

The Potential of Added Value strategies to aid Latin America NR Industry in challenging the limitations of Secular decline of commodity Prices

Diogo Esperante¹

Abstract

This article presents an analysis of the History of Natural Rubber Prices based on the seminal work of Prebisch (1950) and Singer (1950) regarding the Secular decline in the net barter terms of commodity trading. Later it debates the potential of Added Value strategies as an alternative to challenge such limitations through the perspective of the Triangular Model of Value Creation, Capturing and Sharing (FAVA NEVES 2014). Primarily, this article adopts the premise that despite the cyclical variations of Natural Rubber (boom and bust cycles observed in 1909, 1921, 1930, 1998 and 2010) the cumulative change in price for the last century, of -93.3% (JACKS 2013), describes a clear long-run downtrend. The proportional expansion of Natural Rubber Production in poor countries and the ever-growing production of manufactured goods on industrialized nations collaborates to the scenario of consistent deterioration of the terms of trade. When discussing Value Sharing in Agricultural Productive Chains, Fava Neves 2014, argues that: “without value or income generation, there is no sustainable income or value distribution”. To that regard, alternatives that comprises strategies related to: DIFFERENTIATION, COLLECTIVE ACTION, COSTS OF PRODUCTION are presented by FAVA NEVES as potential solutions to common agricultural industry problems, such as the one we here characterized on the Rubber Industry. This model Fava Neves calls Triangular Model of Value Creation, Capturing and Sharing. Finally, this article debates about potentials and limitations of the use of such model by the Latin American Rubber Industry.

Keywords. Natural Rubber Prices, differentiation, collective action, costs of production



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1. Introduction

In Latin America 4 countries, concentrate most of the regional production: Brazil, Guatemala, Colombia, Mexico. The region main producer, Brazil, was once the only rubber producer in the world, back when Natural Rubber was only produced as a Plant Extractivism product out of the amazon jungle.

Image01. Percentage of Natural Rubber Production in Latin America.

Source: APABOR



The cultivation of rubber as an agricultural crop was developed in the late XIX Century but only grew largely in south East Asia by 1910 decade when automotive industry lived one of it's biggest surges and Plant Extractivism was unable to meet it's demand. During the first half of the XX Century, experiences of cultivation on the northern part of Brazil were not successful because of plague and diseases.

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

One of these main areas is the State of São Paulo. Since the 1980's SP has been the continents main NR producer and today corresponds to 65% of the complete Brazilian yield that, less impressive, only corresponds to 1,5% of the worlds whole production.

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

Put together, Latin America is also to be considered an import dependent region with a deficit of about 266 thousand tones per year.

Table01. Latin America NR Fundamentals per year 2018
('000 tonnes)

Latin America NR Prod Countries	Consumption	Production
Brazil	400	185
Guatemala	-	100
Colombia	17	6
Mexico	158	18
TOTAL	575	309

Interesting to highlight that the region's main importing origins are Thailand and Indonesia (responsible for 88% of all rubber imported).

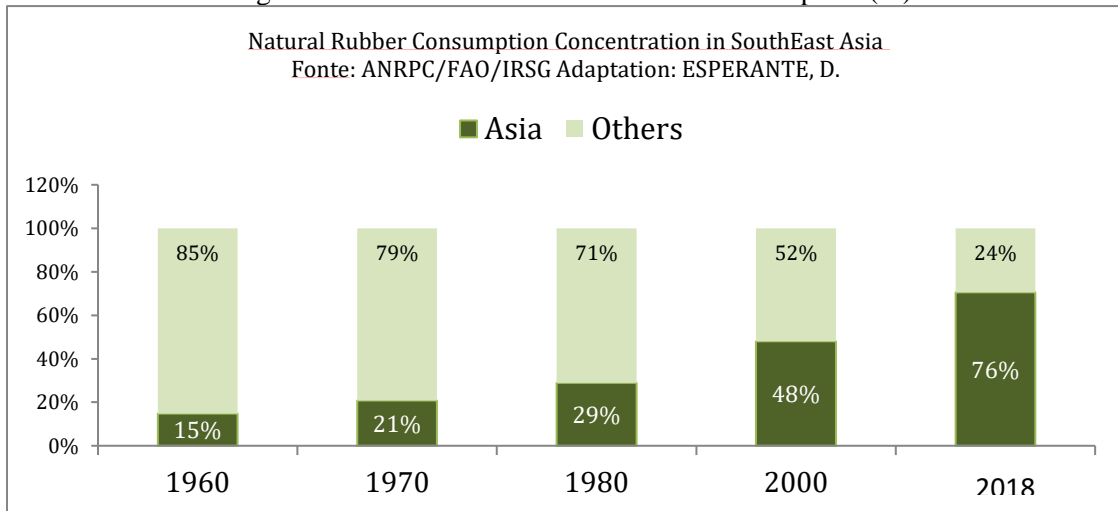
Both Indonesia and Thailand are among the world's top 4 NR consuming countries, and have grown about 10% in Natural Rubber domestic consumption in the past 2 years.

Table02. World Natural Rubber Consumption
('000 tonnes)

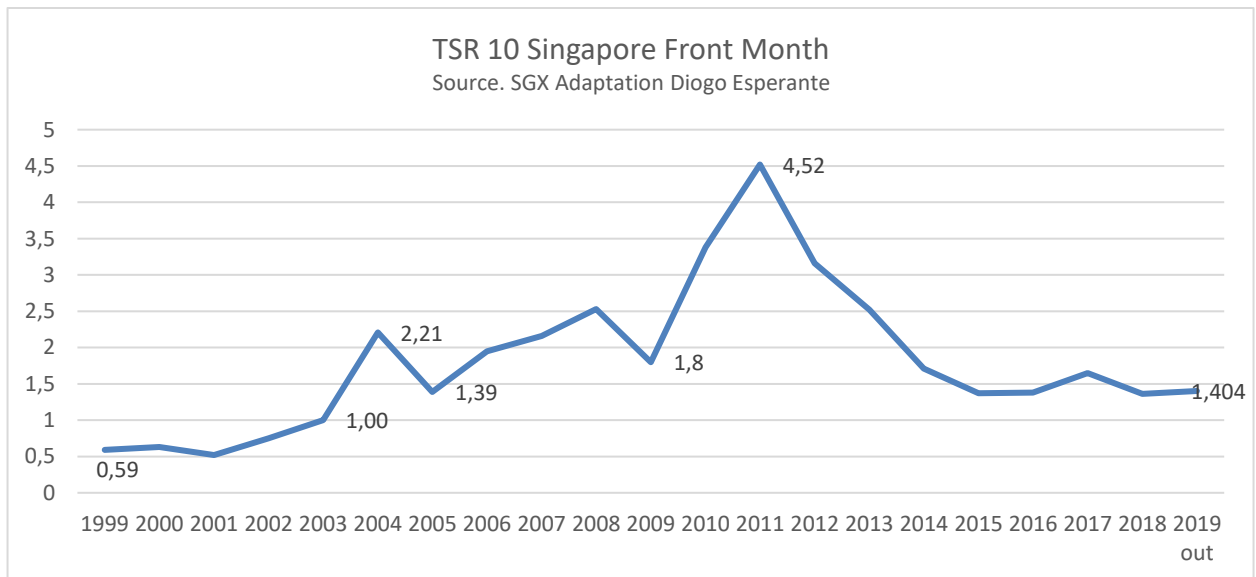
Top 4 NR Consuming Countries	2016	2018	Var%
China	5011	5670	12%
India	1033	1218	15%
Thailand	650	720	10%
Indonesia	619	680	9%

Taking that into account, it is possible that in the near future Latin America will face a risk of NR shortage of NR supply for such countries will increasingly export more Finished Goods than Raw Material (i.e. more tyres and less TSR).

