



RURAL DISPLACEMENT FUND

FEASIBILITY STUDY ON THE RURAL DISPLACEMENT FUND

TERRABLANCA IMPACT CAPITAL SAS

BOGOTÁ, COLOMBIA

www.terrablanca.co

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I. Executive Summary

1A. Overview

“A durable solution to the conflict is achieved when internally displaced people no longer have any specific assistance and protection needs that are linked to their displacement and can enjoy their human rights without discrimination on account of their displacement.” Inter-Agency Standing Committee framework on durable solutions for internally displaced people

TerraBlanca believes that with a market-based model and empowerment of victims through land rights, sustainable agricultural ventures can thrive and benefit from the intricacies of post-conflict rural areas.

Building sustainable agricultural business models in post-conflict regions will need to address three major constraints faced by displaced victims— access to finance, access to market, and poor knowledge on best practices. We believe Colombia’s current post-conflict scenario provides a nurturing economic and social context with three key elements to solve these challenges— market demand, fertile land, and skilled individuals.

The importance of timing and Colombia’s context cannot be undermined, with the Peace Agreements between the government and the leftist FARC guerrilla group, a five-decades long internal conflict ended, which displaced approximately 7.2 million people (higher than Syria)¹, mostly rural citizens fleeing to urban areas and leaving behind between 4 - 6 million hectares of land, more than 15% of Colombia’s agricultural land, an area equivalent to the size of Switzerland².

Having committed to a massive deployment of investments, on a scale never done before in the country, the government cannot rely on international cooperation to secure peace and fulfill its responsibility. Oxfam Colombia estimated that international aid could dry-up in three to five years

after the Peace Agreement. For this reason, the government has made private investment a prioritized source of capital for the funding gap.

After five-decades of conflict, inequitable distribution of land has actually worsened in Colombia and it is the most unequal Latin American country in land ownership 0,4% of farms have extensions greater than 500 hectares and own 75,7% of total land in the country (more than 84 million hectares or more than the size of Texas). On the other side, 73,2% of farms have less than 5 hectares and occupy only 2,3% of total land (nearly 2.5 million hectares or the size of Maryland).

Secure land rights can break the cycle of poverty and violence. We believe that with a market-based approach, lease financing can reduce land ownership inequality which was a major cause for the rural poor to lift up in arms against the state back in the 1960s. Much of the political, economic and social conflict in the country has historically involved rights over land.

Extreme concentration of land is an opportunity for investors. Millions of fertile hectares are not being used for its intended agricultural use. We estimate that procuring inexpensive, accessible, fertile agricultural land will allow farmers to harvest quality produce and thrive driven by competitive unit economics in international markets.

Potential exploitation varies widely, Colombia has extensive areas with different altitudes and climates. The Fund will focus on crop segments specific for the Andean region, such as quinoa and sacha inchi, which we believe will leverage from native environmental factors and long-term trends in consumer preferences.

TerraBlanca has found that the main challenge in procuring land is property informality. Different estimates suggest that around 45-65% of rural properties are informally held and not legally registered. The Fund will focus on procuring land from large landowners with large extensions of unused but fertile lands. TerraBlanca’s foremost priority during

¹ 2017 Global Report on Internal Displacement, Internal Displacement Monitoring Centre (IDMC), 2017

² Las Tierras de la Población Desplazada, The UN Refugee Agency (UNHCR), 2009

the land procurement due diligence will be to find formalized and legally registered lands that will secure the investors' ownership rights over those lands. For the Fund to use the land as collateral of the lease agreements, legally registered land titles will be investors' main assets.

Similarly, the conflict in Colombia, affected disproportionately rural population and children, 87% of total displacements happened in the countryside and around 38% of internally displaced people (IDPs) were minors at the time of the displacement.

Colombia has the largest number of IDPs worldwide. By the end of 2016 there were 40.3 million people living in internal displacement as a result of conflict and violence in the world. From that, 7.2 million are IDPs in Colombia, surpassing countries like Syria (6.3 million), Sudan (3.3 million) and Iraq (3 million).

Host communities have failed to provide IDPs with secure tenures, connect them to government services or with employment opportunities, forcing IDPs to the informal economy in search of an income.

TerraBlanca has conducted a number of group and one-to-one meetings with families who were previously farmers and are facing innumerable economic and social challenges living in metropolitan areas. We have heard first-hand and proven that many wish and dream of returning to the countryside as smallholder farmers.

From such meetings with IDPs, we have also identified the lack of capital and lack of economic opportunities as the main barriers for a family to return to rural areas. Moving to the countryside requires capital and a viable business plan. Basic requirements include buying or renting a property, building or renting a house, acquiring crop inputs, savings to live off while the crop is harvested and sold, among others.

However, displaced farmers usually lack a formal track record to receive credit from conventional banks, and land acquisition or housing require too much capital for accessible microfinance institutions to be a feasible option.

TerraBlanca aims to bridge the credit gap for these families with the Rural Displacement Fund (RDF). Our market-based framework aims to tackle the main challenges faced by families when returning to the countryside.

The Fund will finance the land, housing and productive project (inputs, training, and technology) capital requirements, addressing the lack of access to credit. The Fund will perform a due diligence process on land titles and will legally own the land until the lease agreement is fully paid, securing smallholders whom are often subject to more uncertain land tenure rights. Finally, the Fund will identify a product to cultivate which presents a viable business opportunity, procure produce purchase agreements and letters of intent with major international demand sources (committed off-take) to address the limited access to markets problem.

The Fund will focus on crop segments with strong global demand growth and with intrinsic agricultural advantages given Colombia's soils, location, and climate diversity; largely, but not limited to, Andean grains which include quinoa and sacha inchi.

TerraBlanca will support farmers to produce these value-added commodities and become sustainable source-based suppliers for international buyers. The Fund will not finance land acquisition and housing without a clear business plan to secure off-take contracts from international or local buyers at sustainable prices.

TerraBlanca aims to scale its RDF to support victims' needs in a reconstruction of a new life, not framed as victims anymore but as smallholder farmers and agriculture entrepreneurs. Colombia has a conflicted and violent history, but its citizens have developed, and proven, extreme resilience to adversity.

1B. Investment Strategy

Rural Colombia is undergoing a redevelopment after decades of government and private abandonment.

After years of debacles, illegal armed forces have been consistently losing their stronghold in rural areas and institutionalism is flowing back to countryside regions.

Millions of dollars of capital are required to transform the currently underdeveloped farmlands. Raising this capital offers investors the opportunity to participate in new sustainable agricultural business models in post-conflict regions while positively impacting the lives of individuals directly affected by war.

The Rural Displacement Fund (the “Fund”) is creating an innovative financial platform that aims to empower victims in post-conflict regions. The RDF is a private equity real estate fund with a buy and lease scheme with three main goals, namely to convert unused land into productive high-yielding farms, to reincorporate former smallholder farmers to the value chain, and to supply global buyers with traceable and reliable Andean produce.

TerraBlanca intends to structure the RDF as an innovative financial structure that can properly capture long-term economic value and catalyze private capital in post-conflict Colombia. Investors will profit from financing landless victims of Colombia’s armed conflict to become smallholder farmers. The Fund will provide financing for land and housing to displaced and marginalized farmers through individualized lease agreements and provide business support for families to collectively access international markets and fairly sell their produce in order to meet the lease payments.

The Fund’s business model has the potential to fundamentally improve the risk profile for agricultural investments in post-conflict areas.

The Fund will have two distinct revenue streams, lease payments and profit-sharing agreements from produce sales. Each revenue stream will be managed by distinct legal entities, a Land Project company which buys and leases out the land and an Impact Farming company which secures off-take demand agreements and grows the produce alongside farmers to share technical expertise and scale production. These two firms will be wholly-owned by the RDF which is managed by TerraBlanca Impact Capital.

TerraBlanca has structured the RDF to tackle the challenges small farmers face in the developing world, specifically around access to markets, access to

finance, and training. We believe the RDF business model combining an Impact Farming Company (access to market and training), a Land Project Company (access to finance), and the skilled labor from displaced and marginalized farmers can be a profitable and sustainable model to break the poverty cycle.

Simultaneously, by providing on-farm training on advanced farming techniques, the Impact Farming company will intend to invert the yield gap between small farmers and established agribusiness, and scale production by cultivating in neighboring farms.

With no formal jobs and no assets as collateral, displaced farmers face major challenges to access credit. In some cases, families have access to small loans through microcredit institutions and suppliers (seeds and fertilizers), but these amounts are insufficient to purchase land and build an equity base. Larger amounts are inaccessible through the banking system, as banks require both collateral and a decent credit history which most displaced families often do not have. TerraBlanca aims to bridge this credit gap, or “missing middle”, for these families with the RDF. The Fund will provide the required capital for land acquisition, housing unit, and productive project with no collateral requirement from the families given that the RDF will maintain ownership of land rights until lease payments are finalized.

Demand-side relationships with large international importers of Andean produce (quinoa, sacha inchi, among others). TerraBlanca has made initial contacts and developed relationships with prospective buyers and partners to secure letters of intent (“LOIs”). Conversations are in varying stages of discussions and negotiations but for the types of crops intended for this fund, which are spot-market and climate dependent, LOIs are usually made only 3 months before harvest. All such agreements will be a priority during the entirety of the Fund term. We believe that the Fund’s strategy of ag-finance supplemented with these relationship and long-term contracts will provide greater certainty of revenues from both lease payments and produce sales.

II. Market Opportunity

Crises often imply opportunities and nowhere is this more valid than in post-conflict countries. TerraBlanca believes that with a market-based model and empowerment of victims through land rights, sustainable agricultural ventures can thrive and benefit from the intricacies of post-conflict rural areas. This report will uncover opportunities for impact investments in Colombia. However, Colombia's situation is a complex one and informed investors will need to understand the challenges faced in the country's post-conflict scenario.

Building sustainable agricultural business models will require three key elements: market demand, fertile land, and skilled individuals. Pooling these three elements in a nurturing economic and social context, which we believe Colombia's current post-conflict scenario provides, may allow conflict victims and displaced families to return to rural regions as smallholder farmers and stay well-above the poverty line.

The Fund's investment strategy will aim to significantly de-risk rural lease financing for displaced farmers. This will enable the Fund to become a leading source of much needed value-added capital, becoming a catalyst for foreseeable rural development in Colombia, to the benefit of investors.



Economic Indicators	
GDP (2016)	USD\$282 Bn
GDP Annual Growth Rate (Dec-17)	1,8%
Inflation Rate (Jan-18)	3,68%
Unemployment Rate (Dec-17)	9,4%
Financial Market Indicators	
USDCOP (30-04-2018)	2,806
Policy Interest Rate (30-04-2018)	4.24%
Colcap (30-04-2018)	1,565
Government Bond 10Y (Apr-18)	6,43%
Credit Rating (S&P, Dec-17)	BBB-
Business Indicators	
Global Competitiveness Rank (2017)	66/137
Ease of Doing Business Rank (2017)	59/190
Source: TerraBlanca analysis using World Bank data, DANE data, and BanRep data. Data available upon request.	

Colombia is often subdivided in 5 main regions:

1. Andean region: the Andes Mountains divide the country into three distinct, roughly parallel chains, called cordilleras, that extend northeastward from the Ecuadorian border almost to the Caribbean Sea. It hosts most major cities and nearly 50% of total population. Altitudes reach more than 5,700 m.
2. Pacific Plains: this region is among the rainiest parts in the world, chiefly at the north (Chocó). Rain forests and jungles prevail in its high humidity and high temperatures, but access is very limited.
3. Caribbean Plains: with less extreme conditions than the Pacific Plains, the Caribbean coasts is much more accessible and highly populated. It has the highest mountain in Colombia in the Sierra Nevada de Santa Marta.
4. Orinoquia: the eastern portions of the country are mostly sparsely inhabited tropical rainforest, and inland tropical plains containing large estates or large livestock farms, oil and gas production facilities, small farming communities.
5. Amazon: large extensions of sparsely inhabited tropical rainforest with high levels of biodiversity.

2A. Post-Conflict Colombia as an Impact Investing Opportunity

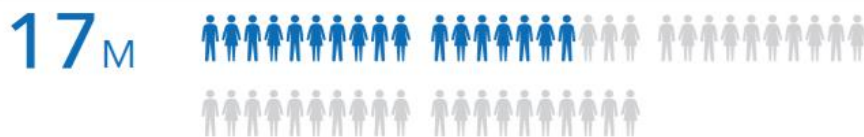
“In the face of the pain of others, indignation is important but insufficient. What is really needed is for Colombians to understand the armed conflict as the result of social and political processes, against which it is possible and precise to react.” Gonzalo Sanchez G. Director, Centro Nacional de Memoria Histórica (CNMH)

The Peace Process between Colombia’s current government and the Revolutionary Armed Forces of Colombia (“FARC”) started in August 26th, 2012 in Havana, Cuba. It was the seventh such attempt since 1982³. After three years of negotiation, a definitive Peace Agreement was finalized with the leftist guerrilla movement, resolving the last armed conflict in the western hemisphere and one of the world’s longest-standing. The importance of these agreements cannot be undermined, with them, a five-decades long internal conflict ended, which displaced approximately 7.2 million people, mostly rural citizens fleeing to urban areas (second only to Syria)⁴, and leaving behind between 4 - 6 million hectares of land, more than 15% of Colombia’s agricultural land, an area equivalent to the size of Switzerland⁵.

TOTAL POPULATION



NUMBER OF PEOPLE LIVING IN AREAS AFFECTED BY CONFLICTS



NUMBER OF PEOPLE IN FORCED DISPLACEMENT (1985-2017)



Source: United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and Internal Displacement Monitoring Centre (IDMC), 2017

The Agreement is based on the government’s responsibility to address the root causes of the conflict that initiated half a century ago. For years, experts have argued about what those causes are, but in general, the agreed upon reasons are rural underdevelopment and land inequality. Especially relevant for the Fund, are the first and fifth points of the six-point agreement, which focus on tackling rural challenges and victims’ reparation respectively⁶. The first

³ Procesos de Paz en Colombia, El Tiempo, 2016

⁴ 2017 Global Report on Internal Displacement, Internal Displacement Monitoring Centre (IDMC), 2017

⁵ Las Tierras de la Población Desplazada, The UN Refugee Agency (UNHCR), 2009

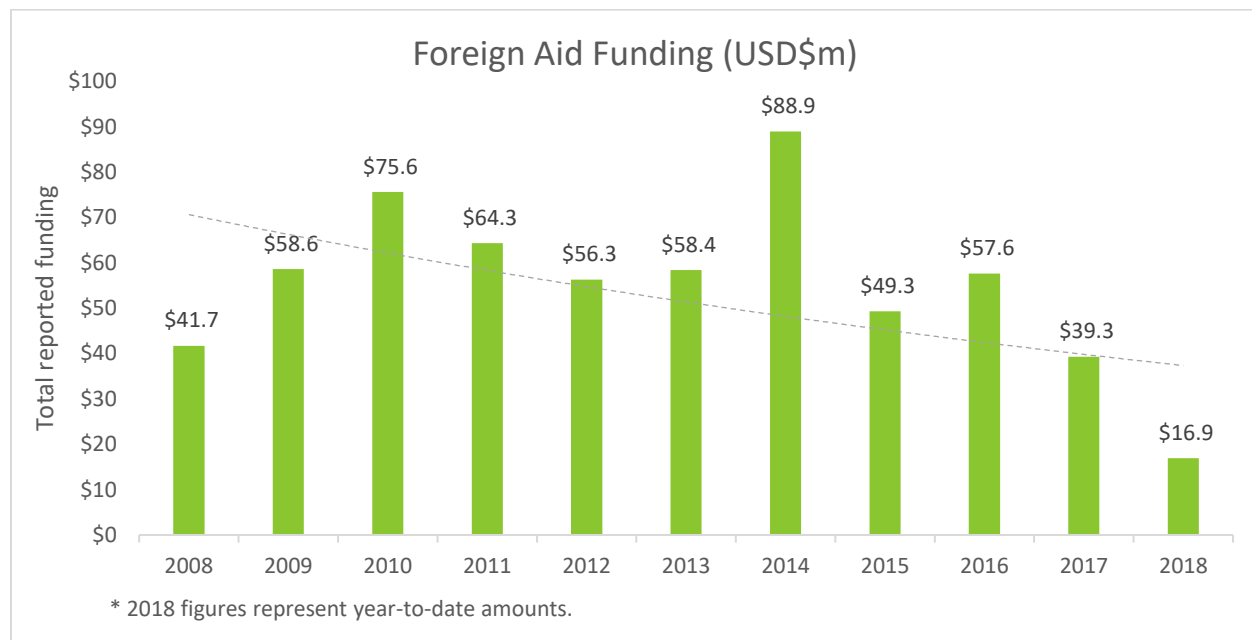
⁶ Conflict victims are legally defined as people who individually or collectively have suffered damages due to events that occurred on or after January 1, 1985, as a consequence of violations of International Humanitarian Law, or of serious and manifest violations of international human rights standards, occurred on the occasion of the internal armed conflict; as well as people who have been displaced to the interior of the territory during internal disturbances and tensions or generalized violence. Law 1448 of 2011 (Victims’ and Land Restitution Law)

point lists out major objectives for agricultural land restitution for victims, rural infrastructure projects and public services to the countryside, among other poverty-reducing measures in remote villages. The fifth point promises millions in reparations and socio-economic aid to the conflict's millions of victims.

More than a year of implementation of the Agreement, the International Human Rights Verification Commission, claims that only 18,5% of agreed terms have been fulfilled⁷. The Colombian government was counting on an influx of international donations to kickstart the implementation, and donors did collaborate. Canada pledged in 2016 assistance with a CAD\$60 million package⁸, and the United States, under the Obama administration, had pitched nearly half a billion US dollars in 2017⁹. However, the government cannot rely on international cooperation to secure peace and fulfill its responsibility.

"You do not build peace by shutting down an armed group. You do it by shutting down inequality." Gerard Gomez, Colombia head of country office at the United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

According to OCHA, in 2017, Colombia received just over USD\$39 million in humanitarian funding, the lowest sum in a decade. Experts suggest the peace deal is the most likely cause on the decline in development aid. Oxfam Colombia estimated that international aid could dry-up in three to five years after the Peace Agreement. A middle-income country in a newfound post-conflict status will lead donors to divert resources to other global crises and turn the page on a conflict supposedly resolved¹⁰.



Source: United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

Having committed to a massive deployment of investments, on a scale never done before in the country, the government would have to fend for itself. Adam Isacson, senior associate for regional security policy of the Washington Office on Latin America estimates that even if donor support doesn't decline post-conflict, the

⁷ Solo se ha Cumplido el 18,5 % del Acuerdo de Paz con las FARC, El Espectador, 2018

⁸ Canada Commits \$57-million to Support Peace Process in Colombia, The Globe and Mail, 2016

⁹ Avanzan en el Congreso de EEUU Fondos para Financiar el Posconflicto, El Tiempo, 2016

¹⁰ For Colombia, Peace Brings Development Imperative and an End to Donor Funds, Devex, 2016

international community's investment will be around 10 percent of what the government promised¹¹. For this reason, the government has from the start turned to the private sector as a main source of funding. Through reduced barriers and tax incentives, many private firms are betting on the peace agreement for economic reasons rather than political. TerraBlanca believes this creates a nurturing economic and social context to build sustainable agricultural business models in the country.

"The fact of the matter is that Latin America has never been a priority in humanitarian terms, and donor countries would be really pleased to turn the page and close at least one chapter," Martin Gottwald, UNCHR.

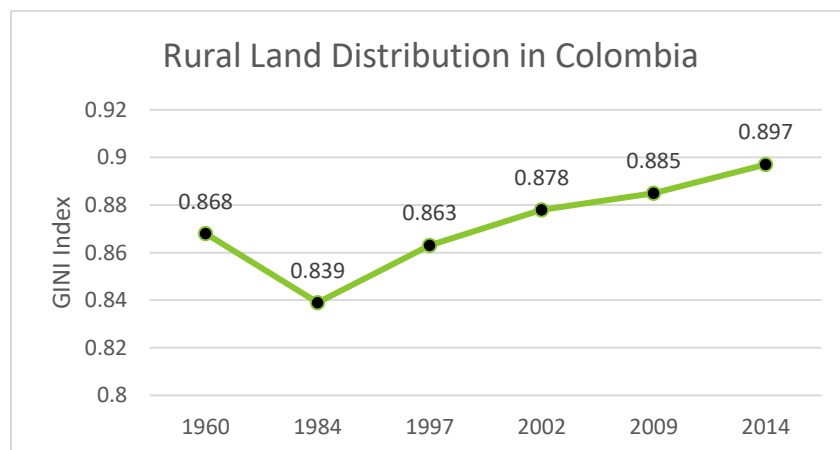
We believe that time pressure on the outgoing government, lack of public resources, and polarized legislative agendas (especially since November 2nd, 2016 when in a referendum Colombians voted NO to the Peace Agreements by an extremely tight margin) will delay implementation of the Peace Agreement further, making private investment a prioritized source of capital for the funding gap. TerraBlanca is developing innovative investment structure for investors to participate in Colombia's long overdue rural development and generate positive social impact as well as risk-adjusted financial returns.

2B. Financing Land Acquisition as an Engine for Rural Development

Land Inequality

Secure land rights can break the cycle of poverty and violence. We believe that with a market-based approach, lease financing can reduce land ownership inequality which was a major cause for the rural poor to lift up in arms against the state back in the 1960s. Much of the political, economic and social conflict in the country has historically involved rights over land.

After five-decades of conflict, inequitable distribution of land has actually worsened in Colombia and it is the most unequal Latin American country in land ownership¹². According to the Instituto Geográfico Agustín Codazzi (IGAC), Colombian land ownership inequality measured by the Gini coefficient was 86,8 in 1960, and 89,7 in 2014. Decades of conflict couldn't change this situation, but we believe our market-based approach to build sustainable agricultural business models will.



Source: Instituto Geográfico Agustín Codazzi (IGAC)

¹¹ Ibid.

¹² Radiografía de la Desigualdad - Colombia, Oxfam, 2017

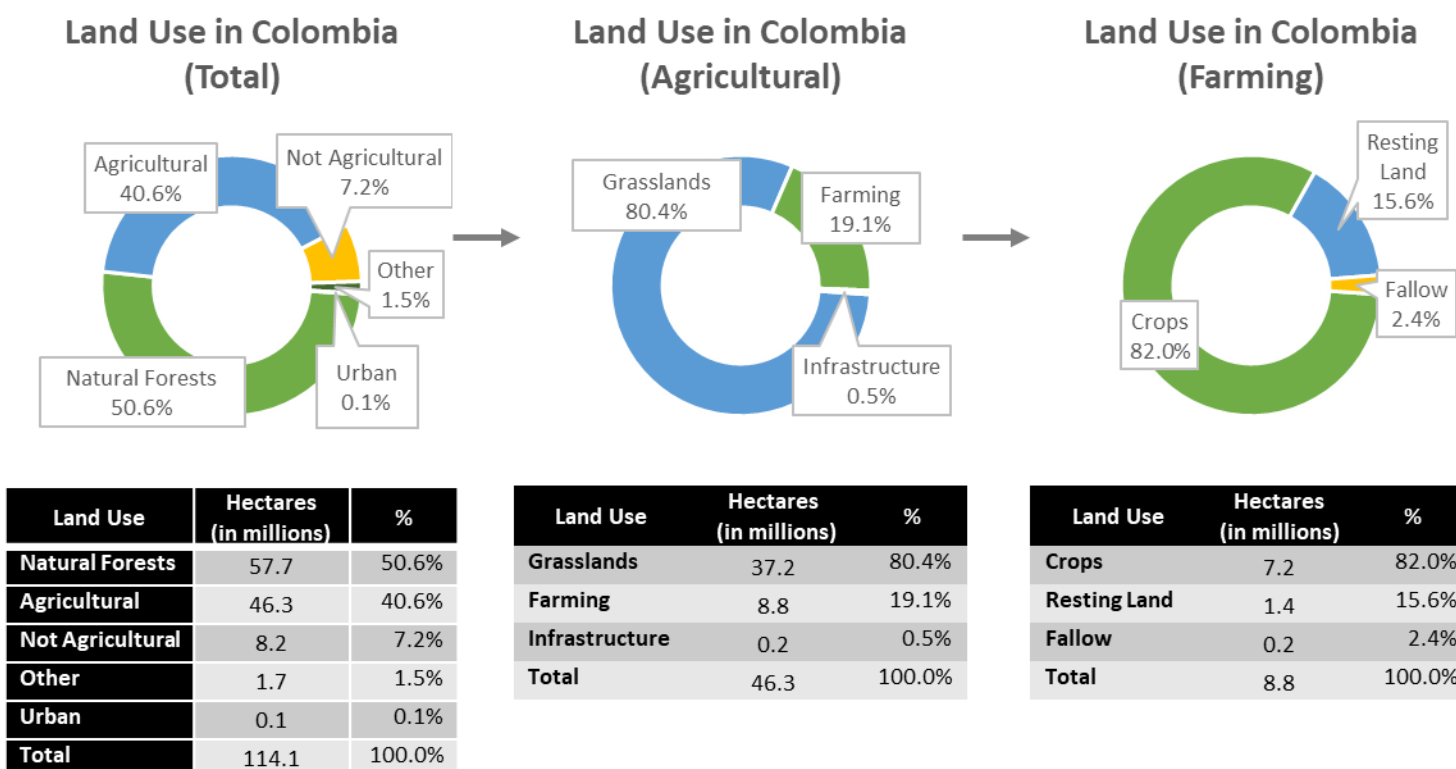
Since rural development and land ownership was a key component of the negotiations with FARC rebels, the government requested the National Statistics Department (DANE) to conduct the first National Agricultural Census in over 55 years. This census provided updated data for a better understanding of the agricultural productive base and living situations in rural Colombia.

Findings show that 704 farms (with an average size of 49.135 hectares each) control 50% of land. 0,4% of farms have extensions greater than 500 hectares and own 75,7% of total land in the country (more than 84 million hectares or more than the size of Texas). On the other side, 73,2% of farms have less than 5 hectares and occupy only 2,3% of total land (nearly 2.5 million hectares or the size of Maryland)¹³.

Underutilized and Concentrated Land Ownership

Colombia is one of the largest tropical countries with a total area of 114.1 million hectares, yet only 6,3% of that is cultivated (7.2 million hectares). Of the country's total area, 50,6% are natural forests (57.7 million hectares), of which nearly 25% are national parks and protected areas (14.3 million hectares).

40,6% of Colombia's territory is fertile, non-protected, agricultural land (46.3 million hectares, more than Japan's or Germany's total size). However, 80% are grasslands -mostly abandoned plots or used for suboptimal extensive cattle raising- and only 15,5% are actual crops (37 million hectares and 7.2 million hectares respectively)¹⁴.



