



Outcome Report 2016

May 2016

Bonsucro Secretariat



Bonsucro Outcome Report 2016 version 1.1

Bonsucro's vision is a sugarcane sector with thriving, sustainable producer communities and resilient, assured supply chains.

Our mission is to ensure that responsible sugarcane production creates lasting value for the people, communities, businesses, economies and eco-systems in all cane-growing origins.

'Bonsucro' is a registered trademark in the EU, Brazil, Australia, Indonesia, China, Norway and a trademark in other countries.

Bonsucro is, a company registered in England and Wales, company number 06798568.

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1. SUMMARY AND KEY RESULTS

214

people trained
in 2015

470

members
(+12% from 2014)

Over
800,000

Ha certified (+8%)

No **child** or **forced**
labour in all certified
operations

0 conversion
of **HCV land**

Average yields (dryland):
73 tons/hectare
(3.4% above global FAO average)

18%

increase in physical uptake of
certified sugar between 2013-
2014

Workers' wages
are on average
26.5% higher
than minimum legal wage (combined
agriculture and milling operations)

Agrochemical use reduced by

16%

between 2013-2014

Avoided emissions*: **677,000 tons of CO₂ eq.**

equivalent to annual emissions of **142,000 cars** (excluding land conversions)

*against the threshold defined in the Bonsucro Production Standard



2. INTRODUCTION, SCOPE, AND OBJECTIVES

Bonsucro has developed and is maintaining a voluntary global metric standard with the objective of improving social, environmental, and economic sustainability of sugarcane farming and of production of ethanol and sugar. This Outcome Report is an exercise, carried out by the [Bonsucro Secretariat](#), to assess and communicate about the initial results of [Bonsucro's certified members](#) in relation to the [Bonsucro Production Standard](#). Besides the outcomes of certification (section 6), Bonsucro also monitors closely:

- the results of its own operations through a series of internal performance indicators (section 3) and a summary of organisational achievements can also be found in the [Progress Report 2014/15](#);
- Independent research and benchmark studies (section 4);
- Data submitted as part of the Annual Report of Bonsucro members (section 5).

On certification, Bonsucro's [Monitoring and Evaluation System](#) (M&E) focuses on 14 Key Priority Indicators (table below). They were chosen by the Secretariat and brought to the scrutiny of Bonsucro members. These indicators were adopted by the Board of Directors in early 2014 and are directly related to Bonsucro's [Theory of Change](#), which was designed in consultation with members.

Priority Indicators for Monitoring & Evaluation



Area	Short to medium-term goals as per Theory of Change	Issue	Indicator of Bonsucro Production Standard	Indicator	Short to medium-term metric (as per Bonsucro Production Standard)	Compliance outcome
Land Rights	All sugarcane is grown in legally-owned land, local communities are consulted and respected	Land Ownership	1.2.1	The right to use the land can be demonstrated	Yes	Land where sugarcane is grown is legally-owned and not contested by local communities
Enterprise Resilience	Farmers add value to their work	Yields	3.1.2	Yield (tc/ha harvested/y)	45 for Dryland; 65 for Supplementary Irrigated Systems; and 85 for Irrigated Systems	Yields are improved
		Value Added	5.9.1	USD \$/t cane	Mill > 4; Agric >2	Sustainable sugarcane adds value to farmers and mills
	Mills are technically efficient	Mill Efficiency	3.1.4	Mill overall time efficiency (processing time as percent of total time)	>75	Mills are efficient economic operators
Labour Rights	Workers work in a safe environment	Workers Safety	2.3.1	Lost time accident frequency (number per million hours worked)	Mill <15; Agric < 45	Workers engage safely in a professional activity in the sugarcane sector
	ILO Standards apply to all workers of the sugarcane sector	Wages*	2.4.1	Ratio of lowest entry level wage including benefits to minimum wage and benefits required by law (\$/\$)	≥1	National minimum wage is ensured
		Minimum Age of Workers*	2.1.1	Years (Minimum)	18 for hazardous work 15 for non-hazardous work	Child labour is eradicated in the sugarcane sector

		Workers' Rights* (regarding forced or compulsory labour, discrimination, and freedom of association)	2.1	To comply with ILO's Labour Conventions	Yes	ILO standards apply to all workers of the sugarcane sector
Climate Change	GHG emissions are contained	GHG Emissions	3.2.1	Net GHG emissions for sugar	<0.4 t CO ₂ eq/t sugar	Sugarcane industry does not contribute to climate change.
		GHG Emissions	3.2.2	Net GHG emissions for ethanol	<24 gCO ₂ eq/MJ	Sugarcane industry does not contribute to climate change.
Biodiversity & Natural Resources	Areas of High Conservation Value are preserved and mills mitigate their impacts on the environment	Water	5.2.1	Net water consumed per unit mass of product (kg/kg of product)	Mill , <20 kg/kg sugar; or <30 kg/kg of ethanol. Agric <130 kg/kg cane	Efficient use of water in agriculture and milling. Environmental burden of sugar milling is contained
		Environmental Impacts*	4.1.7	Herbicides and pesticides applied per hectare per year	<5 kg active ingredient/ha/y	Impact on biodiversity of sugarcane growing is managed
		Environmental Impacts*	4.1.6	Nitrogen and phosphorus fertiliser (calculated as phosphate equivalent) applied per hectare per year	<120 kg/ha/y	Impact on biodiversity of sugarcane growing is managed; Run-offs from fertiliser are reduced
		Biodiversity*	4.1.2	High Conservation Value areas (interpreted nationally as described in Appendix 1) used as a % of total land affected by a new project or an expansion	0	Areas with high conservation values are protected

Table 1 - Priority M&E Indicators

* Core Criteria (compliance is required for certification)

Bonsucro collects information from various sources. Qualitative data regarding implementation of the Standard, market outlook, and the views and experiences from the adoption of the Standard and/or membership accession are collected through reports against [Bonsucro's Code of Conduct](#) which are submitted to Bonsucro on an annual basis. Bonsucro also monitors publication of independent academic research, standard benchmarking studies and other reports relevant to its M&E system.

Finally, Bonsucro collects quantitative data from certification audits and surveillance audits carried out at mills and farms by independent licensed certification bodies, which cover all the sustainability areas described above.

The scope of this Outcome Report covers a total of 57 mills which have been through the certification process in Australia, Brazil, Honduras, and India in the period 2011 to 2014 (mounting to 173 observations); it also considers independent studies as well as the Annual Reports against the Code of Conduct received from 112 Bonsucro members throughout 2015.

The main objectives of this report are:

- Outcomes & Impacts Communication: To support the development of a business case, showcase positive results of certification, and to offer a platform for communicating on the outcomes and impacts of adoption of the Bonsucro Standards;
- Strategies behind the Standards: to enable Bonsucro to better understand the effectiveness of its Standards in

making behavioural changes and to identify their strengths and weaknesses;

- Organisational Learning & Adaptive Management: To enable Bonsucro to better understand the effectiveness of the organisation and strategies, and to identify issues, trends, and areas for improvement.

Data Sources & Uses

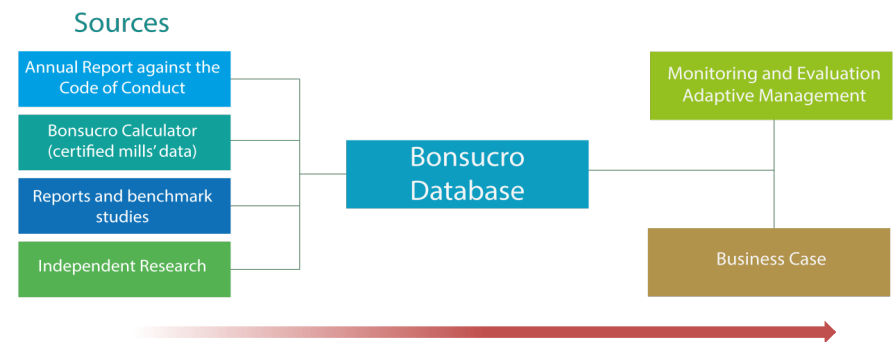


Figure 1 - Data & Sources

3. METHODOLOGY FOR DATA COLLECTION

Data collection, storage, and use are under the responsibility of different staff members:

- *Business Effectiveness Manager*: Responsible for monitoring, gathering, and assessing independent research about Bonsucro; Responsible for designing the member annual report and analysing data; Responsible for analysing certification data and writing M&E and outcome reports;
- *Head of Standards and Innovations*: Responsible for supervising the M&E system; Responsible for supervision of data collection and organisation; Responsible for the data collection tool (Bonsucro Calculator); Responsible for supervision of data analysis and M&E and outcome reports;
- *Standards Manager*: Responsible for data analyses;
- *Standards Implementation*: Responsible for liaising with certification bodies, acquiring, organising, and storing data collected from certified mills by certification bodies.

3.1 ORGANISATIONAL PERFORMANCE DATA

Bonsucro's performance data is captured by multiple management systems used by the organisation. The responsibility for these data is spread across departments but used as reference by the Senior Management Team (composed of the CEO and heads of departments). Those indicators are reviewed regularly to support adaptive management and quick response to emerging trends and a subset of those are used in Bonsucro's publications such as this

Outcome Report and the yearly [Progress Report](#). These indicators will be revised over 2016 since Bonsucro is undergoing an ambitious strategy refresh.

3.2 INDEPENDENT RESEARCH

Independent research, reports, and benchmark studies offer important data to Bonsucro; together with Bonsucro events, they may contribute towards monitoring influencing factors and unintended effects as well as towards understanding broader implications of adoption of the Bonsucro Standards (e.g. community level impacts). We strive to take into consideration studies from respected organisations, researchers, and authors specialised in the sugarcane sector. Data from these sources is collected directly by the secretariat and by Bonsucro members. They are shared internally to relevant team members for their consideration and further actions.

3.3 MEMBER ANNUAL REPORT

The Annual Report against the Code of Conduct is a requirement for Bonsucro membership. Members respond to questions designed by the Secretariat regarding their experiences with Bonsucro, their market, their plans, and their activities to support Bonsucro's goals. It is also an opportunity for members to let Bonsucro know about their concerns, challenges, and opportunities in the sugarcane sector. The reports offer rich qualitative information about adoption of the Standards, market of certified products, amongst others. Data is collated and studied by the secretariat to design global, regional, and



local action plans and feature in the annual publication of the Bonsucro Progress Report.

3.4 CERTIFICATION DATA

Finally, and most importantly, with regards to mills' certification data, to monitor progress regarding the Priority Indicators for M&E presented above, Bonsucro has implemented a data collection protocol (captured in the [Production Standard](#), the [Guidance for Implementation](#), and the [Certification Protocol](#)), which guides what and how data should be collected for each of the Standard's indicators.

For a mill and cane supply area to become certified, the producer is required to complete the Bonsucro Calculator, which is used to evaluate conformity of an operator with each metric indicator of the Bonsucro Production Standard. The Bonsucro calculator is therefore designed to collect and manage data, and is used to perform data analysis, both cross-sectional (comparing certified units' results) and longitudinal (understanding individual evolution over time).

Data verification is put under the responsibility of the licensed certification bodies which have the mission to collect sufficient evidence to justify data entered in the tool. The guiding documents (above) clarify how indicators should be interpreted and what is expected from operators gathering data and auditors collecting and verifying them.

Every lead auditor assessing data is trained on the Bonsucro Calculator by Bonsucro's Standards and Innovation Team, and has the necessary technical knowledge to understand and verify information collected from farms and mills. Bonsucro's Certification Protocol entails different methods to verify data, including: interviews, sampling, document inspection, among others. As licensed certification bodies are the entities with full on-the-ground access to the data and the knowledge necessary to perform audits, ensuring they are skilled, trained and competent increases the reliability of the data.

Audit results and Bonsucro calculators are sent to Bonsucro after validation by the certification body. This way, Bonsucro obtains data of each certified mill through the certification body. Confidentiality is safeguarded by the confidentiality agreement existing between certification bodies and mills. Bonsucro then uses the data in an aggregated way and considers it anonymously for purposes of evaluation and communications.

Through its role of accreditation body, Bonsucro monitors the activity and the compliance of certification bodies with the Certification Protocol and verifies the quality of the auditors as data verifiers. This helps Bonsucro have an increased confidence in the data received.

Following receipt of data from certification bodies, Bonsucro verifies the data sent and cleans it: for the purpose of M&E, outliers (data points that do not make technical sense, potentially from error in units reported) are removed (amounts to 0.6% of total data). The data set is then exported to Qlik Sense, a software package for data processing, visualisation and analyses (see data process for collection, analysis and reporting on figure 2 below).