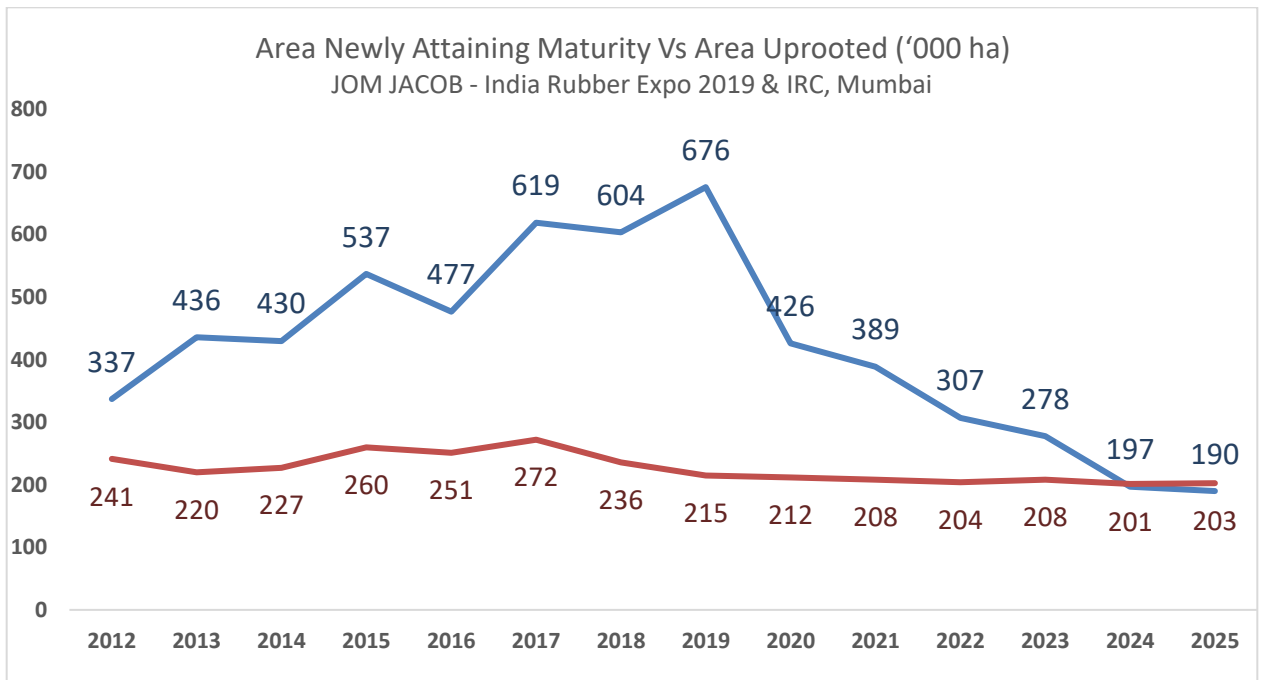
Image02. Natural Rubber Production and Consumption (%)



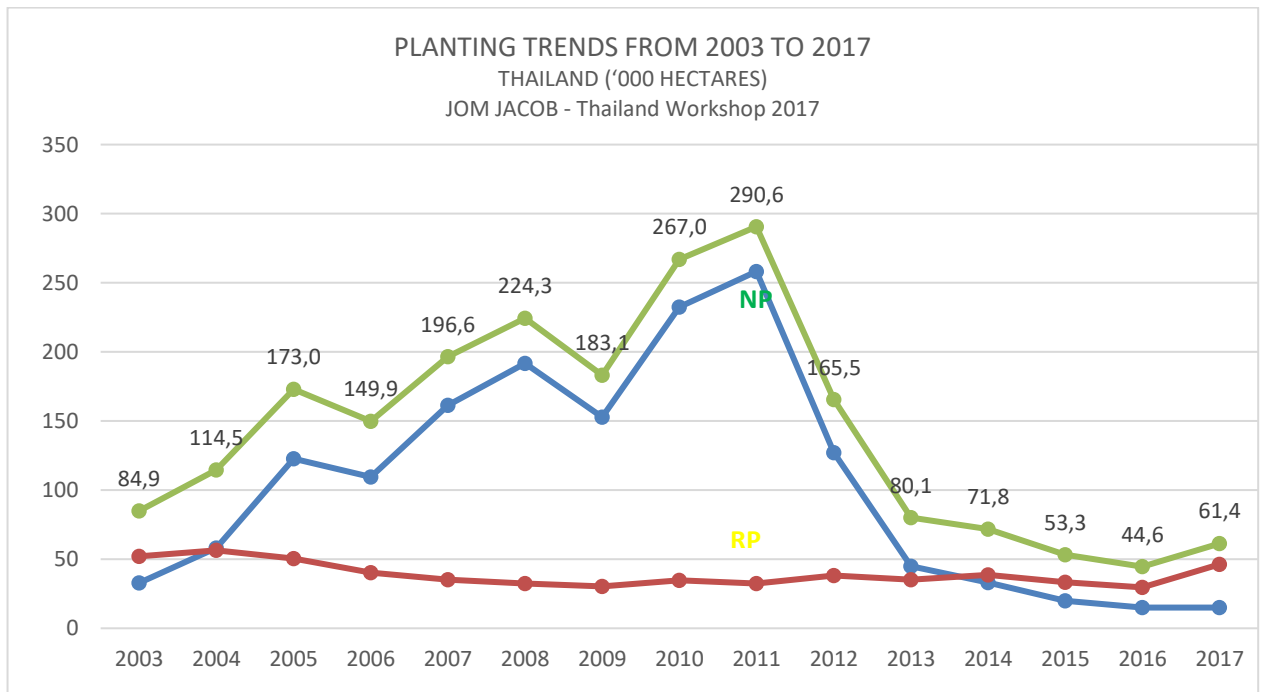
More recently, downtrend price cycle have halted investments through out the whole global producing industry.



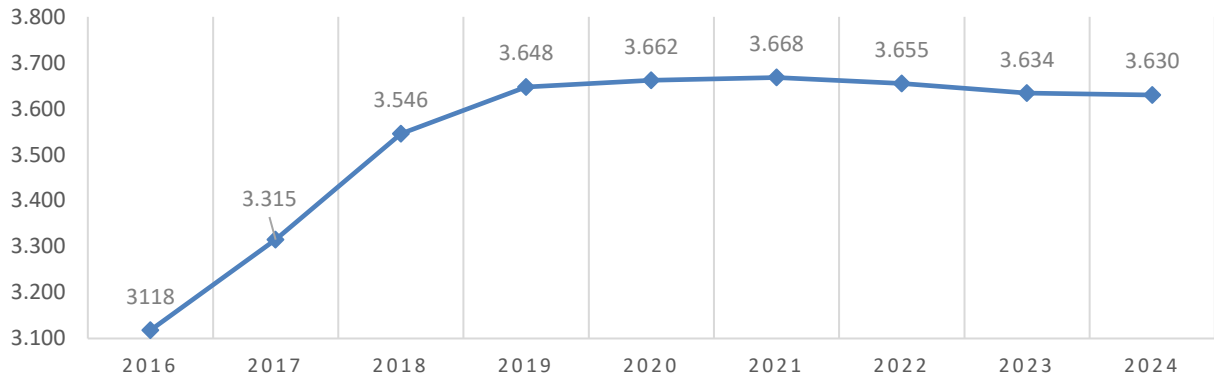
New Planting area increase has dropped from a year average of 600 thousand ha to less than 200 thousand ha/year. That trend will affect the area newly attaining maturity in the next decade to a point that on 2024 it's already projected that the number of hectares uprooted in SouthEast Asia per year will be greater than the ones coming into production.



Areas such as Thailand and Indonesia are expected to completely halt productive area expansion by 2024.

