WORLD COFFEE RESEARCH

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Technical Report

(Final Version)

WORLD COFFEE RESEARCH

Variety Intelligence and Seed Sector Study, Timor-Leste

(ACER–WCR 19 - I.55 TL–S-N)

Dili, Timor-Leste

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Project overview

Project Name:	TA-9521 REG: Olam International Limited: Inclusive, Sustainable, and Connected Coffee Value Chain
Project Period:	10/01/2018 – 11/30/2018
Name of Prime Implementing Partner:	World Coffee Research
[Contract/Agreement] Number:	16352-WCR-ACERES
Name of Subcontractor:	ACERES by Leonardo Sánchez Hernández Heredia, Costa Rica lsanchez@aceres.net
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Reporting Period:	June 2019

List of acronyms used in the report

ACERES	Environment and Special Certifications Consultants
ADB	Asian Development Bank
ADNid	Genetic Information Agency
ANACAFE	National Coffee Association (Guatemala)
CATIE	Tropical Agricultural Research and Higher Education Center
CIFC	Center for Research on Coffee Rust / ISA / ULisboa
CQI	Coffee Quality Institute
DNPEIG	National Directorate for Research, Statistics, and Geographical Information
DNAHE	National Directorate for Agriculture, Horticulture and Extension
DNCPI	National Directorate for Coffee and Industrial Crops
FNC	National Federation of Coffee Growers of Colombia
GAPs	Good Agricultural Practices
GIZ	German Corporation for International Cooperation GmbH
HDT	Timor Hybrid
IHCAFE	Honduran Coffee Institute
ICAFE	Coffee Institute of Costa Rica
JICA	Japan International Cooperation Agency
Kg	Kilogram
MAF	Ministry of Agriculture and Fisheries
NCSDP	National Coffee Sector Development Plan
NDQB	National Directorate of Quarentine and Biosecurity
NGO	Non-Governmental Organization
TCA	Timor Coffee Association
TCC	Timor Coffee Cooperative
WCR	World Coffee Research

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1. Introduction

World Coffee Research (WCR) a non-profit organization, formed in 2012 by the global coffee industry has been collaborating since 2018 with the Timor-Leste private coffee sector through a project led by the transnational Company Olam, which is being funded with funds from ADB and JICA in the amount of US $163 million. The project[1] aims to help improve inclusive and sustainable agricultural value chains. The loan will help small holder farmers integrate into more formalized value chains and integrate with the global economy, expanding their production and operations, improving livelihoods by promoting inclusive and sustainable development. While for Olam improved quality and quantity of production will help increase their profitability, which in turn should lead to better farm gate prices. The execution of the activities has been developed by the consulting firm Landells Mills who is implementing a training package and extension services for smallholder farmers that support the selected activities to further leverage the benefits of this training. The technical assistance of Landells Mills is focused on providing support to coffee producers and will be anchored on a holistic, climate-smart agriculture training program including training sessions, field trials, and demonstration pilots using climate risk mapping. Productivity and quality improvement, environmental sustainability of production, farmer organization, and household financial management will be key focus areas, which will help build suppliers' understanding of and adherence to the Olam Supplier Code. In the same way, within this process, the ADB has been involving the Government of Timor through the MAF and the departmental directorates that have relationships with the coffee sector.

WCR within its role of facilitator is proposing an assessment of varieties and the seed sector. For this purpose, in April 2019 it carried out a public tender to hire a consultancy that would allow it to prepare a technical report of the seed segments and coffee nurseries in Timor-Leste. This report is the result of the consultant's evaluation through a bibliographic review, interviews with other countries' coffee sector institutions, researchers and members of the academy on the subject of genetics, as well as personalized meetings with producers, the export sector, NGOs and gocvernmental representatives in Timor-Leste during a visit made from June 17th to 21th, 2019. Annex 1 indicates the list of people and their institutions that were contacted in fulfillment of the consultancy's objectives.

During the visit to Timor-Leste, we were accompanied by Emilia Umaña, WCR's nursery specialist. Most of the information obtained during the visit was corroborated with Ms. Umaña in order to be able to develop a more complete report including the perspective of both.

1.1 Timor-Leste and Coffee

Timor-Leste is a less developed country, ranking 133rd out of 188 countries in the 2016 Human Development Index[2]. It shares a land border with Indonesia and maritime boundaries with Australia and Indonesia. With a population of 1.2 million[3] and land area of 15,410 square kilometers, the population density is 77 people per square kilometer. Fifty-nine

1 WCR Statement of Work 2019. Timor-Leste

[2]United Nations Development Programme. 2016. Human Development Reports: Timor-Leste: http://hdr.undp.org/en/countries/profiles/TLS

[3]Ministry of Finance. 2015. Population and Housing Census 2015. Preliminary results: http://www.statistics.gov.tl/wpcontent/uploads/2015/10/1-Preliminary-Results-4-Printing-Company-19102015.pdf.

percent of the population is under 25 years of age and 71% lives in rural areas. The country is ethnically diverse with 32 local languages.

Overall, 63% of households are engaged in crop production, with coffee, maize, cassava and other vegetables, farmed mainly by women, being the most common crops; although rice is a staple food, only 25% of households produce it[4]. Rural livelihoods provide incomes for about 70% of the population, but with 22 livelihood zones in the country[5], opportunities for maximizing incomes are very localized and limited. Men generate profits from cash crops such as coffee and rice, while most of the crops grown by women are less valuable and remain for personal consumtion. Although Timor-Leste has managed to reduce the proportion of hungry poor people in the population from 46.9 to 34.3% over the past decade, the 2016 Global Hunger Index rates hunger levels in the country as "serious."

Coffee is the most important agricultural cash crop in Timor-Leste. In addition, this country is known worldwide in the coffee world thanks to the term "Timor Hybrid" (HDT) which was assigned to a coffee genotype from an interspecies outcrossing found on a typical crop plantation on the island in the 1920s. HDT is a natural hybrid cross of Arabica and Robusta that looks like Arabica coffee and has 44 chromosomes. These genotype descendants have been used in coffee breeding for providing resistance to coffee leaf rust and has given rise to entire lines of new coffee varieties, such as Catimors and Sarchimores.

In 2016, coffee production in Timor Leste was estimated at 10,000 metric tons. Approximately 90% of annual coffee production is Arabica and 10% of annual production is Robusta. In 2016, approximately US $23 million in green coffee was exported from Timor-Leste[6]. Coffee exports have accounted for 85 to 90% of Timor-Leste's annual non-oil merchandise exports since independence[7]. Coffee exports increased to almost $30.0 million, more than double their level over the past three years[8]. However, currently coffee production does not generate income for the farmers. The trees are old and in need of pruning. The coffee yield may be the lowest in world because of over-shading, lack of nutrients and lack of pruning. The coffee being planted and currently in the ground is likely multigenerational, unselected progeny of Timor hybrid distributed originally by the Portuguese.

All actors in the coffee supply chain in Timor agree that the two main problems in coffee production are its low productivity and low quality. The government of Timor-Leste, through the MAF, recognize that there is a great potential to produce high-quality coffee and to increase yield.

In addition to the aforementioned, problems, there is an unequal distribution of income generated from coffee between the different actors along the value chain. This inequality is

[4] Ministry of Agriculture and Fisheries Strategic Plan 2014–2020: http://extwprlegs1.fao.org/docs/pdf/tim149148.pdf

[5] WFP. 2016. Timor-Leste Consolidated Livelihood Exercise for Analysing Resilience: http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp282841.pdf

[6] NDE 2016: External Trade Statistics Annual Report 2016

[7] World Bank (2010). Expanding Timor-Leste's near-term non-oil exports, Diagnostic Trade Study, prepared by Integrated Framework (Draft). Poverty Reduction and Economic Management Sector, East Asia and Pacific Region, p. 11

[8] http://www.worldbank.org. Timor-Leste Economic Update, April 2017

not simply a post-independence problem, as it was introduced during the Portuguese colonial period and was also an issue during Indonesian occupation.

There is a country vision to produce organic coffee, however, relevant organic management has productivities per hectare of 5 times the current levels (average productivity of 175 kg of green coffee per hectare was reported during field visits).The poor application of GAP on coffee plantations make it considered a natural coffee growing environment, and therefore changes the concept of coffee farmers to that of "coffee pickers," as once harvesting is finished the tendency is to look for other subsistence crops or to find temporary jobs, with the subsequent deterioration of the coffee plantation by pests and diseases, with rust being the main culprit. After the Indonesian occupation of the territory in 1975, coffee production continued to be the main income and exchange generator. However, there was little interest in maintaining or developing farming practices, or even in contributing to any return of capital for coffee cultivation. The only interest was to extract income from the amount of coffee harvested and sold at a cheap price, mainly through the Indonesian port of Surabaya. Another important point is the effect of global warming that affects this country and which is a reality worldwide. Climate change projections show that Timor-Leste will experience higher temperatures and decreased rainfall in most of the country9 apart from the Oecusse district. The combination of these trends will affect the magnitude of droughts and floods and the sustainability of coffee.

2. Objectives of the Consultancy

The objectives of this report are based on WCR proposal number 16335-01, titled, *Variety Intelligence and Seed Sector Study, Timor-Leste*. These objectives are indicated below.

a. The current planting materials (varieties) being cultivated in Timor-Leste, with their general history, area of distribution identifying any seed resources, distribution and general physiological and agronomic attribute.
b. Description of the current seed sector and current practices of coffee growers to get new planting material;
c. Review of phytosanitary regulations for the importation of coffee germplasm into Timor-Leste;
d. International status of Timor-Leste to preserve coffee genetic diversity – are there international coffee genebanks that have Timor-Leste varieties preserved?
e. DNA fingerprinting/identification of these main samples (DNA fingerprinting protocol to be provided by WCR.

3. Results

Following are the results of the consultation according to the requested objectives. The results were obtained through an exhaustive documentary review in the database of the central library of the University of Costa Rica, which allowed obtaining research information from countries such as Costa Rica, Colombia, Brazil and Honduras. Additionally, interviews with key stakeholders and actors in the TL coffee sector and other countries, are presented for each of the objectives of the consultancy from the coffee sector in several countries and

9 Pacific-Australia Climate Change Science and Adaptation Planning Program. 2015. Current and future climate of Timor-Leste: https://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/5_PACCSAP-Timor-Leste9pp_WEB.pdf 31 Conference on

mainly from what was collected during the visit, where communication was engaged in with more than 25 people (see Annex 1).

3.a Current planting materials (varieties) being cultivated in Timor-Leste, with their general history, area of distribution identifying any seed resources, distribution and general physiological and agronomic attributes.

Timor-Leste is a small, mountainous, sparsely-populated country with diverse geographic features that make it less ideal for agricultural production on rocky and easily eroded terrain, poor soils and variable, often unpredictable precipitation. Even so, the economy is predominantly agricultural, with about 75% of the population living in rural areas where they practice subsistence or small-scale agriculture of rice, corn, vegetables, and fruit trees. Additionally, they raise livestock.

Timor-Leste is the 182nd largest export economy in the world. In 2017, Timor-Leste exported $108M and imported $651M, resulting in a negative trade balance of $543M. In 2017 the GDP of Timor-Leste was $2.95B and its GDP per capita was $7.21k.[10] In 2017 Timor-Leste exported $108M, which made it the 182nd largest exporter in the world. During the last five years the exports of Timor-Leste have decreased at an annualized rate of 28.7%, from $583M in 2012 to $108M in 2017. The most recent exports are led by crude petroleum which represents 60.8% of the total Timor-Leste exports, followed by coffee, which accounts for 24.4%.[11]

Timor-Leste has a long and often tumultuous history of coffee production. Coffee has been grown on large plantations, state farms, communal plantations, penal plantations, and on individual smallholder farms. Depending on the controlling power at the time, schemes were promoted or fell into neglect over time, but smallholder production has persevered. The importance of the smallholder's role in Timor-Leste's coffee history cannot be overstated. Since the mid-nineteenth century, coffee has been the main product of Timor-Leste's economy, being the primary production of the primary sector, and playing an important role in the economy of the country because of its value in relationship to exports as a whole, by the employment it creates and by the income it generates for farmers. Coffee has been planted by farmers and shipped to foreign countries since the Portuguese occupation. Timor-Leste has two types of coffee: Arabica and Robusta coffee. Arabica's coffee has been the leading coffee variant in Timor-Leste. These species were introduced in order to take advantage of the different altitudes of the country. It should also be mentioned that in the past there existed the production of the Liberica species, almost residual in 1975 and nowadays not mentioned in the statistics.

In 2016, coffee production was estimated at 10,000 metric tons. Approximately 90% of annual coffee production is Arabica and 10% of annual production is Robusta. In 2016,

10 https://atlas.media.mit.edu/pt/profile/country/tls/

11 https://atlas.media.mit.edu/pt/profile/country/tls/

approximately US $23 million in green coffee was exported from Timor-Leste[12]. Coffee exports have accounted for 85-90% percent of Timor-Leste's annual non-oil merchandise exports since its independence[13]. Coffee is the most important agricultural cash crop in Timor-Leste. Table 1 shows the destination country, quantity and value of Timor coffee exported during the year 2018.

