



In 2008, ETRMA¹ members committed to work together on three theme related to natural rubber (NR) under the framework of the **European Innovation Partnership on Raw Materials**:

- To ensure fair and sustainable access to Natural Rubber,
- To diversify NR supply in geographical terms – to reduce dependency from South East Asia
- To diversify NR supply in sourcing terms – expanding research into alternative sources, such as the Kazakh dandelion and guayule.

10 Years Later....

- Natural Rubber is recognised as a Critical Raw Material by the EU, acquiring a priority status in EU policies – from trade to research;
- More than 20% of Natural Rubber used in the EU is now sourced from Africa;
- Research projects on dandelion and guayule in Europe are now ready to be scaled to production volumes to supply users of rubber in both the tyre and the non-tyre rubber industries;
- Initiatives on Natural Rubber sustainability have been launched: [SNR-i](#) in the context of the IRSG² and the Tire Industry Project's [Global Platform for Sustainable Natural Rubber](#) (GPSNR), under the auspices of the World Business Council on Sustainable Development (WBCSD).
- Despite this demonstrable progress, the situation regarding the sustainable sourcing of Natural Rubber remains challenging. ETRMA, together with EU and international institutions, will exert themselves to continue on this path of diversification. Matching this Natural Rubber agenda with the environmental agenda of the EU will continue to be a priority. This priority includes a focus on low carbon strategies. One such is the strong potential for rubber trees to sequester carbon. Another is the potential to build a circular economy around NR.

These are some of the themes that were explored during a Seminar, titled, “Sustainable & Critical: Natural rubber and its future” organised jointly by the ETRMA and the IRSG.

A total of seven speakers addressed a full-to-capacity room. Two further question-and-answer panels generated many questions from the audience and lively debate.

¹ European Tyre and Rubber Manufacturers' Association (ETRMA.org)

² International Rubber Study Group (www.rubberstudy.com/)

NR is a critical material

Efforts by the ETRMA led to the inclusion of natural rubber (NR) in the EU list of Critical Raw Materials (CRM) in 2017. NR is now one of 27 materials (see box, right) eligible to receive greater attention and funding from the EU.

As highlighted during the keynote speech from Malwina Nowakowska, Deputy Head of Unit at EC DG GROW, this was a significant development.

Substantial money and resources are available from the EU to support developments in CRMs, especially in the circular economy; in research and development and in monitoring supply and demand. Furthermore, being on the CRM list means having a greater visibility within the EU Institutions as these materials are given priority within all EU policies, from trade – and negotiations of FTAs – to research.

Her keynote speech underlined the importance of matching the tyre and rubber industry sustainability agenda to that of the EU for 2050.

Why NR is a critical raw material

Fazilet Cinaralp, Secretary-General of the European Tyre and Rubber Manufacturers' looked at the data of production, consumption and EU imports of Natural Rubber. She emphasised that a big shift has happened in the past ten years with several producing countries also having become consuming countries - notably Thailand and China. China alone uses nearly 40% of all produced Natural Rubber.

It is also worth noting that China has identified natural rubber as a Critical Raw Material - one of just 10.

The strategic role of natural rubber was again underlined as a key enabler for several industries – especially automotive. The tyre industry alone absorbs about 76% of all natural rubber produced globally.

Limited substitution

Today, there is no substitute for Natural Rubber from *hevea* trees that could be used in all its current applications. The determining factors driving that share of NR in total rubber consumption are:

Technology; and

Composition of the end uses: commercial vehicles tyres use more NR than passenger car tyres.

The share of NR in global rubber consumption has been stable, estimated at ~42% of all rubber, with synthetic rubber (SR) taking the remaining 58%. This ratio is barely affected by price changes.

Engaging with different organisations

OECD works closely with a wide range of organisations, from labour representation to NGOs, as well as businesses. OECD developed several guidelines for multinational Enterprises. These were originally developed in 1976, but have been updated, most recently in 2011, when they were aligned more closely with the United Nations guiding principles for businesses and human rights. The current versions can be downloaded in multiple languages from the OECD website:

<http://mneguidelines.oecd.org/responsible-business-conduct-matters.htm>

The group originally started looking sector by sector, and work on Natural Rubber may start soon under agricultural programmes for Thailand and Myanmar and possibly also for other countries in other regions, such as South America (a programme financed by the EU).

