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Ecoflora: Sustainable Innovation in an Emerging Economy

Ecoflora's general manager, Nicolás Cock, was used to making difficult decisions. Since he took charge of the company, he wasn't afraid of changing directions if the situation required it. He thought he intuitively knew what was right for the company, and results seemed to prove him right. However, as 2020 was coming to an end, his intuition appeared to be failing him.

Through crises, learning, and adjustments, Ecoflora had perfected its business model and was developing products with the potential for financial success, while also preserving the environment. Several international prizes and accolades had put Ecoflora on the map and brought it to the attention of investors. Nicolás knew this was the right time to scale the business. Pro-bono consulting teams from business schools, such as Stanford, Harvard and MIT recommended expanding to the US market.

The company had worked hard to set up a network of suppliers in some of Colombia's poorest regions. This was not some showcase social responsibility program that companies implement to gain goodwill from stakeholders, with little business relevance. Rather, the partnership with subsistence farmers was the source of 100% of the raw materials used for producing natural colorants, with a huge market potential. In fact, catalyzing positive change in marginalized communities was one of the reasons why Nicolás became involved with Ecoflora in the first place. However, demand forecasts suggested that the company would soon need to expand its base of suppliers to avoid bottlenecks in its procurement needs.

Nicolás knew that Ecoflora's success would require giving the brand more visibility, increasing market share for its products, and gaining a foothold in international markets. He also knew that

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At the time this case was developed, the SEKN membership consisted of EGADE, ESADE, ESPAE, IESA, INCAE, Universidad de los Andes, Universidad de San Andrés, Universidad del Pacífico, Universidad Adolfo Ibáñez and Universidade de São Paulo.

success would bring social and environmental benefits. However, growth would entail making difficult decisions and he was not sure what price he was prepared to pay. Some people inside the company saw no reason to reconsider Ecoflora's longstanding policy of procuring supplies exclusively from Colombia's poorest --indigenous and Afro-descendant communities. Others argued that scaling output would require changing course and developing partnerships with farmers and cattle ranchers as the cornerstone of a new procurement policy.

Rural Development in Colombia

Despite the many economic achievements in Colombia since the turn of the century, the country still had one of the most unequal distributions of wealth in the world (Serrano, 2018); inequalities in per capita income and social services between urban and rural areas were particularly marked (*see Exhibit 1*). Furthermore, highly concentrated land ownership remained a recurring source of conflict (DNP, 2016).

When it came to farming, coffee had been fundamentally important to the country's development, especially from the 1930s onwards. Although its importance to the country's economy had fallen in recent years, coffee still employed close to 35% of the rural workforce. In the countryside, opportunities had been scarce (labor supply had historically been higher than demand), which led to internal migration and poor working conditions (Arboleda *et al.*, 2019).

Coffee production was based around smallholder cooperatives. These banded together in the National Coffee-grower's Federation (FNC), the world's largest private nonprofit organization devoted to rural development. The FNC had created *Cenicafé*, Colombia's Coffee Research Center, dedicated to innovation that could strengthen the sector's productivity, lowering coffee growers' costs and improving their products' quality. A multi-layered structure --with committees at the municipal, departmental, and national levels--ensured that the voice and interests of coffee growers were heard and shaped the organization's strategy.

This institutional framework was a huge support to Colombian agriculture and helped consolidate the country's coffee economy... [as well as] keeping most coffee-growing areas out of the social and political conflict that marked the rest of the country (Muñoz-Mora, 2010, p. 21).

One third of agricultural exports in 2015 were generated by 550,000 coffee-growing families living in 595 Colombian municipalities. In addition to strengthening economic production, the cooperatives also provided important social services such as education, housing, health and infrastructure (Rodríguez Vargas, 2008). Coffee was grown in every Colombian department, including Chocó (one of Colombia's poorest departments, largely covered by dense jungle and populated by Afro-Colombians), but in Chocó the cooperative-based institutional framework that prevailed in other regions never took root and did not produce the positive results that had been achieved in the neighboring departments of Antioquia and Caldas (Arboleda *et al.*, 2019).

Company Origins

Ecoflora was born in 1997, when Nicolás's father, Jorge Eduardo Cock, and one of his nephews decided to acquire a microenterprise that made plant extracts. The company belonged to family friends that were professors at the *Universidad de Antioquia*. According to Jorge Eduardo,

...my nephew and I had a successful flower export business. One day he said to me: 'they're asking if we want to get involved in a 'minuscule' enterprise¹ in eastern-Antioquia that makes plant extracts for different purposes... aromatherapy and things like that.' We got involved without giving much thought to the idea because the investment was really small, and the other partners seemed interesting.²

The Cocks were known in the Department of Antioquia for their leadership and commitment to public service. Jorge Eduardo's father got things started when he decided to leave a successful career as a surgeon to set up the Antioquia Red Cross, the Colombian branch of the Boy Scouts, and to cofound the Society for Public Improvement. Jorge Eduardo was also Minister of Mining and Energy and a member of the World Bank's board of governors. During his time as a public servant, he visited Chocó with his family. Chocó was Colombia's poorest department, and bordered its most developed, Antioquia. On that visit, he was struck by the poverty he saw, and by the potential of the region's natural resources to bring prosperity for its inhabitants.

Around this time, Nicolás completed his undergraduate studies in civil engineering in Maryland. He started working for the Inter-American Development Bank's (IADB) Central American Environmental and Natural Resources Division, and soon after that he enrolled in a master's program in environmental policy and natural resources at George Washington University. He completed his studies with a course in Mexico on analog forestry, an ideal way of restoring degraded ecosystems.

In 1997, Nicolás created *Fundación Amigos del Chocó* (Friends of Chocó Foundation)—with support from his sister, parents, family and friends—to make this Colombian region more visible to multilateral organizations. As an IADB consultant, Nicolás had seen first-hand the large-scale projects that governments and multilateral organizations had planned for Chocó and the Darien Gap region. He thought that these mega-projects were not appropriate for these ecosystems, because they did not focus on development by sustainably exploiting the region's natural resources and unparalleled biodiversity.