Source: Censo Nacional Agropecuario, DANE (2014)

¹³ Censo Nacional Agropecuario, Departamento Administrativo Nacional de Estadísticas (DANE), 2014

¹⁴ Ibid.

Profitability and Value

TerraBlanca believes that this scenario of extreme concentration of land is an opportunity for investors. Millions of fertile hectares are not being used for its intended agricultural use. Most large landowners are not profiting from their massive land holdings. Landowners which inherited the farmland don't have the agricultural expertise or intent to invest in the land. Some landowners haven't been to their farms for years because of safety reasons. Others are waiting for their land holdings to appreciate enough and sell.

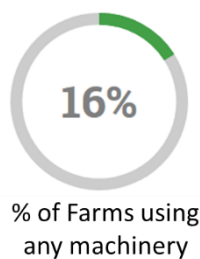
Land value varies extremely in rural Colombia. Fertile lands in the Andean highlands are usually much more expensive than farms in the Pacific or Orinoquia regions. Land near major urban centers not only charge a premium for the proximity for to marketplaces, but urban citizens also highly value nearby rural plots to build vacation homes to visit over the weekends and holidays. From our own field research, we believe we can procure suitable and safe plots of land for the Fund at a cost range of COP\$10 million and COP\$20 million per hectare (USD\$3.500-USD\$7.000).

Low land value is an important characteristic of the Rural Displacement Fund's (RDF) investment thesis. We estimate that procuring inexpensive, accessible, fertile agricultural land will allow farmers to harvest quality produce and thrive driven by competitive unit economics in international markets.

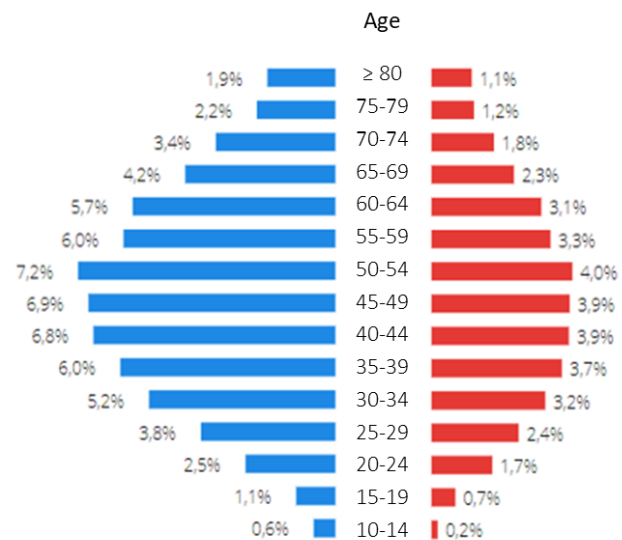
Targeted Investment Opportunities

Potential exploitation varies widely, Colombia has extensive areas with different altitudes and climates. The Fund will focus on crop segments specific for the Andean region, such as quinoa and sacha inchi, which we believe will leverage from native environmental factors and long-term trends in consumer preferences. Detailed analysis on the advantages and challenges of these specific crops will be addressed in section VI. Targeted Investment Opportunities.

The RDF has also identified investment opportunities in underdeveloped countryside areas which include the lack of adoption of technology on farms and an aging population of rural workforce. Only 16% of farms have some sort of agricultural machinery and the average age of Colombian farmers is 50-54 years, only 22,8% of farmers are younger than 40¹⁵.



Farmer Population Age Distribution



Men  Women 

50-54 years old

Age range with the highest proportion of farmers

Source: Censo Nacional Agropecuario, DANE (2014)

¹⁵ Ibid.

TerraBlanca views these as opportunities because, in the case of quinoa, a standard thresher machine can convert the raw product into a value-added commodity, a thresher machine does not require a large investment and it can serve many smallholder farmers at a time. TerraBlanca has also noticed that the aging population in rural areas, if their heirs do not wish to continue working the land, will opt to look for buyers. Their farms do not need major investments in cleaning, felling or deforestation in the terrain because the plot has been made productive. We have interviewed tens of displaced farmers in cities, most are constantly looking for stable and formal economic opportunities. As an alternative to procuring land from large landowners, the Fund plans to finance the relocation of younger displaced farmers to aging populations' farms, as many want to return as smallholder farmers.

Rural Infrastructure

Colombia's rough geography has always presented challenges for large scale infrastructure projects. The Andes mountains, which cross the country from north to south, are made up of three distinct mountain ranges, which makes crossing them with railways and expressways prohibitively costly for an emerging country. In 2013, Colombia launched its Fourth Generation (4G) road infrastructure program, with an estimated investment of US\$70 billion by 2035, the program aims to build 8.000 km in roads, 159 tunnels, and 47 projects through public-private partnerships, a scale never seen before in the country¹⁶. Times and transportation costs will be considerably reduced benefiting Colombia's productive sector, particularly its agricultural sector.

Land Registry and Title Informality

TerraBlanca has found that the main challenge in procuring land is property informality. Different estimates suggest that around 45-65% of rural properties are informally held and not legally registered^{17 18}. In 2015, the Ministry of Agriculture launched the Land Formalization Program (LFP) which promises the formalization and registry of land titles through an exhaustive process of investigation and restitution. Approximately 1.7 million rural properties currently exist without formal property records¹⁹. In past experiences in other countries, similar programs have cost tens of millions of dollars and lasted years, or even decades²⁰.

The Fund has noticed through its field visits that title informality affects smallholder farmers on a larger proportion. Large farms and large landowner families are much more likely to have their lands properly registered and formalized. On the other hand, smallholder farmers might have acquired their properties by settling in an abandoned plot, or actually bought them but without proper legal advice. More frequently than not, acquisition transactions happened by word between a buyer and a seller.

The Fund will focus on procuring land from large landowners with large extensions of unused but fertile lands. TerraBlanca's foremost priority during the land procurement due diligence will be to find formalized and legally registered lands that will secure the investors' ownership rights over those lands. For the Fund to use the land as collateral of the lease agreements, legally registered land titles will be investors' main assets.

¹⁶ Cuarta Generación (4G) de Concesiones Viales de Colombia, Agencia Nacional de Infraestructura (ANI), 2013

¹⁷ El 65 % de los Predios del Campo en el País no Tienen Escrituras, El Tiempo, 2016

¹⁸ Colombia: Land and Rural Development Project, USAID, 2017

¹⁹ Ibid.

²⁰ Securing Africa's Land for Shared Prosperity: A Program to Scale Up Reforms and Investments, Byamugisha, Frank F. K., Africa Development Forum series: World Bank, 2013

2C. Landless Displaced Farmers: Skilled Labor with no Access to Finance

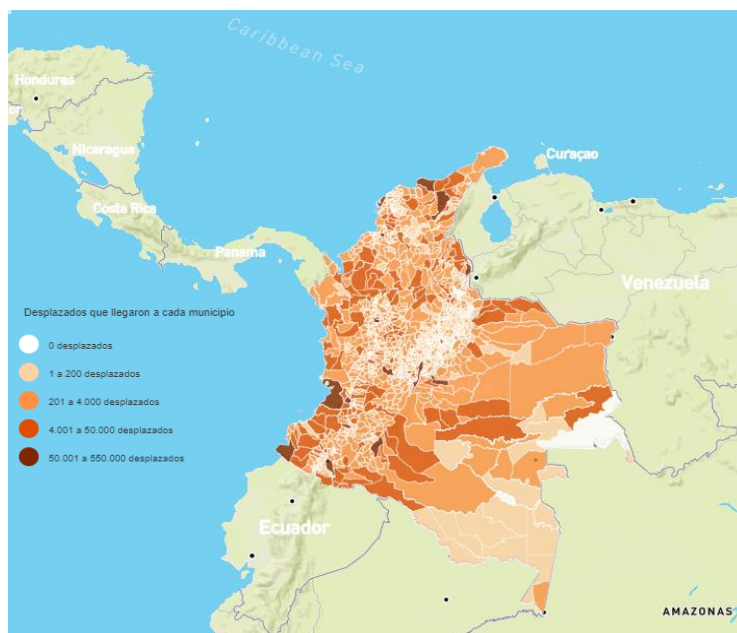
By the end of 2016 there were 40.3 million people living in internal displacement as a result of conflict and violence in the world. From that, 7.2 million are internally displaced people (IDPs) in Colombia. Colombia has the largest number of IDPs worldwide, surpassing countries like Syria (6.3 million), Sudan (3.3 million) and Iraq (3 million)²¹. The United Nations High Commissioner for Refugees (UNHCR) has called internal displacement as ‘ground zero’ for refugee movements, IDPs and refugees require the same kind of solutions, particularly safety and economic opportunities in their communities to reduce the need of migrating.

In Colombia, rural population and children were disproportionately affected, 87% of total displacements happened in the countryside and around 38% of IDPs were minors at the time of the displacement²². In most cases, families fled to large metropolitan areas around the country but 61% of total displacements originated in 6 out of 32 departments - i.e., Valle del Cauca, Antioquia, Chocó, Nariño, Cauca and Norte de Santander²³.

For many IDPs, it may not be feasible or desirable to return to their place of origin, but the alternative is not much simpler. In most cases, displacement from rural to urban areas means facing precarious livelihood conditions with high poverty rates and lack of opportunities. Many are currently residing in shantytowns on the edges of Bogotá, Medellín, or other major cities and simply don't have farms to go back to. Host communities have failed to provide IDPs with secure tenures, connect them to government services or with employment opportunities, forcing IDPs to the informal economy in search of an income.

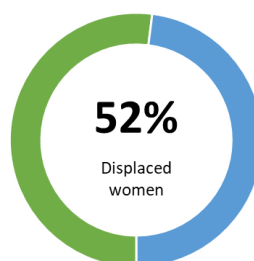
Finding a job in the city is a challenge. Coming from regions where the main, and often only, economic activity is agriculture, makes it extremely difficult for individuals to compete in an already overcrowded job market. Even after years of living in cities, many IDP families find it impossible to adjust to an urban lifestyle.

This situation is not an uncommon one, TerraBlanca has conducted a number of group and one-to-one meetings with families who were previously farmers and are facing innumerable economic and social challenges living in metropolitan



Source: Internal Displacement – Critical Areas, Colombia Check (2012)

Displacement by Gender



Displacement in Children



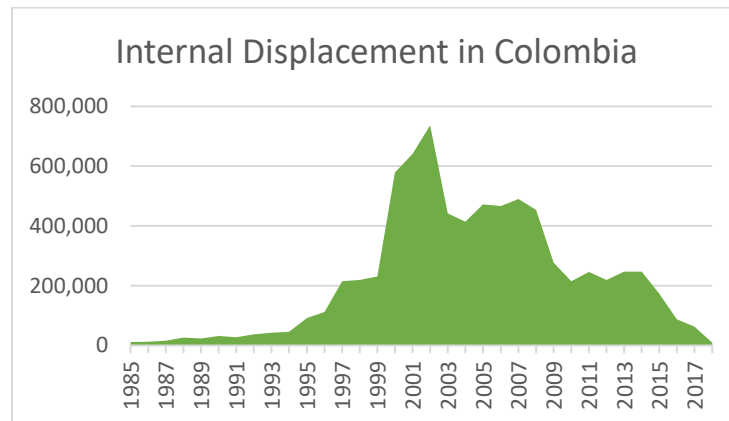
Source: United Nations High Commissioner for Refugees (UNHCR)

²¹ 2017 Global Report on Internal Displacement, IDMC, 2017

²² Una Nación Desplazada: Informe Nacional del Desplazamiento Forzado en Colombia, Centro Nacional de Memoria Histórica, Bogotá, CNMH - UARIV, 2015.

²³ United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Humanitarian Needs Overview – Colombia, 2018.

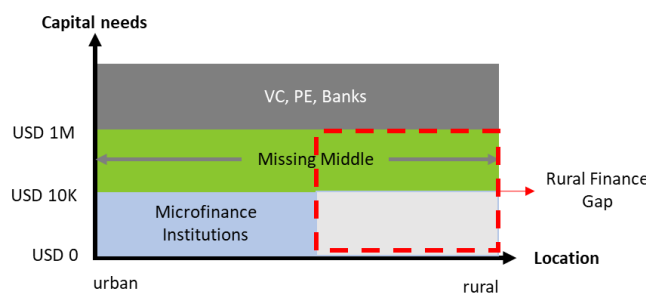
areas. We have heard first-hand and proven that many wish and dream of returning to the countryside as smallholder farmers. In some cases, displaced families want to return to their original communities, but it is not rare that some wouldn't mind rebuilding their life in a different region.



Source: Registro Único de Víctimas - Unidad de Atención y Reparación Integral a las Víctimas

From our meetings with IDPs, we have identified the lack of capital and lack of economic opportunities as the main barriers for a family to return to rural areas. Moving to the countryside requires capital and a viable business plan. Basic requirements include buying or renting a property, building or renting a house, acquiring the inputs for a crop, savings to live off while the crop is harvested and sold, among others. However, displaced farmers usually lack a formal track record to receive credit from conventional banks, and land acquisition or housing require too much capital for accessible microfinance institutions to be a feasible option.

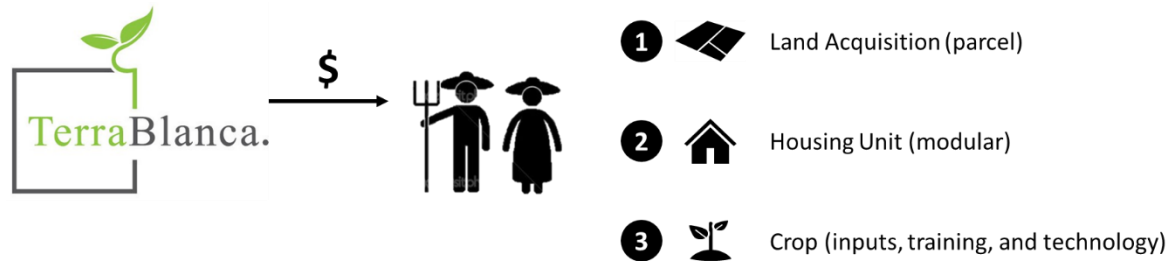
Rural Finance Gap and the “Missing Middle”



Source: World Bank

TerraBlanca aims to bridge the credit gap for these families with the RDF. Our market-based framework aims to tackle the main challenges faced by families when returning to the countryside. The Fund will finance the land, housing and productive project (inputs, training, and technology) capital requirements, addressing the lack of access to credit. The Fund will perform a due diligence process on land titles and will legally own the land until the lease agreement is fully paid, securing smallholders whom are often subject to more uncertain land tenure rights. Finally, the Fund will identify a product to cultivate which presents a viable business opportunity, procure produce purchase agreements and letters of intent with major international demand sources (committed off-take) to address the limited access to markets problem.

TerraBlanca has opted to build the RDF as a purely private sector initiative, without depending on state agencies or the Peace Agreements. However, we will maintain open and researching new government programs that work closely with IDPs and other stakeholders to develop acceptable strategies and policies to integrate displaced people in urban and rural areas where economic and social opportunities differ.



2D. Trends and Opportunities in Food Value Chains

Food and agribusiness is a \$5 trillion industry representing 10% of global consumer spending and 40% of total employment²⁴. However, its importance will continue to grow driven by fundamental shifts in consumer habits and an increasing global population. The Fund will focus on crop segments with strong global demand growth and with intrinsic agricultural advantages given Colombia's soils, location, and climate diversity; largely, but not limited to, Andean grains which include quinoa and sacha inchi (see section VI. Targeted Investment Opportunities).



Quinoa crop



Sacha inchi crop

Demographic growth alone is a major driver for an increasing demand in food. There are approximately 7.3 billion people in the world today. According to the United Nations, that number will grow to 8.5 billion by 2030, 9.7 billion in 2050 and 11.2 billion in 2100²⁵. Feeding the global population will be an increasingly critical issue, as the world will need to produce much more using much less scarce resources. In order to meet this demand, it is predicted that agricultural productivity must increase 50-70%, and landscapes must be managed sustainably²⁶.

Not only will demand for food increase because of population growth, income growth in emerging economies will likely lead to a change in diets with higher consumption per capita of calories, proteins, and processed foods. Moreover, shifts in consumer preferences towards healthier diets and a preference for socially and environmentally responsible produce is rising global standards for food production and procurement. As a result, demand for fairly-traded and ethically-sourced produce is increasing across demographics and geographies²⁷.

²⁴ Pursuing the Global Opportunity in Food and Agribusiness, McKinsey & Company, 2015

²⁵ World Population Prospects: The 2015 Revision, United Nations Department of Economic and Social Affairs, 2015

²⁶ Impact Investing in Sustainable Food and Agriculture across Asset Classes, Croatan Institute, 2017

²⁷ Consumer Demand for the Fair Trade Label: Evidence from a Multi-Store Field Experiment, 2014

TerraBlanca's market-based approach with off-take contracts is designed to take advantage of these opportunities. Similar models have been successfully implemented, and different elements have been proven by other investment firms and foundations globally; for example, One Acre Fund (www.oneacrefund.org), Landesa (www.landesa.org), Fairtrade (www.fairtrade.org.uk), Sustainable Harvest (www.sustainableharvest.com), among others²⁸.

Focusing on and understanding buyers' requirements and demand shifts will allow the Fund to support farmers in the construction of viable business models, reducing the risk of default on lease agreements. Emerging countries, and more so countries in conflict, have highly fragmented supplier and buyer relationships, with distributors playing a critical part in information and logistics. However, institutional buyers are focusing more on supply chain reliability, product attributes and food safety which is starting to change the supply chain giving more power to source-based suppliers from distributors.

Globally, farmers are transitioning from "grower" to product supplier, from smallholder farmers into agriculture entrepreneurs. Availability, traceability, and cost are major risk management issues for corporate buyers, but smallholder farmers in emerging countries lack the investment capital and business acumen to access international markets. TerraBlanca will support farmers to produce value added commodities and become sustainable source-based suppliers for international buyers. The Fund will not finance land acquisition and housing without a clear business plan to secure off-take contracts from international or local buyers at sustainable prices.

- To provide for a population of 9.7 billion in 2050, food production will need to increase from the current 8.4 billion tons to almost 13.5 billion tons a year.
- Fifty percent of the additional food required to meet demand in 2050 will need to come from land already under cultivation.

Source: Sustainable Food and Agriculture, Food and Agriculture Organization (FAO), 2017

Disruption of the retail sector offer farmers other avenues to reach the consumer directly. The implementation of new agricultural and food distribution models driven by necessity will impact developed and emerging countries alike, the "Amazon" model of direct & unique products, redefines distribution centers and retail shops into massive warehouses where mass customization is made possible with millions of unique packages and labels. Grains are a good example of this trend, consumers are increasingly searching for value added products with high nutritional value, traceable and safe production and organic or ancient grains (such as quinoa and sacha inchi) are marketed as "superfoods", a proven high nutritional value product.

2E. A Review of Colombia's Current Security Situation

"We are very worried about this message that when Colombia signs the peace agreements, it will graduate out of all problems. It's not that simple." Aída Pesquera, director of Oxfam in Colombia

Social, economic, and humanitarian problems will not disappear because an agreement was signed. These challenges will continue and must be dealt with in the post-conflict period. More than a year after the peace deal, despite the group's demobilization, there are regions where pockets of violence persist, in some regions violence has diminished but in others it may have intensified. The Pacific region is particularly affected due to its geographical advantages for international drug cartels to illegally send its products to Central America and Mexico, where it later finds its way to North American markets.

²⁸ Agricultural Investment Funds for Developing Countries, FAO, 2010

The coastal areas of Nariño and Chocó, part of the Pacific Region, recorded 48% of total violent events in the first ten months of 2017. Cases also stand out in Norte de Santander and Antioquia, with threats against public transport and attacks against an oil pipeline. The main threat comes when the government cannot successfully leap into the territories and communities given up by the FARC. Other armed groups looking to move into the FARC's former territory could seize them, creating new displacements and conflicts.



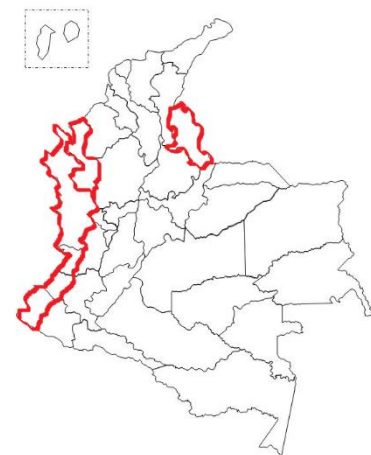
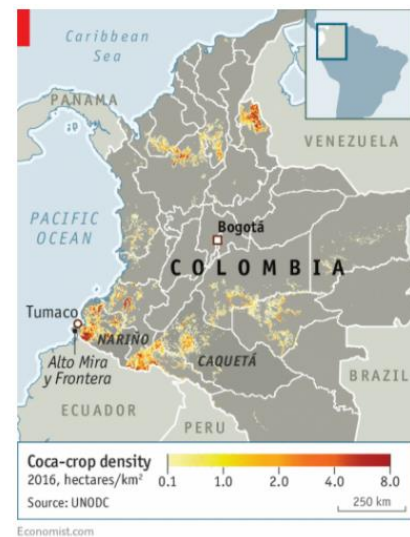
Colombian President Juan Manuel Santos Calderon shakes hands with Revolutionary Armed Forces of Colombia-People's Army Commander Timoleón Jiménez with Cuban President Raul Castro Ruiz and Norwegian Minister of Foreign Affairs Borge Brende.

Investors must understand that a signed peace agreement with the FARC, won't automatically spell the end of violence in Colombia. Although the FARC played a main role in the conflict's most intense chapters, being the largest and most organized rebel group, it is only one of other organizations fighting against the Colombian government. The ELN, another leftist insurgent group, and second largest group by number of combatants, has been courting the government for peace negotiations but has refused to renounce kidnapping, trafficking, and violent action. In early 2018, the government suspended peace talks with the ELN after a series of bombings that killed seven policemen.

Other smaller groups have emerged from a previous demobilization process, in which paramilitary groups were disbanded and their leaders incarcerated. Demobilized members with no economic opportunities sometimes return to delinquency and illicit economies.

The Fund will concentrate its land procurement due diligence on the regions that have experienced diminishing rates of displacements and no conflict-related violent attacks. Our team is on the ground, and our priority is our own safety, through collective judgement calls we will not expose ourselves or investors' capital in conflicted areas of the country.

Last year, Colombia received USD\$39 million in humanitarian funding, the lowest sum in a decade²⁹. As some had expected, humanitarian assistance to Colombia is in retreat, with many donors citing the country's newfound post-conflict status as a reason to divert resources to other global crises. TerraBlanca aims to scale its RDF to support victims' needs in a reconstruction of a new life, not framed as victims anymore but as smallholder farmers and agriculture entrepreneurs. Colombia has a conflicted and violent history, but its citizens have developed, and proven, extreme resilience to adversity.



Regions with Existing Pockets of Violence

²⁹ Financial Tracking System, United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

Colombia's Internal Conflict

“Sociologists and economist have agreed that the root cause of the armed conflict in Colombia is the inequitable distribution of land.” El Espectador

The Colombian conflict cannot be reduced to a story of good versus evil, instead it must strive to capture the complexity of what victims and armed actors have lived. This document nor TerraBlanca are appropriate to clarify all causes and consequences of decades of war. Yet, we do want to provide investors with a brief summary of what we consider is one of the most objective and complete historic recollection of Colombia's conflict.

From a political and ethical requirement, the government financed independent reports from Centro Nacional de Memoria Historica to elaborate a recount of the origin and evolution of illegal armed groups as social and political products of the country's problematic context. As a result, the book series “*¡Basta Ya! Colombia: Memoria de Guerra y Dignidad.*” was published in 2013 and have since become the main reference nationally regarding the internal conflict. Here, we provide some summary paragraphs which should be of interest to potential investors of the RDF.

Causes and Key Facts

Colombia's conflict erupted half a century ago out of a series of grievances in the country's rural areas. Land ownership was consolidated into the hands of a small elite, leaving thousands without access to farms. A leftist insurgency emerged, initially propelled by Marxist ideological convictions, which proved popular across Latin America at the beginning of the Cold War.

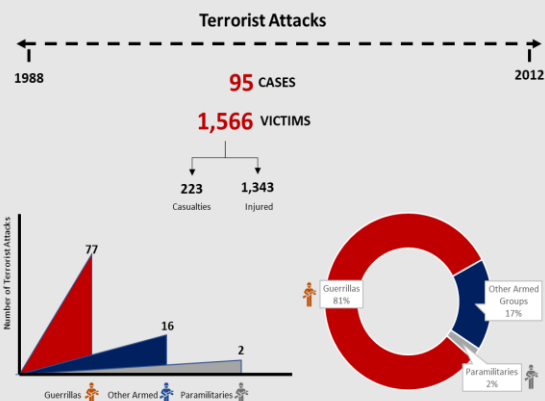
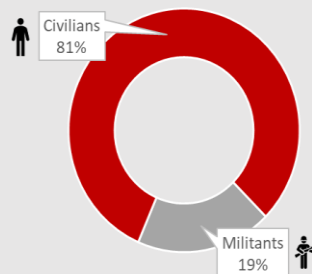
As leftist guerrillas occupied territory (including the nascent FARC), large swathes of Colombian land fell out of reach of government institutions. FARC and other armed groups consolidated their territorial control as they turned to illicit economies (drug trafficking, illegal mining, kidnapping, and other trades) to fund their uprisings.

From the period between 1958 and 2012, nearly 220,000 violent deaths are directly attributed to the armed conflict, of these more than 80% were unarmed civilians. The responsibilities of these violent deaths fall differently between guerrillas, paramilitaries and national security forces, all of which acted outside their legal mandate. Violence against physical integrity was the trademark of paramilitary violence, while violence against personal freedom and private property characterized guerrillas. In other words, paramilitary groups killed much more than guerrillas, while guerrillas kidnaped and caused much more destruction than paramilitaries.

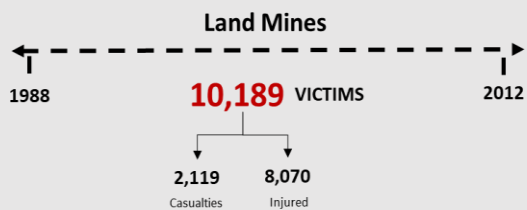
There are many different arguments invoked by the opposing parties to try to give some rationality to their actions. Despite the ideologies, every guerrilla group undertook up weapons and violence as a shortcut to “transform the country”, but in that endeavor they were destroying lives, goods, liberties and the values that they all claimed to defend. On the other hand, paramilitary groups, invoking the abandonment or inability of the State to assume its duty of protection against guerrillas, raised in arms in search of vengeance to execute private justice and filled the country with terrible massacres and blood in order to spread its rightist speech across Colombia. Others, mostly state agents, failed to prevent many others within their ranks, to resort to illegitimate methods to obtain information, and make disproportionate use of force or even disappear or take the life of their opponents and civilians out of combat. Likewise, they were permeated by crime, whether it be drug trafficking, corruption or parapolitics.