Global Platform for Sustainable Natural Rubber

This industry Initiative builds on a history of more than five years of engagement with NGOs, governments of producing countries and smallholder representatives. It is being developed by the Tyre Industry Project (TIP) of the WBCSD, and will be an independent, multi-stakeholder platform, based in Singapore.

Global natural rubber production is dominated by small farmers (85%). A sustainability programme is needed to face the resources challenges for future mobility needs. Demand for vehicles and tires is likely to double by 2050. No-one thinks it is a good idea to clear forests to double the area under rubber. Instead, the yield of the areas currently planted for rubber should be prioritised.

It is observed that the yield in Indonesia can be as low as 700kg/ha/year, whereas the yield in Cote d'Ivoire can be up to 2400kg/ha/year. This is largely a result of better education and better practices in Cote d'Ivoire.

A common theme among the speakers in this area is that building trust and engaging in constructive dialogue takes time.

Only when good levels of trust have been established, does it become possible to move the agenda forward. Furthermore, all the actors within the value chain – and within that, civil society – are needed to bring their input to this platform.

Salvatore Pinizzotto, Secretary-General of the IRSG reminded delegates that IRSG has been working on these issues for over five years. The IRSG's Sustainable Natural Rubber initiative (SNR-i) is still going strong, with 55 companies having signed up and self-declared as meeting the criteria of the SNR-i programme.

IRSG remains the only platform where NR producers, consumers, traders and others can meet in both formal and informal environments, to discuss the most relevant issues relating to this critical raw material.

Market transparency and the obvious imbalance in access to reliable data remain a main challenge. Most of the consumers have ready access to this data. Among the smallholders, however, there is little awareness of the benefits access to this data could have on their work. Furthermore, availability of this same data is highly restricted for them. In this context, one of tasks of IRSG is to better

communicate at all levels within the different stakeholders in the business. It is believed that new technologies might help achieve this goal.

Alternative supply sources

The second session focussed on two other plant species that might offer some measure of substitutability for NR from the *hevea Brasiliensis* tree.

In the mid-19th century, all of the world's rubber came from wild trees in the Amazon basin in Brazil. Over the years, *h. Brasiliensis* became the primary source of natural rubber, contributing over 99% of the world NR.

However, there are at least two other plant species that also produce natural rubber

One is the guayule plant, *parthenium argentatum*. The other is the Kazakh dandelion, or TKS (for *Taraxacum kok-saghyz*).

Where *h. Brasiliensis* thrives in tropical regions within 10° to 15° of the equator, guayule tends to grow in semi-arid areas in sub-tropical regions, typically from 15° to 40° north or south. TKS, meanwhile, tends to do best in temperate climates, from around 40° and as far as 60° from the equator.

In both alternative species, there have been extensive cultivation and breeding programmes in Europe, North America and elsewhere over many decades.

Domestication of wild plant species

Mr Sorensen, Vice-President New Business at KeyGene, explained that one of the challenges that these breeders face is that the plants are essentially wild, and they need to be domesticated.

Mr Sorensen illustrated how his company is doing just that in order to develop new varieties of TKS using genetically-guided breeding.

This process uses the same traditional cross-breeding techniques used by farmers and agronomists for centuries, but the process is dramatically speeded up through genetic analysis of the potential breeding stock.

Each plant has its genome analysed, and those that have genes linked to desirable characteristics are selected as breeding stock; while those that have genes linked to undesirable characteristics are rejected.

In this way, the process of domesticating a wild plant can be accelerated from centuries to a few decades.

Progress in TKS

Mr. Sorensen said that his company is working through the EU-funded DRIVE4EU project, to develop new varieties of TKS that can deliver around 750kg/ha/year of rubber.

The rubber in the TKS plant is harvested from the root. The purity and quality of the rubber extracted from the root depend on the processing method. Those delivering better rubber are also more expensive. As a result, current methods are not suitable for tyres, where the purity needs to be above the current standard of around 85%.

He said the Keygene project is just one of a series of projects being carried out in parallel around the world. These include the PENRA initiative in the United States; the *Taraxagum* project by Continental with support from the Fraunhofer Institute; the Chinese project on Russian Dandelion strategic cooperation and the Kultevat project to develop an alternative to *h. Brasiliensis*.

Progress in Guayule

Michel Dorget of the Centre de Transfert de Technologies du Mans told a similar story about guayule. The EU has been funding research under the earlier EU-PEARLS project and more recently under the FEADER programme. Additional national funding has been secured through ADEME (France).