Moved by his uneasiness with the prevailing development paradigm, Nicolás decided to move back to Colombia in 2000. When he visited the micro-enterprise his family had acquired, he found poor working conditions, low sales, and virtually no profits—all of which led to the exit of non-family partners. At age 24, Nicolás decided to take on the challenge of turning around the organization.

¹ Then called *Aromáticas y Medicinales La Selva*.

² This testimony, and others used in this case, comes from interviews conducted by the authors with Ecoflora directors in April and May 2015.

The Early Years

Pests were becoming more resistant to agrochemicals, and many global corporations were refocusing their research. As Nicolás explained, "on the one hand, they need to fund more and more toxicology tests, which makes it more expensive to find and patent a chemical pesticide, but agrochemicals' service life is getting shorter." He added that although biopesticides made up just 3% of the market, they were growing at an average annual rate of 17% --with agrochemicals growing at 3%. The trend was clear, and it defined the opportunity that Ecoflora decided to bet on. In Nicolás' words:

In 2000, there were around 1000 active ingredients approved for European agricultural use; ten years later, only about 250 were left. The rest had been prohibited or restricted. The toolkit at farmers' disposal to protect crops from pests was shrinking rapidly. There's a great need for the type of solutions that Ecoflora is producing.

Once it took over Ecoflora, Nicolás sought to position the company as a supplier to the farming and food industries, with natural and healthier products that also feature functional benefits over the products they sought to substitute. According to Nicolás, Ecoflora aimed to benefit society by "migrating from the oil age towards a bioeconomy, using more biological resources than petrochemical ones, and substituting polluting products that relied heavily on fossil fuels in their manufacture for products derived from vegetable biomass." As explained by Juan Fernando Botero, president of Ecoflora Cares³, his company was focused on using "formulas that were more natural than those traditionally used, with a functional premium," because "people are not willing to sacrifice efficacy just because a product is natural."⁴

During its early years, Ecoflora produced two very effective natural products: a mosquito repellant and a multipurpose cleaner. The former was inherited from the university professors who had led the company before the Cock family took over, who researched biotechnology. Since the repellant was readily available, someone suggested trying it out on flower plantations. This resulted in a biopesticide that enjoyed higher sales than the original product.

Nicolás' first drive was to generate a substantial cash flow for the company, by selling a high volume of bulk supplies to agroindustry. After conducting field tests on several crops, he decided to prioritize intensive farming, high-value crops, and fresh produce whose customers were sensitive to the presence of residual pesticides and other unhealthy substances.

However, an unexpected event got in the way of this plan. In 2004, one of Ecoflora's main customers for prepared soil and substrates became a direct competitor, and the result was a drastic drop in sales and cash flow. This crisis made Nicolás reconsider his business strategy: "selling commodities in bulk quickly generates cash flow," he thought, "but it also places the company in a position that can be easily imitated and substituted." He decided that from then on, Ecoflora would focus on innovation.

³ One of the two companies that emerged later, when Ecoflora was split up.

⁴ The use of pesticides and amount of residue are two of the dimensions in which conventional agriculture and organic agriculture differ. Biological preservation is the positive result of organic agriculture in both dimensions. **Exhibit 2** shows a 12-aspect comparison between these types of agriculture.

However, betting on innovation as a small business had its own risks, especially for a microenterprise. Developing a product based on natural ingredients took three to four years of research and required an average investment of over one million dollars. This was substantial capital, and there were no investors in sight who would be willing to take on such risk. James Jiménez, Ecoflora's R&D+i Manager explained:

The research process is very complicated because you have to: (1) Understand the problem that needs to be solved; (2) search for a needle in a haystack to find the ingredient you need; (3) ensure the conditions for this ingredient to work well in the formula by being effective, stable and not degrading over time; and, (4) after around 2.5 years of laboratory-based research, verify that it has the same efficacy in the field.⁵

The company did not have an R&D budget that allowed it to undertake long-term projects, so it decided to leverage the funds and capabilities at hand in its milieu: it formed alliances with public universities in Antioquia that wanted to contribute to productivity in the region. These alliances multiplied Ecoflora's R&D capacity and led to the development of various products.

In 2006, the company started to develop a blue colorant based on *Genipa Americana*, known as the genip tree. This colorant had been used since ancient times by Colombian indigenous communities (see **Exhibit 3** on the use of genip by original populations). The product was interesting for several reasons: it could be sold to various industries as a substitute for chemical dyes that were harmful to the environment, which meant that demand could be substantial. In addition, the tree grew wild throughout Chocó, so exploiting it commercially could be beneficial to the region's Afro-Colombian communities that who lived in precarious conditions.

That same year, an opportunity arose that caught the company's attention. Company representatives attended the In-Cosmetics Global 2006 fair in Barcelona and established contact with a cosmetics firm. Primal Cosmetics was an English company that sold temporary tattoos, and it was looking for a non-toxic colorant that would remain stable on the skin for around three weeks. Ecoflora's colorant was exactly what Primal needed, so they offered to supply it using Primal's licensed technology.

By early, 2007, Ecoflora completed testing and started production. Primal's product went viral, helped by celebrities (including Madonna) who posted selfies with temporary tattoos prominently displayed on their bodies. Everything seemed to point towards a phase of huge sales and rapid growth. However, fortunes changed dramatically a few months after the product's release, as consumers began to report that the tattoos were unstable and did not last as long as promised, generating a wave of complaints and frustration. Although legal liability fell solely on the English company as the owner of the technology, the news affected Ecoflora's team, especially Nicolás. Soon after, Primal went bankrupt and this line of business was discontinued.

The financial consequences for Ecoflora were not trivial: invoices were going unpaid, and the team was frustrated and demoralized. However, Nicolás learned a valuable lesson from the experience: "There is no sense in just assembling a product or making supplies for someone else's

⁵ Until this point, Ecoflora had focused on R&D: a monetary investment to obtain knowledge. Later, in Ecoflora's history, it added innovation: an investment of knowledge to obtain money (R&D+i).

