



Ministère de l'Agriculture et du  
Développement Rural



**IRRDB**  
INTERNATIONAL RUBBER RESEARCH  
AND DEVELOPMENT BOARD

# IRC 2018

INTERNATIONAL RUBBER CONFERENCE  
AND IRRDB ANNUAL MEETINGS

THEME

**NATURAL RUBBER INDUSTRY: AN ASSET FOR  
SOCIO-ECONOMIC DEVELOPMENT AND  
PRESERVATION OF THE ENVIRONMENT**

## EVENT HANDBOOK



**22 > 24**

OCTOBER 2018  
SOFITEL ABIDJAN  
HOTEL IVOIRE



FONDS INTERPROFESSIONNEL POUR  
LA RECHERCHE ET LE CONSEIL AGRICOLES



CENTRE NATIONAL DE RECHERCHE AGRICOLE

*Effects of land fragmentation on rubber productivity in Edo and Delta states, Nigeria*

PhD graduate from the Delta State University, Abraka in Nigeria in the field of Agricultural Economics. Dr. Mesike serves as a Chief research officer and Acting Head of Department in Planning Monitoring and Evaluation at the Rubber Research Institute of Nigeria (RRIN). He has over fifteen Journal publications in National and International journals.



**Dr. Samuel  
C. Mesike**

*Sustainability in natural rubber supply chain. Between standards, commitments and assessments, expectations of a Rubber Grower*

Specialist in environment and water quality, Mr. ZEDIA is the Head of the quality and environment department at SOGB. He holds a master's degree in biochemistry and has been responsible for SOGB quality, safety and environmental management systems since 2015.

**Mr. Jean R. Zédia**

## SESSION 5B: Socio Economy & Environment

Venue: Room "Lagunes"

*Sustainability on the Latin America Natural Rubber Industry*

Diogo Esperante is Executive Director of APABOR, the NR Farmers and Processors Association of São Paulo in Brazil. He is also in charge of the Statistical Monitoring Program of the National Association of Natural Rubber Producers in Brazil (ABRABOR). He has been active in the Brazilian NR industry for the past 10 years. As a Market Analyst, Mr. Esperante helps the main agents of the NR industry with their market strategy development in all the NR producing countries of Latin America. He holds a postgraduate diploma in project management.

Esperante represents ABRABOR at the IRRDB Directory Board and publishes regularly on Latin America NR industry in the Magazine Rubber Asia.



**Mr. Diogo  
Esperante**

# ABSTRACTS



# **IRC 2018**

INTERNATIONAL RUBBER CONFERENCE  
AND IRRDB ANNUAL MEETINGS

**SESSION 5B  
SOCIO ECONOMY & ENVIRONMENT****Sustainability on the Latin America Natural Rubber Industry***Diogo Esperante*CEO – APABOR, [www.apabor.org.br](http://www.apabor.org.br)**Abstract**

*Sustainability has become a matter of urgency to many industries, especially those heavily dependent on natural resources. Natural Rubber Industry is facing such phenomenon. The main global consumer of Natural Rubber is Tyre Manufacturers. The Environmental sustainability focus of such industry has shifted from sole energy-efficiency to also factor-in deforestation and including awareness over the importance of ensuring traceability throughout the supply chain. Natural Rubber is mainly cultivated on Biodiversity red alert areas adding importance to such matter. Brazil has a big potential for expanding its production of Natural Rubber with good environmental sustainability scores. One of the most suitable areas for cultivating Rubber in the country, the São Paulo State has large extension of areas considered to be degraded pasture that would be greatly benefited by Rubber Cultivation. Collective Action theories have long debated over the challenges of groups trying to provide what may be considered a “public good”. Sustainability in this context might be considered a “public good”. More recently the Common pool resources theories have added tools to measure and study the efficiency of such initiatives. Such framework studies have grown among the debate over sustainability with special emphasis to the Polycentric approach. Such approach gains potential through the encouragement of experimental efforts at multiple levels. This paper offers through, a multi-case study, an analysis about the performance of the main projects, to this date, in trying to create voluntary activities for the sustainable expansion of Natural Rubber (NR).*

**Keywords:** Sustainability, natural rubber, carbon trade, collective action, common pool resources, polycentric framework

# Sustainability on the Latin America Natural Rubber Industry (september, 2018)

Diogo Esperante  
CEO – APABOR  
www.apabor.org.br

*Abstract*— Sustainability has become a matter of urgency to many industries, especially those heavily dependent on natural resources. Natural Rubber Industry is facing such phenomenon. The main global consumer of Natural Rubber is Tyre Manufacturers. The Environmental sustainability focus of such industry has shifted from sole energy-efficiency to also factor-in deforestation and including awareness over the importance of ensuring traceability throughout the supply chain. Natural Rubber is mainly cultivated on Biodiversity red alert areas adding importance to such matter. Brazil has a big potential for expanding it's production of Natural Rubber with good environmental sustainability scores. One of the most suitable areas for cultivating Rubber in the country, the São Paulo State has large extension of areas considered to be degraded pasture that would be greatly benefited by Rubber Cultivation. Collective Action theories have long debated over the challenges of groups trying to provide what may be considered a “public good”. Sustainability in this context might be considered a “public good”. More recently the Common pool resources theories have added tools to measure and study the efficiency of such initiatives. Such framework studies have grown among the debate over sustainability with special emphasis to the Polycentric approach. Such approach gains potential through the encouragement of experimental efforts at multiple levels. This paper offers through, a multi-case study, an analysis about the performance of the main projects, to this date, in trying to create voluntary activities for the sustainable expansion of Natural Rubber (NR).

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## INTRODUCTION

LONG-TERM increase pressure on Environmental common-pool resources, such as energy and water, have made Environmental Planning imperative to the future success of practically all productive chains. Civil Society pressure to improve sustainable development has also contributed to make Responsible Development a goal for all major corporations.

Being 70% of all the Natural Rubber (NR) produced in the world consumed by the Tire Industry (ANRPC,2016) it is presumable that the Sustainable Development of environmental practices towards Rubber production is not only strategically to this Industry's reputation, and brand image, but paramount to its reproduction. (WARREN-THOMAS 2015)

Historically, Tire industry environmental sustainability focus has been on Energy Consumption and CO2 emissions. That means, the majority of Sustainable Development projects of Tire Manufacturers have been, until now, based on answering the question: “How to make a Tire more fuel-efficient by reducing its rolling resistance?”. (Tire Sustainability Report 2016).

