



# Ambrosus and the Madagascar **Bourbon Vanilla** Supply Chain





# An Original Solution for a Valuable **Supply Chain**

To compliment Ambrosus' industrial project surrounding the traceability of world-class Madagascar Bourbon Vanilla, an in-depth breakdown of the Vanilla Industry, the partnership at hand, and the underlying technological solution designed by Ambrosus is in order. While the mini documentary was filmed as an ideal format for other companies and businesses to concisely observe the Ambrosus solution and its underlying ecosystem, a more detailed explanation of the entire process will function to fully explain the magnitude of the entire partnership at hand.

This will begin 1) with an explanation of current trends in the vanilla supply chain and the larger global vanilla industry. It will then, 2) be complimented with a special interview from the CEO of PREMIUM Goods, Hervé Prime discussing more details surrounding his personal background with the vanilla supply chain, and his strategic collaboration with Ambrosus. Finally 3) a technical discussion of the solution design and implementation procedure will fully outline the digitalization of the vanilla supply chain.





# Introduction to the **Vanilla** Supply Chain

Vanilla is a world-renowned spice, known for its aromatic and soft flavor. For over 500 years, Vanilla has been a prized commodity selectively sourced from only a few locations around the globe. From ice cream, baked goods, and desserts, to cosmetics, and medical care, vanilla is a highly desired product with numerous use-cases.

Originally discovered in Mexico, and then later brought to other parts of the world, vanilla is especially unique insofar as it only grows in a select few locations: Mexico, Madagascar, Tahiti, Uganda, and Indonesia, among a couple others. Beyond its geographical isolation however, vanilla is extremely complex in its harvesting procedure: originally grown as a pod of a tree, the pods must be successfully hand-pollinated in order to produce vanilla beans. The beans themselves must then be picked at the right time, before being heated in warm water, and dried for a number of weeks. Only then is the darkened vanilla stock fit for consumption, and packaged and shipped to the end customer.

In the past decade, vanilla has enjoyed a magnificent price appreciation: according to The Globe and Mail, the price of vanilla has increased 20 fold since 2011. Currently valued at close to \$700 USD per kilo, vanilla is the second most expensive commodity in the world. Changing climate conditions, coupled with an increase in global demand for all-natural vanilla as opposed to its artificial flavoring, is the main cause behind the vanilla boom.

Importantly, as a result of the spike in global vanilla demand, a dependency has been created specifically on the vanilla that is sourced from Madagascar. According to The Globe and Mail's Reporting "Madagascar harvested 67,823 hectares and produced 2,926 tonnes of vanilla in 2016, as opposed to the 14,104 hectares in Indonesia, 1,863 hectares in Papua New Guinea and 979 hectares in Mexico." Altogether, Madagascar makes up over 50% of the world's vanilla supply.

As a consequence of the heavy concentration of vanilla production in Madagascar, problems in the vanilla supply chain have grown increasingly frequent over the years. At \$700 USD per kilo, one kilo of vanilla is equal to roughly an entire year's worth of income for the typical Malagasy worker. According to an Aust & Hachmann report, an overload in demand has led to a spike in vanilla theft, premature vanilla harvesting, and product substitutions of less pure vanilla in place of what ought to be vanilla of the highest quality.





Altogether, premature vanilla harvesting and dilution has led to an imbalance in the quality of vanilla coming from Madagascar, as well as a general lack of trust from consumers, restaurants, and gourmet chefs.

Within such a context, the Ambrosus partnership with PREMIUM Goods is best understood. Ambrosus has partnered with PREMIUM Goods, to help them demonstrate the full purity and story of all of the vanilla that they source from Madagascar. As a counter to low quality vanilla sourcing, PREMIUM Goods, attempts to reinstate consumer trust by publicly demonstrating the purity and journey of their all-natural Madagascar Bourbon Vanilla.