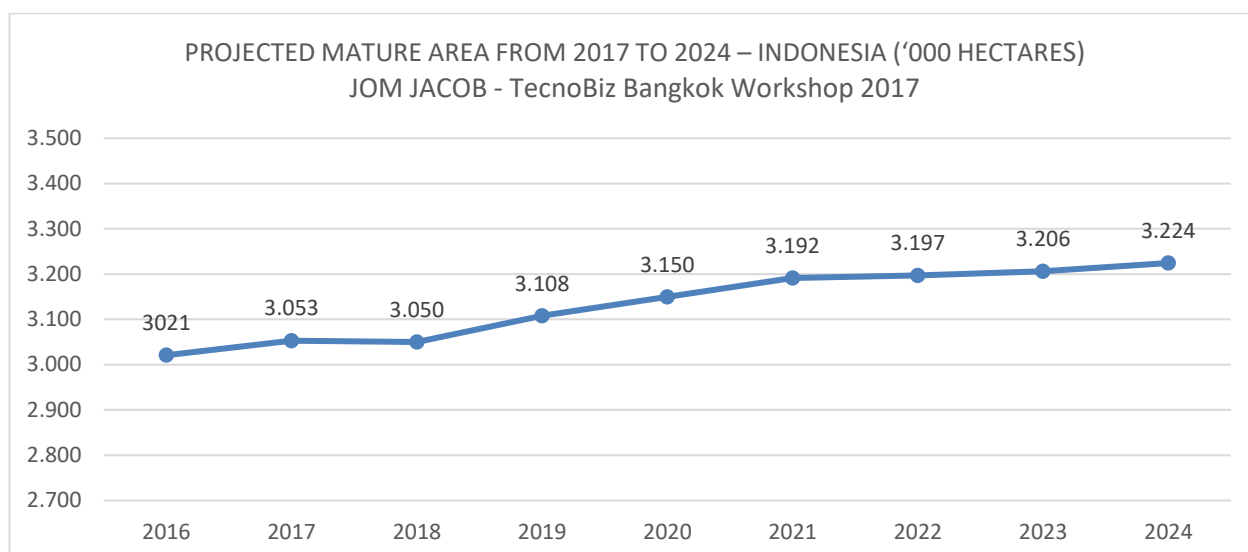


PROJECTED MATURE AREA FROM 2017 TO 2024 – THAILAND ('000 HECTARES)
 JOM JACOB - THAILAND WORKSHOP 2017



PLANTING TRENDS FROM 2003 TO 2017 INDONESIA ('000 HECTARES)
 JOM JACOB - TecnoBiz Bangkok Workshop 2017





These trends are projected to induce the market into a sharp supply crisis after the first half of the decade (assuming a moderate growth of consumption of about 2.5% to 3%).

World Natural Rubber Availability ('000 tonnes)
Dr. NGUNEN BICH IRC 2019

	World Supply	World Consumption	Aftermath	Stock	Consumption of Stock in Months
2016	12,492	12,725	-233	2909	2,74
2017	13,386	13,294	92	3001	2,71
2018	13,770	13,979	-209	2791	2,40
2019	14,511	14,409	102	2893	2,41
2020	15,255	14,884	371	3263	2,63
2021	15,737	15,329	408	3672	2,87
2022	16,070	15,846	224	3896	2,95
2023	16,349	16,433	-84	3811	2,78
2024	16,652	17,084	-432	3378	2,37
2025	16,901	17,775	-874	2505	1,69

As seen, as the “consumption of stock in months” trend starts to stray away from the 3 months average it is expected for prices to start receiving good support from fundamentals.

With that, there are perspectives of improvement in prices in the years to come as supply turns scarce. Since investments in new areas will only amount to additional production 7 years later (time it takes for a plantation to reach maturity) a shoot out in prices is highly likely when such supply crisis sets in.

Adding another layer of complexity to this scenario comes the environmental impacts of Climate Change and its effects on the main Natural Rubber Producing Regions.

Temperature and rain patterns are changing, rise on ocean levels, new diseases outbreaks and a wide range of non-controllable factors are setting limitations to traditional cultivation regions.

Also the need, imposed from a more mature consuming sector, for ever growing sustainability scores also requires a more strategical perspective.

That been said (and taking into account that we seem to be on the after days of a Price bust but already setting up for a price Boom) such scenario puts Natural Rubber production into a predicament.

Volatility has always been a part of Natural Rubber, and historically every intense volatility period has imposed great changes to the market.

The main consuming industry of Natural Rubber, tyre market, is living a deep disruptive technological change brought by disruptive Mobility improvements.

In what consumption of tyres are considered, miles per habitant in the world are projected to rise as more populations are getting access to automobiles, weather as collective and shared platforms or as autonomous driving becomes an ever near reality.

Eletrical vehicles, in-trend with the search for more renewable origins of raw matter (to substitute non-renewables in the long run) are imposing the development of a whole different model of product for tyres.

Not only the materials used for such products will have to be in-lined with ever growing sustainability scores but, material performance will be a key factor in the new line of products that shall source such market.

With risk of supply and need for product performance improvement, agents in the Natural Rubber Production sector are questioning them self's what is needed to warrantee that our product will be, not only available for consuming industry growing demand, but also how may it improve so it may help the industry to attain their future product.

More specially on Latin America, a region with not only great opportunities of consumption but vast lands available for planting, Brazilian, Colombian, Mexican and Guatemalan producers are searching for what can be done in order to fulfil the strategical advantages the region has in cultivating Natural Rubber.

Historically, such questioning has been common in other commodity markets. For that reason, scholars have dedicated their wisdom to elaborate and propose models to help plan and interact with such complex contexts. When discussing Value Sharing in Agricultural Productive Chains, Fava Neves 2014, argues that: “without value or income generation, there is no sustainable income or value distribution”.

To that regard, alternatives that comprises strategies related to: DIFFERENTIATION, COLLECTIVE ACTION, COSTS OF PRODUCTION are presented by FAVA NEVES as potential solutions to common agricultural industry problems, such as the one we here characterized on the Rubber Industry.

This model Fava Neves calls Triangular Model of Value Creation, Capturing and Sharing. To undertake that exercise this article proposes a multi-case study of the Sustainability Plans of tree different Latin American rubber producers: A) APABOR Association in São Paulo State Brazil. B) Grupo Fortaleza GF Trading in Guatemala. C) PROGOMEX in Mexico

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

a) Taking Triangular Model of Value Creation, Capturing and Sharing of Dr. Marco Fava Neves how do the particular framework of such initiatives are performing to the success (or failure) of guaranteeing surpassing the limitations of Secular decline of commodity Prices?

1. PRESENT NR PRODUCTION EXPANSIONS GEOGRAFICAL PATTERNS

Presently Natural Rubber Industry is highly concentrated in Southeast Asian Countries. The region accounts for 92% of the world’s whole production and 74% of it’s consumption.



Although is undeniable a greater market share of production in countries such as Thailand, Indonesia and Vietnam, lately upcoming countries like Camboja, Philipines and Myanmar are expanding rapidly while others, like India and Malaysa are contracting.

Table01. World Supply of Natural Rubber ('000 tonnes)

Country	2017	2018	Growth %	Market Share %
Camboja	193	220	12,3%	1,6%
Tailândia	4429	4879	9,2%	35,4%
China	798	837	4,7%	6,1%
Other Countries	1553	1639	5,2%	11,9%
Vietnã	1095	1138	3,8%	8,2%
Filipinas	102	106	3,8%	0,8%
Indonésia	3629	3630	0,0%	26,3%
Sri Lanka	83	83	0,0%	0,6%
India	713	660	-8,0%	4,8%
Malásia	740	603	-22,7%	4,4%
TOTAL	13335	13795	2%	100%

(ANRPC 2019)

Among the category other Countries is important to highlight Ivory Coast as a rapid expanding country away from the Asian axis. In comparison from 2016-17 the African country has expanded 22,6% and is currently responsible for 624 thousand tones per year making it the 6th biggest Natural Rubber Producer in the world.

When using the expansion ranking and crossing it with the Human Development Index (HDI) of the main regions we get this result:

Table02. World Supply of Natural Rubber/ HDI
('000 tonnes)

Country	Growth %	IDH
Ivory Coast	22,6%	0,462
Cambodia	12,3%	0,555
Thailand	9,2%	0,726
China	4,7%	0,727
Other Countries	5,2%	
Vietnam	3,8%	0,666
Philipines	3,8%	0,668
Indonesia	0,0%	0,684
Sri Lanka	0,0%	0,757
India (Kerala)	-8,0%	0,790
Malaysia	-22,7%	0,779
TOTAL	3,3%	0,681

From such results, we can determine that there are indicators that Natural Rubber is expanding proportionally more on regions with low HDI and contracting in the regions with the highest scores.