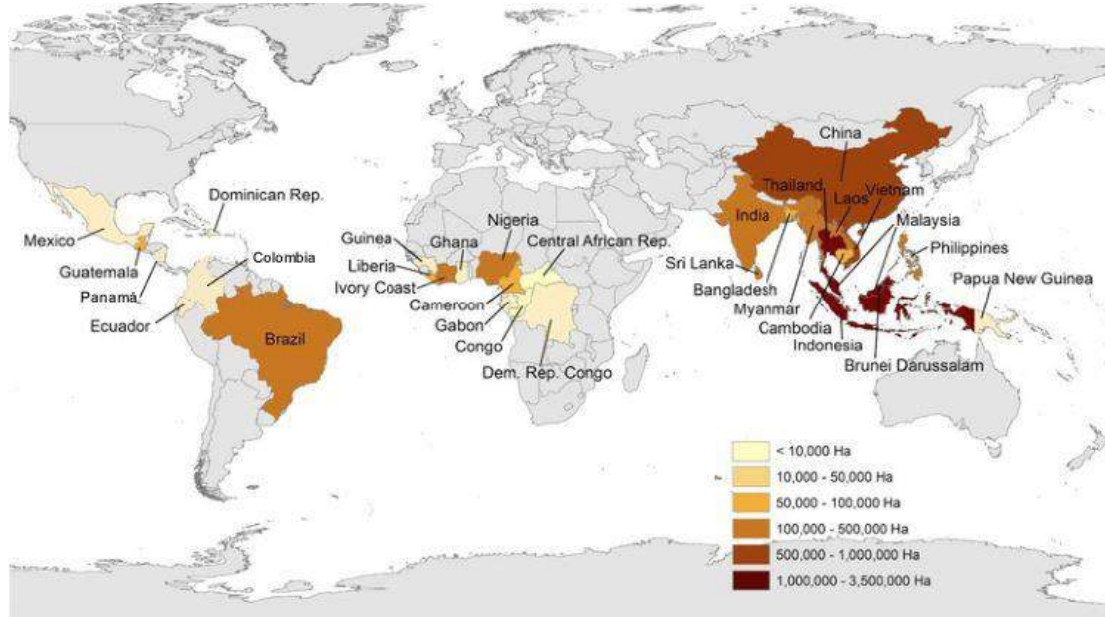
None of the less, being Tire Industry a segment that relies heavily on raw materials sourced from tropical regions, recently a string of important International Agreements<sup>1</sup> made it's drivers for Sustainable Development pay considerable attention to other aspects.

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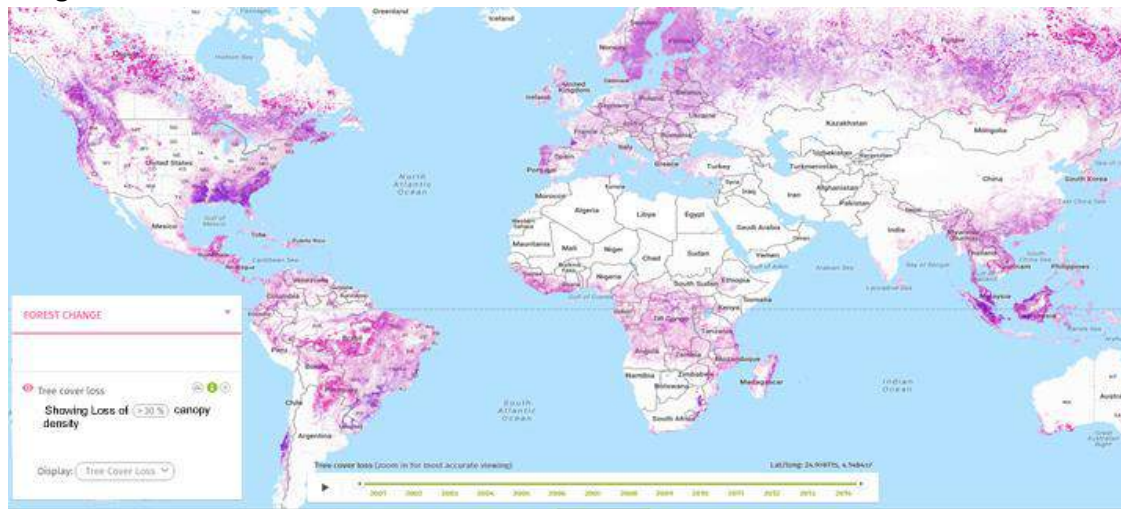
<sup>1</sup> Paris Agreement; The Amsterdam Declaration on eliminating deforestation from Commodity Supply chains; New York Declaration on Forests REDD+ Declaration.

Among this new drivers stands out the increasing concern over how raw materials are sourced and processed in addition to the increasing diligence over all the documentation surrounding that supply chain. (Tire Sustainability Report, 2006). For what is worth, global demand for natural rubber has increased rapidly in the past decade, motivated specially by China's economic emergence (FAO 2013). That made rubber the most rapidly expanding tree crop within mainland Southeast Asia, where main producing countries are located. (FOX 2012). Noteworthy, the main regions where rubber plantations have expanded to in the world concurs with Biodiversity-red-alert Areas such as: Sunderland<sup>2</sup>, Indo-Burma<sup>3</sup> and Wallacea<sup>4</sup> (MYERS 2000) and throughout the world main Tree Cover Loss Areas on the past 15 years.

**Image01. World Natural Rubber Plantation. Source: ethicalcorp /Adaptation Esperante**



**Image02. World Tree Cover Loss Area since 2001. Source HANSEN2017**



<sup>2</sup> Malay Peninsula, Borneo, Sumatra, Java, and Bali  
<sup>3</sup> Laos, Cambodia, Vietnam, most of Myanmar and Thailand, Southwest China in addition to the Islands of Xishuangbanna and Hainan  
<sup>4</sup> Indonesian islands east of Bali and Borneo but west of New Guinea, plus Timor Leste and the Philippines

These areas are home to a great number of endemic and highly threatened international fauna and flora (SODHI 2004).

From this context it is clear the emergency for World NR Industry agents to increasingly challenge the promotion of initiatives regarding Private Environmental Governance (VANDENBERGH 2014).

The awareness of such emergency is clear when revising the Green Source Programs created by major Tire Manufacturers and its latest developments.

Pirelli Green Source Guide Lines already “Strongly Advised” its raw material suppliers to adopt ISO 14040 Life Cycle Assessment by 2014, and stated clear intentions of making it mandatory in the near future. (PIRELLI 2014).

Michelin also states on its PURCHASING PRINCIPLES document that in the process to be approved, a supplier of raw material is requested to comply with Certification to ISO 14001 and TS16949 standards. In addition the company declares in its Natural Rubber Procurement Policy that:

“Combat deforestation: Attaching importance to the protection of primary forests and of zones of high environmental value likely to be endangered by the expansion of rubber plantations, the Michelin Group actively supports a policy of responsible land management. Within its means and the possibilities available through the organization of the natural rubber industry, the Michelin Group does all it can to ensure that the natural rubber which it produces or purchases originates exclusively from plantations which respect the principle of ‘zero deforestation’.”(MICHELLIN 2016)

## LATIN AMERICA and the sustainable Expansion of Natural Rubber

### NR Consumption Increase 2015-16 potential for such sustainable expansion. Source: ANRPC Adaptation: ESPERANTE, D.

The region main producer, Brazil, was once the only rubber producer in the world, back when Natural Rubber was only produced as an Extractivism product out of the amazon jungle.

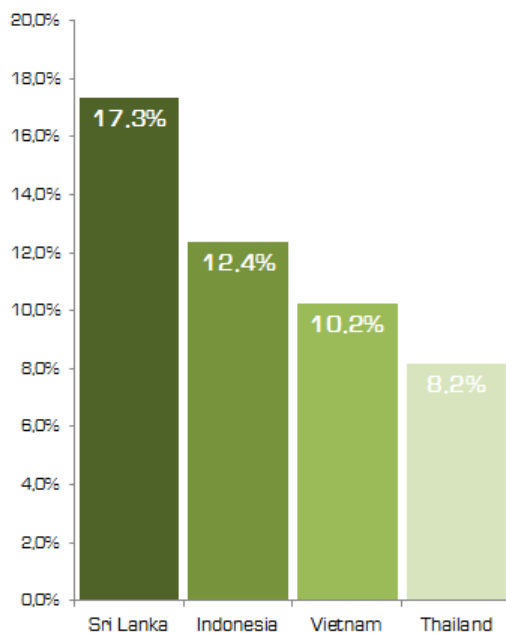
The cultivation of rubber as an agricultural crop was later developed and it's production grown largely in south East Asia. Experiences of cultivation on the northern part of Brazil were not successful because of plague and diseases.

