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Non-timber forest products exploitation and limits to tackle deforestation

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Professional thesis

Presented by

Marc GOMES

To obtain Forest, Nature and Society specialized master

From AgroParisTech

Non-timber forest products exploitation and limits to tackle deforestation

To AgroParisTech,

Montpellier center

2018 - 2019

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RESUME

Los Riscales, communauté afro-colombienne dans la région du Chocó en Colombie, se caractérise par un isolement géographique et un abandon institutionnel. Il en résulte un développement économique non-viable, d'un point de vue écologique, avec l'augmentation des causes de déforestation. Face à cette conséquence, le conseil communautaire général de Los Riscales s'allie avec ICCO Cooperation afin de trouver une solution durable d'un point de vue économique, social et environnementale. Basé sur une méthodologie participative, différentes solutions ont été définies afin de résoudre un problème aux thématiques transversales. L'exploitation de produits forestiers non ligneux (PFNL) est un des résultats de cette alliance. La formulation concrète de cette initiative au travers d'un travail bibliographique soulève également ses limites. Elles renvoient à une réflexion sur le mécanisme REDD+ et sa capacité à résoudre des conflits à niveau local.

ABSTRACT

Los Riscales, Afro-Colombian community in Chocó region of Colombia, is characterized by geographical isolation and institutional abandonment. The result is an economic development ecologically unsustainable with increasing deforestation drivers. Faced with this consequence, Los Riscales general community council is partnering with ICCO Cooperation to find an economic, social and environmental sustainable solution. Based on a participatory methodology, different solutions have been defined in order to solve a problem with transversal thematic. Non-timber forest products (NTFPs) exploitation is one of the outcomes of this alliance. The concrete formulation of this initiative through bibliographic work also raises its limits bringing up a reflection on REDD+ mechanism and its resolve conflicts capacity at local level.

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INTRODUCTION

Since 2014, ICCO Cooperation is working with Afro-Colombians communities from Chocó region to tackle deforestation through sustainable development. The objective is to find sustainable solutions to allow local communities to continue its economic development without threatening forest conservation. Based upon participatory methodology, project initiatives should answer local needs and assure their motivation to be able, at the end, to be fully independent.

Non-Timber Forest Products (NTFPs) represent an often used economic alternative in forest conservation projects. In general, it regroups every product from a forest without logging which implies conservation of the plant. Based upon forest regeneration for resources production, it looks like a sustainable approach to decrease deforestation drivers by giving new economic opportunities to local population. It is the result of new policies making due to REDD+ mechanism which framed this project, economically and ecologically.

1. ORDER ANALYSIS

The presentation of the backer and its initiatives in Colombia for sustainable development will give us a better understanding of the command and local issues.

1.1. ICCO COOPERATION

Originally ICCO Cooperation is a Dutch organization founded in 1964. Created for project development and implementation to help local population, its principal objectives are:

- _Food security (Strengthening individual households capacities to achieve food sovereignty and commercialization to generate earnings);
- _Economic empowerment (Support of smallholder farmers and producer organizations, through economic opportunities, to improve and sustain farmers' livelihood);
- _Environment protection (Design and implementation of sustainable solutions to allow local development with natural resources conservation);
- _Post-conflict transition (Support peace agreement with integration of conflicts groups back in civil life through capacitation);

Colombia is a country with a long story of conflicts which isolated region grows in poverty. That's why, with almost 50 years of experience in Latin America, the organization settled in Colombia with the objectives to alleviate poverty and closing inequality gap in a sustainable way by developing new perspectives and life opportunities. (ICCO COOPERATION 2018)

1.2. PRESENTATION OF THE REGION

Colombia was during a long time associated with arm conflict making difficult of access isolated region with high forest density. With the peace agreements of 2016 the vision of the country started to change and region, before inaccessible, became a priority for sustainable development. Composed by a variety of population, Colombia is a social gathering of various cultures where each one needs lands, the ones where their ancestors lived.

The project I am going to detailed further is located in Chocó region.



Figure 1 - Chocó's region map of Colombia (Source: ICCO 2018)

With 480 826 habitants and an area of 46 530 km², Chocó's region isn't densely inhabited. Its population is concentrated in small conglomerations with 70% in urban centres and the rest in rural areas. With a majority of afrodescendant, the area is characterized by its strong heritages defining its culture and practices. Therefore, some natives still live here with the principal families named: Embera, Wauna and the Cuna. Arborgenous people represent 6% of total population.

Bordered by Atlantic and Pacific Ocean and with an important density of forest, Chocó is a place of rich biodiversity and ecosystems, aquatic and terrestrial. Its tropical climate inhabits endemic species and some are in danger of extinction. With already three national natural parks in the region, we can understand that nature conservation is an important dynamic in the territory. (Ministerio de Comercio, Industria y Turismo: 2016)

1.3. BORN OF LOS RISCALES COMMUNITY

1.3.1. HISTORICAL EVENTS

In the 16th century, Chocó territory, originally home of aboriginal population, faced colonization which led to the occupation of lands by the Spanish. The natives in front of the reducing of their territory engaged in a clash with the occupant, leading to punitive action by the invader and

indigenous population diminution. Consequently, in the 18th century, with regional economy change with the development of mining industry and black slave trade we assist to a shift of population. Africans were transported to the rivers closed to Colombia pacific coast to work for alluvial gold mining.

The independence of Colombia in 1811 and the abolition of slavery in 1851 left this population far away from his roots and without any organization leading to extreme poverty. To survive, the ones now named afrocolombians moved along the pacific coast organizing themselves in fishermen's villages.

In 1991, we assist to a national mobilization of racial groups and university students for the right of acknowledgement of ethnics groups. Consequently, this year, the constitutional law of Colombia is changed and it now recognizes afrocolombians communities as a village, which means as an entity that has a set of collective rights, which is part of the ethnic and cultural diversity of the nation. (Ministerio de Cultura de Colombia 2009) This first law marks the beginning of the process of afrocolombians culture recognition.

In 1993, the law 70 is created, which acknowledge afrocolombians community occupying vacant lands in the rural area around the river of the pacific basin in accordance with their traditional production practices. It's the right to collective ownership. (Ministerio del Interior de Colombia 2018) This law is also known as the "black communities' law". These changes implied the born of various farming communities which reinforce their organizational process. It's with the 1745 decree in 1995 that we assist to the major organizational opportunity for afrocolombians with the right to form their Local Community Conceal. The gathering of the three municipalities: Nuquí, Bahía Solano and Juradó formed the General Community Conceal (GCC) named "Los Delfines" which succeed to apply for the land title of the North part of pacific coast of Chocó. (Figure 2) The independency of the community conceal of Nuquí, in 2002, lead to the born of the General Community Conceal of Los Riscales.



Figure 2 - Chocó municipalities (from top to bottom: Juradó, Bahía Solano and Nuquí) (Source: Google Maps 2019)

1.3.2. GENERAL CONCEAL COMMUNITY ORGANIZATION

The General Conceal Community (GCC) is a juridical entity that administrate the 31 000 acres given by the state of Colombia to the community of Los Riscasles with the change in the constitution in 1991 and with the law of 1993. Therefore, it coordinates the local action with the administration and lands control and planning. The organization also drives and finds the positioning, the acknowledgement and application of their rights not only as a collective right of lands but also as individual, familial and communal. (ICCO COOPERATION 2018)

It articulates the Locals Community Conceal (LCC) which is in charge to control, monitor and participate in the planning of intern administration of the titled lands in collective form of the black community. (Figure 3)

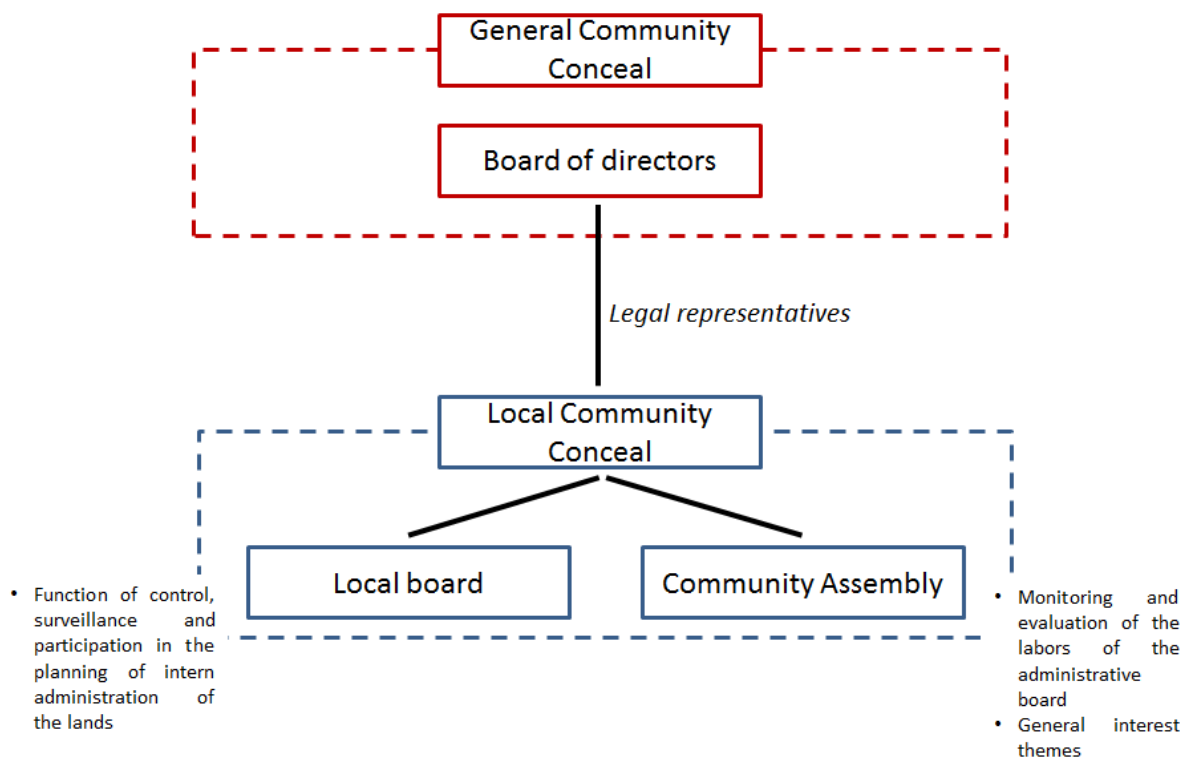


Figure 3 - Organization of the General Community Conceal of Los Riscuales (Source: Marc GOMES 2019)