The farm management system of organic coffee has been developing since 1994. It is agreed that two of the main problems of coffee production are its low productivity and quality. All stakeholders in the sector recognize that there is great potential for high-quality coffee production and productivity increases, and there are a large number of organizations and projects involved in the sector, notably the MAF, exporting companies, NGOs and bilateral and multilateral international cooperatives. The coffee produced in Timor-Leste is organic and of good quality. Therefore, the companies have no problem in selling it overseas, even with current barriers. Companies struggle to increase the quantity by various methods described earlier. It is estimated, that 60% of trees are too old and thus less productive.

Table 1. Coffee exported in Timor Leste during 2018.

Country of Destination	Quantuty (Kg)	Value ($US)
Canada	108,000	475,003
Australia	75,600	371,935
United States of America	36,000	158,334
Japan	15,000	109,699
Indonesia	214,380	82,472
Taiwan	18,000	35,910
Korea	8,130	34,146
Hong Kong	150	987

Source: http://www.statistics.gov.tl/. (Period: Period: December 01, 2018 to December 31, 2018)

Coffee frequently is grown in difficult areas and is not properly cared for. Few farmers have agricultural education and understand the industrial-level efforts to increase coffee production. These industrial-level efforts include acquiring new coffee seeds, pruning old trees and increasing the size of coffee plantations. Companies hire and educate locals as well as try to include local churches in the process of disseminating the knowledge to produce more, better quality coffee. The low price for coffee comes from its lower quality. Nevertheless, the coffee produced is organic and doesn't contain fertilizers. To keep it organic, the companies regularly evaluate the fields and farmer's houses. In the long term, these measures are intended to provide better quality coffee, but not necessarily increasing productivity. Conventional production (chemical fertilization and GAP) will achieve both

12 NDE 2016: External Trade Statistics Annual Report 2016

13 World Bank (2010). Expanding Timor-Leste's near-term non-oil exports, Diagnostic Trade Study, prepared by Integrated Framework (Draft). Poverty Reduction and Economic Management Sector, East Asia and Pacific Region, p. 11

objectives. There is no reliable information available on productivity and the area planted with coffee during the last five years. Table 2 indicates the production and productivity from 2004 to 2013.

The table shows that coffee productivity in Timor-Leste is still far from the expectations. The highest production achieved was in 2007 amounted to 14,000 tons with an average productivity of 269 kg (green beans) or half of production that better technology can provide. Export constitutes 90 percent of the total production, while the rest of the production is traded in the country. In general, the system of coffee marketing in Timor-Leste involves multiple parties or institutions, such as various middlemen at the subdistrict and district levels, cooperatives and governmental organizations in addition to farmers and large traders or exporters.

Table 2. Coffee plantations, productions and productivity from 2004 to 2013 in Timor Leste.

Year	Coffee Plantation (Hectares)	Production (Tons)	Productivity (Tons/ha)
2004	54,341	8,320	0,153
2005	54,025	12,800	0,237
2006	53,616	10,221	0,191
2007	52,002	14,000	0,269
2008	51,998	10,500	0,202
2009	51,989	10,122	0,195
2010	51,348	10,069	0,196
2011	50,784	1,005	0,198
2012	49,873	9,895	0,198
2013	54,878	9,384	0,171

Source: National Directorate of Plantation and Coffee Industry (NDPIAC) -Ministry of Agriculture of Timor-Leste.

There are several districts that grow and produce coffee such as Ermera, Liquica, Ainaro, Manufahi, Aileu and Bobonaro districts. An additional three districts in the east part of Timor-Leste have the potential for coffee production. The main coffee producing districts are indicated in Figure 1. Coffee areas have an important place in the country's culture and tradition. Also, other districts from the Indonesian occupation of 1997, such as the Manatuto districts in the mountains, and the sub-districts of Laclubar and Barique served to produce coffee.

Also, the Suai district and part of the sub-districts Fohorem, Fatululik, Zumalai, Dili and Baucau, contain small coffee production plantations. The coffee is cultivated on small and large plantations scattered throughout the territory in a cultivation system on the mountain slopes.

Annex 2 (Table 2) shows information obtained in Timor-Leste in the 2015 Census. The table details the quantity of coffee producers per sub-district and their use of coffee beans, whether for personal consumption or commercial sale.

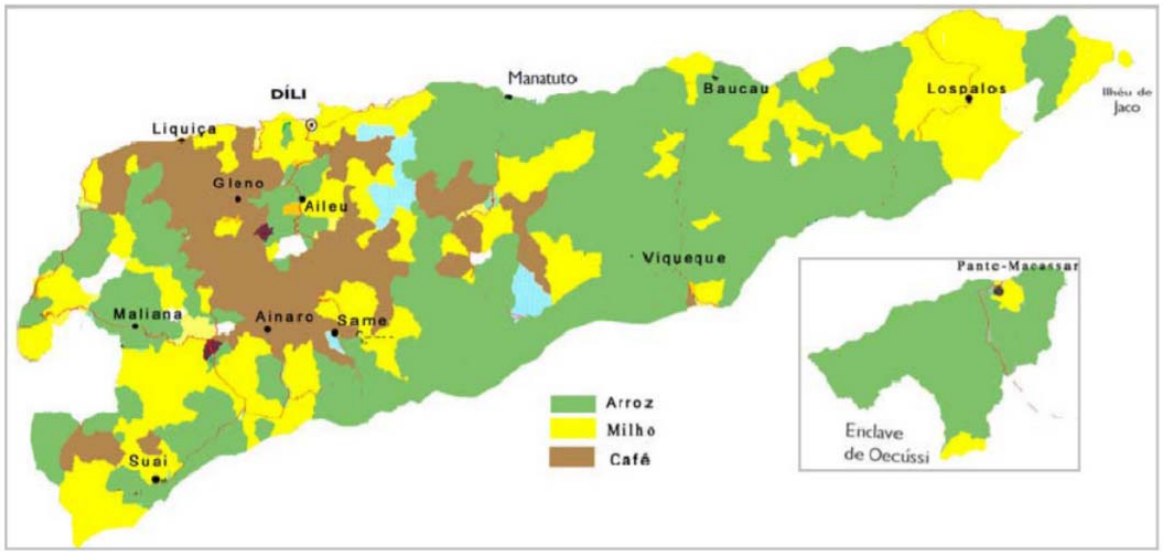
Shade coffee production systems are very varied in their vegetative composition and vertical structure, usually presented in more than two layers, which can be combined in arrangements between components to improve coffee production. The diversity and complexity of existing systems in coffee regions in East Timor make it difficult to set a standard, especially on low-tech plantations where the trees of natural forests are normally mixed with intentionally-planted trees according to the farmer's interest.

Figure 1. Main districts producing coffee in Timor-Leste

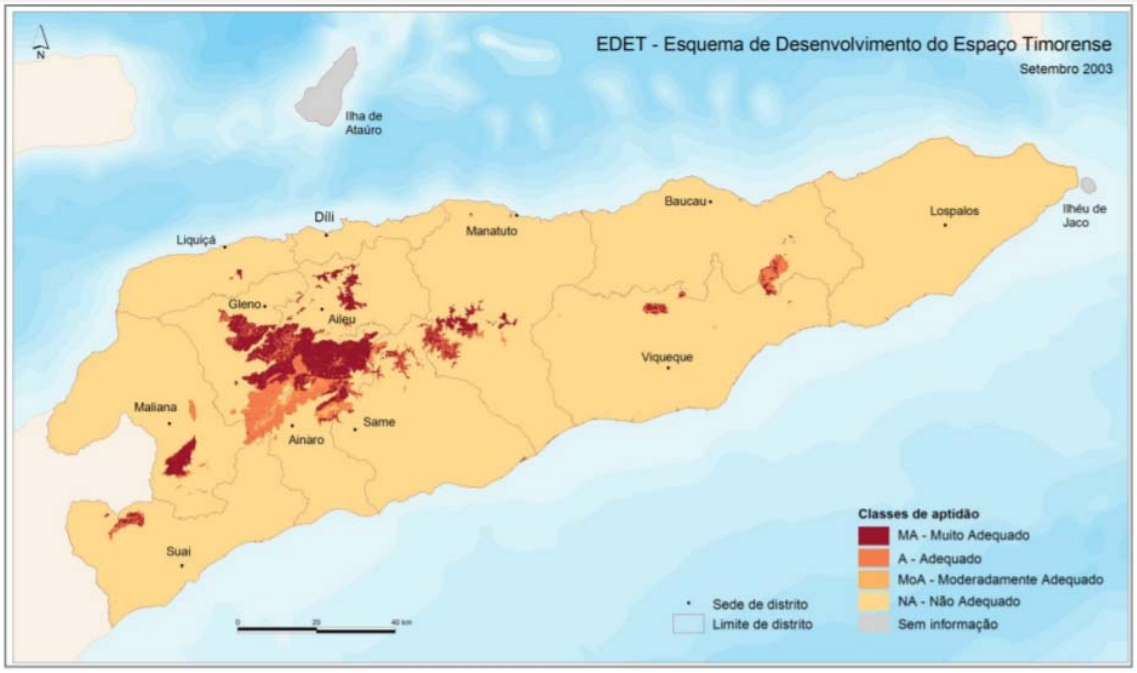
For nearly a century, coffee has been by far the largest source of income for farmers in the mountains and is also East Timor's main export product (80%). The Timor Hybrid, a natural cross between the Robusta (rust resistant) and the Arabica (high quality) variety originated in Timor and after intensive improvement and selection is now planted worldwide. Certified organic coffee from Timor has gotten a good price in the international market and has thus protected the farmers from the current low prices.

The geography and ecology of the territory of Timor-Leste, especially in coffee producing areas, allow for the cultivation of Arabica coffee and Robusta coffee, both important from an economic point of view. Currently for coffee areas of the territory in East Timor, rural and agricultural development corresponds to national development with coffee as the product with the highest agricultural exports. Clearly, the coffee industry will be important for the future of the nation.

Figure 2a establishes the coffee, rice and corn production areas in Timor Leste and Figure 2b shows the coffee growing areas most suitable for arabica sowing, according to climatic conditions.



2a



2b

Figure 2. Coffee, rice and corn production areas in Timor Leste (2a) and coffee growing areas most suitable for arabica sowing, according to climatic conditions (2b).
Source: Timor Leste GIS Portal

This area meets almost all climatic requirements for Arabica and Robusta coffee production, with the main problems of East Timorese coffee being low-productivity due to excessive plant age, pests and diseases, as well as the near absence of cultural practices appropriate to Timor.

However, for the more immediate future, most of the income can be obtained by improving the productivity per hectare, a change that requires investments in the application of GAP, model farms, tecnical assistance and trainning to farmers.

The importance of agriculture in Timor-Leste, throughout history, not only as a generator of food for the survival of families but essentially as a source of resources for industry and availability of labor cannot be underestimated. This may be verifiable in the last century, where spatial planning issues have been influenced by the policies of the Timorese Community, in particular those in the agricultural sector, such as agri-environmental measures, which seek to encourage agricultural production methods compatible with the protection requirements, environmental protection and preservation of the natural spaces.

3.b Description of the current seed sector and current practices of coffee growers to get new planting material

The seed and nursery sector in Timor-Leste do not have an identifiable control structure that allows for establishing a general description of what happens in this young country. This makes it difficult to evaluate the resulting experiences of the private and public sectors and NGOs, to establish the baseline that leads to being able to measure the effectiveness of the planting material used, the control mechanisms and the distribution of same that would allow for measuring mid-term impact levels in terms of productivity and cup quality.

In Timor-Leste there is no governmental or private entity that certifies or documents the traceability of coffee seeds, therefore there is no guarantee of the genetic quality of the seeds used to produce nurseries. Each individual effort, either at the producer-level or in projects involving several institutions, results in obtaining their own seedbeds through a visual selection of those plants that presented greater resistance to rust and had better productivity.

There is a minimal tendency to replant empty spaces that the farmer observes in the plot, without any controlled distancing. During the visit, no cases of renewal of areas greater than one hectare were evidenced or mentioned. Even when a farmer says he knows the variety he has planted, it may not match the characteristics of the variety, such as the size of the plant, size of the fruit, or size and shape of the leaves.

It is important to emphasize that the lack of an implemented strategy within the Timor-Leste coffee sector signifies that the quantitative information in this report, mainly provided by government personnel through the MAF, should be validated over the short term. The current internal control mechanisms do not show cases of successful seed lot or nursery projects in Timor Leste that have generated measurable indicators in the productive area.
During the interview with National Directorate of Coffee and Industrial Plants personnel, it was reiterated that the MAF's lack of knowledge regarding any publicly funded initiatives and their impact on seeds and nurseries, means that there is no clear picture of what has been imported and who is propagating varieties and by which methods.

Below is a summary of the little information available over recent years regarding the issue of seeds and nurseries that has been made in Timor-Leste. This has been divided by sector,

given that there is no joint strategy where two or more actors in the production chain participate jointly in specific projects.