Later on, it has been discovered not only clones disease-resistant but also that southern parts of Brazil contained large portion of land that were suitable for the cultivation of Rubber Trees and free of such plagues and diseases.

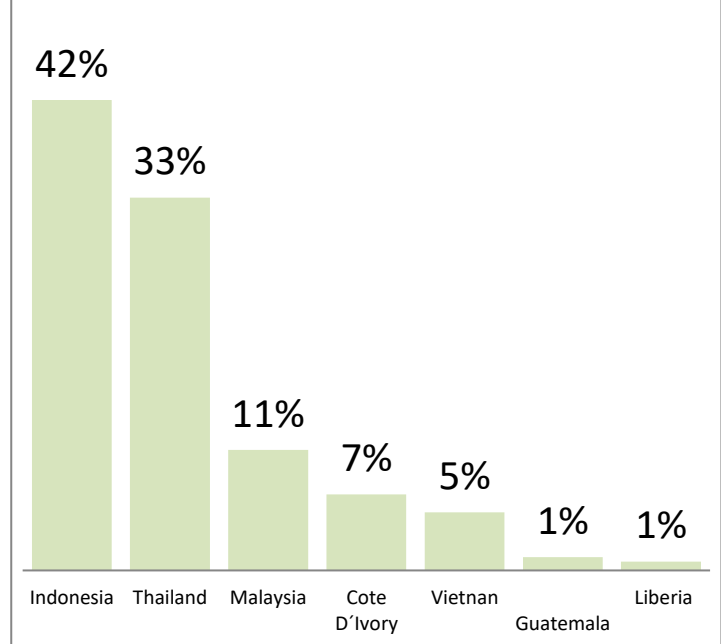
One of these main areas is the State of São Paulo. Since the 1980's SP has been the continent's main NR producer and today corresponds to 58% of the whole Brazilian yield (about 30% of the American continent).

On the other hand Brazil is considered one of the Top 10 NR consumers in the world with nearly 400 thousand tons of rubber consumed every year. Since only 40% of that is produced locally the country is import dependent.

**Image03. NR Consumption Increase 2015-16**  
Source: ANRPC Adaptation: ESPERANTE, D.



**Image04. 2016 Brazil Natural Rubber Imports**  
Source: MDIC Adaptation: ESPERANTE, D.



Most of the NR imports Brazil has come from 2 countries, Thailand and Indonesia. The thing is both these countries are growing on its industrial activities. That leads us to presume more and more these nations will export less natural resources and more industrialized goods; less natural rubber and more tires. To diversify its sources of import and help to create an integrated regional market might be strategic to the region.



To that extent Latin America Rubber Producing Countries like Brazil, Guatemala, Colombia and Mexico, not only have a good reason to expand its natural rubber output, but also might benefit from doing it with a good environmental sustainability score.

### **Challenges to the sustainable expansion of Natural Rubber**

Taking those facts into consideration, it's clear that the sustainable expansion of Natural Rubber is being perceived by some of the biggest Tire Manufactures as a matter of importance and also as an opportunity for industries in the pursuit of adding value to its output.

The strategies of such companies and governments are involving not only Best Practices in land usage (avoiding deforestation) but also including other rigorous responsible practices regarding all aspects of its production in the pursuit of full traceability and certified sustainability.

To that matter sustainability, and the challenges imposed to its pursuit, may be better understood if characterized as a global "public good", as has been debated by Elinor Ostrom:

"Millions of actors affect the global atmosphere. All benefit from reduced greenhouse gas emissions, but the problem is they benefit whether or not they pay any of the costs. In other words, beneficiaries cannot be excluded from the benefit of cleaner air. Trying to solve the problem of providing a public good is a classic collective action dilemma—and potentially the largest dilemma the world has ever knowingly faced. The classic theory of collective action predicts that no one will change behavior and reduce their energy use unless an external authority imposes enforceable rules that change the incentives faced by those involved".(OSTROM 2009)

To that extent, the challenges to such enterprise are no different from most commonly difficulties found when debating over the concept of common-pool resources (CPRs):

"Forests, irrigation systems, fisheries, groundwater basins, grazing lands, and the air we breathe are all examples of (CPRs). Because no one has property rights or control over such a resource, users of CPRs are frequently assumed to be caught in an inescapable dilemma---overexploitation of the resource, or what is commonly known as "the tragedy of the commons." (OSTROM 1994).

Ostrom shows that often, users of CPRs have defeated incentives to "destroy the resources" creating long-enduring institutions and policies that enabled them to consume such resources adequately.

In corroboration, it's interesting to point that, Mancur Olson, in his Collective Action Theory already stated that: groups may produce public goods provision at an optimal level only if making such provision complementary to some private good which the group can exercise an effective monopoly over. (OLSON 1965).

Thus, the issue of creating voluntary activities for the sustainable expansion of natural rubber might benefit from, and be beneficial to, the debate over Collective Action Theory and the Common-pool Resources issue.

As to a possible approach, using such theoretical reference, the Polycentric framework seems to hold a good potential to such study, for as Ostrom argues:

“Given the complexity and changing nature of the problems involved in coping with climate change, there are no “optimal” solutions that can be used to make substantial reductions in the level of greenhouse gases emitted into the atmosphere. A major reduction in emissions is, however, needed. The advantage of a polycentric approach is that it encourages experimental efforts at multiple levels, as well as the development of methods for assessing the benefits and costs of particular strategies adopted in one type of ecosystem and comparing these with results obtained in other ecosystems.”

### **Polycentric Study of Sustainable Natural Rubber Projects**

To undertake that exercise this article proposes a multi-case study of the Sustainability Plans of tree different Latin American rubber producers:

- a) Hevea Forte Cooperative in São Paulo State Brazil
- b) Mavalle SA in Colombia
- c) Occidente Econegocios in Guatemala

To that regard, this article intends to answer the question:

- a) Taking the Polycentric Governance framework analysis of Elinor Ostrom for CPR management how do the particular framework of such initiatives are performing to the success (or failure) of guaranteeing Sustainable Practices in Latin Americas NR production?

### **Polycentricity: an analytical approach to Common Pool Resources Governance**

#### Terminology and Theory

*“Collective-action problems occur when it takes the inputs and efforts of multiple individuals in order to achieve joint outcomes—and it is difficult to exclude beneficiaries of these actions from benefiting even if they do not contribute (E. Ostrom 1998). Collective-action problems vary in scale from very small problems involving only a few individuals to extremely large problems involving global resources, such as the atmosphere and the oceans. Solving collective-action problems requires opening public and private spheres of activities ranging from the small to the very large so as to encourage effective problem solving (Hess and Ostrom 2007).”*

On her later writings, the American political economist and 1999 Nobel Prize in Economics, Elinor Claire "Lin" Ostrom (August 7, 1933 – June 12, 2012) theorized on structures of governance for common resources management, in these cases Ostrom often used the Climate Change and greenhouse gas emissions as an example of an Common Poll Resource to be managed. Her analysis consisted on assessing the limitations of traditional nation-state-centered approaches to governance design and proposing the use of a “polycentricity” as “a useful analytical approach for understanding and improving efforts to reduce the threat of climate change” (Ostrom 2010b, 552).