Such shift indicates that there seems to be certain advantages/disadvantages, specially related to cost of production/labor, that are creating incentives/disincentives for expansion of Natural Rubber. Being the past 10 years considered the background for some of the highest and lowest prices historically in the market, it is undeniable that the current bust

on international prices are shifting Natural Rubber cultivation to areas with lower manpower costs.

None of the less, that trend is contradictory to the market ever growing demand for highest sustainability scores. Which bring us to the present dilemma: how to expand natural rubber production on areas with greater HDI such as the present latin America upcoming producing regions?

2. THE HISTORY OF NATURAL RUBBER PRICES

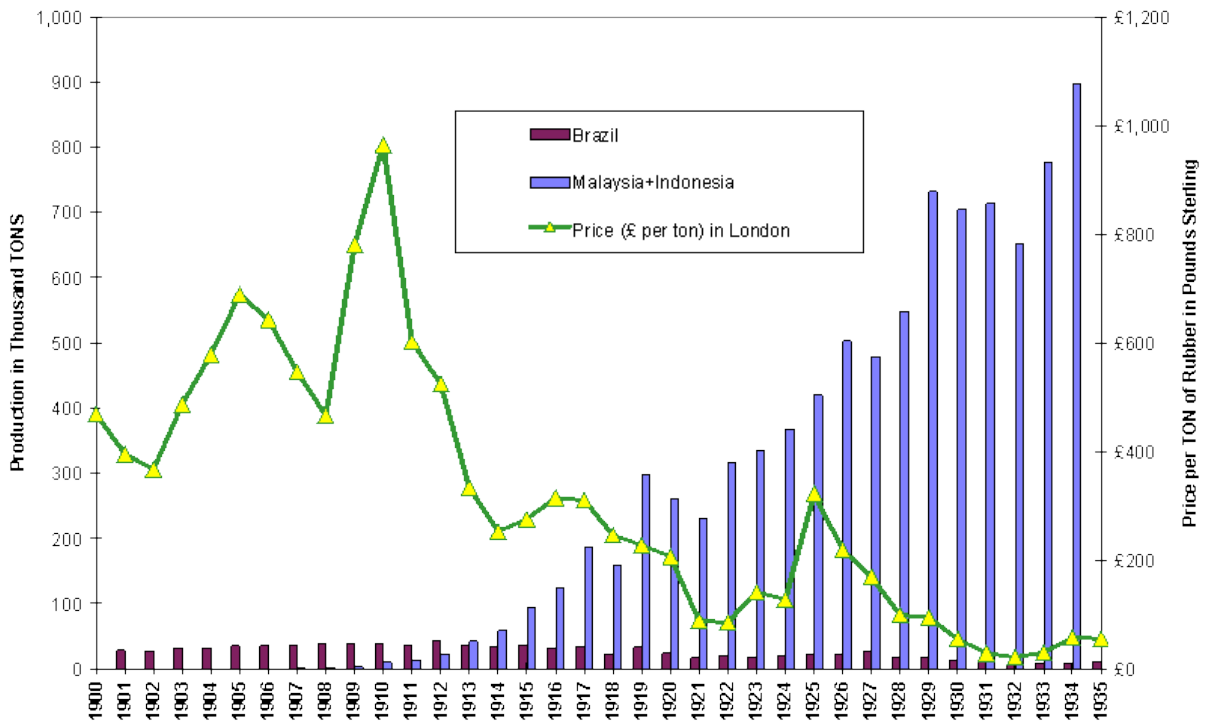
Since the emergence of Natural Rubber Consumption in the late XIX century until the first decade of the XX Century, Brazil and other nations within the Amazon Basin such as Peru, reined solely on the Natural Rubber export market with about 90% of all the rubber traded worldwide. The reason for that relates to the exclusive natural incidence of Rubber Trees in the region. This wild rubber production structure was characterized by inefficient productive technics, colonial servitude labor exploitation and lack of competition (ZEPHYR, MUSACCHIO 2002). This “monopoly” made prices abnormally high (See figure1.)

With the rapid growth of Rubber demand between 1900-13 there was an enormous incentive for the development of alternatives that could not only reduce the high production costs given by the Wild Rubber market but also that would be capable of meeting demand. AS describes Dean:

“As long as Brazilian Rubber was gathered in the wild, the harvest could not rise above 40.000 tones a year, no matter how exaggerated the price. This quantity was insignificant in light of growing industrial applications.”(DEAN, 1987)

Although the development of Natural Rubber Cultivation on Asian countries was already made possible since 1888, it was only after the turn of the century brought excess demand and even higher prices, that the Cultivation Model was able to overtake that market.

Figure 1. Production and Prices 1900-1935



(ZEPHYR, MUSACCHIO 2002)

European colonial powers, like Netherlands and the United Kingdom, transformed Rubber production from an inefficient wild Plant extractivism to cheap colonial-labor, land-intensive and yield efficient cultivation. For this last characteristics it is highlighted the yield maximization through Scientific Research, as describes Dean:

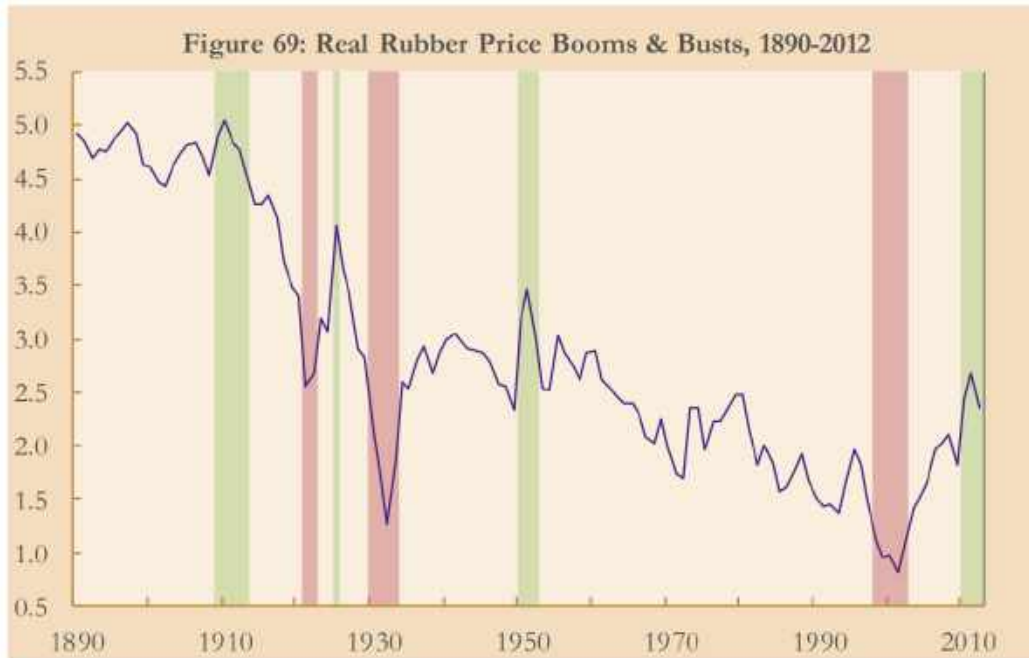
rounding *Hevea brasiliensis*. Planting in swampy ground was proved to be a mistake. Initial spacing of about 350 trees per hectare was shown to permit the most rapid growth. It appeared possible to begin to tap within seven years, suggesting that plantation operations might be expected to yield a profit. Tapping methods were much improved over those employed in the Amazon. To take the place of the small hatchet, knives were designed that excised thin slices of the bark. Repeated excision of the same portion of bark was found to increase, rather than reduce, the flow of latex. It was discovered that the tree could be tapped on alternate days the year through, and that annual yields of about a kilogram per tree were possible, with yields tending to increase as the tree matured. It was found that coagulation of the latex with acetic acid was an adequate substitute for the arduous process of smoking. Samples of coagulated rubber were sent to England and gradually achieved evaluations approaching that of the best grades of Brazilian wild smoked rubber.¹⁹

(Dean, 1987).