3.b.1 Private Initiatives

In 2018, Olam in one of its small-holder clusters on the Pahata / Darulete Coffee farm, with support of its own technicians, implemented a nursery of 1,500 plants that benefit a group of 98 farmers (an average of 150 plants per farmer were delivered). The seeds caome from Quinta Portugal (Sarchimor) which is an experimental station of the Portuguese Cooperation Agency in Aileu. Many did not germinate. As a result, producers used seeds from their own farms to complete the nursery. Currently, they are not working in a new nursery or do they plan to do so as they are currently receiving training through Landell Mills. In October of this year, the seeds and nurseries training module is scheduled by Landelll Mills to later analyze the following steps regarding this topic.

3.b.2 Public donor efforts

There are very few recent initiatives in Timor-Leste that have been generated through non-profit organizations in the creation of seedbeds and nurseries. There have probably been several programs with NGOs that provided coffee seeds in Timor Leste since 2002, however, the name of the sources is not available or is reliable. Some of the past projects for which information could be obtained were the following:

a) The Quinta Portugal Demonstration Station managed by the NGO Camões (Agency of the Foreign Ministry of Portugal), promotes, finances, co-finances and operates dozens of programs and projects in a variety of areas in different partner countries, particularly in Portuguese-speaking African countries (PALOP) and East Timor. Such interventions are the result of the advantages and benefits of Portuguese co-operation in response to the strategies outlined by partner countries. With seeds from Quinta Portugal, nurseries with shade trees and coffee plants that were supplied to different governmental and private projects were carried out continuously from 2002 to 2015. The varieties used are sarchimores. The Quinta Portugal Project Manager thinks that there is HDT also. HDT seeds were taken from the same farm, so there is no guaranty that it is the indicated variety as there is no genetic analysis from a reliable source. Currently Camões is not working in coffee nurseries since there is no sector interest in this crop, mainly because other NGOs, such as GIZ, are focused on supporting initiatives in other products such as cocoa. The Sarchimor plants sent to Timor from Portugal by the CIFC and installed in Quinta Portugal (Aileu) were 11 selections from Sarchimor as indicated in the following list[14]:

   S - Selection

   S1 - CIFC 13683/26
   S2 - CIFC 13682/36
   S3 - CIFC 13682/40
   S4 - CIFC 13682/41
   S5 - CIFC 13682/5

14 Information provided by Hugo Trindade, Project Manager of Quinta Portugal through Dr. Vitor Várzea main researcher from CICF - Lisbon.

S6 - CIFC 13682/9
S7 - CIFC 13683/18
S8 - CIFC 13683/25
S9 - CIFC 13683/26
S10 - CIFC 13683/35
S11 - CIFC 13683/9

The 11 selections correspond to the descendants of 11 coffee trees (previous list), Generation F5, derived from Villa Sarchi x Timor Hibrid, that is, lineages of the population designated by Sarchimor selected in Costa Rica and received in 1985 in the CIFC. There is no additional information regarding cultivars, for example, the original plants from Costa Rica. According to the Quinta Portugal Project Mananer, the seeds were introduced to Timor-Leste from Portugal by a governmental military flight. The importation procedure was established by the government of Timor through the NDQB.

b) In 2002, Parcic, a Japanese NGO started working in Timor-Leste to support farmers' organization in collaboration with Alter Trade Japan, choosing Maubesi prefecture in the province of Ainaro. In time, the Agricultural Cooperative of Maubeshi was created, abbreviated as Cocamau, today containing more than 600 members. In 2004 they supported the producers of this cooperative with training in seeds and nurseries, which resulted in the creation of several 600-plant nurseries (there is no exact data on the number of farmers that participated), for which the NGO donated materials and 200 seeds of unknown variety to each producer. The remaining 400 seeds were provided by the same producer for their plots. From that date until now there have been no new initiatives known on this topic.

c) USDA (carried out by NCBA CLUSA) in partnership with the Timor Coffee Cooperative (TCC), established a project whose main objective was to link small farmers in the East Timor lowlands with international markets, contributing to the increase of trade and rural income. The project that began in 2013 and was completed in June 2019 was intended to benefit 10,000 farmers and create 250 nurseries of Robusta coffee, cocoa, cassava, black pepper, cloves and vanilla. The project delivered the small seedlings to farmers, and independent individuals without land on which to plant but with space in their homes to maintain the seedlings and market them as an income source. In some cases, the number of Robusta coffee plants per beneficiary has reached up to 5,000. There are no updated data on the total number of plants distributed among the TCC partners. The seeds came from robusta plantations in Timor, even though no information was found on the specific place of origin within the country.

3.b.3 Governmental Initiatives

The Timor-Leste government is clear that the main problems of the coffee sector in Timor center on low productivity and quality problems. In terms of quality, lack of GAP, tissue management, soil fertilization, shade regulation, integrated plans for pests and diseases, and mainly the age of the coffee plantations make it impossible to solve the current situation

over the short term. There are scarce financial resources for coffee farm renovation. The economic situation and the lack of land ownership make access to credit impossible for the small farmer. Old farms are vulnerable to diseases and infestations, mainly because what has been planted is unknown. The MAF's research efforts have been focused on food crops. However, they are now planning to begin research on coffee as it is a key crop. Land in a government plantation has been identified as a research site for this initiative.

From 2003 to 2015 through the National Coffee Directorate, the Government of Timor-Leste carried out a program for the production and distribution of coffee seedlings to benefit 9,649 farmers on 3,494.18 hectares, which corresponds to an average of 205.54 hectares and 600 farmers per year. Table 1 details the information provided by this MAF department.

The idea was that the distribution of seedlings made during the first 12 years would allow farmers to replant and those produced from 2015 (2,150,000 seedlings) onwards to renew 1,513 hectares for 2,938 farmers, that is, 0.51 hectares renewed per farmer. However, there are no monitoring and control programs for these plants or their distribution by the MAF and its departments. For all the plants delivered there was no genetic analysis by the MAF because a porrtion of the seeds came from the Coffee Nurseries Center (the largest seed and coffee plant distribution site in Timor), from those plants that were healthier and more productive and in other cases collected by the same communities where the nurseries were. The MAF coffee nursery at Fatuquero is a major infrastructure asset that will be important in the establishment of a coffee research program. This nursery currently supplies farmers with large numbers of coffee seedlings and shade trees. During the visit, plants from 2017 that had not been distributed were found inside the nursery, due to the fact that the government ran out of funds for their delivery. Currently, there are no known initiatives planned regarding the fate of these plants. Another nursery in Liquica, when restored, will supply additional seedlings and serve as another potential research site.

During the field visits to Same and Ainaro, two MAF Coffee Farms were visited, which receive technical assistance from the Ministry, as well as economic incentives to perform pruning on coffee plantations. In both cases, no type of reseeding or renewal was observed that had been provided by the government or that is consistent with the numbers of the National Directorate of Coffee and Plants in Table 3.

One of the main problems observed during the visit to Timor-Leste was the lack of follow-up after the delivery of the seedlings to the farmers, since there is no adequate monitoring to give continuity to the development of the plant and its current productive condition. Additionally, the distances between the regions and their farms made this task more difficult due to the lack of budget for this control.

The next National Directorate of Coffee and Plants strategy, in an effort to reduce distribution costs, is the creation of community nurseries instead of regional nurseries. The selected places will be Aileu and Ermera. In Ermera, the creation of 330,000 plants equivalent to 125 hectares is expected. In Aleiu the projection is to cover the renovation of 200 hectares with 500,000 thousand plants of which 75% are shade trees and 25% coffee seedlings.

Table 3. Distribution of coffee seedlings between 2003 and 2019 by the National Directorate of Coffee and Plants in Timor-Leste[15]

Year	Quantity in production	Distributed quantity	Hectares	Beneficiaries
2003	4,000	13,000	8.2	33
2004	8,000	16,000	10	48
2005	12,000	45,000	28.2	112
2006	25,000	50,000	31.3	124
2007	25,000	75,000	47	188
2008	200,000	200,000	125	500
2009	750,000	750,000	468.8	1,875
2010	300,025	300,000	187.6	748
2011	250,000	250,000	156	624
2012	350,000	350,000	218.75	875
2013	375,000	375,000	234.4	937
2014	259,000	259,000	161.8	647
2015	450,000	435,000	272	1,088
2016	500,000	485,000	303.13	500
2017	800,000	785,000	491	600
2018	0	0	0	0
2019(*)	400,000	1,200,000	750	750
Total	**4,780,025**	**5,588,000** (**)	**3.494,18**	**9,649**
Aver/year	**281,177**	**328,705.82**	**205,54**	**567**

Source: National Directorate of Coffee and Industrial Plants. Timor-Leste, June 2019
(*) The delivery of 700 thousand feet of shade trees was also reported / (**) The seeds are of unknown varieties. There is no genetic analysis to determine the origin.

In the opinion of Mr. Juliberto Dos Santos[16], as the coffee programs in Timor-Leste have been the same over the last few years, the farmers do not have as much interest in implementing or participating because there is not anything new for them, like the introduction of new varieties. However, the previous opinion is contrary to the reality of a country that for years has been doing very little renovation of their coffee plantations with varieties without any genetic traceability.

3.c Phytosanitary regulations for the importation of coffee germplasm into Timor-Leste

The NDQB is the department responsible for the importation regulations for live animals, animal products, live plants, plant products and miscellaneous imports (machinery, vehicles and soil samples).

According to the NDQB Director, Mr. Venancio Oliveira, until June 2019 there were no records on the process of an order for the importation of coffee germplasm into Timor, which had already happened for other agricultural products. The previous is contradictory to the verbal information obtained by the other MAF departments. For example, during an interview with

15 The information indicated in Table 1 could not be verified with another sources or type of control such as delivery receipts, name of beneficiary producers, location, number of plants received, etc. The indicators in this topic are variables that escape the Timor coffee sector.

16 Chief of Department coffee production. National Directorate for Research, Statistics, and Geographical Information

the National Directorate for Research, Statistics and Geographical Information Director, information indicated that he believed that in Timor-Leste solicitations had indeed been made for the importation of germplasm coffee.

There is a document created by the NDQB which in chapter B, sections 1 and 2 establishes regulations for the importation of live plants and seeds for planting. The proposed arrangements for the quarantine clearance of imported cargo is based predominantly on document or certificate-based clearance. Importers and agents are responsible for providing the appropriate documentation (certificates and import permits) for clearance by the NDQB prior to the goods being released.

3.c.1 General Considerations

In the case of live plants, there are general considerations that the Government of Timor-Leste establishes that must be considered due to the lack of adequate post-entry quarantine and disease testing facilities presently available, and the potential high-risk of live plant importations. The following restrictions will apply:

- ✓ Only importations of live plants and planting material that is deemed as "being in the best interests of the country's development" will be allowed to be imported into Timor-Leste. This is likely to include new species of food, fiber and forestry plants that are considered to benefit the country's agricultural and forestry industries.
- ✓ All such imports will require an import permit, which must be applied for at least one month prior to the proposed import, to allow Ministry staff to assess the application. These imports will only be issued to Government Departments and NGO's involved in projects to improve agricultural / forestry industries
- ✓ The importation of live ornamental plants, for private individuals and organisations will not be permitted.

The considerations for planting seeds is as follows:

- o Seeds must be free of soil and trash.
- o Seeds contaminated with soil discernible to the naked eye must be cleaned, re-exported or destroyed. Soil is not always readily visible, but 0.1% is the standard maximum tolerance.
- o Seeds must be free of live insects, plant material (e.g. fruit pulp, straw, leaf or stem material) and animal material (e.g. faeces, feathers, droppings, animal remains).
- o Seeds must be free of contamination from other crop seeds and from "prohibited seeds."
- o Seeds contaminated with other crop seeds or "prohibited seeds" must be subject to seed-cleaning treatments or other treatments (such as heat treatment) which would destroy seed contaminants.

- Seeds must be packed in new containers which are clearly labelled with botanical names.
- Seeds are to be presented for quarantine inspection on arrival to Timor-Leste.
- If infested with live insects, mites or other pests, the seeds should be subject to fumigation or other suitable treatment. As Timor-Leste is free of khapra beetle (Trogoderma granarium[17]), any seeds coming from countries with this pest will be subject to treatment sufficient to destroy this pest.

There are three categories for the classification of imported seeds:

Category One - Prohibited Weed Seeds.
Category Two - Restricted Seed.
Category Three – Non-Restricted Seed.

For the NDQB Coffee seeds within category 2 *Restricted Seed*, that means they are restricted entry and are allowed to be imported by permit only. Applications to import the following seeds must be made one month prior to the proposed importation, to allow for Ministry staff to assess the application.

3.c.2 Procedure

TLQS does not have a documented procedure that clearly establishes the steps that must be followed for the specific importation of coffee germplasm. During the interview with Mr. Oliveira, he indicated the steps that must be followed to obtain authorization for the importation of coffee germplasm. To explain the procedure more clearly, the Director used as an example the hypothetical case that the request came from the Coffee Directorate of the MAF, which is described below:

1. Letter of request to the NDQB. The MAF Coffee Director requests through a letter to the NDQB Director an explaination for the reasons for which the importation of coffee germplasm was requested. The letter must indicate, among other things, a description of the material, the quantity, and the country of origin.

