

**CHOCOLATE
MAKERS**

**COMMITMENT
& IMPACT
REPORT
2024**

planet-loving deliciousness



Our mission: Making unique and delicious chocolate that restores our planet bit(e) by bit(e).

More than 10 years ago we have chosen chocolate as the vehicle to bring about necessary and lasting change for **cocoa farmers**, our **climate** and **biodiversity**. Being heavily involved in all three areas, we have learned a lot in those years. That each of these three areas is under greater pressure today than ever before. That in a system of capital we need companies to grow only as fast and as much as their positive impact grows. That we need to talk more about the way we do things to help others do the same. Hence this report.

We adjust as we go and we let go of things that are no longer in line with our mission or serve our purpose. This report is therefore fluid as in that we might commit to more tomorrow. However, when it comes to our ideals we are as rigid as can be. We will never compromise on our ideals.

We make chocolate. While that covers what we do and what we sell, it's the why and how we do it that matters. Founder Rodney moved from theory to practice many years ago.

// My background is in tropical agriculture. I have carried out projects in production countries to provide farmers with a better life through trade for many years. First in coffee, then in cocoa. I worked on, among other things, certification processes where we helped farmers to improve the quality of their cocoa bean.

After years of working on all kinds of projects, my then business partner and I thought: wouldn't it be better to become part of the chain ourselves, instead of telling people on the sidelines how things should be done? There was no one making real chocolate in the Netherlands anymore, and we thought it would be fun to bring that back. //



Rodney with the cocoa farmers in Peru

We did bring it back. From a very basic setup and limited production with cocoa from one origin we are now working with 6 different countries of origin. From a small garage in the north of Amsterdam, we moved to our current solar powered factory in 2019. Some one million bars left our factory last year, prognosis: growing rapidly.

Farmers, climate and **biodiversity** are at the forefront of everything we do. But bear in mind, we are no NGO. We don't rely on funding or donations. We are a profitable and growing company, and we think that is important for our mission. The more chocolate we sell, the more cocoa beans we will order. Our growth is the farmers growth since we pay them a fair price for their cocoa. It is their win, nature's win and climate's win. That's why we are so focused on taste and on quality. Delicious chocolate sells a lot better. Growth focused systems are destructive if the growth is simply financial and distributed to shareholders. If growth is directly linked to farmers and climate, we all win. We have always been organic, we have always paid our farmers a living



The factory with its solar panel roof. 2019

income, and we make the sustainable choice wherever we can. Why that is necessary and what that means is what we dive into on the pages that follow. This is no static report. Our way of growing, innovating, solving, approaching and adjusting is dynamic and fluid. We might add to this report tomorrow. We might learn something

and adjust course in a week. What isn't fluid are our ideals. We haven't compromised on a single one of them, and we won't do that in the future. The cocoa farmers' lives, our climate and protecting and restoring biodiversity are constantly on the forefront of our minds and inform everything we do.

Our countries of origin

We don't order cocoa beans on the global market or through distributors. We work directly with farmers and farmer cooperatives in all origins and have relationships with them that sometimes go back a decade. The timeline of our relationships in different regions is growing steadily.

Our journey started with a first bag of cocoa beans from Congo in 2011. A try out, to see if we would succeed in making chocolate worth eating. At the moment of writing this our Sierra Leone bars have just been put on shelves in organic supermarkets. Sierra Leone is the 6th origin we work with.



12 years of making chocolate
6 countries of origin
6 farmers cooperatives
Representing 16.000 farmers
Protecting 5 main biodiversity hotspots
Always 100% organic



(Guilty) Pleasure

We make chocolate. For the not yet informed, chocolate seems abundant. It is everywhere, in everything, and obtainable for very little money. We trust in chocolate for treating ourselves and others. It embodies positive emotions and is a symbol of pleasure. That pleasure however, is often a guilty one.

Today's cocoa chains are full of major systemic issues. Modern slavery, child labour, deforestation, biodiversity loss on a massive scale and extreme poverty are some of the pillars the chocolate industry is built upon.

Chocolate is a huge industry with an even bigger impact. The global chocolate market size in 2022 was about \$127.7 billion. Prognosis: growing. Each year, the world consumes close to 3 million tons of chocolate and other cocoa products. Demand: growing.

The regions where cocoa is grown aren't the ones where chocolate products are consumed. While Europe and North America are the biggest chocolate consumers, the

producing countries are mainly Africa and South America. About 70% of the world's cocoa comes from West Africa where most of the farmers are too poor to ever dream of being able to afford a bar of chocolate themselves.

Chocolate used to be a luxury product. But with the addition of cheap sugar, the development of higher yielding monocultures and exploitation of farmers and workers it has been degraded to a dump price product, often under 1 euro per bar. The price for this is paid by the farmers, our climate and nature. Let there be no confusion: the major players in the chocolate industry have created the market that has been the primary driver behind the deforestation and destruction of forests.

We like to think that if people would know, they would make better choices in the supermarket. So please, read on.

On the bright side, we are happy to report that it's not impossible to change the farmers' lives for the better, to restore dead farmland and to minimise our impact on the climate. Our farmers are doing well, so is their land, and so are we. Read on to learn what we're doing, why, and how.



The commodity cocoa industry is devastating for humans...

The plantations are small, yield is low, the price of commodity cocoa is structurally low and the average family size is large. Extreme poverty is the result.

More than 2.5 million children work in cocoa farming and do physically demanding work or handle hazardous substances such as pesticides.

The children working on the plantation can not go to school and pursue education. Which maintains the status quo for the next generation.



... and the planet

Cocoa is a deforestation-driver in every country where cocoa is grown. Nature is sacrificed for plantations and native forests are destroyed.

Biodiversity is irreparably destroyed because plantation monocultures are, by definition, not biodiverse.

The used pesticides and fertilisers are an enormous threat to people and nature.





Our focus are farmers, climate and biodiversity.
All three areas can be positively and lastingly
impacted with cocoa.



FARMERS

CLIMATE

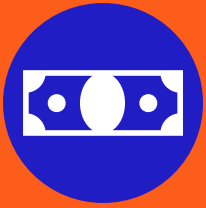
BIODIVERSITY

FARMERS



FARMERS

More than Fairtrade



We pay more than Fairtrade. We pay farmers a living income.



No child labour. When we can solve a problem with money, we do it.



We help provide education and training. Knowledge empowers people and improves the quality of the cocoa.



Adding value through local processing. We make the farmers part of the value chain.



Living income, what is it?

One thing is important at the start of this chapter. How much you pay for a ton of cocoa beans and how much of that money actually reaches the farmer can be two very different prices. Certain government structures, long chains, many middlemen, etc. are all factors that reduce the amount paid to the farmer. Cocoa is the main ingredient in chocolate and is directly linked to the living conditions of farmers around the world. How does this work and what is the Chocolatemakers' approach?