1.4. LOCAL CONTEXT OF LOS RISCALES

African descendants won their lands through a constant manifestation of their existence to national authorities and leading to collective ownership of their ancestral lands (Law 70 of 1993). Since then, they regroup as a community who has the authority to manage this new area named: lands collective of black community. This initiative is to let Afro-Colombians develop themselves following their cultural heritages. However, as explained by N. González, 2016:" the collective territories of Afro communities constitute new forms of self-government, but they are not considered as "territorial entities" and therefore have no legal right to receive participations (budgetary transfers) from the General System of Participations. (Bonet Jaime and al., July 2014) In addition to the above, 23 years after its enactment, Law 70 has yet to be regulated in its Fourth (rights over the use of land and natural resources), Fifth (Mineral resources), and Seventh (Planning and promotion of economic and social development) chapters. To make these chapters operational is fundamental so that the communities receive royalties, compensations and tax for the productive activities in their jurisdiction, including the exploitation of forests, mining, hydraulic and marine resources, among others (Mosquera, 2014); as well as so that they can use directly and as said by N. González, 2016: "for profit these natural resources of their territories". (Natalia GONZÁLEZ 2016) For these reasons, black communities continue to be subjected to state abandonment, traduced by one of the poorest area of Pacific region. In 2016, Chocó region had the most important poverty rate in the country with 59% of the population living with less than 114 692 pesos (Minimum salary in 2016 was 689 454 pesos). (Tiempo 2017)

Lack of help from national government made them turned toward natural resources exploitation: forest, the sea and the mangroves. Lands right makes them able to exploit the forest replacing it by houses and farms and to cut the mangroves for firewood. Therefore, their way of development implies a growth of the main deforestation drivers: agriculture, cattle ranching, and clearing for tourist infrastructure and related services additional to fuel wood and illegal timber extraction. (ICCO 2018)

Today, at the social and economic crisis Los Riscales is facing, an environmental one is added. We are in a situation of development need framed by environmental issues. Without any environmental management plan, we assist to the conversion of forests to rural environments leading to deforestation and loss of biodiversity. The right of forest exploitation without any sustainable management led to threaten the ecosystem.

As it is explained before, the right of land is a community one which doesn't define delimitation of private lands. It led people to settle wherever they want in the area, without predefine land management plan. The classic example of the constitution of what we can call private property is a house in a village close to the sea and a small farm bordered by more farms and forest in the rural area. Insecurity issues in rural areas led to people living in the village and if they are a full-time farmer, going each day to the farm and coming back. Inside this collective land, private property has been defined by people settlement and exploited area. Furthermore, each individual has a right to extract resources from the environment leading to forest area being people property. All these elements contribute to blur the concept of private property. However, Los Riscales' General Community Council understood that if they want to stop the degradation of the ecosystems, they need to define conservations areas which imply to begin to identify limits of urban, rural and forest areas of each individual. The concept of private property and conservations areas will restrain their previous activities and source of income (agriculture, logging...). It can lead to the dissatisfaction of the population implying a political problem for Los Riscales.

1.5. THE ORDER

Los Riscales natural heritage is threatened by their own development. However, one of the elements which led the nation to give them these lands and let them administrate it themselves is their cultural heritage, which is different from others ethnicities. The organism in charge to develop them around this principle is the GCC. One of its duties is to respect the lands of their ancestors. Therefore, the loss of ecosystems in Chocó region is traduced by a loss of their identity and reduces the importance of their fight for their own lands.

In front of this multi-level issues: socioeconomic, political and environmental all linked together and without succeeding to resolve them alone, Los Riscales awareness of their economic development and their environmental richness made them seek help. With the help of Patrimonio Natural, representing the national fund for biodiversity conservation and already working with Los Riscales, it approached ICCO Cooperation to make the pre-feasibility study to frame project initiatives.

1.5.1. STUDY AREA

The boundary of the project is defined by the land of the community which represents 31 470 hectares of forest, coast and mangrove area. (ICCO 2018)

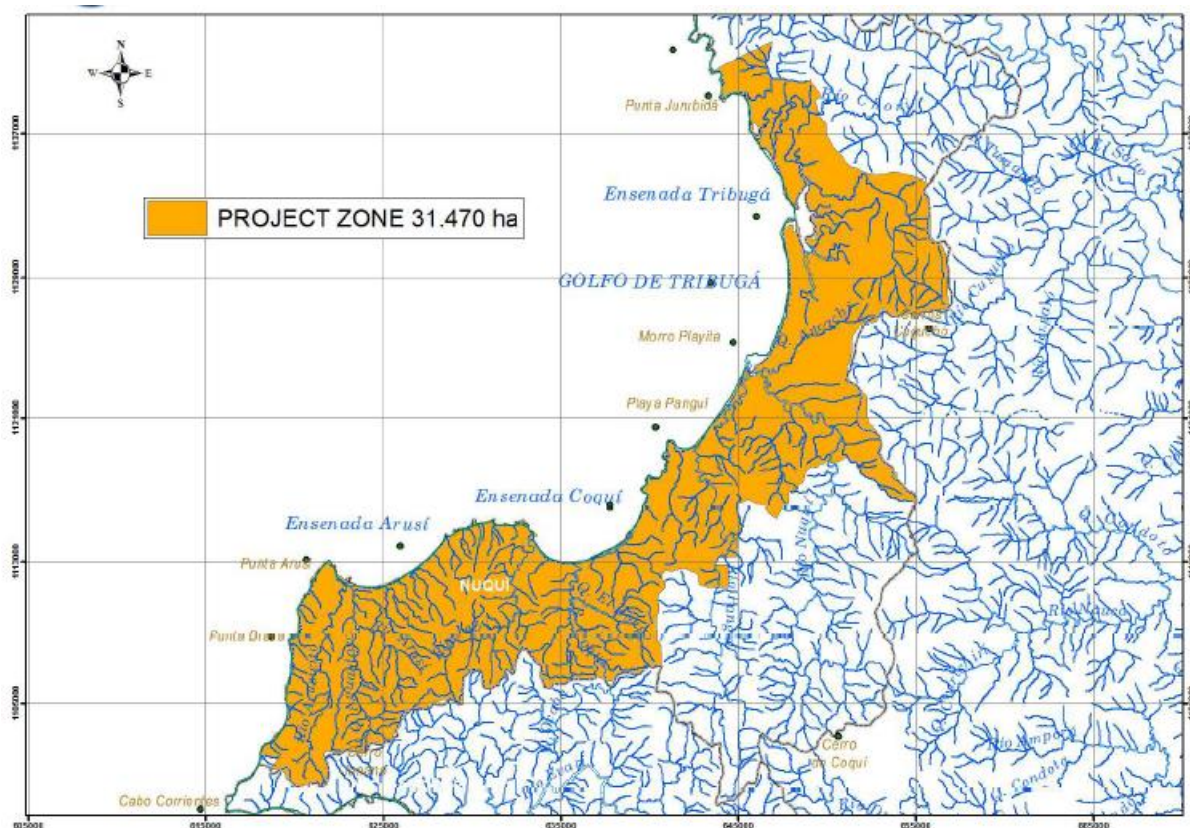


Figure 4 - Project area of Los Riscales (Source: ICCO 2018)

Los Riscales territory is composed by 25,545 hectares of forest. Its area corresponds to tropical wet forest with a mean temperature higher than 24°C meaning a hot and very humid environment with a relative humidity between 80% and 90%. Precipitation oscillates between 5.000 and 7.000 mm per year. Although, rainfall is in abundance year-round, autumn is the wettest time of the year with September and October the months when most rain pours down. The high levels of rainfall traduce an important fluvial system characterized by an abundance of rivers and streams. Fluvial dynamics have a direct impact on vegetation, land use, productive activities and communities' livelihoods. The area is composed by 3 187 people in 957 families organized in 9 local councils. (ICCO 2018)

Councils	Population	Families
Termales	235	68
Partado	175	54
Jurubirá	542	124
Jovi	302	124
Coquí	278	85
Panguí	395	130
Arusí	465	185

Nuquí	300	86
Tribugá	495	101
Total	3187	957

Table 1 - Riscales population distribution (Source: ICCO 2018)

1.5.1.1. NUQUÍ

Nuquí is the principal way of access to arrive in the territory with an airport called Reyes Murillo which serves 5 cities: Quibdó, Buenaventura, Cartago, Pereira and Medellín by 5 companies: Aerolinéa de Antioquia, Aexpa, Satena, Searca and Aerocolombia. The town can also be reached from Buenaventura by boat with an 8 hours trip. It doesn't possess any commercial port or land route and it's principally characterized to be a fisherman village.