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product. This means that you have to share the bad times, but the good times belong to someone else.” So, Ecoflora decided to focus on making its own innovative products.

Innovation was nothing new to Ecoflora, but some members of its board of directors were not convinced about the feasibility of a small Colombian business competing in global markets based on innovation. Many thought that betting on innovation was “a luxury that only large companies can afford.” Despite these doubts, Nicolás managed to get the board to back his objective, and the following year (2008) Ecoflora was awarded its first patent, followed a year later by two more.

But then another unexpected event occurred. In 2008, Nicolás approached Peru’s principal asparagus exporter, who had around 5,000 hectares under cultivation. The company expressed an interest in Ecoflora’s organic pesticide, and Nicolás signed an agreement with two Peruvian distributors to increase export volumes and meet the needs of the new customer. Shortly after, the financial crisis hit Peru’s main export markets for asparagus, the United States and Europe, and demand and prices plummeted. Margins along the supply chain were squeezed, and big players pressured the smaller ones to absorb the bulk of the adjustment. As Nicolás explained:

The crisis with our Peruvian distributor forced us to reconsider our pricing policy. Until then, our prices were based on our costs plus an industry-standard margin. Pressure from these large distributors made us aware of the risks of this approach: we could not absorb shocks. From then on, we began to set prices based on the value perceived by the customer. In practice, this meant increasing prices by an average of 30%. Despite the changes caused by the financial crisis of 2008-2009, our sales were not affected. In fact, they grew and had a notable positive effect on the company’s EBITDA.

Entering the Ecosystem

When Ecoflora began operations at the end of last century, its financial capital and technical knowledge were very limited. From the outset, Nicolás knew that he would need to leverage third-party resources by forming alliances with *Paisa*⁶ organizations that had compatible missions or strategies. Ecoflora’s first product was a fruit of this strategy, and it was produced in collaboration with the *Universidad de Antioquia* during these early years. Jorge Eduardo Cock explained:

We conducted an analysis with the Interdisciplinary Molecular Studies Group from the *Universidad de Antioquia*. These evaluations returned very good results and we used them to develop a mix of nine plant extracts that formed the basis of Ecoflora’s first product, *L’ecomix*, that still uses the same formula today.

These relationships were usually managed by James Jiménez, Ecoflora’s R&D+i Manager. He had an undergraduate degree in agronomy from the *Universidad de Caldas* and a Master of Science in Biology with an emphasis in phytochemistry from the *Universidad de Antioquia*. According to James, the essence of the alliance policy was as follows:

We have relationships with research centers, universities, and other companies, and we share information on the new things they have and their level of progress. This enables Ecoflora to

⁶ The colloquial name for people from the Colombian Department of Antioquia.

determine what level of investment and effort would be required to create new products based on the information shared.

The protagonists believed that this collaborative work had resulted in multiple synergies. “For example, *Bichópolis*⁷ is currently evaluating some of our new products to see if they interact with their natural enemies,” said James. “We have approached other companies... seeking to incorporate more technology into our products.” Over time, the alliance policy began opening to other stakeholders and growing in ambition. The universities that Ecoflora approached stopped being exclusively regional: “In addition to continuing and preserving our alliances with local universities, we formed alliances with universities in Germany or the USA,” explained Juan Fernando Botero.

Ecoflora’s role in these relationships evolved over time. Initially, the company wanted to access its partners’ scientific knowledge, but eventually universities began to seek out Ecoflora for its capacity to develop new technologies or to find commercial applications. “We were able to license technologies from research centers. For example, the Spanish *Consejo Superior de Investigaciones Científicas* contacted us about developing an extract and identifying specific varieties of plants for new products. What is interesting,” emphasized James, “is that Ecoflora did not contact them. They came to us to offer us this technology. We evaluated it and saw that it was an interesting opportunity.” Nicolás recalled a similar situation:

Three Spanish universities had developed a technology to protect crops using plant extracts, and had obtained two patents. We obtained an exclusive twenty-year global license to use this technology, beating a number of Spanish and European companies in the process. They couldn’t believe that a small Colombian company could obtain a global license for European technology!

The company also pursued opportunities for private-public partnerships. “We focused on calls for university-company joint projects under policies from *Colciencias*⁸ and *Innpulsa Colombia*⁹,” explained James. Ecoflora sought to align its priorities with public policy to be able to access soft loans and was chosen to implement projects for the National Learning Service (SENA)¹⁰ and *Fomipyme* (a Ministry of Commerce, Industry and Tourism financing program for small- and medium-sized businesses).

Ecoflora’s engagement in networks was not limited to collaboration in technology and financing. On the contrary, it also joined international networks that promoted the use of biopesticides, such as the Biotrade Facilitation Programme, the Union for Ethical Biotrade and the International Biocontrol Manufacturers Association. Nicolás was invited to join the Endeavor global entrepreneurship

⁷ Colombian company whose mission is the production, import, and commercialization of biological solutions where insects are used for biological pest control and the improvement of the conditions of commercial crops.

⁸ The Administrative Department for Science, Technology, and Innovation (*Colciencias*) has been the Colombian entity responsible for public policy in these issues at the Ministry of Science, Technology, and Innovation since 2019.

⁹ *Innpulsa Colombia* is the national government’s business growth unit, and was created in February 2012, to promote entrepreneurship, innovation, and productivity as central to business development and competitiveness in Colombia.

¹⁰ A public institution that provides technical education to economically poor Colombians.

network, “the world’s leading community of high-impact entrepreneurs,” according to its website¹¹. Nicolás recognized that this was “an important catalyst for Ecoflora and a source of support that accelerated growth.”

Consolidating the Innovation Process

The innovation management system started with the idea-generation stage, continued through research and product development, and ended with the product’s launch. As part of this process, Ecoflora sought to support employees’ academic development, supporting master and doctoral level studies in various ways. In 2007, Nicolás gave a formal structure to the company’s various R&D projects—many of them financed by *Colciencias*—with processes that featured clear criteria for moving through each stage. *Colciencias*’s support was linked with competitiveness policies at the national and department levels. It sought to upgrade an economy based on cheap labor and the exploitation of raw materials, towards a knowledge-based and innovative economy, geared towards global markets. As Sandra Zapata, Ecoflora’s VP Innovation explained: “It was a risky bet because the whole company was articulated around innovation.”