The world market price

Commodities such as oil, cocoa and coffee are traded on two major exchanges. Prices on the Intercontinental Exchange in London (ICE) are the result of global supply and demand. Weather, political unrest and changes in the standard of living in the countries of origin can all affect the global supply of cocoa and therefore the international price of cocoa. Historically, the cocoa market has traded at around \$2.4/kg of beans.

Farm gate price

Cocoa farmers don't get paid the international price, but the "farm gate" price, which is between 50% and 80% of the international market price. In the two major producing countries (Ghana / Ivory Coast, which account for 60% of global supply), farmers receive the lowest farm gate price, which is set by the cocoa boards of these countries. Historically, farmers have received around \$1.2-1.5/kg.

Fairtrade minimum price

Fairtrade guarantees that a minimum price will be paid, even if the international price per ton is lower. It does not focus on the price paid to farmers, which explains why so many Fairtrade farmers live in poverty. A Fairtrade price is an important safety net. But it is not enough to send their children to school, reinvest in their farms, pay for healthcare and do all the things we in the chocolate-consuming world think are normal. Why not?

The price of living

Many people are unaware of the gap between Fairtrade and Living Income, which is the annual net income required by a household in a given location to provide a decent standard of living for all members of that household. The net annual income required for a household in a particular place to afford a decent standard of living for all members of that household.

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Elements of a decent standard of living include: food, water, housing, education, healthcare, transportation, clothing, and other essential needs including provisions for unexpected events.

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Definition of a living income by the Global Living Wage Coalition

Living Income Price for Cocoa

Based on our experience and research, we have estimated that a living income price for cocoa starts, depending on the country of origin, at \$3.60 and \$4 per kilogram of cocoa beans, with 80% going to the farmer as payment and the remaining 20% going to the cooperatives for quality control, training and logistics.

We discuss the price needed to pay a living wage with our suppliers, and rely on and trust their input, so the figures below are not set in stone, but given as an example snapshot in time. Different regions require a different amount per kilo of cocoa due to different production costs and socio-economic circumstances.

Congo \$3.80/kg

Dom Rep \$3.85/kg

Peru \$4.20/kg

Colombia \$4.50/kg

Sierra Leone \$4,-/kg

Brazil \$6,-/kg

Why are we paying this?

Paying a living wage is directly related to child labour. Parents don't want to send their children to work rather than to school, but they have to

because they earn so little that they can't run their farm without the extra help of cheap child labour.

A living wage, or living income, means they can provide for their families, just like parents in chocolate-consuming regions.



During regular visits to the cooperatives (pictured: NorAndino in Peru) we speak with the farmers about the harvest, the production and conduct surveys to determine if the current living income needs an update.

Child labour, hazardous work and the case for organic farming

With the previous chapter on livelihoods in mind, a walk to the supermarket becomes a different experience. The children of the parents who supplied the cocoa beans for a €1 bar of chocolate are certainly not going to school. They have been involved in growing and harvesting the cocoa and supporting their families. It is *not* a cultural preference to make children work instead of sending them to school. It is *not* greed on the part of the parents. It is often the only way a family can survive. In some cases, a person earns as little as \$0.78 a day. They would send their children to school if they could afford it.

Children helping out on the plantation need not be a problem. Farms can be places where the whole family is involved in some way. As soon as it prevents them from going to school because the family depends on their income, it becomes a problem. And when the work harms those children. And when the type of work the children do is physically exhausting or hazardous, and is within the category of worst forms of child labour defined as hazardous work by the ILO as "*work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children*". Research shows that within this

category the "Application of Agrochemicals (pesticides)" is the big elephant in the room.

Organic cocoa is the best way to prevent child labour. Why is that? The most dangerous work children do in the cocoa industry is spraying dangerous chemical pesticides. By definition, organic cocoa farming excludes and prohibits the use of agrochemicals. This is verified at several levels, starting at the farm level through the internal inspections that cooperatives carry out as part of the certification programme. If companies really want to prevent child labour, being organic is a must, it all starts there.

Preventing child labour is one of the reasons we have chosen to work with farmer cooperatives. These cooperatives have rules and procedures in place to prevent and control child labour, which they strictly adhere to.

Cocoa has the power to support families and provide a happy, normal childhood. Used wrongly, it can do the opposite. Think of these children and families the next time a product seems too cheap to be true - it probably is.



Education and skills training. Organised farmers result in higher cocoa quality.

We buy directly from cocoa farmers' cooperatives and associations instead of anonymous trading houses. Cooperatives where farmers actively participate in the day to day management of their coop including training of their members to support healthy farms, good yields and quality cocoa.

The cultivation of organic and biodynamic cocoa is an art in itself, farmers are trained in organic compost preparation as well as soil improvement and crop protection through organic farming techniques. The cooperatives also train farmers in the fermentation and drying of the cocoa beans to the highest quality standards required for specialty chocolate.

A healthy farm with a good yield and high quality cocoa provides a decent income for the farmers and their families, a win-win for all!

SIERRA LEONE

The country had a vibrant cocoa sector before the civil war and social unrest of the 1990s. During this time the cocoa sector collapsed and has only begun to revive in recent years. Village Hope was set up to bring hope to rural communities through cocoa, and has worked closely with us to provide cocoa farming support to rural communities, including training in organic farming. The cocoa is collected and fermented under the supervision of Village Hope to ensure the highest possible quality.

CONGO

Cocoa is being promoted in the Kivu region of Virunga National Park, home to the last remaining mountain gorillas. When cocoa was introduced to the region, farmers were trained in cocoa cultivation, proper harvesting, fermentation and drying. The land is known to be very fertile and produces a good, healthy crop. Training is provided through a *farmer field school* approach, where farmers share knowledge and experience.

COLOMBIA

In the Santa Marta region of Colombia, women took over the coffee plantations during the civil war and began running the farms and cooperatives. The region is known for its unique cocoa varieties with interesting flavour profiles. CooAgroNevada trains farmers in cocoa cultivation, harvesting, fermentation and drying.

PERU

NorAndino is a farmers' cooperative covering coffee, raw cane sugar and cocoa. Operating from the Sierra (Peruvian highlands) to the coast and towards the Amazon, the farmers are organised at village level, using existing social structures. Within and between the farmer groups, they are trained in sustainable production practices and cocoa bean processing (fermentation and drying). This is gradually moving towards centralised fermentation for optimal quality control throughout the process, ensuring the highest possible quality and consistency of premium cocoa for speciality chocolates.

DOMINICAN REPUBLIC

Conacado is a well-known farmers' cooperative with a nationwide presence throughout the Dominican Republic, which collects cocoa from its members and takes it to central fermentation centres (known as bloques), where fermentation is controlled according to customers' requirements.