The terminological origin of the term “Polycentric” might be better understood by the works of Michael Polanyi that on a series of articles in the 1940s and 1950s (Polanyi 1998), analyzed “polycentric tasks”, in reference to problems of balancing a large number of elements.

As put by Polanyi, to solve a polycentric task one needs “achieving a balance by reacting to the whole range of impulses that reach it from all the ‘centers’” (Polanyi 1998, 217). The development of these impulses, produces a solution from each “center” to the polycentric task—or “achieves, at any rate, a measure of success in this direction” (Polanyi 1998, 217).

Ostrom and colleagues (1961) first used the terminology of polycentricity in analyzing the metropolitan governance to describe a system “of (1) many autonomous units formally independent of one another, (2) choosing to act in ways that take account of others, (3) through processes of cooperation, competition, conflict, and conflict resolution” (Ostrom 2014, 46).

The concept was that the management of a certain complex task should be more efficiently solved within a plurality of interrelated units starting from the individual centers self-organization of it’s actions and relationships with the other units involved in a common task. In their findings, it was proven that, for the example of US metropolitan areas, better management was achieved from community action than from the traditional predominant centralized State organization.

This concept (polycentricity) was later used to analyze collective-action cases within the Workshop in Political Theory and Policy Analysis that Ostrom started in 1973 at Indiana University (large-scale case and comparative studies of local common-pool resources)

On her last years, Elinor Ostrom revived the terminology with regard to climate change (Dietz et al. 2003; Ostrom 2009; Ostrom 2010a; Ostrom 2010b; Ostrom 2012), arguing against the prevalent prediction “that only two state-established institutional arrangements—centralized government and private property—could sustain commons over the long run” (Dietz et al. 2003, 1907).

She referred to local, national, and regional policies and other individual relevant actions, stressing the great potential to generate co-benefits at multiple scales and levels interconnecting multilateral initiatives. Thus Ostrom concluded: “a multi-scale approach to the problem of climate change would be more effective and encourage experimentation and learning” (Ostrom 2010a). As an example an international agreement on Climate Change would be more effective, if could rely on domestic policies and institutions that actually implemented the emission reductions (Ostrom 2010b, 550).

### Polycentric System Governance: different users and levels

*“If governance systems arrange polycentrically, from small to very large, collective-action problems are solvable on multiple scales. The costs of effective self organization are lower when authority exists to create institutions whose boundaries match the problems faced. (...) A self governed common-pool resource is one where actors, who are major users of the resource, are involved over time in making and adapting rules within collective choice arenas regarding the inclusion or exclusion of participants, appropriation strategies, obligations of participants, monitoring and sanctioning, and conflict resolution”*(Ostrom, 2010)

For Ostrom, Polycentric systems are characterized by multiple governing authorities at differing scales rather than a monocentric unit. Each unit within a polycentric system performs out of substantial independence on creating norms and rules within a specific domain (such as a family, a firm, a local government, a network of local governments, a state, a region, a national government, or an international regime).

Actors of a polycentric system have the advantage of using local experience and learning from others also involved in a “trial-and-error” process.

No governance system is perfect, but polycentric systems have considerable advantages given their mechanisms for mutual monitoring, learning, and adaptation of better strategies over time.

Polycentric systems promote innovation, learning, adaptation, trust, cooperation among actors and the achievement of more effective, equitable, and sustainable result in different scales. (Toonen, 2010).

Enabling citizens to form smaller-scale collective consumption units encourages face-to-face discussion and the achievement of common understanding. Creating larger collective consumption units reduces the strategic behavior of the wealthy trying to escape into tax havens where they could free ride on the contributions of others.

### Principles Designing over Blueprint

In respect to creating sustainable, cooperative and integrated systems Ostrom argues that the idea of “Blueprinting the solutions” often leads to the distancing of actors. Thus only by fitting local collective-action problems will the system be able to become sustainable on the long run. (Moran and Ostrom 2005; Hayes and Ostrom 2005)

For that, Ostrom creates 7 design principles to be considered:

1) Well defined boundaries: Membership agreed upon rules and excluding those who do not agree to these rules, thus knowing with whom to cooperate and helping the group to sustain and build their cooperation over long periods.

2) Proportional equivalence between benefits and costs: In the case of a user getting all the benefits and pay few of the costs, others will not be willing to follow rules over time (Ensminger 2000). Is important to allocate benefits proportional to inputs that are required.

3) Collective choice arrangements: The third design principle is that most of the individuals affected by a resource regime may participate in enacting their rules. This enables regimes to tailor rules to local circumstances and to devise rules considered fair by participants.

4) Monitoring: Rule enforcement is necessary to achieve sustainable systems. Long surviving resource management systems either select their own monitors or all participants contribute resources to jointly hire monitors. Regular monitoring and sanctioning are strongly and statistically associated with better system efficiency and conditions.

5) Graduated sanctions: Graduated sanctions by robust governance arrangements. The capability to escalate sanctions enables a regime to warn members that if they do not conform they will have to pay higher sanctions.

### Perverse outcomes and Limitations of Polycentric Approach

On one of her most famous articles about the Greenhouse Gas (GHG) Emissions theme, Ostrom debates that often too many projects and activities operating at multiple scales (without no support of a global treaty) may generate negative implications. These perverse outcomes have to be closely monitored and avoided.

A detailed identification proposing the “Recognition of problems as an essential to start serious efforts toward finding methods to reduce them.”

## **Leakage .**

An issue often highlighted on subnational projects to reduce carbon emissions is leakage, either leakage between locations or market leakage (Ebeling, 2008, pp. 49–51).

The notion of Leakage between locations is when an activity that took place on a certain location shifts to another due to a certain project taking place on the first. As an example, farmers forced to leave a location due to a tree planting project may simply move to a new location causing deforestations of new areas.

Market leakage, on the other hand, occurs when changes in the price of a product occur as a result of restrictions. These restrictions reduce offer of such product stimulating an increase in the prices. On a positive scenario, the higher prices work as a stimulus so that more production is made in a conscious manner “In a less favorable scenario, particularly when landuse regulations are poorly enforced, higher prices provide an additional incentive to clear forests for timber or agriculture elsewhere, thereby reducing the net benefits of the climate mitigation project” (Ebeling, 2008, p. 50).

**Inconsistent policies** The inconsistent policies issue relates somehow to the leakage problem for companies that operate in a Global level might find themselves trapped in between different varying policies from one region to another. Such variations often produce different costs and availability of technologies that not always generate enough value and income on the end product, demotivating such investments in certain markets.

**Inadequate certification** There is obviously the demand for skilled personnel to certify that one project is in fact generating a good sustainability impact. As Ostrom argues: “A very active new industry of “global consultants” has emerged. While many consultants do have good scientific training, the greatly increased need for certification has generated opportunities for some unqualified contractors to earn money in the new “certification game.”

**Gaming the system** In this context for each new sustainable product or mean of production is created often incentives such as “green bond credits” are developed. Gaming the system happens when the generation of credits become more profitable than the end activity itself and actors start to concentrate more on finding ways to generate (questionable) credits than to reduce the deforestation activity or GHG emission.

**Free riding** The benefit of reducing deforestation and GHG emission might be used by others that will use this reduction to actually increase their environmental impact substantially.

