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ESG analysis on-farm: a practical framework to support Australian producers

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Abstract Increased pressures for a more sustainable agricultural development model has seen interest in ESG (Environmental, Social and Governance) grow rapidly. ESG frameworks and standards were designed to support industry and organisations to assess and report their ESG impacts, creating economic, environmental, and social benefit for society. However, these frameworks are not necessarily easily applied by farmers or agricultural producers. In principle, the lack of a simpler and specific framework focused on assisting farmers to continuously improve sustainability on-farm could be a limiting factor in them adopting ESG approaches and standards. With the aim of raising awareness and supporting Australian producers to self-assess and report ESG impacts on farm, and thus contributing to enhanced sustainability performance, we developed an ESG on-farm framework. We also developed a preliminary trial to investigate a) how readily the ESG on-farm framework can be applied by sugarcane farmers; and b) whether the framework can support sugarcane producers to measure sustainability-related risks and opportunities (sustainability baseline) and develop an ESG strategy. The ESG on-farm framework comprises five steps based on a blended format informed by the Global Reporting Initiative (GRI) framework and other current and relevant ESG standards. The ESG on-farm framework is a self-assessment of ESG readiness designed to be practical and to enable farmers to start their ESG analysis. Preliminary results suggest that the ESG on-farm framework could streamline the process for sugarcane farmers to develop materiality assessments, establish sustainability baselines, and inform ESG strategy.

Key words ESG on-farm, SDGs, multistakeholder approach, ESG metrics, sustainability performance, ESG strategy, sustainability baseline, sugarcane

INTRODUCTION

Since the term ESG (Environmental, Social and Governance) was coined in 2004, the use of ESG frameworks to disclose data and report on sustainability has grown in importance (G&A 2022; The Global Compact 2004). In recent years, we have witnessed not only the growth of published sustainability reports, but also an evolution in the adoption of ESG principles within corporate core values and management strategies for sustainable management and investments (ASD 2023; G&A 2022). The Paris Agreement goals (United Nations 2015) and ESG investing are increasing the importance of credible ESG standards (Jinga 2022). This new evolving context has not only increased the importance of ESG policies and standards but also led some countries to introduce ESG-related regulatory frameworks (Tang 2023; SFAC 2022; European Union 2021). In Germany, France and

the Netherlands there is close cooperation between government and business to address climate issues and the maturity of ESG instruments (Wang *et al.* 2023).

Interest in ESG has also grown in the agricultural sector due to the potential financial impacts caused by greenhouse gas (GHG) emissions and water risks (e.g., water scarcity and water quality), including extreme events such as heatwaves, droughts and floods (TCFD 2021; S&P Global, 2020). In this context, assessing climate-related risks and opportunities to reduce financial losses becomes relevant and an ESG analysis could be a valuable alternative (TCFD 2021). However, the adoption of ESG standards by farmers/primary producers is a challenge because ESG frameworks and standards were designed with industry (focus of the Sustainability Accounting Standards Board (SASB) guidance¹), organisational (focus of Global Reporting Initiative (GRI) step-by-step guidance²) and financial sector (focus of the Task Force on Climate-Related Financial Disclosures (TCFD) principles³) needs in mind and not those of farmers. The SASB standards, for instance, are industry-specific based on the Sustainable Industry Classification System⁴ (SICS). The GRI provides instructions for any type of organisation, while the TCFD provides recommendations and guidance on climate-related financial disclosures. In principle, the lack of a specific framework focused on assisting farmers to continuously improve sustainability on-farm could be a limiting factor for their adoption of ESG standards.

In Australia, discussions around the value that ESG frameworks and tools can add to farmers have increased in the past few years, as well as the number of initiatives aiming to strengthen sustainability in the agricultural sector. The Australian Agricultural Sustainability Framework⁵ (AASF), for instance, builds on several international and national frameworks to articulate the sustainability of Australian agriculture on a national basis and to facilitate communication with distinct stakeholders. The AASF and other national sustainability initiatives have both expanded the potential adoption of ESG standards by farmers/ primary producers and reinforced ESG principles. Another ESG aligned initiative focused on strengthening sustainability performance on sugarcane production is Bonsucro which can be used by farmers to assess, measure, and report on sustainability performance. Another important aspect regarding the ESG frameworks is their link with the 17 Sustainable Development Goals⁶ (SDGs). At a global level, the SDGs have been adopted not only by governments but also by companies and investors to support more sustainable and inclusive businesses (Sachs 2015; Chang & Ke 2023). The SDG framework includes 169 targets and 231 indicators and can be applied in different ways at a business-level, leveraging ESG standards and performance (Gardes-Landolfini *et al.* 2023). Increasingly, the SDGs framework have been integrated in ESG strategies by businesses and industries (QHSE 2023). It is likely the connection between ESG and SDGs can accelerate the achievement of these goals in a more inclusive way (Su *et al.* 2023; ITFA 2023). A good example of how local farming practices can contribute to broader environmental and social goals is the use of fertilizers, especially nitrogen. On the one hand, nitrogen is an essential nutrient in crop production but, on the other, it is responsible for negative impacts on terrestrial and aquatic ecosystems. Improving nitrogen use can enhance productivity, improve soil quality, and reduce environmental impacts. At a global scale, improving nitrogen use is also linked with the achievement of Sustainable Development Goals 2 (sustainable agriculture), 14 (life below water) and 15 (life on land).