The management of innovation was structured around staged processes in which “each stage had to generate enough information for the project to pass through a gateway that evaluated its efficacy and economic viability, and the numbers were further refined as the investigation process progressed,” said James Jiménez. Armed with this system, the company and its allies embarked on an aggressive search to finance innovative biotechnology projects. These efforts resulted in a pool of projects with 100 new business opportunities, based on the production of specialized plant extracts of high added value for the food and cosmetics industries.

These projects gradually bore fruit in the form of new products, and Ecoflora developed insecticides, molluscicides, fungicides and other products for agroindustry. The plant extract-based insecticide *L’Ecomix*, for example, was approved for use against whiteflies that affected potato, tomato, avocado and melon crops in Colombia, Ecuador and Costa Rica. This facilitated alternative means of pest control—such as mixing or rotating with traditional products—that proved very effective on the majority of pests that had become resistant to traditional methods.

For the food, cosmetics, personal care, and home markets, Ecoflora developed native plant extracts such as borojó, cardamom essential oils, and colorants such as the blue dye obtained from genip seeds. As research progressed, ever more uses were discovered for these plants, such as cardamom’s diuretic, digestive and stimulant properties. Its technical knowledge allowed the company to create products with multiple benefits, such as a natural cleaner that is also an insect repellent effective against ants, spiders, and cockroaches.

The innovation system also generated technological monitoring and competitiveness tools to keep Ecoflora abreast of patents for novel natural products, and to identify gaps in the market that could become new opportunities. Intellectual property protection (patents, brands, means of use, industrial secrets, etc.) and risk management (regulatory, intellectual property, commercial viability, etc.) policies were also implemented.

¹¹ <https://endeavor.org>, accessed on 30-Dec-2020.

In 2007, a year after implementing the system, Ecoflora won the prestigious Innova prize.¹² That year marked a milestone that proved that the changes that had begun eight years before had reached maturity: in its strategic planning strategy, the company formally stated it would no longer produce supplies or raw materials; its strategic drive would be to patent and sell technologies developed with strategic allies through licensing, supply and distribution agreements. As Nicolás put it:

Our core is not growing crops. That's one part of the business, but it's more of an investment, or a necessary evil, that allows us to develop and then transfer knowledge to smallholders, so they can supplement their income, not replace it. Ecoflora is a knowledge-based company, not an industrial one.

The new strategy called for making decisions with long-term implications: "We had to develop our own team of scientists and build our own laboratory. We had to develop these internal capabilities," explained Juan Fernando Botero. "We wanted to maintain our alliances with academia, but we couldn't depend on them for all our needs. As we left behind our dependence on universities, third parties and manufacturers, we were able to standardize our processes," added Sandra Zapata.

The new focus was reflected in resource allocation; more than half of the company's new budget was earmarked to protect intellectual property and for research. Soon after the new focus was formally stated, Ecoflora registered four patents with the United States Patent and Trademark Office, and two with the Patent Cooperation Treaty¹³. By 2009, Ecoflora was developing close to 30 products, and was in the process of registering ten patents. In just a decade, the company had gone from being a bulk-seller of raw materials to being a pioneer in creating knowledge-intensive products using its own trademarks. As Nicolás said:

Today we can say that Colombian-developed technologies based on plant extracts have been successfully validated on five continents. It makes us proud that each month we receive positive feedback from efficacy tests conducted in very diverse agricultural and climatic conditions... on a variety of crops, with very good results. We are even in the process of licensing some of our technologies to third parties, because we realized that we may not be the best company to develop the full potential of some products.

As part of this process, in 2011 the production of biopesticides for agricultural use was spun off to an independent company, called Ecoflora Agro. Home care, personal care, and garden care products went to another independent company under the Ecoflora Cares brand. The separation of business units for the food and cosmetics industries allowed Ecoflora to create specific strategies and business models for each. According to Nicolás, although there was "a strong affinity in their technological base and supply chains, from a market perspective they are completely different universes." Having different companies that shared the same DNA allowed Ecoflora to capture synergies within the group, but also to select different partners for each industry (see **Exhibit 4** for Ecoflora's milestones).

¹² The Colombian Prize for Business Innovation in Micro, Small and Medium-Sized Businesses is one of the Ministry of Commerce, Industry and Tourism's longest-running campaigns to encourage a culture of innovation and increased productivity.

¹³ The Patent Cooperation Treaty (PCT) is an international agreement for intellectual property and patents signed by 183 countries. PCT facilitates patent registration in all signatory countries.

The Supply Chain

The goal of catalyzing positive change among Chocó's population had been on the minds of the Cock family from the moment they acquired Ecoflora. As Nicolás explained, company shareholders wanted to work "with the poorest communities in the country, people who lived in places that were rich in biodiversity, but with very few income-generating opportunities. In traditional agriculture, raw materials come from domesticated sources, products are cultivated in shorter cycles, and they tend to be grown by communities with fewer vulnerabilities". Ecoflora decided to focus on the innovative use of newly discovered active plant components from largely unexplored ecosystems, apart from the traditional agricultural landscape.

"Once we have a demand forecast," explained James, "we have to reverse engineer the process and think how to ensure the supply of those materials." In a similar line, Nicolás added,

We developed plans for the management of wild components; sometimes we experiment with cultivation, usually in partnership with a nonprofit. We have incorporated into our team and organizational structure, individuals, and areas specifically dedicated to managing this non-traditional supply chain. We also developed metrics, and a portfolio of programs aimed at the communities we work with, to offer rural extension, including technical assistance and training, and financing –some of which is funded with our own resources and from other sources, such as international cooperation.