With that, while in Brazil tappers would attend to wild forest trails of about 60 trees each, the Southeast Asian tappers were not only cheaper, but also far more productive than their Brazilian counterparts.

Although with clear advantages, the Cultivation System deployed by British and Dutch was poorly controlled and production started exceeding demand for the best part of the 1910 when prices start collapsing for the first time after the boom period of the late 1900 decade.

When the British did attempt to restrict production in the 1920s, Dutch were keen to take their market share, and even with a rapid surge on 1925, a soon to happened bust on the marked up to the 1930's set the tone until the Boom of the 1950's followed by the bust of 1998 and subsequent Boom of 2010.



Taking that historical trend into account, David S. Jacks, observes in his “From Boom to Bust: A Typology of Real Commodity Prices in the Long Run” that despite the cyclical variations of Natural Rubber the cumulative change in price for the last century (of - 93.3% - JACKS 2013), describes a clear long-run downtrend.



2. THE DETERIORATION OF COMERCIAL TERMS IN INTERNATIONAL TRADE

The theory of international trade until 1870 was centralized on the Ricardian thesis of Comparative Advantages. This model only returned to an equivalent place in the twentieth century, with the development of the neoclassical Pure International Trade Theory and the formulation of the so-called Heckscher-Ohlin-Samuelson model of theorems.

In the immediate postwar period, some authors began to come up with ideas that contested the dominant model. The Argentinian Economist Raúl Prebisch (1950) and the German-born British Sir Hans Wolfgang Singer (1950) independently noted (based on United Kingdom international trade data between the years 1876 and 1947), a tendency for the long-term deterioration of import prices (ie primary goods) in relation to exports, which corresponded to manufactured goods.

This empirical proposition on terms of trade behavior and the formulation of a theoretical foundation behind it became known as the "Prebisch and Singer thesis".

The context for this theory is based on the cyclical demand and supply dynamics and the role played by undeveloped raw-material exporting countries and developed industrialized goods exporting ones.

That is, once demand from the Industry exceeds the supply, the productive sector receives incentive, in the form of price boom, to invest in the means of production (expanding both production and productivity) to meet such demand. Once such input exceeds the demand, the market adjusts itself by reducing the incentive (price) until the exceeding input is absorbed.

The problem is that, according to Singer, in the face of slowing demand, price adjustment tends to be forced on to the developing countries.

That is because the configuration of the economic structure of developing countries tends to make it harder for it to retain the gains from technical progress. On the other hand, in the industrialized countries, a stronger and more organized market tends to retain and distribute the profitability.

With that, Prebisch reveals a tendency of the deterioration of the terms of trade of all primary goods (aggregate or even disaggregated) when compared to manufactured goods.

In conclusion, the behavior of the price trend noted by Singer showed that prices had moved against commodity exporting countries and in favor of exporters of manufactured goods. With the present industrializations of developing countries, one might think such theory would lose relevance, but as shown in many other studies since (Sarkar and Singuer 1991; Maizel et al. 1998; Maizel 2000) a deterioration of the terms of trade between low-tech manufactured goods compared to more high-tech goods maintains the difference between newly industrialized countries and developed ones. As stated by Prebisch:

"It is true that the argument concerning the economic advantages of the international division of labor is of unquestionable theoretical validity. But, as a rule, it is forgotten that it is based on a premise completely denied by the facts. According to this premise, the fruit of technical progress tends to spread equally throughout the community, either by lower prices or by the equivalent increase in remuneration. Through international

exchange, primary producing countries get their share in this fruit. They do not therefore need to industrialize. On the contrary, their lower efficiency would make them lose the classic advantages of interchangeability. The error of this premise is to ascribe general character to what is very circumscribed in itself” (Prebisch, 1950, p.47)

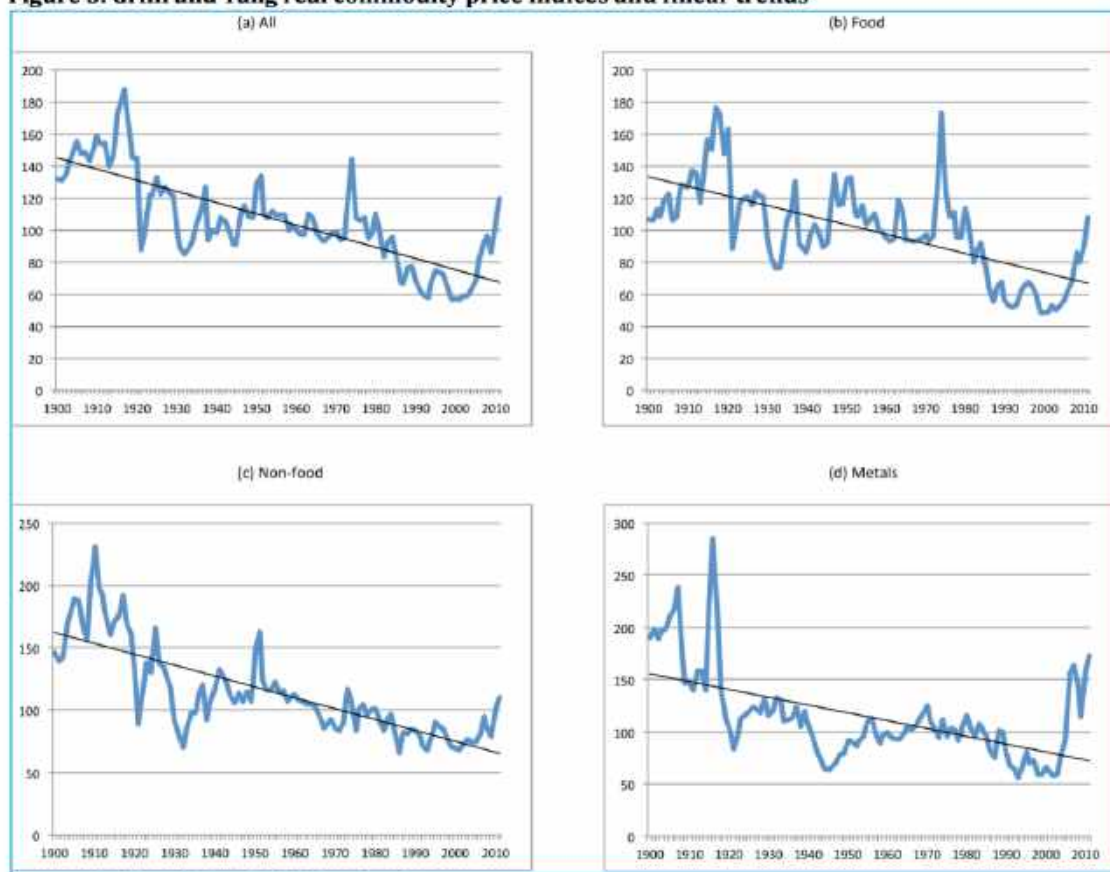
Prebisch then attributes special importance to 3 aspects of product and labor market that differentiate the observed commodity exporting countries and the manufactured goods ones, and thus, created the conditions for the deterioration of the barter terms: **productivity improvement(i), product differentiation(ii) and collective action(iii).**

While developed economies companies tend to compete via product quality and product differentiation(ii), in the commodity exporting countries competition was price. Labor force was unionised(iii) and could bargain for wage rises to secure a share of increased productivity(i). On the other hand, in developing countries, productivity increases manifestes themselves in lower prices and lower wages (specially for being this countries characterized as labor surplus economies).

Many studies have been carried out ever since testing the validity of such theory applied to the curretn trends in commodity prices.

Although some studies show corelation, the 2010 “super-cycle” has created doubts regarding a possible halt or even a reverse in the decline trend when applied to average commodity prices.