## **Polycentric Approach Summary**

*“We need to recognize that doing nothing until a global treaty is negotiated maximizes the risk involved for everyone. Rather than only a global effort, it would be better to self-consciously adopt a polycentric approach to the problem of climate change in order to gain benefits at multiple scales as well as to encourage experimentation and learning from diverse policies adopted at multiple scales.”(Ostrom 2010 p550)*

As Ostrom puts it collective-action problems can't be solved by any magical formula. Such problems varies from different sizes and shapes.

In conclusion, the polycentric approach is not the “silver bullet” to solve collective action challenge but nor is the traditional —state-centric top-down—approach.

As put by Polanyi, to solve a complex multiple collective challenge, many actors will have to be involved to achieve, at any rate, a measure of collective success.

With that Ostron creates a “do’s and don’ts” context for reflecting over efficiency of Sustainability plans

**Table03 . Polycentricity: an analytical approach to Common Pool Resources**

*Source: OSTRON 2005. Adaptation Diogo Esperante*

<b>Principles Designing over Blueprint</b>	<b>Perverse outcomes and Limitations of Polycentric Approach</b>
Well defined boundaries	Leakage
Proportional equivalence between benefits and costs.	Inconsistent policies
Collective choice arrangements.	Inadequate certification
Monitoring	Gaming the system
Graduated sanctions	Free riding

## Prospects, Cases and Scenarios for Sustainable Natural Rubber in Latin America

In Latin America 4 countries, concentrate most of the regional production: Brazil, Guatemala, Colombia, Mexico.

Image05. Percentage of Natural Rubber Production in Latin America. Source: APABOR



### Brazil

Brazil is the biggest Natural Rubber producer in the region with about 202 thousand tons of dry rubber produced annually from about 156 thousand hectares on production. The country has about 222 thousand hectares of planted area, most of it planted on the past 25 years. The immature area estimated to enter production on the next 3 years accounts for about 66 thousand hectares. The main producing region is the state of São Paulo that accounts for about 58% of the production, 40% of the production area and about 50% of the planted area.

Table01. Brazilian Natural Rubber Production Area.

Source. IBGE 2018. Adaptation. Diogo Esperante /ABRABOR



Brazilian Natural Rubber Production Area								
Years = 2010/2017*								
Variável = Harvested Area (hectars) Source: IBGE								*Estimation
	2010	2011	2012	2013	2014	2015	2016	*2017
<b>Brasil</b>	<b>124.946</b>	<b>134.947</b>	<b>137.813</b>	<b>139.998</b>	<b>146.552</b>	<b>144.176</b>	<b>154.835</b>	<b>156.000</b>
São Paulo SP	47.191	51.278	52.438	55.456	61.522	60.358	60.569	61.000
Bahia BA	31.456	33.040	32.800	33.263	33.521	33.595	33.122	33.000
Mato Grosso MT	22.625	22.995	23.350	22.201	21.186	18.615	28.105	28.000
Espírito Santo ES	7.526	7.979	8.240	8.507	8.320	9.015	9.030	9.000
Minas Gerais MG	4.154	7.442	7.714	9.211	9.375	9.726	10.931	10.000
Goiás GO	3.295	3.540	4.394	3.950	5.905	6.240	6.899	8.000
Mato Grosso do Sul MS	829	820	821	855	854	852	6.179	7.000

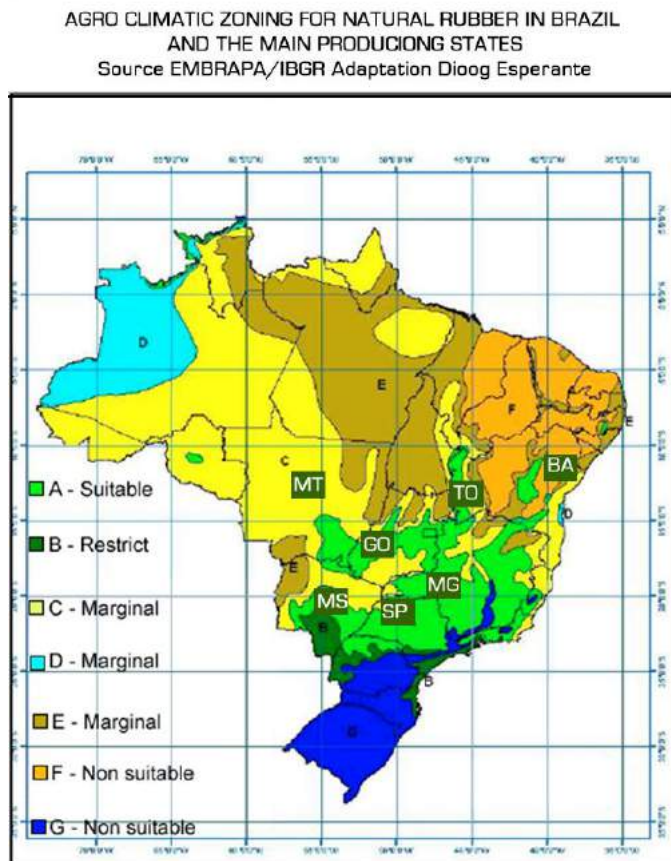
<http://www.sidra.ibge.gov.br/bda/tabela/listabl.asp?c=1613&z=p&o=28>

Estimations: ABRABOR / Adaptation: Diogo Esperante (executivo@apabor.org.br)

Interesting to underscore that São Paulo, as most neighboring states (GO, MG, MS) are considered a “Escape Zone” from the South America Leaf Blight Disease as shown on the image below in green. The country production sector is comprised mainly of Estates ranging from 20 ha to 4 thousand ha.

**Image04. Brazilian Natural Rubber Agroclimatics.**

Source. EMBRAPA 2003 Adaptation. Diogo Esperante /ABRABOR



The State of São Paulo also includes most of the Processing Facilities of the Country that represents about 60% of the whole market installed capacity. This has to do also with the concentration of most Natural Rubber Consuming Industries in the region 90% of them are São Paulo Natural Rubber Producers and Processing Plants Association (APABOR). The other 40% is mostly concentrated on Michelin’s facilities on Espirito Santo (ES) and Bahia (BA). The French Tire Industry is the biggest NR processor in the country.



**Table02. Brazilian Natural Rubber Main Processing Plants.**

Source: APABOR. Adaptation Diogo Esperante /ABRABOR

Name City/State	Michelin Viana/ES	Michelin Camamu/BA	HaveaTech. Jaci/SP	Braslatex Bálamo/SP	Globor Jaci/SP	NB Urupês/SP	Quirino Cedra/SP	Colloxx Poloni/SP Colina/SP	Ask Trading	São Manoel
Processing Capacity (mil ton)	40 (95%)*		50 (40%)	45 (40%)	14 (90%)	13 (70%)	12 (90%)	10 (90%)	10 (90%)	8 (90%)
Form of Raw Matter Sourcing	Third Party (2) Direct fom Producer		Third Party Direct fom Producer	Third Party Direct fom Producer	Third Party Direct fom Producer	Direct fom Producer	Third Part Direct fom Produci	Third Party Direct fom Producer	Third Party Direct fom Produca	Third Party Direct fom Producer
Focus	Tire		Tire	Tire	Tire/other	Tire	Tire/Othe	Tire/Other	Tire/Other	Tire/Other
Other Activities	Technical Assistance, Research and Development		Technical Assistance			Technical Assistance				
	Non-APABOR		APABOR MEMBER							

\*Percentage of usage estimated for 2016 in parenthesis

The consumption of Rubber in Brazil is impressive making the country one of the 10 biggest NR consumers in the World with about 400 thousand tons per year.