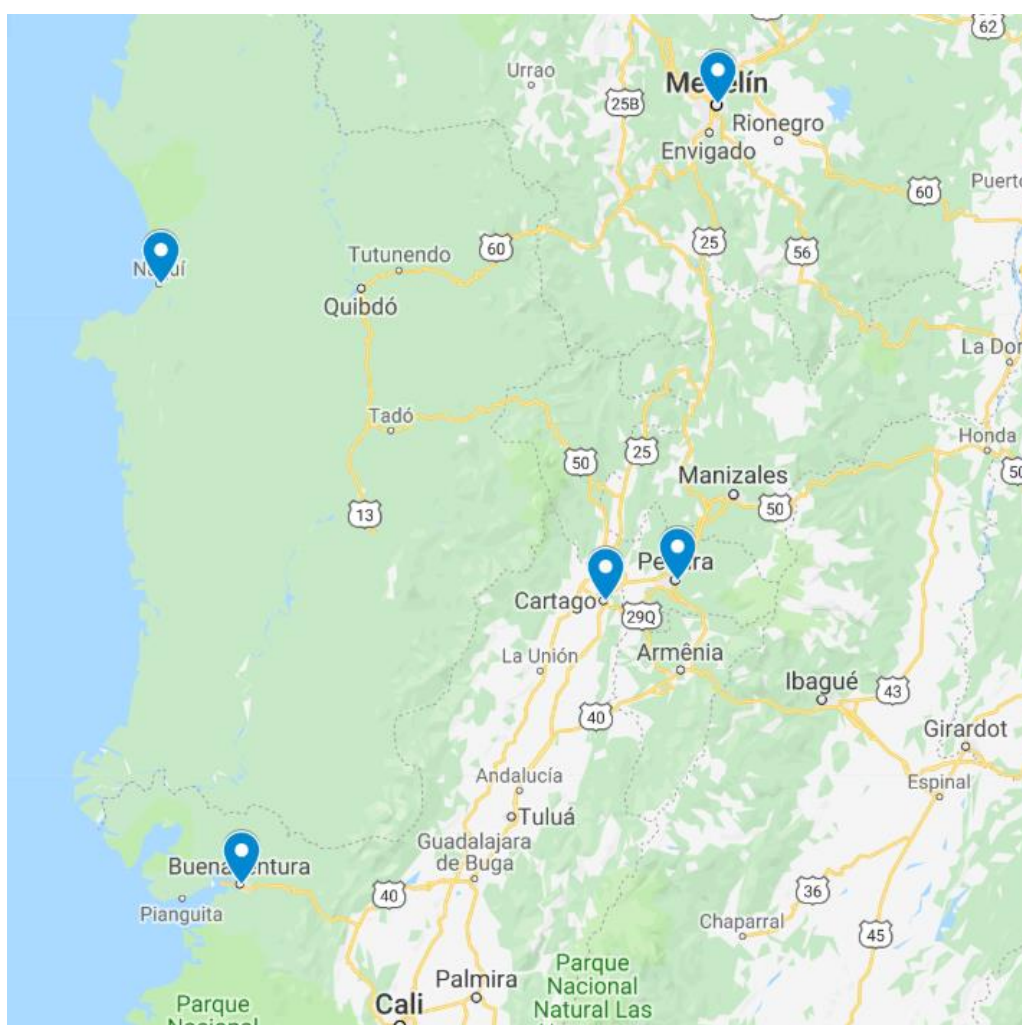


Figure 5 - Map of the different destinations to access to Nuquí (Source: Google Maps 2019)

Its airport represents the only fast access to reach Nuquí and highlight its geographic isolation. Therefore, to export local product, a high added value is necessary for the project economic viability.

1.5.1.2. FARM CONTEXT

People in Los Riscales don't leave close to their farm due to insecurity. It implies that the farms are far away from the urban centre where transformation plant and collection site may be constructed for the process phase. Therefore, during harvest season, transport is important to bring the fruits to the municipality. The transportation method can be by motorcycle or by boat as this region is characterized by an important fluvial network. (ICCO 2018)

1.5.2. FINANCIAL INSTRUMENT

ICCO's project designed for Los Riscales issues is economically achievable because of REDD+ mechanism. It means: Reducing Emissions from Deforestation and forest Degradation. This initiative appeared in 2005 in the 11th Conference of the Parties to the Convention (COP) (UNFCCC 2005) Based upon carbon credits generated by deforestation avoided, looking from the reference scenario, it allows an economic compensation for forest conservation project. During 30 years, ICCO's initiatives should generate enough credits to justify, economically, their implementations. REDD+ represents their principal funding source. (ICCO 2018)

1.5.3. PROJECT OBJECTIVES

ICCO's project aims to alleviate the pressures on the forests through the support of governance capacity (including individual property titling, land-use planning and conservation zone demarcation), generation of sustainable alternative economic activities and income sources, and through capacity building in management and administration. These project activities, beyond protecting local forests and biodiversity, contribute to social and economic development in one of the poorest areas of Colombia. (ICCO 2018)

The objectives of the project are divided in three:

- To mitigate climate change by reducing deforestation and forest degradation, and recuperation of already degraded forest lands;
- Contribute to biodiversity conservation including High Conservation Values;
- Foster sustainable development of local communities;

The evidences of the reduction of the deforestation drivers and the implementation of restoration and conservation areas will generate carbon credits which represent the major funding for the project and its continuity for 30 years. It will be able to pay for the different activities that will be implemented with the local population:

- Strengthening of Land-tenure Status and Forest Governance
- Support the Development and Implementation of Sustainable Forest and Land Use Management Plans
- Demarcating Forest, Tenure and Ownership Boundaries, and Areas of Forest Protection
- Silvopastoral and assisted natural reforestation
- Energy alternatives for cooking food
- Sustainable alternatives economic development

1.6. PROBLEMATIC

Transversal solutions are to be implemented to help Los Riscasles fight for environmental conservation. One of the major issues of deforestation drivers is to find suitable and sustainable economic alternatives. Financed by REDD+ mechanism, forest conservation is the principal objective. It framed the implementation of new policies and initiatives within Los Riscasles cross-thematic issues.

With the richness of biodiversity present in Choco's tropical forests, one of the solutions designed to benefit their willingness to fight against deforestation is the exploitation of natural resources through sustainable practices. More precisely, the one targeted are NTFPs. However, without knowledge of attractive products and transformation process to aim for national commercialization an investigation is necessary. Characterized principally by a bibliographic study and some interviews, the first one highlighted sustainability difficulties to achieve for NTFPs exploitation whereas with local actors' interviews, the economic sustainability is at aim.

Therefore, after the study of the suitable products defined by their facility of access and transformation and added value we can ask the limits of NTFPs exploitation as a sustainable solution and so generalised this reflexion to the cause of this initiative, the REDD+ instrument, an international device for local deforestation issues.

2. METHODOLOGY OF THE STUDY

The investigation of suitable NTFPs for local development is mainly the result of a bibliographical study. Unfortunately, no field investigations were done. Yet, some interviews have been realised which contribute to complement context understanding and knowledge gathering. In Annex 1, the chronology of my project can be found.

2.1. BIBLIOGRAPHIC STUDY

The first phase of research of this study is bibliographic; it is done from ICCO Cooperation office in Bogotá, Colombia. With complete autonomy and an internet connection, documents have been gathered to justify and argues over NTFPs implementation and sustainability.

The typology of the documents collected is diverse: scientific publications and journal articles (agronomy, climate change, management sciences, political sciences, social sciences, etc.), press articles, development project reports, etc. They allow me to have a database of various experiences done over the world with a primary geographic focus on Latin America projects. The similitude environments allow having context relevant information.

To enable a better navigation through this bibliography, a Zotero data base has been created. Therefore, the different documents gathered are organized inside it. It also allows me to show my sources more efficiently in my report.

2.2. NON-DIRECTIVE INTERVIEWS

Even if no field work was realised, I had the opportunity to do several interviews with institutional and local actors, principally from Colombia. (See Annex 3) These ones are non-directive as the discussions were about one of the identified NTFPs for exploitation and its viability (economically and

ecologically). They allow information crossing with my bibliographic study which brings closer context possibilities and limits' understanding as no field trip was done. They were done by phone or meeting, all in Bogotá. Only 7 actors were interviewed. (Figure 6 - Interview actors' category)

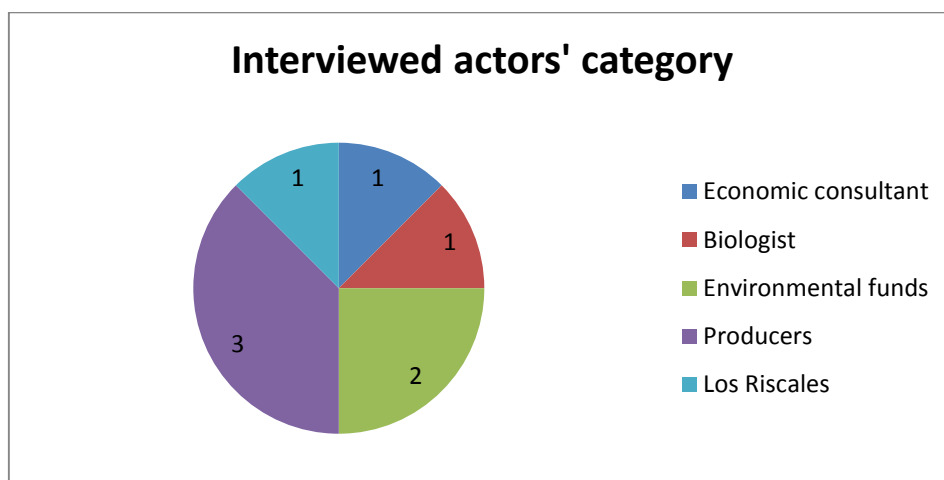


Figure 6 - Interview actors' category repartition (Source: Marc GOMES 2019)

2.3. DATA ANALYSIS

In order to analyze all the bibliographic data with the qualitative one collected during the interviews, a database, built from the research axes, was used to analyze and cross information. This knowledge translation resulted in the highlights of the viability of some NTFPs within local context and limits of the initiative.

The principal research axes are:

- _Local available resources and opportunities;
- _NTFPs exploitation and sustainability;
- _Stakeholders role and involvement;
- _Project limitations and constraints;

3. CONTEXT ANALYSIS OF NTFP OPPORTUNITY FOR LOCAL COMMUNITY

3.1. LAND ORGANIZATION

Officially, land title is community based. However, there is an internal recognition of traditional or ancestral private possession over family lands. Also, several pieces of land are kept aside as provision for potentially new community members or family successions. This local organization is coupled with the right to each family dwelling to the lands they have occupied for generations, including also neighboring crop areas and back forests. They directly manage their lands and on average possesses 3 to 7 hectares. Most families live along the river low-lands, where the trees have already been cleared and the land is more fertile. Lands outside of general family access (without any access trail)

are considered community lands, and are used for timbering, hunting, and NTFPs harvesting (e.g., fruits, barks, lianas, understory medicinal plants). (ICCO 2018)

As we can see, the community has an informal tenure of land. However, it isn't properly defined with a private property land plan. Families which are here since generations know more or less their parcel borders.