Aiming to support farmers on their own pathways toward sustainability through ESG, we propose a simplified and practical ESG on-farm framework which is informed by GRI, SASB, TCFD and the SDGs standards. We also provide preliminary results from a trial developed to investigate whether the ESG on-farm framework can: a) streamline and enable an ESG self-assessment by sugarcane farmers; b) support sugarcane farmers to establish a sustainability baseline facilitating the measurement of sustainability-related risks and opportunities; and c) support sugarcane farmers to perform an ESG self-assessment and develop an ESG strategy.

METHODOLOGY

The ESG on-farm framework

Our framework was adapted from the Global Reporting Initiative (GRI) given that the GRI is considered as the most comprehensive approach towards materiality (Goswami and Islam 2023). However, it also builds on the Sustainability Accounting Standards Board (SASB), and other current international ESG frameworks and

¹ <https://sasb.org/find-your-industry/>

² GRI 1 – Foundation 2021 (file:///C:/Users/jc949702/Downloads/GRI%201_%20Foundation%202021%20(1).pdf)

³ <https://www.fsb-tcfid.org/recommendations/>

⁴ <https://sasb.org/wp-content/uploads/2018/11/SICS-Industry-List.pdf>

⁵ <https://www.agriculture.gov.au/sites/default/files/documents/agricultural-sustainability-framework-update.pdf>

⁶ <https://sdgs.un.org/goals>

standards, such as the Task Force on Climate-Related Financial Disclosures (TCFD) and the Sustainable Development Goals (SDGs). Our framework is also aligned with the AASF. We used a blended format to make the analysis comprehensive and more “on-farm” focused. In the development of the ESG on-farm framework, we also considered the recommendations of TCFD for the agriculture, food, and forest products group and we linked some widely recognised material topics for the agricultural sector in Australia to the SDGs to make it easier for farmers to understand the connection on how farming practices can contribute to the achievement of broader environmental and social goals.

Central to the ESG framework is the concept of materiality. It is a key concept and critical for the identification and prioritisation of ESG issues. From an early focus on financial risks and opportunities, the materiality concept has evolved to a wider perspective of sustainability referred as “double materiality” (Jorgensen *et al.* 2022). Double materiality considers both sustainability issues that may affect the business (“outside-in risks”) and how the business affects society and the environment (“inside-out risks”) (European Union 2014). In this study, we adopted a double materiality approach to develop an on-farm ESG analysis framework meaning that our analysis was focused on potential risks and opportunities related to ESG issues.

The preliminary trial

Aiming to investigate whether the ESG on-farm framework could help sugarcane farmers develop ESG reports, establish sustainability baselines, and document ESG strategies, we developed a preliminary and limited trial. The trial was developed with the support of the sugarcane industry and a farmer organisation that was selected based on their experience with sugarcane sustainable management practices. During the trial, we provided all guidance necessary to apply the ESG on-farm framework. At the end of the trial, the selected organisation shared their experience in using the ESG on-farm framework.

RESULTS

The ESG on-farm framework

The ESG on-farm framework consists of 5 steps (Figure 1). Different from other ESG standards that are focused on reporting, our framework is structured as an input-output process. The inputs involve data and information that farmers already have, are collecting, or will need to collect. The outputs include the information that is gathered from performing the ESG on-farm framework. Farmers will use these outputs to develop an ESG strategy as well as for reporting.

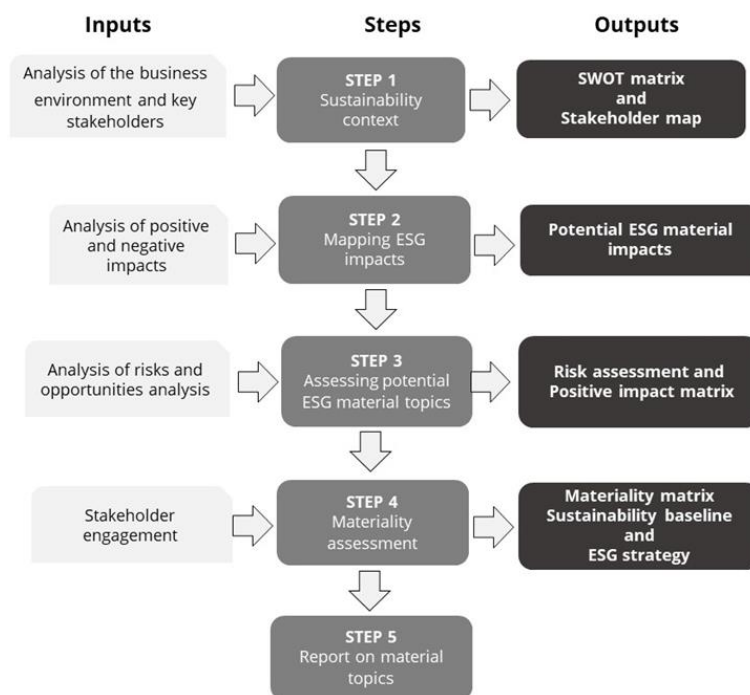


Figure 1. The ESG on-farm framework.