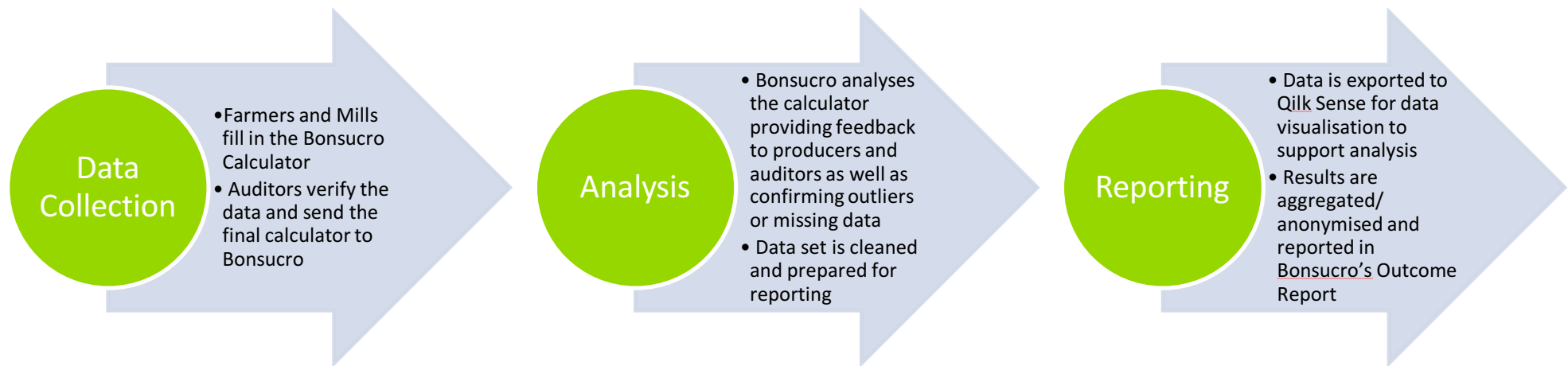


Figure 2 Data Handling Process

4. ORGANISATIONAL PERFORMANCE INDICATORS

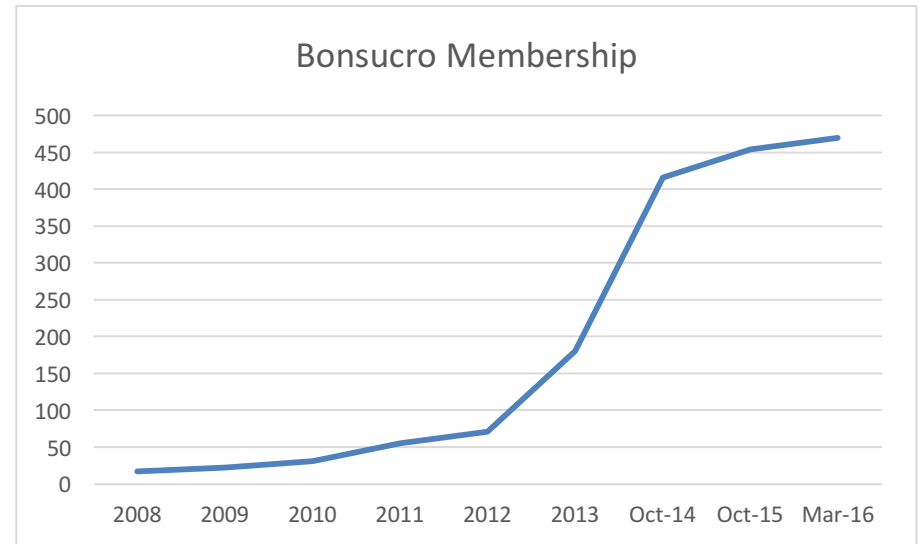
Training

Training is an important part of Bonsucro’s activities and engagement with the sector. Trainings include level-2 (introductory trainings) and level-3 (in-depth training). More recently, Bonsucro has been focusing on providing further guidance on its standards, tools, and specific work streams through online webinar trainings. Records of attendance are below:

Training	2013	2014	2015
Level 2 (introductory)	134	113	74
Level 3 (in-depth, Auditor-level training)	89	121	67
Webinars	33	50 (est)	73

Table 2 - Training Records

The levels have decrease likely because in 2014 there was a requirement for re-training of auditors due to the revised Bonsucro Production Standard, which has increased considerably the number of participants.



Graph 1 - Bonsucro Membership

Membership

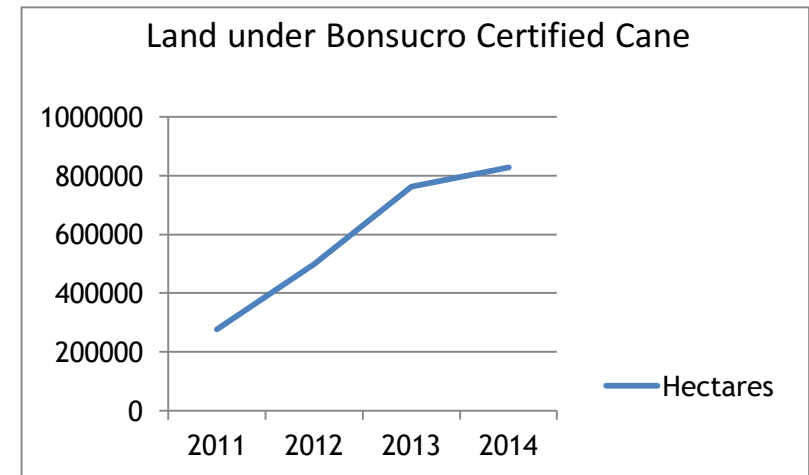
Membership is currently one of the main organisational KPIs, it shows the reach of Bonsucro across five classes (civil society, farmers, industrial/mills, intermediaries, and end users). Membership has been increasing steadily over the years to 470 members, there was a huge leap by end of 2012 when the farmer membership class was introduced (currently there are 350 individual farmers in membership, the majority being smallholders from India), and has increased at a reduced rate since 2014.



Land under Bonsucro certified cane and production

Certified cane area is another important KPI along with production volumes, those are monitor constantly and confirmed annually (estimate numbers are first collected and actualised in the subsequent audit). Over a million hectares are currently Bonsucro certified (considering 2015), which represents over 60 million tonnes of sugarcane produced. In 2014, land under certified cane reached over 800 thousand hectares, as shown in graph 2 below, an increase of 8% from 2013.

Production has of course been increasing at a similar rate. In August 2015 over 4 million tons of Bonsucro certified sugar was produced as well as over 2.5 million cubic meters of ethanol.



Graph 2 - Land under Bonsucro Certified Cane



Certified Production Uptake

Uptake is counted as reported sales of certified product in a given year; it refers to the certified product that was claimed to be sold as certified rather than sold as conventional product. For the moment trades are not reported in real-time to Bonsucro, the numbers are confirmed by auditors in the subsequent audit of a certified unit and reported back to Bonsucro, in other words, Bonsucro collects confirmed trade data up to one year after the trade took place. This might change over the next year since Bonsucro will be looking to implement an online platform to monitor trade of certified products.

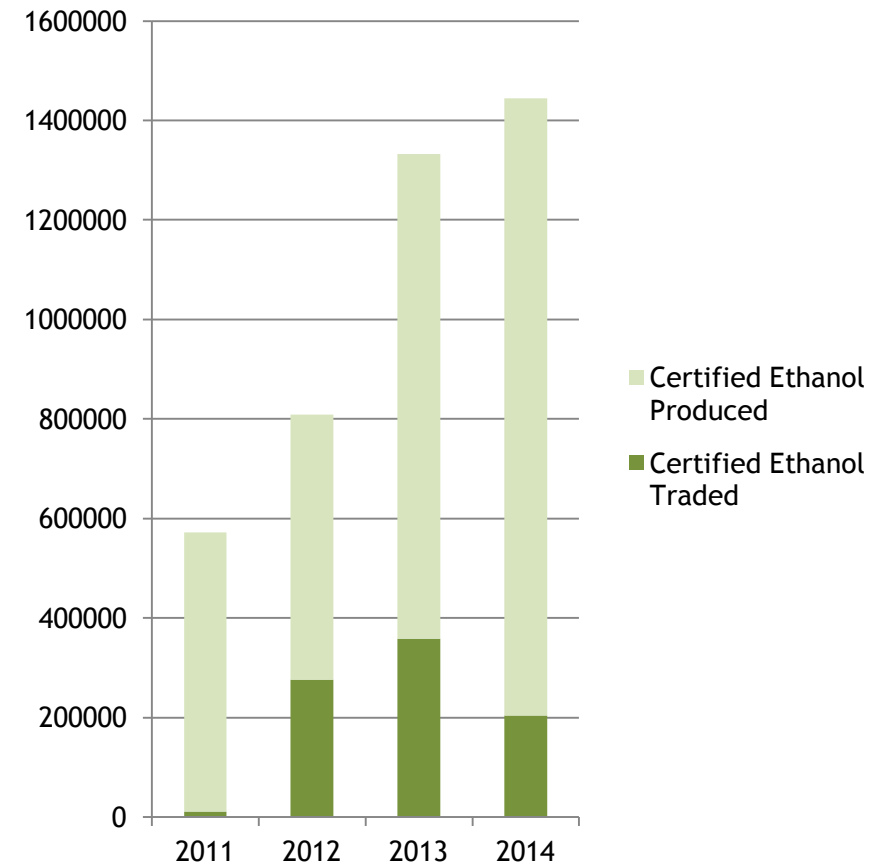
Another point for improvement is that for the moment Bonsucro is only capable of capturing trade data of fully certified supply chains, which does not reflect sales outside the system. Bonsucro works with end users and traders to map more supply chains and increase availability of data on full supply chains.

The uptake of certified product has been increasing consistently, although the market for certified ethanol had a decrease in uptake between 2013 and 2014. The uptake of physical certified sugar has increased 90% between 2013 and 2014. Overall, uptake of certified products is still low (19.5% for sugar and 14% for ethanol in 2014). Bonsucro has been working closely to traders and buyers to increase uptake and training on trading certified products, as well as working with producers to increase availability and visibility of certified products across different regions, in order to allow purchases to happen in already existing supply chains.

Certified Sugar Production and Uptake (in tons)



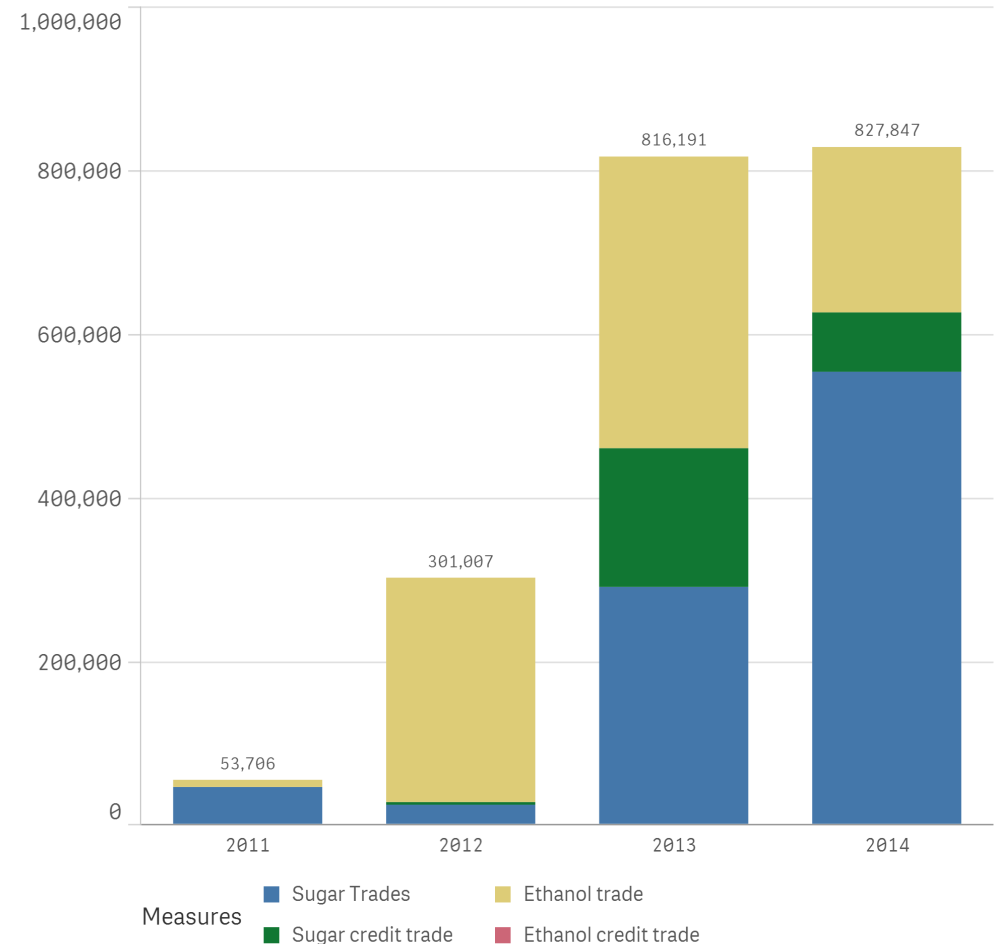
Certified Ethanol Production and Uptake (in tons)



Another measure of uptake relates to the Bonsucro Credit Trading System, implemented in 2012. The system allows buyers to support change by buying credits, which generates income to producer for the production of certified products and to Bonsucro and re-investment in improvement programs of producers, thus helping to increase availability of certified products and also prompting the creation of new market links and stimulating the demand side.

Credit trades have gained importance in the overall product uptake as show in graph 5, particularly in sugar supply chains. Nonetheless, trades in credits are still irregular and Bonsucro will look to review its systems to make it easier to use and more relevant to the sector. Graphs 5 and 6 show that sugar trades are taking over as leading forces in pulling sustainable trades.

sales of certified products (T)



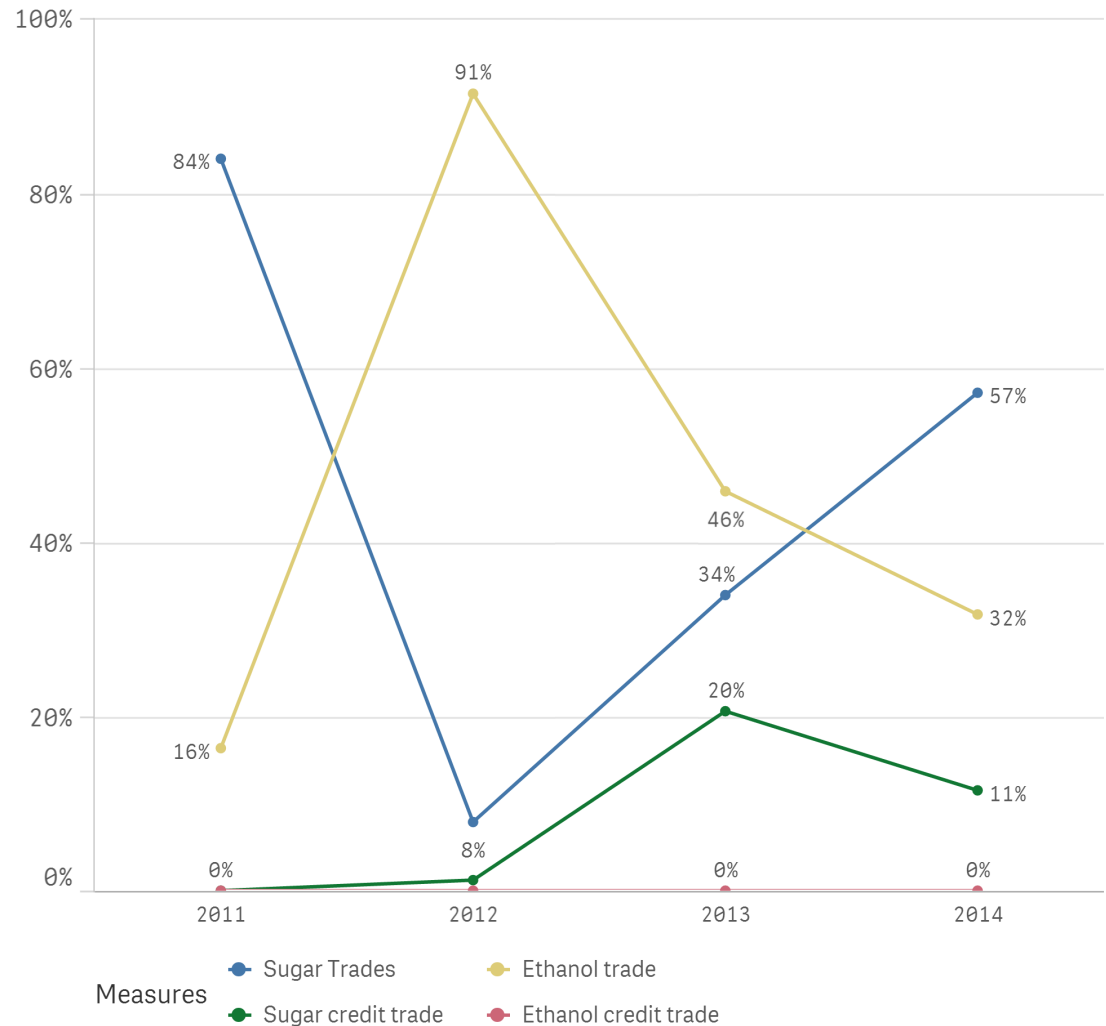
Graph 5 - Uptake by Type of Certified Product

In 2012, trade of sugar represented only 8% of the total uptake where in 2014 it represented 67%. Similarly, the trade of ethanol dropped from 91% to 24% of total trades.