The unclear land boundary delimitation with the development project in Chocó region as the one implemented by ICCO in Los Riscuales community, implies a new way of land exploitation following sustainable practices, which will increase its production capacity and therefore raise value of lands and its resources (water, coasts, beaches and forest). Conflicts over land access and tenure are likely to increase. Therefore, lands closer to communities and with access way, linked to economic growth promoted by project activities, among others: NTFP exploitations and agroforestry, will be seen as better assets to increase one wealth. (Pinault 2013)

NTFP exploitation project will be able to be fully implemented and efficient following fair trade logic with, in the first time, the land boundary delimitation of each family land willing to participate. This information will permit to define precisely the family production capacity and therefore, its economic return. The definition of the borders will also avoid conflict over parcels which can grow due to the economic growth value of them by the implementation of a proficient productive system based upon relevant products for national and international market. Productive land will represent new assets, that's why it's important to define private tenure before the implementation beginning. Also, it will diffuse private or national initiatives to occupy this land. (Pinault 2013)

On the local level, this initiative will prevent social and economic conflicts between neighbors. NTFPs exploitation will be able to contribute to the resolution of Los Riscuales political crisis made by unclear land tenure.

Also, this unofficial land tenure highlights community capacity to use their land as they want without any restriction from officials and environmental awareness.

3.2. LOCAL ACTIVITIES

For the community, the most important income sources are agriculture and livestock. They represent approximately 50% of income earned. It's followed by fishing (ocean and river based) with approximately 35 to 40% of income, followed by tourism (principally in the coast town: Nuquí, Joví, Tribuga, and Termales). For most families, logging is also a common economic activity.

Agriculture production is primarily for self-consumption spare the few occasions when surplus is available and can be sold. Among the most popular products are cacao, plantain, rice coconut, banana, papachina, corn and cassava. Livestock farming is practiced on a small scale and is mainly for meat production. The level of knowledge and experience of the population in livestock management is rather poor and is traditionally combined with agricultural farms, keeping low densities due to the economic constraints of villagers for buying livestock. (ICCO 2018)

These numbers traduced the principal use of local resources. As we are in a context without land use/management plan defined, it implies that each activity can be done following the intensity that

the one implemented it want to. Therefore, we are facing the principal reason of land transformation which is being traduced as deforestation driver.

Agriculture and livestock are managed without sustainable practices responsible of several damages over forest land by their reconversion in agrarian land to plant fruits, vegetables or for pasture. Therefore, a conservation initiative needs to be implemented to protect natural resources. Also, it has to be linked with economic development to compensate actual income activities.

First, NTFP exploitation meaning forest extraction, may implies conservation incentives to be able to generate value and be economically sustainable. Natural resources protection following NTFP exploitation is based on the logic that sustainable use of the biodiversity can be considered as a strategy of preservation by the principle that to give an economic value to the resources generate an interest in the community and the institution for its conservation and as a nature based solution, also contributes to the mitigation and adaptation of climate change.(Fondo Biocomercio 2014, (Ecologic Institute and BfN 2014)) Therefore, NTFP exploitation has a conservation function if done with sustainable practices. Also, they can be exploited through agroforestry system as it is detailed in part 4.1. Non-timber forest Product.

Half of household spending is allocated on food, followed by transportation, health, education, and clothing. Conditions of basic services (eg, housing, water, sanitation, education, health) are deficient. (ICCO 2018) Therefore, as current agriculture is principally for subsistence, with the implementation of an agroforestry system, family alimentation will not be threaten and the land will be more efficiently cultivated with an augmentation of its production capacity through capacitation of local population. New incomes coming from NTFP exploitation will assure life quality improvements.

3.3. ECONOMIC BENEFITS

The REDD+ project in which is inscribed the development of my study has its financed based upon carbon credits. During the 30 years of the duration of the project (2014 to 2044), greenhouse gases emissions reduction is aimed to be achieved through the realization of the project objectives with the implementation of the activities described in part: 1.5.3. Project objectives. It is based upon the estimation of these initiatives to generate economic and technical alternatives to principal sources of deforestation (agriculture, cattle ranching, logging, woodfire...).

However, following the finance methodology described by ICCO in the Project Description Document, it represents an economic inflow each 3 years. Therefore, project activities implementations which are based upon carbon credits finance can be limited which will be traduced by fewer initiatives to tackle deforestation to help the community.

To be able to generate more opportunities through project activities, it is necessary to increase the funding and have a more constant economic flow which will also allow implementing new initiatives which were not programmed for the 3 years of funding given by carbon credits. Therefore, following participative methodology, new opportunities of investment can be developed after being identified with the community. The existence of others economic inflow will allow to be more flexible about new initiatives implementation.

NTFP exploitation to be fully efficient need between 2 to 3 years, as described in part: 4.1. Non-timber forest Products. After that, production is annually meaning economic inflow for the community each year.

The development of this fund will be based upon the producer association which will be implemented by the community. As they will be in charge of the transformation process and therefore the commercialization, a percentage of the buying price will go directly to this fund. Each year, a reunion could be done by the community to vote where to allocate it. The implementation of this initiative will also allow the community to have a total control over its development as it is the final objective of the participative methodology.

4. STUDY RESULTS

4.1. NON-TIMBER FOREST PRODUCTS

4.1.1. RULES AND REGULATIONS FOR FOREST RESOURCES EXPLOITATION

With the ley 99 from 1993 we assist to the creation and definition of the Environment minister. (Ministerio del Interior de Colombia 2018)

Following the creation of the ley, its article five imply the function of the Minister relative to the Environment ministry and its number 42 precise:

“Set global quotas and determine species for the use of natural forests and obtaining specimens of wild flora and fauna, taking into account the supply and renewal capacity of such resources, on the basis of which the Regional Autonomous Corporations will grant the corresponding permits, concessions and authorizations for use.” (Congreso de Colombia 1993)

Therefore, the authority of NTFPs exploitation is administrated by the Regional Autonomous Corporations. They are public corporate entities created by law, made up of local and regional authorities which constitute, geographically, a same ecosystem. They are endowed with administrative and financial autonomy, their own patrimony and legal personality, entrusted by law to administer, within the area of their jurisdiction, the environment and renewable natural resources and to promote their sustainable development, in accordance with the legal provisions and policies of the Ministry of the Environment. (Ministerio de Ambiente y Desarrollo Sostenible 2019)

For Los Riscales, to be able to exploit NTFP, an application has to be submitted to the environmental authority with jurisdiction in the area, here it's the Regional Autonomous Corporations that in Chocó region is: Codechocó. It must give its authorization for both the harvest and the mobilization of the product.

A solicitation, filling the application form showed in Annex 2 has to be sent to be able to exploit non timber forest products.

4.1.2. NTFPS IDENTIFIED

Crossing bibliographic and qualitative information, the following resources were identified for NTFPs exploitation.

4.1.2.1.1. VANILLA

With the international market trend of 80's for natural product, it led to the increasing of the price of Vanilla and gave it a second opportunity, originally threatened by vanilla artificial aroma. With almost 2 000 tons of vanilla exported in 2017, Madagascar is the first producer in the world (80% of international production). It's the 2nd more expensive spices after saffron and its price are exploding since a few years ago (205 Euros/kg in 2015 against almost 400 Euros/kg in 2017) (Pierre Lepidi 2017) However, the plant is not originated from there. (Figure 7)



Figure 7– Wild vanilla using a tree as a tutor (Source: ICCO COOPERATION and Patrimonio Natural 2017)

Vanilla is a native plant of Central and South America which, during colonisation era, was planted in other countries with similar climatic conditions. The high demand of natural vanilla and the context of low supply due to climatic events in principal production countries like Madagascar mean an increasing of the price and a place for Colombian vanilla in international market. (MarketersMedia 2018) Vanilla bean is famous for its aroma: vanillin. (Figure 8)



Figure 8 - Vanilla maturation stages (Source: FAO 2009)

Its native presence in Los Riscales territory makes it a valuable resource with high added value after process which international market is in demand. It is considered to produce vanilla through agroforestry.

4.1.2.2. ACAI

Açaï palm tree is a predominant palm species of the Amazon floodplains. (Figure 9) Called Açaï, Naidi or scientifically: *Euterpe oleracea*, it is located from Central America to the North of South America from sea level to 2000 m high. Abundant in Amazon forest, it can be found in watershed where lands are subject to floods. (Weinstein and Moegenburg 2004) Therefore, this species is highly represented in the Pacific coast of Colombia. It is generally consumed in juice, ice cream, dessert and creams. It is highly prized for its antioxidants propriety.



Figure 9 - *E. oleracea* palm tree culture (Source: BENJAMÍN CASTAÑO MURILLO 2018)

Right now, Açai isn't properly exploited. The objective is the capacitation in management and development of the product of local population to aim for the total control of their production without needing any outsiders.

Açai is one of the five fruits with the best antioxidant potential. (Figure 10) It is responsible for triggering oxidative stresses, which promote aging and induction of diseases such as obesity, cataracts, insulin deregulation, cardiovascular diseases, neurodegenerative, cognitive decline associated with age and also immune system dysfunction and cancer. (Montenegro-Gómez and Sandra Patricia 2015) Therefore, food, cosmetic and pharmaceutical industries are the principal interested in Açai. (USAID 2015)



Figure 10 - Pictures of Açai and bunches of *E. oleracea* palm tree (Source: Montenegro-Gómez and Sandra Patricia 2015)

It represents a natural source of antioxidant which leads each year to more consumption of the product internationally for alimentary, pharmaceutical and nutraceutical application. Its exploitation will represent an important added value to local population

4.1.2.3. ACHIOTE

Achiote or Annatto or the most common names used for a product extracted from the seeds of the *Bixa orellana* tree. (Figure 11) Native to tropical America, it is mostly used as a commercial dye, culinary spice and food colorant. In Latin America and the Caribbean, it gives the dish a yellow colour and a peppery flavour. (Hector Rodriguez 2018) Kenya and Peru are the largest Annatto producer, answering to 60 per cent of international demand. Due to concerns over the safety of synthetic colourings, world demand is raising rapidly presenting an opportunity for Colombian annatto. (ITDG 1991)



Figure 11 - *Bixa orellana* tree (Source: Max Fancourt 2016)

Annatto was used by ancestors but is now left abandoned. However, its worldwide use and convenience of exploitation make it a new resource to be used to support sustainable economic development.