The intention of the report *¡Basta Ya! Colombia*, is not to be a horror catalog, despite the much cruelty voiced in its pages. The report avoids to exhibit decontextualized horror which can lead to hatred and revenge, rather it intends for readers to reflect and repudiate such acts. Probably most important of all, the report carries out a national ethical and moral responsibility, to clarify responsibilities of what happened and to make visible the victims' tragedies.

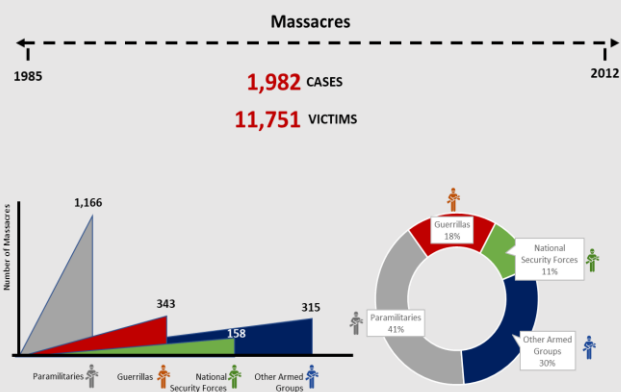
From **1958** to **2012**, the internal conflict in Colombia caused **218,094** casualties



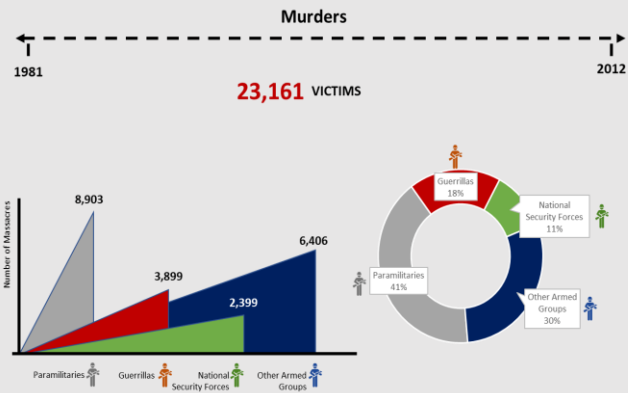
Source: Centro Nacional de Memoria Historica



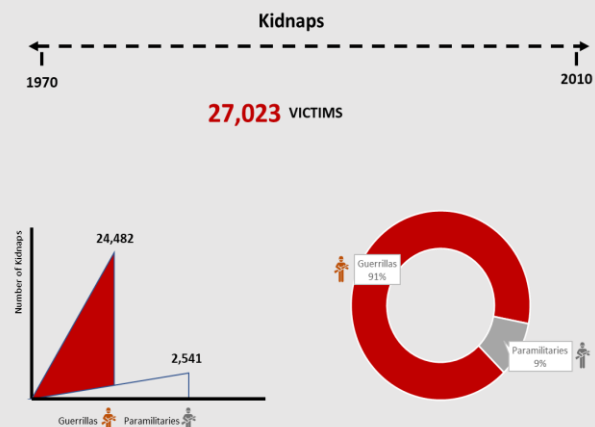
Source: Centro Nacional de Memoria Historica



Source: Centro Nacional de Memoria Historica



Source: Centro Nacional de Memoria Historica



Source: Centro Nacional de Memoria Historica

III. Investment Strategy

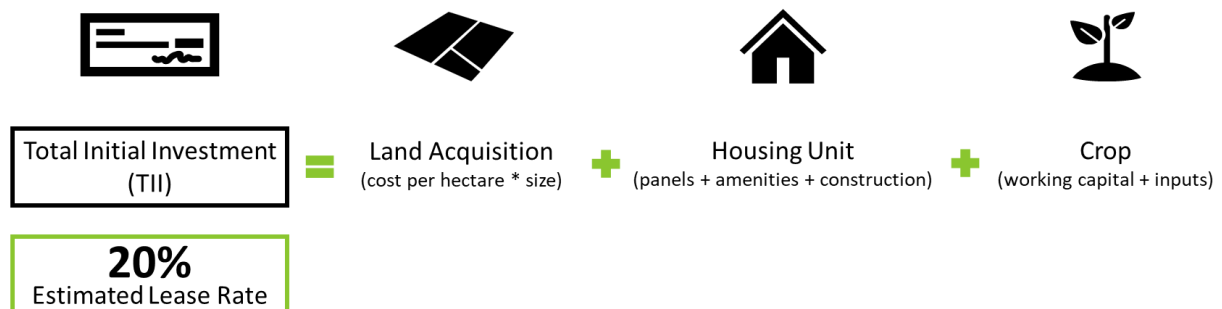
3A. Rural Displacement Fund (RDF)

TerraBlanca intends to structure the Rural Displacement Fund (RDF) as an innovative financial structure that can properly capture long-term economic value and catalyze private capital in post-conflict Colombia. Investors will profit from financing landless victims of Colombia's armed conflict to become smallholder farmers. The Fund will provide financing for land and housing to displaced and marginalized farmers through individualized lease agreements and provide business support for families to collectively access international markets and fairly sell their produce in order to meet the lease payments.

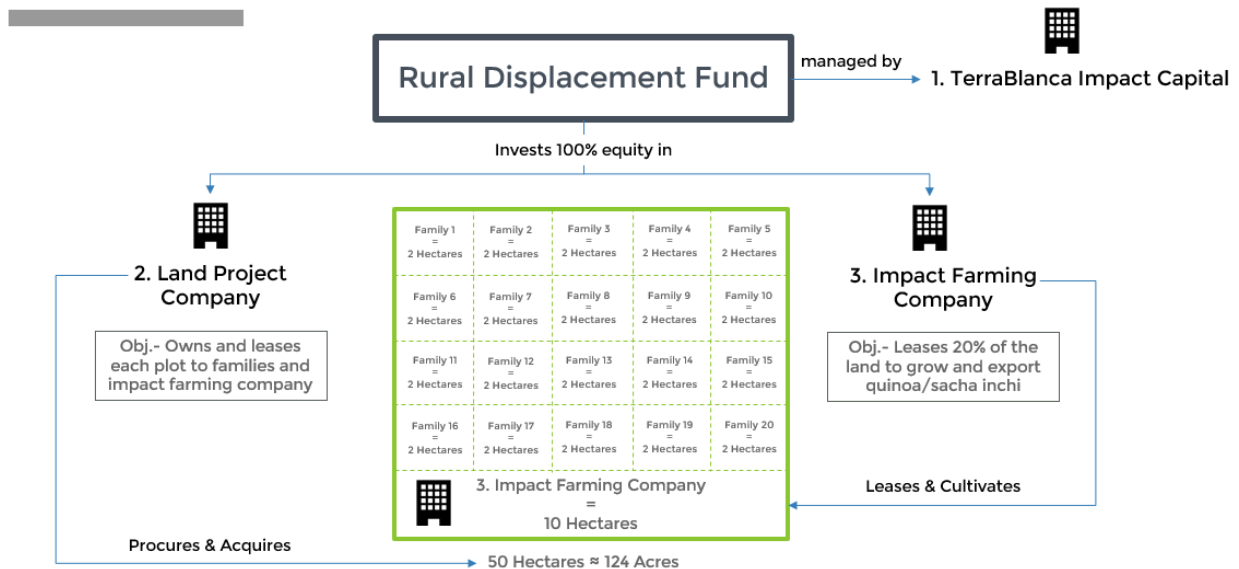
The RDF is a financial instrument that has a private equity real estate fund structure with a buy-and-lease scheme that aims to empower victims and bridge the credit gap for these families in war-torn regions, most of whom were previously farmers. The social impact objective of the Fund is to enable displaced farmers to restart their livelihoods and rebuild ownership of their lands. Significant incentives for families to commit to the Fund's project include the opportunity to work in farming again and the promise of land titling at the end of the lease, particularly relevant for families having no formal land rights nor other assets. The Fund's business model has the potential to fundamentally improve the risk profile for agricultural investments in post-conflict areas.

The Fund will have two distinct revenue streams, lease payments and profit-sharing agreements for produce sales. Each revenue stream will be managed by distinct legal entities, a land project company which buys and leases out the land and an impact farming company which secures off-take demand agreements and grows the produce alongside farmers to share technical expertise and scale production. These two firms will be wholly-owned by the RDF which is managed by TerraBlanca Impact Capital.

The Land Project company will be a private equity investment by the Fund, but the firm will use the investment to acquire the real estate to be leased. Families contracting with the Land Project company will have the obligation of making periodic lease payments, which will depend on the harvest cycle, for example a family growing quinoa will have biannual payments as quinoa typically takes 6 months from planting to harvest, sachu inchi has a 10-month initial cycle and faster cycles later on so the lease agreement will be drafted accordingly. The lease rate will be slightly higher than commercial lease rates given the distinct and value-added structure of the RDF, while the amount to be paid periodically will depend on the Total Initial Investment (TII) made by the land project company in each plot. The TII consists of the value of the acquired land, the construction of the housing unit and amenities, and initial working capital for the crop, therefore, TII will likely vary depending on the invested region and selected specialty crop.



The impact farming company is the second private equity investment by the RDF, but the objective of this investment is to secure produce purchase and marketing agreements with international demand sources. The company will have a dedicated business development team, but TerraBlanca will leverage on its partner and supporters network to secure relationships with buyers to allow investor cash flows to be risk managed through short and medium-term off-take contracts. Given the nature of the selected crops, 3-month forward contracts are the market convention. Additionally, the Impact Farming company will cultivate alongside families to share farming techniques to improve yields and scale production. The Fund intends to align incentives, and secure a second source of cash flows, through profit-sharing agreements when the impact farming company procures higher sale prices.



The RDF will acquire and convert unused land into productive high-yielding farms in different regions of Colombia. To illustrate further, assume the RDF, managed by the Asset Management company (TerraBlanca), invests in a 50-hectare plot in the department of Nariño to grow and export quinoa. The Fund will make several of such investments in a variety of regions and climate to diversify as a risk management measure. The land acquisition is done through the Land Project Company, which then contracts the housing units' construction and selects the families that will lease each plot. Assuming all 50 hectares are cultivable and productive, an analysis of land productivity and the cost per hectare will determine how much land is allocated per family, in this example 2 hectares will allow a family to produce enough to afford the lease payments and have a decent livelihood. 80% of the total land is leased out to displaced families and the remaining 20% is leased to the Impact Farming company.

3B. Building a Sustainable Supply Chain

TerraBlanca has structured the RDF to tackle the challenges small farmers face in the developing world, specifically around access to markets, access to finance, and training. We believe the RDF business model combining an Impact Farming Company (access to market and training), a Land Project Company (access to finance), and the skilled labor from displaced and marginalized farmers can be a profitable and sustainable model to break the poverty cycle.



Rural Displacement Fund
(RDF)



Access to Finance
(Land Project Company)



Access to Markets
(Impact Farming Company)



Skilled Labor
(Internally Displaced Population)

Access to Markets - Impact Farming Company to secure off-take demand agreements

Small farmers are cut-off from access to international markets and buyers. Products might reach high-value markets, but only after brokers and intermediaries make the most margin. However, without intermediaries, farmers rarely have the capability to become authorized standalone exporters by local and foreign authorities nor can they achieve the necessary scale to transit from “grower” to source-based supplier.

Our holistic market-based approach aims to help our farmers and organization remain financially sustainable. An Impact Farming subsidiary will ensure our market-based model always comes first. The firm will have three main objectives:

1. Procure and develop off-take agreements to provide farmers access to markets and create long-term relationships with large buyers.
2. Cultivate alongside families to share farming techniques to improve yields and scale production.
3. Process and ensure the appropriate certifications for the served markets, ensuring quality and standards required by local and foreign markets.

In many ways, other institutions have proven similar models for years. Root Capital has been a pioneer in the field, having launched almost 2 decades ago, it has developed a network of 120+ global buyers to support its smallholder producer clients. Other examples include Fairtrade Foundation, Sustainable Harvest and the sort, with models to transform opaque supply chains to more transparent and fair supply/demand relationships.

Demand-side relationships are expected to significantly reduce market risk on produce and investor cash flows, while still provide exposure to long-term increases in land value and commodity prices. The Impact Farming company will have a dedicated business development team to prioritize such demand-side relationships with large international importers of Andean produce (quinoa, sachu inchi, among others).

The company will be dedicated to export and promote high-quality healthy products that grow in the valleys and mountains of the Andes and in the Amazon rainforest of Colombia. To accomplish this, we will need to provide the necessary support starting at the farmland and supervising all client orders until they are shipped, and contracts fulfilled. Understanding the shipping requirements of buyers in terms of destination, volumes and variety of products will also be a critical capability brought on by our Team.

TerraBlanca has made initial contacts and developed relationships with prospective buyers and partners to secure letters of intent (“LOIs”). Conversations are in varying stages of discussions and negotiations but for the types of crops intended for this fund, which are spot-market and climate dependent, LOIs are usually made only 3 months before harvest. All such agreements will be a priority during the entirety of the Fund term. We believe that the Fund’s strategy of ag-finance supplemented with these relationship and long-term contracts will provide greater certainty of revenues from both lease payments and produce sales.

Simultaneously, by providing on-farm training on advanced farming techniques, the Impact Farming company will intend to invert the yield gap between small farmers and established agribusiness, and scale production by cultivating in neighboring farms.

Focusing on specialty crops and ensuring high-quality produce will facilitate access to new markets. Moreover, we plan to leverage the RDF's social impact story as a key produce differentiator. With these factors and through direct and collective selling, the Impact Farming company will aim to achieve higher prices and yields which in turn will lead to positive financial returns with social impact for the Fund's shareholders.

Crop Selection Factors

- Growing international market demand
- Prospective buyers and potential off-take agreements
- Climate and land availability
- Soil analysis

Market Selection Factors

- Unit economics
- Logistics
- Legal & Political
- Sociodemographic

Access to Finance - Land Project Company which leases out land

With no formal jobs and no assets as collateral, displaced farmers face major challenges to access credit. In some cases, families have access to small loans through microcredit institutions and suppliers (seeds and fertilizers), but these amounts are insufficient to purchase land and build an equity base. Larger amounts are inaccessible through the banking system, as banks require both collateral and a decent credit history which most displaced families often do not have. TerraBlanca aims to bridge this credit gap, or "missing middle", for these families with the RDF. The Fund will provide the required capital for land acquisition, housing unit, and productive project with no collateral requirement from the families given that the RDF will maintain ownership of land rights until lease payments are finalized.

The RDF's private equity real estate structure means that although the Land Project company is a private equity investment by the RDF, securing land ownership rights will reduce investment risk. On pure private equity deals it is possible to lose up to 100 percent of an investment, however maintaining land ownership as collateral throughout the entirety of the lease agreements' terms will prevent such scenario. Another advantage of maintained ownership of property is that, if circumstances require, TerraBlanca and its subsidiaries may decide on a possible third-party crop management, or in extreme situations, evictions.

The promise of future formal land ownership, with no initial capital requirement, incentivizes farmers to follow the Fund's sustainable market approach and reduces the risk of eviction. Contractual agreements to transfer formal land ownership to local smallholders will additionally ensure local buy-in and reduce dispute claims, if any. The Land Project company will provide guidance to program participants ensuring that simple but strict contractual guidelines are understood and followed.

Each lease agreement has three main factors that need to be fully understood by investors and families: Lease Amount, Lease Rate, and Lease Term. The most complex factor to determine is the Lease Amount which depends on the Total Initial Investment (TII) made by the Land Project company in each plot.

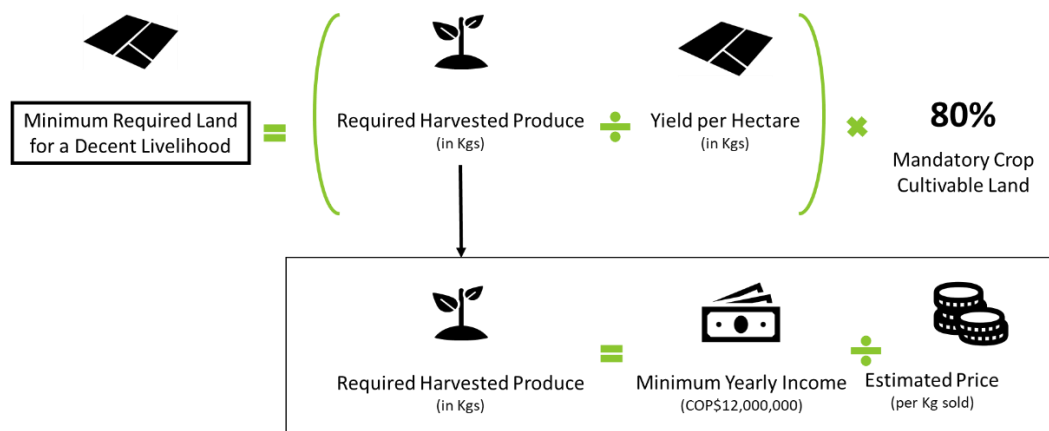
Lease Amount

The TII consists of the value of the acquired land, the construction of the housing unit and amenities, and initial working capital for the crop or productive project.

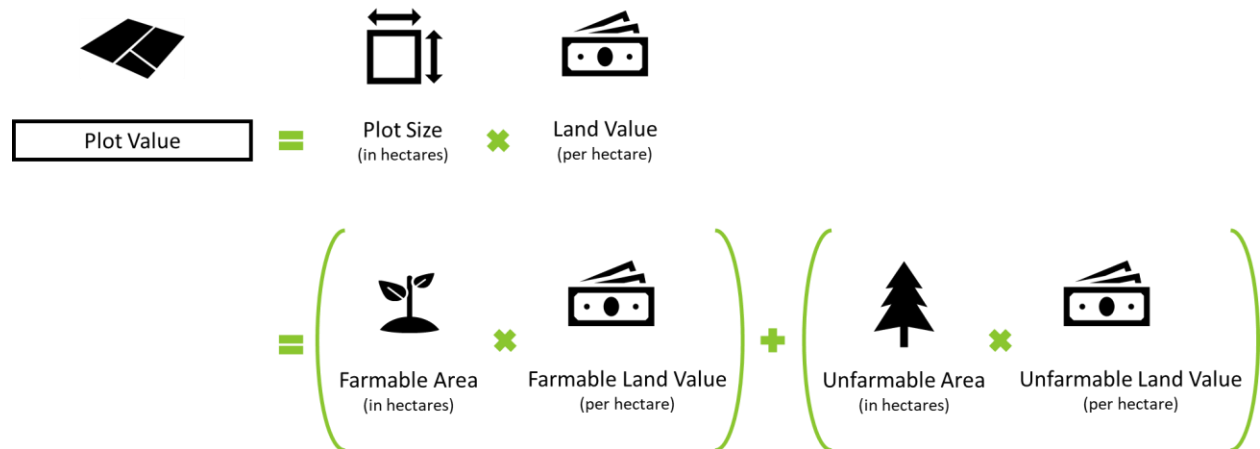
Land Acquisition

The initial value of each plot will depend on: the size of the plot and the purchase price paid by the RDF. Since the RDF will buy a larger extension of land to later be parceled into smaller plots, the Land Project Company will need to calculate the price per hectare of farmable land and define how much land to allocate to each family. Defining the amount of land per family will depend on the following:

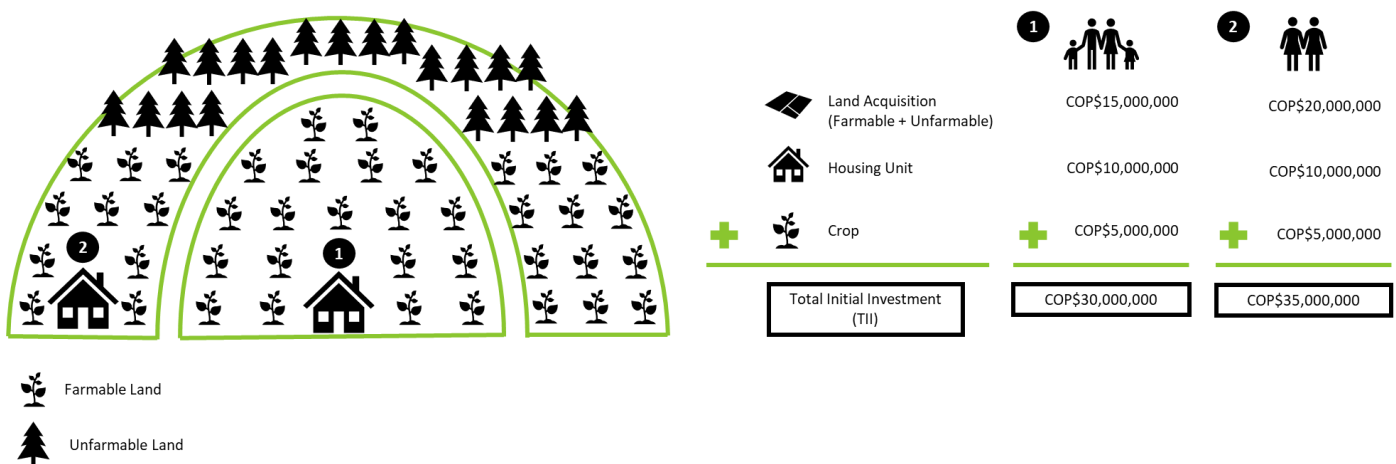
1. Farmable land: Land acquired by the Fund will not be 100% farmable. Topographic characteristics of terrains will define the zones and amount of farmable areas in each farm. Families are to be allocated the same amount of farmable land, not the same amount of total land.
2. Expected land productivity: Farmland in the Caribbean region does not have the same productivity as farmland in the Andean region. Once a profitable product is selected for each farm, following the crop selection process described on the previous section, yield per hectare can be estimated depending on benchmark and soil analysis.
3. Free to use farmable land: Although the Impact Farming company will work to sell all their produce, families will need, and want as recognized from our interviews, to diversify their cash flows. Many have mentioned their wish to have poultry and other farm animals and local subsistence crops like potatoes and corn. Therefore, 80% of farmable land will be allocated to grow the Impact Farming company's selected crop and the other 20% will be free for families to grow what they wish. More than the income diversification argument, this point is also introduced to increase families' attachment to the property, decreasing the risk of eviction and abandonment.
4. Minimum required land for a decent livelihood: As of 2018, the monthly minimum wage in Colombia is COP\$781,242 (approximately USD\$275). After our own research and modeling, we believe large families in rural areas (up to 5 members) can have a decent livelihood, and stay well above the poverty line, with a monthly income of COP\$1,000,000. The RDF plans to enable families to reach this threshold, which means the "Minimum required land for a decent livelihood" is the total amount of farmable land where families can earn COP12,000,000 per year (given the expected yield per hectare explained in the previous point).



5. Scale and impact trade-off: In practice, families could be allocated larger properties, not just the “Minimum required land for a decent livelihood”. However, there is a trade-off between social impact and farm scale. More land per family means less families reached per property. We believe the Fund will not make a higher profit by giving a family more land than the “Minimum required land for a decent livelihood”. On the opposite, by concentrating more land in fewer families, the Fund has a higher risk of non-payment and property abandonment. The Land Project Company will procure to reach as many families as possible, after meeting the minimum required land for a decent livelihood per farm.



When parceling an acquired farm, unless the terrain purchased by the Fund is completely plain, topographic factors will not allow that all families receive equal properties. Therefore, investors most acknowledge that it is practically impossible to standardize the loan amount per family. However, the Fund will allocate the same amount of farmable land per family to ensure all participating displaced families reach the minimum required amount of land to afford the periodic lease payments and have a decent livelihood well above the poverty line. Plots will not be randomly allocated, families will have the chance to preview and sign-off on their desired farms on a first-come, first-served basis.



Housing

In terms of housing, the Fund has considered typical bricks-and-mortar homes and prefabricated modular houses. Although family composition will vary, a 2-bedroom 1-bathroom 60 square meter home would accommodate the needs of most families in a rural context.

Conventional construction methods would mean that the proposed 60 m² home could take up to 4 months, as opposed to 3 weeks for prefabricated homes, and cost 3 to 4 times more than prefabricated modular homes. For construction periods and costs, the Fund will procure and build prefabricated modular homes. Several suppliers can be found throughout Colombia, offering a variety of designs and materials that can easily last more than 30 years. The Fund will focus on quality, life expectancy and price to decide which supplier to partner with.



Housing Cost



Floor Planks
(Concrete)



Prefabricated Panels



Transportation



Assembly Labor

Productive Project

Unused farmland is covered in scrub, bushes, and trees that need to be cleared to prepare the terrain for new plantations. The longer the land has been unused, the harder and costlier clearing the land will be, as existing plants would be larger, stronger and deeply rooted. Although land acquisition and housing make up a higher proportion of the TII, land preparation and crop plantation also require an upfront investment.

After performing two pilot projects, we have identified the following tasks as part of the terrain adaptation process:

1. Terrain Clearing: Scrubs, bushes, and trees are cleared to allow tractors to come in and prepare the land to be planted. In some cases, this is a manually intensive task which may require at least four people with string trimmers and machetes for two weeks to clear a hectare of land.
2. Tractor: Once the plot is accessible for tractors to work, land needs to be plowed and raked. For a hectare of cultivable land, this process might take half a day, but it depends on topographic conditions and how well the terrain was cleared. Acquisition of such machines by the Fund will only be made if the number of individual plots is high enough that renting a tractor (which is usually charged by the hour) is costlier than acquiring one tractor to be used in all the plots.
3. Furrowing: This process will depend on the type of crop selected, but both quinoa and sachu inchi will require this to improve yields. Furrowing is also manually intensive if there are no available tractors with an iron plough. If done manually, similarly to clearing the terrain, it may require at least four people with shovels and hoes for two weeks to make the appropriate furrows in a hectare of land.

4. **Soil Analysis:** Although the Fund will perform initial soil tests to determine fertility levels before acquiring the land, this analysis is crucial to determine nutrient content, composition, and other characteristics such as the acidity or pH level. With this information the Impact Farming company and families will understand better the fertilizer and irrigation requirements.



5. **Procuring Seeds:** This is a critical determinant of the crops' success and yield. Unlike conventional crops like coffee or cocoa, quinoa or sacha inchi seeds are not available or for sale by conventional suppliers, and if they happen to have any, it might be old and unlikely to germinate. The Impact Farming company will procure seeds from smallholder farmers growing or that recently harvested their crops to get high quality and fresh seeds. TerraBlanca has already done this process for its pilot projects and has made sufficient and reliable contacts.

6. **Fertilizers:** Recent years have shown an increasing trend for organic products. The Fund will, however, focus initially on conventional agriculture and later analyze the feasibility of converting conventional plantations into organic ones. This approach will facilitate change management with families and gives enough time to procure higher prices to compensate for the reduced product yield, if any. The Fund will purposely avoid pesticides, unless required in extreme situations (potential loss of crops), to avoid health, environmental, and commercialization (export) issues.