2. Import Permit Aplication. NDQB has an application record that it sends to the applicant, which in this case would be the MAF Coffee Directorate (see application record in Annex 3).

3. Complete the application. The MAF Coffee Directorate staff completes the form and delivers it to the NDQB.

17 https://en.wikipedia.org/wiki/Khapra_beetle. The Khapra beetle (Trogoderma granarium), also called cabinet beetle,[1] which originated in South Asia, is one of the world's most destructive pests of grain products and seeds.[2] It is considered one of the 100 worst invasive species in the world.[3] Infestations are difficult to control because of the insect's ability to survive without food for long periods, its preference for dry conditions and low-moisture food.[4] There is a federal quarantine restricting the importation of rice into the U.S. from countries with known infestations of the beetle.

4. Import license. Within a maximum period of three (3) working days, the NDQB processes the form and generates a permit for the importation (see Import Permit Record in Annex 4). This permit indicates the document requirements that the country of origin must generate and send together with the coffee germplasm once it arrives in Timor-Leste.

5. Sending the import permit by the applicant. MAF Coffee Directorate personnel sends the import permit by courier to the origin country for the supplier of the material to start in their respective country the corresponding export permits

6. Receipt of material and verification of documents. When the material arrives in Timor, together with all the documents requested in the NDQB import permit, that the information matches the type of product received in Timor is verified. If everything matches and the documents are complete, the NDQB releases them on the same day.

The NDQB Director was very clear in communicating that the process becomes much more fluid and permissive if the applicant is the government itself and not a private company or NGO. In case it is not an MAF entity the process will have more difficulties and the approval process may take more time.

3.d. International status of Timor-Leste preserved coffee genetic diversity – are there international coffee genebanks that have Timor-Leste varieties preserved?

Timor-Leste has many different types of landscapes, each with its own climate, agro-ecological characteristics and economy, and many indigenous crops that are unique to the country or region. There is no national or regional seed bank, but the main stakeholders recognize the need to focus on indigenous crops that are nutritious and resilient to climate change. The introduction of new crops and new varieties of traditional crops, and the biodiversity of both cultivated and wild food, can contribute to improving the quality and diversity of diets.

The global coffee crop is increasingly threatened by climate change and diseases and pests. It also appears as if Coffea arabica, which accounts for 70% of global production, is one of the least genetically diverse crop species in the world. To make matters worse, the limited genetic coffee resources maintained are being lost at a rapid pace.

A germplasm collection is a "bank" for coffee's genetic diversity that can be drawn upon by coffee breeders to solve current or future problems facing the crop. There are 19 coffee germplasm banks around the world, each containing a mixture of commonly cultivated species and varieties, as well as wild coffee from the plant's center of evolutionary origin in Africa.

Unfortunately, most of the main genebanks for coffee (called ex situ collections) are in disrepair. Coffee genebanks are all field genebanks, or collections of living plants, which are expensive to maintain. Many critical coffee genetic resources have already been lost as trees die for lack of care and maintenance. Once a tree dies, if there is no duplicate, its unique genetics are lost forever. Rising temperatures and extreme weather are putting pressure on these essential assets; many field genebanks are located at altitudes considered too low for

healthy coffee. In addition, C. arabica's natural habitat in the highland forests of Ethiopia (the world's only in situ collection) is rapidly disappearing. These losses, combined with coffee's lack of genetic diversity, severely threaten the future of the crop.
Coffee breeders turn to genebank collections to find novel traits and their underlying genes to address challenges like rising temperatures, drought, and pests and diseases. The more genetic resources breeders have access to, the higher the likelihood they will be able to address threats to the crop, as well as to improve quality.

The cost of failing to act to preserve coffee's genetic resources could be catastrophic for the entire coffee industry. Any one coffee tree in a threatened germplasm collection could contain a trait that could protect against devastating droughts or crop pests. Every day that there is no global strategy for preserving coffee's genetic diversity is a day we are losing vital resources. But protecting coffee's genetic diversity isn't just about averting disaster. The same tree could have a trait with as-of-yet undiscovered quality or health-promoting traits. Unless we protect coffee's finite genetic resources, we'll never know.

3.d.1 CATIE:[18]

The Tropical Agricultural Research and Higher Education Center (CATIE) is a regional center dedicated to research and graduate education in agriculture, and the management, conservation and sustainable use of natural resources. Its members include Belize, Bolivia, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Venezuela, the Inter-American Institute for Cooperation on Agriculture (IICA) and the State of Acre in Brazil.

Despite the fact that the world's coffee germplasm collections are in disrepair, they are still the main source of diversity available to coffee breeders. But these resources are rarely shared among coffee producing countries. In fact, only the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) coffee germplasm bank in Costa Rica is party to an international treaty[19] on the open sharing of genetic resources for the improvement of crops. As mentioned before, CATIE's part in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) adopted in 2001, is a global response to promote the conservation of genetic plant resources and to protect farmer's rights to access and have fair and equitable sharing of benefits arising from their use.[20]

CATIE's participation in the Plant Treaty enables breeders from around the world to obtain and work with genetic material to make critical improvements to the coffee crop. The other 18 coffee germplasm banks, many of which contain novel species and varieties not held in the CATIE collection, do not participate in the Plant Treaty and do not share their material with breeders globally.[21]

[18] https://www.catie.ac.cr/que-es-catie/mision-vision-estrategia-y-valores.html

[19] International Treaty About Resources Phytogenetic for Feeding and Agriculture (FAO)

[20] http://www.fao.org/3/a-i0510e.pdf

[21] https://worldcoffeeresearch.org/

In summary, there are four key problems facing the coffee industry related to coffee's genetic resources:

1. C. arabica is one of the world's least genetically diverse major crops
2. Genetic resources in C. arabica's center of evolutionary origin (Ethiopia) are severely threatened by deforestation & drought
3. Genetic resources protected in germplasm banks is threatened by lack of funding
4. Only one global germplasm bank shares its genetic resources

The long-term success of coffee cultivation relies on the availability of genetic diversity. Without it, the coffee industry, both small farms and big farms alike, risks finding itself unable to cope with the challenges of climate change, new pests and diseases and ever-rising demand. Every day that there is no global strategy for preserving coffee's genetic diversity is a day vital resources are lost.

CATIE has experienced substantial losses of coffee plants over the years, resulting in loss of entire accessions (Vega et al., 2008). Many of the wild genotype accessions at CATIE are represented by only one or two individuals (Vega et al., 2008). At CATIE genetic erosion is estimated to range between 2 and 8% in various sections of the early 1960s, it can be presumed that this diversity is indicative of a sampling of what was present at that time and due to collection from multiple origins.

International Coffee Collection[22]. The International Coffee Collection has some 1,900 accessions from Ethiopia, Yemen, Kenya, Tanzania, Colombia, Brazil, Mexico, research institutes and other Central American countries. This collection is at CATIE's Cabiria Farm on eight hectares designated for the conservation of materials in the Coffea genus. It contains more than 9,000 coffee plants.

This collection preserves 11 different species of coffee and is ranked as the most important germplasm bank for Coffea arabica in the western hemisphere. It combines the genetic diversity of more than 700 wild materials and cultivated varieties and by keeping these in the public domain, it has an important impact on improving coffee production internationally.

The CATIE coffee collection is highly diverse genetically, consisting of a total of 1,992 introductions. It was founded in 1949 with materials from Brazil, Guatemala and El Salvador. In the 1960s, it was strengthened with wild materials from Ethiopia, including the original materials collected by the FAO (Fernie et al. 1968) and subsequently by ORSTOM (today the IRD) (Guillaumet and Hallé 1978), plus new species collected by IPGRI in Yemen (Eskes 1989).

This collection is the fourth largest in the world, containing a large part of the genetic diversity of Coffea arabica (Anthony et al. 1999), and it is the most important collection of Coffea arabica on the American continent, due to the number of introductions and the genetic diversity conserved. The collection has different types of genetic material: a) more

[22] https://www.catie.ac.cr/productos-y-servicios/colecciones-bancos-de-germoplasmas/coleccion-internacional-de-cafe.html

than 800 wild coffee genotypes and diploid species; b) leaf rust-resistant varieties, mutants and selected plants; c) inter- and intra-specific hybrids; and d) research material. The agreement signed with the International Treaty on Plant Genetic Resources for Agriculture and Food makes CATIE's collection the most important Arabica coffee germplasm bank in the public domain.

For more than 60 years, the collection has implemented breeding programs for genetic enhancement and distributed materials to producing countries. Outstanding materials with resistance to leaf rust include sources of germplasm that allow the generation of F1 hybrids, recently released in Central America. In the case of Costa Rica, the program that generated the Costa Rican variety 95 (leaf rust-resistant) was able to select plants from the 200 different types of Catimores present in the CATIE collection (ICAFE, 1998). Coffea canephora materials (leaf rust-resistant), which are the basis of the improved materials that are in use in Ecuador's Amazon region today, were introduced from CATIE between 1943 and 1986. Another example is the successful introduction of the geisha variety (leaf rust-resistant) that was done in Panama from the CATIE collection.[23]

F1 Seed Dissemination.This is a genetically super-diverse seed for enriching Arabica plant breeding programs worldwide. Under an agreement between CATIE, CIRAD and PROMECAFE, and with the participation of the Central American coffee institutes, different coffee hybrids have been developed over 15 years that show high productive potential (at least 30% more production than the commercial varieties currently used on farms), hardiness and bean quality. Some of the F1 hybrids show higher resistance to leaf rust and have already been released commercially.

CATIE has a somatic embryogenesis laboratory and has mastered the technology for plant reproduction. On the other hand, the CATIE seed laboratory already has a hybrid production program using micro-stakes. Another strength of CATIE is knowledge about the design, establishment and management of coffee plantations with F1 hybrids, which makes the development of training programs for technicians and producers possible.

CATIE has developed a detailed plan to upgrade its collection and transplant it to better locations. Upgrading and funding the Origin Collections is the first of a number of steps in the building of a comprehensive global system for the conservation and use of coffee diversity in genebanks.

[23] https://www.catie.ac.cr/en/what-do-we-work-on/agroforestry/coffee.html

Table 4. List of Timor Hybrids that CATIE has preserved[24].

Identification	Hibrido de Timor			
Accession number	**Identification**	**Country of origin**	**Place of origin**	**Introduction date**
T.04387	CRRC 1343/86	Portugal	Coffee Rusts Research Center, Oeiras	1964/04
T.04388	CRRC 1343/180	Portugal	Coffee Rusts Research Center, Oeiras	1964/04
T.04389	CRRC 1343/349	Portugal	Coffee Rusts Research Center, Oeiras	1964/04
T.04390	CRRC 1343/933	Portugal	Coffee Rusts Research Center, Oeiras	1964/04
T.04452	CRRC 1342/258	Portugal	Coffee Rusts Research Center, Oeiras	1965/02
T.05119	CRRC 832/2	Portugal	Coffee Rusts Research Center, Oeiras	1966/08
T.05122	CRRC 1343/933	Portugal	Coffee Rusts Research Center, Oeiras	1966/08
T.05206	L 8-154	Colombia	CENICAFE, Chinchina, Caldas	1972/11
T.05207	L 8-1396	Colombia	CENICAFE, Chinchina, Caldas	1972/11
T.05228	No.1 CIFC 832/2	Portugal	Coffee Rusts Research Center, Oeiras	1973/06
T.05250	CIFC 1343/915	Portugal	Coffee Rusts Research Center, Oeiras	1973/06
T.05286	B-61042 EP-7002 LC-1561 (T.04387)	Brazil	Instituto Agronomico de Campinas, Campinas	1974/03
T.05289	CIFC 2252/2	Portugal	Coffee Rusts Research Center, Oeiras	1975/09
T.05290	CIFC 2252/28	Portugal	Coffee Rusts Research Center, Oeiras	1975/09
T.05291	CIFC 2252/57	Portugal	Coffee Rusts Research Center, Oeiras	1975/09
T.12859	UFV 1965 (450-63)	Brazil	Universidad Federal de Vicosa, Minas Gerais	1981/06
T.17790	CIFC 843	India	Coffee Board	1987/08

3.d.2 CENICAFE: National Center for Coffee Research (Centro Nacional de Investigaciones de Café)[25]

In 1938, the FNC created the National Coffee Research Center, Cenicafé, in order to study aspects related to farm production, harvest, benefit, grain quality, management and use of by-products for coffee exploitation, and the conservation of the natural resources of the Colombian coffee zone.

[24] https://www.genesys-pgr.org/explore

[25] https://www.cenicafe.org/

Since its founding, Cenicafé has received the support of coffee farmers and its challenge has been the development of appropriate technologies for coffee production in Colombia, in terms of economic, environmental and social sustainability.

At the end of 1960, the Genetic Improvement Program of Cenicafé initiated the development of varieties resistant to coffee rust, highly productive, with the characteristic cup profile of Colombian coffee, low bearing, reasonable phenotypic uniformity and adaptability. Under this scheme and as a result of the rigorous evaluation and selection of at least four generations (Subsidiaries or F) and in each generation, and cycles of four harvests, in 1980 Cenicafé delivered the Colombian variety, under the concept of compound variety. This means that it is a variety of coffee that is constituted by different progenies, which in turn have different mechanisms of resistance to coffee rust. This is how the concept of genetic diversity is used as a mechanism for the establishment of a durable resistance to rust.