The drop in ethanol trades could be due to the supremacy of ISCC certification scheme on the certification of biofuels aimed at the European market. The scheme has been favored by the supply chain actors due to its multi-commodity offer which streamlines the administrative management of international trades of EU-RED compliant biofuel operators. Consequently, operators may have switched to ISCC to certify their bioethanol operations as EU-RED compliant.

These market changes have had little effect on the overall level of trades of Bonsucro certified material as a continued and active promotion of trades of certified sugar to the supply chain has allowed a transfer from ethanol trades to sugar trades, maintaining and slightly increasing the total volumes of trade.

Relative distribution of sales of certified products



Graph 6 - Relative Distribution of Uptake by Product

5. INDEPENDENT RESEARCH & BENCHMARK STUDIES

As Bonsucro continues to gain global recognition in the sugarcane sector, feedback from independent stakeholders is highly valuable to ensure Bonsucro’s global reach is as effective as possible in supporting a sustainable sugarcane sector. The secretariat follows independent research and collaborates on request. Bonsucro’s M&E programme has prioritised research on the impact of certification at the mill and farm level, and welcomes collaboration and leadership on this work (Bonsucro will also be publishing a list of research questions that it considers crucial to understanding its impacts in the sugarcane sector over 2016, based on a new and ambitious strategy).

By monitoring publications Bonsucro learns from different viewpoints to continuously improve its systems and practices. Below are a number of studies published in 2014/15 that mention Bonsucro:

AUTHORS	TITLE	SUMMARY & RELEVANCE TO BONSUCRO
Adam Sneyd	When Governance Gets Going: Certifying ‘Better Cotton’ and ‘Better Sugarcane’	A review of Bonsucro’s and BCI’s trajectories from a systems and governance perspective. The study points out shortcomings of both systems (some of which were already addressed) and recommends research agendas going forwards.
Iris Lewandowski	Securing a sustainable biomass supply in a growing bioeconomy	Discusses and elaborates recommendations on competing claims on fuel, feed, fibre and food. It points out limitations of sustainability schemes in providing effective strategies for dealing with food security and competing biomass-use claims.
Marcia A.F.D. Moraes, Andre M. Nassar, PaulaMoura, RodrigoL.V.Leal, L.A.B.Cortez	Jet biofuels in Brazil: Sustainability challenges	Study on legal and sustainability standards’ requirements and mapping of compliance gaps of Brazilian operators in the market of biofuels for aviation.
Maurício Roberto Cherubin, André Luiz Custódio Franco, Carlos Eduardo Pellegrino Cerri, Dener Márcio da Silva Oliveira, Christian Andrew Davies, Carlos Clemente Cerri	Sugarcane expansion in Brazilian tropical soils— Effects of land use change on soil chemical attributes	Study that finds that sugarcane expansion in Brazil replacing pasturelands will promote improvements on soil chemical quality as well as associated management strategies to increase soil organic matter and improve the soil fertility, reducing the environmental and economic costs associated with ethanol production in Brazil.

Michael Veale and Rafael Seixas	Moving to metrics: Opportunities and challenges of performance-based sustainability standards	Discusses the limitations, benefits, and opportunities of metric, performance-based standards and uses Bonsucro as an example of a performance framework. The paper identifies five relevant areas opened up by performance-based metrics. Each area is discussed in relation to a wide literature from a variety of disciplines, informing opportunities for standard-systems to explore within their own activities, as well as an agenda for future research.
Stefania Bracco	Effectiveness of EU biofuels sustainability criteria in the context of land acquisitions in Africa	Discusses the challenges and effectiveness of EU legislation around land acquisitions in Africa. It covers how Bonsucro and other schemes deal with land acquisition and studies factors that influence investor choice in adopting a standard in the context of land acquisition. It finds that the European economic operators involved in acquisitions for biofuel crops show significantly lower probability of being certified

Table 3 - Research carried out in 2014/15

Focus on three additional reports

Accenture Report

Accenture has compiled a short report on the work it has carried out for Bonsucro with regards to the organisation’s financial model and business plan, which resulted in a set of recommendations to improve its governance and financial structures as well as measures to mitigate key risks. The summary can be found online at:

<http://www.cpwerx.eu/SiteCollectionDocuments/PDF/Accenture-Bonsucro.pdf>

WWF Study

Bonsucro has been supporting an upcoming study from World Wildlife Fund. It is an innovative study methodology with the potential of uncovering important impacts and opportunities for Bonsucro. It is the first study that uses the metric quality of Bonsucro’s Production Standard to reach sound quantitative estimates of impacts, in the way that the Standard was intended to allow. The study will be published later in 2016. A summary of the study can be found below.



“An evaluation of the potential global-scale conservation benefits of compliance with Bonsucro sugarcane sustainability standardsⁱ”

World Wildlife Fund (WWF) in partnership with The Coca-Cola Company and the Luc Hoffmann Institute have initiated a first-time research effort aimed at evaluating the potential conservation benefits of compliance with Bonsucro sustainability standards at scale. The team is utilizing cutting-edge global data on current sugarcane extent, yield, and management practices to test the potential effectiveness of Bonsucro certification as a global policy mechanism to improve yields while minimizing greenhouse gas emissions, freshwater availability and quality, and biodiversity. These data are then combined with future scenarios of demand-driven increases in sugarcane production under various levels of compliance with Bonsucro standards. Preliminary results suggest compliance across Bonsucro environmental criteria could increase global sugarcane production to the 50th percentile of achievable yields, while significantly reducing greenhouse gas emissions, and improving water availability and quality globally. Additionally, Bonsucro certification could largely eliminate the clearing of natural ecosystems for sugarcane production, resulting in the preservation of carbon stocks and biodiversity in these critical ecosystems. The study also highlights currently unaccounted for potential trade-offs, including increased pastureland displacement and the potential for detrimental indirect effects. The findings of this research effort have the potential to significantly enhance the conservation benefits of the Bonsucro sustainability standards. Final results and discussions are forthcoming in a peer-review journal later this year.”

ISEAL’s case study on EID Parry

ISEAL has published a case study on India’s EID Parry group, their commitment to certifying all of their mills to Bonsucro, and the changes and impacts they have realised in one of their two already Bonsucro certified mills. This was the first Bonsucro certified mill in India, and the first to include smallholder farmers (<5ha) in the scope of certification.

The case study brings evidence of important results in different areas: growing awareness, empowering smallholders, the benefits of sustainable production, industry improvement, and commitment to sustainable production.

The case study reports on the cultural change that took place in the several small farms supplying EID Parry and how farmers are increasing productivity:

“All the farmers in the Bonsucro program have seen environmental and economic benefits. The biggest motivation for the farmers is that they can get greater yields with the same investment.”

The full case study is available on the ISEAL website: <http://www.isealalliance.org/business-stories/bonsucro.html>

6. ANNUAL REPORTS FROM MEMBERS

Every year we ask members to respond to the Annual Member Report, a requirement of the Code of Conduct that enables the Secretariat to understand members’ views regarding Bonsucro, areas for improvement, and their own contribution to Bonsucro’s mission.

112 members have responded in 2015, a slight increase from last year:

Membership Class	% of class that responded
Civil Society	9%
End Users	23%
Farmers	27.2%
Industrial	25%
Intermediaries/Traders	10%

Table 4 - Annual Report: Response Rate by Membership Class

Recurring Topics

Sector alignment, bridging partnerships, and enabling knowledge exchange

Members recognise Bonsucro’s role in creating alignment within the sector and providing a common language that supports understanding, action, and results at scale. In the same sense, Bonsucro plays an important role in bridging partnerships and facilitating issue-resolution and knowledge exchange through member engagement. Members acknowledge Bonsucro’s role in providing transparency to buyers/clients and providing guarantees and adequate levels of confidence regarding suppliers’ legal compliance. This is enhanced by Bonsucro’s democratic processes and by the carefully safeguarded credibility of the Standard.

Tools/Benchmarking

The Bonsucro Calculator was again mentioned as one of the most important services maintained by Bonsucro. The tool enables effective performance tracking and gives mills and farmers insights on where improvements can happen in their facilities and/or plantations. Nonetheless, members see a great opportunity for Bonsucro to further develop this and other tools and to help the sector to better map and understand challenges and opportunities.

Areas for Improvement

Market focus/market development

One of the most cited areas for improvement is the work of Bonsucro in encouraging more commitment from buyers and, especially, of promoting demand and encouraging more uptake of certified products. For that, Bonsucro is currently looking into ways in which trades can be facilitated, which include improving the trading platforms and rules, as well as reducing the costs to producers but also how to secure buyers' commitments and actions toward the purchase of certified material.

Members also emphasised the need to promote greater alignment among buyers and to reduce the necessity for multiple audits. Furthermore, members believe that Bonsucro should work more closely with local buyers (not necessarily associated to global brands), which have strategic relevance in their specific regional markets. In that sense, Bonsucro develops local network of partners led by local Bonsucro directors and Ambassadors. The first regional director was appointed in November 2015 to represent Bonsucro in the Latin America region. The key staff members will increase local knowledge of supply chains and help better connection between participants unlocking trades of certified materials, but also find the resources to overcome the barriers to performance improvement and achievement and potentially certification.

Sharing more stories and promoting a business case

Another area for improvement is the sharing of success stories of Bonsucro members and business cases that inspire more producers, traders, and buyers to take action. Members believe that Bonsucro

needs to increase the amount and frequency of communications regarding members' initiatives and their stories in relation to social, environmental, and economic improvement as well as their journeys towards Bonsucro certification. In response to these points, Bonsucro is using the roll-out of the new strategy to carry out a refresh of its monitoring and evaluation strategy to ensure deliverables will build business cases for engagement with Bonsucro.

Identifying collaborative projects/defining impact priorities

As a global platform, Bonsucro should help the sector to define impact priorities and to focus efforts and resources on strategies that can transform the sector as a whole and more rapidly. Bonsucro may offer a privileged view of the multiple initiatives in the sugarcane sector and promote collaboration across a wide range of stakeholders and geographies. Members believe that Bonsucro should dedicate more time to building partnerships and alliances to identify and solve key global challenges. One particular aspect of the new strategy answers directly to that point with dedication of resources being allocated to the development of a programme aimed at benchmarking and endorsement of local improvement schemes and standards. This is the recognition of the importance played by locally relevant initiatives that support improvement of the sugarcane sector. Bonsucro wants to create a bridge between these initiatives and the globally recognised Bonsucro Standard.



7. ANALYSIS OF PRIORITY INDICATORS

Utilising the data collected from certified mills and farm supply areas, Bonsucro has analysed the performance of certified units against the priority indicators defined in the Bonsucro theory of change. The Bonsucro Certification System has now been active and implemented since 2011, and this is the first year Bonsucro M&E is able to report on longitudinal data.

The data set is composed of 173 observations from 57 mills from 4 countries (Australia, Brazil, Honduras, and India) between the years 2010 and 2014 covering the complete harvest and inter-harvest seasons of certified mills and supplying farms within the aforementioned period. It is important to mention that the number of observations are not fixed by year, i.e., that some mills have left certification and others have joined over the years.

This section covers the following topic areas:

- Enterprise Resilience;
- Labour Rights;
- Climate Change;
- Biodiversity & Natural Resources.