Developing such a model was far from easy, and it involved plenty of experimentation and learning. Initially, the organization tried to align its incentives with those of smallholders; the idea was that the latter would be more invested in the harvesting process if they had a stake in the company's success. Stemming from that concept, a joint venture was created between Ecoflora and smallholders in Chocó. Although the idea of fruit pickers being shareholders sounded good on paper, in practice the results were not as good as expected. As Jorge Cock reflected:

We made the mistake of depending on just one supplier to organize fruit pickers. Soon a tension began to simmer around whom did the value being appropriated belong to, either the fruit suppliers, or the company where they held shares. We were never able to resolve this friction. When pickers realized they called the shots, they started to impose price conditions that bordered on extortion... They preferred to see the company go bankrupt rather than accepting a fair and sensible price that was economically viable, one that would be profitable for the joint-venture and generate value for them through dividends.

In another attempt to rethink its relationship with suppliers, Ecoflora tried to maximize production at the source. As Nicolás recalled,

We invested in a floating factory on the Atrato river to process *açaí*. We struggled to make it work for five years, but the challenge got the better of us. No wonder we don't see more of these initiatives materialize. Developing a supply chain in such complex conditions is a daunting challenge. We gave up and let that venture go bankrupt... Right now, the jungle is eating up the factory. But we did learn something important from the experience.

Ecoflora's model started to take shape around the development of a blue colorant derived from genip. According to Juan Fernando Botero, "the B2B unit that supplied the food and cosmetics

industries had been researching a natural blue colorant derived from a Colombian plant, which had the potential to disrupt the colorant market.” The natural blue colorant they found filled an important gap in the market because it was stable and did not degrade when exposed to UV light, temperature, or PH. The source of this colorant was the genip tree that grew wild in abundance across Chocó. “We had seen that indigenous populations painted their faces with a blue-black dye... We had developed working relationships with local communities through various other projects. An idea emerged to develop a colorant with them, and see where it took us,” said Jorge Eduardo.

But the idea proved to be more complex than originally thought. Unlike other Colombian regions where farmers had a long-standing tradition of working in cooperatives and had an institutional framework to support their work, in Chocó farmers had no such business traditions. Many civil society organizations and development organizations were doing social work there, but few companies had gone to the region in search of suppliers. Nicolás knew that his biggest challenge would be the supply chain: “We were trying to work with Afro-Colombian groups that had little formal education and no business skills at all.”

In Ecoflora’s view, the main problem was how to supply the fruit. Whenever Nicolás went to Quibdó (Chocó’s capital) it was easy for him to find about half a dozen vendors of the genip fruit in the local market ready to sell limited amounts, useful for research purposes. However, there was no system in place that could supply fruit to generate output on an industrial scale. It was Sergio Arango, Ecoflora’s Supply Chain Manager, who found a way out of this situation.

Sergio had heard of Ecoflora when he was director of *Fundación Espavé*, an organization dedicated to helping marginalized communities in Colombian Pacific coastal areas to find sustainable economic opportunities from nature. This nonprofit had been working with genip, and its mission was fully in line with Ecoflora’s. After Sergio was recruited by Ecoflora, he continued to see himself as a social entrepreneur. In his opinion, the main bottleneck he suffered in his previous work in the social sector was the lack of scalability of most development programs:

There were local initiatives for forest fruit production, or dye made from forest fruit. These were tiny and did not go beyond a micro, very micro level; as a consequence, they had little impact... Beyond small local initiatives, the only way of helping a region take off and having a real shot at economic development was to connect smallholders with companies that will open up markets for them, that will do research to support their output, and who are willing to support communities with technical training to manage and supply plant resources.

While he was at *Fundación Espavé*, Sergio approached Nicolás and proposed that Ecoflora develop this supply chain; the latter accepted, and this was the start of an alliance between the organizations. Over time, however, Sergio started to feel that he could increase his impact from “the other side,” as his work as *Espavé’s* director was not generating the results he expected. After joining Ecoflora, Sergio continued his work, but rather than working for a nonprofit he was now part of a company that sought to articulate supply chains that reached the poor. His decision was not well received or understood among some of his civil society peers. As Sergio explained,

Many said, ‘this guy has sold out to the private sector,’ an accusation that affected some of my friendships. Some people never understood, nor will they ever understand... However, from

my point of view, I was doing what I always dreamed of! I was now able to work at scale, to multiply my work and replicate it in other regions, to an extent that I had not thought possible.

And that was how Ecoflora and Sergio began to develop a supply chain that reached out to Chocó's poorest. "We built a laboratory to develop fruit collection processes in highly marginalized contexts, with complex dynamics and sociocultural traits that are very different to our own, among highly vulnerable communities. They are the poorest of the poor, as forest-dwellers usually are."

Sergio transposed the company's logic to those marginalized communities, bridging both worlds. Acknowledging and managing these differences had proven to be critical success factors in similar experiences. In Sergio's opinion, these differences are deeply rooted:

These communities have a long-term perspective; they don't pay much attention to the short-term, not even the mid-term. This means that building relationships with them requires patience and understanding that they do not suffer the same day-to-day deadline stress that we do. They are also highly politicized. Because they live in such marginal conditions, their only interlocutor (other than the armed groups) is the government. When they negotiate, they are thinking in terms of political demands, such as defending their right to health, education, and land. They have waged a long fight for their lands, to obtain the deeds to their forests. Their leadership model was shaped by that struggle, and they tend to replicate the same model when dealing with companies.

As well as the different perceptions of time and dialogue, Sergio highlighted the differences between company and community practices:

These communities are not used to meetings. They are used to political meetings, but not to meetings that seek to find practical solutions through collective decision-making. These communities do not make decisions at meetings. Decisions are shaped in day-to-day life: in the street, over coffee, in informal conversations when they bump into each other... anywhere but in meetings! Companies, on the other hand, are used to holding a meeting, making decisions, and moving ahead... That may be the way things work in the business world, but not here! Here, after you hold a meeting, you need to continue lobbying on the street, and you need to visit some families in their own homes to make sure the decision holds. At the end of the meeting, they keep talking, and they may turn around and change their decision. You have to be patient and use your intuition, and that's not at all easy for a company to do. These communities are also highly suspicious; winning their trust is far from easy. In Atrato, this is an odyssey. Anyone who establishes contact with them is a *Paisa*. Regardless of whether that person actually comes from Japan, Bogotá, or Chile, she will be considered a *Paisa*; and furthermore, a *Paisa* who has come to plunder their riches!