Figure 3. Grilli and Yang real commodity price indices and linear trends



Source: Grilli and Yang (1988) updated.

None of the less, as explains Hallam, although it could be argued that recent price trends might weekend the support for the Prebisch-Singer theory (regarding the conviction that terms of trade would move steadily against primary commodities) productivity improvement, product differentiation and capturing value added are still prominent strategies for maximizing revenues from commodity:

“Declining commodity terms of trade are not unequivocally a bad thing in welfare terms if falling commodity prices are accompanied by declining production costs or increasing productivity (...) if the Prebisch-Singer conviction that term of trade would move steadily against primary commodities has weakened (...) the case for maximizing revenues from commodity production and export through productivity improvement, product differentiation and upgrading and capturing value added is still unchanged”.

1. TRIANGULAR MODEL OF VALUE CREATION, CAPTURING AND SHARING

When discussing Value Sharing in Agricultural Productive Chains, Fava Neves 2014, argues that: “without value or income generation, there is no sustainable income or value distribution”.

To that regard, alternatives that comprises strategies related to: DIFFERENTIATION, COLLECTIVE ACTION, COSTS OF PRODUCTION are presented by FAVA NEVES as potential solutions to common agricultural industry problems, such as the one we here characterized on the Rubber Industry.

This model Fava Neves calls Triangular Model of Value Creation, Capturing and Sharing

DEFERENTIATION.

In his model the author divides the differentiation into 5 different fronts: integrated relationship(1), products and solution(2), people and services(3), packaging(4) and image and branding(5).

About integrate relationship(1) the author hightlights the importance of locking on the client, that is, offering the client a package of advantages that will increase the costs of changing supplier for him thus offering an exclusively solution that simplifies it's cost and decision process.

Regarding products and solution(2) the model suggests innovating solutions for new or expanding markets. Sustainability Certifications fall into this category.

People and servives(3) are related mainly to speed and reliability creating advantages for the client to have your product instead of the competition.

Packing(4) is related to reducing environmental impact, enhancing safety and making it more practical for your client.

Branding and image(5) are suggested as a way of bringing value to the product throught recognition of the public.

COST OF PRODUCTION.

FAVA NEVES divides costs into two main categories: (1) Internal Costs and (2) Chain of Supply Costs.

Regarding the first category, the model suggests (a) listing the activities directly related to production, central competence, and develop strategies to improve them. Second the model proposes to (b) analyze assets and find ways of using them better. Third, it is suggested the (c) search for gains in scale, (d) material quality, (e) manpower performance, (f) continuous reformulation of practices and operations, (g) new technologies to improve company's efficiency, (h) improving financial architecture to reduce the cost of capital, (i) improve competition with in the value chain, (j) plan assets acquisition taking into account seasonal

variations and (k) reducing the cost of transaction with the usage of contracts.

COLLECTIVE ACTIONS.

These activities are divided here in 07 different categories. Collective actions (1)among the supply chain, (2)internal management, (3)products, brands, packages and services, (4) marketing channels, (5)prices, (6)communications and (7)associations and cooperatives.

Regarding those (1) among the supply chain are the activities that companies do together with the objective of improving it's negotiation with a same group of suppliers.

(2)Internal Management is when different companies invest together in projects of quality, traceability.

Related to (3)products, brands, packages and services are activities such as complementary product lines, use of brand licensing and structure sharing to enter new markets. The creation of national product branding is another example.

Market channels(4) can be used jointly to get access to bigger markets (i.e. international).

Price(5) collective strategies have integrated fidelity programs as an example, services and product packages offered jointly to reduce the clients costs of acquisition.

Collective communication (6) can be operated through shared public relations, promotion spaces and events.

Integration through Associations and Cooperatives are a way or coordinating many of the activities listed above and also work with political representation for a better commercial environment with legislation and tax improvements.


2. LATIN AMERICA RUBBER INDUSTRY CASES:

a) BRAZIL. NR Production Context

Brazil is the biggest Natural Rubber producer in the region with about 185 thousand tons of dry rubber produced annually from about 156 thousand hectares on production. The country has about 257 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 65% 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
Brasil		124.946	134.947	137.813	139.998	146.552	144.176	154.835	156.000
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	7.373	8.240	8.507	8.920	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



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 Espírito Santo (ES) and Bahia (BA). The French Tire Industry is the biggest NR processor in the country.

Table02. Brazilian Natural Rubber Main Processing Plants.

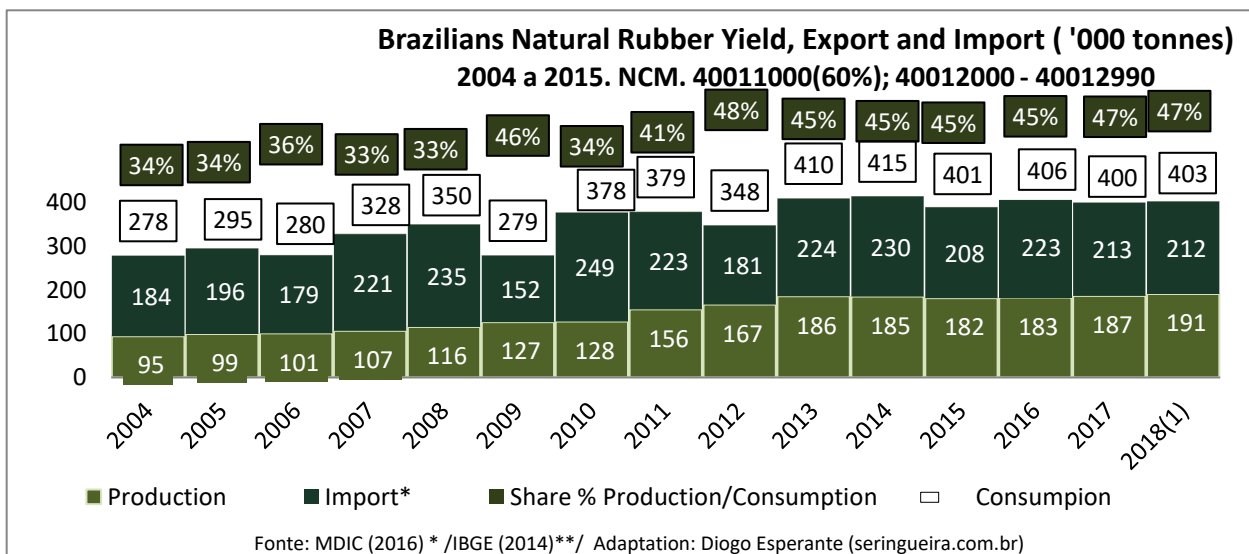
Source: APABOR. Adaptation Diogo Esperante / ABRABOR

Name City/State	Michelin Viana/ES	Michelin Camamu/BA	Havea Tech. Jaci/SP	Braslatex Bálsamo/SP	Globor Jaci/SP	NB Urupês/SP	Quirino Cedra/SP	Coltex 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 from Producer		Third Party Direct from Producer	Third Party Direct from Producer	Third Party Direct from Producer	Direct from Producer	Third Part Direct from Produc	Third Party Direct from Producer	Third Party Direct from Producer	Third Party Direct from Producer
Focus	Tire		Tire	Tire	Tire/other	Tire	Tire/Other	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



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.

a.2) APABOR - IMPROVING QUALITY, SUSTAINABILITY AND PERFORMANCE THROUGH COLECTIVE ACTION

During her lecture during APABOR’s Series of Lectures, in November 2018, Pirelli’s R&D Engineer Yvette Richards gave a piece of good news: Brazilian natural rubber has improved its quality!

This announcement had a special importance for us, as it was the 1-year celebration of the ‘Legal Rubber Program’. (In Portuguese, the word ‘Legal’ also means ‘good’). Its first project was the dissemination of Good Practices for the production of natural rubber.

This project was created from an interaction among the Council of Producers, the Technical Committee and the Council of Processing Plants of the Association. The members of the Association today account for more than 20,000 hectares of rubber plantations and 80% of all rubber processed in the country.