BRAZIL

In the Atlantic Forest of Brazil, cocoa is grown in a traditional agroforestry system called cabruca cocoa. It is known for its wide variety of tree species and the stratified structure of the farms. The Cabruca Cooperative shares knowledge among its members about biodynamic cocoa farming, where soil quality and fertility are guided by the cycles of the moon and the sun. The cooperative supports its members with finance, training and market access.

Becoming part of the (short!) chain

Extracting resources from developing countries without involving the people of those countries in the value chain is colonialism. Without the hard work and agricultural skills of farmers, there would be no delicious chocolate. Their work has a huge impact on taste and is invaluable to the whole chain. Keeping them small and dependent is an unethical way to make chocolate. Unfortunately the commodity cocoa industry is characterised by long chains that leave farmers with little to nothing. Our short chains, direct trade and living wage system ensure the farmers' ability to grow, reinvest and prosper. This should be the standard everywhere.

Peru

In Peru, we have been able to go one step further. Working with the NorAndino cooperative, we helped build a professional chocolate factory. Ten times larger than the Chocolatemakers factory in Amsterdam.

What does that mean for the farmers, the region and the cocoa?

First and foremost, it means that farmers are now part of the value chain. They don't only sell the raw material, they can now produce their own cocoa liquor, a semi-finished product that is bought by chocolate companies around the world. The cooperative trains the farmers in everything they need to know to work more safely, increase their yields and protect the ecosystems on which they depend so much. The training they currently offer their nearly 5000 members includes:

- Agroforestry systems coffee
- Agroforestry systems cocoa
- Carbon capture

Cooperativa Agraria NorAndino Ltda. was founded in 2005 and is made up of more than 7000 smallholder cocoa, coffee and panela producing families. The NorAndino Cooperative was created to help smallholder families move towards sustainable and diversified cocoa-agroforestry systems, and to help them diversify their incomes so that they are less dependent on one source of income. It specialises in climate change adaptation - a pressing issue for farmers who are already and will continue to be severely affected by climate change.

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It is really their factory and that is unique. This development in the collaboration with NorAndino is a next step in fair distribution within the cocoa industry and more independence for the cocoa farmer, the next step is that they will produce not only the cocoa liquor but also the chocolate.

Rodney Nikkels, Chocolatemakers

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CLIMATE



CLIMATE

Cooling the planet



Measuring and reporting of emissions



CO2 binding shadow plant agroforestry



Solar powered factory



Sailed and biked cocoa and chocolate

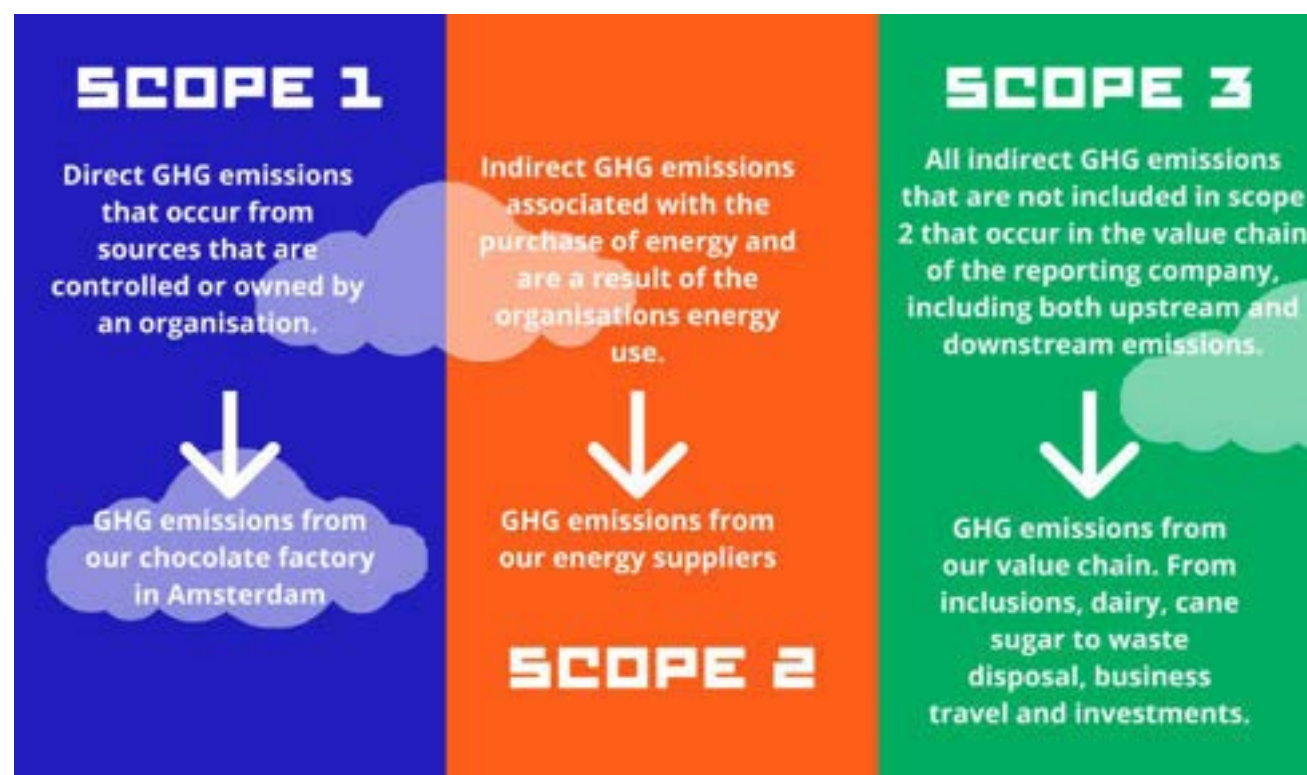


Our emissions

We all know that **greenhouse gas (GHG) emissions** cause climate change. To stay within the 1.5 degree limit, international bodies have agreed that global greenhouse gas emissions must be reduced by 85% by 2050. This is a huge challenge because it means a total ban on deforestation, very low emissions from agricultural production, little or no emissions from transport, shipping, storage, processing etc, combined with the use of renewable energy at all levels.

Scopes 1, 2 and 3

To assess the GHG emissions of our products and processes, we use the GHG Protocol Corporate Standard, which classifies a company's GHG emissions into three 'scopes'. Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting organisation. Scope 3 includes all other indirect emissions that occur in a company's value chain.



Our ambition: Removing GHG from the atmosphere.