To sign long-term agreements and work with dozens of communities in this climate of suspicion and cultural differences, Ecoflora used bridge organizations with a longstanding presence in the region: in Atrato they worked with *Fundación Espavé*, in Chigorodó they partnered with the indigenous council, and in San Luis they approached the *Corporación Amigos del Bosque*. These organizations facilitated the building of trust; they led extensive meetings where consensus within the community was forged, and a shared vision began to emerge. Ecoflora chose not to engage the suppliers directly, because it knew it lacked the resources to do so, and because it simply was not

feasible to deal with each one individually. So, worked with communities on a regional basis using a facilitator.

The basic company-community dynamic was clear: Ecoflora provided materials and knowledge, and the smallholders took care of the plants and the harvest (see the genip colorant life cycle in **Exhibit 5**). Ecoflora then purchased the agreed volumes. But how could prices be set in the absence of established markets? What would be a “fair price” when there is only a sole buyer of any given raw material? Most of these communities had very few commercial exchanges with the outside world, and they used little cash in their daily lives, with no bookkeeping. Most economic activity among smallholder families, indigenous peoples and Afro-Colombians was geared towards subsistence and self-consumption. In response to these challenges, Ecoflora’s created an ad-hoc methodology to calculate direct, indirect, and marginal costs, which was discussed and agreed upon with the communities (see **Exhibit 6**).

Each family’s cash income was, on average, one-third of a monthly minimum wage. Working with Ecoflora increased family income on average by 80%. However, generating money alone was not enough; in these contexts, enhancing revenue does not always equate to development. According to Sergio,

I am now giving some thought to the next phase; I need to think about the future. I need to find ways to ensure that this income benefits and creates well-being among families. These communities have terrible cultural value issues around money: an increase in revenue sometimes ends up in liquor, prostitution, and things of that sort.

A Fork in the Road Ahead

In 2009, a venture capital fund called *Promotora* became Ecoflora’s first investor. In 2011, *Promotora* sold its stake to Gowan Company, a global agricultural solutions business headquartered in the United States. Gowan transferred technology and opened markets for Ecoflora Agro; its first container of biopesticides was exported to the United States in 2015. In the meantime, Ecoflora spearheaded a conversion to sustainability at this multinational agricultural chemical company. Gowan’s international sales networks convinced Nicolás that the company would increase Ecoflora Agro’s potential impact. In 2019, Gowan Company purchased a controlling interest in Ecoflora Agro. In Nicolás view, this showed the way that Ecoflora Cares should follow; he began looking in earnest for another strategic partner with the right capabilities.

Meanwhile, the natural blue colorant that had been developed over a three-year research process was becoming a flagship product for Ecoflora Cares. The colorant had passed initial toxicology, efficacy, and stability tests, and had also been laboratory tested per each of its foreign markets’ regulations. In parallel to this, Ecoflora’s supply department had identified plantations, conducted a census of trees, trained pickers in working at height, and obtained exploitation permits. The Nagoya Protocol (signed by Colombia) framed the relationship between the laboratory and communities of suppliers. This protocol, part of the Convention on Biological Diversity, guaranteed access to genetic resources and a fair and equitable distribution of the benefits arising from them. Genetic resources were public goods, and government permission was required to use them. Ecoflora had already

obtained approval to use genip commercially in Colombia and Russia, but regulatory processes in Mexico and the USA would not be completed until the middle of 2020 and 2021, respectively.

Increasing genip fruit production and sales became a priority for Ecoflora. International markets demanded a constant supply of a considerable quantity of genip and biopesticides. By early 2020, Ecoflora was purchasing 2 tons per month of genip fruit from Afro-Colombian and indigenous communities. Early estimates suggested that the company's needs would increase to 6.5 tons per month to meet the projected surge in demand. As supply chain manager, Sergio could see three possible ways of meeting this demand:

One possibility would be that Afro-descendant smallholders enhance their traditional production units, by planting 10, 20, or 30 additional trees; some people were already starting to do this spontaneously. Another possibility would be that rural entrepreneurs sow pure or mixed genip plantations. Finally, cattle farmers could incorporate genip into silvopastoral systems. This is the future of genip.

Only the first scenario kept genip supply exclusively in the hands of Afro-Colombian and indigenous communities. Nicolás started to give serious thought to the possibility of involving small and mid-sized rural entrepreneurs and cattle farmers—Sergio's second and third scenarios—due to the bottlenecks at indigenous councils and in Afro-Colombian communities. Nicolás had joined Sergio on a trip to the middle-Magdalena River valley and Urabá Antioqueño, 150km to the east of Medellín, to promote sowing genip trees that could also serve as natural fences. Genip trees take four or five years to bear fruit, and then produce about 50kg of fruit per year. Based on experience, Ecoflora knew that it would take a similar amount of time to get enough communities and their councils to commit to producing 4.5 tons per month more than they were already harvesting.

Sticking to the original plan of working exclusively with Afro-Colombian communities would take plenty of effort, and although Ecoflora did not usually take the easy path, market pressure was substantial. Everyone knew that once the window of opportunity closes, it never reopens. The only thing Nicolás knew for sure was that he wanted to avoid industrial genip plantations; other than that, he was not sure which path to follow to meet the growing demand from the cosmetics, textile and food industries. Should Ecoflora invest in organizing traditional communities and encouraging them to plant and exploit wild resources, or should it focus on promoting silvopastoral systems among cattle farmers and rural entrepreneurs?