Reduction of contaminants levels

The main purpose of the project, which was the symbol of the launch of a Comic Book Project, was to reduce the contaminants index in the raw material of our Plantations with simple tips on matters such as: separation of the lace, avoiding the contact of the boxes with the land and maintaining cleanliness and good organization of the work environment. Simple activities, but these make all the difference in guaranteeing a quality product.

Ms. Yvette, showed that during the project activity period, in the monitoring done by Pirelli in Brazil, the contaminant indices denoted a significant improvement in the quality of the national

product.

Collective action has greater impact

The success of this initiative has shown that, when we align the entire chain to act together, we generate a greater impact.

It was a demand of the Consumer Industry that led to the processing plants to organize and, together with the producers and agronomists, to elaborate the strategies to obtain that improvement.

With the success of the Comic Book Project, the Association continued the program, which has already launched new projects dedicated to the dissemination of good practices. A Compliance Agreement between the Processing plants (for the dissemination of Good Commercial Practices) and the creation of a Productive Protocol based on the Technical Notes (combined with the training of producers for the elaboration of Management Plans) are the next steps for the year 2019.

This work is essential to not only improve the competitiveness of our Industry but also to enhance the market share of our product by creating more and more attractiveness of the rubber consuming companies and ultimately generating more competitiveness and negotiation capacity of the productive sector. Brazilian Natural Rubber Industry continues to evolve.

Next step to this program is repeating the same strategies in promoting a Road Map to sustainable practices meeting the sustainability standards proposed by an important local consumer (Pirelli). A joint team of 80% of all processing plants in the country was created and using the collective coordination of the association, activities are being designed.

Research and Development

Brazil has developed important Breeding Programs for the last 50 years. Lately focused mainly on productivity IAC has successfully developed series of clones that hold the potential of disrupting Natural Rubber Production in the country.

The IAC 500 series have already, after 17 years of studies, been able to produce 74% more than the main planted clone in the region (RRIM 600).

All these studies have been closely monitored by both laboratories of Molecular Biology (VBMEG Unicamp - Dra Anete Pereira) and Material Engineering (EMBRAPRA São Carlos - Dra. Maria Alice Martins).

As a result, genomic mapping of all 09 hevea species, identification of genomic strains of interest (production, cold tolerance) and development of interaction with nano-composites of cotton and Açaí harvest able to improve Natural Rubber resistance to heat. A whole world of possibilities is opened to be explored.

To fulfill such advantages it is necessary to develop a systematic model for funding such researches. Thus Apabor has created a Think Tank on alternative models of Research and Development funding and has already made contact with 2 big tyre industries and Research Institutes that are working on a program for interacting both private and public resources in helping such important research invocations to follow through.

B).GUATEMALA . NR Production Context

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 represent 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.

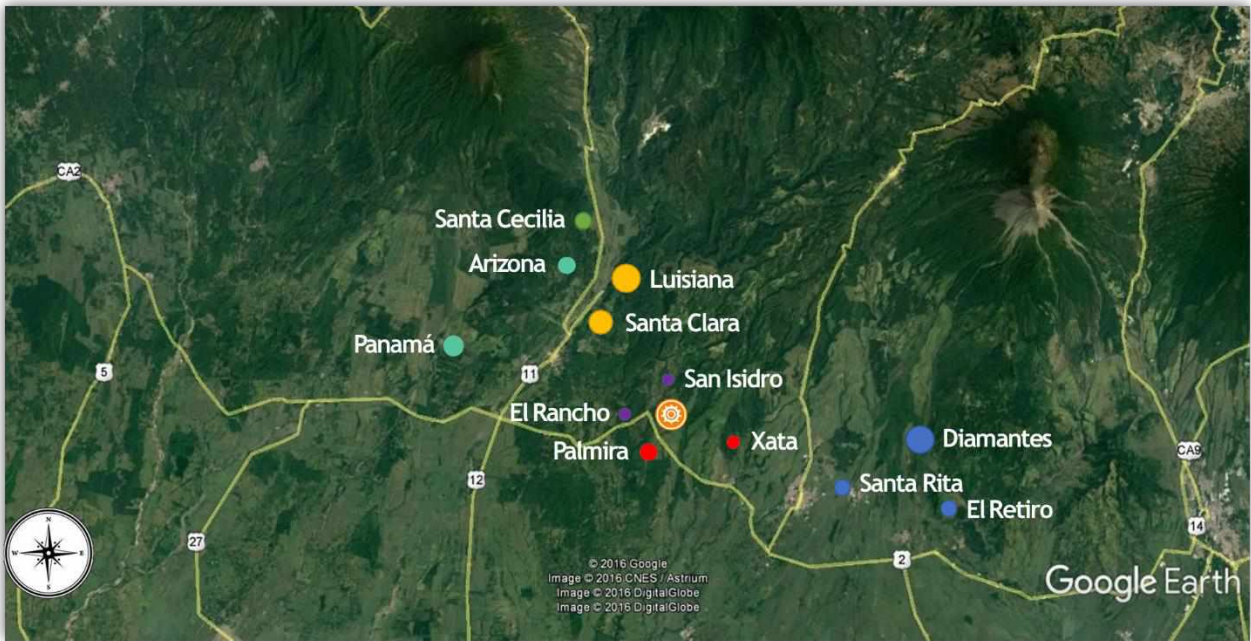
The main processing plants in the region are Grupo Introsa, Grupo Entre Rios, Grupo Occidente and Procesadora Industrial Fortaleza (GF Trading S.A.).

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.

b.1) Grupo Fortaleza GF Trading in Guatemala. Differentiation through Sustainability

Grupo Fortaleza is one of the most important processing plants in Guatemala. Build in 2016 it is the result of joint efforts of a group of 12 plantations owned by local agricultural entrepreneurs already involved in other activities such as sugar cane.



Grupo Fortaleza Guatemala is the world leaders in sustainability aspect with strong 100% FSC Rainforest Alliance certifications. An example that serious independent scrutiny in the natural rubber world is possible and can create a great case of differentiation.



c) COLOMBIA Production Sector Context

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
Total	17.675	23.727	29.140	32.942	36.530	43.200	52.600

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



c. 1) GRELCO. Integrating different solutions and markets for Latex Products

Grelco was originated from a family company that gathers the contributions of 3 generations of agroindustrial experience sugar cane, cotton, palm oil and cattle raising. They are also the owners of Rubber Plantation, a Bio Factory and a Clonal Garden.

The company has also gathered partners with experience in other industries such as: agroindustrial process of palm oil and palm oil processed food industry, Latex processing and production of Industrial Gloves and Health Services Industry.