We are and have always been doing a lot. We are aware that we are at the top of the list of companies that do everything they can to minimise their emissions. However, we continue to aim higher. If we remain the only ones doing this, it will never be enough. We want to inspire more companies to do the same and want to be of help and share our experiences and knowledge. As we are borrowing the planet from future generations we need to clean the place up. Reducing and avoiding emissions is not enough, we will also have to actively develop products that are net positive, meaning that they are actively **removing GHG from the atmosphere.**

Since the start of Chocolatemakers, we have been aware of these challenges and have made choices in our value chain, transportation, processing, packaging and waste management. For us, a key driver of impact is the growth in the volume of chocolate we produce and sell, and we need to be sure that our foundations are solid when we plan to grow and expand our operation. We have therefore put ourselves to the challenge of producing a full GHG report.

Read on to learn everything about our scope 1,2 and 3 emissions.

Scope 1 & 2

Chocolatemakers in Amsterdam

In 2019 we built a new factory at Radarweg in Amsterdam. This is where all our operational and production activities take place. It is a 2000 m2 site, half of which is used for the bean-to-bar chocolate factory, with a roof made of solar panels. This allows us to generate electricity during the day, all year round. We have also installed an underfloor heating and cooling system.

Scope 1: Direct emissions

Natural gas combusted

In 2022, we reduced our natural gas consumption to 1500 M³/year by switching off all heating in the building. The only remaining source of natural gas is the cocoa bean roaster (Sirocco 400). In 2022 we conducted 300 roasts. This natural gas is also purchased as green gas, with the GHG emissions offset by reforestation and deforestation prevention projects in Uganda (Kibale National Park) and Brazil (Amazon forest).

Scope 2: Indirect emissions

Electricity consumed

In 2022, we consumed a total of 130MWH, of which 92MWH was generated in-house and the remainder was purchased from our energy supplier, Green Choice. As we purchase Green Energy from renewable sources (wind), the GHG emissions for this part are also zero.

Scope 2: Indirect emissions avoided

Energy produced.

Our solar panels produced a total of 95 Mwh in 2022. This production takes place mainly during the day between April and October. What is consumed at night is bought back from the grid.

Energy production and consumption 2020-2023 (Mwh)

| Mwh | 2020 | 2021 | 2022 | 2023 |
|---------------------------------------|--------|--------|--------|--------|
| Electricity consumption | 121 | 150 | 150 | 130 |
| Electricity production | 92,3 | 89,5 | 95 | 92 |
| Net electricity consumption (Mwh) | 28,3 | 60,5 | 55 | 38 |
| Gas consumption (M ³) | 2500 | 2500 | 1500 | 2250 |
| Total GHG scope 1 (TCO ₂) | 4,450 | 4,450 | 2,670 | 4.005 |
| Total GHG scope 2 (TCO ₂) | 10,471 | 22.385 | 20.350 | 14.060 |
| Total volume produced (MT) | 60 | 70 | 105 | 95 |
| GHG / kg produced | 0,25 | 0,38 | 0,22 | 0,19 |

We grew, and so did our impact. Or to put it in GHG terms: we grew, and our GHG emissions shrunk significantly.

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Reducing and avoiding emissions is not enough, we will also have to actively develop products that are net positive, removing GHG from the atmosphere.

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Rodney Nikkels, Chocolatemakers

Reduction Scope 1 & 2

Energy Efficiency

We try to be smart wherever we can. We have learned that taking a little more time to weigh different options helps a lot. And that initial green investments in our building are mostly earned back quickly. The reduction measures currently in place:

Heating and cooling

We have underfloor heating that can be connected to a heat reservoir (in winter) or a cold reservoir (in summer). We have not connected this yet due to budget constraints.

We heat our offices and production areas with electric heat pumps, which are much more efficient than the traditional hot water system based on burning natural gas.

Lighting & movement detection

All the lighting in the factory is LED and consumes very little energy. Because of our semi-transparent solar panel roof, large windows and transparent doors we don't need much lighting on most days as natural sunlight comes into the building. This gives a very spacious feeling and a pleasant working atmosphere as opposed to many factories that depend on artificial light sources. Our LED lighting is also adjustable, we use it depending on the weather conditions and cloud cover. With motion detectors in many rooms the lights switch off when no one is in the room, saving a lot of energy.

Machinery

We have invested in energy efficient chocolate making equipment. We refine the chocolate with ball mills and conch the chocolate with a batch liquid conch. The combination of the two results in a 40% energy

reduction compared to traditional roller refining and rotary conches. This is reflected in our overall low energy consumption per kg produced.

Company vehicles and travel

We encourage our employee's use of public transport and bicycles by paying the full cost of public transport. Employees who live in the Amsterdam area commute by bicycle. We travel as little as possible when visiting producers and clients. We use Google Meet for meetings and Arcgis for remote sensing when we need geographical information from the plantation. Whenever possible we travel by train, also (and especially) long distance.



Our solar roof factory in the Amsterdam cocoa harbour.

Reduction Scope 1 & 2

Energy reduction measures 2024-2028

Although the little energy we do buy is considered 'green', we want to be autonomous in our energy consumption, i.e. to consume what we can produce ourselves. During 2023, we have commissioned a study with the aim of being able to grow fourfold (in line with our business plan from 2 million to 8 million turnover), while remaining within the limits of our energy production. This will require the following adjustments:

Roasting

From high temperature natural gas to low temperature hot air roasting where the first nibs are produced and roasted. The output from the roaster (hot nibs) can be ground directly into cocoa liquor, avoiding the need to cool, sift and heat the nibs.

This would mean replacing the antique Sirocco batch roaster with a new type of vertical hot air continuous roaster. As well as reducing the energy used in the roasting process, this change of system has two other advantages. As it is a continuous system, it also reduces the labour required in the roasting process and increases the output per hour.

Grinding

Working with hot nibs would make grinding much easier, and the universal grinder could then be replaced by a stone grinder, for example, which could grind with a much lower motor power (5 KWh instead of 15 KWh). Grinding 275 MT of cocoa nibs (for a 400 MT chocolate) takes 1,375 hours at 200 kg per hour. The total saving would be 13,375 KWh/year.

Heating of machinery, tanks & tubes

We currently heat the system with a 4 KWh heat pin, which is activated about 50% of the time (4,380 KWh/year). The hot water system needs to be kept at 50°, which can easily be achieved by a heat pump with 30% energy consumption compared to a heat pin. The total saving would be 3,066 MWh/year.

We also have 4 mobile chocolate storage tanks that are also electrically heated. The estimated background energy consumption is 1 KWh/machine (17,520 KWh/year). This can also be replaced by a heat pump which uses only 30% of the energy compared to the heat pins. The total saving is 12,264 MWh/year.



Our solar roof factory with the harbour in the background.

Scope 3

Value chain emissions

Scope 3 emissions analysis is more difficult to measure and assess, but incredibly important. They are usually the largest source of emissions for a company in most sectors. Not only that, but organisations often *can* have a lot of control over these emissions.