In the case of guayule, the economic model involves valorising latex and all co-products: notably the bagasse, or plant material, as well as the resins that also grow in the plant, and possibly the use of inulin as a higher-value product.

The aim would be to sell guayule latex into relatively high-value goods, such as latex gloves, condoms and suchlike, rather than make it into solid rubber for use in tyres.

The latex from guayule is less of an allergen than the latex from *h. Brasiliensis* and the mechanical properties of the thin film provides more flexible behavior. There is therefore the potential to create high-value hypoallergenic products from the guayule latex.

The FIGUALEX project started in October 2017 to produce a mobile extraction pilot based on a patented water-based process which will provide a sufficient production quantity to get a technical and economical assessment of the guayule chain. In terms of agronomic projects, 2 hectares have been planted today, focusing on marginal land (not competing with food crops), the first crop will be obtained after 2 years, then guayule will be harvested every year

The common call from both the dandelion and the guayule communities is that they need funds to demonstrate that their plants can be grown in large quantities.

What is a 'Critical Raw Material'

The EU has had three rounds of identifying critical raw materials (CRM). The first was in 2011, when the raw materials initiative was launched. The list is reviewed (at least) every three years, so reviews followed in both 2014 and 2017. Natural Rubber was added in the 2017 review.

The criteria for identifying the most critical of these include both economic Importance, and supply risk.

Economic importance is measured according to the value added from imports of raw material to finished products. This is decreased if there is scope to substitute the CRM for another material.

Supply risk is a measure of how likely is the risk of a disruption to EU supplies of the material, based on the geographic sources of the material; the routes to production of the raw materials. Recycling and substitution both reduce the supply risk factor.

The current CRM list contains just 27 materials, following studies of 61 candidate materials. These are identified as the most significant in the EU for research; for funding and for attention.

Materials on the Critical list

Antimony	Fluorspar	Light Rare Earth Elements (LREEs)	Phosphorus
Baryte	Gallium	Magnesium	Scandium
Beryllium	Germanium	Natural graphite	Silicon metal
Bismuth	Hafnium	<u>Natural rubber</u>	Tantalum
Borate	Helium	Niobium	Tungsten
Cobalt	Heavy Rare Earth Elements (HREEs)	Platinum Group Metals (PGMs)	Vanadium
Coking coal	Indium	Phosphate rock	

The EU has a measure of both economic importance and supply risk. Natural Rubber has an economic importance measure of 5.2, compared to an economic importance threshold of 2.8.

Natural rubber has a supply risk value only just above the EU's minimum threshold of unity and is therefore considered one of the least at-risk of the CRMs



Annex 3: Abbreviations

ADEME	French Environment and Energy Management Agency
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CRM	Critical Raw Material
ETRMA	European Tyre and Rubber Manufacturers Association
EU	European Union
FEADER	Fonds Européen Agricole pour le Développement Rural
FIGUALEX	Filière Guayule Française de Latex
GPSNR	Global Platform on Sustainable natural rubber
HREE	Heavy Rare Earth Elements
IRSG	International Rubber Study Group
LREE	Light Rare Earth Elements
NR	Natural rubber
OECD	Organisation for Economic Co-operation and Development
PGMS	Platinum Group Metals
SICOM	Singapore Commodity Exchange
TIP	Tire Industry Project (of WBCSD)
TOCOM	Tokyo Commodities Exchange
WBCSD	World Business Council on Sustainable Development

Annex 4: Useful resources

Event website	http://eurawmaterialsweek.eu/events.html
Event programme	http://eurawmaterialsweek.eu/PDF/Sustainable_Critical_Natural_rubber_and_its_future.pdf
Papers from event	http://www.etrma.org/uploads/ModuleXtender/Eventsmanager/47/20181119 - Booklet_Event.pdf
Event Attendee list	http://www.etrma.org/uploads/ModuleXtender/Eventsmanager/47/20181106 - LoP - effective_participation.pdf
EU CRM home page	http://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en
ETRMA home page	http://www.etrma.org/
IRSG home page	http://www.rubberstudy.com/
SNR-i homepage	http://snr-i.org/
OECD home page	http://www.oecd.org/
WBCSD-TIP home page	https://www.wbcsd.org/Sector-Projects/Tire-Industry-Project
WBCSD-TIP's GPSNR	https://www.wbcsd.org/Sector-Projects/Tire-Industry-Project/News/Launching-the-Global-Platform-for-Sustainable-Natural-Rubber