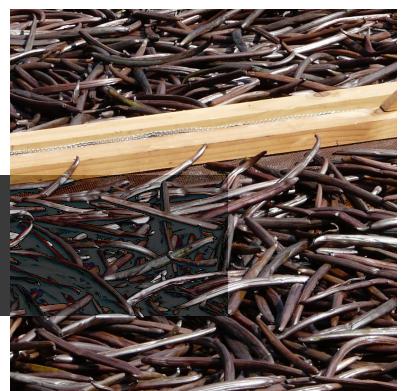
# A Conversation with Hervé Prime, CEO of **PREMIUM** **Goods**



In order to get a better grasp on the background experience and focus of Ambrosus' partner PREMIUM Goods, we had the opportunity to sit down with the company CEO, Hervé Prime to discuss the fine-detail behind the vanilla industry and his vision for PREMIUM Goods.

**Ambrosus Interviewer:** Hello Hervé, it is a pleasure to be able to speak with you today about your passion, and previous experience in the vanilla industry.

**Hervé Prime:** I am glad to be here, and happy to discuss my experience in the vanilla industry.



**Ambrosus Interviewer:** To begin, would you explain to us a little bit about your background with vanilla, as a global commodity?

**Hervé Prime:** I have been working in the vanilla business since 1983. More specifically, my specialization was on the process of importing the vanilla beans, transforming them into extracts, and eventually into vanilla infused flavors of all sorts. Vanilla itself remains a specialty due to the fact that it is a raw material without possessing its own heavily regulated market.

It became clear about 10 years ago that "natural vanilla" was not merely a trend, but rather a deep and definitive evolution growing year after year. Especially in the last two decades the consumer has begun to "learn" about this magical raw material and the "exotic mystery" behind its genuinely wonderful taste. Even from the very beginning of my time in the industry, vanilla has been considered to be the most famous and well sold "taste" all over the world, and that concerns both its natural and artificial variants.



**Ambrosus Interviewer:** You have just recently started a brand new company exclusively focused on the sourcing and processing of vanilla – What is the vision behind PREMIUM Goods?

**Hervé Prime:** Yes, so PREMIUM Goods has been founded with the idea of mastering three extremely important parameters for the global vanilla industry: 1) sourcing – establishing where the vanilla comes from, 2) first transformation – perfecting how the vanilla is made into an extract from its original bean, and 3) demonstrating complete traceability, in every possible way, for all vanilla sold on the market.



**Ambrosus Interviewer:** In light of these focuses, and your time working with vanilla, what has been the biggest problem facing the vanilla industry over the past couple of decades?

**Hervé Prime:** Over the last couple of decades the average vanilla consumer or retailer has become a “connoisseur” for what quality and safe vanilla needs to be; they have increasingly demanding requirements for the vanilla they purchase. Based on this trend, the vanilla industry has had to master all of the essential parameters surrounding their product: guaranteeing its quality, the origin, providing traceability for the entire supply chain, and most recently proving that it has been sustainably sourced.

Overall, however, the main obstacle concerns the general stability of the vanilla market. From the moment vanilla is taken from the field, to when it reaches the consumer a number of variables still remain unregulated and frequently prone to change: the size of the crop, the varieties of quality, the influence of social or political problems (especially regulations), the overall cost of the produce, crime, fraud, corruption, and natural disasters.

In this sense, the market is not organized: it is a market that has been created from multiple, overlapping, and often times contradictory over-the-counter agreements. This is the recurrent economic reality for players in the global vanilla industry: each person involved must find a way to grow amidst these uncertainties.

Altogether, the real challenge is in continuously adapting strategies so that the consumers can always find and incorporate vanilla into the final products they love, and into the shelf spaces of the stores where people will buy them. At the end of the day, it should end with the consumer.

**Ambrosus Interviewer:** In your experience, where does the best vanilla in the world come from? Are there any particular reasons why?

