective: Analysis of current Forestry and Environmental policies and laws in Belize

Forest Policy, Timber Industry Act and Forest Act and Regulations

Findings		Findings	Problem/Limitation	Opportunity	Recommendation <i>(How can it be changed? What needs to be done?)</i>
Policy	Law				
				those farmers who have planted trees for commercial purpose whether for timber wood or carbon storage.	
		Lumber Industry Fund "The Fund" created by the GoB. This consist of monies that are collected from the levy on timber at the rate for the time being in force under any Order made under section 3.	None	A fund similar to this to incentivize AF at a national level in Belize	Create a Fund similar to this or use portion of the \$ from "The Fund" to incentivize AF in Belize
		Does not speak about how communal lands will/or handle the harvesting of wood for timber. How can AF be implemented in communal land and how can trees be harvested from these systems in a communal land?	None	None	Need to develop a Standard Operating System that speaks directly to implementation and harvesting of wood for timber from an AF system within a communal land.
		The Forest Act speaks mostly to timber wood in natural forests.	However, there is a need to speak also to farms that specifically produce timber wood commercially.	None	The law can issue license for harvesting of timber wood within commercial farms or in AF systems by promoting its importance.



Objective: Analysis of current Forestry and Environmental policies and laws in Belize

Forest Policy, Timber Industry Act and Forest Act and Regulations

Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Law				
					<ul style="list-style-type: none"> - Can be used as carbon stock and can be sold as such - Provides an economic and alternative income - Provides room to produce valued timber, assist in reducing deforestation, and increase forest cover.
Forest Policy		Key Issues highlighted in the Forest Policy are similar for the development of the AF Policy	Difficulty in getting the IMPORTANT Ministries together to consolidate and agree on how these issues can be attended to. No much effort is being done to get these entities together	None	The key issues need to be addressed as soon as possible and needs to be done through the 3 ministries that is; MFFESD along with Ministry of Agriculture and Ministry of Natural Resources
		Key issues in the wood industries are similar to the development of AF	Poor incentives for investment in the timber industry, royalty rates are low. Timber is under-valued	None	It is necessary to identify what strategy would be the best strategy that should be used to incentivize participants and the royalty rates can be reviewed to determine if the price that have been established is an adequate price in terms of feasibility.



Objective: Analysis of current Forestry and Environmental policies and laws in Belize

Forest Policy, Timber Industry Act and Forest Act and Regulations

Findings		Findings	Problem/Limitation	Opportunity	Recommendation <i>(How can it be changed? What needs to be done?)</i>
Policy	Law				
		None	How can we encourage sustainable practices and at the same time generate sufficient income which can be used to maintain these practices and how can this be easily adopted into the system to ensure sustainable practices	None	Encourage development and management of natural forest through implementing AF practices. Encourage sustainable use of Non-Timber Forest Products
		Gender Issues	There isn't any policy that directly speaks on gender participation and mainstreaming especially in the AF sector and other agricultural related sector. Need to consider what would be the best approach to incorporate gender participation within the NAP.	Encourage and educate women on their rights	Here comes into play the Ministry of Human Development with their expertise on what would be the best approach to mainstream gender. Land issued to women can also function as an incentive for participation in AF so that women doesn't feel like the time invested in these doesn't go in vain and this can also guarantee practices that can adopt environmentally sustainable farming on their land
		Lack of coordination among interested parties. Thus, have caused inefficiencies,	No inter-ministerial coordination between the important ministries such as the Forest Dept,	Encourage and integrate cross sectoral policies and build synergy among these institutions	In order to have a successful NAP, all the departments mentioned of the ministries need to



Objective: Analysis of current Forestry and Environmental policies and laws in Belize

Forest Policy, Timber Industry Act and Forest Act and Regulations

Findings		Findings	Problem/Limitation	Opportunity	Recommendation <i>(How can it be changed? What needs to be done?)</i>
Policy	Law				
		mismanagement of public resources and loss of valuable time.	Agricultural Dept, Dept of the Environment etc.	and harmonize established goals and goals that area being created within the important governmental institution etc.	work together and share responsibilities so as to accomplish the established goal.



The findings, limitations, opportunities and recommendations mentioned are similar to those issues that have risen for the development of the NAP. In General, the forest laws of Belize highlight standard procedures and issues of licensing for management and harvest of timber.

However, within in the Act, it does not mention the implementation and management of commercial farms designed for timber production and use of alternative production systems. The Act also does not encourage and incorporate gender participation. The Forest Policy on the other hand, does highlight gender issues but does not mention how they can be tackled in the forest sector. The Policy does mention that the allocation of land is a very important topic because not being able to own the land does affect the participation of women in the forest sector. How does this affect gender? This occurs because if one does not have ownership of land, then involvement in permanent practices such as AF will be limited because of the use of permanent species. According to the Forest Policy (2015), the social status of women often limits their access to land, they may not be aware of their rights and they may get excluded from being able to get access to land. This influences how women access, control and use sustainable farming practices, as well as forest resources, on land that they do not own.

Therefore, it is important to improve the land tenure act and create incentives that can incentivize communities, especially women, to participate and invest in forestry and to a certain extent AF.

It is necessary that the government integrate gender into the development of the forest sector, especially in AF, since this will assist in increasing women's reliance on the forest for food and commercialization of products as a viable alternative for social, economic and ecological sustainability.

There is also concern over communal land rights, as the Act and Policy do not clearly address how to manage such lands appropriately. This is an important matter due to the fact that there has been a long-standing claim by the Mayan people in Southern Belize. There are villages in southern Belize where Mayans live and produce on lands that they do not have a legal title to.

The Forest Policy highlights the need to have inter-ministerial involvement and cooperation because the forestry sector is cross sectoral and deals with the management of natural resources which relies on the participation of ministries such as agriculture, energy, human and economic development etc. Thus, a multi-sectoral approach to forest management is essential. Unfortunately, the lack of coordination and limited human resources among these parties has led to inefficiencies in the use of available resources and duplication of efforts (Forest Department, 2015).



Multi-sectoral involvement is also key for the successful development and implementation of the AF Policy, this will move Belize forward in complying with its Nationally Determined Contributions (NDCs) and agreements under the Paris Agreement.

The Department of Environment (DOE)

The objective and strategy of the DoE is to recommend national policies which promote improvement in environmental quality, to recommend priorities among environmental programs and to assist in achieving international cooperation in dealing with environmental problems. These are centered on: strengthening the coordination of environmental activities between government and non-government organizations; establishing and enforcing standards for pollution control; reviewing and revising existing environmental legislation and regulations and strengthening their enforcement; promoting environmental planning for key areas of development such as the coastal zone, island and tourism sites; establishing, upgrading and maintaining information systems to store data and other information on the environment so as to facilitate planning and monitoring; public participation in environmental issues through education, campaigns and district outreach activities so as to encourage community based environmental planning and enforcement of regulations; and finally ensuring the Government's Environmental Impact Assessment procedures are implemented for all environmentally sensitive projects.

Evaluation of legal aspects

Prior to 1992, Belize did not have an environmental protection legislation. The Environmental Protection Act, Chapter 328 of the Substantive Laws of Belize was established by the DOE. This provides the Government with the comprehensive environmental protection authority needed to address modern environmental pollution problems. It also grants broad regulatory and enforcement authority to the prevention and control of environmental pollution, conservation and management of natural resources and environmental impact assessment. The Act became effective in January 1993 and was amended in 1998. The DoE has mentioned that there is still much to be done to ensure effective implementation, and preparation of necessary implementation regulations.

The DoE is responsible to enforce several regulations made in the Environmental Protection Act, which includes: Environmental Impact Assessment Regulations, The Environmental Protection Regulations and the Pollution Regulations to ensure the



protection and rational use of natural resources for the benefit of the present and future generations.

Environmental Impact Assessment (EIA)

EIAs are studies needed in identifying, predicting, evaluating, mitigating, and managing the environmental and key social and economic impacts of development projects, undertakings, programs, policies or activities.

This assessment shall identify and evaluate the effects of specified developments on: human beings, flora and fauna, soil, water, air and climatic factors, material assets, including the cultural heritage and the landscape, natural resources, ecological balance and any other environmental factor which needs to be taken into account (GoB, 2000).

All information needed must be presented in a written document known as the Environmental Impact Assessment Report (EIA Regulations, 2007)

The Environmental Protection Act under the functions of the department states or encourages the Department to:

- Assist the FD in promoting the development of a balanced forest management program.
- Play a major role in providing the direction for long-term sustainable development based on the promotion or incorporation of ecological concerns in the economic development process
- Foster, through inter-ministerial cooperation, the prudent use and proper management of the natural resources of Belize, the control of pollution of the natural environment and the re-establishment of an ecological equilibrium
- Exercise any other function in relation to the protection of the environment

Environmental Policy and Environmental Impact Assessment Amendment

Findings from the revision of the Environmental Protection Act and EIA Amendment are found in Table 5. The findings described in the table are points found in the law and policy document and recommendations are pointers on what can be done to improve findings.

Although the environmental act and its policy do not address the implementation of AF, their focus is on environmental sustainability, good management of natural resources and the environment. With this focus and expressing interest in increasing alternative livelihood opportunities for people, the document can assist and support in mainstreaming agroforestry in Belize.