Subsequently, in 2005 the Castillo Variety was released, consisting mostly of materials of intermediate size and resistance to rust, which have excellent attributes as a beverage, are highly productive and were selected in specific environments to optimize their performance and productivity. However, aware of Colombian coffee growers' requirements, Cenicafé developed the new Cenicafé Variety, which has as the characteristics of a Caturra variety type, resistance to coffee rust and the coffee cherries-CBD disease, equal production and percentage of supreme coffee greater than the Castillo Variety.

The Castillo variety was obtained from the crossing of the variety Caturra x Hybrid of Timor. After successive generations of selection until generation F5, the best lines (components) were propagated and their seeds mixed to obtain this variety. The last evaluations were carried out in different national coffee zones.

The conditions of Colombia, due to its geographical position and the existing rainfall pattern, allow the coffee industry to have quite favorable characteristics for rust epidemics, considering that this disease tends to change permanently, generating new breeds. In this sense, what is done is anticipatation and action in preventive ways to ensure that the durability of the resistance of Castillo varieties is reinforced for the benefit of Colombian coffee growers.

Different lineages of HDT have also been used in genetic improvement programs in countries such as Brazil and Colombia, because since it is the result of an interspecific cross between Coffea arabica and Coffea canephora, HDT is a tetraploid that behaves like an Arabica in all its characteristics, but providing at least five specific resistance genes inherited from the canéfora. This makes HDT an extremely valuable material for the transfer of resistance genes in the synthesis of new varieties of Coffea arabica.

In addition to the well-proven rust resistance, HDT has resistance to another very important disease known as Coffee Berry Disease (CBD) caused by the fungus Colletotrichum kahawae, which currently affects coffee trees in African countries.

3.d.3 Agronomic Institute of Campinas (IAC)

Brazil's reputation as an agricultural power has received a strong contribution from IAC research works since its creation in 1887.

Besides conventional breeding, IAC develops genome studies of crops such as sugarcane, citrus, and coffee, having provided throughout its history, about 920 varieties of 66 plant species of high nutritional quality, high-productivity, and less demand for water and pesticides.

The genetic improvement of rubber helped turn San Pablo into the largest Brazilian producer of natural rubber. The varieties of peanut obtained by IAC's breeding program represent 80% of the area cultivated with this crop, while 90% of the coffee grown in Brazil came from IAC. The work of IAC's scientists enabled the cultivation of temperate fruits in different regions of San Pablo.

The Brazilian agricultural climatology studies begun in 1890 at IAC and up to the present times assist farmers in managing their crops. IAC has the only public laboratories accredited by INMETRO in soil agro environmental resources besides the first laboratory accredited by the Ministry of Agriculture for diagnosis of citrus plant diseases.

The use of varieties resistant to the Hemileia vastatrix fungus, which causes the disease known as Roya del Cafeto, is undoubtedly the most efficient and economical control measure, and is also favorable for the environment. In Brazil since 1974, the Agricultural Research Company of Minas Gerais (EPAMIG) and the Federal University of Viçosa (UFV) have been working on research in the state of Minas Gerais. As a result of this agreement, the EPAMIG / UFV Coffee Genetic Improvement Program has managed to develop several cultivars of low-size and high-productivity, among which is the Catiguá MG2 variety, resistant to several races of Hemileia vastatrix that attacks coffee trees[26].

The Catiguá MG2 variety comes from a crossing carried out in 1980 by the team of plant breeders of EPAMIG / UFV, between the Catuaí variety IAC 86 and the Timor Hybrid UFV 440-10 rust resistance carrier. The development of the variety was carried out through the genealogical method adopted in the breeding process, carrying out the selection program through the evaluation of several generations that ended with the planting of the material in the Experimental Patronage Fazenda (FEPC), to give rise to Catiguá cultivar MG2 in generation F5. This variety was denominated Catiguá, in reference to the old name of the city of Patrocínio in Minas Gerais.

The Catiguá MG2 variety was brought from Brazil to Costa Rica by an engineer, Jorge Ramírez Rojas, in 2008, as part of a large group of genetic materials obtained through the technical cooperation efforts made by the then Technical Manager of ICAFE, with Centers of Research in Brazil and with expert colleagues from the Agricultural Research Company of Minas Gerais (EPAMIG), the Federal University of Viçosa (UFV) and the Agronomic Institute of Campinas (IAC).

[26] Consorcio Brasileño de Pesquisa y Desarrollo de Café (CBP&D/café),

The Catiguá MG2 was planted in 2009 on the CICAFE farm in Heredia, as part of the varieties that make up the Central Test of Introductions of Brazil and with the aim of initiating the process of evaluation and validation of the behavior of these varieties in Costa Rican conditions.

With the advance in the study development and the evaluations made to these new genotypes, the Catiguá MG2 variety has presented very good agronomic qualities, resistance to rust, standing out especially for presenting an excellent cup quality.[27]

Actually, the collection maintained by the IAC Alcides Carvalho Coffee Center consists of about 30,000 coffee trees belonging to the Coffea arabica, C. canephora, C. congensis, C. eugenioides, C. liberica, C. racemosa, C. salvatrix, C. Kapakata, C. stenophylla, C.millotii, C. sessiliflora, C. heterocalyx, C. humilis, C. anthonii Psilanthus ebracteolatus and P. travancorensis species. It brings together a great diversity of mutants, botanical forms, exotic varieties and introductions from the centers of origin and diversification of C. arabica and C. canephora, the main cultivated species.[28]

3.d.4 Federal University of Viçosa (UFV)

When rust disease reached Brazil in 1970–1971, a coffee germplasm bank was created at the UFV in Minas Gerais. At first, it contained about 450 accessions with high genetic variability. HdT was introduced by vegetative propagation, and seeds were sampled from plants selected at the Coffee Rusts Research Center (Centro de Investigações das Ferrugens do Cafeeiro–CIFC), the Experimental Stations of the Agronomic Research Institute of Angola (Estações Experimental do Instituto de Investigação Agronómica de Angola –IIAA), and the Regional Uige Station (Estação Regional de Uige–ERU) at the Coffee Institute of Angola. This germplasm is major source for resistant coffee breeding programs.[29]

In a study conducted on the main phytosanitary problems affecting global coffee production, which are the fungal diseases, one hundred and fifty-two (152)[30] accessions from the germplasm collection of UFV were analysed. They belong to the Híbrido de Timor (HdT) group and were introduced into the Plant Pathology Department of UFV by vegetative propagation by means of seeds samples collected in coffee trees selected in CIFC, Portugal, or IIAA and ERU, Angola. Figure 3 indicates the coffee accessions of the HDT germplasm analyzed in UFV.

HdT genotypes are important coffee pest- and disease-resistant sources used worldwide. Therefore, it is essential to expand and exploit the genetic basis of their pathogen resistance. UFV and EPAMIG have maintained a valuable HdT germplasm collection, which is the genetic basis of disease-resistant coffee breeding programs in Brazil and worldwide. Some

[27] Consorcio Brasileño de Pesquisa y Desarrollo de Café (CBP&D/café),

[28] Banco de Germoplasma de café do IAC (https://revistacafeicultura.com.br)

[29] The Híbrido de Timor germplasm: identification of molecular diversity and resistance sources to coffee berry disease and leaf rust. (https://link.springer.com/article/10.)

[30] The Híbrido de Timor germplasm: identification of molecular diversity and resistance sources to coffee berry disease and leaf rust. (https://link.springer.com/article/10.)

cultivations have been developed using this genetic material as a resistance source, while others have been sent to other coffee-producing countries to support local production. Knowledge of this germplasm and the identification of resistant genes are crucial for their optimal utilization in the development of new, high-yield, and durable resistant cultivations.

3.d.5 IHCAFE[31]

IHCAFE is an institution with the objective of promoting the socioeconomic profitability of the Honduran coffee grower; through the development of the competitiveness of the Agroindustrial Coffee Chain, in a sustainable manner, using avant-garde technologies friendly to the environment; and providing customers with excellent quality coffee, implementing efficient promotion programs and viable alternatives for diversification as an alternative source of income.

IHCAFE 90 Catimor. High performance plant adapted to the lowest altitudes. It requires high fertilization. It was confirmed that IHCAFE 90, through a scientific evaluation, is susceptible to coffee rust in Honduras and possibly also susceptible in other areas of Central America. Highly susceptible to the Ojo de Gallo. This variety is genetic between Timor Hybrid 832/1 and Caturra. Pedigree selection made by the Honduran Coffee Institute (IHCAFE). Highly similar to T5175.

WCR has established numerous programs to address the fragile nature of resistance to coffee leaf rust in the region—including a regional breeding program that includes the creation of new interspecific hybrids, guidance for coffee technicians and farmers for comprehensive agronomic approaches for the management of rust, a program to ensure the quality and genetic purity of seeds and seedlings sold to farmers, and a global effort to safeguard coffee genetic resources that breeders will need to tap to ensure greater genetic diversity for the crop.[32]

31 http://www.ihcafe.hn/images/BoletinT%C3%A9cnico%

32 http://gcrmag.com/news

Table 1 Coffee accessions of Híbrido de Timor germplasm analyzed

Accession Name	Origin	Accession Name	Origin	Accession Name	Origin	Accession Name	Origin	Accession Name	Origin
UFV 376-01	IIAA808-5(CIFC 2234)[a]	UFV 427-24	ERU202/13 (CIFC1343/136)	UFV 439-01	ERU209/2 (CIFC2570)	UFV 443-02	ERU209/7 (CIFC2570)	UFV 448-40	ERU209/16 (CIFC2570)
UFV 376-02		UFV 427-40		UFV 439-02		UFV 443-03		UFV 448-42	
UFV 376-05		UFV 427-55		UFV 439-03		UFV 443-07		UFV 448-48	
UFV 376-08		UFV 427-56		UFV 439-04		UFV 443-08		UFV448-69	
UFV 376-09		UFV 427-65		UFV 439-05		UFV 444-01	ERU209/11 (CIFC2570)	UFV 448-75	
UFV 376-11		UFV 427-90		UFV 439-11		UFV 444-02		UFV449-20	ERU210/14 (CIFC2571)
UFV 376-12		UFV 428-01	ERU202/3 (CIFC1343/136)	UFV 439-13		UFV 444-04		UFV 450-06	ERU209/15 (CIFC2571)
UFV 376-14		UFV 428-02		UFV 439-14		UFV 444-05		UFV 450-12	
UFV 376-31		UFV 428-03		UFV 439-16		UFV 445-01	ERU209/15 (CIFC2570)	UFV 450-18	
UFV 376-37		UFV 428-04		UFV 440-04	ERU209/6 (CIFC2570)	UFV 445-02		UFV 450-61	
UFV 376-52		UFV 428-05		UFV 440-07		UFV 445-03		UFV 450-63	
UFV 376-57		UFV 430-13	ERU206/14 (CIFC1343/136)	UFV 440-10		UFV 445-46		UFV 450-65	
UFV 376-79		UFV 430-15		UFV440-18		UFV445-53		UFV 450-84	
UFV 377-01	IIAA811 (CIFC 2235)	UFV 432-25	ERU207/6 (CIFC2568)	UFV 440-19		UFV 445-70		UFV 451-28	?
UFV 377-04		UFV 432-30		UFV 440-22		UFV 445-92		UFV 451-42	?
UFV 377-05		UFV 432-41		UFV 440-32		UFV 446-08	ERU209/8 (CIFC2570)	UFV 454-43	?
UFV 377-15		UFV 433-01	ERU207/15 (CIFC2568)	UFV 440-37		UFV 446-09		UFV 477-02	?
UFV 377-21		UFV 433-03		UFV 441-01	ERU209/10 (CIFC2570)	UFV 446-29		CIFC 4106	Vegetative propagation[d]

Table 1 continued

Accession Name	Origin	Accession Name	Origin	Accession Name	Origin	Accession Name	Origin	Accession Name	Origin
UFV 377-23		UFV 434-09	ERU207/12 (CIFC2568)	UFV 441-02		UFV446-50		CIFC 832/1	Vegetative propagation
UFV 377-24		UFV 435-03	ERU207/12 (CIFC2568)	UFV 441-03		UFV 446-98		CIFC 832/2	Vegetative propagation
UFV 377-34		UFV 435-08		UFV 441-04		UFV 446-99			
UFV 377-51		UFV 435-13		UFV 441-05		UFV 446-104			
UFV 379-07	IIAA845-5 (CIFC 2252)	UFV 437-02	ERU209/1 (CIFC2570)	UFV 441-11		UFV 446-109			
UFV 380-52	IIAA845-8 (CIFC 2252)	UFV 437-03		UFV 441-13		UFV446-138			
UFV 408-01	CIFC 1590/9[b]	UFV 437-06		UFV 441-14		UFV 447-06	ERU209/12 (CIFC2570)		
UFV 408-10		UFV 437-09		UFV441-20		UFV 447-43			
UFV 408-18		UFV 437-10		UFV442-34	ERU209/14 (CIFC2570)	UFV447-47			
UFV 408-26		UFV 438-03	ERU209/13 (CIFC2570)	UFV 442-40		UFV447-48			
UFV 408-28		UFV 438-10		UFV442-42		UFV447-50			
UFV 427-01	ERU202/13 (CIFC1343/136)[c]	UFV 438-12		UFV442-44		UFV447-51			
UFV 427-09		UFV 438-40		UFV442-47		UFV 447-67			
UFV 427-15		UFV 438-49		UFV 442-50		UFV 448-12	ERU209/16 (CIFC2570)		
UFV 427-22		UFV 438-52		UFV 442-108		UFV 448-16			

[a]Seeds introduced from IIAA, Angola, derived from seeds of plants in CIFC. [b]Seeds introduced from CIFC, Portugal. [c]Seeds introduced from ERU, Angola, derived from seeds of plants selected in CIFC. [d]Clones introduced form CIFC, Portugal

Figure 3. Coffee accessions del HDT germplasm analyzed in Federal University of Viçosa.