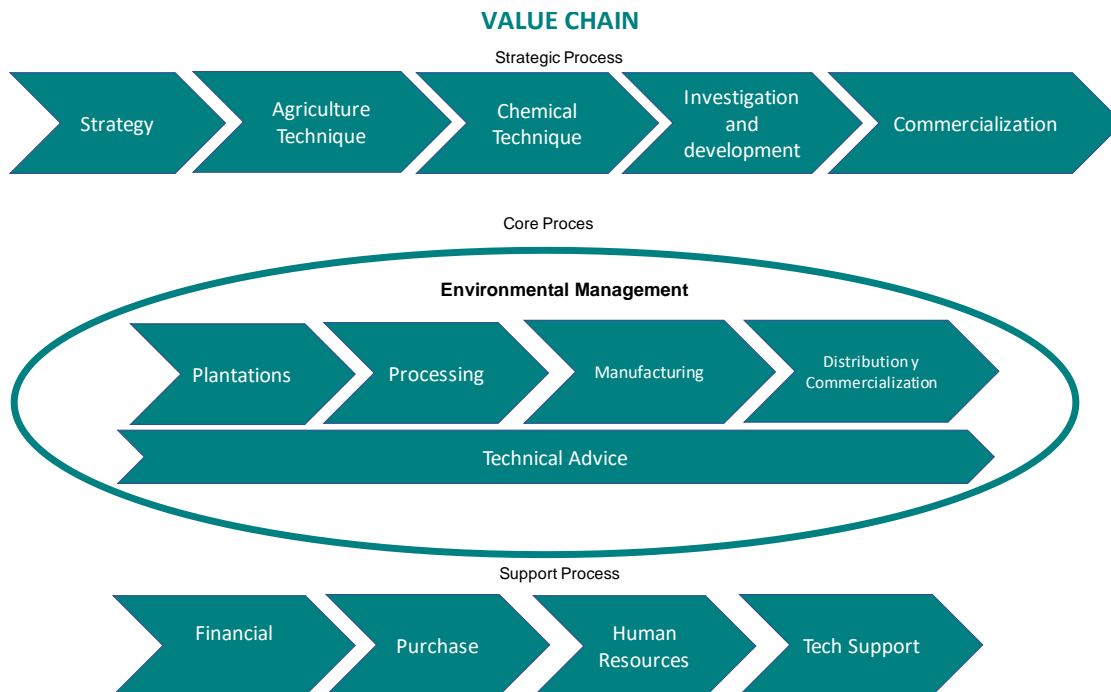
GRELCO´s AREAS OF INFLUENCE

1,250 Ha	Of the owners
3,500 Ha	<i>Carimagua Region</i>
4,000 Ha	<i>Puerto Lopez Region</i>
8,750 Ha	TOTAL AREA

Production of Centrifuged Latex (Wet) DRC 60% (Tons/Month)	750
Natural Latex Consumption (Wet) DRC 30% (Tons/Month)	1,500
Hectares required to achieve maximum capacity	3,000

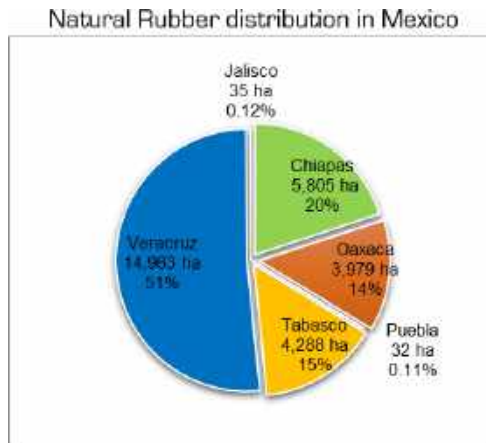


With a value chain approach, Grelco is a company that is expanding vertically gathering partners with experience in different stages of the value chain and differentiating locally with a product of high quality and with low competition.



d) MEXICO. Production Sector Context

Natural Rubber consumption in México accounts for 158 thousand tons of dry rubber annually being the national production of merely 18 thousand tons per year. According to official numbers, the national Rubber Area Cultivated is about 29,102 hectares, concentrated on the states of Chiapas, Oaxaca, Tabasco and Veracruz. The chart below shows the percentages of each area:



Source: SIAP. Anuarios estadísticos SIAP y Rueda *et al.*, 2016.

Out of the whole planted area about 15,000 hectares are in production with an average productivity of 1.2 t of dry rubber. The two main local processing plants are PCLATEZ and PROGOMEX, with 60% and 40% respectively of the total Block Rubber Production in the region. Block rubber accounts for 80% of the country’s total output. The other 20% of the rubber market is operated by smaller plants (mostly concentrated in Centrifuged Latex and Rubber Sheets).



The main source of the local consumption comes from the tire industry with 68.5% of the total. The other 31.5% are consumed by small artifact industries. Interesting to highlight that the world's biggest Balloon Industry (Globos Payaso) is located in Mexico.



Mexico, like Brazil, is also a net importer. It's main sources of imports are Guatemala, Indonesia, Malaysia and Thailand. Interesting to highlight that Guatemala alone responsible for about 41% of the total volume.

Block Rubber corresponds to 68.5% of imports, being latex 30.0%, RSS3 0.3% and other forms about 1.2%.

d.1) PROGOMEX. Interacting with the Supply chain towards efficiency and quality

PROGOMEX began its operations in February 2011 with the first branch located in Jose Azueta Veracruz, later in 2018, operations begin in a second branch in the Municipality of Las Choapas Veracruz, in the limits with the state of Tabasco, which makes us A young company, but with more than 15 years of experience in the business. A 100% Mexican company dedicated to natural rubber processing integrated with highly trained personnel in the development of its processes.

By 2011 PROGOMEX main branch reached 30% of its installed capacity in the production of HEM-20 granulated dry rubber, in 2012 an increase in production of 120% was obtained, and by 2013 an increase was 25% of what was obtained in the previous year. At PROGOMEX Las Choapas, operations begin in January 2019, reaching 30% of its installed capacity in the first month.

Presently PROGOMEX sources from the Mexican regions Veracruz, Chiapas, Oaxaca and Tabasco and also imports from Guatemala. They produce annually a total of 15,000 ton of which part comes from its 1,500 ha plantation (30% under production and 70% still not producing) and the rest from 6,000 producers that sells their cup lumps.

Because of the characterization of its supply chain and in order to be able to guarantee the availability and quality of its product PROGOMEX created a wide range of technical and material support activities like Plant Production of Highly Productive Clones, specialized technical advisory services and Sale of inputs for rubber production. In 2017 through a partnership with Pirelli visited Brazil for a benchmark with the local productive sector. Thus, such activities brought PROGOMEX to interact across its chain of value.

DISCUSSION

After evaluating the different business cases selected for this exercise and analyzing them by the perspective of the Triangular Model of Value Creation, Capturing and Sharing it's possible to highlight some of the practices across such companies that are contributing to some form of strategy described on the model.

In all 4 cases were found activities that are contributing to at least one of the models suggestions.

To the most part each business case brought a specific contribution to the model tripartite approach. There were activities in all 4 business cases analyzed that could also be characterized through the models framework, but due to the limitations of this article we have chosen to select one or two activities per case.

In the case of APABOR, it's characterized that it's Quality Project, consisting in the advertisement of a culture of good practices done across the whole productive chain with engagement from all relevant stakeholders that can be related to the COLLECTIVE ACTION approach regarding to it's point related to **(2) Internal Management.**

Also in the case o APABOR we may highlight it's program to support Institutes and Universities to fund researches that can enhance productivity and product performance within the short and long term as a way of contributing to the COST OF PRODUCTION regarding the strategy of **(g) Creation of new Technologies to improve efficiency.**

In the Case of GF Trading (Guatemala) we can identify a clear contribution to the DIFFERENTIATION factor through (2) Product and Solutions with it's impressive Sustainability project with top Environmental Certifications such as FSC.

Related to GRELCO (Colombia) it was perceived an interesting strategy related to COST OF PRODUCTION related to **(b) Better use of company assets** promoting the integration of different products for different markets within the same company.

Regarding Progomex (Mexico) a contribution to the COLLECTIVE ACTION factor was identified in its project of parting up with client to develop a program to enhance productivity and quality among Raw Material Suppliers, that way contributing to the promotion of **Collective Activities within the Supply Chain.**

Below is a Table with the findings:

Activities/Cases	APABOR BRAZIL	GF TRADING GUATEMALA	GRELCO COLOMBIA	PROGOMEX MEXICO
DIFERENTIATION		(2) Product and Solutions: Sustainability project with top Enviromental Certifications (i.e. FSC)		
COLLECTIVE ACTION				(1) Colective Activities within the Supply Chain: parting up with client to develop a program to enhance productivity and quality among Raw Material Suppliers
COST REDUCTION	(g)Creation of new Technologies to improve efficiency: Support to Institutes and Universities to fund researches that can enhance productivity and product performance within the short and long term		(b) Better use of company assets: integration of different products for different markets within the same company	

CONCLUSION

Although were found examples of activities through out the whole Latin America Natural Rubber Industry that are contributing to the Value Creation, Capturing and Sharing there is the obvious need for multiplying and amplifying such initiatives.

Although the whole region presents good aspects related to Sustainability only in Guatemala were found initiatives that are realizing such strategical advantage.

The regional benchmark is a good strategy but a better Coordination of such activities in a Collective way can help to expand the externalities of such initiatives.

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