TABLE 5. FINDINGS, OPPORTUNITIES, LIMITATION & RECOMMENDATION FOUND IN THE ENVIRONMENTAL PROTECTION ACT AND ENVIRONMENTAL IMPACT ASSESSMENT AMENDMENT

Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Environmental Protection Act and Environmental Impact Assessment Amendment					
Source		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
Environmental Protection Act and Environmental Impact Assessment Amendment		Does not mention AF or agricultural practices	No mention of sustainable agricultural practices that provide services for environmental protection		There is the need to have a synergy between both ministries.
		Document mainly speaks on dumping and disposal of waste, chemical etc.	There is no link with agriculture and environment	None	None
		An environmental impact assessment is carried out when an individual plans to undertake any project, program or activity that may affect the environment negatively. This shall evaluate the following: human beings, flora and fauna, soil and water, air and climate factors, material assets, including cultural	No link with agricultural practices and how the environment act can protect the environment from agricultural practices that may cause environmental adversities. Does not promote conservation and biodiversity conversation.	Under the Environmental Act, the Minister must prepare and present on administration and enforcement of the year to the national assembly. Increase alternative livelihood opportunities for people near protected areas to reduce poverty	A report similar to this can be prepared for the implementation of the AF policy especially if there is an incentivized mechanism implemented for AF mainstreaming



Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Environmental Protection Act and Environmental Impact Assessment Amendment					
Source		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
		heritage and landscape, natural resources, ecological balances and any other environmental factor			



The environmental act states that there must be a yearly report on the administration and enforcement that have been accomplished and presented to the national assembly. A strategy like this can be used to mainstream AF, especially if an incentive mechanism will be developed to implement the policy. The environmental impact assessment is a great strategy that the GoB has been using to evaluate the impact that any project can cause on the environment.

The National Environmental Policy and Strategy, as well as the Forest Policy, emphasize the issue of Land Tenure and Land Planning whereby they recommend the strengthening of land use management in order to have a safe and healthy environment.

Just as the Forest Policy the same applies for the Environmental Act and Environmental Policy; it is important to highlight that there needs to be a synergy or link between ministries such as the ministry of Agriculture, Forest Department, Department of Environment, Lands department etc. This is very important because the AF will be an inter-sectoral policy. Thus, there is the need to have all parties involved and working as a team, to guide and ensure that the policy is being implemented fluently.

Other Policies

Findings from the revision of the Horizon 2030 and some other documents that speak to natural resources, forest and agricultural practices are found in Table 6. The main findings, problems and opportunities, are described briefly in the following table and can serve as excellent pointers to guide future investigations and further this analysis.



Table 6. Findings, opportunities, limitation & recommendation found in the horizon 2030 and other policies

Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Horizon 2030 and other policy that may speak to natural resource, forestry and agricultural practices					
Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
Horizon 2030 Long Term Development Framework		There is a need to understand the differential impact of development program on men and women and take these differences into account in policy development	While the document does cover various sectors and on gender violence and crime, it does not focus on gender mainstreaming in the agricultural and forest sectors.	In addition to this, it can also focus on gender participation in the agriculture and forestry sector. Recognizing and promoting women's participation in this sector can promote women's empowerment in the sense that they will be able to make decisions and not depend on the decision of men on production, harvesting, and chain value of products.	An adequate approach needs to be identified, analyzed and mainstreamed.
		None	None	Planning must be relevant to both urban and rural communities	None
		None	None	Planning must integrate and mainstream inter-sectoral collaboration to increase program efficiency and effectiveness	Needs to comprehensively design an implementation, monitoring and evaluation framework so as to keep track of development process



Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Horizon 2030 and other policy that may speak to natural resource, forestry and agricultural practices					
Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
		Develop, adopt and implement a comprehensive natural resources and environmental policy and strategy including planning for climate change and mitigating its effects and should have an inter-agency approach and integrate the use of scientific findings	None	Proper management allocation and utilization of the country's natural resources guided by the principle of sustainable development	None
		Promote the "greening of productive sector" through incentivizing private companies to adopt superior green practices. Provide tax and incentives for household to more easily adopt "Green Technologies"	None	Integrate and focus on the symbiotic relationship between natural resource management and social and economic development	None
		None	None	Provide incentive for reforestation and encourage students and families to practice replanting	None
		Provision of subsidies and other support for local agricultural	None	Strengthened protected areas management and promote green energy	None



Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Horizon 2030 and other policy that may speak to natural resource, forestry and agricultural practices					
Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
		producer. Development of agricultural insurance option to cover crops losses and creation of proper bank for farmers to provide access to low interest loans. Increase in government investment in technology, irrigation, development of seeds and green pesticides and provision of technical support to farmer through rebuilding of demonstration plots across the country to provide training		Build a vibrant agriculture and strong rural communities Increase investment in agricultural school	
National Agricultural and Food Policy		Promote home food production utilizing backyard/container gardening technology	None	Home gardening is also one of the many AF systems that exists; it enhances the livelihood of the local community and provides socio-economic and agro-ecological services that a non-tree-based garden does not provide. In addition, it is also an important	None



Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Horizon 2030 and other policy that may speak to natural resource, forestry and agricultural practices					
Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
				climate change adaptation measure.	
		Develop and implement programs targeted for women	None	Through the establishment of a platform for women in the agricultural sector can also integrate with women who are/will be participating in the AF sector, where they can discuss opportunities and benefits perceived from the AFS, share experiences, advocate for women's participation, become a support for family agriculture and home gardening through production of home goods i.e food grown at home for auto consumption. Women can also strengthen their marketing framework on their product and create added value to their product	None



Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Horizon 2030 and other policy that may speak to natural resource, forestry and agricultural practices					
Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
		Promote best practices in Disaster Risk Management and Climate Change Adaptation	None	Improve the adaptation, mitigation, prevention and preparedness of the agricultural sector (livestock, crops etc) to disasters and hazards	AF can be integrated into the Agriculture and Food Sector Disaster Risk Management (AFDRM) plan because although AF systems have trees included, AF practices form part of agricultural systems.
		Develop a comprehensive agricultural income compensation and risk transfer scheme	None	Support the development and implementation of comprehensive agricultural income and support the development and operationalization of a Disaster Management Fund	Since this system will also require investment it is only fair that they are included in the AFDRM plan and Disaster Management Fund so as to be able to recover some part of their investment and this can also serve as an incentive to continue participating
		Support the development of carbon sequestration and other agro-ecological services through good agricultural practices	None	Support identification of opportunities and options for a Belizean strategy for sequestration. Promote reduced deforestation through intensification and	AFS fits adequately into Strategic Objective 4.2 and Policy Measure 4.2.3 of the Agricultural and Food Policy. Thus, there would need to be in integration of the AF



Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Horizon 2030 and other policy that may speak to natural resource, forestry and agricultural practices					
Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
				<p>increased productivity in areas under cultivation. Support identification of appropriate mechanism for development of an agro-ecological services business program via a portfolio of incentives for implementing environmental protection technologies and optimal use of natural resources for sustainable production. Support carbon-neutral certification by providing a robust framework and credit certification that aims to reduce its net carbon dioxide emission to zero.</p>	<p>into or linked to the policy.</p>
		<p>Improve the resilience of the agriculture and food sector to climate change</p>		<p>Exploration and identification of livelihood options in the agricultural sector, models of best practices for farm-based climate change adaptation.</p>	<p>AF is a strategy used to face climate change and it is also a farm-based best practice for climate change adaptation. This will also contribute to education and will lead</p>



Objective: Analyze existing Forestry and Environmental policies and laws to mainstream AF in Belize					
Horizon 2030 and other policy that may speak to natural resource, forestry and agricultural practices					
Findings		Findings	Problem/Limitation	Opportunity	Recommendation (How can it be changed? What needs to be done?)
Policy	Laws				
				Dissemination and access of educational materials to increase knowledge and support the identification, definition and development and monitoring of resilience indicators in the face of climate change adaptation and mitigation.	to understanding climate change adaptation and mitigation through model farms all over the country. There would need to be the participation of institutions like the University of Belize-Central Farm campus through the establishment of investigation and research projects for their Climate Smart Agricultural Program



The Horizon 2030 in addition to the Forest Policy and the National Agriculture and Food Policy all speak to the importance of considering gender participation. Recognizing, focusing, promoting and including women’s participation in all sectors, especially in AF, is a way to promote women’s empowerment in terms of decision-making in commercialization of their produce.

Thus, women’s participation can contribute positively to appropriate management and utilization of natural resources, which as a result can ensure sustainable production and development. Women tend to perceive forest good and services as essential; this is because women are solely responsible for the well-being of their family, especially kids. Thus, for women natural resources have more value to them than men (Gutiérrez-Montes, et.al, 2011). Men, however, tend to only appreciate natural resources, such as the forest, for commercial purpose only.

The Horizon 2030 also speaks to the option of looking for greener alternatives to implement not only at a household level but also at the production level. Their strategy aims to provide a long-term sustainable development plan for Belize.