Annatto is principally used all over the world by the food and cosmetic industry as a natural colorant. (Figure 12) In this category, it has the second rank by economic importance. The red orange pigment coming from the seeds (Figure 13) represent the unique source of bixin, responsible of the coloration. (KUMARAN, K 2014)



Figure 12 - *Bixa orellana* fruits (Source: Max Fancourt 2016)



Figure 13 - Bixa orellana seeds (Source: Max Fancourt 2016)

Its international demand targets in majority products as hard cheeses, butter, other dairy products and margarine. The remainder of it is for fish products, salad dressings, confectionery, bakery products, ice-creams, beverages and snack foods. (Green 1995) Also, it presents the characteristic to be grown in association with vanilla through agroforestry.

4.1.3. LOCAL EXPLOITATION

Aiming for sustainable management, NTFP exploitation is devised as a strategy for biodiversity conservation. It includes all animal and plant products other than timber which can be collected from forests for subsistence and for trade. (Mirjam A.F. Ros-Tonen 2012)

NTFP exploitation has already been started in the community by isolated initiatives. It answers for local consumption or for vanilla, by the need of beans by a middleman.

Vanilla market success can be identified by its local exploitation. No official organizational structure has been implemented to exploit this product. Locally, it isn't used and so not much exploited. However, it is the only product which local people said that an intermediary come once a year. He buys green vanilla in small quantities and then sells at national or international level. Its economic importance is reflected by this single person who has identified an opportunity in Los Riscas territory. However, it also represents the contrary of the objective to be achieved with NTFP exploitation. This single intermediary presents himself in a monopole situation abusing of vanilla market lack of knowledge of the community leading to buy them to the lowest price. For this product, we face a situation of exploitation of local population by an intermediary.

Locally, Açai has been used for generations to make juice. The high antioxidants present in the fruits, represent a nutritional addition to local diet which is poorly diversified. They principally eat rice, plantains and fish. Therefore, there are in need of products rich in nutriment to complement their usual meal. Açai fruits are able to contribute to the nutritional needs of the population.

Local use of Açai doesn't need any infrastructures for its process. Families buy it in the market or if they have some of the palm trees in their territory go directly harvest it. Consequently, for this product, the only actors for harvest, process and sale are local families.

Achiote was traditionally used for its colorant property by indigenes for ceremonial body painting. However, it wasn't used on an economic point of view and so didn't have any local market. It's a species identified for its consequent use in food industry and the facility of its management both for growing and processing.

Within this project, NTFP exploitation is framed as an opportunity to develop economic alternatives to help tackle deforestation drivers. The durability, economic and ecologically, of this new market will traduce, in the long term, the sustainability of the project. Participatory methodology is implemented aiming for local empowerment leading to activities continuity even after the project end. It allows the population to understand the economic values of its products and the added one given by transformations process. Therefore, the control of the plant management and the technical chain will be in charge of local population capacitated. They will also be in charge of commercialization giving them an institutional importance as the principle actor at the production and transformation phase. This method highlights the community integration to market and up to the value chain to economically uplift it to prevent future exploitation by middlemen due to collectors' ignorance as seen in actual vanilla exploitation. (INBAR 2004) The implementation of NTFP exploitation through community-based approach will allow new knowledge to local population to be able to manage its development framed by forest conservation.

To implement this model, the first reunion about NTFP exploitation resulted in the willingness of the community to create a producer association which will be in charge of local capacitation for harvest, management and transformation process. The transformation plant will be their property to fully control the product to aim for uniform production to be able to add value and be in charge of all the commercialization.

4.2. SELF-GOVERNANCE AND STAKEHOLDERS

Community-based approach implies, in the long term, self-management which here suggests, local population as a future important actor in production, transformation and commercialization.

4.2.1. SELF-GOVERNANCE

It was reported that an intermediary come each year to buy green vanilla. From his call, few answers and some beans are sold at low price. The intermediary then vanishes until next year.

This situation highlight two things: First, local population doesn't really know how to exploit vanilla as green beans come from the forest. Secondly, the intermediary is in a monopole situation, no other one come asking for vanilla and until now no initiatives were made to learn about vanilla economical potential. Therefore, this context shows a relation of dependence between the intermediary and the community. However, the first one profit from harvester's lack of knowledge to buy it at a small price. Furthermore, him alone is enough leverage to reduce more vanilla cost and define the price has he want. It reflects the control (governance) exercised by global buyers from developed countries whose control is reflected in the concentration of profit at the retail end of the chain. (Valentina De Marchi, Eleonora Di Maria, and Gary Gereffi 2018)

This example is the situation to avoid during this project implementation. Participatory methodology is the foundation to promote project activities integrating the community. Its result is based on their capacity to manage themselves their new products; from management to production and finally

commercialization. Theoretically, it should assure fair price for each participant in the process chain and a durable economy allowing local development. It shows the importance of the governance structure in local community engagement in developing their products, production, process and function which here represent a fundamental concern of the implementation of global value chain following community-based approach. (Valentina De Marchi, Eleonora Di Maria, and Gary Gereffi 2018)

Today, with ICCO Cooperation help, economic alternatives have been identified with the community to allow an economic development based upon sustainable practices to reduce human pressure on forest. These entities are helping them to implement a governance structure of products exploitation managed by the community.

The entity has been defined by the population through the gathering of the motivated ones. They have decided for the creation of a producer association called: *“Asociación de productores de recursos no maderables del Golfo de Tribuga”* (Producers association of non-timber resources in Tribuga’s Gulf). It will enable technical assistance to the producer families throughout the year and access to national and international market. It is also in charge of the transformation plant. Its fund system is based on membership and sales. Each year, families have to pay an annual subscription fee to be part of it which is different for each system exploited (agroforestral or forest). The board will be constituted by one person from each municipality. It will also create new work opportunities, even without having land with sufficient resources, through needs of harvester and the creation of the transformation plant as explained in Figure 14.

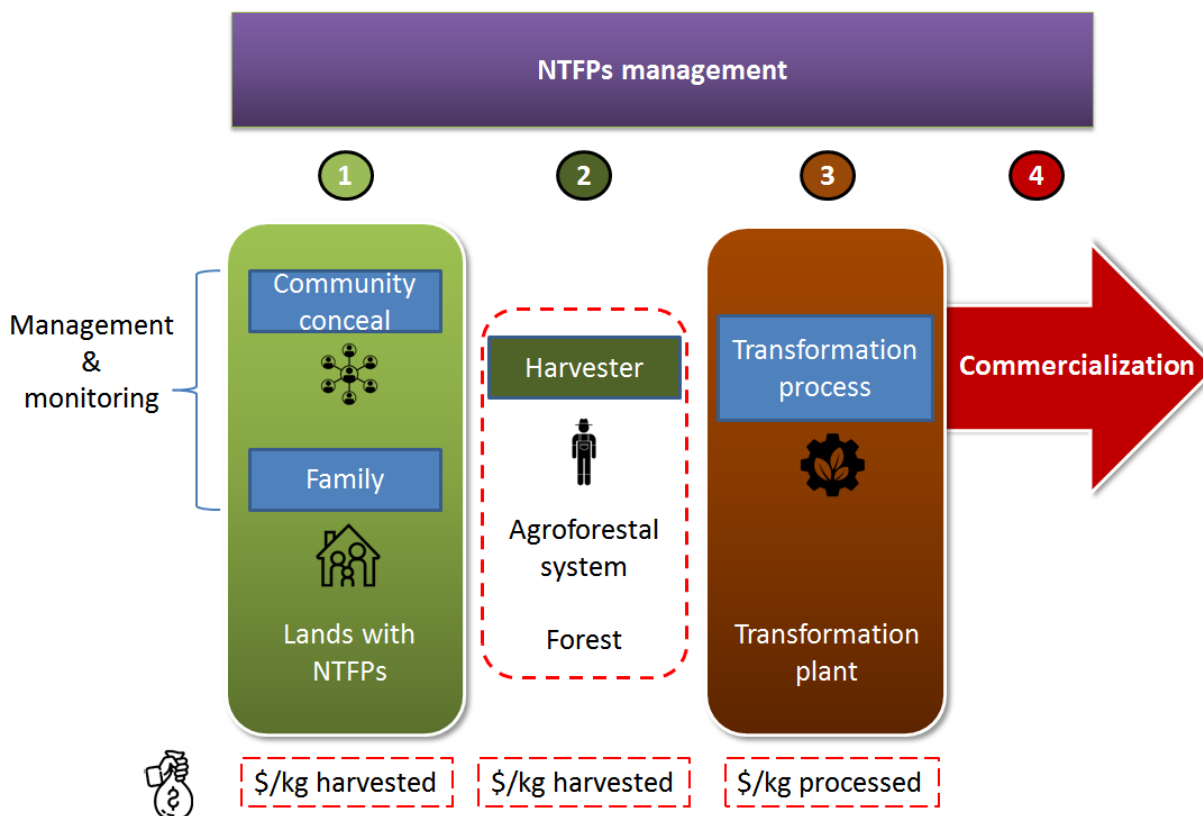


Figure 14 - Technical and economic relations of NTFPs management (Source: Marc GOMES 2019)

This structure will allow local producers to have full control over products prices from primary products to processed ones. It will give them leverage to sell to national and international market at a reasonable price, limited further situation of exploitation by an intermediary.

The Figure 15, shows how families and producer association articulates between each other.