Enterprise Resilience

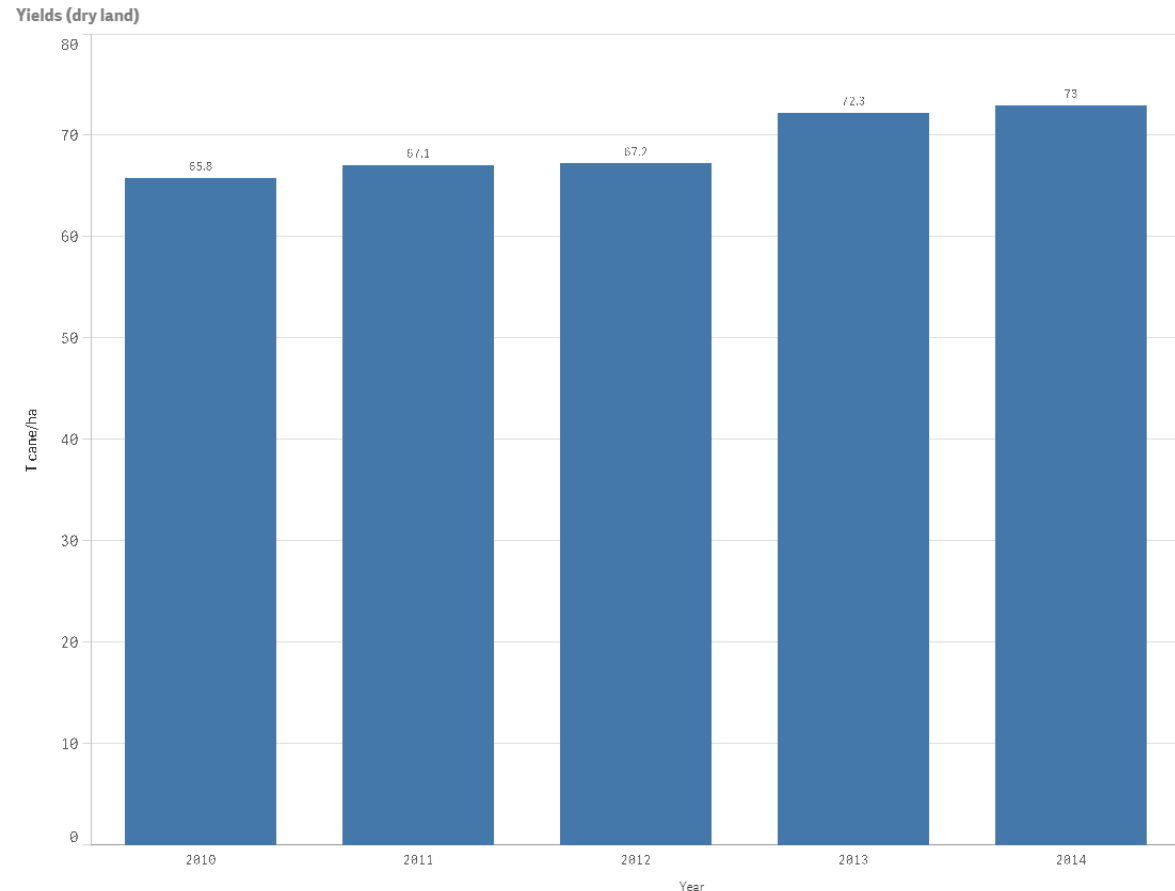
Addressing the sustainability of a mill requires an investment. To be compliant, sugarcane processing mills are asked to demonstrate economic sustainability. Bonsucro defines it as the ability to create value that can be redistributed to workers through wages, governments through taxes, shareholders through dividends and participate to innovation through investments. While financial strength has no guarantee of promoting sustainable land management and the conservation of common pool resources, recent reports appear to show that socially strong operators spend money in ways that promote sustainabilityⁱⁱ, and the lack of economic sustainability can be a main barrier to the adoption of better practices.

Bonsucro currently measures priority indicators for enterprise resilience through three metrics. The first metric is agricultural, looking at the cane yields per hectare of land under cane.

Yields

Yields of certified cane supply areas have remained above the world average since 2013 (the world average orbited around 70 tonnes per hectare, reaching the highest level in 2013 at 70.7 t/ha)ⁱⁱⁱ; however, defining a globally ‘ideal’ level of productivity per hectare of sugarcane is difficult given the wide range of factors contributing to yields, such as weather, climate, technology, cane-age, and disease.

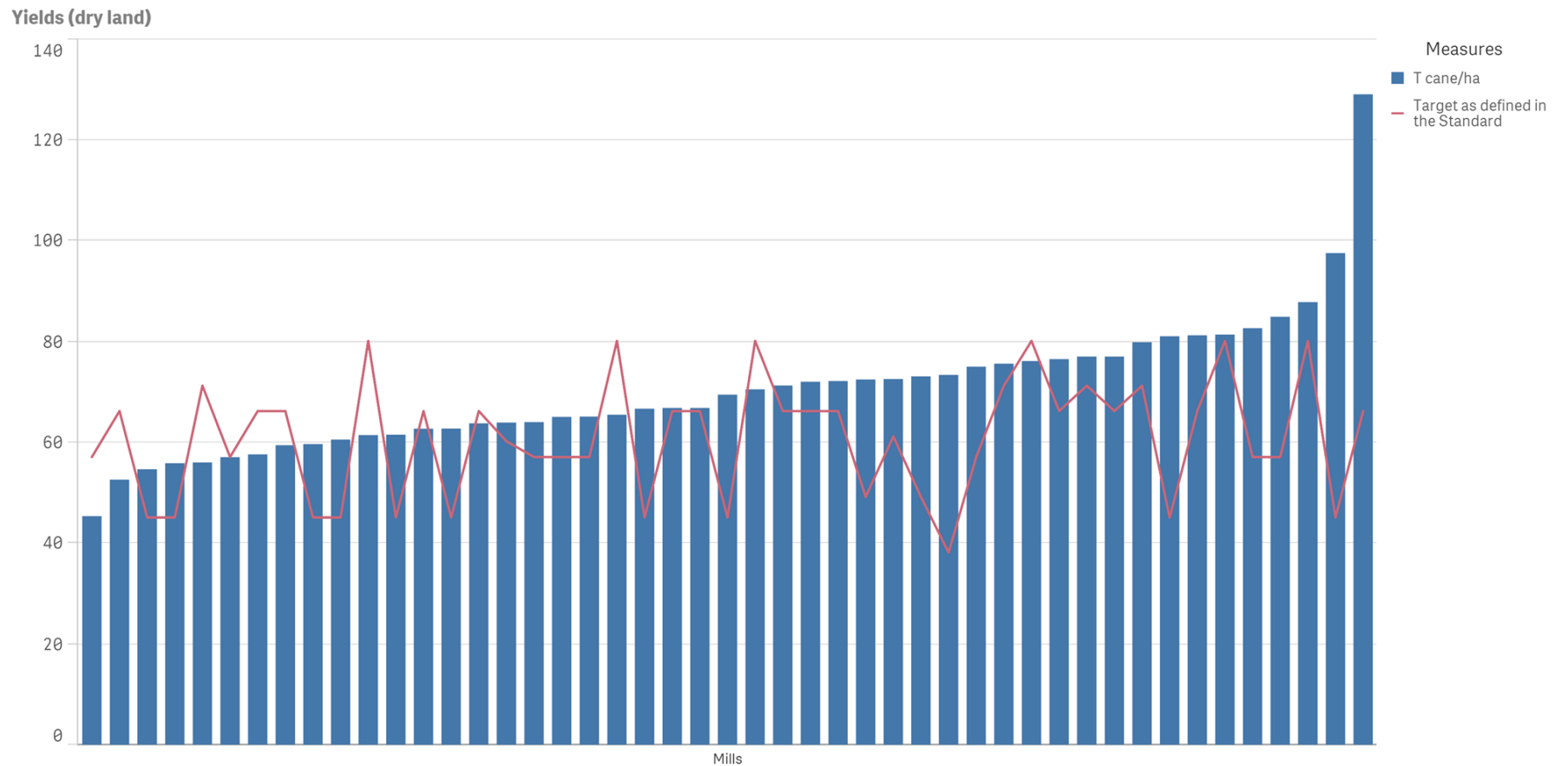
Certified mills have improved their yields consistently reaching an average of 73 tons per hectare in 2014, even though in theory the average yields should be decreasing. This is because, in theory, the average yields of early adopters (best performing mills) combined with the average yields of later joiners (that may have worse performance) would result in lower yields’ averages^{iv}. This has not materialised until now, which means that mills joining Bonsucro have maintained and/or improved their productivity levels. This is reassuring considering that most certified mills are in Brazil and that the country faced difficult climatic conditions^v and strong droughts reinforced by the climatic event El Niño which was one of the hardest on record^{vi}. This may indicate that mills have been resilient to climatic impacts; nonetheless, there might be several indirect factors that can be the reason for these yields increase including investments in research and development (better sugarcane varieties and



Graph 7 - Yields per Year (Dryland Systems)

technology). An analysis could also conclude that mills only access Bonsucro certification after they have sufficiently improved their operations to reach the level set in the standard, de facto removing worst performing mills from the scope of assessment of Bonsucro impact.

Graph 8 below shows anonymised individual results of 44 mills in the year 2014. The red line is the yield objective according to the Bonsucro Production Standard for the given mill.



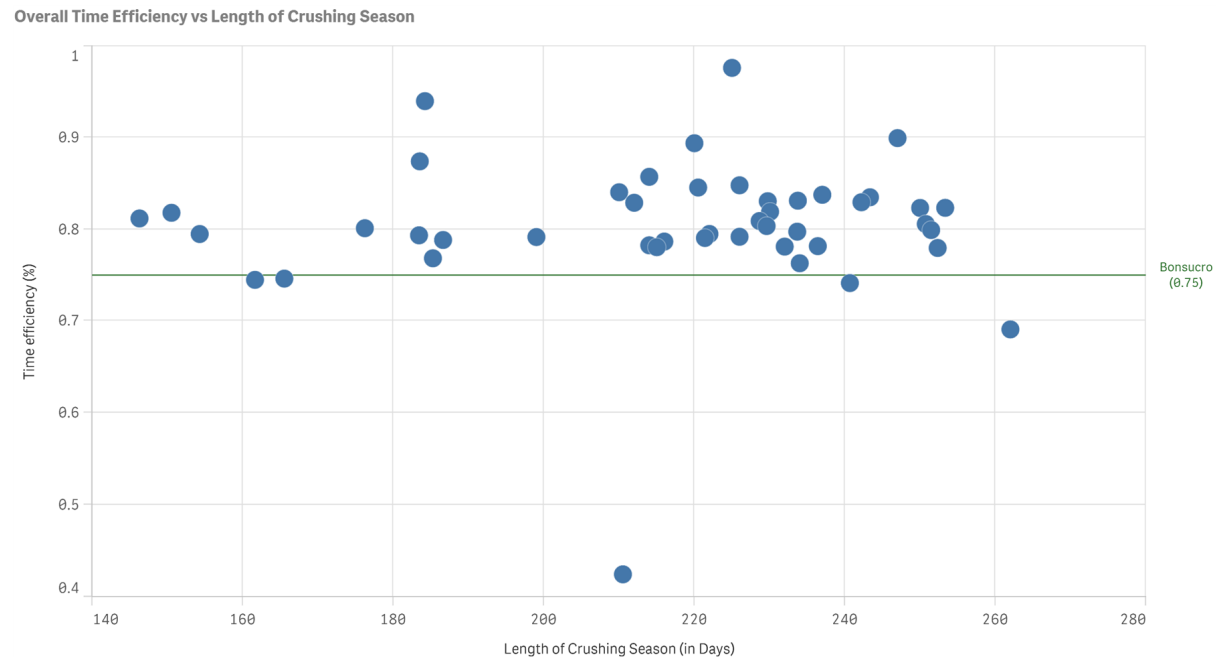
Graph 8 - Yields per Mill against Production Standard's Target

According to the records collected, and based on indicator 3.1.2 which sets yield objectives depending on the climatic zone where cane is grown, 33 out of 44 reporting mills in dry-land systems (75%) have yields that exceed their individual objectives.

This provides an indication of the high level of performance of the certified sugarcane producers. It helps fulfilling one of the objectives of sustainability improvements to produce more on same land, hence avoiding additional pressure on non-agricultural system and other crops systems. As the demand for sugarcane is set to double in the next 50 years, in line with the increased population, the sector needs to demonstrate its ability to answer the challenges ahead. High performing operators are leading the way and demonstrate their ability to provide solutions.

Overall Time Efficiency

This indicator refers to mills' processing time as a percent of total time during the harvest and crushing season. The purpose of this indicator is to assess production capacity and operating structure of the mill, and may show resilience to both internal production challenges and external shocks (e.g. finance, labour force, etc.). An ample majority (over 90%) of Bonsucro certified mills have continued to perform above the Standard's threshold of 75%.

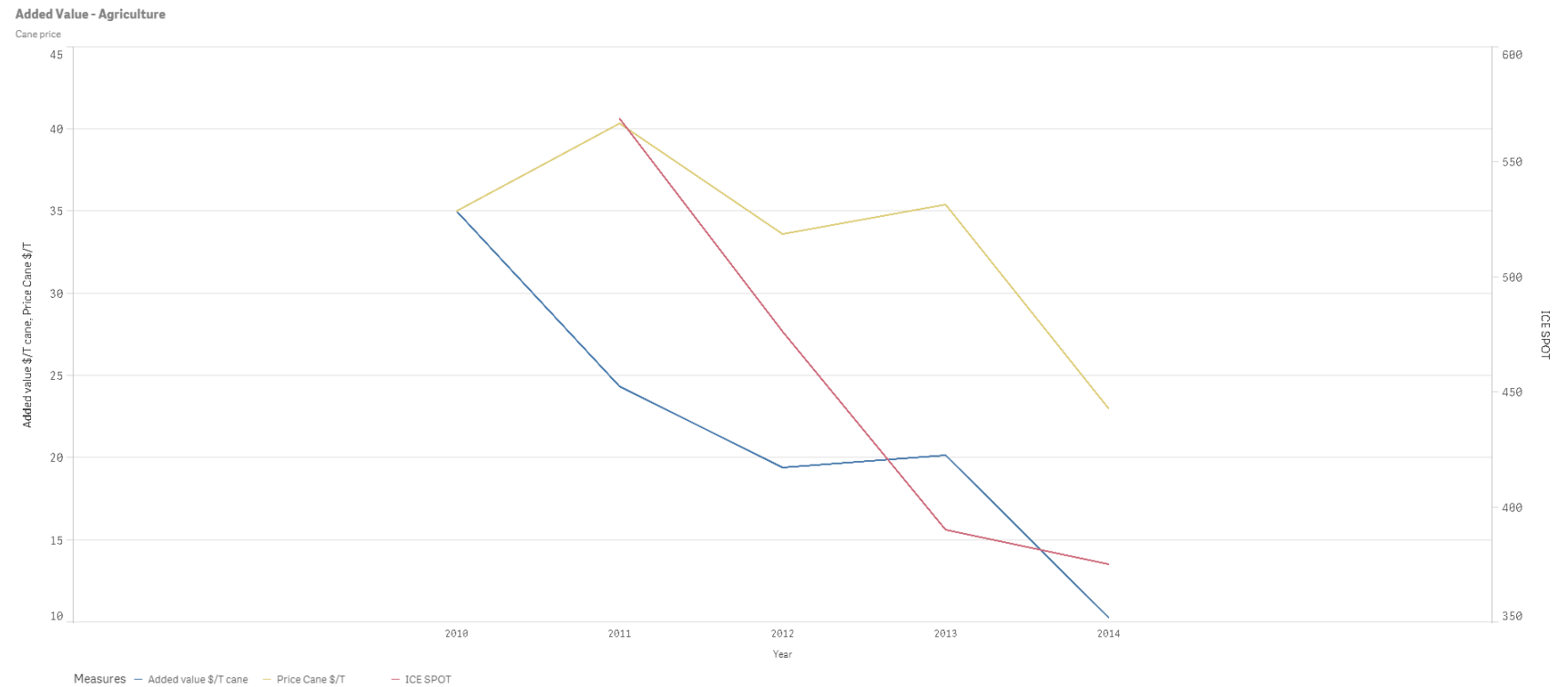


Graph 9 - Overall Time Efficiency against Length of Crushing Season

Graph 9 shows that irrespective of the length of the crushing season, mills are operating at a high level of efficiency, certainly due to efficient preventive and corrective maintenance, efficient logistic operations avoiding drops in supply of cane, hence a well performing coordination of farming and milling activities.