The National Agriculture and Food Policy speaks to seeking alternative and sustainable production, the importance of having a Disaster Risk Management Plan and Disaster Risk Fund, while the Horizon 2030 speaks about subsidies to support agricultural producers. These topics are very important and the GoB must take them into consideration for the development of the National AF Policy. If AF systems are to be promoted in the country it will require investment by farmers/producers and if no tool is in place that supports the farmers in the event of a risk or hazard, for example forest fires; then farmers will hesitate and the willingness to implement AFS will decrease.

If the issues highlighted in this analysis of these policies are taken into consideration and are dealt with by the GOB in an adequate manner; then these corrective actions can serve as incentives to encourage farmers to participate and want to get involved in the implementation of AFS.

Lessons learned on gender mainstreaming in AF policies

Agriculture is an important engine of growth and reduction of poverty. In agricultural labour, at a global level, women comprise up to 43%. They play a crucial role in agriculture and rural economy. However, they face constraints that reduce productivity. Overall, the labour burden of women especially in rural areas exceeds that of men and includes a higher unpaid household responsibility because many rural women manage complex households and pursue multiple livelihood strategies. Their activities typically include producing agricultural crops, tending animals, processing and preparing food,



working for wages in agriculture or other rural enterprises, collection of fuel and water; they also engage in trade and marketing; they care for their family members and maintain their homes. Sadly, many of these activities are not defined as economically active employment but they are very important for the maintenance of the household (FAO, 2012).

It is estimated that women produce 60 to 80% of food in developing countries and the female share of the agricultural labour force is approximately 20% in the Americas to almost 50% in East and Southern Asia and Sub-Saharan Africa (FAO 2011). The participation of women in livestock sector such as managing poultry, dairy animals, small-scale pig production, etc., is highly active. Nevertheless, as the livestock sector becomes more commercialized women tend to find it more difficult to compete because they tend to lose control over profitable activities and negotiation in the market or often times they are underestimated by male buyers. For example, in Central America the role of women contributing to cattle production is mostly as spouses or daughter of cattle producers where they tend to perform less physical effort as compared to men (Gallina, 2016).

It has been determined that women's activities tend to take place near the home due to their responsibilities in the household. Men tend to dominate commercial transaction, meanwhile women are involved in non-commercial activities. However, many activities especially in the cattle sector depend on the contribution of all household members, that is, the entire family, including children (Gallina 2016). It is also important to mention that men's and women's needs and interests in relation to nature can be very different. For example, in terms of water use and management, their concepts, perspective and attitudes can be different because men often see water as an important input within agricultural activities, placing their attention on quantity of water needed for these activities. Meanwhile, women perceive water for its quality because for women, water is a starting point in food preparation for the family (Gutiérrez-Montes, et.al. 2011).

Men and women have differences, which should not be taken as inequality of any gender. Nevertheless, the socialization process through which male and female progress is based on the perceived supremacy of men and inferiority of women (Siles, et.al. 2015). The status of women, their income and access to power determines their involvement in decision making related to conservation. These decisions and resources may determine the degree to which a woman can use them to increase her resources such as livestock, and therefore increase financial and food security for herself and her family (Gutiérrez-Montes, et.al. 2011).

In cattle production the role of women and men differs depending on the size of the business, where men are responsible for organizing, supervising production, hiring workers, maintaining contact with buyers etc. While women monitor milk supply, manage



relations with suppliers, maintains records, conduct payments, and oversee production in the absence of their husband (Gallina, 2016). At big business scale women tend to participate only in the administrative and packaging task.

The gender approach in development has been enriched with contributions from different studies on women and feminism. From this approach, it is believed that the problem is the inequality of power and structure that has produced and maintained them, thus preventing equal development. The gender approach is a way of observing and analysing reality from a historical understanding of building relationships between women and men which depend on context, on variables of age, ethnicity or economic link. This approach helps explain and broadens the understating of reality in identifying the causes of gender inequities, it also helps to formulate means and mechanisms to bridge gaps and promote relations of equity and equality (Siles, et.al. 2015).

Gender participation in Belize

Despite the significant progress of Belizean women who have been able to access a higher education and/or have advanced in the public service and civil society organizations, the doors of Belize's governing bodies remain stubbornly difficult for women to open at a national level (UNDP, 2012).

A National Women's Commission (NWC) was established in 1982 as Government's national advisory body on gender related issues. The NWC functions mostly on voluntary and part time participation and they monitor and report on Belize's compliance with the Convention on the Elimination of all forms of Discrimination against Women (NWC, 2013).

In 2002, Belize developed its first National Gender Policy and it outlined five major policy priorities for gender empowerment in Belize. In 2008 the NWC reviewed and validated the National Gender Policy to ensure: i. its continued relevance in the Belizean context and ii. its responsiveness to the CEDAW committee's concluding comments (NWC, 2013).

With the National Gender Policy, Belize has benefited from improved programming, service delivery and legislation that support gender equality, equity and women's empowerment (NWC, 2013).

The purpose of the gender Policy (2013) sets out to achieve the following general objectives:

- Protect the human rights of women and men as enshrined in the Belize Constitution and in relevant International Conventions which Belize has ratified
- Ensure national accountability for commitments made in national policies and programmes as well as relevant International Conventions, particularly CEDAW, which Belize ratifies



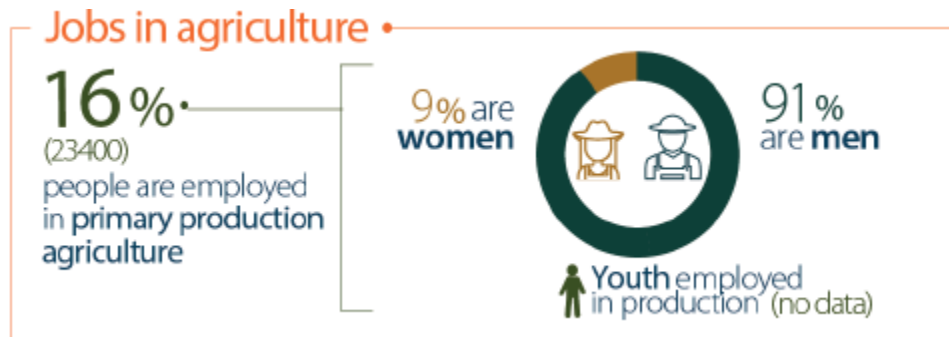
- Provide policymakers, civil society organizations and international development agencies with a reference point for recognizing and addressing gender issues and making gender responsive, human rights-oriented policy decision
- Address the fundamental causes of gender inequality and inequity and place the family and the community at the centre of this process of change
- Act as a basis for transforming gender relations within the family and the community and across all levels of public and private institutions
- Enhance and support national efforts towards human-centred development in which women and men participate fully and from which they benefit equally
- Ensure the involvement of men in all aspects of productive and reproductive life and recognize their important role within the family and as agents of change in the wider society
- Ensure that development policies, programmes and related budgets are gender responsive, human right-oriented and provide real spaces and opportunities for the jure and de facto gender equality and equity
- Act as a basis for establishing a legal framework that supports and facilitates the achievement of gender equality and equity.
- Promote and facilitate women's and men's equal access to and control over, productive resources, services and opportunities.
- Act as a framework for recognizing and valuing women's and men's productive roles and how this contributes to national development
- Redress imbalances that arise from existing gender inequalities which hinder the advancement of gender equality and equity
- Promote the collection and gender analysis of sex-disaggregated data so it can be used in the planning, implementation, monitoring and evaluation of development plans and programmes
- Establish an institutional framework for the coordination, monitoring and evaluation of national policies and programme from a gender perspective.

Gender in Agriculture and AF in Belize

In the agriculture sector in Belize approximately 23,400 people are employed, where 9.4% are women who work mainly in the agro-processing sector while males work in the main traditional crops (World Bank 2018). Men in Belize play a greater role than women in the exploitation of natural resources for commercial purposes, which are logging, grazing livestock, fishing, mining and extraction of various tree products. Women are also involved in the economic activities such as farming but in addition they have domestic responsibilities such as taking care of the house, children and making food (Forestry Department, 2015 & Pontara, 2015).



FIGURE 6. FEMALE WORKERS IN AGRICULTURE IN BELIZE



Source: World Bank, 2018

According to the data obtained from the 2011 agricultural census the most recent source states that 19,236 people identified themselves as farmers, 24% owned land fewer than 5 acres, 33% owned land between 5 and 20 acres, 43% owned more than 20 acres and only 8% of women are agricultural landowners (World Bank 2018). Unfortunately, the social status of women in Belize often limits their secure and independent access to land because they may not be aware of their rights, or traditions may exclude them from this process (Forest Department, 2015).

Qualitative data indicates that forests and trees make significant contribution to the Sustainable Development Goals through the non-structured sector. Many countries have already successfully integrated forest and territorial approaches that link multiple SDGs to broader programs of sustainable development. It is estimated that non-wood forest products provide food, income, and nutritional diversity to one of every five people worldwide, especially women and children (FAO, 2018). As part of the National Forest Policy in Belize, various principles are developed on the government's national development priorities of good governance, sustainable development and poverty eradication. Therefore, principle 8 of the Forest Policy in Belize, encourages the participation of both men and women, including youth, the elderly and vulnerable, to actively integrate themselves in the forestry sector (Forest Department, 2015).