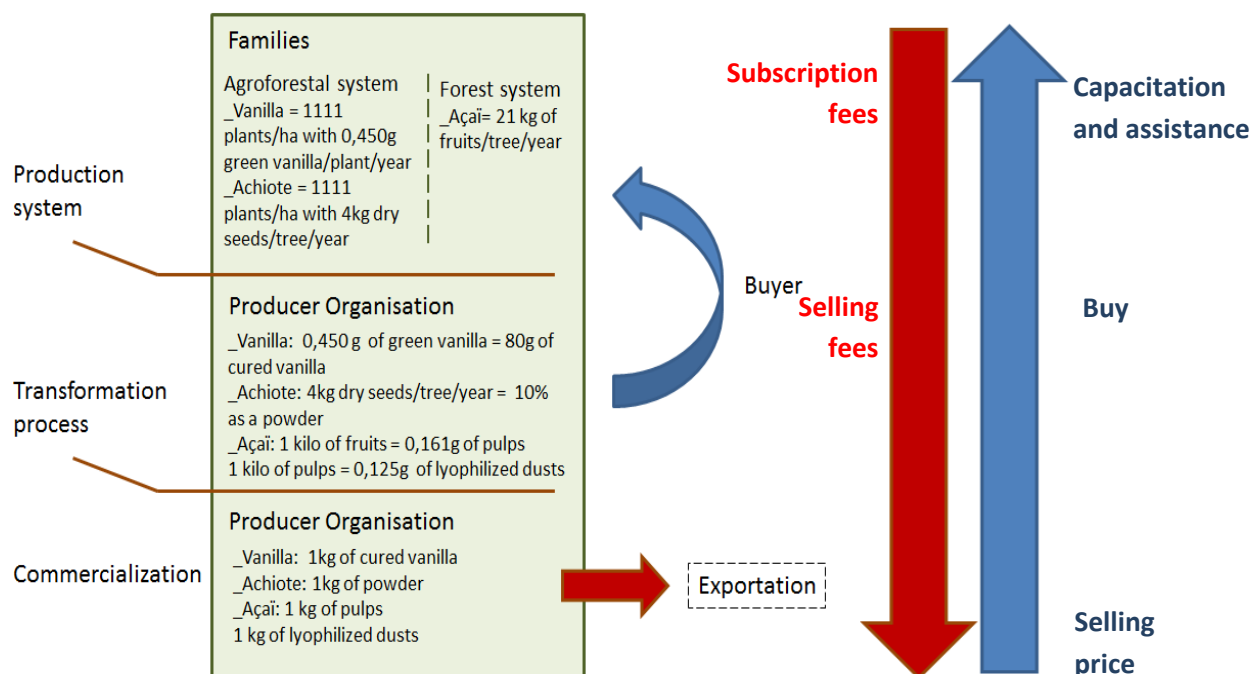


Figure 15 - Relationship between families and producer organization (Source: Marc GOMES, Jorge YORIA and Astrid ALVAREZ 2019)

However, even with the basis of a participatory methodology being applied here, the guarantee of a total participation and representation of the community in decision making may be difficult.

4.2.2. STAKEHOLDERS RELATIONSHIP

The project was formulated with the community with the technical help of ICCO Cooperation. They succeed to define a project to improve their lives following the idea of sustainable development to preserve their natural heritage.

The objective is for the producer to be independent in the management and commercialization of their products. Therefore, the schema of actors' relationship (Figure 16) highlights the link between national and international organisation with local community. This relationship defines a suitable project to answer to their need and then, one of its components, NTFP exploitation, which is based upon local capacitation. During the 30 years of the project, for the growing of their knowledge, local people will need this technical assistance which depends on the funding of the project based on carbon credits. However, in the schema we can see that this activity is managed directly by local actors: Families and producer association. Therefore, it will generate their own fund with which they can continue to invest in their local development without the need of national and international institutions giving them an early autonomy and being able to start managing their own development in a sustainable way.

NTPF exploitation is framed by regional regulation represented by the public organism called Codechocó.

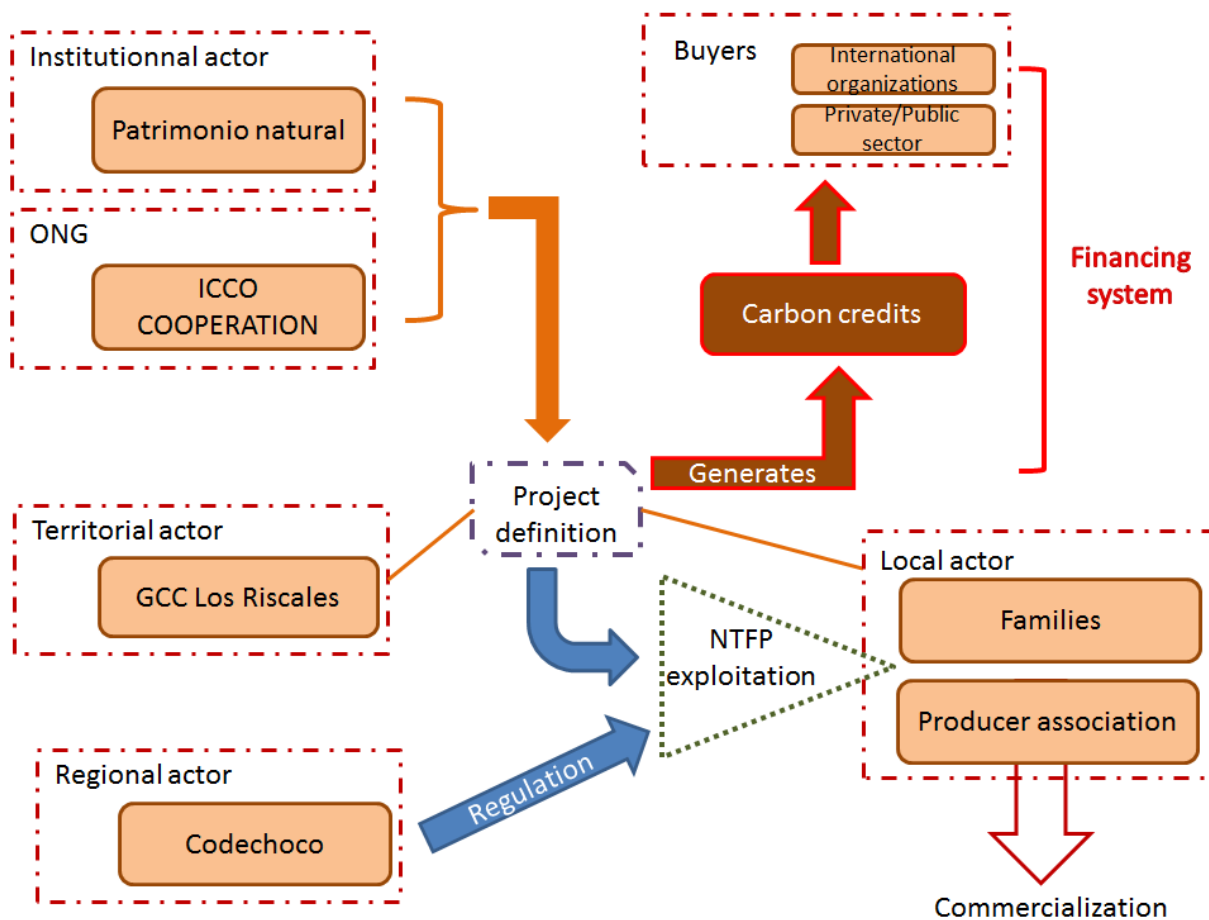


Figure 16 - Stakeholders map (Source: Marc GOMES 2019)

This scheme shows few actors in project development and may highlight empowerment situations and lack of institutions.

5. DISCUSSION ABOUT ICCO'S SUSTAINABLE INITIATIVE AND REDD+ MECHANISM

Deforestation has been internationally targeted as an important source of gas emission. The REDD+ mechanism, as an international economic mechanism to fight against deforestation in developing countries, frames ICCO's project. It is at the origin of new policies as NTFPs exploitation.

To fight deforestation, NTFPs sustainable exploitation has been implemented among other initiatives worldwide and in particular in tropical areas. Defined, in ICCO's project, as a sustainable economic alternative to reduce deforestation driver, yet, through a bibliographic work, this model suggest some limits and certain fragility.

5.1. NON-TIMBER FOREST PRODUCTS TO TACKLE DEFORESTATION

NTFPs have been harvested by forest-dwelling population since thousands of years. However, with ecological issues awareness starting in the 70s (Matagne 2003), its increasing interest became worldwide among conservation and development organizations, as the answer to economic development and forest conservation. (López Camacho 2007) At this time, potential and challenges of NTFPs seemed unlimited due to little environmental knowledge. This willingness to develop NTFPs exploitation was due to significant market values of some of them. This way, in the long-term, this value could override the short-term financial prospect of forest conversion and timber (Sunderland, Ndoye, and Harrison-Sanchez 2011). Therefore, NTFP exploitation was empowered through its economic potential and almost no research about their exploitation and its consequences, on the forest biodiversity, were done. It is highlighted through the initial concept that giving value to forest products will develop an economic interest from harvester and middle-men to natural resources therefore giving them awareness about environmental conservation to protect them to keep their market going. This hypothesis implies knowledge about economic value and intuition about conservation. The concept of NTFPs, therefore, became an economically acceptable option of development. (Solomon Mela u Melese 2016)

Knowledge about NTFPs species, harvest and human activity consequences on biodiversity were and are still unknown. Then, this initial theory and NTFP exploitation are more and more questioned for forest conservation as commercialization interest alone may put in danger the ecosystem and its resources. (López Camacho 2007) This scenario present an important drawback, as exploitation of NTFPs for commercial purposes may results in overexploitation which may lead to danger of extinction of species. This environmental issue has a direct economic consequence as its increasing scarcity may increase the costs of exploitation which will lead the market costs upward implying a reduction in demand and so, possible substitution with another more available product. (Alfredo Kingo Oyama Homma 1992) Without regulation, NTFPs activity can become a driver of deforestation.

NTFPs represent a subsistence resource for forest-dwelling community as they are used for artisanal, building house, religious ceremony and more. For this reason, 400 to 500 million people are directly dependent from these natural products. However, they are also a source of income which

complements these other activities. (Solomon Mela u Melese 2016) Therefore, NTFPs are already under some pressure at which will be added a more important one coming from their exploitation for commercial purposes. To not endanger biodiversity, a balance must be found between resource sustainability and market benefits but also resource for local subsistence. That way, a win-win situation can be created to fight against deforestation and improve livelihoods of local population.