Upstream scope 3 GHG emissions

In chocolate, there are basically four main ingredients being used;

- cocoa beans
- cocoa butter
- cane sugar
- full-fat milk powder (26%)

plus a number of smaller volume ingredients which we have excluded from the calculation for the time being as their annual volumes are insignificant. For this report we have focused on cocoa beans. These raw materials are produced, transported (shipped/trucked), stored and processed, packaged, sent to warehouses and retail outlets. As the main ingredient is cocoa, the assessment starts with the production of cocoa beans.

Methodology and farm dynamics

The GHG emissions in agroforestry systems have an interesting dynamic at each stage from establishment to full maturity. A major source of GHG in cocoa agroforestry comes from the conversion of primary or secondary forests into cocoa farms. In accounting terms this is deducted over the first 20 years (every year 5% of the total GHG emission caused by the land use change). Therefore the establishment date and the previous land use is a crucial element for

this calculation. For farms older than 20 years, the emissions from land conversion are neglected.

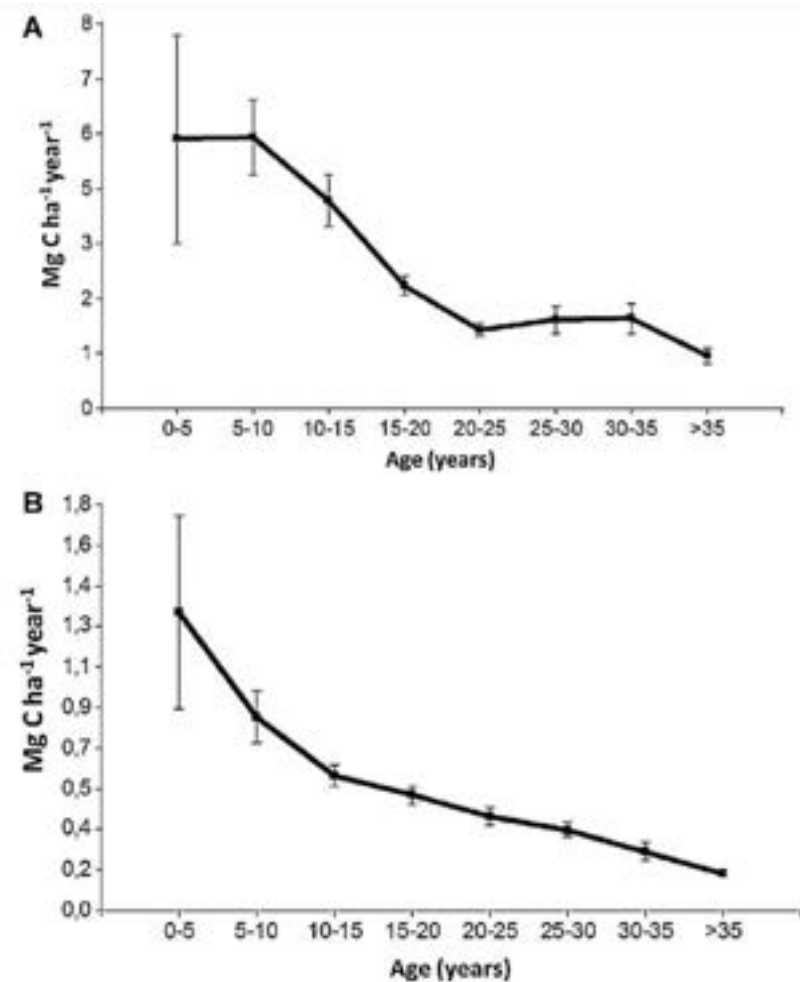


Fig. 5. Accumulation rate of carbon in aboveground biomass in Central American cocoa agroforestry systems: (A) total = cocoa + shade canopy and (B) in cocoa trees.

Notice that on the x axis where the amount of bound CO₂ is expressed a shadowplant-system does bind significantly more CO₂ from the very start. All very logical as there is a bigger diversity of trees, low ground and higher trees. The density of CO₂ binding surface is simply much bigger. And not only that. Over the years the CO₂ binding 'power' decreases for both systems. But after 35+ years the shadowplant agroforestry systems still binds more CO₂ than the monoculture cocoa tree system does after only 5 years.

Once established, a farm can *absorb* (act as sink) Co₂ in cocoa- and shade trees as well as in the form of Soil Organic Matter. Also carbon is stored in above and below ground Biomass as well as in litter.

What does MgCha/y mean?

This unit of measurement indicates megagrams (1Mg = 1 tonne) of carbon (MgC) per unit (ha = hectare) per year (y).

A cocoa farm can also be a source of GHG emissions from fertiliser and pesticide use. As all our cocoa is certified organic, we can safely assume that there are no emissions from fertiliser or pesticide application.

Master research shows that the rate of carbon sequestration decreases with the age of the farm (faster in the beginning, slower towards the end). The average Co2 sequestration rate of a shaded cocoa agroforestry system over a 35-year life span is estimated to be 2.6 Mg C/Ha/yr, which corresponds to 8.32 MT Co2 /Ha/yr.

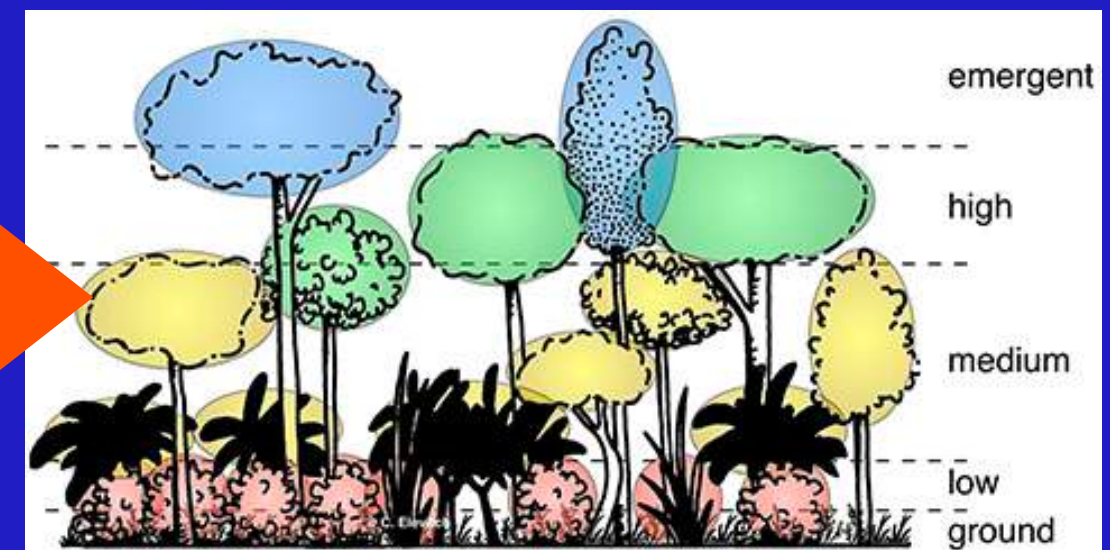
Have a look at the photo on the right. You see a monoculture vs. a native, biodiverse forest. This should make it clear for consumers that buying organic is not enough, Fairtrade is not enough. Both labels say nothing about how ecosystems are treated and how our climate is endangered. The monoculture plantation on the left side in the photo could be organic and Fairtrade certified. But it's still destroying the ecosystem.