**Hervé Prime:** Even if the industry is not very well organized, the all-around leader for vanilla is Madagascar. I should say that even in Madagascar it is not very well organized, but compared to other places that source vanilla, it is the best. One of the main reasons why I think Madagascar has one of the best vanilla markets is due to the fact that they set some sort of price regulation alongside certain quality controls, which are then followed by all of the other vanilla producing countries.

In terms of quality, a shipment of vanilla beans can take up to a year and a half in order to prepare adequately: both on the farm and in the refineries. In Madagascar, although there are some quality problems, it has consistently been the country with the best preparation methods that are also quite unique.

**Ambrosus Interviewer:** Is there any variety of vanilla beans, and on average, how far does a shipment of vanilla normally have to travel before it arrives at its end destination?

**Hervé Prime:** Yes, in general there are two main kinds of vanilla beans:

1. "Planifolia" vanilla beans, which make up over 90% of the market and is the preferred taste for consumers. Inside of this vanilla bean family there is a kind of appellation authorized only for Madagascar, Reunion Island, and Comoros known as "Bourbon" Vanilla.
2. "Tahitensis" vanilla beans which are much less popular and have a more distinct and strong taste.

Madagascar thus, not only produces the best vanilla in the world, but also the unique "Bourbon" grade which is what is almost exclusively harvested there.

In terms of the transportation of vanilla, I should mention that in general, shipping vanilla has not been a problem: "packing lists" and documentation of shipments have been historically well organized. The only differentiator is that depending on the weight of the shipment it can either be sent via sea or air which sometimes affects how quickly it can reach the consumer.

**Ambrosus Interviewer:** Where then in the vanilla supply chain is there a need for better traceability and documentation?

**Hervé Prime:** The major problem in the vanilla supply chain is in the traceability of the vanilla bean stock within Madagascar and where it ends up once it has been shipped away. The process within Madagascar can be quite confusing as various farms sell their vanilla to a regional collector who then moves to different preparation facilities. Only after the vanilla has been prepared into its darker and dried out stock version can it then be transferred to all of the buyers outside of Madagascar. The need for traceability is in terms of guaranteeing that the shipments within Madagascar, are correctly and efficiently prepared and then shipped around the world – to the USA, Europe, and the Asia Oceania region.

**Ambrosus Interviewer:** What kind of clients does PREMIUM Goods provide Vanilla to? From such a perspective, would you say Vanilla can be used for a variety of purposes?

**Hervé Prime:** All of PREMIUM Goods' customers are located within the food industry, and more specifically in sweet foods and colorings, or in related areas: baby foods, liquors, energetic 'sports' products, and sometimes even for dieting. The main end products are normally for gourmet ice-cream, dairy products, and in chocolate, biscuits, and premixes.





**Ambrosus Interviewer:** More recently, what kind of troubles have occurred when it comes to the quality assurance of vanilla beans? Is there much counterfeiting?

**Hervé Prime:** The main trouble in the vanilla supply chain has always been inflation of prices followed by excessive speculation that can stem from a number of different sources: if there will be a small crop due to natural cycles, if multiple cyclones damaged the crop, or if there is a shortage in vanilla supply due to an increase in market demand.

In the event that there is a significant price increase especially in the context of high levels of demand, the quality suffers due to general hastiness in making profit: either beans are delivered too early without 'sufficient' preparation as sellers try to make as much profit as possible, or they are kept in bad storage conditions for too long as sellers wait for higher market prices. This really strikes at the core of the issue which is a lack of ability to see which shipments have already made it to the market, and where other shipments end up in their place.

**Ambrosus Interviewer:** In light of the problems we have been discussing, why exactly does a solution like Ambrosus appeal to you, when it comes to tracing your vanilla?

**Hervé Prime:** The Ambrosus ecosystem is complete. What I mean is that with Ambrosus I can use it to organize the final phase of shipping the product from Madagascar to somewhere else around the world, while also, at the same time, I can use Ambrosus as a security tool that my clients can then use to demonstrate to consumers the quality of the product they use. Essentially the argument remains the same: demonstrating and guaranteeing the origin of a product and its journey, without deficiency is a very valuable service.