7. **Planting:** For a hectare of cultivable land, planting may take up to two days with a team of four people. The process is fairly standard and simple which families will learn from the Impact Farming Company's Field Experts, this process will aim to optimize germination and crops' yields.

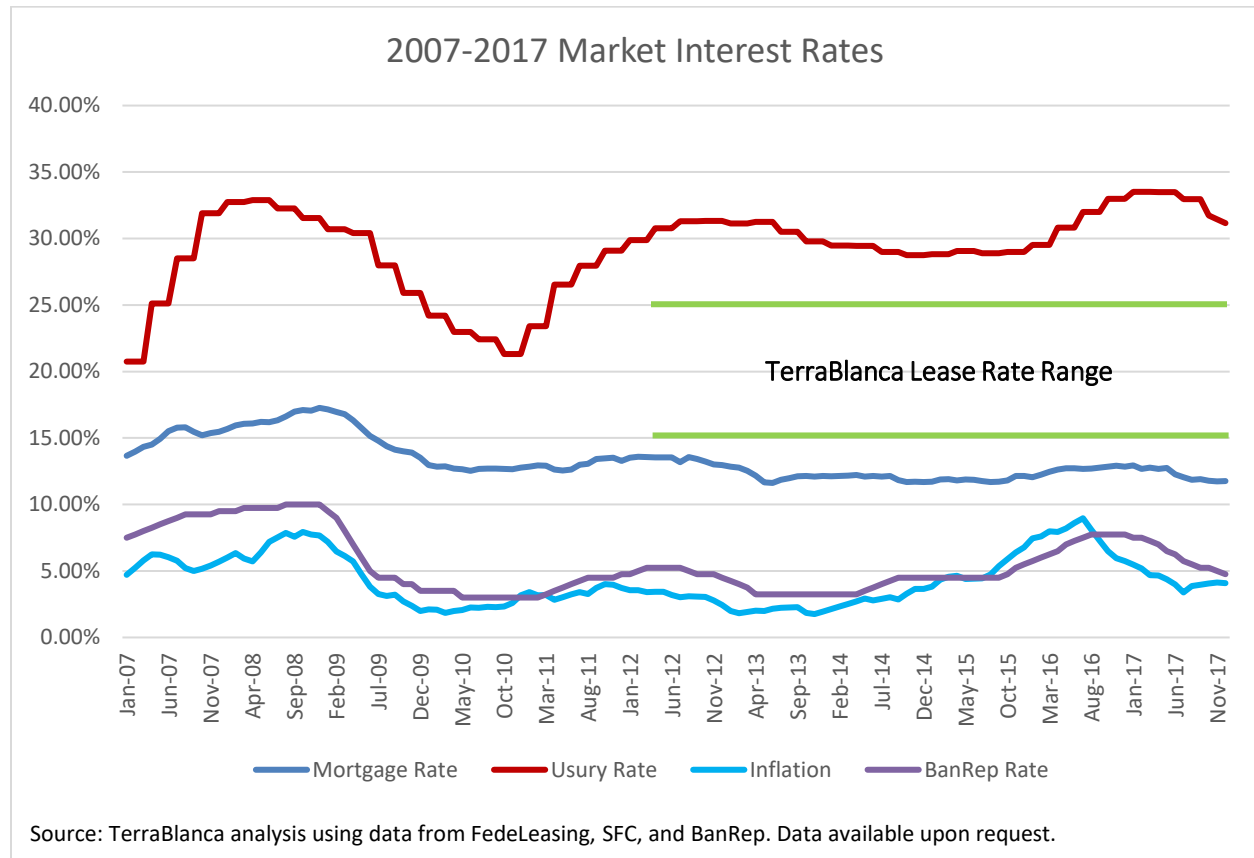
The process after planting is hard to standardize as it depends on a number of factors. Families and Field Experts will oversee and respond to the crops' needs specially regarding germination, watering, and pest control.

Terrain Adaption and Crop Plantation		Month 1				Month 2			
Week		1	2	3	4	1	2	3	4
Terrain Clearing									
Tractor (plow and rake)									
Furrowing									
Soil Analysis									
Procuring Seeds									
Fertilizers									
Planting									

Lease Rate

The distinct and value-added structure of the RDF has several factors that determine an appropriate range for lease rates above the average commercial credit rates. First, the RDF does not finance traditional lease agreements, instead it finances individuals with no assets and no credit history making them riskier investments. Second, investments are

made in post-conflict rural areas, not in urban areas making it riskier from a liquidity perspective. Third, the Fund's support for families to access markets to secure fair-trade prices for their produce is an added value that requires a higher rate. Fourth, currently the RDF might be the only financial mechanism for these families to access the needed capital to fulfill their dreams of becoming smallholder farmers.



Colombia's usury rate is determined by Superintendencia Financiera de Colombia (SFC) on a trimestral basis and establishes the maximum legal rate any lender can charge a borrower. The usury rate is often charged by credit cards and other consumer loans. TerraBlanca cannot charge above the usury rate and will charge well below (around 5 basis point below the published usury rate depending on market conditions) to make it financially acceptable and sustainable for participating families.

TerraBlanca will also need to follow the average commercial mortgage rate also published and compiled on a monthly basis by the SFC. The Fund will use the social interest housing mortgage rate as a benchmark, given that it resembles and incorporates the risk premiums for financing low-income population with riskier profiles.

Periodic Payment

Lease payments will represent families' current housing costs (rent). As a cautionary budgeting rule, the Fund will procure that families do not spend more than 40% of their yearly total income in lease payments. The estimate for their total income will depend on the selected product, expected yield per hectare, and average selling price of the produce.

Periodicity of payments will depend on the expected harvest cycles of selected products. For example, every 6 months for quinoa fields.

Lease Term

The main variables for any lease agreement are:

- Principal: which we have defined as the Total Initial Investment (TII).
- Residual or Purchase Option: which will always be 0% to reduce the liquidity risk of not transferring ownership at the end of the lease agreement.
- Lease rate: which will be defined between the usury rate and the average market social interest housing mortgage rate.
- Payment: expected to be no more than 40% of families' yearly total income (estimated by the expected yield per hectare and average selling price of the produce).
- Periodicity and compounding: depends on the selected product harvesting cycle.
- Term: will be calculated using the previously defined variables but it is expected to be between 8-12 years.

Once the variables have been defined, the Land Project company will calculate the lease amortization schedule. For example, we have estimated a TII of US\$10,500³⁰ per family and per hectare (around 50% land acquisition, 40% housing expenses and 10% for the first plantation), with 0% as residual, semiannual compounding and payments (because of the 6-month quinoa harvest cycle), an estimated yearly family income growing and selling quinoa of no less than US\$6,000 (at least one yearly harvest of 3 tons per hectare with an average price of US\$2,000 per ton), and an expected IRR of 20%. We calculate that the term should be at least 10 years with the following amortization schedule:

LEASING ASSUMPTIONS	
Variables	
Principal (TII)	\$10,500
Residual	\$0
Term (years)	10
Payments per year	2
Payment	\$1,233
Exp. biannual family income	
	\$3,083
Date of first payment:	
	01-06-19
IRR (Effective Interest Rate)	20.00%
Nominal rate per period	10.00%

³⁰ This estimated value might increase or decrease depending on factors including but not limited to land acquisition costs, land size, housing expenses, initial planting success, and USDCOP exchange rate.

AMORTIZATION SCHEDULE								
Payment	Date	Payment	Interest	Principal	Cumulative Interest	Cumulative Principal	Outstanding Principal	Cashflow
0							\$10,500	\$10,500
1	Jun-19	\$1,233	\$1,050	\$183	\$1,050	\$183	\$10,317	-\$1,233
2	Nov-19	\$1,233	\$1,032	\$202	\$2,082	\$385	\$10,115	-\$1,233
3	May-20	\$1,233	\$1,012	\$222	\$3,093	\$607	\$9,893	-\$1,233
4	Nov-20	\$1,233	\$989	\$244	\$4,082	\$851	\$9,649	-\$1,233
5	May-21	\$1,233	\$965	\$268	\$5,047	\$1,119	\$9,381	-\$1,233
6	Nov-21	\$1,233	\$938	\$295	\$5,985	\$1,414	\$9,086	-\$1,233
7	May-22	\$1,233	\$909	\$325	\$6,894	\$1,739	\$8,761	-\$1,233
8	Nov-22	\$1,233	\$876	\$357	\$7,770	\$2,096	\$8,404	-\$1,233
9	Jun-23	\$1,233	\$840	\$393	\$8,610	\$2,489	\$8,011	-\$1,233
10	Nov-23	\$1,233	\$801	\$432	\$9,412	\$2,922	\$7,578	-\$1,233
11	May-24	\$1,233	\$758	\$476	\$10,169	\$3,397	\$7,103	-\$1,233
12	Nov-24	\$1,233	\$710	\$523	\$10,880	\$3,920	\$6,580	-\$1,233
13	May-25	\$1,233	\$658	\$575	\$11,538	\$4,496	\$6,004	-\$1,233
14	Nov-25	\$1,233	\$600	\$633	\$12,138	\$5,129	\$5,371	-\$1,233
15	May-26	\$1,233	\$537	\$696	\$12,675	\$5,825	\$4,675	-\$1,233
16	Nov-26	\$1,233	\$468	\$766	\$13,143	\$6,591	\$3,909	-\$1,233
17	Jun-27	\$1,233	\$391	\$842	\$13,534	\$7,433	\$3,067	-\$1,233
18	Nov-27	\$1,233	\$307	\$927	\$13,840	\$8,360	\$2,140	-\$1,233
19	May-28	\$1,233	\$214	\$1,019	\$14,054	\$9,379	\$1,121	-\$1,233
20	Nov-28	\$1,233	\$112	\$1,121	\$14,167	\$10,500	\$0	-\$1,233

It is worth noting that this example does not include other potential income sources the family might obtain from other activities (livestock or other complementary and subsistence crops). Families are free to cultivate and use up to 20% of total farmable land as they wish. It also includes only one semiannual harvest per year.

Lease Agreement

Although it is practically impossible to standardize the loan amount per family given the difference in TILs, land sizes and topographic characteristics, the Fund has standardized the legal paperwork by creating a lease template and a Manual of Conduct that families must sign to participate in the RDF.



Contrato Leasing Rural Para Beneficiarios

Fecha: Año ____ Mes ____ Día ____

PARTES:

TERRABLANCA IMPACT CAPITAL S.A.S.

GUSTAVO ADOLFO BERNAL TORRES, mayor de edad, identificado con cédula de ciudadanía No. 1.020.739.484 de Bogotá, quien obra en representación de TERRABLANCA IMPACT CAPITAL S.A.S., con domicilio en la ciudad de Bogotá, constituido por documento privado de fecha 18 de diciembre del año 2017, registrado en la Cámara de Comercio de Bogotá, el día 18 de diciembre de 2017, con Matricula Mercantil 02900026, NIT 901141456-S.

BENEFICIARIO:

BENEFICIARIO(S): ____ mayor(es) de edad, domiciliado(s) en ____ identificado(s) como aparece al pie de mi firma, obrando en nombre propio, quien en adelante y para los efectos del presente contrato y para todos los demás que con él se relacionen se denominará(n) **BENEFICIARIO(S)**.

DESCRIPCIÓN DEL BIEN OBJETO DEL CONTRATO DE LEASING

Este inmueble se identifica con el folio de matrícula inmobiliaria número ____ de la Oficina de Registro de Instrumentos Públicos de ____ tiene un área de ____ el presente contrato de Leasing incluye el uso y disfrute del predio, y los servicios públicos (en caso de que el inmueble cuente con ellos) de ____

TRADICIÓN. Inmueble adquirido por TERRABLANCA IMPACT CAPITAL S.A.S a título de compraventa mediante escritura pública número ____ de fecha ____ protocolizada en la Notaría ____ del círculo de ____ debidamente registrada el día ____

TerraBlanca Impact Capital S.A.S.
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Bogotá, Colombia



VIGENCIA Y PLAZO DEL CONTRATO: La vigencia del presente contrato es de ____ años, contados a partir del día ____, hasta el día ____, sin embargo, las partes podrán prorrogarlo de común acuerdo.

VALOR DEL BIEN OBJETO DE LEASING ____

Suma de dinero discriminada así

VALOR TERRENO ____

DESCRIPCIÓN Y VALOR PROYECTO PRODUCTIVO. ____

VALOR IVA ____

CONDICIONES FINANCIERAS:

VALOR LEASING (VALOR FINANCIADO) ____

PERÍODO DE GRACIA: En caso de existir período de gracia, este se determinará en un documento anexo.

MODALIDAD DE PAGO ANTICIPOS ____

CANON(ES) EXTRAORDINARIO(S) ____

FECHA(S) PAGO CANON(ES) EXTRAORDINARIOS ____

MODALIDAD DEL CANÓN ____

MODALIDAD DE PAGO. ____

Obligaciones derivadas del Leasing el leasing. Son obligaciones a cargo de TERRABLANCA IMPACT CAPITAL S.A.S. () Adquirir de TERRABLANCA IMPACT CAPITAL S.A.S el pleno dominio y la posesión sobre el bien inmueble descrito anteriormente, dicha adquisición se hará en interés, a instancias y por mandato del **BENEFICIARIO** el cual

TerraBlanca Impact Capital S.A.S.
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Bogotá, Colombia

Skilled Labor – Landless Displaced Farmers

Over 500 million small-scale farmers produce over 70 percent of the world's food and spend over \$400 billion on farm inputs and other services annually³¹. In countries with internal conflicts like Colombia, rural areas are often the most affected by violence leading to mass displacements of population where the main, and often only, economic activity is agriculture.

With 7.3 million IDPs, Colombia has an enormous idle skilled population of farmers. Without access to finance nor access to markets these families usually go into informal jobs in their new hometowns. The RDF offers these families an opportunity to be land owners and restart their livelihoods in agriculture. Through the Impact Farming subsidiary, the families will receive commercial and technical support; and through the Land Project company, the families will receive financial and legal support³².

When providing financial and legal support, the Land Project company will have a key task: Selecting the displaced families to participate in our program. Unlike banks, which grant leases according to, mainly, credit risk and income analysis, the Fund will give prevalence to other non-financial factors in its Family Selection Process.

Family Selection Process

- Place of origin or displacement: Families will only receive leases on fields in the same geographical regions or with similar climate conditions as their place of origin or displacement. This intends to prevent the risk of abandonment by families with little or no attachment to the land or region. In our interviews with IDPs, we have noticed that some families might be willing to initially relocate to new regions with the promise of future land ownership and economic welfare, but we also believe these families will have a harder time adapting to the relocation increasing the risk of abandonment.
- Family composition: There is no standard or desired family, but the Fund will require that at least two family members be willing, suitable, and available to work on the designated farm. No minors younger than 16 will be allowed or counted for this point.
- Agricultural experience: Families are required to have been farmers previous to their displacement or victimizing event. No specific crop experience or knowledge will be required. However, the Land Project company's team will perform a written assessment to the head of household with standard agricultural questions to try to verify that they were indeed farmers. This point is also intended to prevent the risk of property abandonment. Individuals with previous farming experience are more likely to understand the intense long-term labor commitments that the RDF's business model entails. In order to transfer formal land ownership, families will need to work on their fields for the entirety of the Lease Term. Families with no previous farming experience might be initially willing to apply for a lease but are unlikely to understand what they are required to commit to.
- Judicial record: The Land Project company will investigate publicly available Police criminal records to ensure that applicants do not have outstanding or any history of criminal behavior.

Families who meet these four requirements will be accepted to apply for lease and plot allocation. TerraBlanca has intentionally maintained the selection process simple and with few factors to encourage applications and enrolments.

³¹ AgTech Startup Wefarm Secures New Financing Round Led by True Ventures, BusinessWire, 2018

³² There might be situations, at any point of the lease term, where relocated victims require psychological support for a variety of reasons. In such cases, the Fund does not intend to provide first-hand psychological support, instead the Fund will proactively partner with some of the many local NGOs that provide such support to conflict victims.

After receiving and validating that applicants meet these requirements, the Land Project company will create and appoint team members in an even-numbered “Selection and Conduct Committee” to interview and select the appropriate families.

To procure harmonious convivence between families and neighbors, the Land Project company will also require families to follow a Manual of Conduct with straight-forward and simple behavior rules. This Manual of Conduct will be required to be signed, alongside the lease contract, by each family and will entail conduct responsibilities by everyone living or working in the RDF’s properties. In the lease agreement contract will be stipulated that if these conduct rules are not followed, the agreement may be unilaterally finalized, and the family may be evicted from the property. The Selection and Conduct Committee will be in charge of deciding if the Manual of Conduct was breached and the respective consequences for the involved parties.

3C. Operational Model

The RDF is structured as an innovative financial solution to address the challenges and take advantage of the market opportunities described in sections 2A to 2E. The Land Project and Impact Farming company will work in tandem to operationalize the RDF investments managed by TerraBlanca Impact Capital. We have drafted an overall operational plan summarized in 8 main phases.

1. The Fund’s holistic market-based approach kickstarts the operational model to ensure sustainability by sourcing an institutional demand for the program’s produce. The Fund has previously performed extensive market research to define agricultural products with growing international demand and production suitability in post-conflict areas. The Impact Farming company will later procure and develop off-take agreements to provide farmers access to markets and create long-term relationships with international buyers.
2. Once profitable and marketable products are defined, the Land Project company will procure appropriate properties to develop the RDF project. The Land Project company will follow a proprietary land procurement due diligence process to choose suitable land plots for acquisition. The detailed TerraBlanca Land Procurement Due Diligence Process elaborates on the following points:
 - a. Legal analysis: our legal team will procure only formalized and legally registered lands which will be investors’ main assets and will secure the investors’ ownership rights over those lands during the Lease Terms. Legally registered land titles are required for the Fund to maintain the land as collateral for lease agreements.
 - b. Soil and climate analysis: the Fund will perform tests to determine fertility levels before acquiring land plots. This analysis is crucial to determine nutrient content, composition, and other characteristics such as the acidity or pH level and compare those results to the needs and requirements of the selected crops.
 - c. Topographic analysis: the acquired land will be later parceled into smaller farming units allocated to individual families. Topography will determine the feasibility of parcellation and the calculation of the total cultivable area to be allocated to families.
 - d. Logistics and infrastructure: transportation cost estimates are crucial to determine whether production will be feasible and profitable. These cost estimates will depend on the available road infrastructure, final distance to distribution centers and ports of export, and regional trading and transportation partners.

- e. Access to basic amenities: the Fund will analyze whether the host community is able to provide access to electricity, water, sanitation, education and health services to the relocated families. Relocating tens of families at a time can be problematic if these basic services are not in place, both from a family and host community perspective.
 - f. Law and order conditions: the Fund will concentrate its land procurement processes on regions that have experienced diminishing rates of displacements and no conflict-related violent attacks. Talking with host communities and neighbors before acquisitions will provide an on-the-ground understanding of local community acceptability of the RDF project. Our priority is our team's safety, through collective judgement calls we will not expose ourselves or investors' capital in still conflicted areas of the country.
 - g. Economic analysis: success of the project depends on the profitability of the business model. Final land acquisition costs must be in a suitable range for the Fund and families to jointly build a sustainable business model.
3. Family enrolment is legalized after the signature of the Lease Agreement and a Manual of Conduct. To enroll, families will need to meet the four requirements of the Family Selection Process described in the previous section. The Fund will need to communicate and explain the program to families and invite them to apply. TerraBlanca has made initial contacts and developed relationships with prospective partners including victims' associations, victims' leaders, and NGOs to reach IDP families.
 4. Properties are parceled and allocated to enrolled families. But before families move, housing units need to be constructed and basic amenities connected. Only then can families move to their plots and begin working on preparing the terrain for the initial plantation, which is the Terrain Adaptation and Crop Plantation process described in previous sections.
 5. After the plantation, families must follow the upkeep instructions given by the Impact Farming company. If no externalities negatively affect the crop, after a few months families will harvest their crops and hand it over to the Impact Farming company for value-added processes (if any) and final sale.
 6. The crop is prepared and shipped to the final buyer. Export requirements and procedures vary depending on market destinations. The selling process, if exported, will entail several documentation and logistical efforts to be done by the Impact Farming subsidiary.
 7. Once the product is sold, the Impact Farming company will receive the sales proceeds, not the individual families. Before distributing the generated income amongst families, the Impact Farming company will pay the Land Project company the periodic lease payments, due both by the families and the Impact Company itself. This is a risk management mechanism for the Fund to promptly receive the lease payments.
 8. After several harvest cycles, the lease term will end and families would have paid-off the entirety of their leases. The final phase is the Fund's responsibility to end the contractual agreements by transferring formal land ownership to the new smallholders. Selling the plots to IDP families is the preferred exit option by the Fund. Families will be left as legal owners and with the knowledge of a proven business model to continue growing as established communities.



Main Groups



Internally Displaced Families



Impact Investors



TerraBlanca



Institutional Buyer

Support Groups



Technical Assistance



Brokers - Fair Trade



Psychosocial Accompaniment



National Government



Landowner

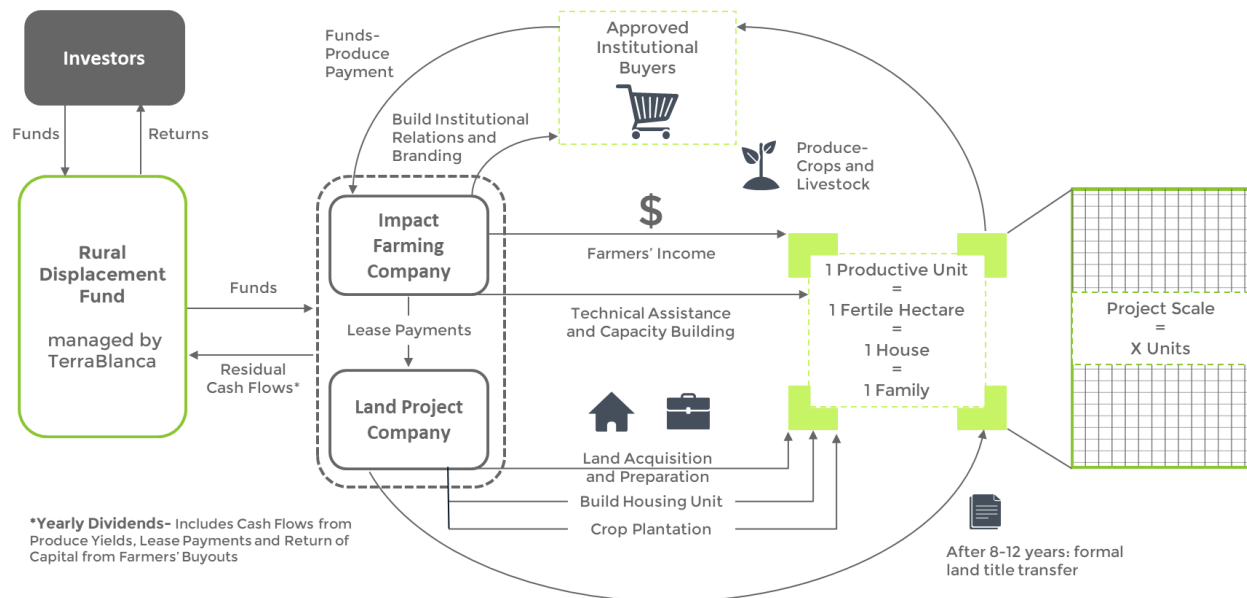


Local Government



Constructor

3D. Revenue Model



1. Investors fund the Rural Displacement Fund
2. The RDF invests in the Impact Farming Company and the Land Project Company
3. The Land Project Company finances the acquisition and preparation of land
4. The Land Project Company finances the construction of a prefabricated modular housing unit
5. The Land Project Company finances the initial crop plantation
6. The Impact Farming Company procures off-take agreements to provide farmers access to markets and creates long-term relationships with international buyers
7. The Impact Farming Company provides technical assistance and training to families
8. Families harvest their crops and produce is shipped to Approved Institutional Buyers
9. Approved Institutional Buyers pay the Impact Farming Company for the produce
10. The Impact Farming Company pays the Land Project Company families' periodic lease payments
11. The Impact Farming Company distributes the remaining revenue amongst families accordingly
12. After the Lease Term ends and all payments are received, the Land Project Company formally transfers land ownership to the respective families
13. The Impact Farming Company and the Land Project Company transfer all residual cash flows to the Fund
14. The RDF transfers the returns to Investors

The Fund will have two distinct revenue streams, lease payments and profit-sharing agreements from produce sales. Each revenue stream will be managed by distinct legal entities, a Land Project company which buys and leases out the land and an Impact Farming company which secures off-take demand agreements and grows the produce alongside farmers to share technical expertise and scale production. These two firms will be wholly-owned by the RDF which is managed by TerraBlanca Impact Capital.

To understand the cash flow waterfall, investors need to understand the unit economics of 1 productive unit. A productive unit is 1 plot of land, with 1 family, with 1 housing unit, typically of 1 hectare in size. After understanding

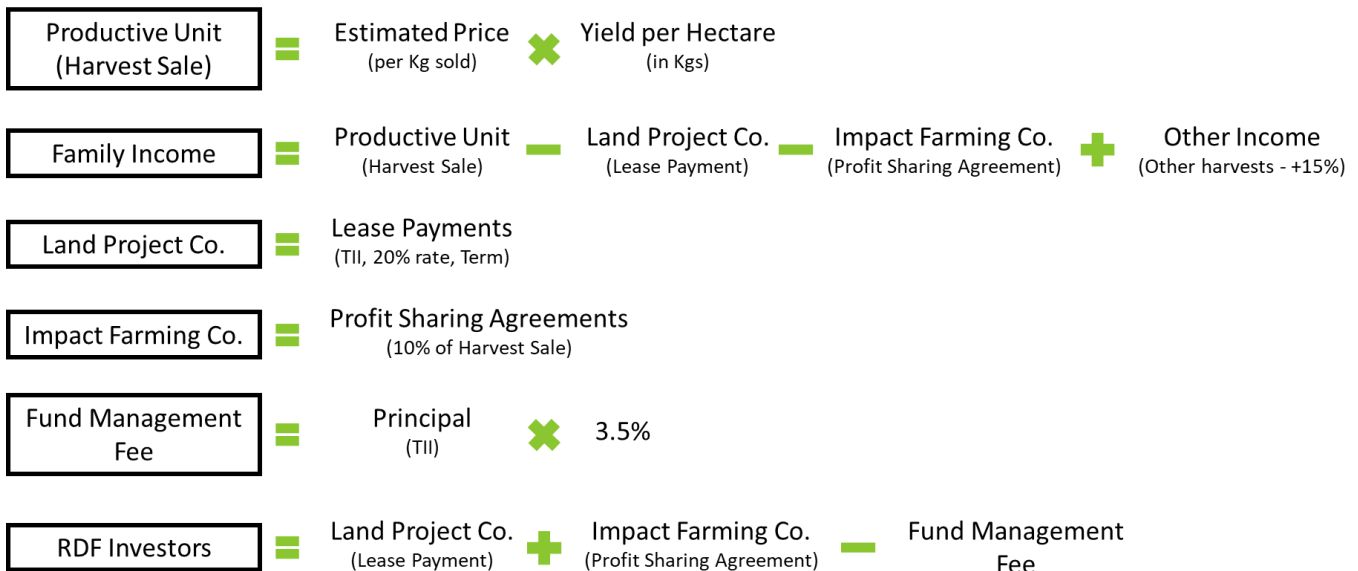
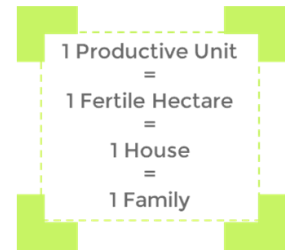
the economics of a productive unit, investors will understand the Fund economics by scaling up the project size from 1 productive unit to 50, 350, or 1,000 productive units.