Added Value

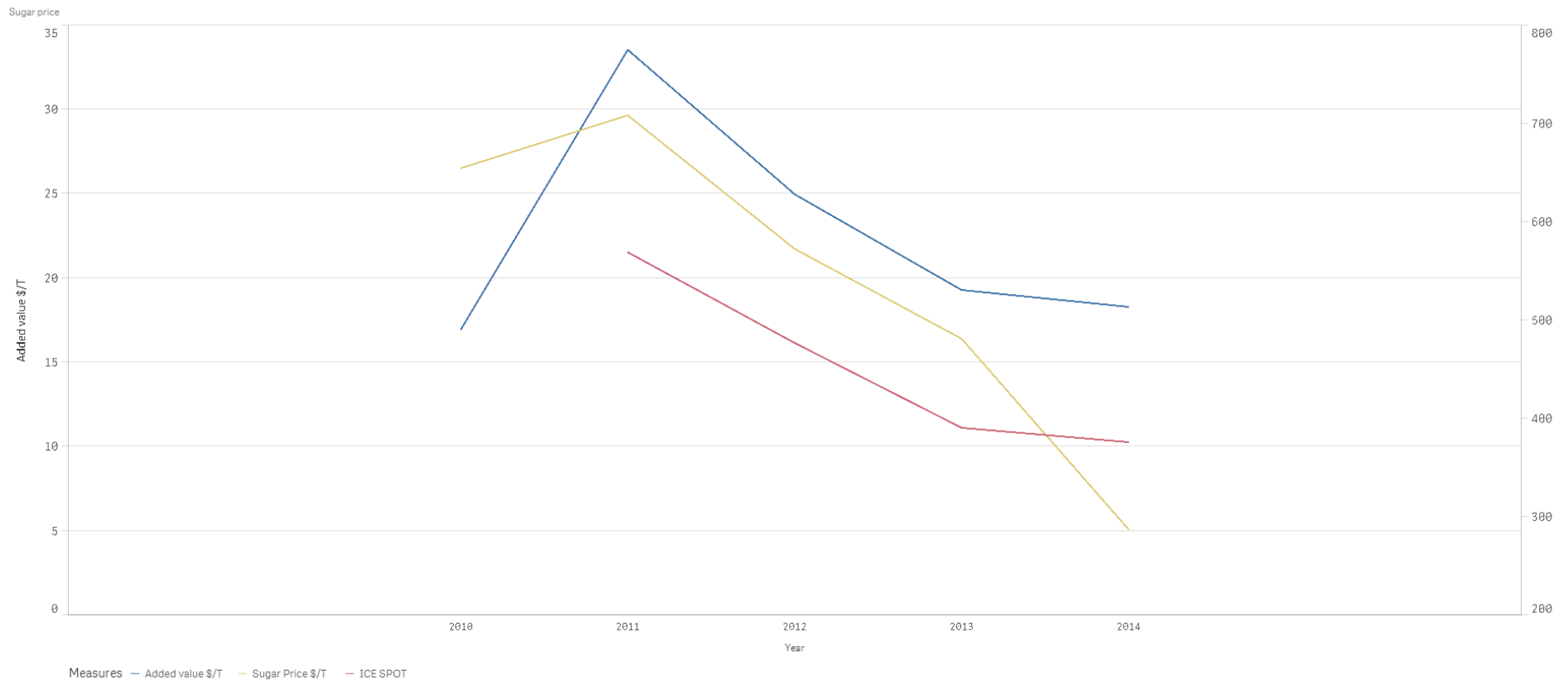
Added value is defined as the total sales minus the cost of production, excluding salaries, taxes, dividends and investments. For both agricultural and milling operations the added value of production has been decreasing considerably since 2013. The graphs below show the reported added value at farm and mill level (blue line) in relation to global market prices of sugarcane (yellow line) or sugar as reported by the operators and the price of sugar on the International Commodity Exchange market (ICE SPOT-11 – red line).



Graph 10 - Added Value in Agriculture

In both cases (see mill added value below), there is a direct relationship between the reported added value in the Bonsucro Calculator and the trend line of sugarcane and sugar prices. We can note that between 2013 and 2014, the influence of the spot price has reduced on the overall agriculture added value which has continued to fall despite a slight relative recovery of the ICE spot price whereas it continues to impact the mill added value, surely due to its direct contact with the international markets. More studies will need to be carried out to study the influencing factors of the agriculture added value (especially price of oil), monitor the consistency of reporting and influence and evolution of each component of the added value.

Added Value - Mills



Graph 11 - Added Value in Mills



Labour Rights

Labour rights are an important sustainability hotspot in the sugarcane sector. Child labour is a serious concern in some parts of the sector, as are health and safety hazards to workers, which include injuries from equipment or plants, repetitive action, overexposure to chemicals, sunlight or smoke, heat and long working hours.^{vii} To evaluate the impact of social sustainability, four indicators from the Standard have been selected: the absence of child labour, ILO Labour Convention compliance governing absence of forced labour, absence of discrimination, right to union, minimum wage adherence, and worker safety. The first five indicators are core indicators, meaning every certified mill must demonstrate compliance to the independent party certifier.

Absence of Child Labour and Compliance with ILO Labour Convention

Each certified mill has demonstrated absence of child and forced labour. This equates to 828,306 hectares free of child or forced labour. It also means that 52 mills have also demonstrated to third party independent assessors the absence of these forms of labour within their premises.

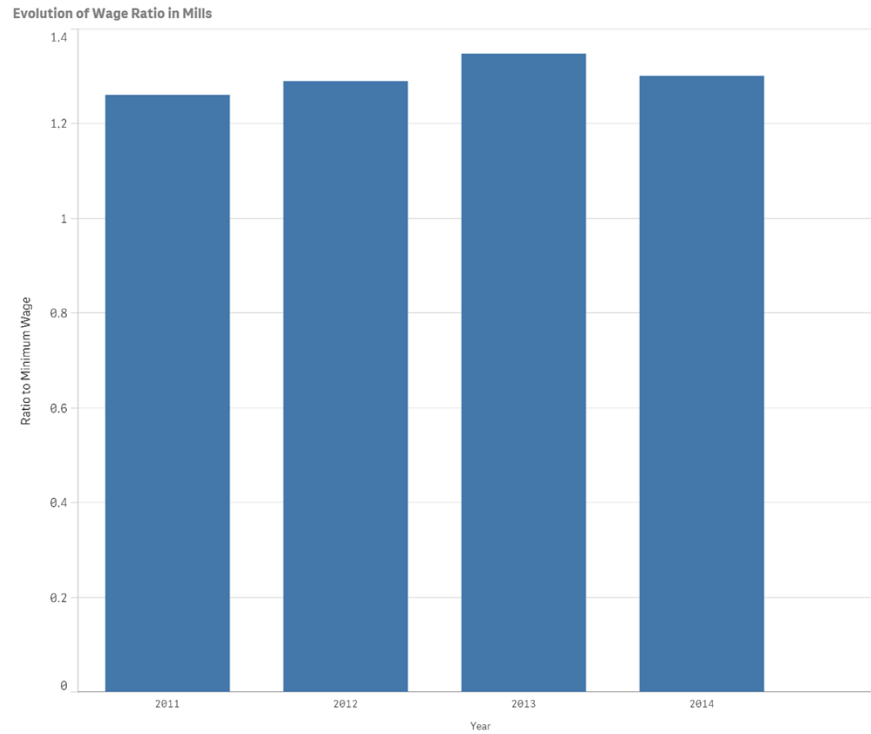
Though the achievement of this level of compliance is difficult to attribute directly to Bonsucro, it can however be said that Bonsucro offers a tool to the supply chain actors to clearly identify volumes of sugarcane derived products that have been produced without the recourse of child or forced labour. On a longer term, it would be possible to evaluate if the credibility and robustness of the Bonsucro certification system, as well as the large support by supply chain operators could have participated to encourage operators to eradicate these forms of labour from their practices.

Minimum Wage

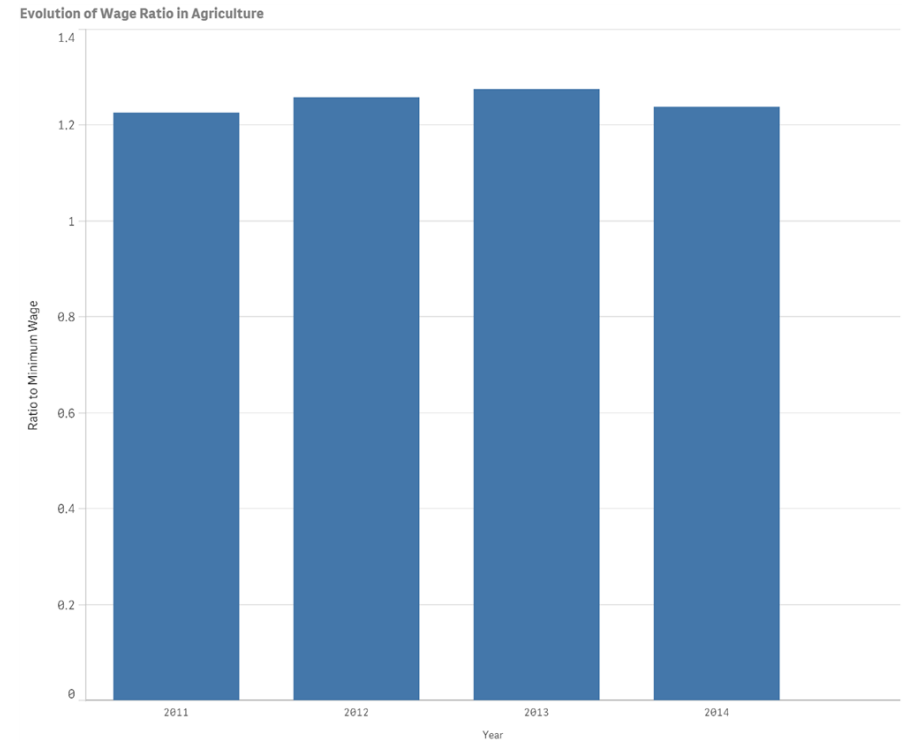
It is observed that the average Bonsucro mill's lowest wage, including benefits, is 24% higher (agriculture) and 29% higher (mill) than the local minimum legal wage. The difference cannot be directly explained through the observation of calculator data and therefore more analysis would be required.

In both cases, the lowest wages' level has been increasing consistently. In 2014, they have been reduced close to 2011 levels. Looking at the global price of sugar as shown in previous graphs, the fall can be seen as the consequences of the constant fall of international sugar prices. Although prices have dropped since 2011, it is interesting to note that salaries have continued to rise until 2013. It would be interesting to evaluate what forces drove the salary increase (managerial decision to maintain salary level raising in the context of inflation, salary pressure, and regulatory framework) and whether it could be linked to sustainability management strategies. Nonetheless and irrespective of sugar prices, Bonsucro certified mills continue to pay wages that are above the minimum wage threshold. It would also be interesting for Bonsucro to understand how wages are evolving

for non-certified mills; this is an area where the potential impact of sustainability can be tested since higher wages may lead to retention of talented staff, and thriving sugarcane communities with stronger household income and purchasing power.



Graph 12 - Evolution of Wage Ratio to Minimum Wage in Mills



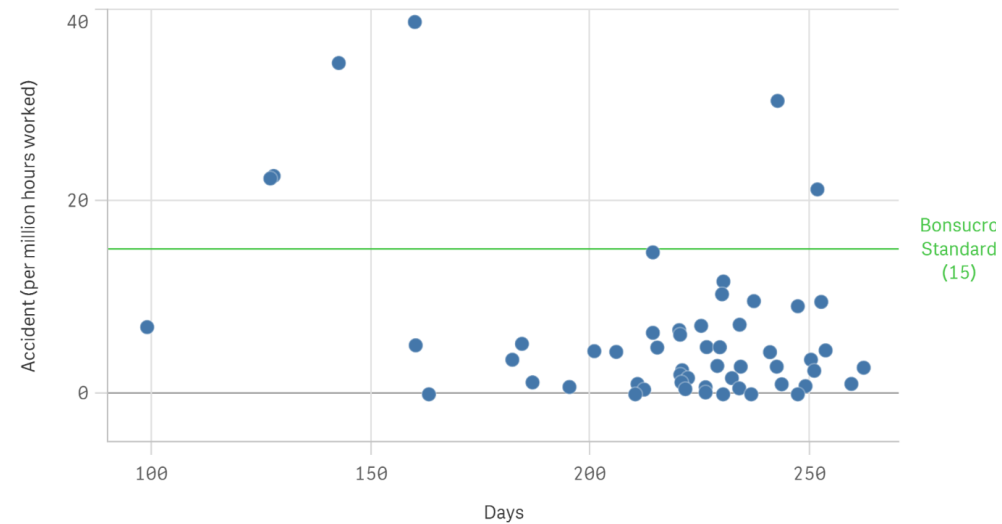
Graph 13 - Evolution of Wage Ratio to Minimum Wage in Agriculture

Worker Safety

The vast majority of certified mills completely adhere to a third criterion capturing worker safety, evaluated by lost time accident frequency per million hours worked in both the mill and farm supply area.