The type of agroforestry system determines whether a cocoa farm is binding or emitting CO₂.

What are shadow agroforestry systems?

Shaded and agroforestry production systems are characterised by the canopy cover under which the smaller cocoa trees grow. Agroforestry provides many environmental benefits, including higher biodiversity, higher carbon stocks, and lower soil erosion. Farmers' livelihoods can be improved through agroforestry. Fruit trees production can be consumed or sold. Timber trees act as insurance or wealth storage. As climate change worsens it is crucial for farmers to adapt to the changing weather. Cocoa trees in shaded farms experience less damage from floods, storms, heat stress, intensive rainfall, and pests.



A shadowplant agroforestry system with a variety of different height trees.

Current situation scope 3 emissions for cocoa beans production.

A major source of GHG in cocoa agroforestry is the conversion of forest to cocoa farms. Basically, deforestation. In accounting terms, this is deducted over the first 20 years (each year 5% of the total GHG emissions caused by land use change). The date of establishment and previous land use is therefore a key element in this calculation. For farms older than 20 years (the default assessment period), emissions from land conversion are neglected. In the following, whenever you the little bold word **negative**, that means we didn't emit those greenhouse gases, we took them *out* of the atmosphere.

Conventional cocoa emits 7-12 MT per ton of cocoa. When assessing our current origins, the following can be said:

DR Congo, Virunga region

This is a relatively new production area where cocoa is being promoted on land that has been deforested for other uses (mainly illegal logging for firewood and charcoal). The farmers we work with operate at the edges of the rainforest and create valuable buffer-zones made of cocoa. We expect the establishment of cocoa farms to have a positive impact compared to the previous land use because of the dense tree canopy. The carbon sequestration rate of a cocoa farm is estimated to be in the range of 5 to 8 TCo2/Ha/yr during the first 20-25 years of farm establishment. Yield levels are estimated at 650 kg/Ha/yr, resulting in an embedded **negative** carbon of 7.7-12 MT Co2/MT/yr.

Sierra Leone, Gola National NP

Cocoa farms in Sierra Leone are relatively old and predate the civil war. In the ICS, the farms are between 25 and 40 years old, so emissions can be neglected. As these farms are in a mature state, the annual sequestration rate is lower, closer to 2-4 TCo2/Ha/yr. The average yield in Sierra Leone is 450 kg/Ha/yr, resulting in an embedded **negative** carbon of 4.4-8.8 TCo2/MT/yr.

Dominican Republic

Cocoa farming has quite a long history in the Dom.Rep. and the farms were established in the '60s and '70s mainly and the country currently is having a net sequestration of GHG due to land use, meaning that their forests and agroforestry system absorb Co2. As the cocoa farms are in the mature state also the sequestration rate is at a relatively low level. For simplicity we use the conservative number of 2-4 TCo2/Ha/yr. As farms are relatively old also the yields are modest with a 650 kg average. This results in an embedded **negative** carbon of 3,1-6,2 TCo2/MT/yr.

Colombia, Santa Marta

Cocoa is indigenous to the region and has been grown in farmers' gardens since time immemorial, in the buffer zones of the Sierra Nevada National Park by smallholder farmers and intercropped with coffee. The region is known for its lush vegetation and beautiful scenery. Cocoa is grown in multi-shade agroforestry with high carbon content in the vegetation. CooAgroNevada is implementing a programme to plant additional cocoa trees to improve yields and overall cocoa production on 20 hectares at a density of 850 trees per hectare. These new cocoa trees per ha sequester a low estimate of 3.6 TCo2/ha/yr and with new seedlings it is expected that the yield will be around 650 kg/ha. This results in an embedded **negative** carbon of 5.5 TCo2/MT/yr.

What is carbon sequestration?

Carbon sequestration is the process of capturing and storing atmospheric carbon. This is a naturally occurring process. Biological carbon sequestration means that the carbon is extracted from the air and then stored by plants and vegetation, like trees. Geological carbon sequestration means it is stored in the soil. Shadowplant agroforestry as it is used for cocoa production by our farmers extracts and stores high amounts of carbon and is therefore exactly what we want!

Brazil, Bahia

The Atlantic Forest has traditionally been an important region for cocoa production in Brazil. Cocoa is cultivated in combination with shade trees in a so-called agroforestry complex. The cocoa we use for our Demeter certified bars is sourced from the “Bom Jesus” farm. The farm itself is quite extensive, covering a 43 Hectares of land of which 13 Ha is still forest.



This is where cocoa grows naturally. This is how our cocoa grows.

No agrochemicals or artificial fertilisers are used. The carbon stocks on the farm are high and as the farm is in a fully developed agroforestry stage, the additional annual carbon sequestration is on the low side. Using a conservative figure, it would be in the range of 1 TC/Ha/yr,

which is equivalent to 3.2 TCo₂/Ha/yr. Using a conservation yield of 500 kg/ha, this would result in a sequestration rate of 6.4 TCo₂/MT/yr.

Peru, NorAndino cooperative, Awajún cocoa

The cocoa we use in the Awajún bar comes from the Santa Maria de Nieva region, along the Rio Santiago in the northern Amazon. Awajún cocoa has been promoted by conservation organisations to give the Awajún an extra income. Coop NorAndino started buying from them about 10 years ago and we have been using their cocoa for our ‘Awajún’ and ‘Organic & Taste’ ranges of products. The farms are on average relatively small (1.5-2 ha) and yields are moderate (500-600 kg/ha). The farms are estimated to be around 15 years old and the carbon sequestration rate is in the range of 1.5-2 TC/Ha/yr, which equates to 4.8-6.4 TCo₂/Ha/yr or 9.6-12.8TCo₂/MT/yr.

Conclusion: Our farms, all of them, remove carbon from the atmosphere. Forests can remove carbon from the atmosphere because plants need CO₂ to grow. Therefore land use change, or deforestation, are the biggest driver of global warming.

How does one calculate a forests emissions or sequestration?

Once established, a cocoa farm starts to sequester carbon in the cocoa and shade trees. The plant density is an important parameter here, combined with the change in diameter at breast height (DAB). This is a global standard of measuring tree trunk diameters at a certain height to keep track of forest growth. It gives us information about how many plants are growing on a square meter, but also how old those plants are. That's the information we need to be able to make an estimate about how much carbon sequestration is actually happening on a farm.