3.d.5 Center for Research on Coffee Rust/ ISA / ULisboa

As was mentioned previously coffee rust disease attacked in almost every part of the world where Arabica was cultivated. But through the resistance manifested in Hibrido de Timor (immunity to 23 physiological races of the disease!), a defense had been found.
The supposedly first HDT plant was introduced by vegetative propagation into the "Centro de Investigação das Ferrugens do Cafeeiro" (CIFC) in Portugal, receiving the registration number CIFC 4106.33. In 1957, seeds of different HDT from the Timor Island were taken to CIFC.

Among these, the CIFC established clones and offshoots of the original plant from its seeds and from 1960, several clones and offspring of HDT accessions CIFC 832-1, CIFC 832-2 and CIFC 1343 and CIFC 2570, were distributed to several coffee-producing countries, including Colombia, by CIFC. As result, a number of commercial varieties were produced at the end of the 80s and planted in extensive areas of Central and South America.[34]

HDT accessions:

a) **HT CIFC 4106:** considered the original HDT plant (C. arabica x C. canephora) obtained in the Timor Island and introduced into CIFC (Portugal) by vegetative propagation.

b) **HT CIFC 832/1, 832/2 and 1343/269**: introduced into CIFC through selected plant seeds from Timor Island. In 1970/71, HT clones of CIFC 4106, 832/1, 832/2 and 1343/269 were obtained through vegetative propagation by the CIFC and brought to the Germplasm Bank of the Universidade Federal de Viçosa Brazil.

c) **HT UFV 377-01 and UFV 377-09:** accessions originated from seeds of IIAA 811-7, cultivated in the "Instituto de Investigação Agronomica de Angola" (IIAA) originating from seeds of CIFC 2235; this plant, in turn, was obtained from seeds of VCE1587, selected in Tanzania.

Some HDTs, with resistance to all known rust diseases, were used as sources of resistance in the breeding programmes originating varieties such as Catimor and Sarchimor.
Both HDT and its derivatives as well as all the available CIFC coffee materials have been provided free of charge to all the world's coffee growing countries and more than 90% of cultivated resistant coffee varieties were created from the studies carried out at CIFC[35].
Other accessions of HDT from CIFC are not published therefore that information is not available.

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[33] Impact of CIFC research (https://www.isa.ulisboa.pt)

34 https://libertycoffee.sg

[35] Impact of CIFC research (https://www.isa.ulisboa.pt)

3.e DNA fingerprinting/identification of these main simples

3.e.1 Field samples

During the field visits, 70 single samples (each with three leaves per plant) were taken at nine different points in Timor-Leste to establish the DNA fingerprinting / identification, which were sent on the last day of the courier visit to the ADNid[36], France. For the above, the WCR protocol was followed for the preparation of the samples (see protocol in Annex 5).

For the amount of sample, the available budget was taken into account, so the selection by place varied between six to 10 samples per site for the nine farms and nurseries visited. The amount was established according to farm size, depending on the diversity of the genetic material and not in the area. Figure 4 establishes the final list of the 70 samples in the format established by WCR and in figure 5 the location points of the samples are located in each of the regions, taking into account the GPS coordinates. The codes correspond to the following locations:

Code	Location		Code	Location
QP	Quinta Portugal, Aileu		PC	Parcic, Maubessi
JB	Julio Barros, Manufahi		LM	Leopoldinho Mendoco, Aileu
M	Missao, Ainaro		FA	Fazenda Algarve, Liquicá
FN	Fatuquero Nursery, Fatuquero		P	Pahata, Liquicá
DA	Demostration Apido, Apido			

The collection of samples also served to train National Directorate for Coffee and Industrial Crops, and National Directorate for Research, Statistics, and Geographical Information staff who accompanied the consultants during the entire field visit. As shown in Figure 6, they were responsible for choosing the plants randomly, taking the samples, labeling them in the envelope and identifying the plant for their tracking. According to the DNPEIG Director, the next step will be to install signs for each plant which will contain the corresponding information once the results of the variety are known by the WCR.

[36] ADNid is a France-based (Montpellier) innovative company specialized in the production of high quality genomic data

WORLD COFFEE RESEARCH
COFFEE VARIETY GENETIC TESTING SERVICE

GENERAL INFORMATION

Number of samples:	70

No. Sample	Code on the envelope	Supposed variety	Data of collection (mm/dd/yy)	Country of Collection	Region of Collection	Farm/Plot of collection	GPS coordinates	Type of analysis
1	QPS1	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	C
2	QPS2	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	C
3	QPS3	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	C
4	QPS4	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	C
5	QPS5	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'14.86S/125°34'50.36E	C
6	QPS6	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'27.15S/125°34'1.7E	C
7	QPS7	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'27.5S/125°34'1.97E	C
8	QPS8	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'27.95S/125°34'1.73E	C
9	QPS9	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	C
10	QPS10	Unknown	6/18/19	Timor Leste	Aileu	Quinta Portugal	8°42'27.84S/125°34'2.48E	C
11	JBS1	Unknown	6/18/19	Timor Leste	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	C
12	JBS2	Unknown	6/18/19	Timor Leste	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	C
13	JBS3	Unknown	6/18/19	Timor Leste	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	C
14	JBS4	Unknown	6/18/19	Timor Leste	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	C
15	JBS5	Unknown	6/18/19	Timor Leste	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	C
16	JBS6	Unknown	6/18/19	Timor Leste	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	C
17	MS1	Unknown	6/18/19	Timor Leste	Ainaro	Missao	8°59'23.91S/125°30'33.07E	C
18	MS2	Unknown	6/18/19	Timor Leste	Ainaro	Missao	8°59'23.91S/125°30'33.07E	C
19	MS3	Unknown	6/18/19	Timor Leste	Ainaro	Missao	8°59'23.91S/125°30'33.07E	C
20	MS4	Unknown	6/18/19	Timor Leste	Ainaro	Missao	8°59'23.91S/125°30'33.07E	C
21	MS5	Unknown	6/18/19	Timor Leste	Ainaro	Missao	8°59'23.91S/125°30'33.07E	C
22	MS6	Unknown	6/18/19	Timor Leste	Ainaro	Missao	8°59'23.91S/125°30'33.07E	C
23	FNS1	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
24	FNS2	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
25	FNS3	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
26	FNS4	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
27	FNS5	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
28	FNS6	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
29	FNS7	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
30	FNS8	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
31	FNS9	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
32	FNS10	Unknown	6/19/19	Timor Leste	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	C
33	DAS1	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
34	DAS2	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
35	DAS3	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
36	DAS4	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
37	DAS5	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
38	DAS6	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
39	DAS7	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
40	DAS8	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
41	DAS9	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
42	DAS10	Unknown	6/19/19	Timor Leste	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	C
43	PCS1	Unknown	6/19/19	Timor Leste	Maubessi	Parcic/COCOMAU	8°50'33.0S/125°36'69.0E	C
44	PCS2	Unknown	6/19/19	Timor Leste	Maubessi	Parcic/COCOMAU	8°50'32.7S/125°36'69.5E	C
45	PCS3	Unknown	6/19/19	Timor Leste	Maubessi	Parcic/COCOMAU	8°50'32.3S/125°36'68.0E	C
46	PCS4	Unknown	6/19/19	Timor Leste	Maubessi	Parcic/COCOMAU	8°50'32.5S/125°36'67.0E	C
47	PCS5	Unknown	6/19/19	Timor Leste	Maubessi	Parcic/COCOMAU	8°50'30.2S/125°36'67.3E	C
48	PCS6	Unknown	6/19/19	Timor Leste	Maubessi	Parcic/COCOMAU	8°50'31.0S/125°36'66.7E	C
49	LMS1	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
50	LMS2	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
51	LMS3	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
52	LMS4	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
53	LMS5	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
54	LMS6	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
55	LMS7	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
56	LMS8	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
57	LMS9	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
58	LMS10	Unknown	6/19/19	Timor Leste	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	C
59	FAS1	Unknown	6/20/19	Timor Leste	Liquica	Fazenda Algarve	8°39'99.6S/125°19'80.8E	C
60	FAS2	Unknown	6/20/19	Timor Leste	Liquica	Fazenda Algarve	8°39'99.2S/125°19'80.1E	C
61	FAS3	Unknown	6/20/19	Timor Leste	Liquica	Fazenda Algarve	8°39'99.5S/125°19'78.3E	C
62	FAS4	Unknown	6/20/19	Timor Leste	Liquica	Fazenda Algarve	8°39'97.8S/125°19'77.3E	C
63	FAS5	Unknown	6/20/19	Timor Leste	Liquica	Fazenda Algarve	8°39'98.5S/125°19'75.6E	C
64	FAS6	Unknown	6/20/19	Timor Leste	Liquica	Fazenda Algarve	8°40'0.0S/125°19'75.0E	C
65	PS1	Unknown	6/20/19	Timor Leste	Liquica	Pahata	8°39'89.2S/125°20'63.2E	C
66	PS2	Unknown	6/20/19	Timor Leste	Liquica	Pahata	8°39'89.2S/125°20'63.9E	C
67	PS3	Unknown	6/20/19	Timor Leste	Liquica	Pahata	8°39'89.3S/125°20'63.8E	C
68	PS4	Unknown	6/20/19	Timor Leste	Liquica	Pahata	8°39'89.8S/125°20'63.9E	C
69	PS5	Unknown	6/20/19	Timor Leste	Liquica	Pahata	8°39'90.3S/125°20'65.0E	C
70	PS6	Unknown	6/20/19	Timor Leste	Liquica	Pahata	8°39'90.9S/125°20'65.3E	C

Source: Emilia Umaña (WCR) and Leonardo Sánchez (ACERES)

Figure 4. List with the general information of the 70 samples taken in Timor-Leste for DNA fingerprinting / identification analysis.

Figure 5. Location of the GPS points in the farms where the samples were obtained in Timor-Leste for DNA fingerprinting / identification analysis in the major coffee producing regions.

Figure 6. DNPEIG and DNCPI personnel trained to take leaf samples following the WCR protocol.

For example, one of the farms sampled was Quinta Portugal (QPS1-QPS9) in Aileu, where the Project Manager sent us a satellite image of the two lots where the 10 samples were taken from and analyzed by ADNid. This is shown in Figure 7.

Figure 7. Areas where leaf samples were taken at Quinta Portugal in Aileu. On the right is the plot where the samples from 1 to 5 were taken and the plot from samples 6 to 10 on the left. *Source: Quinta Portugal*

3.e.2 Results

The bottom line of the analyses is that there is a lot of crossing and mixing with other Sarchi/catimors that were introduced to the island, probably from Indonesia. The Timor Hybrid was never a stable variety - it is not homogeneous like Marsellesa - rather it was started by a few individuals and the descendants on the island are obviously outcrossing with other introduced catimors.

The results obtained by ADNid indicate that the samples collected from different areas of Timor-Leste randomly, resulted in 72.8% of Arabica varieties introduced as Catimor / Sarchimor mixes, 22.8% were from the Typical-Bourbon genetic group, 2.85% was classified as plants with more robusta genes than normal and only a sample of the 70 sent to France (1.42%) resulted from the Ethiopia class (Java / Abysinia), was just introduced from Indonesia. Could have been before the occupation. Figure 8 shows the graphs of the classification obtained from each of the locations indicated at the beginning of section 3.e, as well as the number of resulting samples in numerical value.

One hundred percent of the samples obtained from the Julio Barros farms in Manufahi and Missao in Ainaro were mixtures of Catimor / Sarchimor, that is, crosses of HdT X Caturra and HdT x Villa Sarchi. Of the 10 samples collected from the demonstration farm of Apido, 4 were: Catimor / Sarchimor and the other 6 of the Typica-Bourbon genetic group, where DAS3, DAS6, DAS8, DAS9, DAS10 samples tend to make more of the group genetic Bourbon-Typica / Typica, as well as the FNS10 sample of the Nursery Fatuquero according to the results. Similarly, sample 2 of Quinta Portugal (QPS2) obtained a result from the Typica-Bourbon / Bourbon genetic group, which implies that it can be a Bourbon or Caturra.