The Bonsucro Standard requires that certified producers do not exceed 15 accidents per million hours worked in the mill and 45 in the field (defined as injuries with subsequent worker absence), annually. The indicator is a measure of the performance of the health and safety management plans implemented by operators to reduce the risk of serious injuries by their staff. The sugarcane industry is sometimes classified as heavy industry due to the heavy machinery used in the mill which present dangerous hazards to workers. Additionally, workers in the field could be handling sharp tools and involved in hard physical work that could also present high hazard levels. The observation of results shows that some mills are above the limit set within the Standard (mill level as shown above). For mills where the harvesting season is short (<150 days) the impact of one accident on the result is very high and therefore such mills are likely to be over the limit. For the other mills which results are above 15 accidents per million hours worked, the good performance of their peers should incentivise them to improve their current practices. This benchmark of performance is one of the main positive outcomes of working with measurable data, it drives improvement. Overall performing health and safety plans support reduction of production

Accidents and Length of Season



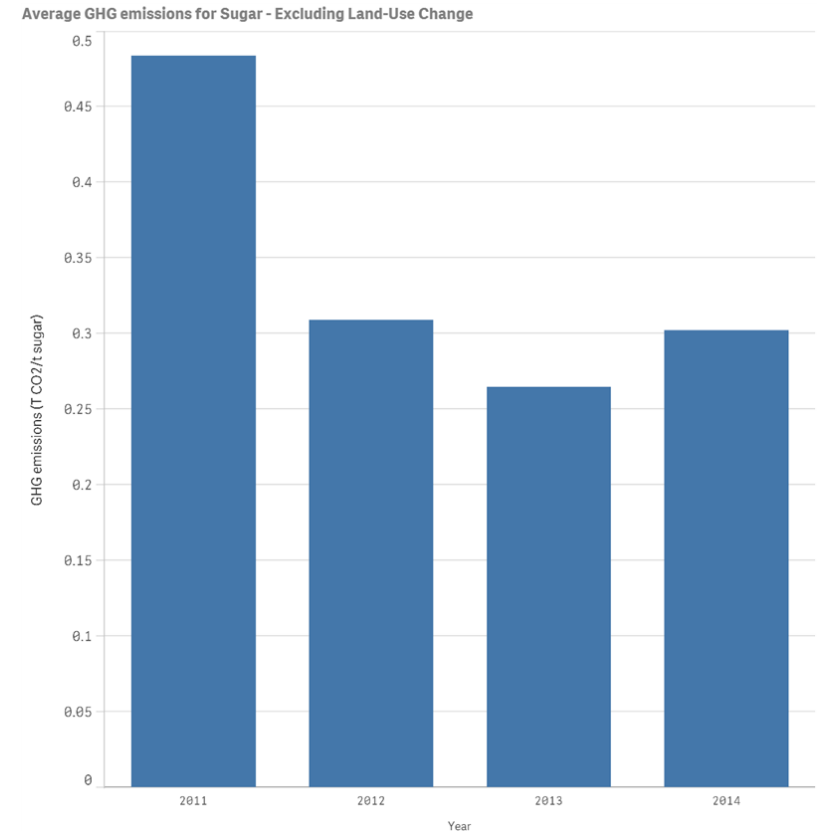
Graph 14 - Accidents against Length of Crushing Season

costs (both for mills and governments) in term of reduction in hours lost, disturbance of work shifts, additional medical costs and care due to injuries and long-term illnesses. One potential area for further exploration would be to monetise those benefits with case studies by comparing mills (of similar size and region) with contrasting performance levels and developing a clear business case, as has been done for other sectors^{viii}.

Climate Change

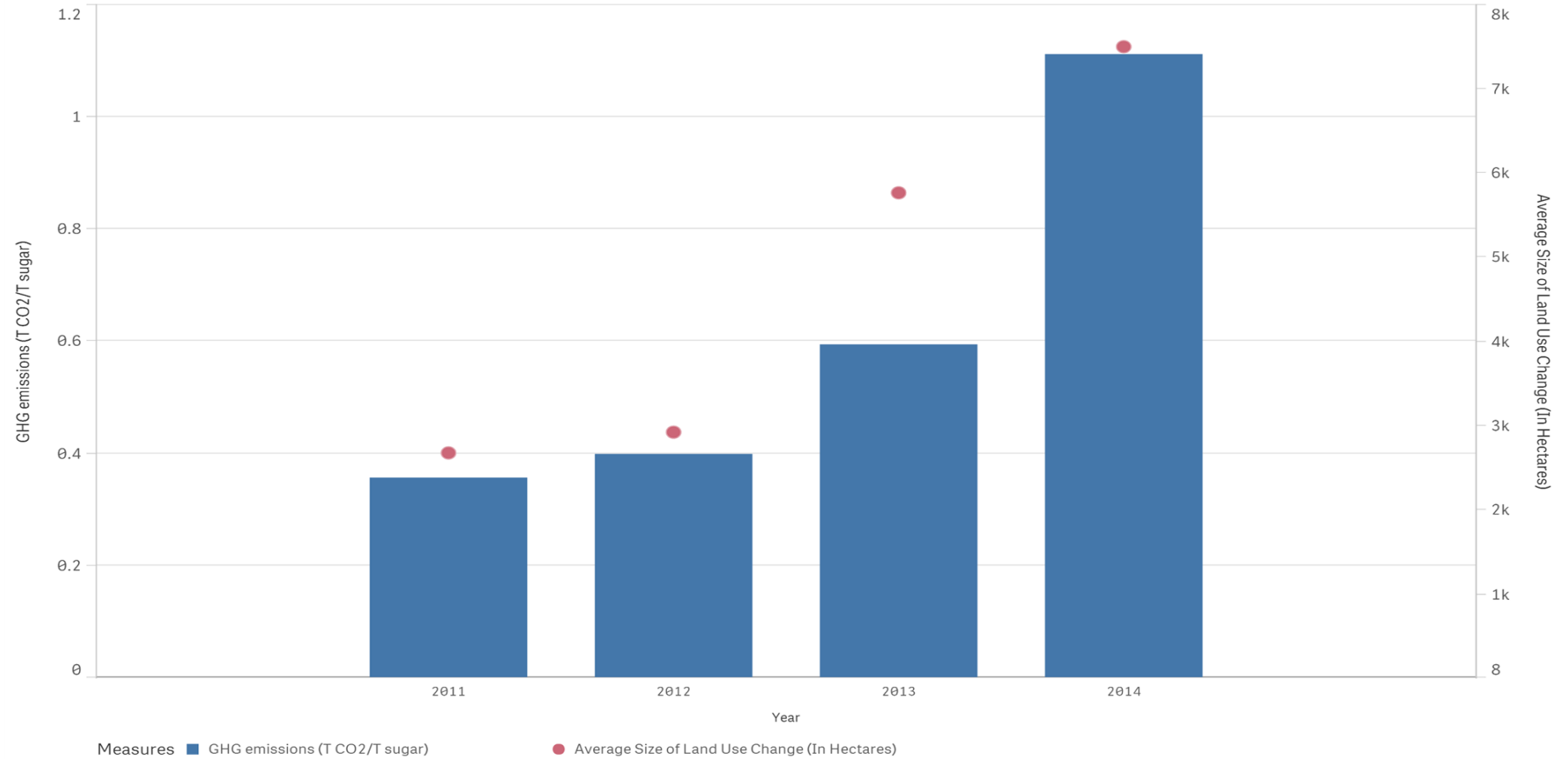
More and more scientific work demonstrates the direct link between anthropogenic greenhouse gas emissions (GHG) and climate change^{ix}. There are a number of activities in the process of sugarcane production that generate greenhouse gas emissions, including, but not limited to, use of fertilisers, diesel use in the field and chemical products at the mill. Those emissions are measured and managed as part of the Bonsucro Calculator. The methodology for estimating GHG emissions is adapted from internationally recognised methodology (GREET for corn ethanol) and uses default emission factors for all relevant input (references of which can be found in the Bonsucro Standard and the Bonsucro Calculator, tab “conversion factors”). For land use change, Bonsucro uses the methodology defined within the standard BSI PAS2050^x. The emissions from the mill and cane supply area are calculated separately but with consistent methodology across all Bonsucro certified producers. Producers can use this information to identify their relative sources of greenhouse gas emissions. For the results presented here, the information is reported in kg CO₂ eq./t cane or kg CO₂ eq./t sugar or g CO₂ eq./MJ ethanol.

By realising several levels of analyses on the observed results, it has been researched the major factor influencing the evolution of GHG emissions over the years and across the certified operators. As a result, the decision was taken to separate the results on GHG emissions by the occurrence of land use change. Following this, the average emissions per tonne of cane was compared year on year for mills which have all of their cane planted on land that was already planted with cane before 01/01/2008 (graph 15 to the right) to emissions for mills that have operated on converted land which was planted with cane after 01/01/2008 (graph 16 below).



Graph 15 - Average GHG Emissions for Sugar excluding Land-Use Change

Average GHG emissions /t and Average Size of Area Converted in Unit of Certification since 01/01/08



Graph 16 - Average GHG Emissions for Sugar including Land-Use Change



In graph 16 above, the red dots indicate the average size of land that was converted to cane after 2008. It shows a continuous increase since 2011 and a sharp increase since 2013. It means that mills have included more land that were converted after 2008. A more in-depth and individualised analysis would be required to identify the reason for these inclusions. Conversion of land may have had a strong effect on the level of GHG emissions of certified mills. This effect is clearer when we compare mills that have converted new land to sugarcane post 2008 and mills that have not. The average emission for sugar in mills that have converted land is 0.76 tons of CO₂ eq/ton of sugar, more than the double of what was found in mills that have not converted new land, at 0.29 tons of CO₂eq per ton of sugar.

Land conversions have been impacting the GHG balance of Bonsucro certified producers, which now stand to 12.69 million tons of CO₂ eq emitted by all certified mills since certification started. The difference between results of mills with land conversion and those without is again considerable. Using the Bonsucro standard as the baseline (0.4TCO₂eq/T sugar) mills with no land conversion have saved 677 thousand tons CO₂eq. (i.e. net emissions avoided), the equivalent to the annual emissions of 142,000 passenger vehicles or the energy used by 61,000 homes^{xi}, whereas mills with land conversion had a negative effective (i.e. net emission) of 3.17 million tons of GHG emissions, or the annual emissions of 667,000 passenger vehicles or the annual energy consumed by 289,000 homes. Would have all mills operated without land conversion (-2.46 M tons), the total emissions would have been 7.71 million tons (net avoided emissions of -4.98 M tons).

The in-depth analysis of these results has raised certain observations and reservations. The calculations do not consider the carbon capture potential of some conversions (e.g. cane over degraded pasture). Also, the default value for land conversion as included in PAS2050 lacks precision. For example, there is no factor for the conversion of orchards to sugarcane which means that the default factor for forest conversion is used when for example orange trees are replaced by sugarcane. This considerably increases the overall GHG emissions of such conversion.

Bonsucro will work to improve the methodology to account for type of conversion and have more precise results on actual emissions.

Of course, the negative results of land conversions may have impacted positively on other areas, such as employment, investment, and recovery of degraded land. Further investigation is needed to understand, from a sustainability perspective, whether those land conversions were desirable or not. It also informs the sector of the need for in-depth pre-assessment of land conversions prior conversion which must include estimation of GHG emissions. As it stands, Bonsucro might have not sufficiently prevented conversion of lands to sugarcane which resulted in additional GHG emissions. This will have to be confirmed by further individualised analysis, especially to verify whether these conversions happened before or after 2011, date the organization became operational.



Biodiversity & Natural Resources

Agricultural systems such as sugarcane production are built upon and rely on ecosystem services. These services can be water supply, soil structure and nutrient recycling; regulating services, such as pollination, water purification or soil retention; or cultural services, such as aesthetic landscapes.

The value of ecosystem services to agriculture is enormous, and often underappreciated. Poor management can damage ecosystems and cause habitat loss, nutrient runoff, and poisoning of non-target species with agrochemicals. Management practices should aim to both avoid value destruction, while promoting and strengthening the resilience and quality of beneficial ecosystem services. Methodologies to measure the impact of the Bonsucro Production Standard certification have yet to be developed, but in lieu of being able to measure the health of the ecosystem services themselves, the Production Standard requires operators to measure and mitigate sugarcane processes that are known to damage ecosystems.

To conserve biodiversity and natural resources, sugarcane mills are required to (a) limit pesticide and fertiliser use, (b) limit water consumption, and (c) not allow sugarcane production to expand into areas considered to be of High Conservation Value.

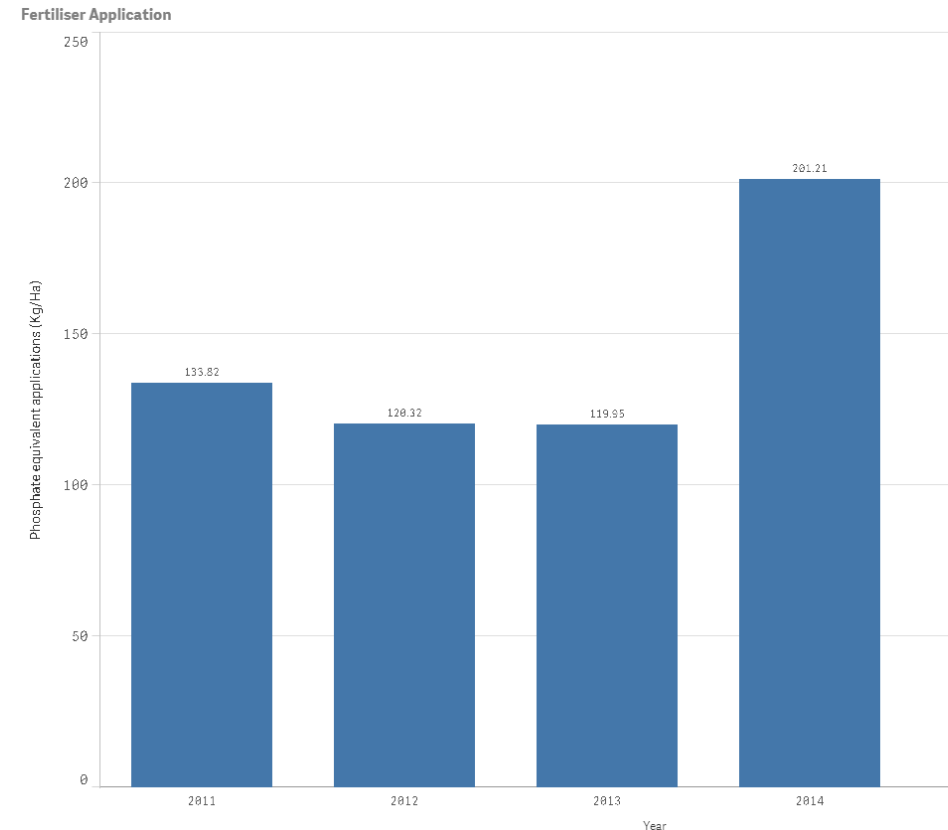
Fertilisers

Fertiliser application of Bonsucro certified producers has fluctuated. It has been decreasing since 2011 and had a large increase (59%) in 2014. This increase might be a direct result of changes to the indicators in the Bonsucro Production Standard, moving from a setting a maximum amount applicable per hectare (120Kg P equivalent/Ha), to a localised requirement of applying no more than 5% above recommended rates per hectare.