**Table03. Brazilian Natural Rubber Production and Consumption**

Source. IBGE 2018; MDIC 2018. Adaptation. Diogo Esperante /ABRABOR

Import*	Production**	Consumption	Share %
Year	'000 tons DRC	'000 tons DRC	Production/Consumption
2004	95	278	34%
2005	99	295	34%
2006	101	280	36%
2007	107	328	33%
2008	116	350	33%
2009	127	279	46%
2010	128	378	34%
2011	156	379	41%
2012	167	348	48%
2013	186	410	45%
2014	184	414	44%
2015	184	403	46%
2016	184	407	45%

Source: MDIC (2016) \* #BGE (2016)\*\*

DRC = Dry Rubber Content.

Brazil is a Natural Rubber net importer. Most of the country’s consumption (about 55%) is imported from countries like Thailand and Indonesia. Imports from other Latin America Countries have increased since many of the local consuming industry started to fear the big concentration of consumption over South East Asia. As an example of that, Brazilian imports of Centrifuge Latex from Guatemala more than doubled last year, having surged from merely 800 tons in 2016 up to 2.2 thousand tones on 2017.

**Sustainable Natural Rubber Production Projects in Brazil**

For the past 5 years the concept of Sustainable Natural rubber has gained some attention in Brazil. Specially since 2016, when Pirelli, one of the biggest consumers of Natural Rubber in Brazil, engaged all of its Brazilian suppliers on the International Rubber Study Group (IRSG)

program called Sustainable Natural Rubber Initiative (SNRi). Among such suppliers are 80% of the processing plants market share in the country. With that became gradually clear to the industry the need to, continue the stakeholder engagement processes which brought the producers on to the same page.

### **The Hevea Forte Cooperative Sustainability Project**

Hevea Forte is the biggest Cooperative of natural Rubber in Brazil with 5 thousand hectares of Natural Rubber planted (and about 2 thousand under production).

With about 7 thousand tons of Dry Rubber Produced Annually the group is the result of the union between 25 agribusiness entrepreneurs that in 2006 got together to develop a quality program for their Natural Rubber Producing Units.

Each Producing Unit is managed independently, but all are intertwined through a Quality management program which integrates good management practices, technical Excellency and ethics. These facilities act as Producing Units within the same Rubber Production Project. Currently, local Processing Plant named Braslatex (the biggest Rubber Processing Plant in Brazil) processes Hevea Forte's rubber.

In 2008 the group was awarded by a local São Paulo State contest as the best Agricultural Practices in Natural Rubber Production (The Paulo Gonçalves Award). During the award ceremony the group executives were introduced to some Pirelli Research and Development professionals that became interested in getting to know more about the group.

For the past 10 years the Cooperative has aided voluntary studies on rubber quality together with Pirelli.

With the compromise of Pirelli with sustainability, Hevea Forte decided to launch in 2017 its Sustainability Program. The first step was to fulfill the Sustainable Natural Rubber Initiative Self Declaration form for all its members.

Since Hevea Forte's rubber was processed by Braslatex (also a self-declared company on the SNRi program), it was one of the first initiatives in Brazil that integrated producers, processors and Industry.

The next step for the Sustainability Program of Hevea Forte is to undergo an auditing process of its SNRi self-declaration and start preparing for a Chain of Custody Certification, namely the Forest Stewardship Council (FSC) certification

### **Guatemala**

In Guatemala the natural rubber is planted mostly in the Southwest and Northeast. In the South the main regions are: Escuintla; Suchitepequez, Retalhuleu, Quetzaltenango and San Marcos representing 85% of the national natural rubber production. The Northeast represents 15% of the national production mainly on the regions of Izabal, Alta Verapaz, Quiché and Petén which.

### Image03. Natural Rubber Main Producing Areas in Guatemala

Source GAO2016 - Adaptation Diogo Esperante



The production have gain momentum and according to estimates, the country will be ranging to about 120 thousand tons of Dry Natural Rubber by the year of 2018.

The main processing plants in the region are Grupo Introsa, Grupo Entre Rios, Grupo Occidente and Procesadora Industrial Fortaleza (GF Trading S.A.).

The production is mainly exported in both Latex and Block Rubber forms being the first correspondent to about 30% and the last about 70% of total exports.

The main regions of Exports, in order of volume, are Mexico, Colombia, Peru, United States, Brazil and Argentina.

### Sustainable Natural Rubber Production Projects in Guatemala

Guatemala was a pioneer on Natural Rubber Sustainability. Since 2010 local producers have engaged in Sustainability Projects, Certifications, Green Credit Emission programs and even Carbon Credit sales on the Voluntary Market.

This innovation apparently came as a way to differentiate the Guatemalan product and open up markets for exports (especially European).

### The Econegocios Occidente

Occidente is a business group of Guatemalan capital made up of four Business approaches: Financial, agro-industry, energy and eco business. Group Agroindustrial Occidente, S.A. -GAO- is dedicated, among others, to responsible production and marketing International of granulated rubber and natural latex. GAO is based on Guatemala and has more than fifty (50) years of experience in the establishment, maintenance and management of the cultivation of rubber plantations.

Currently, Econegocios Occidente has national and international programs in the agroforestry, transport and renewable energy sectors and is developing new initiatives in forestry and energy efficiency. It has a series of strategic alliances worldwide that allow them to access solutions and

highly specialized markets and put them at the service of Latin America.

In 2010, Grupo Agroindustrial Occidente (GAO) created an eco business division named Econegocios Occidente. That year they validated the first forestry project in America under the Verified Carbon Standard, allowing rubber forests to generate and commercialize carbon credits in the Voluntary Market. Carbon credits created incentives to promote rubber cultivation with sustainable management practices. With this in mind, the GAO also obtained the first Forest Stewardship Council (FSC) certification for natural rubber plantations ensuring best management practices.

Carbon credits generated in the voluntary market are referred to as Voluntary Emission Reductions (VER's) and are purchased outside of the compliance market. The market offers businesses, NGOs and individuals who wish to offset their own emission reductions the opportunity on a voluntary basis by purchasing carbon credits.

Despite the opportunities that carbon credits offer to sustainable projects, the process is rigorous, costly and requires expertise in an uncommon subject.

### **Eco2 Rubber Forests program and Other Initiatives**

In hopes of breaking the barrier of entry and utilizing natural rubber to mitigate climate change, Econegocios created the Eco2 Rubber Forests program of activities, validated by Rainforest Alliance in 2016. By creating a broad platform for carbon market access where rubber forests are established and managed, the project facilitates access to carbon finance as an additional income source to generate positive incentives for reforestation with sustainable and responsible management practices.

The program though, was never implemented outside of Guatemala and the platform currently limits it's activities to Econegocios domains that recently has shutdown both its agricultural and industrial facilities.

None of the less, from Econegocios Experience, other producers in Guatemala developed similar programs in the past few years such as Procesadora Industrial Fortaleza (GF Trading S.A.) that integrated both FSC and Carbon Credits with other impressive certifications related to Neutrality of Carbon Emissions and the SNRi program of IRSG.