Productive units' IRR will depend on a variety of factors but most importantly on selected crop, land productivity (expected yield), and final produce sale price. For example, a productive unit growing quinoa in fertile lands of the Andes will not have the same return and cash flow as a productive unit growing sachu inchi in the humid plains of the Caribbean. Although, TerraBlanca has selected these projects because their return profile will improve the risk profile of agricultural investments in post-conflict regions, however both projects are fundamentally different.

Investors will receive yearly dividends from the cash flows generated by the Land Project company (lease payments) and the Impact Farming company (profit sharing agreements).

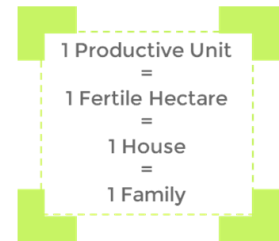
Quinoa Productive Unit – Cash Flow Model

Cash Flow Model - Quinoa (per hectare)						
Year	Productive Unit (Harvest Sale)	Family Income	Fund Mgmt. Fees	Land Project Co.	Impact Farming Co.	Rural Displacement Fund (RDF Investors)
0						-\$11,500.00
1	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
2	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
3	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
4	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
5	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
6	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
7	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
8	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
9	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
10	\$ 6,750	\$ 4,385.93	\$ (402.50)	\$2,701.57	\$675.00	\$2,974.07
IRR	58.09%	36.43%		IRR		22.45%



Sacha Inchi Productive Unit – Cash Flow Model

Cash Flow Model – Sacha Inchi (per hectare)						
Year	Productive Unit (Harvest Sale)	Family Income	Fund Mgmt. Fees	Land Project Co.	Impact Farming Co.	Rural Displacement Fund (RDF Investors)
0						-\$11,500.00
1	\$ 3,750	\$ 1,235.93	\$ (402.50)	\$2,701.57	\$375.00	\$2,674.07
2	\$ 7,500	\$ 5,173.43	\$ (402.50)	\$2,701.57	\$750.00	\$3,049.07
3	\$ 10,000	\$ 7,798.43	\$ (402.50)	\$2,701.57	\$1,000.00	\$3,299.07
4	\$ 10,000	\$ 7,798.43	\$ (402.50)	\$2,701.57	\$1,000.00	\$3,299.07
5	\$ 10,000	\$ 7,798.43	\$ (402.50)	\$2,701.57	\$1,000.00	\$3,299.07
6	\$ 10,000	\$ 7,798.43	\$ (402.50)	\$2,701.57	\$1,000.00	\$3,299.07
7	\$ 10,000	\$ 7,798.43	\$ (402.50)	\$2,701.57	\$1,000.00	\$3,299.07
8	\$ 10,000	\$ 7,798.43	\$ (402.50)	\$2,701.57	\$1,000.00	\$3,299.07
9	\$ 10,000	\$ 7,798.43	\$ (402.50)	\$2,701.57	\$1,000.00	\$3,299.07
10	\$ 10,000	\$ 7,798.43	\$ (402.50)	\$2,701.57	\$1,000.00	\$3,299.07
IRR	60.58%	43.80%		IRR		23.95%



3E. Potential Scale and Pilot Options

Scale - Colombia

TerraBlanca has estimated that an initial fund of USD\$30 million, with nearly 3,000 hectares of farmable land and impacting more than 2,500 IDP families is feasible given that Colombia has between 4 - 6 million hectares of readily available agricultural land (an area equivalent to the size of Switzerland) and approximately 7.2 million displaced people. Scaling up in Colombia will depend mostly on the Fund's ability to secure offtake contracts, formalized plots of land, and committed and skilled IDP families. After the initial fund is raised and executed, subsequent funds can be raised to reach a total of USD\$360 million, which would impact at least 0,5% of total IDPs and operate in 0,06% of land abandoned during the internal conflict.

Scale - International

Violence and natural disasters displace millions inside borders every year. According to the Internal Displacement Monitoring Centre and the Norwegian Refugee Council, in 2017, over 30 million people were displaced after natural disasters or outbreaks of violence. This is equivalent to 80,000 people each day abandoning their homes. Similarly, accumulated displacements from previous years, or stock displacement, reached over 60 million people worldwide.

This phenomenon usually happens in emerging economies with extensive unused fertile lands. However, special attention to conflict situations and the ability to secure private land ownership on behalf of the Investment Fund (as land rights will be Investors' collateral for the entirety of the Fund's Term) will be key to determine the feasibility of the RDF in other geographies. Likewise, the ability to find local produce such as quinoa and sachu inchi that could potentially deliver higher returns and value-added products.

We believe the RDF can be used as a framework and a template to develop sustainable agricultural business models in different parts of the world where internal displacement has affected thousands. TerraBlanca has compiled publicly available data to determine potential countries with substantial internal displacement (over 80,000 IDPs from outbreaks of violence and natural disasters), sufficient agricultural land (over 30 million hectares), diminishing or absence of violence and political stability (measured by the Heidelberg Institute for International Conflict Research - HIIK- Conflict Barometer), and ease of doing business and foreign investments (measured by the World Bank's Doing Business Ranking). **TerraBlanca has estimated a current potential market of nearly USD\$1.8 billion by applying the RDF's framework in countries where operations can be scalable and impact at least 0,5% of total IDPs in these countries.** However, we expect impact to be well above 0,5% of total displacements globally.

Country	Displacements			Area** (million hectares)	Political Stability & Absence of Violence***	Foreign Investment Security****	Est. Fund Size (RDF)	
	Violence	Disasters	Total*				Impact (0.5% Displacements)	Total Investment (≈USD10,000 per IDP)
Colombia	7,246,000	31,000	7,277,000	114.2	3	59	36,385	\$363,850,000
Syria	6,326,000	-	6,326,000	18.5	5	174	0	\$0
Sudan	3,300,000	123,000	3,423,000	188.6	3	170	17,115	\$171,150,000
Iraq	3,035,000	-	3,035,000	43.7	3	168	15,175	\$151,750,000
DR Congo	2,230,000	130,000	2,360,000	234.5	5	182	0	\$0
Yemen	1,974,000	45,000	2,019,000	52.8	5	186	0	\$0
Nigeria	1,955,000	78,000	2,033,000	92.4	4	145	0	\$0
South Sudan	1,854,000	-	1,854,000	62	5	187	0	\$0
Ukraine	1,653,000	130	1,653,130	60.4	4	76	0	\$0
Afghanistan	1,553,000	7,400	1,560,400	65.3	5	183	0	\$0
Turkey	1,108,000	200	1,108,200	78.4	3	60	5,541	\$55,410,000
Somalia	1,107,000	70,000	1,177,000	63.8	5	190	0	\$0
India	796,000	2,400,000	3,196,000	328.7	3	100	15,980	\$159,800,000
Myanmar	644,000	509,000	1,153,000	67.9	4	171	0	\$0
Azerbaijan	582,000	-	582,000	8.66	3	57	2,910	\$29,100,000
Pakistan	464,000	13,000	477,000	79.6	3	147	2,385	\$23,850,000
Central African Republic	412,000	7,500	419,500	62.3	5	184	0	\$0
Mexico	311,000	12,000	323,000	196.4	3	49	1,615	\$16,150,000
Libya	304,000	-	304,000	176	4	185	0	\$0
Côte d'Ivoire	301,000	-	301,000	32.2	3	139	1,505	\$15,050,000
Cyprus	272,000	40	272,040	0.9	2	53	1,360	\$13,602,000
Guatemala	257,000	1,700	258,700	10.9	3	97	1,294	\$12,935,000
Georgia	208,000	-	208,000	7	2	9	1,040	\$10,400,000
Palestine	193,000	510	193,510	0.6	5	-	0	\$0
Honduras	190,000	890	190,890	11.2	3	115	954	\$9,544,500
Cameroon	177,000	-	177,000	47.5	1	163	885	\$8,850,000
Kenya	138,000	40,000	178,000	58	3	80	890	\$8,900,000
Niger	136,000	46,000	182,000	126.7	3	144	910	\$9,100,000
Chad	108,000	5,700	113,700	128.4	3	180	569	\$5,685,000
China	-	7,434,000	7,434,000	959.7	2	78	37,170	\$371,700,000
Philippines	87,000	5,930,000	6,017,000	30.1	4	113	0	\$0
Indonesia	7,100	1,246,000	1,253,100	190.5	3	72	6,266	\$62,655,000
United States	-	1,107,000	1,107,000	983.4	1	6	5,535	\$55,350,000
Cuba	-	1,079,000	1,079,000	11	2	-	5,395	\$53,950,000
Japan	-	864,000	864,000	37.8	2	34	4,320	\$43,200,000
Bangladesh	426,000	614,000	1,040,000	14.8	3	177	5,200	\$52,000,000
Sri Lanka	44,000	500,000	544,000	6.6	3	111	2,720	\$27,200,000
Ethiopia	258,000	347,000	605,000	110.4	4	161	0	\$0
Ecuador	-	289,000	289,000	28.4	2	118	1,445	\$14,450,000
Haiti	-	180,000	180,000	2.83	3	181	900	\$9,000,000
Korea, Dem. Rep.	-	107,000	107,000	10	1	4	535	\$5,350,000
Canada	-	93,000	93,000	998.5	0	18	465	\$4,650,000
Thailand	35,000	90,000	125,000	51.3	3	26	625	\$6,250,000
Vietnam	-	81,000	81,000	33.12	2	68	405	\$4,050,000
TOTAL			63,173,170				RDF Pot. Market	\$ 1,774,931,500

Mostly natural disaster motivated displacement

* List of countries with >80,000 IDPs. Data from the International Displacement Monitoring Center (IDMC)

** Countries with extensive land (>30 million hectares)

*** Scale used by 2017 Conflict Barometer - Heidelberg Institute for International Conflict Research (HIIC). Countries with ratings of 4-Limited War and 5-War are discarded for near-term RDF operations (but are potential future markets).

**** Economy rankings on 2017 Ease of Doing Business, World Bank. Rankings are not a cardinal measure, therefore are not used to discard potential markets.

In Latin America, countries like Mexico, Guatemala, Honduras, and Haiti might offer current potential opportunities for an investment instrument like the RDF. In the future, Venezuela could offer similar opportunities as Colombia currently does. Over 1 million Venezuelans have migrated due to economic hardships and thousands more have been internally displaced.

In Africa, TerraBlanca has been contacted to analyze the situation in the Democratic Republic of Congo, twice the size of Colombia and with 2.3 million IDPs, it offers extensive land and skilled workers for the RDF to succeed. However, its current political instability and ongoing conflict makes it unfeasible for the RDF to be implemented at the moment, but in the future it could prove as a perfect scenario for the RDF model to be tested. Nigeria, Sudan, South Sudan, Angola, among others offer similar conditions where the RDF could be tested and successfully implemented.

In Asia, the RDF could be implemented in Myanmar given the displacement of millions of Rohingyas. China, in theory, with over 7 million IDPs (exclusively because of natural disasters) would offer extensive opportunities. However, its current policies regarding foreign investment in farmable land make the RDF model inapplicable at present. The RDF could also be tested in India, Pakistan and even in the Philippines where natural disasters have displaced thousands and in the Southern islands of Mindanao where ongoing religious conflicts have also caused massive displacements.

In conclusion, the RDF requires certain political, investment, and safety criteria to be met. Some countries currently meet such requirements, Colombia being the largest potential market, and countries not meeting the criteria at present will probably do once conflicts finalize. The RDF model can prove to be successful in rebuilding rural economies, communities, and families affected by violence and conflicts. Unfortunately, the world will continue to have conflicts and wars, but these will eventually end. No war can last forever. The RDF offers a model for investors to profit from the redevelopment of conflict-torn regions and offers IDPs the opportunity to restart their livelihoods and rebuild ownership of their lands.

Pilot Options

The Fund has determined a minimum viable pilot size from an offtaker perspective. Buyers' requirements are usually given by the quantity needed for 1 container to be exported (usually 20 tons). For the Fund to produce and export a minimum of 20 tons, it would need at least 7 farmable hectares. Therefore, an initial pilot can start from 7 hectares up to 850 hectares, which is the largest suitable plot in our current pipeline.

TerraBlanca has made initial contacts with landowners to build a pipeline of potential plots suitable to establish the RDF's projects. To test the RDF's business model in these plots, TerraBlanca will need to invest from USD\$0.6 million - USD\$5.8 million, depending on the pilot's size.

Land Acquisition Pipeline		
Plot	Size (in hectares)	Region
1	122	Boyacá
2	35	Boyacá
3	360	Boyacá
4	480	Cundinamarca
5	58	Cundinamarca
6	85	Tolima
7	700	Tolima
8	20	Nariño
9	12	Nariño
10	850	Meta

3F. Liquidity and Exit Strategies

TerraBlanca believes that the Fund offers three unique exit strategies that will enhance its ability to generate liquidity for its investors.

- Ownership transfer to lease tenants- The preferred strategy is to hold the assets until the term of lease agreements is reached and sell to the relocated displaced farmers.

- Local banks refinance with alternative credit history methods³³- Lease payments build up formal credit history for smallholders over the years, making local credit markets accessible in the long run. TerraBlanca has made initial contacts with foundations of the largest local banks to discuss the model and has received positive feedback to move forward.
- Securitization of loan portfolio- After reaching some scale, securitizing the lease agreements will improve the risk profile of the loan portfolio and be able to be sold to debt investors.

3G. Opportunities for Additional Upside and Reduced Risk

The post-conflict agreements dictate a number of responsibilities to the national government in the upcoming years. The Fund might be eligible for government support, loan guarantees, and other incentives that derive from the Peace Accords. We will not assume the presence of such incentives in typical underwriting scenarios, but we believe that those incentives could offer the opportunity to provide investors with additional derisking and enhanced returns. These opportunities may include:

Government support and incentives:

- Victims Law – Ley 1448, 2011: Economic benefits and transfers to victims as part of national conflict reparation efforts, meaning families might receive other sources of income.
- ZOMAC Law (Conflicts' Most Affected Zones)– Decreto 1650, October 2017: Tax incentives for investments and job creating projects in ZOMAC regions.
- ZIDRES Law (Rural, Economic, and Social Development Zones)- Ley 1776, 2016: Plans to formalize and allocate abandoned farmland to productive projects that prove economic and social development in rural areas.

3H. Impact Fund Metrics

Metrics to be measured, tracked, and reported:

- Repayment rates.
- Creating paid jobs in underserved rural communities – We estimate that an average 1-hectare farm will require 5 part-time workers for different tasks, such as, cleaning, plowing, furrowing, and others.
- Family wage increase %.
- Families lifted from extreme poverty conditions.
- Other metrics might include a comparison on a common list of current challenges faced by displaced farmers. (Access to basic necessities, informal employment, education levels and access, and others).

³³ These smallholders in theory would have built credit histories with their lease payments, collateral through formal land ownership, and proven reliable cash flows on their new crops to now allow them access to local credit markets. Displaced farmers would be a new pipeline for local financial institutions, creating opportunities for institutions and local financial systems to grow and scale support of future rural projects.

IV. Targeted Investment Opportunities

4A. Crops and Land

The food and agribusiness industry will continue to grow driven by fundamental shifts in consumer habits and an increasing global population (see section 2D. Trends and Opportunities in Food Value Chains). The Fund will focus on crop segments with strong global demand growth and with intrinsic agricultural advantages given Colombia's soils, location, and climate diversity; largely, but not limited to, Andean grains which include quinoa and sacha inchi.

Demographic growth alone is a major driver for an increasing global demand in food, but other consumer trends are also leading to an accelerating demand for highly nutritious food. Quinoa and sacha inchi present several advantages over other more traditional Colombian crops like coffee and cocoa. First, both crops are native to the Andes and Amazon. Second, both are considered "superfoods" because of their high nutritional values, and third, they have relatively short harvest cycles, 6 and 10 months respectively, compared with nearly 2 years for coffee and cocoa.

4B. Quinoa

"While no single food can supply all the essential life-sustaining nutrients, quinoa comes as close as any other in the plant or animal kingdom." NASA, 1993³⁴.

Originating in the Bolivian Andes, quinoa formed an important part of the diet of prehistoric communities through the mountain range, from Colombia to Argentina and Chile³⁵. Consumed like rice and used to make flour, soup, cereals or alcohol, quinoa is a highly nutritious grain that is growing in popularity across the world due to its high protein content.

Domesticated by farmers in the Andean countries, crops were largely eradicated during the Spanish invasion. Quinoa biodiversity suffered as a result of over 400 years of post-conquest neglect, cultural stigmatization, and massive wheat imports in the region. However, the grain is appreciated around the world today for its high nutritional value and its potential in alleviating hunger and food security in impoverished areas of the world.

After a proposal made by The Food and Agriculture Organization (FAO), the General Assembly of the United Nations declared 2013 as the International Year of Quinoa (IYQ), highlighting the potential role of the grain in contributing to global food security, given its high nutritional value and tremendous potential to adapt to different climatic conditions for its resistance to drought and cold. Through the IYQ, the UN has recognized quinoa as an important alternative to contribute to global food security, especially in areas where the population have no access to adequate sources of protein, or where there are environmental constraints to food crop production.

In Colombia, reports dating back to 1560 indicate that quinoa was cultivated in the highlands between the cities of Pasto (Nariño) and Quito (Ecuador), Spanish conquerors wrote: "Very little or almost no maize is to be found in all these towns; because of the low temperatures only quinoa is to be found."³⁶

At a global level, quinoa crops are now spreading to numerous countries across all continents. FAO believes quinoa has the potential to become a main crop in world agriculture proved by the rapid expansion of the areas where it is grown today. It is rare for a crop of regional status, and considered as a minor crop, to obtain such world recognition,

³⁴ Quinoa: An Emerging "New" Crop with Potential for CELSS, NASA Technical Paper 3422, 1993

³⁵ Planella, M., Domestication and Prehistoric Distribution. Chapter 1.3. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

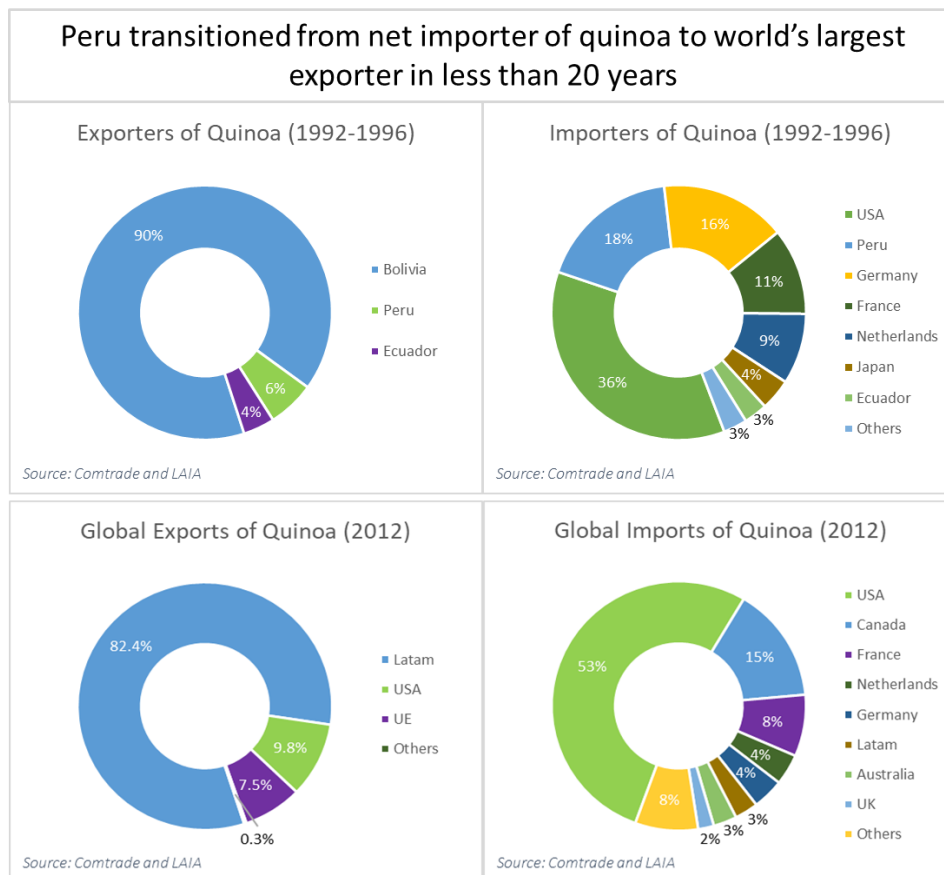
³⁶ Cieza de León, P. La Crónica del Perú, Historiadores primitivos de las Indias. 1879

but this is not the first time it happens. Like quinoa, potato originated in the Andes, where it was first cultivated over 8,000 years ago. Today, potato ranks fourth among the world's main food crops with Europeans being the world's biggest potato consumers – 85 kg per person in 2009³⁷. Although the internationalization of potato is a different case, it might showcase the potential for quinoa's global demand.

4B.I- International Markets and Trade

FAOSTAT data shows that Peru and Bolivia are the leading producers and exporters of quinoa. Estimates suggest both countries account for nearly 90 percent of world production and nearly 80 percent of total exports, with Peru surpassing Bolivia as the world's leading producer since 2014. In 2016, Peru produced 79,269 tons and Bolivia produced 65,548 tons³⁸.

In 2017, the export market was worth around USD\$275 million, with Peru exporting 53,000 tons (47%) and Bolivia 44,000 tons (31%). The United States of America is the leading quinoa importer accounting for over half the exports from Bolivia (54%), Ecuador (55%), and Peru (61%)³⁹. Europe is the second largest market followed by Canada. Exports have grown from USD\$700 thousand in 1992 to USD\$111 million in 2012 and USD\$275 million in 2017, an average annual increase of 26.9%⁴⁰.



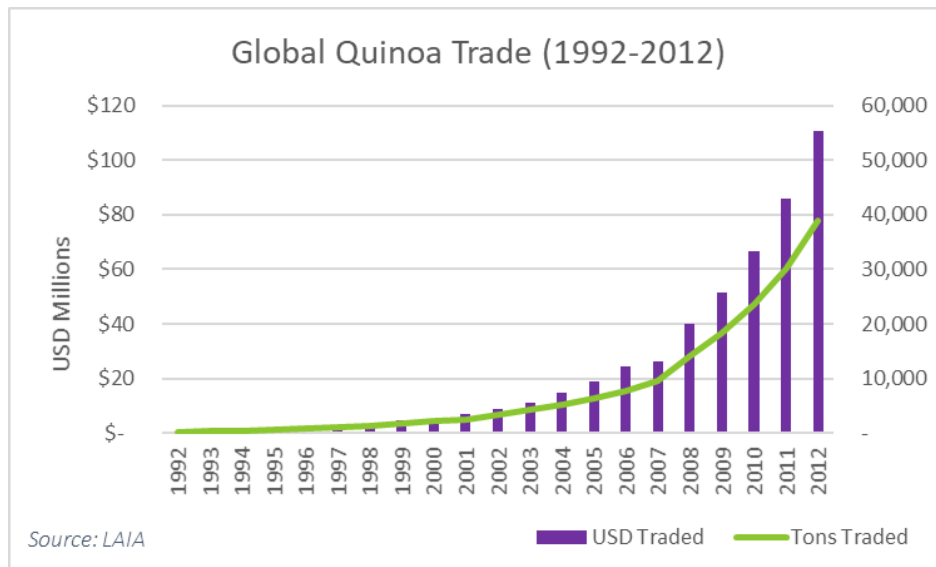
³⁷ Bazile, D., Quinoa and the exchange of genetic resources: improving the regulation systems. Chapter 1.6. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

³⁸ TerraBlanca analysis using data from FAOSTAT and Veritrade. Data available upon request.

³⁹ Salcedo, S., International Quinoa Trade. Chapter 4.1. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

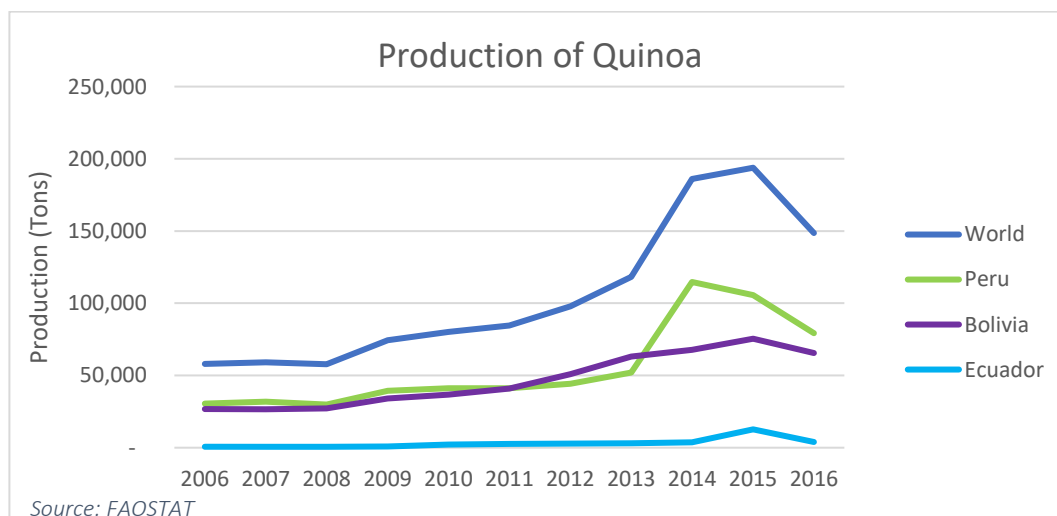
⁴⁰ Ibid.