**Ambrosus Interviewer:** From your experience in the industry, do you think the need for transparency and quality assurance of products is something that other companies have a need for as well?

**Hervé Prime:** Definitely yes. The business model that Ambrosus is able to propose to companies is something new that many companies do not even imagine to be possible, much less incredibly cost effective.

I should qualify that for many companies, vanilla is both a big concern and a small problem; a large business volume combined with a significant amount of diversity within the internal organization can make it difficult to quickly adopt new and innovative solutions.

My company PREMIUM Goods has the advantage of being new, and thus we can gradually test and integrate with the Ambrosus solution, until after some time it can spread to being fully used and offered to all the other users in the network.

**Ambrosus Interviewer:** Thank you for your time Hervé, and we look forward to the growth of PREMIUM Goods, with its all-natural 'Bourbon' vanilla.

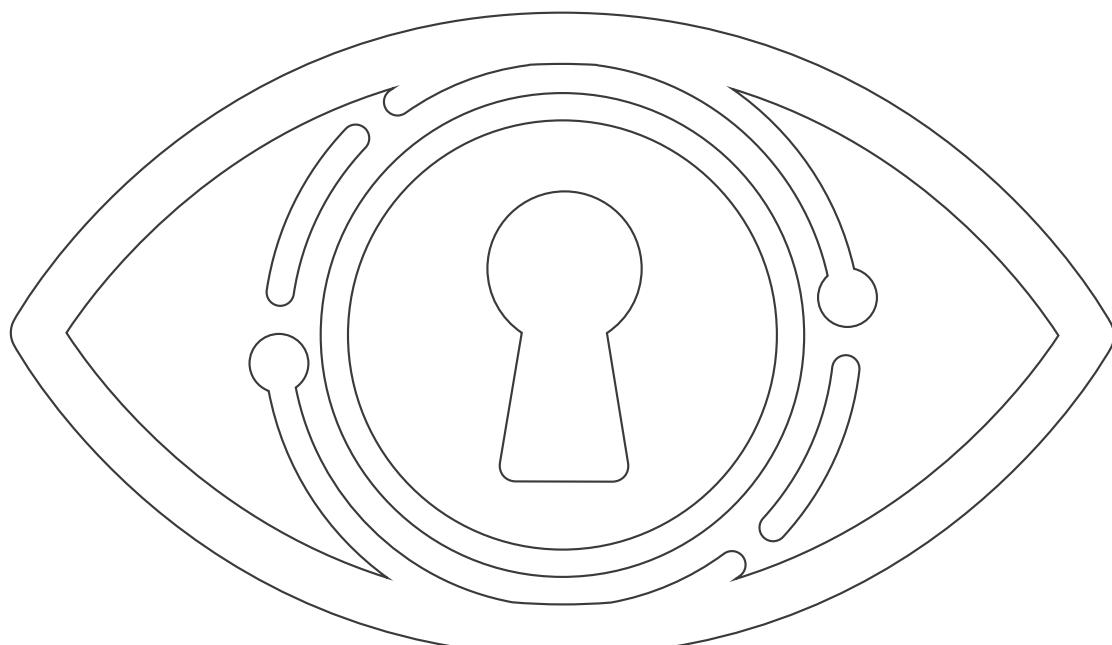
**Hervé Prime:** Thank you for having me, and I am glad I could share some insights from my time in the vanilla industry.

Thanks to the detailed interview from PREMIUM Goods CEO Hervé Prime a better explanation of the problem that Ambrosus sought to solve can be ascertained: vanilla in Madagascar – more specifically known as "Bourbon" vanilla – is the highest quality and most unique vanilla in the world. However, due to price fluctuations, shipments of vanilla in Madagascar are often times severely delayed or unnecessarily forced into the market in order to make maximal profits. Ambrosus, described by Hervé as a 'complete solution' is capable of changing the way the vanilla supply chain within Madagascar flows, to thereby allow a more transparent and honest movement of vanilla around the world. With such a solution, businesses benefit from sourcing the highest quality 'Bourbon' vanilla available, while consumers also benefit from the increased transparency in the vanilla supply chain.