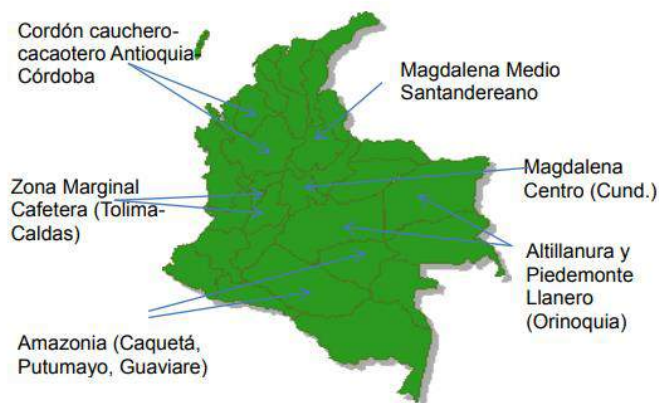
### **Colombia**

Colombia has about 52.600 há o planted areas, distributed over 5 regions: Magdalena centro (Santander), Magdalena Medio (Caldas y Cundinamarca), Cordón cauchero-cacaotero (Antioquia y Córdoba), Amazonía (Putumayo, Caquetá y Guaviare) y Orinoquia (Meta y Vichada).

In 2014, the countries consumption was about 17.000 ton/year and production 4.000 ton/year. Therefore, 75% of all consumption was imported (mainly from Guatemala and Southeast Asia). It is expected that from 2018 in on the country is going to emerge from net-importing and intensify exporting to US, China, Brazil, Canada and Venezuela.

### Image04. Natural Rubber Distribution at Colombia

Source CNC 2015 Confederación Colombiana Cauchera



### Table04. Natural Rubber Plantations in Colombia

Source CNC 2015 Confederación Colombiana Cauchera

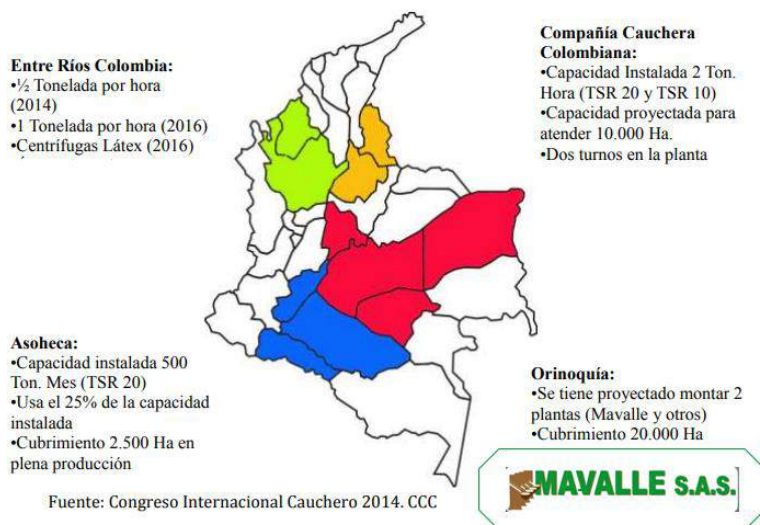
Region	2.008	2.009	2.010	2.011	2.012	2.013	2014*
Meta	3.750	6.860	9.998	11.498	12.500	15.000	18.000
Santander	4.000	4.500	5.611	5.911	6.000	6.500	7.000
Caquetá	3.881	4.102	4.310	4.810	5.000	5.500	6.000
Antioquia	1.899	2.577	2.577	2.827	3.100	4.000	5.000
Córdoba	1.318	1.732	1.732	1.832	2.000	2.500	4.000
Caldas	968	1.155	1.385	1.585	1.650	2.000	3.000
Guaviare	300	400	600	700	800	1.100	1.600
Cundinamarca	100	150	300	300	350	400	500
Vichada	250	318	347	1.500	2.500	3.000	3.500
Otros	1.209	1.933	2.280	1.979	2.630	3.200	4.000
<b>Total</b>	<b>17.675</b>	<b>23.727</b>	<b>29.140</b>	<b>32.942</b>	<b>36.530</b>	<b>43.200</b>	<b>52.600</b>

Source: CNC 2015.

The main processing plants in the region are Block Rubber producers being MAVALLE the biggest. This enterprise as about 10 thousand ha of it's own and another 10 thousand potential neighbors for sourcing. The country is a exporter and is currently expanding it's reach especially at the Brazilian market.

### Image05. Natural Rubber Processing Plants in Colombia

Source CNC 2015 Confederación Colombiana Cauchera



## **Sustainable Natural Rubber Production Projects in Colombia**

Although currently Colombia is a small producer of Natural Rubber, not only there is good prospects for expansion of rubber in the country but also an interesting profile of it's farmers.

There is a mix of big Estates and small growers that make Colombia Natural Rubber Industry very diverse. This diversity is interesting on both Social and Environmental aspects.

One of the reasons for such is accounted for the Illicit Crop Substitution program that by 2017 verified 23,770 hectares of coca plants were uprooted by peasants.

In total there are 49,031 hectares that the UN must certify based on the agreements reached with the communities.

One factor that is linked to the voluntary substitution program is the pressures exerted by criminal groups on peasants, social leaders and even UN officials, who have denounced 47 threats to their integrity and lives to date.

The Government the goal set at 50,000 hectares of substitution from May 2017 to May 2018.

UN in its report highlights that there are municipalities such as Tumaco (Nariño) where more than 25,000 hectares of coca are concentrated, families despite intimidation and threats from the five groups outside the law that dispute the territory, especially the front 'Óliver Sinisterra' under the command of alias Guacho, complied with exterminating 1,324 hectares.

Arauquita in Arauca is another outstanding municipality where families started 100 percent of the bushes they had committed to exterminate, 404 hectares.

In Caquetá, where the United Nations reported in 2016 about 10,000 hectares of illegal crops, families in Montañita and San Vicente del Caguán managed to exterminate nearly 600 hectares, which is considered a start to change the culture of the region.

The official reiterated the need to give an opportunity to voluntary substitution and curb so many criticism, considering that: "it is an innovative and complex program because it is not simply a matter of removing coca but of replacing it. Where you are entering extremely complex territories where the actors of drug trafficking, those who benefit from the illicit cultivation and the exploitation of the peasants do everything possible to prevent the program by assassinating leaders."

Since Natural Rubber is a crop that has good economical attractiveness even on small areas it was one important crop among others on this program.

Understanding that Natural Rubber can help communities in Colombia to overcome a difficult chapter in their history as a tool for Social emancipation the government has shown great commitment to the expansion of Natural Rubber.

Policies such as the creation of a National Carbon Credit Market, built upon taxation over Carbon emissions has led the country to be considered an important reference in the region regarding "Green Policies". The generation of Carbon Credit out of Natural Rubber Plantations is undergoing regulations and soon will be operational.

## **Mavalle S.A.S**

**Mavalle S.A.S.** began operations in 1986 seeking to determine the viability of growing and producing natural rubber in Colombia. Since its early years of technological and agricultural development it has received advice and guidance of the international experts' such as Harrisons Fleming, Michelin, APABOR and other Guatemalan and Brazilian authorities.

At its early stage of research and technological adjustment, Mavalle planted an experimental area of 444 ha. (1991-1997) with American and Asian clones (RRIM 600, FX 3864, IAN 873, PB 235, IAN 710, GT1 and PB 260) which started production more than 15 years ago. All pre-industrial production was sold locally. Today it manages and exploits 2,418 hectares of natural rubber (444 ha. of Mavalle and 1,974 ha. of Organización Pajonales SAS) with annual production forecast for 2017 of 2,421 tons of dry rubber.

With international assistance, Mavalle designed and built in 2014/2015 an industrial plant to produce technically specified rubber TSR.