UN World Commission on Environment and Development define sustainable development as: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This notion highlights the idea of balance between present and future”. (UNFCCC 2005)

Here, it concerns environment and the duty of present generation to assure the durability of natural resources for the ones coming after. Following this concept, a particular resources management, integrating NTFPs exploitation, were created to aim to tackle deforestation: Sustainable Forest Management (SFM).

5.1.1. SUSTAINABLE FOREST MANAGEMENT (SFM)

This concept was built on the principle that forest management need to meet social needs without affecting future generations or forest’s abilities to rejuvenate. It is based upon three essential standards: First, that forest management has to be socially acceptable and equitable. Then, that the human pressure result into an impact ecologically benign and finally, the economic impact to local communities has to be positive. Therefore, sustainable forest management presents itself as a type of management that preserves and improves long-term health forest ecosystems, while giving economic, social and cultural opportunities benefitting present and future generations, thus, reducing deforestation. (Solomon Mela u Melese 2016)

The social approach of SFM concerns, primary, local community which depends on forest for their livelihood. Through interviews a solution adapted to local issues can be implemented. This is where the participatory methodology intervenes to answer to local needs and forest conservation.

5.1.1.1. PARTICIPATORY METHODOLOGY

Community based approach is often presented in project development. As examined by Dr. Chambers: “[...] failure of a number of resource management programs was associated to the disregard of local culture and wisdom.” (Chambers 1991) He makes an important link between the failure of the projects never succeeding to meet their objectives and lack of local population involvement which represents the beneficiary for who this project has been firstly developed. (Daniel López García 2014)

Participation is a process by which people can gain more or less degrees of participation in the project development process. It is not a fixed state. It can be determined by their degree of organization, the flexibility of the institutions and the availability of the stakeholders. Technicians and scientists have a major role as an actor as they may change some attitudes and work methodology so the population is able to participate in its own development. (Geilfus 2005)

By implementing participatory methodology in sustainable project development, a cultural dimension can be added to the social one. This approach allows exchange between stakeholders enabling a space for local population to share its traditional environmental knowledge which is

critical in understanding the fundamentals of NTFPs management as their heritage and relationship with them can be traced back several generations. (Chambers 1991) Traditional knowledge is important for minimum ecological impact which can be achieved only with sufficient data about the harvested species.

ICCO's project is the result of the community willingness which is looking forward to be able to preserve its natural heritage. Through various reunions with the population, species and their names (scientific, common and traditional) have been successfully identified. Also, the community produced a document named ethno-development plan which regroup their traditions and has been used as a bibliographic document to write the project design document. Capacitation about some species and how to properly harvest them has already been done, showing the community's participation in project implementation. Therefore, the thematic of taking into account local population and its knowledge is being respected.

In this project, the creation of a producer association which will assure the exploitation and process of NTFPs is seen as a community-based initiative. At local level, this initiative looks more like the empowering of a part of the population giving them leadership about natural resources exploitation and transformations. Therefore, this association may also control commercialization giving them economic authority over the community. In this same group of producer, as a person can dominate and overrule others (Mubita, Libati, and Mulonda 2017), the scenario of a middleman exploiting local producer can be taken in charge by one of the member of the community. It will lead to the enrichment of one person on the benefit of the others which is one of the issues participatory methodology should be addressing. It can be seen through the lack of communication with the direct contact with the community: the elected representative of Los Riscasles. This person never answers when contacted. It traduces a control of information by powerful people. (Mubita, Libati, and Mulonda 2017) This community-based approach seems more efficient in terms of labor work than in decision making. It can result in the design of a non-suitable solution for deforestation which can lead to the increasing of deforestation drivers.

To fight deforestation, valorization of local knowledge and community involvement aim to a socially equitable management. It needs to be coupled with scientific information's to have empiric data to demonstrate human impact on forest and therefore if NTFPs harvesting and commercial exploitation are a suitable solution for forest conservation and economic development.

5.1.1.2. ECOLOGICAL STUDIES AND HUMAN IMPACT

To be able to limit the ecological impact on forest, it is necessary to understand the consequences of human activity in the ecosystem. Therefore, ecological researches are required to understand the functioning of the species and its limit from an exploitation and conservation point of view. However, even if some studies exist, most of them are short-term focused, meaning they have a length of less than two years. Only 10% of NTFP population has studies lasting longer than three years. (López Camacho 2007) As described by Dr. Pérez: "It is somewhat surprising, however, that the ecological factors associated with the exploitation of these forest resources have so rarely been addressed." (Ruiz Pérez and Workshop Research on Non-Timber Forest Products 1996)

Two big ecological impacts can be identified coming from forest's resource exploitation and management:

_Impacts on the species

_Impacts over the ecosystem

The first one is characterized by human activity effect on population size and genetic diversity. The harvest of a same species in a same place without any control will see the number of individuals decreasing with the infrequency of seedling establishment. Therefore, collect of fruits and so seeds, have a direct impact on population structure and can lead to the local extinction of the species. Madagascar is facing an important biodiversity threat with 83% of the island native palm tree threatened of extinction. The local use of rural population for their daily subsistence and exportation of species directly removed from the natural habitat are responsible of this ecological disaster. (Live Science Staff 2019) Also, the collection of NTFPs can as well influence genetic diversity of the plant population being exploited. For example, a population of forest fruit trees will generally be composed of several individuals with large fruit, a large number of individuals will produce fruits of intermediate size and some individuals will have fruits considered inferior, from a commercial point of view, because of small size, poor appearance or bitter taste. As a result, the most valuable fruits will be harvested creating, over time, a selective removal of the most productive trees. It will result in the population of individuals dominated by trees with low market value. (Ruiz Pérez and Workshop Research on Non-Timber Forest Products 1996)

Measured human pressure allows identifying its different impacts over the ecosystem. It is the direct consequences of management and, therefore, of decisions making about the forest use and intensity. (López Camacho 2007) The last one, often determine the limit between sustainable exploitation and overexploitation. Yet, practices also participate in forest conservation. Therefore, with sufficient information, sustainable practices and limits of exploitation can be defined to protect the forest and allow resources' natural regeneration.

With no scientific studies made by ICCO or by another relevant academic actor over the selected species presented in this report, the legitimacy of sustainable exploitation is not reached. This document is a first work about NTFPs exploitation for the project. The only expert, who is quite sure to be contracted, is to make a biological study and species identification of vanilla. Obviously, the main concern is about the most profitable product. It seems thought through an economic point of view. On the long term, ICCO is the one who will decide of local capacitation, we can fear the development of bad practices (no sustainable, putting in danger the species) for other products if the same initiative isn't taken. Even with a bibliographic study about NTFPs to harvest and sustainable practices gathered studies are still necessary as growth and plant development is affected by local factors as humidity, temperature... which are specific to each geographic localization. Therefore, to properly be able to define these sustainable practices, ecological research is still necessary.

For some population, NTFPs exploitation represents the first source of income. In India, in Kerala region, the forest dwelling communities depends on NTFPs as their major source of livelihood with 56% of their income coming from NTFPs. (Sunderland, Ndoye, and Harrison-Sanchez 2011) That's why one of the essential standards of SFM is to have a positive economic impact on local population.

5.1.2. NTFP LONG TERM SUSTAINABILITY

It's the combination of the three objectives which create a balance between economic, social and ecological to assure forest conservation and local development. If only two over the three SFM's

standards, defined before, are prioritized some species can be endangered of extinction as it's happening for medicinal plant in Africa. The socio-economic development prioritization over ecological situation is reflected by the consequences of the higher demand from growing urban population leading to an increasing human pressure over the forest to meet the demand. It leads to numerous medicinal plant species becoming scarcer. (Solomon Mela u Melese 2016) The consequences of overexploitation are well described by Professors Sunderland, Ndoye and Harrison-Sanchez: "Increasing market demand has affected the availability and quality of these resources [NTFPs], as well as livelihoods." (Sunderland, Ndoye, and Harrison-Sanchez 2011) highlighting the close relation between environment, economic and social and so the importance of a balance.

The defined type of management which frames sustainable practices needs to be monitored to show its results as defined by Researcher Khaing Thandar Soe and Dr. Youn Yeo-Chang: "inefficient monitoring on the utilization of forest resources and inadequate implementation of conservation programs are the limitations to address over-exploitation of forest resources, illegal logging [...] and related activities". Monitoring allows assessing current state of NTFPs exploitation to identify way of improvement and implement a control of the exploitation to keep it sustainable. (López Camacho 2007) Only by considering the ecosystems dynamics as the basis for resource management can we aim to a sustainable NTFPs exploitation. Therefore, NTFPs has the capacity to fight against deforestation if implemented following sustainability management as presented before. However, we can conclude that the line between sustainable exploitation and deforestation is thin and can be defined only with the implementation of ecological studies to understand the regenerative capacity of the plant harvested and human impact on biodiversity.

Sustainable management of resources became key words to define adequate policies to fight deforestation. It has become an international issue through carbon emission leading to the creation of an international mechanism to implement policies framed around sustainability, to fight climate change and, therefore, deforestation in developing countries.

5.2. REDD+: RESULT BASED MECHANISM

Tropical forest has the largest green cover and is constituted by more biodiversity than other biome. As trees stock carbon for their development, it also represents an important carbon pool. Therefore, to limit GHG emissions coming from deforestation of tropical forest, Costa Rica and Papua New Guinea suggest, in 2005 as the 11th session of the Conference of the Parties to the Convention (COP), to discuss ideas to reduce emissions from deforestation and forest degradation in natural forests as a mitigation measure. (UNFCCC 2005) With substantial attention received from the United Nations Framework Convention on Climate Change (UNFCCC) and participating country of COP 13, a new mechanism was created in 2007, REDD+. (Gebara and al. 2014) UNFCCC define REDD+ as the following: "reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries." (Pinsky and Kruglianskas 2019) In practice, it performs as a mechanism based on performance to mitigate forest-related carbon emissions. Through it, developing countries should be motivated to improve forest management by giving an economic value to the carbon stored in trees.