In the National Food and Agriculture Policy (NFAP)-2002-2020, as part of their strategic objectives to comply with the national policy, the Ministry of Agriculture plans to increase sustainable livelihood options for the food and nutrition deprived. It is expected to achieve this by expanding employment and generating income opportunities for marginalized communities, through the promotion of home food production by utilizing backyard/container gardening technology. They also plan to increase the participation of youth and women in the development process by developing and implementing empowerment programs for youth, developing and implementing programs targeted for women through discussion on agricultural opportunities, supporting the provision of



resources (land and credit), providing basic infrastructure, and technical support for family agriculture and home gardens (Min of Agric, 2012).

Women and AF in Southern Belize

In the Mayan communities of San Jose, the division of labour according to gender is determined by the Maya Culture, men claim responsibility for all agricultural production. Women do not get involved unless there is a shortage of labour force, they are involved in marketing of agriculture, but women have also recently taken up various economics activities to generate enough income to meet increasing family needs. This may be done through associations for women where for example, the women would work together to acquire a mill for grinding corn. (Levasseur& Oliver, 2000).

According to Pontara (2019), the traditional role of women on the farm is to comply with their household responsibilities such as preparing lunch for their husbands and helping to collect food from the field, looking after the children and the house, which also includes home gardens. Home gardens are very important because cultivating in the backyard is very near to the kitchen and crop can easily be monitored and harvested for the family.

Although this is not perceived as an AF system this practice is relevant because it is the only area where farmers tend to plant trees. Thus, women's role in everyday life in regard to finding food, childbearing, nurturing, concern for their children's future and linking their households to resources often gives women insight into the need for conversation (Guitierrez-Montes et.al. 2011).

In return, these trees keep crops safe and can be protected from wildlife and people. Trees can also produce fruits which are used by the family. Ground food is also planted which is used for family consumption and for local market but at a small scale (Pontara, 2019).

Nonetheless, Q'eqchi' Maya women in southern Belize have formed the Indian Creek Maya Arts Women's Group and they dedicate themselves to making handcrafts, such as Cuxtal handbags, JippiJappa baskets, wood and slate carvings, pottery, jewellery and clothing with sustainable sourced material from the forest. As a result, they saw opportunities to capitalize on a market niche by providing an authentic Maya culture experience. However, with the threats of climate change and deforestation; these women joined Ya'axché training workshops in conservation, sustainable resource use practices, leadership, conflict resolution, product development, and business plan development. They are also advocates for cultural preservation and forest protection through their Maya culture tour in the tourism industry (YCT, 2019).



With the help of the YCT and the Small Business Development Centre Belize, they have partnered with BELTRAIDE in providing efforts to support community development and empowerment by receiving business development advisory services and capacity building (YCT, 2019; BELTRAIDE, 2019).

As part of teaching sustainable practices, and as a strategy to adopt to climate-smart farming practices the YCT provides interactive workshops such as organic bio fertilizer production training to men, women and youth in the Maya Golden Landscape. These bio fertilizers are made from organic material found on the farms with the objective that these can improve soil health and plant nutrition. The benefits of organic bio fertilizers help plants by increasing their ability to take up minerals and water, enhance root development and increase crop yield (YCT, 2019).

According to Garcia (2019), YCT supports mayor practices such as bee keeping, Inga alley cropping and cacao AF.

[Maya Mountain North Forest Reserve and Maya Golden Landscape Beekeepers](#)

A group of 5 beekeepers established their apiary within the Maya Mountain North Forest Reserve and have been producing honey since 2018, of which 4 of these beekeepers are young women. In 2018, honey production combined reached approximately 840 lbs, meanwhile in 2019 production up to April reached 120 lbs, which was reported by two farmers (Garcia, 2019).

Meanwhile, the Maya Golden Landscape Beekeepers produce honey from 4 different communities with most of these farmers being from Indian Creek Village. In 2018, honey production combined reached 1,251 lbs and production up to April 2019 reached 600 lbs (Garcia, 2019). Garcia (2019) mentions, selling price for honey production is at \$6.00 Bze/lb, generating a total of BZ\$5,040 in 2018 for the MMNFR and BZ\$7,506 for the Maya Golden Landscape Beekeepers.

[Maya Mountain North Forest Reserve Cacao AF Concession](#)

The need for a first community AF concession came to light because of the need to gain legal access to land for the benefit and improvement of the community and livelihoods in southern Belize. Overtime, The Maya Mountain North Forest Reserve community cacao AF concession became Belize's first community concession, allowing residents to access a protected area and become stewards of that area (Beaton, 2019). The concession work is being implemented by the Trio Farmers Cacao Growers Association and a total of 31 farmers are registered, of which only 3 women formed part of the group. For the year 2018 and the first production and harvesting, 22 farmers including the 3 women harvested 3,550 lbs of cacao combined. In 2019, 30 farmers were registered and together they harvested 8,587 lbs of cacao between January and March (Garcia, 2019).



Regional Study Cases

Plan Sierra Development Project- Dominican Republic

According to FAO, the Sierra is a rugged, relatively isolated region in the Central Mountain of the Dominican Republic, where household income, health status and education level of residents are well below national averages and their economy has suffered from boom-bust cycles in mining and lumbering. The area has been largely deforested through commercial timber exploitation and the practicing of shifting cultivation. Most agricultural production is nested within AF systems based on mixtures of field crops, coffee, pastures and forest. They are combined in simultaneous intercropping mixtures as well as in rotation over time. Most farm families manage such diverse holdings for both subsistence and commercial ends (Fortmann & Rocheleau, 1985).

Plan Sierra was designed as an integrated rural development project which included strong agricultural, reforestation and soil conservation components. The program was divided among the technical unit that is agriculture and forestry, health, education, rural organization, surveying, engineering and construction, marketing and rural industry. As in other projects in Latin America, local women's participation in Plan Sierra was initially limited to health services, home hygiene and home economics. Eventually some of the nurseries hired women to water seedlings and to fill polyethylene bags with potting soils, this was because nursery supervisors considered them to be more efficient and patient (Fortmann & Rocheleau, 1985).

At the beginning women began working reluctantly with plant propagation techniques, which they later acquired an active interest for. Plan Sierra administrators and technical staff trained a group of para-technical women horticulturists who became known as "budders and grafters" which eventually led to the inclusion of more women in technical nursery work (Fortmann & Rocheleau, 1985).

Empowering indigenous women in AF and community forestry in Guatemala

In Guatemala, tropical forests are being destroyed due to the rapid growth of slash and burn agriculture and cattle farming. The land is only arable for three years and then new land is cleared. The objective of the United Nations Framework Convention on Climate Change by empowering women seeks to educate farmers and communities on alley cropping methods, using Inga trees (*Inga spp.*). Inga trees are planted in rows and cash crops can be grown in between rows. They can be used as fertilization and can be used as alternative for firewood, which as a result helps reduce pressure on the forest. Guama (*Inga edulis*), is an economical alternative for men and women, which helps to increase the family income through by-product of the commercialization of seeds firewood, fruits and increased yield of food staple (UNFCCC, 2020).



Families have been participating and implementing environmentally friendly practices that contribute to the mitigation of climate change. They have also seen improvement in their standard of living. The main beneficiaries are women (350), since they are the one's involved in producing the food and applying the AF systems. These women have also been socializing their experiences in the program with more women from the region and have increased the demand of genetic resources and education in the techniques involved (UNFCCC, 2020).

Monterroso *et al* (2018) indicate that community forest concessions in Guatemala represents forest governance model at a local level, where the potential local communities have for forest conservation and management are within the land tenure rights framework. Part of forest management is the promotion – implementation of AFSs in some areas to strengthen the forest management and its conservation.

For the implementation of the model, the following elements were taken into consideration:

1. Ordering of territory and usage of La Reserva de la Biosfera Maya delimiting conservation areas and applying strict protection; buffer zones that aim to soften the impact that the agricultural sector has on strict conservation areas and the multi-use area where forest concessions are located in order to exploit and contribute to the connectivity of ecosystems.
2. Legal and contractual figures between formal community-based organizations and the Guatemalan State for the forest use in multipurpose area zones.
3. The rights and obligations agreed in the concession range from the use of timber and non-timber species to carrying out ecotourism activities.
4. Constitution of community forest companies with a management fund model used for the benefit of their community (i.e in improvement of basic services) and capacity development (i.e in management, marketing of products and management of natural resources).
5. Articulation within families, communities and business communities in forest management and civil organization initiatives with a wide scope such as the Mesoamerican Alliance of People and Forests.
6. Identification of 3 aspects of action: community organization, ensuring the sustainability of forest resources, strengthening the value chain of timber and non-timber products.

The following challenges and lessons learned from the project are:

1. Uncertain political will in the coming years to support forestry business initiatives.



2. Further research on the impacts that the management of a multipurpose area can cause in order to adapt policies as time passes and new environmental challenges arise.
3. Inquire about the factors that influence forest concessions, to make them more relevant to the expectations of the user.