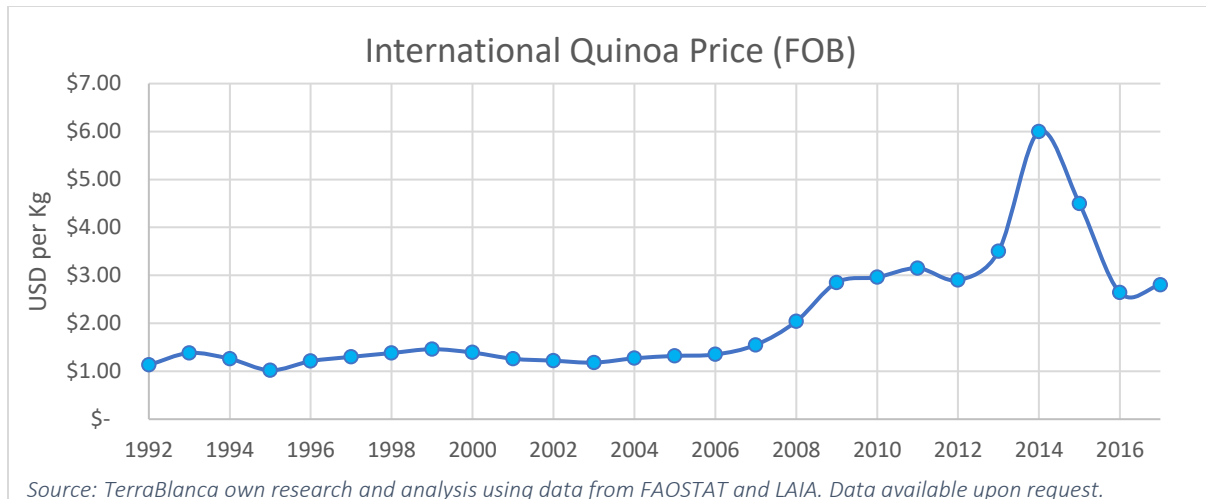
Colombia can learn from Peru's case. In the 1990s, Peru was a net importer of quinoa to meet its domestic demand and today is the world's leading producer and exporter of the grain. TerraBlanca intends to learn and apply how Peruvian growers capitalized from international growing demand and the government's open-market policies.



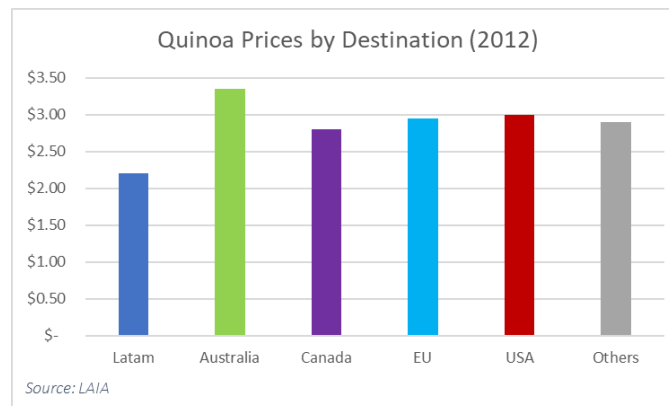
International Price

Due to the high demand in international markets, prices increased rapidly from around USD\$1.5/kg in 2006 to its peak of USD6/kg in 2014. After the IYQ, supply similarly increased, to meet international demand and take advantage of high export prices, especially in Peru. This massive increase in supply led prices to plummet and have now stabilized in a range of USD\$2-3/kg.





Prices, however, are not standardized. Prices depend on grain quality, conventional or organic certifications, and transportation costs. Also, as in many other value chains, middlemen are inevitably involved in marketing and distribution channels, making most of the profit (Peru has nearly 250 quinoa brokerage firms but 4 manage 80% of traded volumes). For example, retail prices in United States supermarkets range between USD\$12-24/kg for white whole grain quinoa, while the export price FOB is just above USD\$2/kg. TerraBlanca intends to reduce this price gap through its Impact Farming subsidiary.



Certifications act as mechanisms and investments to secure higher prices, for example, with a Fairtrade certification, producers get a Fairtrade minimum price (it can be higher) of USD\$2,250 per ton of conventional white quinoa and USD\$2600 per ton of organic white quinoa.

Product	Product variety	Price applies to	Currency / Quantity * Unit	Fairtrade minimum price	Price updated
Quinoa (cereals)	Organic, processed (rinsed from saponine)	South America	USD / 1 MT FOB	\$2,600	15-May-18
Quinoa (cereals)	Conventional, processed (rinsed from saponine)	South America	USD / 1 MT FOB	\$2,250	15-May-18

Source: Fairtrade International

Market access conditions

Quinoa exports face low tariff protection in major destination markets. The US has a non-preferential tariff for WTO member countries of barely 1.1% and the European Union levies a specific tariff of EUR\$37/ton for quinoa imports (equivalent to a 2% tariff at an estimated price of USD\$2.25/kg). Other major markets, including Canada, Japan, Australia and Israel, have fully exempted quinoa imports from taxes⁴¹.

In Colombia's case, quinoa exports are exempt from US and EU tariffs tax as a result of the tariff preferences granted under the ATPA (Andean Trade Preference Act), the United States of America–Colombia Free Trade Agreement, the European Union–Colombia Free Trade Agreement, and the EFTA–Colombia Free Trade Agreement. Therefore, tariffs do not pose a significant barrier to the Fund's access to major markets.

Given that there are few or no tariff barriers, non-tariff barriers constitute the critical factor for access to major world markets for quinoa production. Non-tariff restrictions include phytosanitary regulations, norms and standards set by destination governments. For example, there are reports of seven quinoa shipments being returned to Peru in 2014 for not meeting US regulatory requirements set by the Environmental Protection Agency (EPA) and enforced by the Food and Drug Administration (FDA).

The Fund's products will need to comply with food safety guarantees, including measures concerning the maximum tolerable levels of chemical and other residues, which is why the support and training given by the Impact Farming company to IDP families will be critical to secure higher international prices.

Additionally, the Fund will allow importing clients to have product traceability, a common requirement that is becoming increasingly important. Similarly, although the Fund's initial goal is to produce conventional quinoa, in the eventual case of having organic production, the Fund will comply with standards and procedures and obtain formal certifications recognized in relevant destination markets.

Finally, once health certification regulations and other checks have been met with the competent authorities, quinoa exports gain access to destination markets and reach the final client. It is worth noting that the higher the processing level of the product, the lower the associated health risks, which means that quinoa-derived products have easier access to markets than standard pearled quinoa.

4B.II- Production

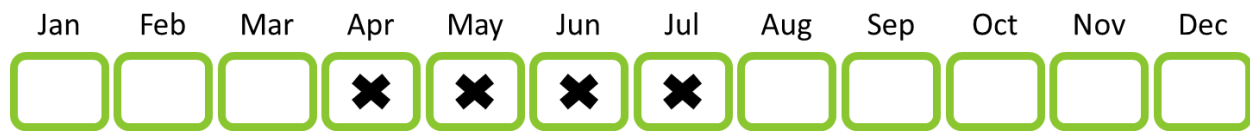
Quinoa offers a wide genetic diversity allowing the crop to adapt to different agro-ecological conditions (soils, rainfall, temperature and altitude). Its resistance to frost, drought and salinity are some of the reasons why FAO is pushing for projects worldwide.

Crop cycle

Normally planted during September and November (in Andean tropical regions), depending on the variety of quinoa planted, some crops reach physiological maturity within 120 days, while others take up to 220 days to mature. Harvest are usually between the months of April and July. Farmers, however, often store most of their harvest and sell in batches throughout the year to yield higher prices in the later months of each year.

⁴¹ Ibid.

Crop Cycle – Quinoa (Expected Harvests)



Crop cycles depend on the variety of quinoa planted and climate conditions. Quinoa grown in Colombia is categorized as Inter-Andean valley quinoa, a variety that takes longer to mature than more traditional varieties from the Peruvian and Bolivian Altiplano. Nevertheless, Inter-Andean valley are known to have higher yields per plant than Altiplano varieties⁴².

Agro-Ecological Group	Rainfall (in mm)	Minimum Temperature
Inter-Andean Valley Quinoa	700-1500	3°C

Grain diameter

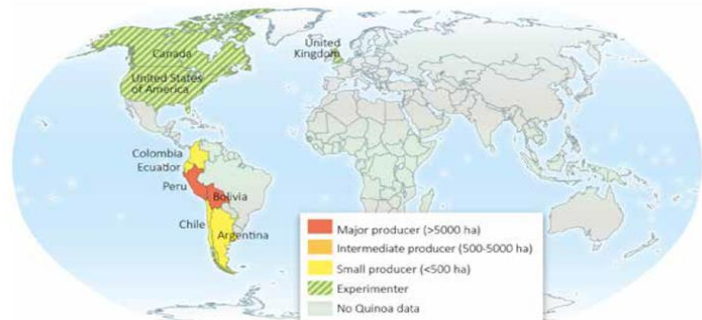
Grain diameter ranges from 1.36 to 2.66 mm depending on the variety planted. Small-grained quinoa varieties come mainly from the northern Altiplano (Bolivia) and the Inter-Andean valleys (Colombia, Chile and Ecuador), the large-grained varieties mainly originate in the southern Altiplano (Bolivia)⁴³. If grain diameter is below the average ranges, market prices will be lower.

Crop yield

Yields as high as 250 g per plant have been recorded, TerraBlanca has piloted quinoa plantations with nearly 20.000 plants per hectare (potential yields of 5 tons per hectare). Yield per plant will depend on the variety used and variables such as stem diameter, plant height, panicle length and diameter, and grain diameter⁴⁴.

Quinoa trials, hosted by FAO in countries such as Italy and Greece, have reported yields of 2.28 and 3.96 tons/ha with seeds from Bolivia where yields have averaged 700 kg/ha by local farmers

Quinoa Production (1983)



Quinoa Production (2013)



Source: FAO, 2015

⁴² Rojas, W., Quinoa Genetic Resources and ex situ Conservation. Chapter 1.5. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

⁴³ Ibid.

⁴⁴ Ibid.

growing traditional varieties. Experiments in Bolivia with added technology and increased inputs have achieved yields from 1.2 to 3 tons/ha with Altiplano varieties. Trials along the Peruvian coast (warmer varieties) have also shown that it is possible to reach yields of 6 tons/ha when fertilization and irrigation systems are adopted⁴⁵.

Statistical Parameters of Quinoa Characteristics

Component	Minimum	Maximum	Mean	Standard Deviation
Flowering bud (days)	38	95	51.72	5.66
50% flowering (days)	60	145	93.5	12.04
Physiological maturity (days)	119	209	176.89	19.79
Harvest index	0.06	0.87	0.4	0.12
Stem diameter (mm)	10.16	26.26	17.12	2.66
Panicle length (cm)	15.4	62.8	37.41	8.09
Panicle diameter (cm)	2.86	19.42	6.85	1.66
Plant height (cm)	54	174.2	110.84	17.51
Grain diameter (mm)	1.36	2.66	1.96	0.23
100-g weight (g)	0.12	0.6	0.27	0.08
Saponin content (cc)	0	10.88	3.16	3.02

Source: FAO, 2015

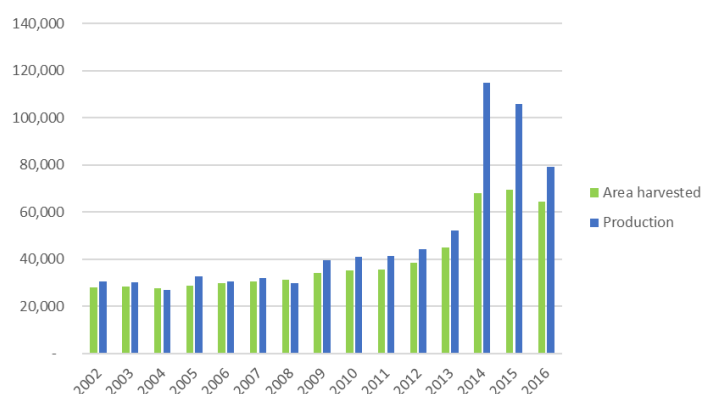
Peru experience

Due to growing demand from international markets, Peruvian quinoa production skyrocketed to a peak of 114,725 tons in 2014. Rising international prices as a result of stronger demand encouraged producers on coastal and lower lands to switch from other crops to quinoa (mostly rice and potato).

Quinoa Production in Peru (2002-2016)

Year	Area harvested	Production	Yield (tn/ha)
2002	27,851	30,373	1.0906
2003	28,326	30,085	1.0621
2004	27,676	26,997	0.9755
2005	28,632	32,590	1.1382
2006	29,947	30,429	1.0161
2007	30,381	31,824	1.0475
2008	31,163	29,867	0.9584
2009	34,026	39,397	1.1578
2010	35,313	41,079	1.1633
2011	35,475	41,182	1.1609
2012	38,495	44,213	1.1485
2013	44,868	52,129	1.1618
2014	68,140	114,725	1.6837
2015	69,303	105,666	1.5247
2016	64,223	79,269	1.2343

Source: FAOSTAT

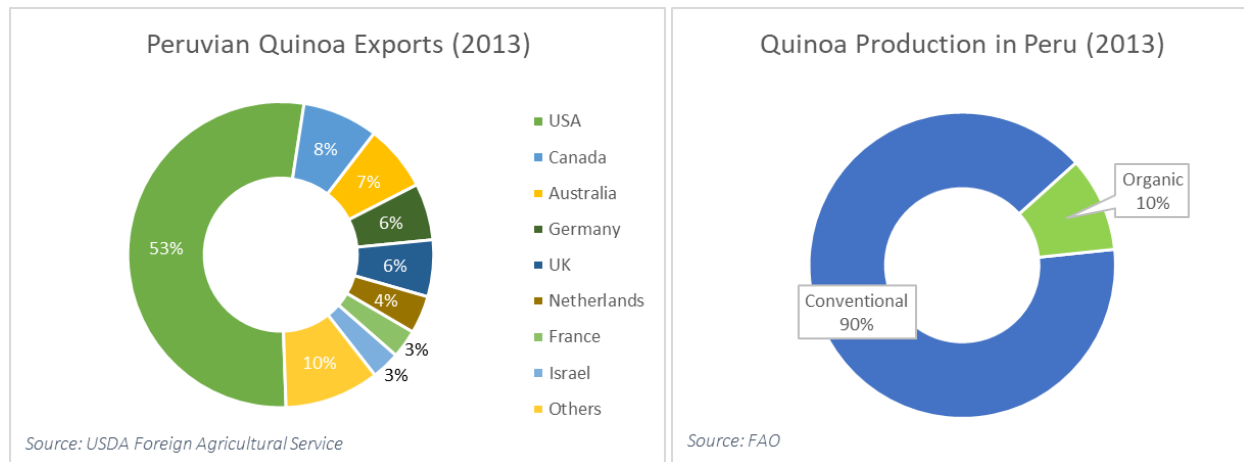


Since quinoa crops require only 30 percent of the water rice crops demand, the Peruvian government was particularly interested in replacing rice production in the northern coast with quinoa crops. In 2013, the government launched a

⁴⁵ Bonifacio, A., Quinoa breeding and modern variety development. Chapter 2.5. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

program to reconvert at least 50,000 hectares of rice into quinoa, reducing water consumption from 20 to 6 cubic meters per hectare, and avoiding salinization of fields (flood irrigation of rice leaves 30 MT of salt in the field)⁴⁶.

In the Southern coast of Peru, new quinoa growers not only successfully adapted this Andean crop to the coastal environment, but also significantly improved yields through improved practices and pest control management. Quinoa yields in the Andean highlands average about 1 MT per hectare with peaks of 1.2 MT per hectare, while on the lower lands of Arequipa yields averaged about 5 MT per hectare with peaks of 8 MT per hectare⁴⁷.



North American Experience

In the 1980s, the United States of America introduced the crop in Colorado. Although U.S. production has risen since, with Colorado and Nevada being the major producers, the production remains relatively low compared to Andean countries because of more favorable climatic conditions in the latter. Canada also grows quinoa on the plains of Saskatchewan and Ontario. According to estimates, Canada and USA produce around 10% of the world's quinoa, more than Ecuador which is considered the world's third largest producer⁴⁸.

Other experiences

In Europe, quinoa is grown particularly in the United Kingdom, Sweden, Denmark, the Netherlands, Italy and France. In Asia, it is cultivated in the Himalayas, on the plains of north India and Pakistan where yields are promising. In Brazil, it is being grown experimentally as a cover crop in the Amazon Basin. In Africa, specifically in Kenya, it has also been grown experimentally for many years. More recently, it has been cultivated in Mali, where the plant has been introduced to reduce hunger and poverty⁴⁹.

⁴⁶ Quinoa Outlook – Peru, USDA Foreign Agricultural Service, 2014.

⁴⁷ Ibid.

⁴⁸ Quinoa: A Plant with a Lot of Potential, US Department of Agriculture, 2013.

⁴⁹ Bazile, D., Quinoa and the exchange of genetic resources: improving the regulation systems. Chapter 1.6. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

4B.III- Value Chain⁵⁰

1. Harvest

Successful production of highly commercial quality grains depends to a large extent on what occurs at harvesting. Quinoa is harvested when the plant reaches maturity, recognized when the panicle changes its color to yellow, red, pink, purple or black, depending on the variety planted. The state of maturity is confirmed by the hardness of the grain when manually pressed. Moisture content in the quinoa grain at maturity should be around 10–13% and 16–20% in the plant. Untimely harvests, specially weeks after maturity, lead to significant grain losses through wind induced threshing (friction between plants), in addition to threshing when the plants are cut and stacked in sheaves.

Depending on the technology used, harvesting quinoa involves various stages. When harvesting is done manually with stationary threshers, the steps are: reaping or cutting, placing in sheaves or arcs, threshing, winnowing and cleaning of grains, drying, sorting, bagging and storage. When it is mechanized, using combined harvesters, reaping, threshing, and winnowing are done simultaneously, followed by sorting, bagging and storage.

1.1 Uprooting and reaping: Grains may be reaped manually in different ways. According to a survey carried out in the southern Altiplano in 2008, 57% of producers uprooted the plants, 42% used a sickle and 2% used a motorized mower⁵¹.

The mature plant may be reaped or mowed 10–15 cm above the surface of the land. Parts of the stem and the roots remain in the soil to protect it from erosion and are subsequently converted into organic matter through a natural composting process. Quinoa producers are gradually adopting the practice of using sickles, hoes or mechanical mowers for reaping. These slight innovations result in a significant reduction in contamination of the grain with sand, small stones and soil, which is extremely important for subsequent processing of the grain. Harvest is recommended to be done during the morning hours when there is still dew on the plant, reducing threshing induced wastage.

Another task during harvest is sorting out atypical plants, in particular those with different seed colors, to avoid blends that reduce both quality and price. International standards specify that $\leq 1\%$ of grains can be of another color, for white grain varieties any red, mocha or black grains must be removed. Similarly, for black or red-colored varieties.

1.2 Sheaving: Sheaving quinoa involves piling together the reaped plants in arcs or spikes to let the plants and panicles dry. There is a wide range of forms and methods of sheaving. The most common is to make small heaps within the plot; another is to make linear sheaves with the panicles to one side, or circular sheaves with the panicles turned inwards. The most commonly used method in the southern Altiplano is to form an arc with the plants attached in the form of an “X” and the panicles pointing upwards. This form of sheaving allows for proper airing, and the drying process is much faster than with other methods.

The sheaves must remain in the field no longer than necessary, to avoid further attacks by rodents and birds. To protect the harvest against late rains, the upper part of the sheaves (panicles) must be covered with polyethylene.

⁵⁰ Quiroga, C., Traditional processes and Technological Innovations in Quinoa Harvesting, Processing and Industrialization. Chapter 3.1. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

⁵¹ Aroni, J.C., Cayoja, M. & Laime, M., Situación Actual al 2008 de la Quinoa Real en el Altiplano Sur de Bolivia. Fundación FAUTAPO, 2009

If this is not done carefully, significant losses can occur as a result of seeds germinating within the panicle after being moistened by the rain.

1.3 Threshing: Threshing involves separating the grain from the panicle. Prior to threshing, it is important to check that the moisture content of the grain is $\leq 15\%$. The method adopted for threshing depends on the available machinery and the local topography. Traditional threshing can still be observed in places where quinoa is produced on slopes, a wood baton is used to beat the panicles until the grains drop or fall off. Tractors and other vehicles are also used for threshing on tarpaulins spread out on a raised threshing floor (platform). The tarpaulin must cover the entire surface to avoid the tires of the vehicle coming into constant contact with the soil and/or sand, which would result in contamination of the grain.

Threshing machines: Various types of stationary threshers have been tested in recent years and available in specialized markets. They have not been widely adopted, however, because they can be quite costly for smallholder farmers.

Quinoa Variety	Dry Plant Weight (kg)	Threshed Grain (kg)	Chaff (kg)	Threshing Time (min)	Threshing Yield (kg/hr)
Linea Purpura	50	16	34	10	96
Jacha Grano	56	19	37	12	95
Surumi	33	11	22	7	94
Average	46	15	31	10	95

Source: FAO, Fundación PROINPA

1.4 Sieving: Sieving or sifting consists of separating the grain from the chaff, which includes bits of leaf, small stones, pedicels, inflorescences and small twigs. The sieves used for this manual task generally measure 0.80×1.50 m and are made of mesh or of wood drilled with 3.5–4 mm holes.

1.5 Winnowing: Winnowing involves the removal of small, light impurities. In traditional practices, wind energy is used, while mechanized winnowers use a blower or fan. These winnowers generate a regular air current with rotating blades and are equipped with a receiving hopper where a constant, regulated quantity of grain is poured. These machines are relatively cheap and yield about 500–800 kg/hr. By 2008, roughly 77% of the southern Altiplano farmers in Oruro, and 14% in Potosí were using mechanical winnowers⁵².

There is engine-driven combined harvested machinery available that perform the shearing, threshing, sieving, and winnowing simultaneously and avoids contamination with impurities. The introduction of mechanized systems, such as mowers, blowers, winnowers, threshers, brushes, and combined threshing and sifting equipment, on medium and large-sized farms has various advantages over traditional manual practices. These technologies reduce impurities, as well as damage to and loss of grains; they also require less labor, which can be scarce in the farming areas.

In terms of crop management, improvements can be made in several areas: soil preparation (particularly in levelling); appropriate sowing density; and use of varieties with a simple growth habit, homogeneous crop maturity, producing plants with a single panicle. The shearing system used by the machines also needs to be adjusted to reduce the high percentage of losses resulting from shattering and shorn panicles that remain on the ground.

1.6 Transport: Transportation to the processing plant is generally done in 100kg or 50kg bags made of polypropylene or woven sacks.

⁵² Ibid.

1.7 Storage in harvest areas: Proper storage ensures that the grain remains clean for a given period of time with the right environmental conditions (temperature and humidity) to preserve grain quality. The construction must facilitate cleaning and provide protection from rodents and other animals that could cause contamination.

2. Processing

Quinoa is processed to obtain grains that meet consumption and quality standards. Grains are not uniform in size after harvesting and winnowing. On average, grain size varies between 1.4 and 2 mm in diameter, and the grain will still contain impurities (especially chaff residue, twigs, leaves, and small stones, as well as broken, damaged, colored, germinated, covered, and unripe seeds).

The grains, therefore, must undergo a series of processes including preliminary sorting and removal of impurities; saponin removal, which is normally carried out using both hulling (dry method) and washing (wet method); drying; sorting by size; separating of different colored grains, and removal of residual impurities.

These processes are performed by medium or large-sized intermediaries equipped with grain sorter machines that are capable of processing tens or hundreds of tons of grain each month. Most large processing companies use metal silos to store produce and avoid rodents and moths.

2.1 Preliminary sorting and removal of impurities: the initial product is sorted using simple sieves made of a plate perforated with 3 mm diameter openings and a woven mesh with a spacing of 1.2 mm between the threads. These machines run on a 1.5 hp motor with processing speeds of 100 kgs every 2–3 minutes. The sorting process generates five products:

- Particulate matter (mainly dust and saponins)
- Light, coarse impurities (twigs, leaves)
- First-grade grain (grain with a diameter of > 2.2 mm)
- Second-grade grain (grain with a diameter of < 2.2 mm) second-grade quinoa is purchased at a lower price than first-grade grain.
- Heavy impurities (stones)

2.2 Saponin removal: The term saponin comes from the Latin word “sapo”, meaning soap. Saponin is found in the outer shell of the quinoa grain, which is generally 0–3% in dry grains and gives the grain a bitter taste and must be removed before it can be eaten. Saponin is a natural detergent and organic foaming agent that could have potential uses in industry such as soaps or other products. However, similar to rice, quinoa must be hulled and washed to remove the outer shell before human consumption.

The process of removing saponins is one of the most important stages in grain processing, and in recent years, various appropriate technologies have been developed for removing saponins to levels within the acceptable limits, without affecting the grains’ nutritional properties.

Saponin content varies between quinoa varieties, these being classified as “bitter”, “semisweet” or “sweet”. This classification is based on saponin content, “bitter” grains contain 1–3%, “sweet” grains contain 0.0–0.1%, and “semi-sweet” grains everything in between 0.1–1%. Human consumption acceptability varies between 0.06 and 0.12%, so even “sweet” quinoas must be processed for saponin removal. The Inter-Andean valley quinoa varieties grown in Colombia (Tunkahuan type), which TerraBlanca will grow, is considered a “sweet” variety.

For many years, quinoa processing companies used or adapted machines, equipment, and technology initially developed for processing rice, wheat, soybean and sorghum. The low volumes of production, compared with

these other crops, and the existence of only a small number of milling companies globally, provided little incentive for the development of specific machines, equipment and technology for this sector. In the last 10 years, however, quinoa has experienced a boom with growing global demand and being cultivated in extensive areas, not only in the countries where it originated, but in others where it has been introduced. This growing demand has led to the development of machinery for the processing and harvesting of quinoa.

There are 3 main methods for saponin removal processes: wet, dry and combined methods. Each with its own advantages and disadvantages. The wet method is a washing system with three stages: soaking, centrifuging and rinsing, followed by drying in a tunnel of warm air. The dry method uses huller machines, similar to rice and other grains, and combined methods use hulling, washing and drying techniques.

Currently, most processing companies currently prefer the combined method because it efficiently removes saponins and maintains grain quality, thus satisfying international requirements. Current combined processes enable saponin removal to reach levels of 0.01–0.06% (as required on the international market), which is far below the values detected by a human consumer. The most effective systems use the dry method to remove up to 95% of saponins in the huller. The rest of the saponin is removed during washing when the grain remains in contact with the water for barely 2 minutes – or even just seconds⁵³.

2.3 Resorted and bagged grain: The dry grain is then re-sorted to obtain the most homogeneous grain in a granulometric sorter, straws are removed in an electric engine powered winnower and different colored grains are separated through an optical-pneumatic sorter in two or three runs. Finally, the grain is picked manually, to eliminate 100% of any remaining impurities in the quinoa grain before being bagged as an end product for export (bulk pearly quinoa).