Plan 2024: Site specific, farm by farm

To fully assess the GHG emissions from cocoa farms, we will use the Cool Farm Tool (CFT) from the Cool Farm Alliance. The CFT covers GHG emissions from farm to port of destination (including trucking, shipping, etc.). Version 1.1 (302). For 2023, we have used figures derived from the internal control system data used for organic certification and we have used estimates for farm establishment date.

We source cocoa beans from six origins and it is a significant effort to carry out fieldwork. Therefore these tools are amazing and very helpful. This is planned to start in 2024 to further refine the calculations. One thing is clear: emissions from land use change (deforestation) are by far the largest component of the total calculation of emissions. Transportation, production and other sources emit far less CO₂.

Plan 2024: Other Ingredients

As mentioned at the beginning of this chapter, we would also need to include all the intermediate steps between the raw materials arriving at our factory (local transport, shipping, storage) and all the other raw materials (cane sugar, milk powder, cocoa butter). With these figures we can then make the full Scope 3 emissions assessments.

Unlike other chocolate producers, we can say that by far the biggest part of our ingredients and raw materials is cocoa. Not sugar, not milk powder. We have therefore started there, and carried out a very detailed analysis.



On CFT maps like these we can see the farmers locations and protected areas

BIODIVERSITY



BIODIVERSITY

Protect and restore



100% Organic or biodynamic



Shadow plant agroforestry



Genetic variety



Regenerating forests



Cocoa

Cocoa's genetic origin is the Amazon rainforest. It is a shade loving tree crop that needs and likes warm and humid conditions. Where you find cocoa today, there was rainforest in the past (or hopefully still is). That explains why cocoa is related to deforestation in the producing countries. Cocoa in itself is either a problem or a solution for biodiversity loss or climate change. We can deforest old rainforests, plant cocoa monocultures, spray those with pesticides and harvest a high yield, low quality product that can be processed into cheap chocolate bars in your local supermarket. Or we can plant it at the edge of the rainforest, under the canopy of old trees, with an organic approach and harvest a little lower yield, but high quality and flavourful cocoa. In the second scenario we protect existing and restore lost biodiversity. We have chosen the second option since the very beginning.

Cocoa and deforestation, the current situation

Driven by global demand, the area of land used for cocoa production has increased sharply since the 1970s, from 4 to more than 10 million hectares. At least half of this expansion has been at the expense of natural forests, and cocoa has become one of Europe's main food imports linked to deforestation. The proliferation of alarming reports on cocoa's impact on biodiversity, and deforestation in particular, adds to a history already marked by controversies over child labour and the highly uneven distribution of value along the supply chain.

Boom and bust cycles, the third wave of deforestation

Cocoa development has undergone cycles of about thirty years that result from a complex interaction between price cycles, crop cycles and the exhaustion of "forest rent". At each cycle, new regions of production emerge to the detriment of the previous ones. In a highly

pressurised market, that is used to obtain abundant and rapid harvests. Every time there is an emergence of a new production area, it is therefore accompanied by a wave of deforestation. Furthermore, all of the signs show that, thirty years after the last cocoa boom in the late 1980s (in Ivory Coast and Indonesia mainly), a new cocoa cycle is underway: high price volatility, declining productivity in the main production areas and an inability for farmers to invest in plantation renewal. And to make it all even worse, climate change caused extreme weather events that endanger ecosystems and yields everywhere.



“

The price that consumers don't pay when they buy cheap chocolate is paid by the rainforest and the farmers. And us eventually. There is no such thing as cheap and truly sustainable chocolate.

”

Big industry

To address these issues, the cocoa sector has developed several strategies to improve the sector's image, and also to contribute to its transition towards greater sustainability. The main initiatives include: certification (Fairtrade, organic, Rainforest Alliance/UTZ) and the establishment of "corporate policies" and voluntary commitments. Research work conducted by the think tank IDDRI has examined the development of those initiatives, and the available impact assessments, focusing on their ability to meet the challenge of conserving biodiversity. The results show that, despite some interesting progress, the sector is struggling to achieve real change. The major companies have developed their own programmes with high ambitions and fine reports. Having been involved in the chocolate industry for over 100 years, it is surprising to read how little they understand about the solutions to the challenges identified.

Forever Chocolate (Barry Callebaut), Cocoa Plan (Nestlé), Cocoa Life (Mondelez), Cocoa for Generation (Mars) are all well designed, long reports and ambitious plans, all nicely written. Additional subsidies from public funds are also invested to implement all these nice programmes.

“

However, it is embarrassing to see that the only really effective tool to fight poverty and deforestation is neither mentioned nor used. It all comes down to PRICE. Cocoa farmers depend on the income their crops generate. As long as the prices are low, nothing will change. Nothing *can* change.

”

The role of certification

Supermarkets are a jungle of stamps, certificates and promises on packaging. What do they do for biodiversity? Organic and Fairtrade

labels are having some interesting results – especially with regard to supporting producers and diminishing the pressure on local biodiversity (at least for the organic certification) - but they are overly reliant on world cocoa prices. In a context of global overproduction, they do not always offer a profitable alternative to conventional agriculture. Organic chocolate can still be grown in deforested areas in a monoculture system. A Fairtrade label tells us nothing about biodiversity.

Summary: Core drivers for deforestation

The conversion of forests to cocoa farms are caused by overall low cocoa prices causing lack of investment from farmers in their farms, resulting in low soil fertility and low yields. To conclude:

- **Conventional cocoa prices are too low to allow farmers to farm sustainably**
- **Corporate policies and voluntary commitment are not enough to protect ecosystems in a system of capital**
- **Labels and certification mostly have a single focus (organic, fair-trade, etc) but don't address the protection and restoration of rainforest adequately or at all.**

Break the cycle, connection between price-income-deforestation

A key element in all these explanations and trends is the overall low price of cocoa and the continued decline in real cocoa prices (as inflation also occurs in producing countries!). A good price is the best fertiliser for a cocoa farm and a cocoa farmer. It should be said that certifications such as Fairtrade or Organic do not protect a farmer from low prices; Fairtrade sets a minimum price, but this is still far below the price level of a living wage.