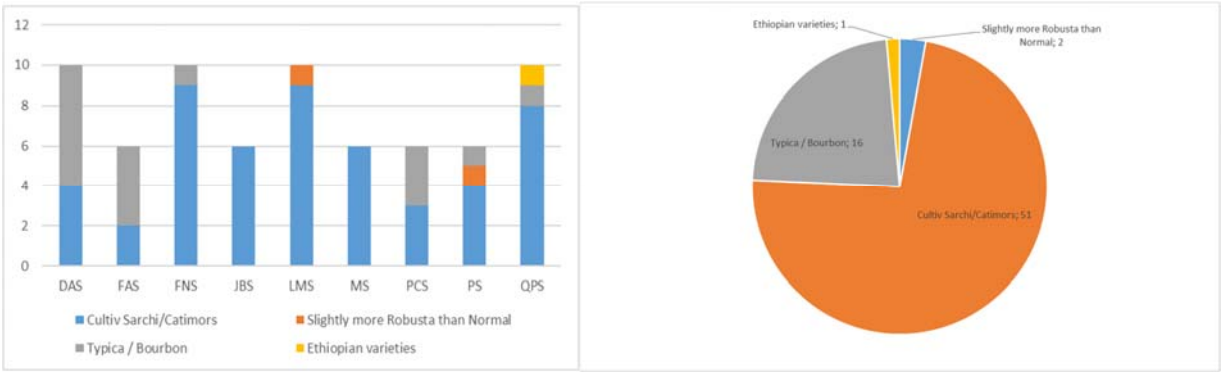

Figure 8. Varieties obtained from the 70 samples collected in Timor-Leste for each of the locations *Source: ADNid*

There are two samples of real interest that have more robusta genes in them than normal and should be immediately separated and studied, to establish their behavior against rust and productivity and determine if they have characteristics close to HdT. These samples correspond to the LMS10 and PS4 coming respectively from the farms of Leopoldinho Mendoco in Aileu and Pahata in Liquicá. It is important to indicate that Pahata farm has varieties of Robusta and Arabica, even though the PS4 sample was taken from a plot planted with Arabica.These samples are the ones highlighted in the general results list for the 70 samples in Figure 9.

Annex 6 shows the results graphically for the codes of each sample provided by the ADNid.

WORLD COFFEE RESEARCH

COFFEE VARIETY GENETIC TESTING SERVICE

RESULTS TIMOR LESTE
DNA fingerprinting/identification

Code on the envelope	Region of Collection	Farm/Plot of collection	GPS coordinates	Classe
QPS1	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	Cultivated Sarchi/Catimors
QPS2	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	Typica/Boubon
QPS3	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	Ethiopia: Java/Abysinia
QPS4	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	Cultivated Sarchi/Catimors
QPS5	Aileu	Quinta Portugal	8°42'14.86S/125°34'50.36E	Cultivated Sarchi/Catimors
QPS6	Aileu	Quinta Portugal	8°42'27.15S/125°34'1.7E	Cultivated Sarchi/Catimors
QPS7	Aileu	Quinta Portugal	8°42'27.5S/125°34'1.97E	Cultivated Sarchi/Catimors
QPS8	Aileu	Quinta Portugal	8°42'27.95S/125°34'1.73E	Cultivated Sarchi/Catimors
QPS9	Aileu	Quinta Portugal	8°42'14.86S/125°33'50.36E	Cultivated Sarchi/Catimors
QPS10	Aileu	Quinta Portugal	8°42'27.84S/125°34'2.48E	Cultivated Sarchi/Catimors
JBS1	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	Cultivated Sarchi/Catimors
JBS2	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	Cultivated Sarchi/Catimors
JBS3	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	Cultivated Sarchi/Catimors
JBS4	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	Cultivated Sarchi/Catimors
JBS5	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	Cultivated Sarchi/Catimors
JBS6	Manufahi	Julio Barros	8°57'17.45S/125°39'02.11E	Cultivated Sarchi/Catimors
MS1	Ainaro	Missao	8°59'23.91S/125°30'33.07E	Cultivated Sarchi/Catimors
MS2	Ainaro	Missao	8°59'23.91S/125°30'33.07E	Cultivated Sarchi/Catimors
MS3	Ainaro	Missao	8°59'23.91S/125°30'33.07E	Cultivated Sarchi/Catimors
MS4	Ainaro	Missao	8°59'23.91S/125°30'33.07E	Cultivated Sarchi/Catimors
MS5	Ainaro	Missao	8°59'23.91S/125°30'33.07E	Cultivated Sarchi/Catimors
MS6	Ainaro	Missao	8°59'23.91S/125°30'33.07E	Cultivated Sarchi/Catimors
FNS1	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS2	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS3	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS4	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS5	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS6	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS7	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS8	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS9	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Cultivated Sarchi/Catimors
FNS10	Fatuquero	Fatuquero Nursery	8°42'43.69S/125°27'08.31E	Typica/Boubon
DAS1	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Cultivated Sarchi/Catimors
DAS2	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Typica/Boubon
DAS3	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Typica/Boubon
DAS4	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Cultivated Sarchi/Catimors
DAS5	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Cultivated Sarchi/Catimors
DAS6	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Typica/Boubon
DAS7	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Cultivated Sarchi/Catimors
DAS8	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Typica/Boubon
DAS9	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Typica/Boubon
DAS10	Apido	Demostration Farm Apido	8°45'19.24S/125°24'31.53E	Typica/Boubon
PCS1	Maubessi	Parcic/COCOMAU	8°50'33.0S/125°36'69.0E	Cultivated Sarchi/Catimors
PCS2	Maubessi	Parcic/COCOMAU	8°50'32.7S/125°36'69.5E	Typica/Boubon
PCS3	Maubessi	Parcic/COCOMAU	8°50'32.3S/125°36'68.0E	Typica/Boubon
PCS4	Maubessi	Parcic/COCOMAU	8°50'32.5S/125°36'67.0E	Typica/Boubon
PCS5	Maubessi	Parcic/COCOMAU	8°50'30.2S/125°36'67.3E	Cultivated Sarchi/Catimors
PCS6	Maubessi	Parcic/COCOMAU	8°50'31.0S/125°36'66.7E	Typica/Boubon
LMS1	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS2	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS3	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS4	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS5	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS6	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS7	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS8	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS9	Aileu	Leopoldinho Mendoca	8°41'59.93S/125°32'14.19E	Cultivated Sarchi/Catimors
LMS10	**Aileu**	**Leopoldinho Mendoca**	**8°41'59.93S/125°32'14.19E**	**Slightly More Robusta than Normal**
FAS1	Liquica	Fazenda Algarve	8°39'99.6S/125°19'80.8E	Cultivated Sarchi/Catimors
FAS2	Liquica	Fazenda Algarve	8°39'99.2S/125°19'80.1E	Cultivated Sarchi/Catimors
FAS3	Liquica	Fazenda Algarve	8°39'99.5S/125°19'78.3E	Typica/Boubon
FAS4	Liquica	Fazenda Algarve	8°39'97.8S/125°19'77.3E	Typica/Boubon
FAS5	Liquica	Fazenda Algarve	8°39'98.5S/125°19'75.6E	Typica/Boubon
FAS6	Liquica	Fazenda Algarve	8°40'0.0S/125°19'75.0E	Typica/Boubon
PS1	Liquica	Pahata	8°39'89.2S/125°20'63.2E	Cultivated Sarchi/Catimors
PS2	Liquica	Pahata	8°39'89.2S/125°20'63.9E	Typica/Boubon
PS3	Liquica	Pahata	8°39'89.3S/125°20'63.8E	Cultivated Sarchi/Catimors
PS4	**Liquica**	**Pahata**	**8°39'89.8S/125°20'63.9E**	**Slightly More Robusta than Normal**
PS5	Liquica	Pahata	8°39'90.3S/125°20'65.0E	Cultivated Sarchi/Catimors
PS6	Liquica	Pahata	8°39'90.9S/125°20'65.3E	Cultivated Sarchi/Catimors

Figure 9. Final results of the varieties obtained from the 70 samples collected in Timor Leste. *Source: Emilia Umaña, Leonardo Sánchez, ADNid*

ANNEX

Annex 1. List of people interviewed during and after the visit to Timor-Leste

Organization	Name	Position
Landell Mills	Miguel Nogueira	Team Leader
	Zelia Soares	Senior Agronomist
Asian Development Bank	Cipriana Soares	ADB main government contacts
OLAM	Chaitanya Varma	Timor-Leste general manager
Ministry of Agriculture and Fisheries	César José Da Cruz	Secretary General
Timor-Leste Quarantine and Biosecurity (MAF)	Venancio Oliveira	Director
National Directorate for Research, Statistics, and Geographical Information (MAF)	Claudino Ninas Nabais	Director
	Juliberto dos Santos	Chief of Department coffee production
	José Da Costa	Research Technician
	Luis Pereira	Chief of Department for Industrial crops
National Directorate for Coffee and Industrial Crops (MAF)	Fernando Santana	Director
	Edmundo Martins	Techinician coffee production
	Marcos Do Santos	Director Rehabilitation and conservation of plants
	Alberto Madeira	MAP Technician Manager of Apidó demo site
National Directorate for Coffee and Industrial Crops (MAF)	Agostinho Marques	Project focal point from MAF
Quinta Portugal	Hugo Trindade	Camões (Portuguese Cooperation)- Project Manager
MAF's coffee farms	Julio Barros	Coffee Producer
	Marcos De Araujo	MAF Field Technical
PARCIC' coffee members	Domingo Soares	Coffee Producer
Fazenda Algarve	Sartolino Alves	Farm Administrator
Olam-Landell Mills coffee farmers group PAHATA	José Dos Dores and 15 more farmers	Coffee Producers
CATIE	William Solano	Researcher in Phytogenetic Resources
Coffee Quality Institute	Robert Osgood	International Coffee Consultant
Center for Research on Coffee Rust / ISA / ULisboa	Vitor Várzea	Researcher in Phytogenetic Resources

Annex 2. Number of producers census by district and subdistrict by year 2015

Subdistrict	District	Suco	Households that grew coffee for self consumption	Households that grew coffee for cash	Total population
Aileu Vila	Aileu	Aissirimou	164	102	326
		Bandudato	54	93	204
		Fahiria	142	106	301
		Fatubossa	99	197	357
		Hoholau	15	188	218
		Lahae	24	82	119
		Lauisi	45	89	212
		Saboria	16	103	131
		Seloi Craic	89	419	550
		Seloi Malere	207	242	740
		Suco Liurai	169	450	688
	Aileu Total		**1024**	**2071**	**3846**
Atsabe	Ermera	Atara	139	156	433
		Baboi Craic	142	177	343
		Baboi Leten	62	57	185
		Batu Mano	119	13	167
		Lacao	167	65	381
		Laclo	26	161	282
		Laubono	36	49	179
		Leimea Leten	201	145	392
		Malabe	54	148	256
		Obulo	47	4	188
		Paramin	80	140	287
		Tiarlelo	26	22	87
	Ermera Total		**1099**	**1137**	**3180**
Bazartete	Liquiça	Fahilebo	98	45	200
		Fatumasi	161	21	273
		Lauhata	92	13	533
		Leorema	448	456	986
		Maumeta	58	68	677
		Metagou	88	118	280
		Motaulun	14	30	390
		Tibar	53	192	702
		Ulmera	205	141	544
	Liquiça Total		**1217**	**1084**	**4585**
Ermera	Ermera	Estado	88	319	521
		Humboe	129	225	376
		Lauala	362	39	503
		Leguimea	149	258	469
		Mertuto	56	240	330
		Poetete	741	446	1356
		Ponilala	151	324	533
		Raimerhei	117	194	377
		Riheu	130	139	305

		Talimoro	463	149	902
	Ermera Total		**2386**	**2333**	**5672**
Hatulia	Ermera	Aculau	232	63	343
		Ailelo	299	59	384
		Coliate-Leotelo	177	422	665
		Fatubessi	286	388	756
		Fatubolo	313	341	701
		Hatolia Vila	117	277	510
		Leimea-Craic	48	70	247
		Leimea-Sorinbalo	120	3	124
		Lisapat	131	372	560
		Manusae	441	217	713
		Mau-Ubo	112	108	267
		Samara	7	25	101
		Urahou	147	385	565
	Ermera Total		**2430**	**2730**	**5936**
Laulara	Aileu	Cotolau	47	101	183
		Fatisi	154	15	210
		Madabeno	145	78	241
		Talitu	149	91	336
		Tohumeta	52	1	96
	Aileu Total		**547**	**286**	**1066**
Lequidoe	Aileu	Acubilitoho	47	71	131
		Bereleu	108	71	205
		Betulau	56	14	99
		Fahisoi	55	97	169
		Faturilau	22	6	99
		Manucassa	9	69	88
		Namolesso	81	139	239
	Aileu Total		**378**	**467**	**1030**
Letefoho	Ermera	Catrai Caraic	243	161	470
		Catraileten	134	188	366
		Ducurai	134	459	791
		Eraulo	116	219	363
		Goulolo	37	59	230
		Hatugau	48	233	314
		Haupu	287	380	903
		Lauana	142	321	496
	Ermera Total		**1141**	**2020**	**3933**
Liquiça	Liquiça	Açumanu	113	209	328
		Darulete	95	177	283
		Dato	207	120	1407
		Hatuquessi	165	278	506
		Leotala	85	277	424
		Loidahar	168	114	477
		Luculai	111	8	134
	Liquiça Total		**944**	**1183**	**3559**