Corficolombiana is a holding company of the non-financial investments of Grupo Aval (NYSE: AVAL), the largest financial conglomerate in Colombia and it is the result of the merger between Corporación Financiera del Valle and Corporación Financiera de Colombia.

Corficolombiana has strategic stakes in sectors with continuous long-term stable growth. Currently includes investments in sectors such as Financial Services, Infrastructure, Energy, Hospitality, Agribusiness, among others.

Through its subsidiaries Corficolombiana participates in in agriculture projects such as rice, cotton, African palm, livestock farming and natural rubber plantations accounting close to 26.000 hectares. Industrial process has a current output capacity of 3 tons per hour with an installed capacity of 12,960 ton TSR per year

According to forecast Mavalle will process 2,947 tons in 2017 of which 82% will come form own plantations and the rest will come from neighbor farmers

In year 2020 Mavalle estimates a capacity increase to 5 tons per hour in order to produce up to 21,600 tons per year to cope with de supply increase

Once all plantations and those of the neighbors reach maturity the supply of natural rubber to the plant will be 60% and 40% accordingly.

### **MAVALLE Sustainable Natural Rubber Projects**

In 2016 Mavalle S.A.S. implemented the management system needed to comply to the international standards and BASC (Business Alliance for Secure Commerce).

BASC -Business Alliance for Secure Commerce-, is an international business alliance that promotes safe trade in voluntary cooperation with Governments, border agencies, control authorities, and international organizations

"World BASC organization Inc.", is constituted as an international non-profit organization under the laws of United States of America.

WBO is the world's largest business led organization whose mission is to generate a security culture throughout the supply chain, by implementing Management Systems and control measures in international trade processes and other related sectors.

In BASC, companies from all over the world work in strengthening international trade in an agile and secure manner by applying internationally recognized standards and security procedures.

The Control and Security Management System implemented seeks to continuously improve the safety standards applied in Mavalle in order to ensure that the product is not contaminated by any foreign substance, in order to keep the company out from any illegal activity, and at the same time smooth customs' processes. ISO 9001 Quality Management System is currently implemented.

On 2017, Mavalle started homologation processes with Brazilian companies and thus became aware of IRSG SNRi program. One year later Mavalle became the first Colombian company self-declared to the Initiative.

Mavalle has also started process to generate Carbon Credits to international Voluntary Market, but the program is still undergoing evaluation for approval by international institutions.

### **The Sustainable Natural Rubber Initiative (SNR-i IRSG)**

On 2014, the International Rubber Study Group (IRSG) created its Sustainable Rubber Project Initiative (SNR-i) as a:“(...)contribution to the sustainability and transparency of the rubber field”. (IRSG 2018)

As it is advertised: “The SNR-i (...) is being developed as a voluntary and collaborative rubber industry value chain activity -through a working group composed of industry and producers' representatives of the whole rubber value chain1.(...)” (IRSG 2018)

The criterias of this “voluntary and collaborative rubber industry value chain activity” (IRSG2018) are determined by the group of participants during annual meetings.

Presently there are a total of 42 companies /organizations participating in the program. Among these 42 self-declared registrants, 58% are processors, 21% down-stream-tyre and 11% are related to plantation and trader categories.

The main objectives of the project are as it follows: transparency and traceability, strong relations and support from industry agents, special concern over the plantation industry and small farmers.

To the present date, the two main Brazilian Processing Plants are participating on the program and the local Producers and Processors Association (APABOR) have initiated conversations with the intention to extend de participation to all of the country's main processing plants.



## Discussion: Latin America Sustainable Natural Rubber and the Polycentric Approach

Throughout Latin America, there are important initiatives over the past few years that indicate that the local industry is moving towards the production of Sustainable Natural Rubber.

**Table04 . Polycentricity: an analytical approach to Common Pool Resources Governance**

*Source: OSTRON 2005. Adaptation Diogo Esperante*

Country	Case Study	Profile	Planted Area	IRSG SNRi	Operational
Brazil	Hevea Forte Cooperative	Cooperative of Private Plantations	5 thousand ha	Yes	Yes
Colombia	Mavalles S.A.	Private Plantation	10 thousand ha	Yes	Yes
Guatemala	Econegocios	Private Plantation	6 thousand ha	No	Parcial

Analyzing these sole initiatives through the Polycentric Approach concerning Ostrom Design principals we may categorize them as such:

**Well-defined boundaries:** For Hevea Forte the boundaries issue is well determined for the requirements of the Sustainability program are mandatory for all members. On the other 2 initiatives it is not applicable for they consist in private single programs.

**Proportional equivalence between benefits and costs:** In this case, all tree initiatives are bearing the costs. What might work as a stimulus for more producers to act on similar way is if added value is able to generate substantial extra income either by expanding the groups clients base, selling of Green Bonds or by any sort of premium offered by Consuming Industry for high sustainability scores.

**Collective choice arrangements:** All three initiatives have interacted in forums and on different platforms to discuss sustainability and the IRSG SNRi program is the most prominent one. It is true that there is a lack of official interaction on behalf of the Brazilian case so far but a new project from the government named "Brazil Certificado" might be a step on the right direction. On Colombia the National Carbon Trade Market is certainly one good example of positive government interaction. In the Case of Guatemala, their interaction with FSC has been more active and advanced.

**Monitoring:** In the case of Guatemala, advanced certifications and auditing are already a reality. In Brazil the first good example of monitoring was when Pirelli hired Bureau Veritas to audit all its Natural Rubber Providers. Next, the development of other certification initiatives in the country will surely benefit the maturity of such issue. In the Colombian Case, no auditing was yet performed.

Graduated sanctions: Specially in the Brazilian case there is a lot of sanctions already made by government for many of the sustainability standards are already enforced by a set of restrict legislations.

About Ostrom considerations on perverse outcomes and Limitations of Polycentric Approach:

The Leakage and Inconsistent policies problems leads to the emergency that Local legislation keeps improving to reassure that there will be no Leakage and to reduce the risk of inconsistent policies in all 3 cases. Since we are talking about a global market the same thing, apply to other countries outside Latin America. Strong commitment of Consuming Industry might help in this case.

Concerning Inadequate certification the pioneering of Guatemala has centennially benefited the Region in the way of generating local awareness and building skillsets that can now be used by other initiatives in the region. Many professionals that acted on Guatemala projects are now being hired to help develop initiatives in other Latin America regions. The IRSG SNRi program has centennially given a good contribution as to establish certain parameters. The ever-growing involvement of IRSG with these initiatives in Latin America is also a good way of mitigating the risk of inadequate certifications.

As to Gaming the system and Free riding, this two consequences of Collective Action will always pose as a risk and strategies have to be considered on all Sustainability plans for its mitigation. Again Strong commitment of both Producers and Consuming Industry might help to create checkpoints to avoid this.

### **Partial Conclusion and Prospects for Continuing the Study**

From all the initiatives observed in this article, it is important to high light a common ground to all: the IRSG SNRi.

This goes to show that the international platform of IRSG, through its Sustainability Program performed an important role as reference and stimulus for different Industry actors to develop and move forward on their Sustainability projects.

The pioneering of Guatemala poses as a very important landmark for it has developed an important know-how that other actors from Latin America can now learn from. As to the issue of certifications, many Guatemala professionals are now consulting for other Latin America countries on their own processes of certification.

With this, although is just a start we might consider that Natural Rubber Sustainability is growing fast in Latin America and further studies are welcomed to monitor the future of this issue on local rubber markets.

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