The development of increasingly efficient and innovative equipment and technology for quinoa harvesting and processing will be driven by market forces (increasing demand) and more stringent environmental standards given the limited water resources in production areas.

There is a trend towards dry saponin removal methods, that do not require any water, and also allow the collection of saponin, which can be sold for good prices on the market since they can be used in various areas of the industrial sector. It is expected that the expansion of the quinoa market will lead to the development of other derived products, such as protein concentrates and isolates, oils, starches, and high value-added saponin derivatives.

4B.IV- Agronomic Aspects

Quinoa's genetic diversity allows it to adapt to a variety of environments (highlands, valleys, mountains, coasts), different types of soil (salinized soils), and places characterized by wide ranges in humidity (40 to 90%), altitudes (0 to 4800 masl) and temperatures (-8° to +38°C). Its adaptability and wide range of varieties makes it difficult to identify the most efficient techniques to achieve higher crop yields.

Quinoa development is determined by four main factors: temperature, photoperiod (time exposed to sunlight), irrigation and radiation⁵⁴. Studies suggest that temperature and photoperiod are the environmental factors with the highest relative impact on development duration. Grain development may be strongly inhibited by high temperatures

⁵³ Small scale saponin removal machines have been developed in Bolivia with the capacity to process 12 kg in 7 minutes using the traditional method of roasting, hulling, winnowing, washing and drying – processes which could take workers up to 12 hours to complete.

⁵⁴ Bertero, H., Environmental control of development. Chapter 2.1. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

and/or long days. Similarly, seeds can lose their viability in a short time, particularly in conditions of high temperature and humidity. Crop experiments indicate that the optimum temperature for germination of quinoa seeds occurs between 18° and 23°C⁵⁵.

In terms of irrigation, water supply is essential during germination. However, after sprouting, quinoa possesses an intrinsic low water requirement allowing it to cope through water shortages by pausing and rapidly resuming its photosynthesis process. This makes quinoa suitable for growing in arid and semiarid environments where there is no irrigation and farmers need to rely on seasonal rainfall. Drought tolerance of quinoa has been attributed to its branched and deep root system that penetrates up to 1.5 m in sandy soils, and the presence of leaf vesicles containing calcium oxalate, which could reduce transpiration⁵⁶.

Given the agronomic advantages, with continual genetic improvement and the introduction of the crop to other countries, FAO expects quinoa to become humanity's new staple food crop. TerraBlanca believes this is fairly feasible given quinoa's water stress resistance and its ability to grow in highly salinized agricultural soils worldwide. This capacity to adapt makes it an ideal crop in today's context of climate change and degradation of agricultural land.

Pests and diseases⁵⁷

Due to their extended growing areas, Bolivia and Peru report the greatest damage and losses incurred due to pest infestation. Elsewhere, production areas are smaller, and pests are therefore less of a problem. The situation is similar in new quinoa-growing areas around the world.

The main quinoa pest, responsible of most economic losses, is a moth endemic to the Andean region. Its larvae feeds and damages developing flowers and grains. Besides pests, the most serious disease in the region and on a global scale is quinoa's downy mildew, which is caused by a fungus that grows on the plants' leaves. It is important to note that, in the Andean region and North America, there are quinoa varieties of medium to high mildew resistance.

Pest and disease control strategies depend on whether production is conventional or organic. Conventional quinoa farming employs strategies for control similar to other crops, while organic farming requires an integrated approach that relies on various practices and inputs that meet organic standards.

1. Field inspections monitoring for the presence of larvae
2. Crop rotation: a practice that aims to avoid soil fertility exhaustion and break the pest life cycle
3. Use of light traps to attract and catch moths
4. Using pheromone traps
5. Using bioinsecticides and ecofriendly pesticides.

The most frequently used products in Bolivia for conventional quinoa farming are chemical insecticides and fungicides classified as pyrethroids: Cypermethrin and Lambda-Cyhalothrin. In the Inter-Andean valleys area (Colombia), where average rainfall

Organic Insecticides for Moth Larvae Control

Active Ingredient	Dosage/20 liters	% efficiency
<i>Bacillus thuringiensis</i>	90 gr	63
Spinosad	3 g/liter	93.5
Lime sulfur	500 cc	35

Source: FAO

⁵⁵ Bois, J.F., Winkel, T. & Homme, L., Response of some Andean cultivars of quinoa (*Chenopodium quinoa* Willd.) to temperature: effects on germination, phenology, growth and freezing. Euro J. Agron. 2006

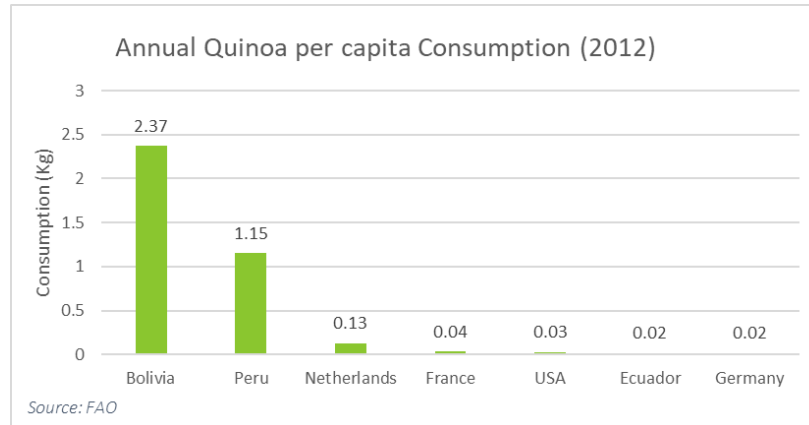
⁵⁶ Zurita-Silva, A., Quinoa Drought Responses and Adaptation. Chapter 2.4. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

⁵⁷ Gandarillas, A., Principle quinoa pests and diseases. Chapter 2.6. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

reaches 500 mm, it is important to procure resistant or tolerant varieties and to implement control measures with products that are applied early as a preventive measure.

4B.V- Consumption and Uses⁵⁸

Quinoa is usually sold as pearled grains ready to be prepared and consumed like rice. The market has traditionally preferred quinoa varieties with white large grains (such as the Tunkahuan variety which TerraBlanca will focus on), and small grain quinoa is generally used to make flakes, flours and other products.



- **Flakes:** Quinoa flakes are obtained by pressing the grains between two converging rollers, a process very similar to that used for oat flakes. Quinoa flakes have a wide range of potential uses: in juices combining quinoa with fruits (apple, pineapple, and mango) and are very popular as baby food, in soups, and in pies, tarts and cakes. For soups and juices, quinoa flakes require less cooking time than the grain, making them easier to use and consume.
- **Expanded quinoa:** Expanded or popped quinoa is made from the pearled grain. The processed grain, with a moisture content of 14–15%, is pressure cooked at high temperatures, which makes the grains to pop as they expand immediately. Popped quinoa can be used in many ways, including as instant cereals and as a base for energy bars. The nutritional quality of quinoa may however deteriorate during this process.
- **Flour:** Quinoa flour is obtained by grinding quinoa from which the saponins have been removed, using pressure and friction, and later airing it to obtain a light powder. Quinoa flour can be used in almost all products manufactured by the flour industry, and up to 40% quinoa flour may be used in making bread, 40% in pasta, 60% in sponge cakes and 70% in biscuits. Some varieties can also be used in baby formula.
- **Noodles:** Quinoa flour provides an alternative for the noodle and pasta industry for the preparation of gluten-free pasta.
- **Oils:** The oil content in quinoa is quite high and varies from 2% to 11%, with an average of 6.39%. The quality of oil is good, due to the high percentage of unsaturated fatty acids (approximately 89%) and includes 50–56% linoleic acid (omega 6), 21–26% oleic acid (omega 9) and 4.8–8.1% linolenic acid (omega 3). On account of these characteristics, quinoa helps to reduce bad cholesterol (LDL) and increase good cholesterol (HDL), thus making it a potential source for the production of oil as a by-product.

⁵⁸ Quiroga, C., Traditional processes and Technological Innovations in Quinoa Harvesting, Processing and Industrialization. Chapter 3.1. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

- Protein concentrates: Due to its high protein content (12–18.9%), and because it provides all the essential amino acids, quinoa is of particular interest for the production of protein concentrates and isolates to be used as the main ingredients in high value-added food formulas.
- Nutraceutical properties and uses⁵⁹: various studies adopting different biological approaches have confirmed that the bioactive components present in both seeds and leaves of quinoa possess hypocholesterolemic, anti-oxidant, anti-inflammatory and anti-cancer effects, as well as being safe for consumption by patients with coeliac disease.
- Coeliac disease and gluten-free diet⁶⁰: quinoa as a naturally gluten-free product is a suitable substitute for patients with coeliac disease, a condition characterized by an inappropriate immune response to dietary gluten leading to damage of the small intestine. An effective treatment is a lifelong gluten-free diet, which quinoa can offer while meeting patients' nutritional needs. The prevalence of coeliac disease has been estimated to be approximately 0.5%-1% of population in different parts of the world.
- Animal feed⁶¹: quinoa has been used to feed animals since pre-Hispanic times. Since saponins confer a characteristic bitter taste that inhibits consumption, they must be removed through washing before the grain is used in feed. Saponin must be removed from the grain before it can be fed to pigs and poultry. Fresh quinoa leaves and harvest chaff have proven to be quite attractive for sheep, bovines, camels, goats and fish, and quinoa leaves may be used for silage. However, in the current situation of high grain prices, using quinoa as animal feed may not be commercially feasible, unless low quality broken grains are used for animal feed.

4B.VI- Nutritional Facts

Just 12% of the main crop species cultivated provide 75% of our food. Of these, wheat, rice and maize provide 60% of the calories consumed in the world⁶². According to the human nutrition standards defined by FAO, quinoa is the only plant food that provides all essential amino acids.

Quinoa vs. Rice

As mentioned, quinoa is similar to rice in terms of culinary uses, transportation and storage, but once processed, quinoa offers superior nutritional quality.

Neither possess gluten, but quinoa has other advantages which have not been fully exploited to achieve greater expansion of its consumption and cultivation. First, when rice is peeled, a large proportion of the proteins and other elements associated with the chaff are lost. On the other hand, quinoa loses almost none of its nutritional qualities when it is peeled or washed.

The water requirement of quinoa is much less than that of cereals, which means that higher yields are possible, particularly in terms of protein production in relation to water consumption. Quinoa's adaptability to arid zones is one of the reasons for which FAO promotes greater use of the crop. Furthermore, the peel of quinoa produces saponins,

⁵⁹ Fuentes, F., Nutraceutical Perspectives of Quinoa: Biological Properties and Functional Applications. Chapter 3.5. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

⁶⁰ Zeballos, V., Quinoa, Coeliac Disease and Gluten-Free Diet. Chapter 3.6. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

⁶¹ Blanco, J., Fodder and Animal Feed. Chapter 3.2. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

⁶² The Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture, FAO, 2010

a waste product with potentially valuable industrial uses. Finally, quinoa has more proteins than the other grains, and its seeds contain all the essential amino acids⁶³.

Type of Grain	Water Footprint (liters/kg)	Water efficiency of protein production (% of proteins * 1,000 liters of water)
Rice	2497	2.7
Maize	1222	7.7
Wheat	1227	10.3
Quinoa	500	27.8

Source: FAO

Component	Minimum	Maximum	Mean	Standard Deviation
Protein (%)	10.21	18.39	14.33	1.69
Fat (%)	2.02	10.88	6.46	1.05
Fibre (%)	3.46	9.68	7.01	1.19
Ash (%)	2.12	5.21	3.63	0.50
Carbohydrates (%)	52.31	72.98	58.96	3.40
Energy (kcal/100 g)	312.92	401.27	353.36	13.11
Invert sugar (%)	10	35	16.89	3.69
Fused water (%)	16	66	28.92	7.34

Source: FAO

Nutrient	Unit	Value per 100 g
Proximal		
Water	g	13.28
Energy	kcal	368
Energy	kJ	1539
Protein	g	14.12
Total lipids (fat)	g	6.07
Ashes	g	2.38
Carbohydrates, by difference	g	64.16
Fibre, total dietary	g	7.0
Starch	g	52.22
Minerals		
Calcium, Ca	mg	47
Iron, Fe	mg	4.57
Magnesium, Mg	mg	197
Phosphorus, P	mg	457
Potassium, K	mg	563
Sodium, Na	mg	5
Zinc, Zn	mg	3.10
Copper, Cu	mg	0.59
Manganese, Mn	mg	2033
Selenium, Se	µg	8.5
Vitamins		
Thiamine	mg	0.360
Riboflavin	mg	0.318
Niacin	mg	1520
Pantothenic acid	mg	0.772
Vitamin B6	mg	0.487
Vitamin C, total ascorbic acid	mg	22.39
Pholate, total	µg	184
Betaine	mg	630.4
Luteine + zeaxanthine	µg	163
Vitamin E (alpha-tocopherol)	mg	2.44
Tocopherol, beta	mg	0.08
Tocopherol, gamma	mg	4.55
Tocopherol, delta	mg	0.35
Lipids		
Fatty acids, total saturated	g	0.706
Fatty acids, total mono unsaturated	g	1613
Fatty acids, total polyunsaturated	g	3292

Source: USDA

⁶³ Martinez, E., Quinoa: Nutritional Aspects of the Rice of the Incas. Chapter 3.4. In FAO & CIRAD. State of the Art Report of Quinoa in the World, 2015

4C. Sacha Inchi

Sacha inchi is a climbing plant native of the Amazon basin. The words Sacha Inchi literally translate to bush peanut from quechua, an indigenous language. Although found in the wild throughout Peru, Ecuador, and Colombia, indigenous people have been cultivating the plant for centuries, over 3,000-year-old carvings of the star-shaped fruit can be found in Chan Chan, a Peruvian archeological site.

Sacha Inchi is also commonly known as Inca peanut. The fruits of the plant are star-shaped and contain seeds or peanuts which can be consumed in three main forms: as snacks (roasted peanuts); as sachu inchi oil by cold-pressing the seeds to extract a clear, pale to dark yellow oil which contains high levels of Omega-3, 6 and 9 fatty acids; and as powder to be used in dietary supplements and protein powders.

The fruits have a variable number of lobes, usually four or five but it can go up to eight. When the fruit is mature, it turns into a dark brown color with hardened crusts, the seeds are then taken out of the shell, separated, dried, and prepared for processing.

Sacha Inchi is cultivated from Central America down to Bolivia. However, Peru is by far the largest producer and exporter followed by Ecuador, but sufficient volumes for sustainable international trade are not yet available. In Colombia, it can be found in the wild in the Amazon, Orinoquia, and Pacific regions.



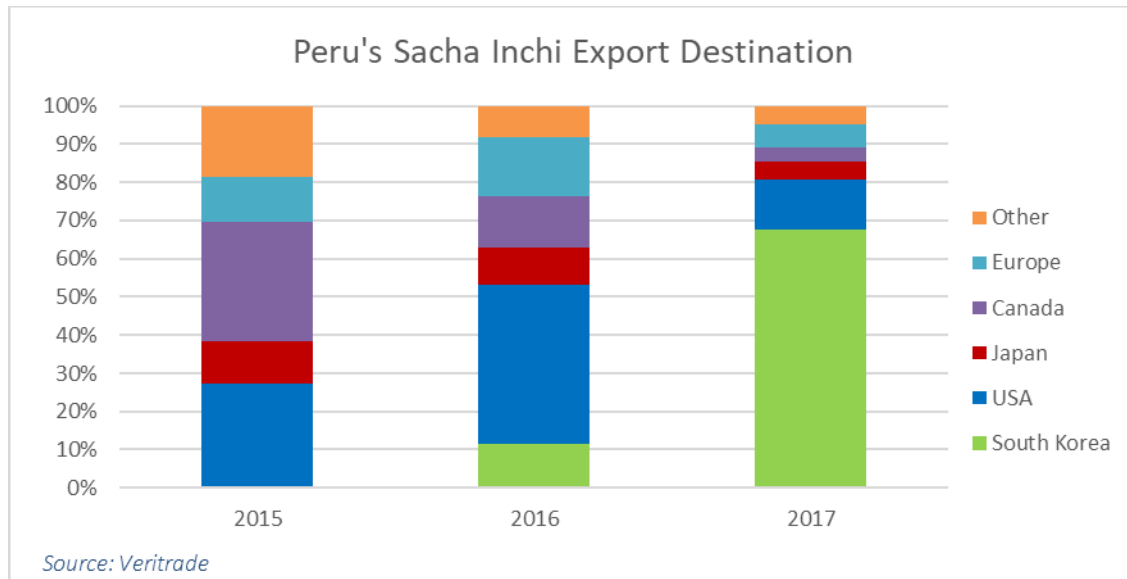
4C.I- International Markets and Trade

Sacha inchi is becoming increasingly popular thanks to its fascinating marketing story, origin, and nutritional properties (high Omega-3 and protein content). However, currently there are a lot of challenges in securing sufficient supply worldwide. Our internal research suggests that South Korea's demand alone is higher than the combined supply of all major sachu inchi producers (Peru, Ecuador, Colombia, and Thailand).

No specific international trade statistics are available for sachu inchi as there is no separate Harmonized System (HS) classification of goods code for sachu inchi nuts, sachu inchi oil, or sachu inchi powder. Instead, these products are traded under other generic HS codes such as 'other fruit, nuts and other edible parts of plants' (HS code 2008.19), 'other fixed vegetable oils and fats' (HS code 1515.90), or 'other flours and meals of oil seeds or oleaginous fruits' (HS code 1208.90).

However, Peru and the EU have published compiled export data on sachu inchi. Data shows that Peruvian exports of sachu inchi products have nearly doubled from 2015 to 2017. Total Peruvian exports of sachu inchi oil to Europe reached around 46 tons in 2014, accounting for 21% of total Peruvian exports of sachu inchi oil. Exports to Europe, of only oil, had a value of USD\$4.5 million, nearly USD\$22 million globally with an average annual increase of 31% in value since 2011⁶⁴.

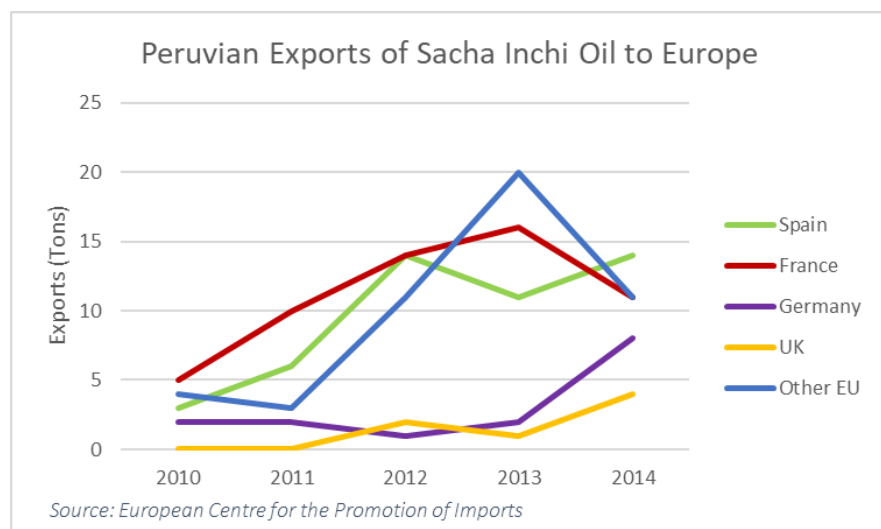
⁶⁴ Exporting Sachu Inchi Oil to Europe, Centre for the Promotion of Imports, 2016



After the demand for sachu inchi oil from the cosmetics sector, the European Union also approved in 2013 the use of sachu inchi for food products. This will probably increase demand further for sachu inchi roasted peanut and powder products. The overall European cosmetics market is fairly stable, estimated at €72.5 billion in 2014. This market grew by about 0.5% from 2013 to 2014. Europe is the largest cosmetics market in the world, followed by the USA, China and Japan⁶⁵.

The spike in consumer interest in both the nut and oil is also visible in the United States and Asia, especially in South Korea where it is considered as novel and functional food. Its allure comes from the fact that sachu inchi is a natural and plant-based source of Omega-3, offering an alternative to fish-based omega oils, a market expected to reach USD\$2.63 billion by 2020⁶⁶.

Currently, Peru is the largest exporter of sachu inchi nut, oil, and powder. Production of oil in Ecuador and Colombia is growing, but their role on international markets for sachu inchi oil is still negligible. Because of the oil's international popularity in both food products and cosmetics, countries outside South America have started cultivating the sachu inchi plant. Currently, a few companies are producing sachu inchi nuts and oil in Thailand, Laos, and Myanmar.



⁶⁵ Ibid.

⁶⁶ Fish Oil Market Expected to Reach \$2.63 Billion by 2020, Nutraceuticals World, 2015

Price

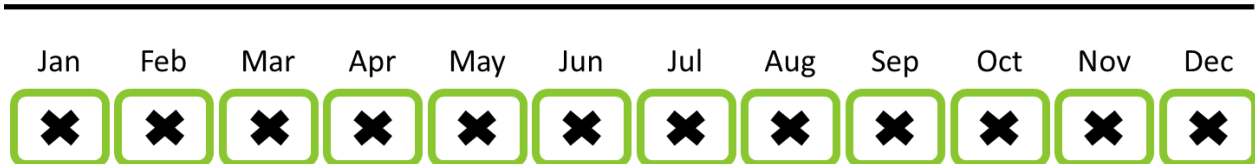
Sacha inchi oil is still a relatively specialty product. Therefore, there is no standard international price for its different products. However, by comparing the value and volume of Peru's sacha inchi exports we can give an indication of export prices. In 2017, export prices for roasted nut varied from USD\$12 to USD\$9 per kg, for sacha inchi oil prices ranged from \$27 to \$16 per kg, and for powdered products export prices varied from USD\$15 to USD\$12 per kg.

Peru's exports to Europe have shown that to achieve higher export prices, producers need to certify their production of sacha inchi, build a marketing story around the product providing buyers with stories, pictures or videos to show the social aspects and ethical production of sacha inchi.

4C.II- Production

Sacha inchi is probably one of the few Amazonian plants with continuous production cycles. The plant harvests fruits every 15 days and has an estimated productive life of 10 years. The fruits are capsules of 3cm to 5cm of diameter, of green color that turn brown/black when they mature. The fruits have a variable number of lobes, usually four or five but it can go up to eight, with seeds inside of an approximate diameter of 1.5cm to 2cm.

Crop Cycle – Sacha Inchi (Expected Harvests)



Sacha inchi is a fast-growing plant if it has wooden stakes or support systems where it can be entangled and grow. With the right support system, it develops a large number of branches and leaves, and after the initial 2 years of growth, it reaches an approximate height of 2 meters. Yields for the first year are expected to be between 700kg and 800kg per hectare. As the plant increases its height, with higher number of branches and leaves, it produces a higher number of fruits. Yields on the second-year reach between 2,000kg and 3,000kg per hectare; and from year 3 to year 10, the plant stops growing in height but becomes leafier with stable expected yields of 3,500kg to 4,200kg/hectare.

Sacha Inchi's Main Characteristics

Factor	
Plant height	190 cm
Elevation	100-1600 masl
Soils	Loam and sandy loam
Required seeds per hectare	4 kg
Nuts per kg	1250
Probability of germination	70%
Planting distance	2m * 3m
Planting density	1666 plants per hectare
Crop cycle	Perennial
Oil content	48%

Source: AgroNegocios de Colombia, 2014

4C.III- Value Chain⁶⁷

1. Terrain Preparation

1.1 Leveling: excess humidity will increase the chances of roots rotting and pest proliferation. Leveling is an important process to prevent the terrain from puddling and generating subsequent problems due to excess water. The terrain does not need to be plain, steep terrains are also suitable for sachá inchi crops, but water needs to be able to flow throughout the crop and not puddle.

1.2 Plowing: sachá inchi does not strictly require mechanized tillage of the soil, however manual or mechanized practices can improve root development. When performed manually, minimum tillage at each planting point will facilitate seed germination, a favorable factor for soils with erosion problems. Mechanized plowing does not need to be extremely deep as sachá inchi plants have relatively superficial root systems, plowing of 30cm-40cm is advisable.

2. Planting and Upkeeping

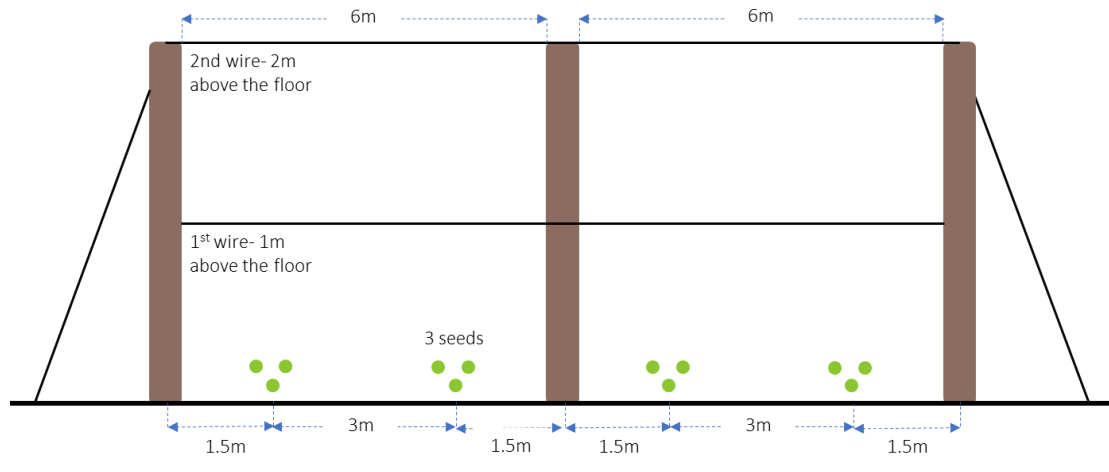
2.1 Stakes: sachá inchi is a climbing plant, therefore, the plant requires support systems where it can be entangled and grow. Stakes need to be of a durable material to last over 10 years (the crop's life expectancy), bamboo or immunized wooden stakes are usually used. Its selection will depend on availability and cost in the selected region.

Stakes are placed 6m apart from each other, each measuring 2.5m (0.5m buried and 2m for the plant to grow up to that height). Two strings of wire are passed through all stakes. One at 1m from the ground and the second one at 2m above the ground. The wire used should be strong and resistant as full-grown plants will support all their weight on the wires for 10 years.

2.2 Sowing: seeds need to be planted at the beginning of the rainy season to guarantee higher germination rates. In terrains with irrigation systems, sowing can be done at any time of the year. Planting points can be 2m-3m apart, depending on soil analysis and fertility. Seeds should be planted at a depth of 3cm, and at least 3 seeds at each planting point in a triangle shape to later facilitate thinning.