[Compensation mechanisms relating forest water conservation in Central America and the Spanish-Caribbean](#)

Méndez (2008) described that forestry issue was tackled normatively through the Guatemalan forest law regulation which was in the responsibility of the National Institute of Forest (INAB). The forest law proposed some work aspects on the environmental issues within the country. One of them was the Guatemala Forest Incentive Program (PINFOR) and its general characteristics are as follows:

1. Payment of taxes to landowners with a minimum area of 2 ha that demonstrate the legality of their property.
2. PINFOR was created and emphasizes two areas: to motivate the establishment and management of forest plantations for the use of wood; and the conservation of forests due to their functionality in the production of ecosystem services, especially the hydrographic basins by protecting riparian forests.
3. Formulation of a reforestation or forest management plan in natural forest that proves the forest's vocation of the land is a requirement to receive financing from PINFOR.
4. The allocation of finance for forest protection will depend on the number of hectares: there is a greater incentive (US\$347.25) for smaller hectares of forest.

In 2015, at the end of PINFOR Program, AF systems were integrated as part of this forest incentive program, they were also contemplated in the new Program PROBOSQUE, which substituted PINFOR.

The financing of this initiative is absolutely owned by the state, 80% of the budget is allocated to forest management and 20% to forest conservation to ensure the permanence of the water resource.

Some observations made regarding PINFOR are that there is a need for balance (since it is disproportionate) in terms of the budget allocated for forest use with respect to the conservation of riverine forests, as well as for AF systems. The importance of prioritizing payments for environmental services in critical areas that are about to lose vegetation cover was also highlighted.

[Law on incentives for smallholders for forest or AF practice in Guatemala](#)

The National Congress of Guatemala (2010) mentions that Decree No. 51-2010 is the forest incentives law for holders with small extension of land with a forest or AF practices.



This confirms that reforestation and forest conservation is listed as an urgent matter and of national interest. Thus, forest incentives represent an important advancement in forest conservation and have regulated the use of forest material for the economic development of the country, while at the same time it is taking care of the forest resource in a responsible manner through AF systems that benefit small farmers.

PROBOSQUE Experience in Guatemala

This initiative was created under the Decree² of 2015 and its objective is to increase forest cover through incentives. The validity of the law is for 30 years and it is defined by the National Forest Institute (INAB). This is the entity that oversees managing public and private investments to contribute to the incentives promoted by this initiative. Among the main guidelines of the standard, the following are highlighted:

A. Who can access?

1. Landowners, including municipalities.
2. The social groups that are legally constituted, that is, that have legal status and that in turn occupy the municipal land.
3. The nation's tenants of reserves.
4. Cooperatives indigenous communities or groups that have communal land tenure and are duly represented.

B. Budget

The State provides incentives, from the General Income and Expenditure Budget, an amount not less than 1% of the State Ordinary Income Budget. The Board of Directors of the National Institute of Forest updates the amounts it has annually and socialize them through the official newspaper, so that there is public knowledge.

C. Production modalities that can access the program are:

1. Establishment and maintenance of forest plantations for industrial purposes.
2. Establishment and maintenance of forest plantations for energy purposes.
3. Establishment and maintenance of AF systems.
4. Management of natural forests for production services (this modality includes natural forests for the purpose of forest seed production).
5. Management of natural forests for the purpose of protection and provision of environmental services.
6. Restoration of degraded lands.

To access the program, those interested must register in the National Forest Registry. In addition to this, the respective project management plan must be



submitted to the National Forest Institute, must fulfill aspects requested from the standard along with the projects objective before it can be incentivized.

D. Area

A minimum area of 0.5 ha is proposed under the standard and should not be greater than the area equivalent to the amount.

E. Overlap with protected areas

If the project (incentivized projects) falls within a protected area, approval must be requested from the National Institute of Forests, which in turn will oversee consulting with the National Council of Protected Areas. The response to the applicant should not take more than 30 days.

F. Distribution of resources

The distribution of economic resources is made annually according to the number of projects that are requesting to join in PROBOSQUE program. It is important to mention that no applicant may receive more than 0.5% of the annual budget that is allocated nationwide for this activity. The decree mentions that an amount of not less than 50% of the annual budget will be allocated to projects that occupy an area of less than or equal to 15 ha.

G. Incentives frequency

The decree mentions that PROBOSQUE participants receive the incentive only once for each area unit, according to the following modalities:

1. Establishment and maintenance of plantations- receive the incentive for a defined time and for this purpose, the purpose of the project is taken into account, whether it is industrial or energy.
2. AF systems projects- receive the maximum incentive for six years.
3. The incentives are used for the management of natural forests for up to ten years.
4. In projects that are dedicated to forest protection in forest management, the incentives can be awarded for up to 10 years.
5. As well as for forest restoration initiatives, they can access incentives for up to 10 years.

H. Entity in charge of payments

Participants selected for PROBOSQUE can access the payment of incentives through INAB with the agreement of the Ministry of Public Finance.

I. Compensation



The decree states that the National Forest Institute will promote the implementation of compensation mechanisms in project areas that generate ecosystem services.

J. Administration of resources

The Decree also creates the National Forest Fund, which is responsible for managing all the resources (government, donations, credits and compensation mechanisms) that are destined for PROBOSQUE incentives.

Female Farmers in Cuba - Empowerment Hands

Cuban government policy continues to dedicate multiple efforts to eradicate the gender gaps that still underlie in areas of society, especially in in the farm fields. This is working along with the Federation of Cuban Women and the Ministry of Agriculture (MINAG, 2019).

Previous to 1959, rural women concentrated on domestic work, only a few initiatives were allowed because of the marked differentiation by gender. Where men worked the land, which was under the strict ordinance of the male voice. Government policy has allowed changes in the vision and treatment that female farmers hovered over (MINAG, 2019).

According to the government up to 2018, more than 200 thousand women were associated in the agricultural sector, where 17,000 people worked in usufruct land which was obtained through the Decree Law 300 of the Ministry of Agriculture. This shows that the government continues to implement multiple efforts to discard gender gaps within their society. However, this does not seek to favor and empower female farmers nor distancing them from the logical and natural connection with men but this looks for both genders to understand that it is about having everyone play equal roles and become an active part of the agricultural development of the country. The Cuban Agriculture System focuses on agricultural, forestry and tobacco production. In order to do this, it is important to pay special attention to the human capital, which is an important factor for its workforce, which can be accomplished through the promotion of gender equality (MINAG, 2019).



National challenges in developing AF policy

CATIE (2020) indicates that for the developing of an AF policy, every country establishes certain objectives that they expect to meet. These objectives serve as a guideline and a meter to measure the success of the policy. However, countries face various challenges that have prevented them from meeting their established objectives. Resulting, in the held back or prolongation of the implementation of their AF policy. The challenges often observed by the countries are:

1. The sources of financing are scarce, thus limiting the proposed implementation action.
2. There is no conceptual clarity about the terms and process that are related to AF systems; thus, making it difficult to understand and work with all actors involved.
3. There is limited information on gender's perspective, how they are related and how they influence in AF policies development. There are also no concrete actions that can be carried out to address the issue as it pertains to gender and AF and how they influence or play a role in the development of and in AF policies.
4. Access to land tenure is also a problem that affects not only the implementation of AF initiatives but also limits the production of rural communities.
5. Information does not flow through the different stakeholders interested in developing this type of productive system. This is often an obstacle that impedes the joint work of actors and the handling of basic concepts that are related to AF.
6. Access to markets is sometimes a problem that producers must face, this is because they do not know where they can market their products and what are the permits and paperwork that they must possess in order to market their products.
7. Although the technologies have been developed to allow labor to become more effective; the price to obtain these technologies are sometimes or if not most of the time costly. This does not allow the farmer or communities to gain access; making simple tasks for implementation and maintenance of AFS difficult and demands for more effort and investments.
8. The articulation between institutions and other entities are challenging because most of the time a consensus is not reached on what are the specific guidelines that will be followed in order to meet specific objectives and activities needed in order to implement both the construction/development and execution of the policies.
9. The absence of a comprehensive agroforestry policy that can secure coordination across organizations and that can tackle the main constraints of AF, can certainly be a major source of confusion and duplication and, above all, can explain the slow progress in demonstrating the full potentials of AF for any country.



The challenges mentioned above are no different from what is observed in Belize. For this reason, it is important to take into consideration all challenges mentioned above and at some point, the GoB will should consider amending current laws and policies that will facilitate and promote the implementation of a Belize National AF Policy.

Based on experience elsewhere, it is proposed that these considerations and recommendations be taken into account in the process of developing and implementing national AF policies. They are as follow:

Normativity

Step 1 is to review the different regulations that exist around the subject, some laws already enacted can be complementary, or not present conflicts within the regulatory framework. Coordination is needed between all relevant institutions being involved so that there is commitment and participation in the execution, hence ensuring the success of the policy goals and objectives.

During the process of developing the regulations, it is important to include in detail the information on the legal permits that are required for the use and commercialization of forests according to the status of the land tenure.

It is essential to include definition of basic concepts used in AF systems. This is to ensure conceptual homogeneity and to facilitate joint work between actors.

Institutionalization

It is important to have an entity that is responsible for and leads the implementation of the National AF Policy and manages the economic resources that is required. For example, in Costa Rica, they have created an entity that is independent of the Ministry of Environment and Energy and has legal representation through which the state allocates its resources destined for the PES for AF initiatives.