Chocolatemakers' approach

There is another way. Cocoa can also be used to prevent deforestation when it is cultivated around highly biodiverse areas like national parks. Nature conservation agencies like Conservation International and WWF make use of this approach whereby cocoa provides income to farmers and prevents further deforestation. Income that was previously generated with deforestation is now generated with cocoa. Chocolatemakers cocoa is grown in buffer zones around national parks and contributes to the preservation of the following areas:

- Congo cocoa: Virunga National Park
- Peru Awajún cocoa: Amazone Biosphera
- Sierra Leone cocoa: Gola National Park
- Colombia cocoa: Sierra Nevada de Santa Marta National Park
- Brazil cocoa: Bahia native rainforest
- Dom.Rep.: the farms are spread across the island

On farm

On-farm biodiversity, agroforestry

Organic and biodynamic cocoa excludes the use of chemical fertilisers and pesticides. Also it requires shade trees to protect the cocoa trees from direct sunlight. The shade trees create micro habitats for all kinds of organisms (birds, small mammals, insects, etc). Therefore the on-farm biodiversity is impressive and in some cases almost equal to the original rainforest or the nearby national parks.

Thanks to organic cultivation also the soil organic matter is higher as well as the soil humidity. The consequence is a living soil with nematodes and soil bacteria and fungi etc. that decomposes the organic matter and liberates nutrients for the cocoa trees!

On Farm conservation of unique cocoa varieties

The taste of fine flavour chocolate is defined by:

- **Genetics**
- **Terroir**
- **Farmers craftsmanship in farm management / fermentation and drying**

The market distinguishes between 'criollo', 'trinitario' and 'forastero' cocoa. The 'Nacional' variety is extremely rare and not sold on the world market. The true criollo cocoa is almost extinct (1-2% world production). It is characterised by a white cocoa bean when freshly harvested, and after fermentation and drying it is light brown coloured. The flavour profile is complex "nutty, fruity" with mild tones of chocolate. It can still be found in South and Central America in remote cocoa areas or old cocoa farms. At Chocolatemakers we use Forester, Criollo and Trinitario cocoa beans.



FORASTERO



CRIOLLO



TRINITARIO



NACIONAL

Cocoa is still genetically considered to be a “Wild Crop”, largely unaltered and genetically very close to the wild cocoa in the Amazon forest. In recent times higher yielding and more disease resistant varieties have been developed, but with less complex flavour profiles.



Forastero, Criollo and Trinitario beans, fresh from the cocoa pod.

At the other end you'll find the Amelonado or Forastero cocoa, predominantly in West Africa (85% of world market). The cocoa bean in its fresh state is deep purple and after adequate fermentation dark brown. The flavour profile is very chocolaty but not as complex as the criollo cocoa. The trinitario cocoa is considered to be genetically a mix of both and can be found in the caribbean islands (Trinidad and Dominican Republic) as well as spots in Central and South America. It

is estimated to be around 10% of the world market and the flavour profile is chocolaty as well as hints of other flavours (berry, wine, etc).

Our approach

We search for and collaborate with farmers that have fine flavour cocoa and traditional varieties. Especially the “criollo cocoa” is slowly disappearing, and on farm conservation programs are developed with our Peruvian partner “NorAndino” to protect these from going extinct. Nurseries are set up and farms renovated with these unique varieties.

2024-2028

The new chocolate forest

From degraded land to cocoa agroforestry
1.500 ha land conversion programme

Summarising all the problems in the cocoa industry, we conclude that the current cocoa sector is not sustainable for the future. It results in poverty for farmers, continued deforestation, soil degradation, excessive use of pesticides and artificial fertilisers.

The future of cocoa

Cocoa needs to make the leap from a poverty strategy to a sustainable agroforestry business case that is attractive to the next generation of cocoa farmers. We conduct regular surveys with our farmers at scale where we establish if the living income we pay them is still sufficient. That research shows that a farming family in rural areas of Peru, such as San Martin Province or Amazonas Province, must be able to earn \$650 per month to make a decent living. A farmer aiming for a market that pays premium prices and rewards craftsmanship and sustainable practices should be able to produce 1000 kg of dried cocoa beans per hectare.

Using a reference price of \$4.00/kg (FOB*), of which the farmer receives \$3.00 (farmgate is 75% of FOB), he or she would need a viable farm size of at least 5 hectares. This would generate an average of \$15.000 per year, or \$1.250 per month. From this must be deducted the cost of production, which averages \$450. This results in a net income of \$800/month. Clearly above the \$650 dollar threshold of the living income.

* FOB = Free on board price. Free on Board (FOB) means that the seller delivers when the goods pass the ship's rail at the named port of shipment. From that point forward, the buyer has to bear all costs and risks of loss or damage to the goods. Under FOB terms, the seller is required to clear the goods for export.

How can this be achieved?

As Peru has also experienced heavy deforestation over the last 20 years, resulting in degraded land after a series of crop cycles, the strategy involves reforesting these degraded areas into cocoa multi-layer agroforestry. Cocoa trees are combined with timber shade trees and other valuable tree species such as citrus and mango trees.

This has multiple benefits: it would allow farmers to have a reasonable farm size with an acceptable yield of highly valued cocoa varieties that command premium prices in the speciality cocoa market. It will also sequester carbon from the atmosphere at a rate of 5-8 TCo2/Ha/yr.

Strong through partnerships

This project can only be realised if the farmers, their cooperative NorAndino, and the financial institutions work together and if the carbon benefits can be converted into cash through the carbon market. The project has alliances with Rabobank's Acorn programme, the Ecosia search engine and has the support of Progreso Peru as its local implementing partner.

As Chocolatemakers, we are 'the middleman', connecting the dots and overseeing the project with the future cocoa farming families. It sets the standard.

The price that consumers don't pay for cheap chocolate bars is paid by the rainforest and the farmers. There is no such thing as cheap and truly sustainable chocolate. Biodiversity truly suffers, and we can't afford that.

Cocoa can be a force for good

If you've read this far, you care about our planet and its people. Good. We need people who care. We need people who hold companies accountable, and we need people to take it upon themselves to educate themselves and help those around them to do the same.

We hope this report has made things clearer, we hope you will carry the torch with us, and we hope it has made you a little (or very) angry. We felt the anger as we wrote it. More people need to know, less money needs to be spent on harmful products that poison us and our planet. People have power, consumers have power, even loving the right chocolate can be a powerful thing.

Share this report with your circles, spread the word,

**spread the love for
chocolate!**

planet-loving deliciousness



Reading material, sources and links to our cooperatives

For Living Income we use the Anker Methodology, see also: https://files.fairtrade.net/2019_RevisedExplanatoryNote_FairtradeLivingIncomeReferencePriceCocoa.pdf

<https://nationalzoo.si.edu/migratory-birds/bird-friendly-farm-criteria>

Conventional cocoa emissions: https://www.mycargill.com/content/dam/cargill/static-assets/fibi/sustainability/Carbon_Footprint_Methodology_Cargill-Quantis.pdf

<https://www.iddri.org/en/about-iddri>

<https://coopnorandino.com.pe/>

<https://conacado.com.do/en/>

<https://www.cabruca.com.br/>

<http://www.villagehopeinc.org/>