According to the new fertiliser indicator (which considers the ratio of application according to recommended application by a specialised/authorised professional), a total of 69.5% of certified mills have a rate of application at or below the recommended rate. Under fertilization can be a limiting factor in yield achievement and therefore this might be an area where improvements can still take place. However correcting this level of application could have important consequences on GHG emissions, soil quality and financial resources, fertilizer being one of the costliest inputs for farmers. Therefore investigation could also help to understand the extent to which lower fertiliser applications can contribute to better results in other areas.

Linked to previous observation related to land use change, land conversions in areas where sugarcane is being expanded may also require higher levels of fertiliser application in the initial years, which can also explain part of the increase. It is also important to note that the period 2013-14 was marked by extreme climatic events (such as droughts), which may have impacted the production of sugarcane^{xii}. Therefore, we would expect that the increase in the rate of application may also be partially explained by soil needs due to climatic conditions and levels of rainfall.

By increasing the analysis of fertilization rate and using the GPS coordinates of mills, Bonsucro could consider how to identify local best practices in fertiliser application and pass it on to mills in similar areas with high fertiliser application.



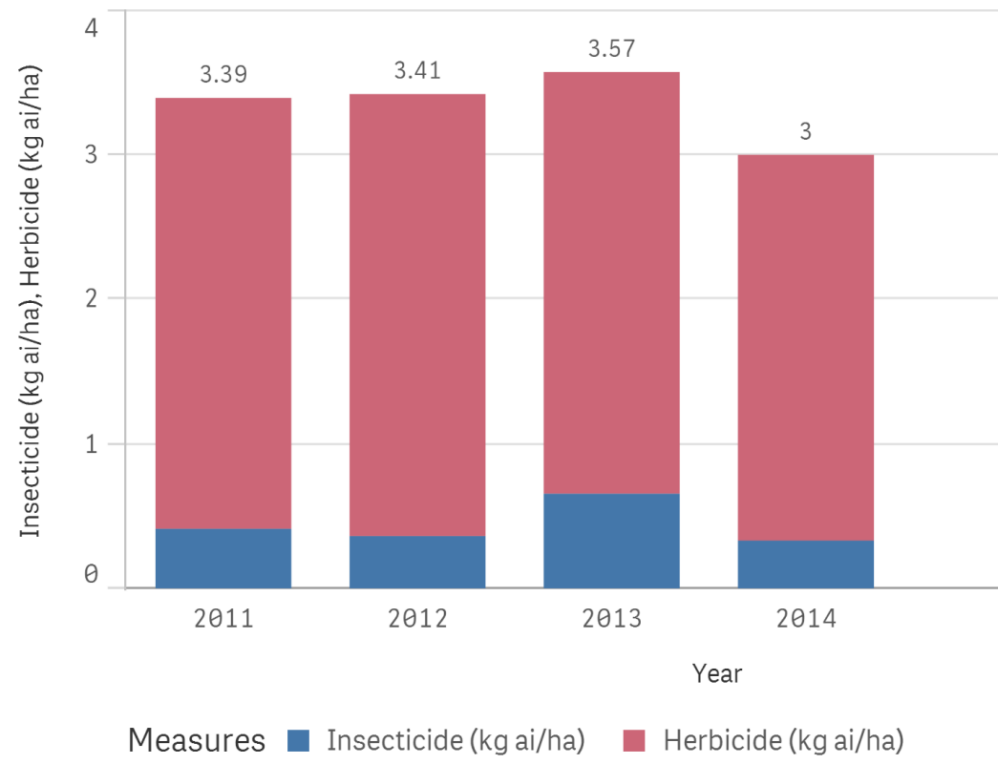
Graph 17 - Fertiliser Applications per Year

Agrochemicals

The application of agrochemicals can have strong impacts on ecosystems and human health. In sugarcane, agrochemicals are applied to deal with specific diseases and pests.

The use of insecticides and herbicides by Bonsucro certified mills (measured as kilogram of active ingredient applied per hectare) has increased between 2011 and 2013, although there was a slight reduction in the use of insecticides in 2012. Nevertheless, the data for the 2014 season shows a sharp decrease (-16%) in the use of agrochemicals. This may be related to improved conditions in the fields and more resilient crops. A contributing factor may also be the recent changes to the Bonsucro Production Standard, which introduced the ban of the most dangerous agrochemicals (as per the Rotterdam, Stockholm and Montreal Conventions, and WHO 1A and 1B lists). This is definitely a positive result and something that should be looked into in more detail to help understand how mills are reducing their agrochemical inputs and how this can be related to the observed improvements in productivity.

Insecticide & Herbicide Application



Graph 18 - Insecticide & Herbicide Applications per Year

Water

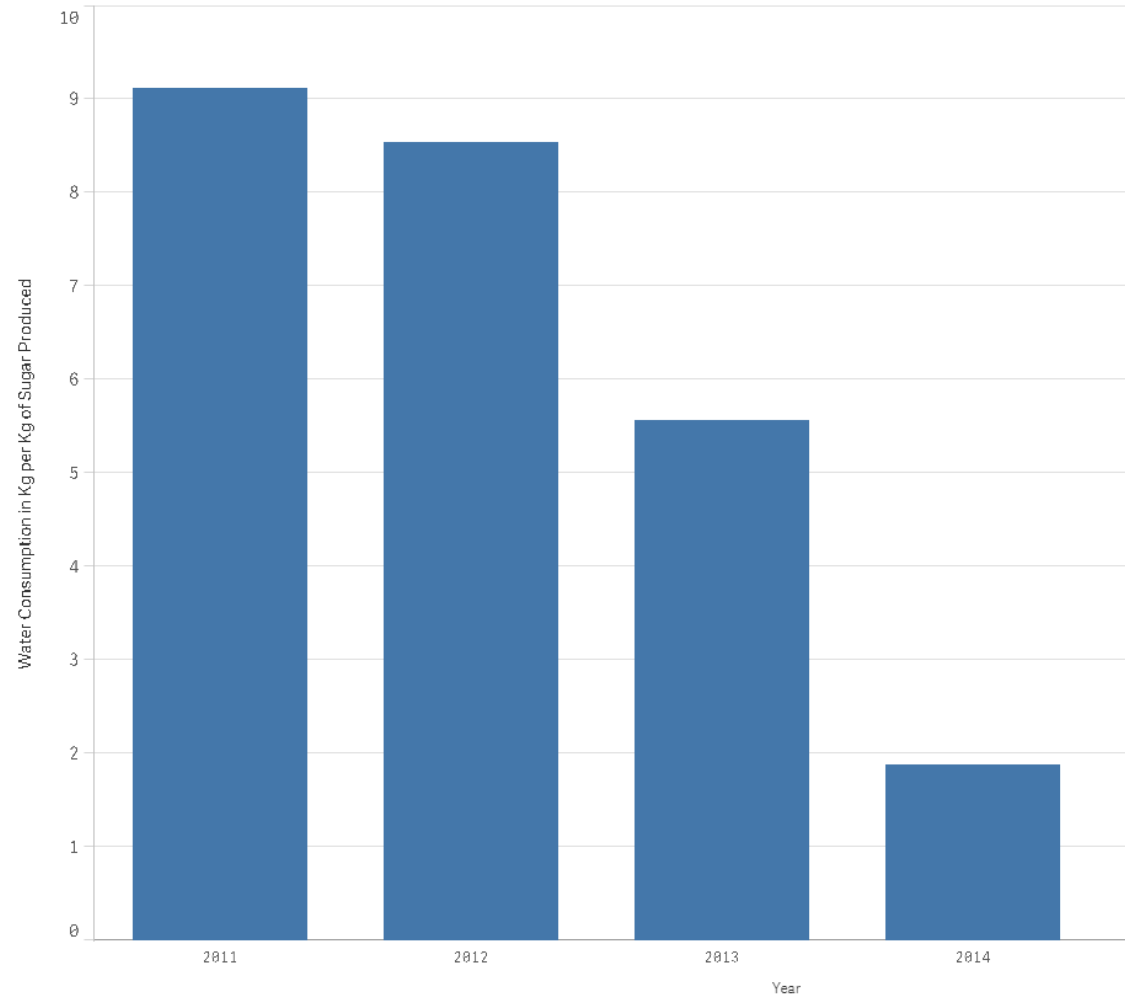
Water use is measured and managed at both the cane supply area and the mill.

In the cane supply area, to recognise methodological difficulties and diversity of water measurement, Bonsucro has implemented new methodologies to determine the sustainable use of water. The first one is the inclusion of the notion of “crop per drop” within the standard of yields achievement. The second is the efficiency of water consumption by irrigated systems by evaluating the amount of cane grown for each millimetre of extracted water added to the cane.

For mills, the Bonsucro Production Standard requires a maximum water consumption of 20kg of water per kg of sugar produced.

As shown in graph 19, water consumption shows a huge spike in 2011 and has been decreasing consistently ever since, reaching in 2014 its lowest level, with under 2kg of water per every kilogram of sugar produced, which is 90% below the level required by the Standard.

Mill water consumption

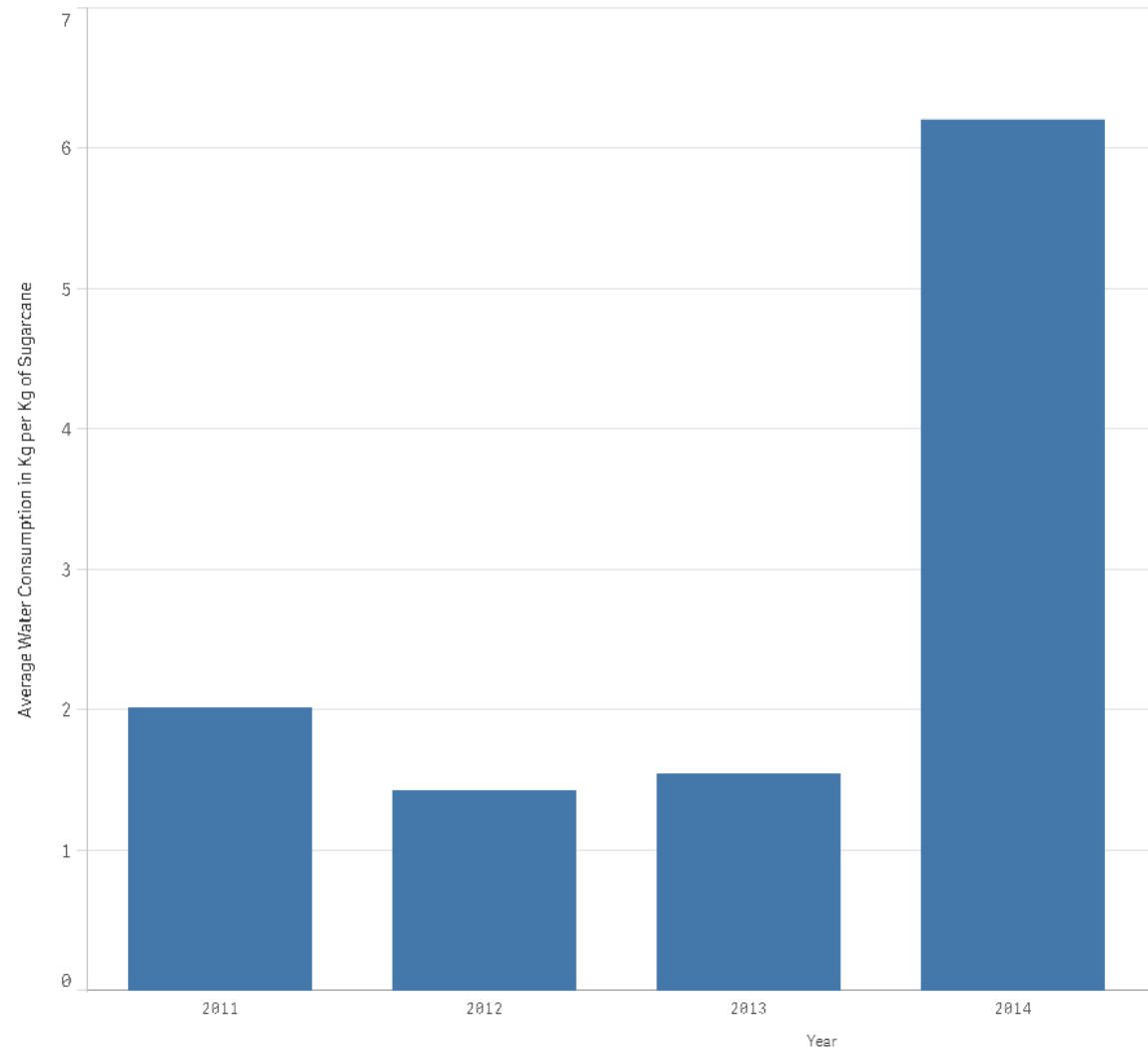


Graph 19 - Water Consumption in Mills

For mills, use of water presents a great opportunity for optimising costs through improved efficiencies and better technology for specific processes (such as cane washing) whilst preserving natural resources. Water prices have been increasing year on year, including in water-rich countries like Brazil.

The potential financial savings from better performance are considerable. Taking São Paulo State as example, where the cubic meter costs USD \$2.14 (in the cheapest price plan)^{xiii} and considering the average performance level of certified mills (just under 2kg of water, for every kg of sugar) against the maximum level allowed in the Standard (20kg of water for every kg of sugar), the difference means a saving of USD \$43.38 for every tonne of sugar produced. Considering the average production of certified mills (1.3 million tonnes per year), savings can reach up to USD \$57 million per year.