Finance

This is one of the biggest challenges that AF policies face, because there are not enough economic resources to execute the actions proposed in the policies. For this reason, it is necessary to create an economic fund so that moneys can be mobilized and channeled through the fund. It is also important that there is a specific allocation of monetary resources to finance PES in AF. In Costa Rica, the resources for AF come as a percentage of the national fuel tax collection.

These finances can be obtained in various ways, that is:



A specific annual budget is set aside for the implementation of national program forest incentives, as the example from Guatemala; however, this source is vulnerable to changes and reduction of budget by government.

Access to financing and credit lines so that small producers can implement AF systems are also necessary.

Capacity building

Work on capacity building is imperative for understanding AF systems and components, their management options and practices, the use of multi-purpose tree species, harvesting regimes, analyzing the legal aspects that must be taken into consideration for the management of the forest species and all the processes that must be carried out from production acquisition of plant material to commercialization in consumer markets. It is important to highlight that this must be designed for all actors, according to the role that each of them plays at the national, regional and local level.

Gender approach

From a human right and equity perspective, gender issues need to be addressed in an AF policy and in its delivery and evaluation. There are no concrete actions that have been formulated through which it is possible to work with a gender perspective. However, it is necessary to identify which strategic approach would be best to use for gender mainstreaming within the AF sector. A gender impact assessment is recommended, which is a practical tool that can facilitate the implementation of gender mainstreaming. For example, an ex-ante impact analysis of policies or laws can be performed at different stages of the law-making or policy implementation cycle to fine-tune the gender mainstreaming strategies.

Monitoring

This is important to measure progress in the implementation of the actions proposed by the AF policy and the impacts it generates at a national level. Data collected during the monitoring should feed into a database in one of the country's information management system. It is also recommended to formulate a follow-up and monitoring plan and that financial resources be formally allocated for monitoring.

Land and tree tenure

When introducing trees on rural spaces, and drawing on the work of ICRAF, there are a number of land and tree tenure issues that could potentially drive or impede the adoption of AF, hence there is the need to understand the legal regulations and customary practices in Maya lands, unexploited village land, boundaries between freehold properties. Hence, an AF policy should also enable the formulation and implementation of land and



tree tenure policies that can promote AF. This could be achieved, for example, by providing a legal basis for AF, understanding local resource use and tenure practices (i.e. rights of whom, for whom and for what), valuing land with trees, and creating incentives that can lead to greater participation and equity in rural communities through the adoption and sustainability of AF.

Market Access

Last but not least, the elaboration of an AF policy should comprise strategy for product development, improvement of value chains for all actors, market and external trade intelligence, and establishment of commercial alliances that open up and access new markets.

Conclusions

An AF policy is not developed in isolation, but it is rather seen as a complementary tool and action that facilitates sustainable practices and development. In order for the implementation to be successful, the policy requires sustainable financing resources which at times are vulnerable to the political will of the government in power. Therefore, it is wise for long term financial sustainability, to develop the financial plan such that, ideally, the bulk of core resources should come from the State and the rest be complemented by all the other stakeholders, including the farmers and other land users.

Although all other policies mentioned such as Horizon 2030 and the National Agriculture and Food Policy, with the exception of the Forest Policy, do not speak directly on the implementation and utilization of AFSs, they do refer to using alternative sustainable practices for production. Thus, AF systems can fit perfectly into these agenda.

It is important to know who the key actors are and to understand what the perceived barriers, risks and benefits of AF systems are, in order for their needs and concerns to be addressed. In addition, through the analysis of the topics that were highlighted in the different policies are: the distribution of land, articulation between ministries, a development plan to tackle disaster risk management, and a risk management fund. It is necessary to pursue these issues and measures because if there is no plan to improve them, then highly likely, that the NAP implementation will not be successful.

Tackling the situation above can serve as an incentive for the implementation of AFS. Still it is necessary to identify which strategy would be adequate to implement for the maximum benefit of the producers and GoB. For this reason, it is important to conduct further consultation on this matter.



It is also important to encourage the participation and build synergies among the key ministries because the expertise and knowledge are crucial for the successful implementation of the NAP. GoB needs to also strategize on measures to motivate and encourage simultaneous synergies and participation between parties because AF cannot move forward without the inter-sectoral and multi-disciplinary approaches. Hence, the only way to guarantee success in the design and delivery of an agroforestry policy is through real coordination and collaboration of the key participants, in this case the ministries and departments, the private sector, civil society, and the farmers and producers.

A flexible term or definition for AF, perhaps specific to the country needs, can be created, considering that Belize is a country that is culturally diverse and that each ethnic group has deep-rooted traditions.

It would also be necessary to consider the challenges that have been determined in other countries and that are similar to Belize so that this can allow for fluent execution of the national AF policy in the country.

Gender participation, especially that of women, is a crucial topic that needs to be taken into consideration, because although men claim majority responsibility for agricultural production, women do play a big role in the value chains of commercial products, decisions that concern the welfare of the family and children, and of course, behind the scene, they are most influential in long term decision making in their households. These roles must be fully acknowledged and strengthened, especially when it comes to marketing and administration of the cash income.



References

- Beaton, M. 2019. Belize's first AF concession for conservation & livelihoods. Case study report 01. Toledo, Belize, YCT. 50p. .
- Beltraide. 2019. Business development for the Indian Creek Mayan arts women's group (online, website). <https://belzeinvest.net/2019/10/03/business-development-for-the-indian-creek-mayan-arts-womens-group/>
- CATIE (Centro Agronómico Tropical de Investigación y Enseñanza). 2020. Estado del arte y diagnóstico breve bibliográficos sobre agroforestería y políticas agroforestales. Proyecto PRAGA. 43p.
- Cherrington, E; Cho, P; Waight; I. Santos; T. Escalante; A. Nabet, J; Usher, L. 2012. Forest cover & deforestation in Belize. 2010-2012 (online). Researchgate. https://www.researchgate.net/publication/324043040_Forest_Cover_Deforestation_in_Belize_2010-2012
- Congreso de la República de Guatemala. 2019. Reglamento de la ley de incentivos forestales para poseedores de pequeñas extensiones de tierra de vocación forestal o agroforestal- PINPEP- Guatemala. 22p
- Detlefsen, G; Ibrahim, M; Rosa Cruz A; Santos, T. 2000. Belize cattle farms: Potential to produce high value timber. Turrialba, CATIE, Costa Rica. <http://hdl.handle.net/11554/8688>
- Environmental Impact Assessment Regulations. No 24. Gazette. Belize. 24 March. 2007.
- FAO (Food and Agricultural Organization of the United Nations), 2018. El estado del bosque del mundo; las vías forestales hacia el desarrollo sostenible (online). Rome, Italy. 132 p. <http://www.fao.org/state-of-forests/es/>
- FAO (Food and Agricultural Organization of the United Nations), 2012. The role of women in agriculture (online). Rome, Italy. 48 p. <http://www.fao.org/3/am307e/am307e00.pdf>
- FAO (Food and Agricultural Organization of the United Nations). 2011. The vital role of women in agriculture and rural development. Rome, Italy. 12 p. <https://www.unwomen.org/en/docs/2011/6/the-vital-role-of-women-in-agriculture-and-rural-development>
- Forest Department. 2015. National Forestry Policy. Belize. 54p.
- Forest Department. 2020. Belize Forest Reference Level, 2001- 2015. Belmopan, Belize. Government of Belize. 97 p.
- Fortman, L & Rocheleau, D. 1985. Women and AF: four myths and three case studies. AF Systems (2): 253-1503 Netherlands.
- Gallina, A. 2016. Gender dynamics in the cattle sector in Central America: A literature review. CCAFS coordinating unit. University of Copenhagen. Denmark. 19p. Working Paper No. 181.



- Garcia, C. 2019. Beneficiary socio-economic assessment in the Maya golden landscape. Toledo, Belize, YCT. 8p. (GIZ-CATS report).
- Government of Belize, 2000. Environmental Protection Act. Chapter 328. Belize. 31 Dec. 2000.
- Government of Belize, 2016. Forest Department- Programs. Belize Forest Department.<http://forest.gov.bz/programs/>
- Government of Belize, 2016. Forest Department Mission. Belize Forest Department (Online, Website). <http://forest.gov.bz/mission/>
- Government of Belize, 2016. Forest Sustainability Services Unit (FSSU) – Belize Forest Department. <https://forest.gov.bz/sustainable-forest-management/>
- Belize Forest Department, undated. Sustainable forest management. <https://forest.gov.bz/sustainable-forest-management/>
- Guerra, F. 2020. Sustainable Forest Management Program. *In* Ya'axché Community Forestry Symposium. Feb. 20 2020. Belmopan, Cayo, Belize.
- Gutierrez-Montes, I., Emery, M., and Fernandez-Baca, E. 2011. Why gender matters to ecological management and poverty reduction. *In* Integrating Ecology and Poverty Reduction. Ingram, J.C., DeClerck, F. Rumbatis del Rio, C. (Eds). New York, USA. 39p.https://www.researchgate.net/publication/264550885_Why_Gender_Matters_to_Ecological_Management_and_Poverty_Reduction
- I, Monterroso, I., Stoian, D., Lawry, S. and Rodas, A., 2018. Investigación y políticas públicas forestales comunicativas en Petén, Guatemala: Lecciones aprendidas y desafíos pendientes (en línea). CIFOR, 8p.<https://doi.org/10.175/cifor/007044>
- Kay, E; Avella, E. 2010. Belize environment outlook: geobelize 2001. Belmopan, Belize. Ministry of Natural Resource and the Environment.160p.
- Kongsager, R. 2017. Barriers to the adoption of alley cropping as a climate-smart agriculture practice: lessons from maize cultivation among the Maya in southern Belize (online). *Forest* 8(260): 1-23. <https://doi.org/10.3390/f8070260>
- Levasseur, V. Oliveier, A. 2000. The farming system and traditional AF systems in the Maya community of San Jose, Belize. *AFSystems* 3 (49): 275-288. <https://doi.org/10.1023/A:1006327403980>
- Méndez, B. 2008. Mecanismos de compensación relacionando bosques con agua en Centroamérica y EL Caribe de habla hispana, Guatemala: la conservación de bosques dentro del Programa Nacional de Incentivos Forestales (PINFOR).
- Ministry of Agriculture, 2015. National Agriculture and Food Policy of Belize. Belize. 25p.
- MINAG (Ministerio de la Agricultura, Cuba). 2019. Estrategia de Género del Sistema de la Agricultura de Cuba 2015-2020.<https://www.minag.gob.cu/node/1938>
- National Women's Commission, 2013. The revised national gender policy. Belize. 52p.
- Pontara, G. 2019. Analysing farmers' perceptions towards AF adoption in Couther Belize.