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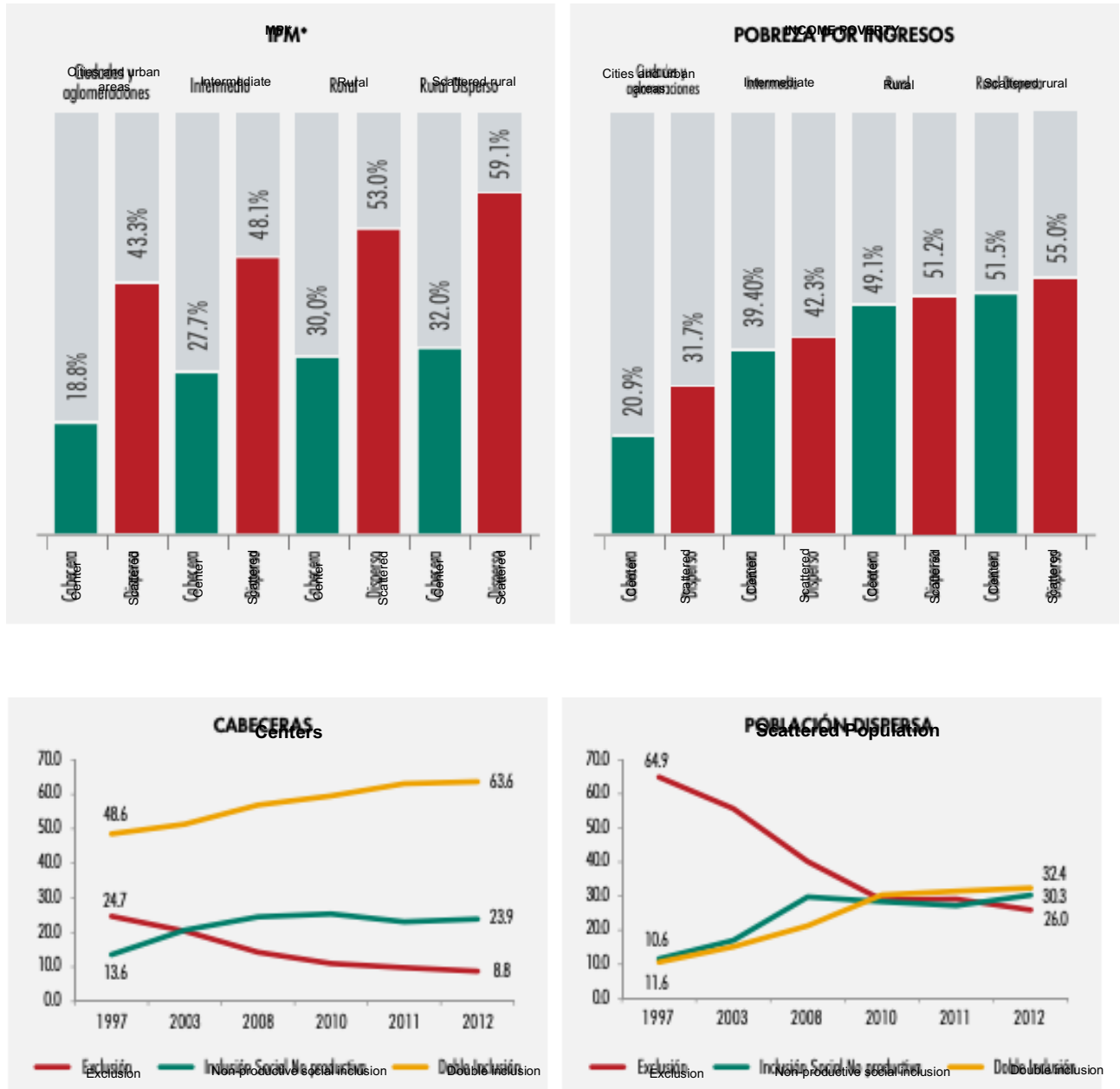
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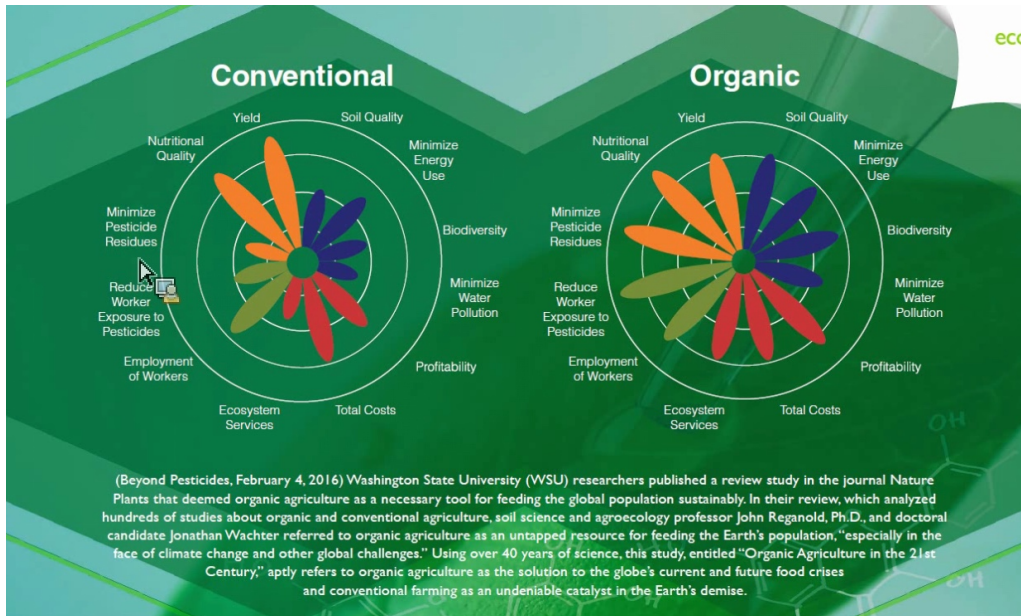
Exhibit 1. Differences in Income and Social Exclusion



* Multidimensional Poverty Index

Source: National Planning Department (2016).

Exhibit 2. Comparison Between Two Types of Agriculture



Source: Reganold, J. and J. Wachter. (2016). "Organic agriculture in the twenty-first century." *Nature Plants* 2, 15221.