# Breaking down the **Ambrosus** **Solution**

The Ambrosus solution to tracing and proving the quality of Madagascar's premium 'Bourbon' vanilla was complex insofar as the most difficult aspects of the supply chain in need of tracking were those which lacked the most technological infrastructure.

In context, many supply chain solutions can be created using SAP (Systems, Applications, and Products), a German software that was specifically designed for optimal Enterprise Resource Planning (ERP) and data management systems. The prerequisite for using SAP however, is a configured and stable network that can support the data flows that are processed over time.



# The Ambrosus Application Design

In the case of the transfer of vanilla in Madagascar, no such system was deployed: altogether, a more flexible and 'pragmatic' solution had to be designed by Ambrosus Solutions Architects. When asked to comment on the matter, Ambrosus Solutions Architect Tiphaine Paulhiac, said the following:

*"Designing solutions for complex supply chain problems is a really demanding but exciting challenge to tackle. For this specific case, the difficulty was all about properly fitting the Ambrosus solution to the context of rural Madagascar. And just to be clear, this is a problem that a lot of commodities companies have; because a lot of raw materials like minerals, spices, and cereals only grow in very remote or exotic places in the world, there is not a lot of infrastructure in place to be able to track and trace them.*

To get a sound solution for the client company's problem we really had to think practically. So we went through everything that could be used: tags, sensors, loggers, etc. and did our best to imagine how it would work in reality for the users in Madagascar. As an example, for the tagging, out of all of the existing solutions, we ended up settling on zip tie tags that are flexible for tagging any products (bags or basket). This solution is designed to be easily adaptable but at the same time with a first layer of security (unique tags that cannot be opened once fixed). The solution fit the needs of the company and the practice of the partner in Madagascar, while at the same time making sure that the vanilla made from the farmers of the company would be certified, and the end consumer could actually see where it all came from."

For tracing and proving the origin of PREMIUM Goods' vanilla, Ambrosus utilized unique tags in the shape of zip tie cables. Each cable has a printed QR code and serial number with its unique ID. By scanning the QR code with the camera of a basic smartphone, certain information about each individual item (bundle of vanilla or green vanilla bag) can be recovered and visualized.



Ultimately, this makes it very simple for Malagasy vanilla workers to utilize: by simply scanning the QR code of the item, they effectively 'sign' the product and add its specific information with a very basic and easy to use application. This information is then transferred to the Am-brosus Network in the digital form of an "Asset" or "Event". When a consumer or client company of PREMIUM Goods wishes to verify the origin of their vanilla, they simply scan the QR code themselves with their own phone: the code then displays the previous information logs and signatures in a custom designed application.

## Applying Ambrosus Technology to the Vanilla Supply Chain

In terms of the vanilla supply chain itself the following breakdown explains in detail what happens to each box of vanilla as it grows, is processed, and eventually shipped around the world:

## Step 1: On the Farm



Malagasy vanilla farmers must adequately care for and harvest their vanilla produce. With an increase in crime and poor harvesting techniques (either harvesting the vanilla too early or not picking them due to a failure to check the maturity) vanilla farmers stand to lose out, as the entire vanilla industry suffers from inconsistent variations in product quality.

While the Ambrosus solution was not applied to any aspect of the 'farm', in the future the Innovation Laboratory is designing specific devices made for 'static' or 'on-site' data collection and configuration. In such a scenario, Ambrosus possesses the capability of protecting the local vanilla farmers from theft or other malactors.