- Mag.Sc. Netherlands, Wageningen University & Research. 107p.
- Rosa Cruz, A.2010. Desafíos de la legislación forestal para el aprovechamiento del recurso maderable en sistemas silvopastoriles del Cayo, Belize. TesisMag. Sci. CATIE, Turrialba, Costa Rica. <http://hdl.handle.net/11554/4604>
- Sánchez-Chavez, J. Navarrete-Chacón. 2017. La experiencia de Costa Rica en el pago por servicios ambientales: 20 años de lecciones aprendidas. In Revista de Ciencias Ambientales 51(2):195. <https://doi.org/10.15359/rca.51-2.11>.
- Shibu, J. 2012. AF for conserving and enhancing biodiversity (en línea). AF systems 85: 1-8. Available on [DOI 10.1007/s10457-012-9517-5](https://doi.org/10.1007/s10457-012-9517-5)
- Siles, J. Ramírez, F. Hernández, L. Bustos, G. Padilla, D. Gutiérrez, I. 2015. Estrategia de equidad e igualdad de género. Manual técnico N° 126, Turrialba, Costa Rica, CATIE. 36p.
- Somarriba, E., Beer, J. Alegre Orihuela, J., Adrade, H., Cerda, R., De Clerk, F., Detlefsen, G. Escalante, M., Giraldo, L.A., Ibrahim, M., Krishnamurthy, I., Mena, V.E., Mora-Delgado, J., Orozcom, L., Scheelje, M., Campos, J.J., 2012. Mainstreaming AF in Latin America. In: Nair, P.K.R and Garrity, D.P. (Eds), AF: The way forward. Advances in AF, 9 Springer, USA, pp 429-53.
- Somarriba, E. 1998. Diagnóstico y diseño agroforestal (en línea). Agroforesteria en las Americas 17(5): 17-18. Consulted 17 February 2020. Available on <http://hdl.handle.net/11554/6043>
- UNDP (United Nations Development Program, Belize). 2012. Toward equality of opportunity for equality of results: a situation analysis of gender and politics in Belize (online). Belize. 120p. <https://www.undp.org/content/dam/belize/docs/Women's%20Empowerment/SitAn%20Gender%20and%20Politics%20FINAL%20compressed.pdf>
- UNFCCC (United Nations Framework Convention on Climate Change) Germany. 2020. Indigenous women empowerment and AF systems in a changing climate-Guatemala (Online, Website). <https://unfccc.int/climate-action/momentum-for-change/activity-database/indigenous-women-empowerment-and-AF-systems-in-a-changing-climate-in-guatemala>
- Vidal, C. 2012. Timber production value chain in three Belizean Mennonite communities. Belize. Finnfor Project I & Finnfor II Technical bulletin no 53. <http://hdl.handle.net/11554/8711>
- World Bank. 2018. Climate-smart agriculture in Belize. Washington DC. USA. 24p. (Report paper). Working Paper vol 1(1). <http://documents.worldbank.org/curated/en/301461541662271068/Climate-Smart-Agriculture-in-Belize>
- YCT (Ya'axche Conservation Trust, Belize). 2019. Q'eqchi' maya women are important forest keepers (online, website). <https://yaaxche.org/news/qeqchi-maya-women-are-important-forest-keepers/>
- YCT (Ya'axche Conservation Trust, Belize). 2019. Ya'axche provide organic biofertilizer. <https://yaaxche.org/news/yaaxche-provided-organic-biofertilizer/>



Annexes

Annex 1. Questions given to informants and data base created from the response of informants

Organization	Q1. Considering the effects of climate change, do you consider agroforestry one of the strategies that will help mitigate climate change?	Q2. Base on your experience and knowledge can you mention some of the benefits that an agroforestry systems provides?	Q3. Can you mention some of the limitations/gaps/barriers which affects that implementation of an agroforestry system?	Q4. How can this NAP, benefiti you as stakeholders and as a country?	Q5. If the NAP enters the phase of implementation at a national level, in your opinion what would be the best way to get this policy into action not only at an organiationla level but also a farm level?	Q6. What would be one of the best ways to promote the articipation of women in agroforestry system?
IICA	Yes, Certainly	Sustainable production, carbon captured/sequestration, linking XX gives to sustainable forest based business, regenerate systems	lack of business/marketing strategy/support for communities. Lack of awareness of how systems can	Help through implementation and development of projects to support clients.	Development of strategy for implementation and funding to support this implmenetaiton.	Involve them in the development if the policy and its implementation
Program for Belize	yes if it does not cause the unecessary conversion of mature forest into agricultural systems	soil conservation, water retention, temperatur regulation, biodiversity conservation, financial benefit, erosion control, pest control	scale of production, limited knowledge of ideal mix of species to put under production, market weeds	provide direction	training, demonstration, seed materials, synergizing with other policies, weed produce that are short term as well as long term	develop these near residence where they would be clos to home, need produce that is short term as well as long term
Ya'axche Conversation Trust	absolutely, more trees needed to be plantes using the concept of carbon sequestration	degradeg land restoration, soil nutrients replenishment, foot/altered habitats for migrating birds (stopover sites), carbon sequestrations, diversified produce and incomes	no synergy among departments/ministry, fire threats (no fine management response team), funding for program or incentives to maintain	robust strategic guidelines for communities to become stewards, sustainable land use management at a national level contributing to the SDGs, national integration and	strengthen NGO agroforestry extension visits to farmers on a regular basis to ensure local compliane for a national/regional impact.	backyard organic garndeing, women's group managing an ecofarm, ecotourism to pormot a traditional experience (indegenous) at an
Ya'axche Conversation Trust	yes	food, fodder, fiber, timber, soil conservation, temperature regulation	Know how, risk of fire, natural disaster	There will be guidelines on how the system can be adopted by communities. As an NGO it will provide opportunities to attract funding	theyse if demonstrative farms and exchange visits will allow for peer to peer learning	include the idea of family famrs that will allow for participation of all family memebrs. There is also de need to have value added products which allos for women to participate in mayan