Exhibit 3. Genip Use by Indigenous Communities



Emberá woman painted with genip



Temporary genip tattoo

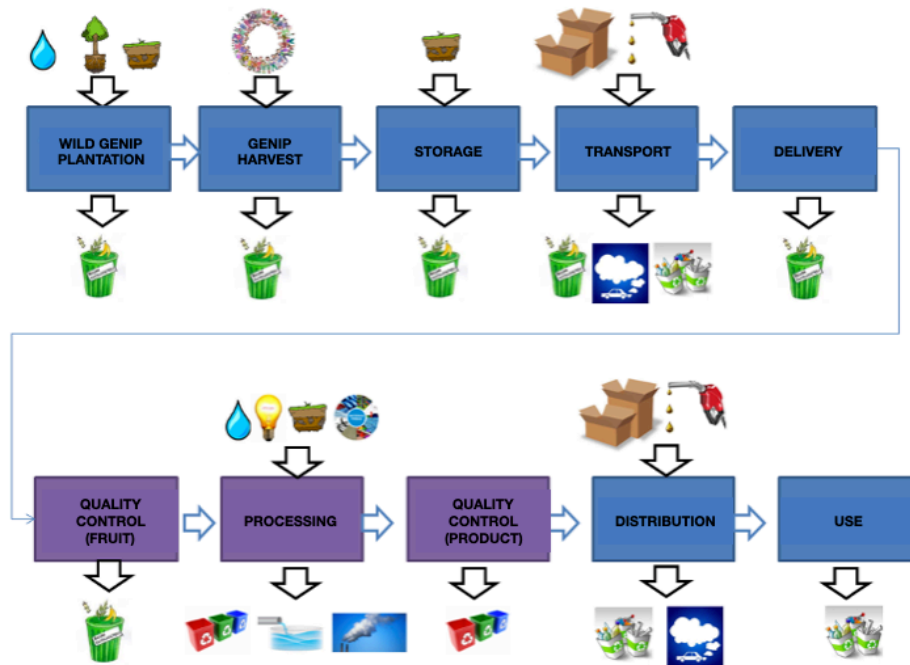
Source: Diosa Jagua Blog. at <http://diosajagua.blogspot.com/2014/11/que-es-la-jagua.html> Accessed on July 2, 2020.

Exhibit 4. Ecoflora Milestones

1997	The Cock family promotes the Friends of Chocó Foundation and <i>Oro Verde</i> artisanal mining program.
1998	<i>Aromáticas y Medicinales La Selva</i> becomes Ecoflora with an innovative chemical engineer, a natural repellent, a cleaner and an insecticide.
2000	Construction of an extraction plant.
2002	<i>Colciencias</i> approves the first co-financing project for innovation in plant extracts. The extraction plant is updated and the Good Manufacturing Practice certification process begins.
	<i>SENA</i> and <i>Fomipyme</i> resources are used to strengthen the supply chain and design an innovation management system.
2003	First appearance at an international fair (In-cosmetics).
	First laboratory in Colombia certified by the Colombian Farming Institute in quality control for plant extracts for agricultural use.
2004	Wins <i>Premio Innova</i> 2004.
2006	<i>Fomipyme</i> finances the development of an innovation management toolkit.
	Good Manufacturing Practice certification.
2007	First exports of agricultural bio-supplies to Ecuador and Peru.
	First exports of genip colorants to France and England.
	Selected as an Endeavor company.
	Wins <i>Premio Innova</i> 2007.
2009	Selected as a New Ventures Colombia company.
	Investment from <i>Fondo Progreso Capital</i> .
2010	Wins <i>Premio Innova</i> 2010.
2011	Ecoflora Agro is incorporated, with investment from Gowan Company.
	Obtains a patent in the USA for the process of extracting a colorant substance from raw genip juice.
	Requests access to genip genetic data from the Colombian Ministry for the Environment and Sustainable Development, to develop a commercial product.

2013	First exports to Costa Rica.
	Products tested and validated in eight countries on five continents.
2014	Registration with the US Environmental Protection Agency.
2015	First exports to USA, Mexico and Chile.
2017	Contract won, in partnership with a European firm at a virtual auction, to supply and license intellectual property related to the sale and distribution of a blue colorant for use in food and beverages.
2019	Gowan Company purchases a controlling interest in Ecoflora Agro.
	Receives the award for “Best New Biofungicide Product” at the Biopesticide Summit in the UK.

Exhibit 5. Life Cycle of Genip Colorants



The input arrows signify the raw materials necessary for production. The output arrows are residues generated by production. The icons represent:



Source: Ecoflora Analysis, Universidad de los Andes – SEKN, May, 2015.

Exhibit 6. Setting Prices in the Absence of a Market or Quote¹⁴

According to Sergio Arango, Ecoflora's Supply Chain Manager:

We had to learn about pricing, harvesting, climbing equipment, pickers. We have slowly followed a learning curve that began in Atrato (Chocó), and the process is much more agile now.

DIRECT COSTS

Harvesting costs. All costs associated with harvesting 800 kg of genip were recorded, including the cost of gasoline, mules, sacks and storage.

INDIRECT COSTS

Sowing and maintenance. In addition, the labor cost was calculated (paid or not) of producing a tree—this was a hidden cost because the community had never invested a single peso in a tree, so a value was calculated for the number of workdays required to produce a tree in its current state.

Approval from the Autonomous Regional Corporation (ARC). Because genip is a wild product, a management plan had to be produced and approved by the ARC that included per kilo costs.

PROFIT MARGIN

The sum of direct and indirect costs gave a cost per fruit, and an average profit margin of 20% was recognized for a kilo of genip delivered to the company's warehouse.

AWARENESS-BUILDING AND AGREEMENT

These calculations were piloted two or three times, and then a meeting was held with the community to seek agreement on the values and ensure that nothing had been forgotten in the calculations. A supply agreement was signed that included the price for a specified number of deliveries per year, *i.e.*, this much genip, this month, this day.

¹⁴ Identifying a fair price for genip fruit providers was one of the “difficulties of being a pioneer in implementing legislative frameworks that are not fully regulated” (*Fondo para la Acción Ambiental y la Niñez*, 2013). An account of the legal process can be found at: https://www.wipo.int/wipo_magazine/es/2019/01/article_0005.html