## Step 2: Regional Collectors

Upon harvesting of the vanilla beans, the green-vanilla-beans are then taken to a regional collector whereby they are weighed, logged and combined with the other vanilla beans produced by farmers in the region. The origin of the vanilla bean is registered according to the region from which it originates from.

## Step 3: Preparation Plant Processing



Once the vanilla arrives at the production plant, the origin of the vanilla from each regional mother-lot is scanned, and signed, effectively creating digital identities for the vanilla from the various regions of Madagascar.

After being digitally recorded, the vanilla beans are then washed in steaming hot water, before being laid out to dry for three to four months. It is during this time that the vanilla will 'sweat' excess humidity and moisture from its casing, and ultimately dry out.

## Step 4: Grade Measurement and Bundling

As the vanilla beans dry out, they are separated according to their length, humidity and colour into various grades.

After adequately drying and sweating, the vanilla bean stock now appear as a much darker brown color. At this stage of the supply chain, the vanilla beans are bundled together according to their product grade, and then tied with a zip tie. Using the QR code printed on the zip tie, the specific grade of the vanilla stock can be effectively recorded in line with the origin that has already been signed into the network. Altogether, when the vanilla is bundled according to its grade and then packaged into its container, a QR code is also printed and stuck on top of the package, so as to refer to the specific vanilla stored inside.



## Step 5: The End Goal

Altogether, with the Ambrosus solution the grade and origin of all of PREMIUM Goods' natural vanilla stocks are digitally recorded, publicly verifiable, and consumer oriented. By simply tagging and testifying to the origin of the vanilla-lot once they arrive at the production plant, and after they have been prepared and bundled together according to their quality grade, the all-natural Madagascar 'Bourbon' Vanilla can be digitally traced and authenticated as the unique and high quality vanilla that it is.

In the case of PREMIUM Goods, these boxes of vanilla are then shipped all around the world to gourmet chefs, sweet food producers, flavor companies, and other high end retailers.



# Ambrosus and Vanilla Traceability: A Savory Success?

To date, the traceability solution that PREMIUM Goods has implemented in their vanilla supply chain through the Ambrosus Network has been extremely successful. Ambrosus Account Manager, Rado Dragov explains this success in more detail:

*I was very pleased with the results of our partnership with PREMIUM Goods. More specifically, when PREMIUM Goods announced that their Madagascar Bourbon Vanilla would be tracked and verified using a public blockchain, they almost immediately sold out of their stock in their pre-sale offering. This is a positive indication of the real value that Ambrosus can provide to companies, and it also inaugurates a new shift in the values that undermine business practice. Transparency, sustainability, and consumer orientation can now truly become a priority.*

To compliment the business success that PREMIUM Goods has enjoyed, Business Consultant, Pierre-Alain Ceralli briefly discussed the larger potential for Ambrosus Solutions in the color and flavoring industry:

*Over my career, I have spent 22 years of experience working in the food and flavor supply chains. During that time, it became quite evident to me that product traceability, and more specifically, the quality assurance and origin verification of a product were very much needed. Since my time with Ambrosus, I have become convinced that the Ambrosus solution is one that companies all across the food and coloring industry will eventually require for optimal business success. In that sense, there will be no shortage of demand for Ambrosus' solutions, especially when it comes to highly valued and rare crops that have previously suffered from a lack of transparency.*

Most importantly, the industrial partnership with PREMIUM Goods has demonstrated the flexibility and applicability of the Ambrosus Network: even in rural Madagascar, where there is poor infrastructure and minimal supply chain planning systems, Ambrosus capably designed a thorough and effective solution which had a profound effect on the business and brand reputation of PREMIUM Goods.

While the technical capabilities of the InnoLab exceed far beyond the solution that Ambrosus applied to the vanilla supply chain, the original message put forward by Ambrosus CEO Angel Versetti, and CTO Dr. Stefan Meyer echoes in the clearly labelled and origin verified packages of Madagascar 'Bourbon' Vanilla: Ambrosus takes complicated problems and builds straightforward solutions that simply make sense.