AG water consumption

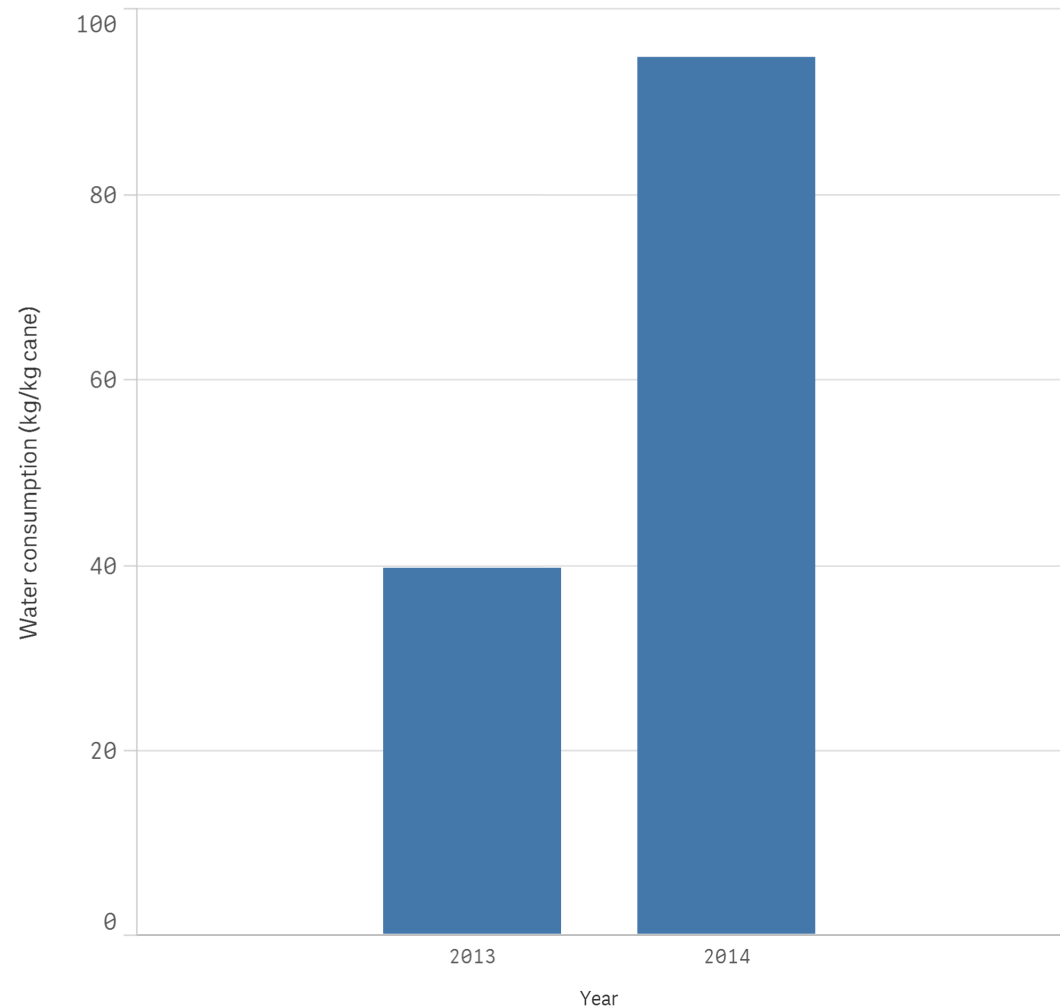


Graph 20 - Water Consumption in Agriculture

The overall water consumption in agriculture seems to face the opposite trend. However, by splitting the result per country, we can identify country-specific observations which are directly related to the agricultural systems. In 2013 and 2014, new mills have gained certification. These mills were in areas where cane is usually irrigated, resulting in a higher level of water consumption (Australia, India).

If we observe the results for Indian and Australian mills, we see a sharp increase in the water consumption. To understand this, we need to analyse their production and system and we come to the realisation that these mills are relying on irrigation to grow their cane, which increases their overall water consumption.

AG water consumption for India and Australia

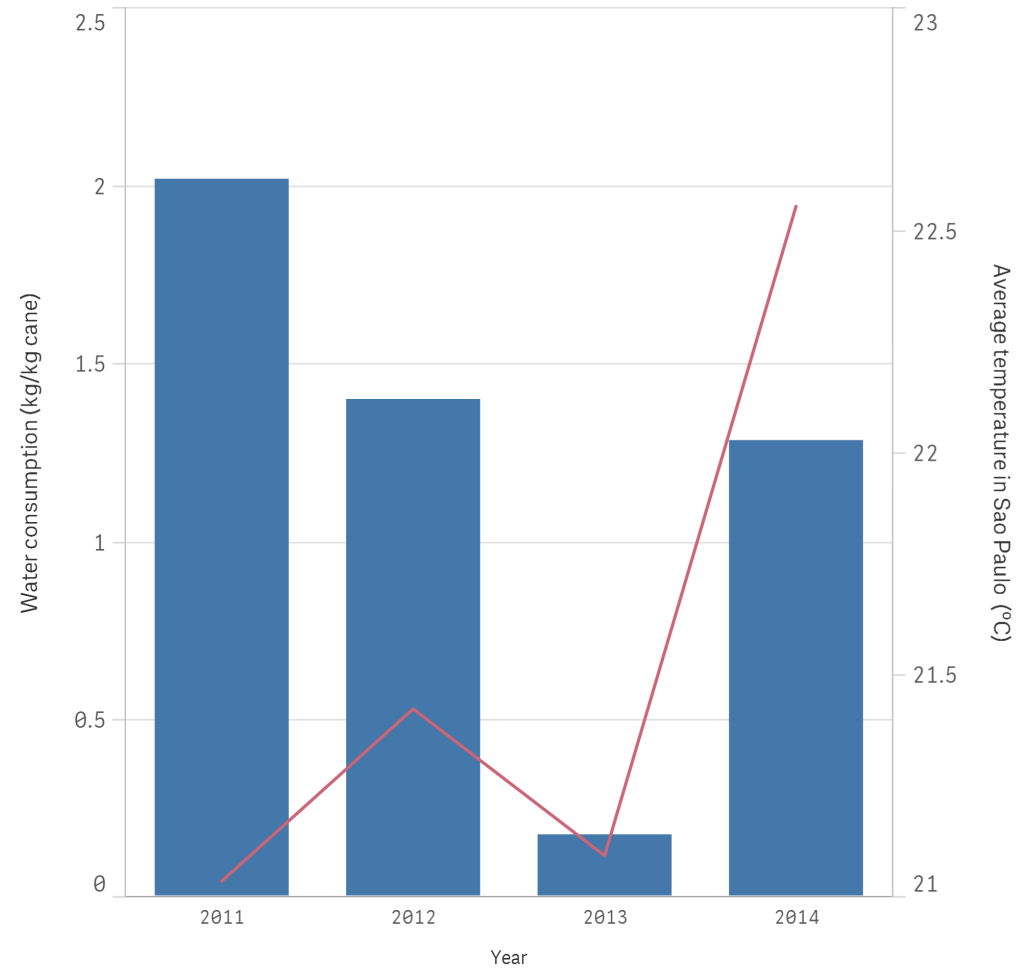


Graph 21 - Water Consumption in Sugarcane Agriculture for irrigated Systems (India & Australia)

If we only take into consideration Brazilian mills, we observe a decrease in the water consumption between 2011 and 2013 and an increase in 2014 (from 0.17 to 1.28 kg water/kg cane).

If we compare this to the average temperature observed in São Paulo State, we could conclude that the high temperature of 2014 (22.5 vs 21 in 2013) might have resulted in a sharp increase of consumption of water, covering for the deficient rainfall which occurred at the same time and reducing the water saving efforts of producers.

AG water consumption in Brazil against average temperatures in Celsius



Graph 22 - Water Consumption in Sugarcane Agriculture in Brazil against average temperatures in São Paulo State



High Conservation Value Land

To protect land with high concentrations of biodiversity, all mills seeking certification cannot convert land classified as High Conservation Value into sugarcane producing land.

Using a cut-off date of 2008, land that falls into a category listed as high conservation value (HCV) land cannot be converted. Operators have to demonstrate that no land under cane, that can be characterised by one or more of the six HCV categories, was converted after 2008. They do so using land registry, field studies as well as satellite imagery. The growing number of Bonsucro Production Standard certified mills indicates more mills are willing to agree to this commitment in moving forward in production and can prove none of the certified sugarcane has been produced on land that was of HCV after 2008.

8. RECOMMENDATIONS

- **Future impacts on data:** One of the goals of Bonsucro is to increase the scale of mill certifications (both in volume and in number of origins). As Bonsucro certification expands into areas where mills may be not as high performers as early adopters, analysing agglomerate data might be more challenging if we aim at analysing over time changes. Bonsucro is looking to be more inclusive and to work with mills in the most challenging contexts, which may bring general outcome results and averages down. In order to avoid a misperception that Bonsucro is underperforming as a Standard, it is important that the Secretariat keeps track of changes by year and country, and control for the inclusion of mills with lower performance (i.e. to avoid misinterpretation of overall results of mills that have been engaging in the program for a longer time).
- **Data visualisation to mills:** As Bonsucro's datasets grow the potential learning from data increases. Bonsucro should assess ways in which it can help mills to visualize data, benchmark against other mills, and learn from the information.
- **M&E Strategy:** In its new strategy as a global sugarcane platform, Bonsucro will need to revise its Theory of Change and M&E indicators. Bonsucro has also recently published a commitment to support the United Nations' Sustainable Development Goals^{xiv}. It is important that Bonsucro understands which indicators can be monitored to capture key risks and opportunities in the sector, aligned to the Global Development Goals. In order to identify a reduced relevant set of indicators (i.e. a subset of indicators that can be applied globally), Bonsucro should use statistical analyses to determine the level of correlation between variables in the Production Standard and how indicators can predict each other.
- **Yields:** Bonsucro should develop more capacity, either internally or externally, to monitor productivity more closely across the globe, and, in particular, to understand the several factors that affect yields year on year, including monitoring weather and rainfall conditions, economic and political circumstances, local prices of inputs and farmer autonomy in choosing seeds and agrochemicals, amongst several others. In the same sense, Bonsucro should start monitoring individual evolution of yields and to map the best performing mills for carrying out in-depth case studies and story-telling.
- **Added Value:** A lot more research is needed to propose a fuller and consistent methodology to account for the added value of sugarcane production and processing. There may be multiple hidden variables, including local factors that are not relevant elsewhere, which may play a part in determining added value and that are currently not accounted for by Bonsucro.
- **Workers' Wages:** It would be interesting for Bonsucro to understand how wages are evolving for non-certified mills; this is an area where the potential impact of sustainability can be tested since higher wages may lead to thriving sugarcane communities with stronger household income and purchasing power.

- **Workers' Safety:** Results have remained positive. Although there is an existing rich literature around the business benefits of health and safety measure, there are very few case studies of benefits in the sugarcane sector. Bonsucro could play a leading role in understanding how preventive health and safety measures translate into business benefits for sugarcane farmers and mills.
- **Fertiliser Application:** By increasing the analysis of fertilisation rate and using the GPS coordinates of mills, Bonsucro could consider how to identify local best practices in fertiliser application and pass it on to mills in similar areas with high fertiliser application.
- **Agrochemicals:** Results have been very positive this year. Bonsucro should further assess agrochemical use to understand how the Standard may have helped producers to move away from dangerous agrochemicals and what possible side effect might have occurred. Further studies on the linkages of agrochemical use and productivity would also be important.
- **GHG emissions & land conversions:** Bonsucro has privileged access to data on carbon emissions in the sugarcane sector. Bonsucro can have an active role in promoting non-conversion of inappropriate land and on providing guidance on suitable conditions for land conversions. In the same direction, Bonsucro could promote or support studies to determine how land conversions have positive impacts in other fronts (such as employment, investment, and recovery of unused degraded land), and to better understand the multiple trade-offs involved in expanding land conversions.
- **Water:** Bonsucro should continue assessing the efficiency of water use and potentially create a risk base analysis based on the production data to focus studies on actions to areas most at risk. Bonsucro should also encourage basin-level management of water to support a collaborative approach amongst the various users of same water sources. It might require an evolution of the Production Standard.
- **High Conservation Value Land:** Bonsucro should extend the concept of HCV, not just to prevent conversion of HCV areas but to support the maintenance and improvement of existing ones in the direct surrounding of sugarcane operations.

ⁱ W. Kolby Smith, Derric N. Pennington, Justin A. Johnson, Erik Nelson, Steve Polasky, Paul C. West, Jamie S. Gerber, Stefen Siebert, Eric F. Lambin, Kate A. Brauman, Kimberly M. Carlson, Margaret Arbuthnot.

ⁱⁱ <http://www.theguardian.com/sustainable-business/2016/feb/23/corporate-social-responsibility-sustainability-general-mills-patagonia-ben-and-jerrys>

ⁱⁱⁱ FAO, 2016: <http://faostat.fao.org/site/339/default.aspx>

^{iv} Prakash, A. & Potoski, M., 2006. The Voluntary Environmentalists: Green Clubs, ISO 14001 and Voluntary Environmental Regulations. Cambridge: Cambridge University Press.

^v Online news articles: <http://www.ibtimes.com/brazil-drought-boosts-coffee-prices-threatens-sugar-production-1704093>;

<http://www.agrimoney.com/news/brazil-drought-may-be-bigger-sugar-threat-in-2015--6764.html>

^{vi} Climate Variability: Oceanic Niño Index, LuAnn Dahlman, August 30, 2009 updated February 11, 2016 <https://www.climate.gov/news-features/understanding-climate/climate-variability-oceanic-ni%C3%B1o-index>

^{vii} International Programme on the Elimination of Child Labour (IPEC). *Hazardous child labour in agriculture, sugarcane sector (Safety and health)*. ILO, Geneva, 2004. URL <http://www.ilo.org/ipeinfo/product/download.do?type=document&id=5713>.

^{viii} <https://osha.europa.eu/en/tools-and-publications/publications/reports/the-business-case-for-safety-and-health-cost-benefit-analyses-of-interventions-in-small-and-medium-sized-enterprises>

^{ix} IPCC Climate Change 2014, Synthesis Report https://ipcc.ch/news_and_events/docs/ar5/ar5_syr_headlines_en.pdf

^x PAS2050:2011 Specification for the assessment of the life cycle greenhouse gas emissions of goods and services shop.bsigroup.com

^{xi} <http://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

^{xii} <http://www.ibtimes.com/global-drought-conditions-are-drying-out-several-regions-sparking-food-production-1628770>

^{xiii} http://site.sabesp.com.br/site/uploads/file/clientes_servicos/comunicado_04_2015.pdf

^{xiv} <https://sustainabledevelopment.un.org/?menu=1300>