5.2.1. REFERENCE SCENARIO

ICCO project is under the REDD+ mechanism. Here, it represents the first financial instrument of the project. It's an instrument to manage carbon emission due to deforestation. It is based upon trees

which not cut result in a value of carbon stored in it. The total of each one saved imply the generation of an economic value of carbon stocked named carbon credits. In the international market, the carbon credits can be bought by public and private institutions to justify their gas emissions. Consequently, REDD+ is an economic instrument fighting deforestation by giving financial value for trees saved.

However, the baseline of carbon credits generated must be closely linked with actual emissions reductions. Forest dweller communities are localized in marginal areas and are often difficult to access. They rarely have any record of their activities (agriculture, timber...) which complicate the definition of the baseline. Therefore, reference scenarios, which describe the future in the absence of specific interventions (Max Fancourt 2016), are often built upon uncertain hypothesis by their nature as they are formulated through the interviews of the community without much of empiric data. The missformulation of the baseline can affect the efficiency of the REDD+ instrument. (Dezécache, Salles, and Hérault 2018) If we follow the forest transition theory (countries which had high rate of deforestation will decrease it while developing themselves), we can see the limits of this model through various scenarios: High Forest/Low Deforestation (HFLD) and Medium Forest/High Deforestation (MFHD). First, if the baseline emission is based upon HFLD, we can assist to an underestimation of deforestation resulting in a debt in carbon credits. Then, if MFHD is considered as the scenario, deforestation could be overestimated which will generate a large amount of carbon credits. In the first case, the community and its project development is at risk and in the second one, we assist to an abuse of REDD+ financial mechanism. Therefore, REDD+ reference scenario can be easily manipulated as it can be hardly verified, because previsions will never occur, and countries can even receive economic compensation for deforestation if this one is not as high as defined in the reference scenario. (Alain KARSENTY 2010)

Colombia is defined as an HFLD country. This nomination implies that countries have a high ratio forest conservation/deforestation. However, it also means that their baseline of deforestation is low which means that emissions reductions will be small and so the credited emissions given by REDD+ mechanism. Therefore, they are the ones which will gain the least from gas emission reduction through the reduction of deforestation. Even if, in the future, they might contribute to a significant increase of deforestation if the forest transition theory is followed. For this reason, REDD+ doesn't benefit HFLD countries which represent a lack in potential economic prosperity, locally and nationally, which could be brought by deforestation. Accordingly, they could become the most vulnerable target for deforestation if new carbon trading negotiation fails to include HFLD countries. Since deforestation drivers are mobile, between tropical forests, deforestation reduced elsewhere could shift to HFLD countries. (Mongabay 2007) Therefore, the affirmation of Doctor Dezécache and Professor Salles and researcher Hérault: "They [HFLD] represent the largest remaining tracts of intact and unfragmented tropical forests" (Dezécache, Salles, and Hérault 2018) shows the importance of this country and the threat for gas emission and biodiversity if REDD+ fails to successfully integrate them in its compensation scheme.

5.2.2. REDD+ POLICIES

To meet its objectives, REDD+ implies the creation of new policies to efficiently tackle deforestation. Forest conservation can lead to sustainable economic alternatives development through capacitation. However, even if in theory the idea looks adequate the field reality is different. In ICCO's project, no economic studies have been made to determine the economic value that these

sustainable activities will generate and so there is no concrete evidence about them being able to compensate, economically, deforestation driver activities. The high price of Vanilla (205 Euros/kg in 2015 against almost 400 Euros/kg in 2017) (Pierre Lepidi 2017), presented as an argument for economic development and forest conservation is a result of bad weather condition in the world principal countries of production as Madagascar and Reunion Island. Therefore, the price is suggested to a high variability as proven by its fluctuation from past years. Consequently, formulating economic prevision for this product is linked to highly inconstant variable (weather). Added to the interviews of some actors for Açai in Colombia, who presented a difficult economic efficiency to achieve without colossal investment, we can ask ourselves the legitimacy of these initiatives to help, economically, local community and successfully substitute deforestation drivers as their economic activities.

During my work in ICCO I could notice some issues that can reflect some REDD+ implementation difficulties. Through my study I had to make several interviews. However, the actor I had the most difficulty to obtain an answer from was the president of the general council of Los Riscuales. It may traduce a lack of communication between ICCO and the community. We can ask ourselves if we are in a dialogue or in a one-way communication (coming from whom?). REDD+ policies imply multi-scale governance which one of its success is based upon the quality of exchanged information. (Iris PARROT 2016) This point highlights governance's strategies not totally efficient as ideal strategies involve dialogue among stakeholders. Yet, we assist to the implementation of participatory methodology with a lack of actors' communication which threatens the eligibility of the project. Also, a diversification of institutions, from their types and multilevel arrangements, allow a better adaptability, improving governance strategy. (Gebara and al. 2014) However, the only institution about NTFP exploitation which will be created is a local producer association and no initiatives have been made to connect them with regional and national institutions about NTFP exploitation legislation and environment protection organizations. The lack of efficient policies can limit the project development when problems in complex socio-ecological systems arise and no space has been previously defined to talk and solve them.

The willingness to conserve its natural heritage and which seek out for help was Los Riscuales traducing a capacity to change. However, the consequences of policy and management currently implemented, if not adequate, can, in the future, lead to a resistance to change leading to the increasing of deforestation. (Moeliono and al. 2014) Also, deforestation reduction may only be temporary, as local community can go back to their practices, while the corresponding REDD credits, would allow emissions that are permanent. (Alain KARSENTY 2010)

REDD+ is a result-based payments mechanism from questionable reference levels. (Dezécache, Salles, and Hérault 2018) It represents an economic approach to tackle deforestation. Yet, its principal focus should be to empower local stakeholders and allow a network with effective connections across groups to promote cross-scale coordination, knowledge exchange and social learning. It would lead to a better understanding of actors' action levels allowing proper levers to be identified to tackle deforestation. Therefore, proper policies could be implemented to reach project sustainability. REDD+ should focus on removing the underlying political and socio-economic forces of deforestation rather than only being an economic instrument.

CONCLUSION

As a community, Los Riscasles want to assure the conservation of their environmental heritage. Therefore, they have sought help to allow cohabitation with nature. ICCO Cooperation answered to this call and, with what it defined a community-based approach, structured and designed solutions seeming, at first look, economically and ecologically sustainable.

One of them is the exploitation of NTFPs. It is supposed, in the long term, to decrease deforestation drivers by offering a suitable economic alternative. It is based upon natural resources high added value, after process, and the theory of giving economic value to forest will provoke environmental awareness to keep their production. Defined, in the project, as one of the sustainable economic alternatives, if looked closer, the environmental friendliness of this initiative is questionable.

NTFPs selection for exploitation isn't based on any scientific data but only from available resources and added value expecting after process. It implies that its economic capacity to successfully replace deforestation drivers isn't known. It can lead to the abandon of this exploitation to go back to deforestation practices or to resource overexploitation to reach the same economic standard. In both cases, we assist to increase deforestation. Therefore, human impact and economic study is relevant to determine model viability. Yet, these studies would take years to have sufficient data, meaning in the meantime that exploitation consequences are unknown and so deforestation would probably continue. The unknowing of consequences is directly linked to REDD+ reference scenario as this one seems hard to defined precisely and impossible to assess at the end of the project. The economic part is linked with deforestation, however, in front of the scenario uncertainty we assist to the certification of carbon-credits by extern organization. Therefore, forest conservation looks more economic than ecological. It also implies longer process to validate gas emission avoided for project implementation. This device seemed hovering at distance around local community issues meaning that it hasn't any direct contact with it and is impossible to be realized by local population itself through the difficulty of carbon-credits verification. It highlights local absence in REDD+ model. Therefore, complete participation of local community, with this model, seems utopic and participatory methodology appeared defined from national and international stakeholders' viewpoint. In the project, no solution has been implemented to improve communication with the community. Yet, project implementation and decision making are still applied. Achieving forest conservation looks challenging as initiatives are questionable. Added to the absence of policies and institutions, long term sustainability may be difficult.

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ABREVIATIONS LIST

NTFP	Non-Timber Forest Product
GCC	General Community Conceal
REDD	Reducing Emissions from Deforestation and forest Degradation
SFM	Sustainable Forest Management
HFLD	Hugh Forest/Low Deforestation
MFHD	Medium Forest/High Deforestation

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Annex 1. Internship chronogram

Activities	November	December				January				February				March				April				May		
	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1		
Phase 1: Investigation																								
Analysis of NTFP as a solution to tackle deforestation	█																							
Bibliographic investigation of value chain in similar contexts		█																						
Analysis of value chains			█		█																			
Choose of the NTFP to develop					█		█																	
Check with the tutors of the advancement of the study										█														
Phase 2: Local development																								
Value chain development of vanilla and Açai								█		█														
Redaction about vanilla and Açai management								█	█		█													
Interview with local and national actors										█	█		█											
Local context analysis of process implementation											█	█		█										
Achiote process and implementation development													█		█									
Check with the tutors of the advancement of the study																					█			
Phase 3: Analysis and Redaction																								
Analysis of NTFP exploitation as a solution against deforestation and its implementation																	█		█					
Stakholder analysis																			█		█			
Conclusion about Los Riscasles' crisis and sustainable solution																					█		█	
Document redaction													█											

Annex 3. Interviewed data

Name	Organisation	Expertise area	Indicative	Number	Email
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Camila ZAMBRANO	Fondo accion	Value chain development	57	3166169353	
Edgar MONTENEGRO	Corpocampo (Putumayo)	Açaï exploitation (plant in Guapi)	57	3208338197/312778494	edgar.montenegro@corpocampo.com
Astrid ALVAREZ	Swiss Aid	Vanilla exploitation in Nuqui			libelulazul65@gmail.com
Harry GORAZ	Los Riscales	Leader of the General Community Conceal	57	3136558074	
Maria Teresa PALACIOS LOZANO	Patrimonio Natural	Consultant on cross-sectoral and territorial environmental issues	57	3105635725	matepalo@yahoo.com
Jorge YORIA	Corpocampo (Tumaco)	Palomitos/Naïdi pulp exploitation (Management and process)	57	3108678126	jyoria@hotmail.com
Vismar ARENAL	COCOMOPOCA	Achiote	57	3147255767	