2.3 Thinning and replanting: 2 weeks after planting, the first leaves will be visible and a week after the main stem begins to grow. If 3 seeds were used per planting point, removing smaller plants will allow the stronger plant to grow better and yield higher. Only one plant per planting point should be kept. Smaller plants can be replanted in planting points where no seeds sprouted. Once replanted, fertilization will be performed according to the soil analysis and technical recommendations.

⁶⁷ Ayala, G., Análisis de Crecimiento y Producción de 3 Variedades de Sachá Inchi (*Plukenetia Volubilis* L.), en el Municipio de Tena Cundinamarca, 2016



2.4 Trimming: this process is done to shape the plant and achieve a good distribution of branches throughout the wires and stakes. Trimming unwanted branches will facilitate aeration and light distribution increasing production and will also facilitate harvesting and crop management.

There are two types of trimming used in sacha inchi crops:

- Initial trimming: after 60 days of planting, thin and badly formed branches are trimmed. Similarly, branches from the main stem growing below 50cm from the ground are also trimmed. Two main strong branches should be left and guided to be entangled through the supporting system.
- Production trimming: after one and two harvests, branches that are dry, sick and unproductive are trimmed, favoring the re-sprouting of those healthy branches with good production.

2.5 Pastures: the use of pastures, or other crops of cover, avoids the proliferation of weeds and establishes good soil conservation practices.

3. Harvest

Harvesting starts approximately 6 to 8 months after sowing, after the first harvest, the plant does not stop producing. Therefore, the continuous picking must be done every 15 to 25 days, periodicity will depend on plant productivity. The harvest is done by picking only the fruits or capsules that have turned brown/black and still remain in the plant. Seeds that have fallen to the ground should be avoided because these are contaminated and could affect the quality of the lot. Picking of fruits should be done during sunny periods to avoid excess humidity in the seeds.

4. Processing

4.1 Drying and Hulling: sacha inchi thrives in extremely humid environments. Once mature fruits are picked from the plants, fruits need to be left to dry before any processing to minimize moisture content and reduce the risk of microbial contamination. Once fruits are fairly dried, seeds are removed and separated from the hull of the fruits. This process can be done manually or mechanically with the use of hulling machines, there are already specialized hulling machines for sacha inchi.

4.2 Roasting, Cold-Pressing or Grinding: the next processes will depend on the use of the nut. Whether it is to be roasted to be consumed whole as a snack, cold-pressed to extract oil, or grinded to make a powder and be used as a nutritional supplement.

Further processes include deodorizing, as cosmetic companies prefer to use odorless and colorless vegetable oils in their products. However, sacha inchi oil is commonly deodorized by buyers according to their formulas and specific requirements. Also, importers of sacha inchi test for adulteration of the oil with other vegetable oils.

4C.IV- Agronomic Aspects

Sacha inchi crops thrive in environments with high humidity and high temperatures. The plant can be found from 100 to 2,400 masl but ideal and higher yields are achieved in regions up to 1,500 masl. The plant grows fairly fast and requires constant irrigation. Without irrigation systems, the crop requires annual rainfall above 800mm to 3,600mm (1,200mm to 1,500mm is an optimal range), but more importantly than the amount of rainfall is the stable distribution of rainfall throughout the year. The plant grows in humid environments with high temperatures, its resistance goes from 10°C to 36°C, with an optimal medium of 25°C.

Sacha inchi development is determined mostly by temperature and precipitation. However, wind, photoperiod (time exposed to sunlight), radiation, and relative humidity also play a major role in the crop's optimal development. Initial seed development may be strongly assisted by high temperatures and/or long days during the initial months of growth. Optimal photosynthesis processes require abundant sunlight. With low intensities of light and shadows the plant needs a greater number of days to complete its vegetative cycle, flowering decreases and therefore production is reduced.

Pests and diseases

The superficial root systems of sacha inchi plants make it vulnerable to pests such as nematodes or ground worms. If the plant is infected, it can lead to a deficient development and a smaller size and quantity of leaves. To avoid nematodes, it is necessary to eliminate all infected plants and fumigate the soil with standard pesticides. In plots with existing nematodes, crop rotation and deep plowing is used in order to avoid host plants when preparing the terrain.

Common diseases include anthracnosis and other typical tropical and humid environmental diseases. To prevent or combat such diseases, there are plenty of commercial fungicides available throughout Colombia. Rotting of roots is also common due to puddling and excess humidity, good terrain preparation and drainage is required to avoid such problems.

4C.V- Consumption and Uses

- Roasted peanuts: almond-like seeds are found inside sacha inchi fruits. These seeds are known as Inca peanuts and have been used for centuries in a variety of local recipes by indigenous communities. The most popular way to eat Inca peanuts are as healthy snacks after the seeds have been roasted. The seeds are packaged and consumed similarly to macadamia nuts and other specialty nuts.



- **Oil:** after seeds are harvested, these are cold-pressed to extract a clear, pale to dark yellow oil which contains Omega-3, 6 and 9 fatty acids. Sacha inchi oil has a variety of uses from nutraceuticals, cosmetic product categories, and foods as a gourmet oil for salads.

Sacha inchi oil is used as a functional/active cosmetic ingredient in skin humectants, protectants, emollients, anti-aging, and hair products. Functional cosmetics and nutraceuticals are booming markets since consumers perceive natural and exotic ingredients as healthier than synthetic alternatives and can work just as well as. The oil's Omega-3 fatty acids are believed to give skin a youthful look. A growing demand for natural cosmetics holds strong opportunities for sacha inchi oil. Globally, the natural cosmetics market was estimated at USD\$30 billion in 2014 and is expected to grow 10% annually until 2019.

Consumers tend to associate exotic ingredients with the rich biodiversity of the regions they come from, such as the biodiversity of the Amazon or the Andes. Consumers are also increasingly interested in the product's traditional or specific local production processes, which is why cosmetics producers use exotic ingredients in their marketing collaterals.

Omega fatty acids are popular among consumers not only for their anti-ageing potential, consumers see Omega 3, 6, and 9 as something that is good for their health. In food products, Omega fatty acids are already being marketed as being healthy. Now, cosmetics manufacturers are starting to use these associations in their cosmetic products as well. In marketing collaterals at European cosmetics fairs, companies stressed that sacha inchi oil is rich in Omega-3 fatty acids and antioxidants. As examples, they mentioned that it can be used on dry skin, for damaged hair and that sacha inchi oil has both nutritional and cosmetic benefits.

As a food oil, sacha inchi oil is sought after for its pleasant flavor and drizzled over salads, soups and any other warm dish or sandwich, and as an ingredient for dressings. The oil is also often mixed with other food oils (extra virgin olive oil) for Omega-3 and antioxidant enrichment.

- **Powder:** sacha inchi powder can be used in food and nutritional supplements for its nutritional profile (highest in polyunsaturated fatty acids and tocopherol antioxidants), mild flavor and digestibility.

4C.VI- Nutritional Facts

Of all known natural sources, sacha inchi oil has the highest Omega 3 content (48%, higher than fish oil at 30%). Sacha inchi seeds have a higher percentage of unsaturated fatty acids (good fat for the organism) than all known oleaginous seeds used worldwide (soy, sunflower, nuts, etc.).

Sacha inchi has a competitive advantage because of its rare fatty acid and antioxidant composition. Coupled with its interesting marketing story due to its exotic origin and traditional production by local communities in the Amazon, it presents an interesting market opportunity with low risk of substitution.

Composition of Sacha Inchi Oil

Component	Average Content (%)
Omega-3	48%
Omega-6	37%
Omega-9	8%
Saturated fatty acids	7%

V. Risk Management

TerraBlanca believes that risk management is critical to generating dependable and attractive long-term financial returns in the agriculture sector and in financing rural development projects in post-conflict regions. The investment opportunities discussed in this document do not come without risks, but the Fund's structure is intended to allow the team and Investment Committee to identify, track and manage a variety of risk factors.

The RDF employs a multifaceted approach to limit the Fund's exposure to risk. Using this approach, the RDF attempts to mitigate risks at both the project level and the portfolio level. In the event of an unforeseen issue adversely impacting a project in the Fund's portfolio, TerraBlanca's management team and strategic partners collectively have the required knowledge to overcome these challenges or even take on a development or operations role based on their extensive experience managing the development and understanding of projects' operations. The table below presents the five categories in which we analyze and manage risks inherent to our investment strategy.

Development and Construction <ul style="list-style-type: none"> ▪ Site selection ▪ Construction problems and delays 	Market <ul style="list-style-type: none"> ▪ Off-take relationships ▪ International trade dynamics ▪ Market price 	Operations <ul style="list-style-type: none"> ▪ Weather risk ▪ Pest and disease management ▪ Property abandonment ▪ Early lease payment or non-payment ▪ Quality labor and expected yields ▪ Transaction costs and value chain
Livelihood, Social Impact, and Sustainability <ul style="list-style-type: none"> ▪ Access to basic amenities ▪ Family coexistence ▪ Community acceptance ▪ Food safety and product traceability 	Political <ul style="list-style-type: none"> ▪ 2018 elections ▪ Peace agreement implementation and continuity 	

5A. Development and Construction

The ability of the Fund to execute on its pipeline and deploy capital in an efficient manner will be determined by the ability of it and its partners to procure, site, parcel, and construct farms on time and on budget.

5A.I- Site selection

Land procurement and selection can be complex and is influenced by numerous factors, including but not limited to, land availability, geographical location, topography, altitude, climate, soil fertility, road infrastructure, and availability

of basic amenities, education and health institutions. Selecting appropriate sites will be critical to the economic and impact success of the Fund and its supported families. Deployed capital in real estate (land) will be tied up for a considerable amount of time and will be the Fund's collateral during its leasing and agricultural operations, it is estimated that nearly 50% of the Fund's capital will be used in land acquisition.

To help mitigate site selection risks in post-conflict areas for the Fund and its Investors. TerraBlanca has developed a proprietary Land Procurement Due Diligence Process which elaborates on the following points:

- a. Legal analysis: our legal team will procure only formalized and legally registered lands which will be investors' main assets and will secure the investors' ownership rights over those lands during the Lease Terms. Legally registered land titles are required for the Fund to maintain the land as collateral for lease agreements.
- b. Soil and climate analysis: the Fund will perform tests to determine fertility levels before acquiring land plots. This analysis is crucial to determine nutrient content, composition, and other characteristics such as the acidity or pH level and compare those results to the needs and requirements of the selected crops.
- c. Topographic analysis: the acquired land will be later parceled into smaller farming units allocated to individual families. Topography will determine the feasibility of parcellation and the calculation of the total cultivable area to be allocated to families.
- d. Logistics and infrastructure: transportation cost estimates are crucial to determine whether production will be feasible and profitable. These cost estimates will depend on the available road infrastructure, final distance to distribution centers and ports of export, and regional trading and transportation partners.
- e. Access to basic amenities: the Fund will analyze whether the host community is able to provide access to electricity, water, sanitation, education and health services to the relocated families. Relocating tens of families at a time can be problematic if these basic services are not in place, both from a family and host community perspective.
- f. Law and order conditions: the Fund will concentrate its land procurement processes on regions that have experienced diminishing rates of displacements and no conflict-related violent attacks. Talking with host communities and neighbors before acquisitions will provide an on-the-ground understanding of local community acceptability of the RDF project. Our priority is our team's safety, through collective judgement calls we will not expose ourselves or investors' capital in still conflicted areas of the country.
- g. Economic analysis: success of the project depends on the profitability of the business model. Final land acquisition costs must be in a suitable range for the Fund and families to jointly build a sustainable business model.

5A.II- Construction Problems, Cost and Time Overruns

Housing development is estimated to use up to 40% of the Fund's raised capital. To mitigate project-level housing risks, the Fund will invest in prefabricated modular structures that have relatively short construction periods (typically less than 4 weeks) and are easily deconstructed and rebuilt in other sites.

TerraBlanca will source and rely on developers/operators with extensive execution track records of successfully deploying multiple housing units at a time in contracted regions of the country. To minimize the risk of construction quality, delays and cost overruns, the Fund will use guaranteed price construction contracts with defined down payment agreements or payment schedules as certain milestones are met.

5B. Operations

Agricultural production is the main income stream that ultimately support the ability of lessors (IDP families) to continuously service its obligations to the Fund and enable the Fund to make distributions to investors. These agricultural operations are subject to certain risks, including the following:

5B.I- Weather risk

The Fund's rural development and agricultural projects are inherently dependent on weather conditions, and experience frequent weather hazards, such as variation in rainfall, drought, floods, and windstorms. This leads to production quality and yield variations which affects the families' ability to repay debt and to cover essential living costs.

The RDF will implement the following weather risk management strategies:

- a. Crop selection (ex-ante): selecting as main income source a crop like quinoa with a genetic diversity that allows it to adapt to a variety of environments and climatic conditions, different types of soil, humidity levels, altitudes, and temperatures. Allows the Fund to depend on harvests with a wide range of varieties (drought-resistant variants) that are more adaptable and resistant to weather risks.
- b. Rotating crops and intercropping (ex-ante): selecting fast-growing, high-value crops like quinoa and sacha inchi allows families to have at least 2 harvests per year. Rotating quinoa with potato (6-month crops each) gives families two potential income sources per year, and with quinoa being prioritized, farmers have twelve months to have a successful quinoa harvest and withstand weather conditions (one successful quinoa harvest per year should be sufficient for families to pay their lease payments and have a decent livelihood). Sacha inchi allows intercropping for families to diversify income sources.
- c. Low initial input investment (ex-ante): low initial investment in seeds and fertilizers allows families to easily replant if weather conditions destroy their crops in initial stages. Timely replanting efforts allow families to have at least one successful harvest per year.
- d. Incentivize saving (ex-ante): after produce is collectively sold to institutional buyers, the Fund needs families to open bank accounts for an easy income distribution. By having families in the financial system, the Fund incentivizes and will communicate the need of financial inclusion and saving that will allow families to endure periods with no substantial income.
- e. Site selection with water sources (ex-ante): communities collectively mitigate weather risks with irrigation projects and conservation tillage that protects soil and moisture. Sites with adequate and year-round water sources will allow communities to bear low-rainfall or drought seasons.
- f. Private insurance markets (ex-post): providing weather risk management mechanisms, like crop insurance, is an up-and-coming business for formal financial institutions in Colombia and throughout emerging

economies. While current policies on the market provide at best partial coverage and lack of lists of acceptable forms of collateral, formal financial markets are developing to fill these gaps. The Fund will follow market trends and developments in the space, and where appropriate, will require families to manage exposure to weather risk by acquiring relevant crop insurance policies if available and economically accessible.

- g. Seeking off-farm employment (ex-post): seasonal migration to change labor allocation (working in non-farm businesses in nearby towns) will allow family members to diversify their income sources during extreme weather periods. Site selection in thriving communities or nearby major cities will be important for other family members to find other sources of income.

5B.II- Pest and Disease Management

The expected yields and productivity per family may be influenced by the efficiency of their pest and disease management. The established Impact Farming company, part of the RDF structure, will not only cultivate alongside families to share farming techniques to improve yields and scale production, it will also establish rigorous pest and disease management protocols to assure families effectively control potential infestations and outbreaks.

A deep understanding of the causes and effects of the main pest and diseases affecting our selected crops will allow the Impact Farming company to successfully communicate effective methods and protocols to IDP families. TerraBlanca has made relevant networks with private and public institutions with extensive experience with pest and disease management protocols across crops and climates in Colombia. The Fund's team members will routinely visit Fund-invested fields to monitor strict adherence to protocols.

Conventional farming may be less prone to pests and diseases than the use of organic agriculture methods. The Fund will initially focus on and master conventional farming control protocols before exploring organic opportunities. The Fund's objective will be to achieve higher returns on invested capital while sustainably source produce. Therefore, organic methods and certifications will be explored, and most likely, implemented once our Impact Farming team and IDP families are comfortable with the change in practices.

5B.III- Property Abandonment

It is possible for relocated IDP families to abandon the RDF project and their properties at any point in time from the lease acceptance to the formal transfer of land ownership. Lease agreements do not impose financial obligations on the families, but after making initial payments, families are less likely to leave the project because of the land ownership transfer promise and the already invested capital by the families. Property abandonment might occur in the first months or years of operations, but this will give the Fund more time and chances of finding new families to take up the abandoned plots.

To mitigate these risks further, the Fund's Family Selection Process (described in section III. Investment Strategy 3.B Building a Sustainable Supply Chain) establishes that families will only receive leases on fields in the same geographical regions or with similar climate conditions as their place of origin or displacement to have better adaptation and higher attachment to the land and region. Also, only families with agricultural experience will be selected, individuals with previous farming experience are more likely to understand the intense long-term labor commitments that the RDF's business model entails, lowering the risk of property abandonment.

To increase families' attachment to the property, the RDF establishes that 80% of farmable land will be allocated to grow the Impact Farming company's selected crop and the other 20% will be free for families to grow what they wish. More than the income diversification argument, this point is also introduced to decrease the risk of non-payment and abandonment.

Diversifying the amount of families is also critical to mitigate property abandonment risk. The Land Project Company will procure to reach as many families as possible, after meeting the "Minimum required land for a decent livelihood" threshold per farm. On the opposite, by concentrating more land in fewer families, the Fund would have a higher risk of non-payment and property abandonment.

5B.IV- Early Lease Payment or Non-Payment

Fixed-income instruments, including the rural lease agreements deployed by the RDF, have default and prepayment risks. As with property abandonment, defaults might have higher chances of occurring during the initial months or years of operation, this will give the Fund more time and chances of finding new families to take up the abandoned plots.

On the other hand, prepayment happens when families pay-off their lease obligations earlier than the maturity date. Meaning investors are fully compensated and paid but receive lower yields than initially expected. When principal is returned early, investors will not receive future interest payments on that part of the paid principal.

As the RDF is an innovative financial structure with no previous projects, TerraBlanca cannot provide investors with expected default or prepayment rates. However, using microfinance experiences as proxies, default rates in loans provided to low-income families are usually the lowest within the financial industry⁶⁸.

5B.V- Quality Labor and Expected Yields

Targeted families by the RDF will be displaced families who used to be smallholder farmers previous to their displacement or victimizing event. To have quality labor, TerraBlanca's Family Selection Process will ensure that families have the required agricultural experience. No specific crop experience or knowledge will be required. However, individuals with previous farming experience are more likely to understand the intense long-term labor commitments that the RDF's business model entails. Non-farmer families might be initially willing to apply for a lease but are unlikely to understand what they are required to commit to nor have the required skills to work on the fields for the entirety of the lease term.

Additionally, for families to achieve the expected yields per hectare, the Impact Farming company will cultivate alongside families to share farming techniques to improve yields and scale production. TerraBlanca has made relevant networks with private and public institutions with extensive experience developing training and development programs at every level. Combining this with the families' own knowledge and farming experience, the Fund will have access to a unique and highly qualified community of experienced farmers.

5B.VI- Transaction Costs and Value Chain

The Fund aims to build sustainable business models in post-conflict regions. These areas are sometimes hardly accessible making logistical and transportation costs extremely high, compromising the profitability of the model. To

⁶⁸ Default Rates in the Microfinance Industry, Penn Microfinance. 2016

mitigate these risks, TerraBlanca's proprietary Land Procurement Due Diligence Process ensures that the Fund has fully estimated and understands the logistics and infrastructure implications of any investment. Transportation cost estimates are crucial to determine whether production will be feasible and profitable. These cost estimates will depend on the available road infrastructure, distance to distribution centers and ports of export, and regional trading and transportation partners.

5C. Market

The RDF's holistic market-based approach aims to help our farmers and organization remain financially sustainable. However, our business model success depends on the Fund's ability to grow and sell produce in open markets with changing supply/demand levels and market prices. The Fund's business model has the potential to fundamentally improve the risk profile for agricultural investments in post-conflict areas, TerraBlanca intends to mitigate market risks as follows:

5C.I- Off-Take Relationships

Demand-side relationships with large international importers of Andean produce (quinoa, sachu inchi, among others) will materially reduce the Fund's exposure to market risk while still provide exposure to long-term increases in land value and commodity prices. TerraBlanca has made initial contacts and developed relationships with prospective buyers and partners to secure letters of intent ("LOIs"). Conversations are in varying stages of discussions and negotiations but for the types of crops intended for this fund, which are specialty, spot-market, and climate dependent commodities, LOIs are usually made only 3 months before harvest.

All such agreements will be a priority during the entirety of the Fund Term and will be procured by a dedicated Business Development team from the Impact Farming subsidiary. We believe that the Fund's strategy of ag-finance supplemented with these relationships and long-term contracts will provide greater certainty of revenues from both lease payments and produce sales.

5C.II- International Trade Dynamics

To obtain higher prices for the Fund's produce, the RDF plans to export the entirety or majority of its harvest to high-value overseas markets. Exporting agricultural products intended for human consumption undergo strict health and sanitary regulations and other checks with a variety of local and international authorities. Our team members have had experience successfully exporting agriculture and food products.

Currently, Colombia's exports of quinoa and sachu inchi are exempt from tariffs tax in major markets. US and EU markets as a result of the tariff preferences granted under the ATPA (Andean Trade Preference Act), the United States of America-Colombia Free Trade Agreement, the European Union-Colombia Free Trade Agreement, and the EFTA-Colombia Free Trade Agreement. The Fund will stay up-to-date on all relevant changes to existing or new trade agreements between Colombia and other markets.

5C.III- Market Price

Both quinoa and sachu inchi are considered relatively specialty products. Therefore, there are no standard international prices and do not trade in commodity exchanges. Prices fluctuate mostly according to international supply and demand levels. However, prices also depend on factors such as product quality, conventional or organic certifications, transportation costs, among others.

Also, as in many other value chains, middlemen are inevitably involved in marketing and distribution channels, making most of the profit. TerraBlanca intends to reduce the price gap through its Impact Farming subsidiary, securing off-take agreements and relationships with institutional buyers. For the selected crops, LOIs are usually made only 3 months before harvest and no forward contracts exist in established financial markets.

5D. Political

Political stability in Colombia has been tied, in large part, to the country's armed conflict. For decades, political periods were defined by the conflict's evolution and the Peace Agreements are no exemption. Colombia faces presidential and congressional elections in 2018, and although the RDF does not benefit nor dependent on any way from the Agreements, Colombia's political stability is a risk factor to consider carefully.

5D.I- 2018 Elections

Despite political uncertainty related to elections in 2018, there is significant momentum across many national and sub-national actors to commit to rural development, open-markets policies, climate change mitigation, and victims' compensation and land restitution (e.g., carbon tax, post-conflict rural development financing).

The next president's agenda could potentially benefit or affect the Fund's projects. However, no presidential candidate has talked about ending the Peace Agreements with FARC. Ivan Duque has mentioned his intentions to modify part of the Agreements and has significant chances of winning. However, his free market and investor-friendly postures gives TerraBlanca the security to continue its project under his eventual mandate. Similarly, TerraBlanca believes that Colombia's new post-conflict scenario will allow the RDF to operate and succeed under any of the candidates currently running for the presidency.

5D.II- Peace Agreement Implementation and Continuity

Social, economic, and humanitarian problems will not disappear because an agreement was signed. These challenges will continue and must be dealt with in the post-conflict period. More than a year after the peace deal, despite the group's demobilization, there are regions where pockets of violence persist, in some regions violence has diminished but in others it may have intensified. The Pacific region is particularly affected due to its geographical advantages for international drug cartels to illegally send its products to Central America and Mexico, where it later finds its way to North American markets.

Investors must understand that a signed peace agreement with the FARC, won't automatically spell the end of violence in Colombia. Although the FARC played a main role in the conflict's most intense chapters, being the largest and most organized rebel group, it is only one of other organizations fighting against the Colombian government. The ELN, another leftist insurgent group, and second largest group by number of combatants, has been courting the government for peace negotiations, which have been on and off since 2017.

The Fund will concentrate its land procurement due diligence on the regions that have experienced diminishing rates of displacements and no conflict-related violent attacks. Our team is on the ground, and our priority is our own safety, through collective judgement calls we will not expose ourselves or investors' capital in conflicted areas of the country.

5F. Livelihood, Social Impact, and Sustainability

The Fund is committed to investing in projects that create sustainable business models for investors and IDP families in post-conflict regions while delivering produce that is wholesome, safe, fresh, and highly resource efficient. Livelihood, social impact, and sustainability addresses the risks surrounding the ability of the Fund and its subsidiaries to meet expectations from families, host communities, off-take partners, and end consumers while simultaneously enhancing Fund economics.

Sustainability is also not an endpoint; it is a way of thinking that continuously evolves and within which TerraBlanca continuously learns. The RDF will manage the sustainability profile of the Fund through strategies that may include the following:

5F.I- Access to Basic Amenities

Relocating tens of families at a time can be problematic and unsuccessful, both from a family and host community perspective, if basic amenities such as readily available water, electricity, sanitation, education and health services are not in place.

TerraBlanca's proprietary Land Procurement Due Diligence Process ensures that the Fund has fully estimated and understands whether the selected land and host communities are able to provide the relocated families with the basic amenities they require before relocation happens. The Fund will estimate the cost, logistics, and infrastructure implications of any investment. When possible, the Fund will also analyze the feasibility of utilizing Pay-As-You-Go solar panel systems for each individual home and family, or other renewable energy business model readily available in our operating zones.

5F.II- Family Coexistence

Building communities and harmonious living conditions with tens of coexisting families will be challenging. This is especially relevant when IDP families are the subject of the development program. IDPs have endured through innumerable poverty and conflict-related challenges. However, the complexity of the situations faced, have forced and proved IDPs to be extremely resilient and adaptable.

To procure harmonious convivence between families and neighbors, the Fund has developed an initial Manual of Conduct template with straight-forward and simple behavior rules. This Manual of Conduct will be required to be signed, alongside the lease contract, by each family and will entail conduct responsibilities by everyone living or working in the RDF's properties. Subsequent versions of the Manual of Conduct will be drafted collectively with families to ensure harmonious convivence and strong and supportive communities are collectively constructed.

5F.III- Community Acceptance

Host communities might be reluctant and constrained to host RDF's projects. The Fund will, when possible, include local communities in its value chain to increase economic activity and revitalize rural communities. International experiences show that hosting IDPs/refugees is a way for a remote place, long neglected by the government and private sector, to get noticed. The RDF's IDP communities will boost local businesses and act as a magnet for foreign aid. TerraBlanca will work to help the host community see their new neighbors as a benefit, not a burden.

5F.IV- Food Safety and Product Traceability

Sustainability of the RDF's business model depends on constant and long-term off-take agreements with international buyers. The Fund's produce needs to align with fundamental shifts in consumer habits searching for healthy value-added products with high nutritional value, traceable and safe production.

The Fund will seek that families pass mandatory off-take audits. Off-take partners will be encouraged to visit the RDF's properties to check any social, environmental, and food safety requirements to comply with their standards as well as those of leading industry retailers and food service entities.

VI. Next Steps





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