Maubara	Liquiça	Gugleur	223	158	691
		Guiço	127	70	320
		Lissadila	247	288	749
		Maubaralisa	125	142	354
		Vatuboro	130	93	493
		Vatuvou	369	163	693
		Vaviquinia	134	6	441
	Liquiça Total		**1355**	**920**	**3741**
Railaco	Ermera	Deleso	41	38	85
		Fatuquero	285	68	477
		Liho	97	125	290
		Matata	47	153	229
		Railaco Craic	137	49	193
		Railaco Leten	36	155	205
		Samalete	160	12	174
		Taraco	88	2	93
		Tocoluli	71	99	204
	Ermera Total		**962**	**701**	**1950**
Remexio	Aileu	Acumau	270	90	391
		Fadabloco	47	212	286
		Fahisoi	63	93	193
		Faturasa	107	21	165
		Hautoho	116	7	133
		Maumeta	31	51	89
		Suco Liurai	42	3	53
		Tulataqueo	275	43	346
	Aileu Total		**951**	**520**	**1656**
Grand Total			14434	15452	40154

Source: Census 2015

Annex 3. TLQB Import Permit Application

REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE
Ministério de Agricultura, Florestas e Pescas
DIRECÇÃO NACIONAL DE QUARENTENA E BIO-SEGURANÇA
DEPARTAMENTO DE QUARENTENA PLANTAS (DQP)

Import Permit Application

1. Detail of Importer :	
Name / Organisation	
Country of Origin:	
Street Address:	
District:	
Telephone, email, fax:	
Contact Name:	

2. Details of Exporter :	
Name/Organisation:	
Country of Origin:	
Street Address:	
Postcode:	
Telephone, email, fax:	
Contact Name:	

3. Country of Origin :

4. Type of Quarantine Material Proposed for Importation:
Please tick one of the boxes shown below:

☐ **Option (A) – Application to Import Plant Materials**
If you are applying for a permit to import fresh and frozen fruit and vegetables, plants or plant parts, tissue cultures (including in-vitro laboratory use) or seeds please tick this box. Proceed to Option (A) and complete the relevant details.

☐ **Option (B) – Application to Import Live Animals, Reproductive Materials, Meat or Meat Products**
If you are applying for a permit to import live animals (eg livestock, horses, laboratory animals, fish and insects) or reproductive materials (i.e. animal semen, fertile avian eggs and embryos), please tick this box. Proceed to Option (B) and complete the relevant details.

☐ **Option (C) – Application to Import Biological Materials**
If you are applying for a permit to import food stuffs for human consumption, animal feeds, fish feeds, therapeutics, cosmetics, vaccines, viable organisms, vaccines, organic fertilizers, dried/processed plant materials laboratory materials or any other biological commodities, please tick this box. Proceed to Option (C) and complete the relevant details.

☐ **Option (D) – Application to Import Other Material**
If you are applying for a permit to import any material other than those mentioned in Options A, B and C, such as mined guano, chemical fertilisers or machinery please tick this box. Proceed to Option (D) and complete the relevant details.

Option (A) – Application to Import Plant Materials:

Complete this section if you are intending to import fresh and frozen fruit and vegetables, plants, plant parts or tissue cultures (including in-vitro laboratory use) or seeds. Please use Option (C) if intending to import dried/processed plant material.

Country of origen for plant product	Common / product name	Scientific name/ botanical name (*Genus, species*) *	Description – Strain/variety/cultivar Unprocessed/frozen/cooked	Quantity/volume

Please attach additional pages if you require more space to complete this section

* *Applications will not be processed if the scientific name is not provided*

5. Product details:	
1. Method of preparation/treatment	
2. Certified scheme/accredited source	
3. Virus & disease testing procedure	

4. Location grown/collected	
5. Country/province/state/region	
6. Treatment /collection centre	

6. Country of export: _____

7. End Use: _____

8. Is the product genetically manipulated or does it contain genetically manipulated material?

Yes - ☐ **(If yes please specify and attach details)**

No - ☐

9. Details of Transport:

1. Mode of transport eg air, sea	
2. Expected date of arrival	
3. Route details to Timor-Leste	

Please note that it is the importer's responsibility to notify the DNQB Office prior to the arrival of the consignment.

10. Location details on arrival in Timor-Leste:

Held/processed/inspected/	

Post-entry quarantine	

Is this address registered as a Quarantine Approved Premise? Yes ☐ **No** ☐

11. Importers Declaration

1. I hereby apply for permission to import the materials/products detailed in this application.
2. I declare that these materials/products will be used in accordance with all quarantine regulations and quarantine conditions as may be specified in any permit to import issued for the importation.
3. I declare that the information that I have provided is true and accurate to the best of my knowledge.

Broker/Agent contact details	
Signature:	**Address:**
Printed name:	**Phone No:**
Date:	**Mobile No:**

Annex 4. TLQB Import Permit Document

MINISTÉRIO DA AGRICULTURA E PESCAS
MINISTRY OF AGRICULTURE AND FISHERIES
DIRECÇÃO NACIONAL DE QUARENTENA E BIOSEGURANÇA
NATIONAL DIRECTORATE OF QUARENTINE AND BIOSECURITY
DEPARTAMENTO DE QUARENTENA DE PLANTAS
DEPARTEMEN OF PLANT QUARENTINE

AUTORIZAÇÃO DE IMPORTAÇÃO
IMPORT PERMIT

№ ..... /Imp/DNQB/VI/2019

To: Plant Protection/Quarantine Organization of Indonesia

Os Produtos Importados Deverão Fazer-se Acompanhar de Uma Cópia Desta Autorização
A copy of this permit must accompany the imported goods. Permit valid for single import only

Os produtos/artigos, abaixo enumerados e descritos no impresso de importação anexo, poderão ser importados para Timor-Leste, estando sujeitos às seguintes condições.
The goods/items listed below, and described in the attached import application, may be imported into Timor-Leste subject to the following conditions.

Descrição dos Produtos/Artigos/Plantas/Produtos Plantas
Description of Goods/Items/Plants/Plants Product

País do Origem das Plantas *Country of Origin for Plant Product*	**Nome Comum do Produto** *Common of Product Name*	**Nome Científico/ Nome Botânico (Género, Espécie)** *Scientific Name/ Botanical Name (Genus, Species)*	**Descrição Raça/ Variedade/Cultivo Não Processado/Congelado/ Cozinhado/***Description Strain/Variety/Cultivar Unprocessed/Frozen/ Cooked/Fresh*	**Quantidade/Volume/** *Quantity/Volume*
Indonesia	Sofa	-	Processed	65 set
	Bad kayu	-	Processed	5 set
				Massa (Total) *Mass (Total): 70 set*

Nome e Endereço do Importador (*Declared Name and Address of Consignee*)	**Nome e Endereço do Exportador** (*Declared Name and Address of Exporter*)
Unique Trading, LDA Rua de Audian Dili Timor-Leste Post Code : - Tlp/Fax/Email : +670 77237840 Contact Name : Rafi Al Islam	C.V. M^3 Cakrawala Jl. Timor Raya, Kupang NTT-Indonesia Post Code : - Tlp/Fax/Email : +6281 13820071 Contact Name : Rafi Al Islam

ORIGINAL
DQP-Tr4.43019619B

Original

Condições de Importação
Conditions of Import

- **Cada remessa do produto horticola devem ser acompanhados de um *Certificado Fitossanitário* emitido pela agência governamental autorizada no país de origem.**
- **Cada remessa de produtos Re-Exportado deve ser acompanhada por um *Certificado Fitossanitário* ou reexportação emitido pela agência governamental autorizada no país e um original ou uma cópia autenticada do certificado do país de origem dos produtos.**
- **Horticola produtos devem estar livres de patógenos, o solo, insetos vivos, contaminação com sementes de outras plantas e outros materiais submetidos a quarentena por exemplo folhas ou caule material, fezes, restos de animais etc.**
- **Qualquer remessa do produto horticola encontrado para ser infestada de pragas quarentenárias serão dadas as opções de re-exportação ou destruição.**
- **Os horticola devem ser acondicionados em recipientes à prova de insetos, tais como caixas embrulhadas em plástico ou em redes.**
- **Os horticola devem ser apresentados ao oficial de quarentena para a inspeção na chegada em Timor-Leste.**
- **Se os itens não estiverem em conformidade com as condições acima, o produto pode ser re-exportados ou destruídos em Timor-Leste de acordo com a regulamentação e requisitos de quarentena.**
- **A autorização prévia de importação é válida para uma única remessa contando desde a emissão.**
- Each consignment of horticulture produce must be accompanied by a *Phytosanitary Certificate* issued by the authorized government agency in the country of origin.
- Each consignment of re-exported produce must be accompanied by a *Phytosanitary Certificate* or Re-Export issued by the authorized government agency in the country and an original or certified true copy of the *Certificate* from the country of origin of the products.
- Horticulture produce must be free from pathogens, soil, live insects, contamination with seeds of other plants and other material of quarantine concern e.g. leaf or stem material, faeces, animal remains etc.
- Any consignment of horticulture product found to be infested with quarantine pests will be given the options of re-export or destruction.
- Horticulture must be packed in insect proof containers, such as cartons wrapped in plastic or in nets.
- Horticulture must be presented to the quarantine officer for inspection on arrival in Timor-Leste.
- If items do not comply with the above conditions, the produce may be re-exported or destroyed in Timor-Leste according to quarantine regulation and requirements.
- This import permit is valid for a single consignment and is only effective after the issue of this permit.

Informação Adicionais
Additional Information
AINDA NÃO EXISTE EQUIPAMENTO ADEQUADO EM TIMOR-LESTE PARA SE PROCEDER À FUMIGAÇÃO OU A OUTRO TRATAMENTO, PELO QUE SE UMA PRAGA DE INSECTOS FOR ENCONTRADA NA CARGA, A DESTRUIÇÃO OU A RE-EXPORTAÇÃO SERÃO AS ÚNICAS OPÇÕES POSSÍVEIS.
NO FUMIGATION OR TREATMENT FACILITIES PRESENTLY EXIST IN TIMOR-LESTE; IF INSECT INFESTATIONS ARE FOUND IN THE CONSIGNMENT, DESTRUCTION OR RE-EXPORT MAY BE THE ONLY OPTIONS

Local de Emissão ***Place of Issue***		Data de Emissão ***Date of Issue***
Dili		..... /06/2019
Nome de Autoridade DNQB *Name of DNQB Authority*	**Assinatura de Autoridade DNQB** *Signature of DNQB Authority*	**Carimbo Seal**
Venacio Oliveira National Director of Quarantine and Biosecurity		

ORIGINAL
DQP-Vgtbl.42817062019.r[DNQB-]

Sampling Protocol for Genetic Compliance Analysis (source: WCR)

Each sample corresponds to a single coffee plant.
Each sample is composed of 2-3 leaves. The leaves should not be adult leaves, nor young sprouting. The desired leaves are those that are generally located in the second or third internode, starting from the extremity of the branch.

The photo on the left side (mature plants), is an example for sampling plants on the plot. The first pair of leaves on the branch are too young (new sprouts). In this photo, the third pair of leaves are too adult. The second pair of leaves, in this case, can be sampled.

The next photo, on the right side, is an example of nursery plants. The red dates indicate examples of leaves too young or too adult. The blue arrows indicate the ideal leaves to be sampled.

Samples in the nursery. Red arrows indicate examples of too young (center) or too old (right) leaves. Blue arrows indicate good leaves to be sample

The 2-3 leaves per sample (= 1 tree or 1 plant) should be placed into a normal business envelopes (3.5 x 6or similar) as soon as they are sampled. Do not dry the leaves and place them in a cool place. Avoid that the leaves have drops of water.

The envelope is sealed and framed with the sample number, with a permanent marker. All relevant notes and descriptions of the sampled plant must be kept in a "sample notebook".

SHIPPING INSTRUCTIONS

1. Complete and sign a supplier's declaration (ANNEX 1). You will need to complete with the Airway Bill Number, which you should receive from the shipping company

2. Make 4 copies of the declaration and place them as follows: (1) inside the package, (2) on the outside of the package in a transparent envelope, (3) one for yourself, (4) scan a copy and email to solene@worldcoffeeresearch.org and fabienne.moreau@qualtech-groupe.com
3. Complete the general information page (ANNEX 2) and (1) place it inside the package, (2) scan a copy and email to solene@worldcoffeeresarch.org and fabienne.moreau@qualtech-groupe.com
4. Ship the package(s) to the following address:

Dr. Fabienne Moreau
ADNid
830 Avenue du Campus Agropolis Baillarguet 34980 Montferrier sur Lez
France
Contact: Fabienne Moreau or Cinderella Sans Email: fabienne.moreau@qualtech-groupe.com Tel : + 33 4 30 00 30 20

Annex 6. Graphically results for the codes of each sample provided by the ADNid. (source: ADNid)