Ya'axche Conversation Trust	yes	food, fodder, fiber, timber, soil conservation, temperature regulation	Know how, risk of fire, natural disaster	There will be guidelines on how the system can be adopted by communities. As an NGO it will provide opportunities to attract funding	these if demonstrative farms and exchange visits will allow for peer to peer learning	include the idea of family farms that will allow for participation of all family members. There is also a need to have value added products which allows for women to participate in mayan
Ya'axche Conversation Trust	Yes, it helps in protecting water catchment areas and in promoting food security	protecting buffer zones, protecting water catchment, food security, biodiversity soil conservation, forest protection, soil management	behavioural change, lack of policies/implementation of regulation, incentives, risk of fires/hurricanes, lack of insurance, lack of markets	usage of land more sustainable, forest/water protection, wildlife abundance, ecotourism	backup by research/funding with farms sharing results, agroforestry model farms for other to see, implementation/adaptation by	inclusion in family farms, introduce value-added cocoa products chocolate, nibs, honey etc. create female model farms, ecotourism
CARDI	Yes, not just as a mitigation strategy but as part of climate change adaptation	income, sustainable production development, environmental conservation, synergies with regulation and enforcement agencies	Baseline data information, cultural and traditional methods of production in agriculture and livestock	incentives for adaptation to a NAP program, alternative livelihood opportunities for natural resource dependant persons	monitoring & evaluation officers to document progress	consultation, capacity building & cluster formation & development, Group dynamics for women & youth organizations
Department of Agriculture	Yes	helps to protect & sustain biodiversity, diversify income, strengthen resilience to climate fluctuation	lack of knowledge in production system, poor enforcement, political will	it may benefit the country by providing a clear guideline & understanding of processes that	the best way is to have stakeholder buy in once that happens the policy will have an	educate them about the system. This can be done through stakeholder discussion personally think products that
Belize Audubon Society	Agroforestry could be one of the solutions if there are incentives and some policies that are in place. For example: provision of technical support and financial support	it maintains & reduces the chance of forest degradation and provides ecosystem services such as carbon sequestration while bringing income to farmers.	some limitations include, knowledge gaps, not willing to change, lack of financial support and management of new systems	for the country it is an alternative for income, without affecting too much on the natural ecosystem	these will be a need for a series of training	are produced can be marketed across the country and also internationally. For example, honey and ramon are products
UBERI	for Belize, agroforestry is going to be crucial as an adaptation and resilience building measure	income, soil conservation, watershed, carbon etc. etc.	implementation of systems at scale integration and coordination of regulatory agencies involved. Incentives-	provides guidance and integration of other relevant policies and actions.	model systems need to be implemented in Belize so that farmers can see how it works on the ground and in their country	incentives (including microloan systems) just for women, scholarships for women, support systems for taking care
BLPA	it will not only help I think, it will also improve production for example less stress for cattle improvement of pasture more food for animals.	if its improving land that is already cleared it provide more value to land. It can be used as a protective barrier for rest around the land been work. Provide or create a	limitation would be use of machinery on the land. For example spraying of rice field the herbicide that are being used.	cattle industry is growing and farmers only know to clear all the land and no shade. Due to this farmers were forced to sell	as it has been mentioned here both ministries would need to work along. Promote the nap and give real example of the	maybe one of the way promoting organic produce or been production of egg chicken as compared how its done by
Donaus Consultants	yes definitely, by planting trees you can help with carbon sequestration, and other services	there are lot of benefits, diversification of production increase of profits per area, landscaping, shelter to birds and other animals, shade, soil conservation etc.	lack of knowledge on the systems. Long term systems-long term investments at the initial phase	as far as I understand for this meeting having this policy framework will help Belize to bring funding for implementation. All the	first work with farming scales and different systems medium and large scales farmers may need different AFS than small	it is very important issue, women will be very well involved in small-farm scale. Med-large scale are mainly
SIRDI	yes, surely it will create a balance to XX already deteriorated soil	1. prevent soil erosion, 2. balance and prevent the outbreak of perhaps a pest or disease	financial constraints, lack of technical-knowledge, needs sensitization programs	sugarcane the nor is to clear the land which agroforestry system the farmers can plant trees/national barriers. sugar needs to diversify	sensitizations sessions/programs awareness of the NAP so the target audience. Are aware and help in the	its of importance to involve the women and youth also. Youth through the agriculture schools, women identify key persons in a
SIRDI	Yes it is. By creating synergies between the forestry usage and its preservation along with sustainable agricultural activities (production) have several implications that are positive in the mitigation of Climate Change producing elements.	it reduces the effects of water surface runoff, having more trees and forested areas reduces soil erosion. The fact that the dead foliage falls to the forest floor increases the organic matter content of the soil and make the soil more healthier.	the plant density of larger trees cannot go over a certain threshold or else it can have adverse effect negatively while removing the forest trees. Some pests and diseases might find the forest to be a natural host and can infect the	this can ensure that the survival of a healthy ecosystem lives on and provide food and employment for the generations to come. This NAP can indicate the economic possibilities why protecting as well as sustainable usage of our	for one it must have stringent repercussions if all the rules and policies are not adhered to, the high should be as damaging as the bark. There must be a nationwide campaign explain the project and the benefits it	women have always been involve in agroforestry system planning and execution. The fact that these system provides food for the family is a no-brainer that female/women would gladly participate in



Annex 2. Questions given to technicians during SMART Agriculture course in Belize

Questions on benefits, services, barriers and incentives to incorporate agroforestry and silvopastoral systems in your area of work and			
1	Heidy Cobb 631-0228	Stann Creek heidy.cobb@agriculture.gov.bz	Incorporating agroforestry and silvopastoral systems will be beneficial to the environment and will help the economic and market hence will be able to have quality products for
2	Ronnie Martin 604-7393	San Ignacio rmartinez@coopsde.com	Important for recycling, resilience against pest, biological control
3	Andy Che 663-2623	Corozal andyche150@gmail.com	It is beneficial to soil to give nutrients to soil and to support soil run-off, ponds etc.
4	Justaquio Tus 630-9634	Toledo justaquio.tush@agric.com	Benefits of barriers- reduce wind forces provide shade to crops, incorporate more rain
5	Miguel Huerta 632-7544	Orange Wall miguelhuertas19@gmail.com	Not Available/ No answer was given
6	Victor Kuk 626-8530	Toledo victor.kuk@agriculture.gov.bz	my views of the benefits of incorporating agroforestry and silvopastoral system will be to have long term human and environmental health benefits
7	Vicente Tugub	Belize vicentetugub@agriculture.gov.bz	It provides shade to animals and increase yield of beef meat and milk. It also provide other benefits to the farm such as timbers etc.
8		Orange wall	Not available/No answer was given
9	Barry Palacio 615-3410	barrypalacio@agriculture.gov.bz	it is important for environmental and health
10	Stanley Murillo 625-7567	Stann Creek stanleymurillo55@yahoo.com	It will help with the shaded areas for animal and help in the reduction of green house gases into the atmosphere
11	Marvin Roches	Stann Creek	benefit and maintaing flora and fuana of the area, increas weight gain of animals and keep production cost low. BARRIER: Is lack of education by farmers on benefit of the
12	Allan Castillo 634-8883	Stann Creek wafamilra@gmail.com	It is absolutely necessary as it ensure biodiversity, creating habitats for various species of birds, animals and insects, increase production in livestock and reduce GHG.
13	Benedict Caliz 630-6966	Toledo bhcaliz@hotmail.com	it's a great idea to include it but it has to be done in a resonsible way which would not affect the natural function of the environment
14	Francis Vega 608-7781	Belize fvega@coopsdept.gov.bz	Not available/ no answer was given
15	Andres Megia	Cayo amejia_bz@yahoo.com	incorporating agro-forestry and silvo-pastoral systems in Belize is very important to cut the negative effect of climate change. The incorporation can aso helo farmers produce healthier meat and milk for belizean population



Questions on benefits, services, barriers and incentives to incorporate agroforestry and silvopastoral systems in your area of work and		
16	Carlos Martin 661-2348	Corozal it is a good idea because it helps in the lowering GHG emission
17	Arnold Teck ateck@est	Corozal Benefits: environmentally friendly, no use of chemical, care of having organisms, less diseases
18	Leonardo Eck 630-7988	Corozal decrease GHG and improve soil structure
19	Emilio Perez 602-1379	Corozal will improve soil condition and biodiversity
20	Elser Campos 608-5916	Corozal to regenerate soil and natural equilibrium, to help mitigate climate change
21	Ernesto Pech negopech@gmail.com	Corozal it would improve the biodiversity of plant, improve soil microorganisms, improve water retention and irrigation
22	Elvira Pinelo 614-5781	Belmopan The benefits include high: carbon sequestration, high meat & milk conversion, agroforestry, shades, home for birds and other healthy organisms
23	Miguel Bolon 663-4345	Belmopan agroforestry and silvopastoral system provide multiple ecosystem service, i.e. food fibre, increase production and income for producer. Protects the environment through carbon sequestration and improve environment service.
24	Keiron Alberto 628-9126	Chunox, Cd Benefits: soil recuperation, services: carbon capture, Barriers: adoptability of technique by society, incentives: carbon capture in return of agricultural benefits eg. Money, seeds, fertilizers etc.
25	Kayla Gaboure 828-7868	Belmopan more training of experts required; integration of technology is a must; support from Government is limited.
26	Abimael Puck 626-9840	Belmopan Benefits: more production of animals, sustainable agriculture
27	Moises Perez 620-4715	Corozal it is good since it will maintain the biodiversity
28	Jose Tillet 627-6283	Belize Benefits: Creates microclimate attracts beneficial insects, pollinators
29	Mario Howe mario.howe@agriculture.gov.bz	Cayo improve crop protection, classification of land
30	Noel Ramos rms@uaho	Belize we will first have to show farmers the benefits not just on paper but on live. So a demonstration area would be a great plus



Annex 3. Benefits Identified for the Implementation of AFS in Belize.

Benenfits Identified	No. of response
Agricultural restoration: soil, livestock, crop improvement	15
Carbon sequestration, climate resilient	12
Maintain & attract more biodiversity	11
Diversify, produce & generate additional income	6
Sustainable agriculture	5
Reduce GHG emission	5
Human & Environmental health benefit	4
Provide Multiple Ecosystem Service	4
Sustainable Forest	2

Annex 4. Barriers Identified for the implementation of AFS in Belize

Barriers Identified	No . of response
Lack of knowledge & Sensitization	10
Lack of funding program & incentives for AFS implementation	5
Willingness to adopt technology by society	4
Integration of technology	2
lack of market	2
Natural disaster (Hurricane & Fire)	2
No regulating bodies	1
Support from Government	1
More training	1
Lack of support from communities	1
Stop the use of chemical	1



Annex 5. Incentives Identified for the Implementation of AFS in Belize

Incentives Identified	No. of Response
Payment for carbon capturing	1
Training & demonstration on functionality of AFS	4