Step 1 Sustainability Context

Step 1 is focused on getting a better understanding of the sustainability context and identification of key stakeholders. We propose a SWOT analysis to strategically analyse the business environment and farmer's capability to deal with changes in the business environment. A SWOT analysis is a type of qualitative analysis often used to assess relevant factors impacting on business. It summarises key issues from the business environment and the strategic capability of an organisation that are most likely to impact on strategy development (Johnson & Scholes 1993). The SWOT matrix illustrates the strengths (S), weaknesses (W), opportunities (O) and threats (T) of farming business and is a very useful tool to develop comparisons with competitors. Regarding the identification of stakeholders, we suggest the Mendelow's power/interest matrix to develop a stakeholder map and determine their potential level of impact on-farming business (Medelow 1991). The Mendelow's model is a stakeholder mapping technique useful to link the dynamism of the business environment with the power of the stakeholders to affect the business (Olander and Landin 2005).

Step 2 Mapping ESG Impacts

Step 2 involves mapping the potential ESG impacts from on-farm activities. The identification of impacts can be based on a literature review, farmers experience, and industry reports. To simplify the development of Step 2, we provide farmers with a list of some widely recognised local agriculture ESG impacts and related risks (Table 1) as a useful starting point. Because we adopted the GRI approach we also suggest farmers identify negative and positive impacts and classify these impacts on i) actual or potential; ii) direct or indirect; and iii) short or long-term basis.

Table 1. List of widely recognised local agriculture ESG impacts and risks.

ESG Dimension	Risks	Potential local impacts
Environmental (E)	Increased air emissions (cane burn, GHG emissions/ carbon emissions)	Pollution of air, extreme weather events with recurrent heatwaves, droughts and flooding events, food insecurity, health disorders
	Improper soil management/ soil pollution	Loss of soil fertility, soil erosion and nutrient runoff, soil degradation, desertification, depletion of natural resources, carbon emissions
	Improper water management (waterways and groundwater)	Pollution of land and water, depletion of water resources, water scarcity, and water security
	Improper energy management	Waste of local energy sources, air pollution (diesel combustion), carbon emissions
	Deforestation	Increase GHG emissions, changes in the rainfall distribution and floodings
	Loss of biodiversity	Depletion of ecosystems and ecosystem collapse
	Improper waste disposal	Air, soil, and water pollution
Social (S)	Employee health, safety, and wellbeing	Health disorders, production delays, absenteeism, and employee turnover
	Distinct consumer interests	Potential loss of market
	Human rights violations	Psychological, physical, and interpersonal problems
	Livelihood	Health disorders and well being
	Animal and human welfare	Animal harm and human health
	Lack of community engagement	Stakeholder opposition and interference
Governance (G)	Systemic risk management	Direct economic losses
	Improper/ lack of measurements	Lack of transparency, green washing
	Low business performance	Legal compliance, structural stability, estate/ succession planning
	Lack of business plan/ business strategy	Financial consequences, loss of resources, time spent on the wrong path, miss opportunities to growth
	Lack of succession plan	Increase business disruption, disagreements and personal conflicts, reduced business performance

Step 3 Assessing Potential ESG Material Topics

Step 3 focuses on developing a risk assessment and a positive impact matrix to assess the significance of the impacts identified in Step 2. The concept of significance was adopted from the GRI to assess negative and positive impacts. In the risk assessment, significance is determined by the severity and likelihood of the impact. The severity of an impact is related to scale (how grave the impact is) and scope (how widespread it is). In the positive impact matrix, the significance of positive impacts is determined by the beneficial rating. The beneficial rating of an impact is measured by scale (how beneficial the impact is) and scope (how widespread it is, i.e., the extent of the benefit). Likelihood refers to the chance of the impact to happen in both type of assessments. Moreover, in the risk assessment, we also suggest farmers propose a mitigation strategy for each impact that they identify.

Step 4 Materiality Assessment

In Step 4, farmers develop their materiality assessment based on a multistakeholder approach aiming to incorporate ESG factors into farming businesses and build a materiality matrix. The materiality matrix is a graphic representation of the materiality assessment and shows the prioritisation of sustainability issues in a two-axis diagram (Figure 2). One axis shows the significance of ESG impacts and the other shows the importance of those issues to stakeholders. The process to develop the materiality matrix involves the prioritisation of ESG issues by farmers/primary producers (significance of impacts) and by stakeholders.

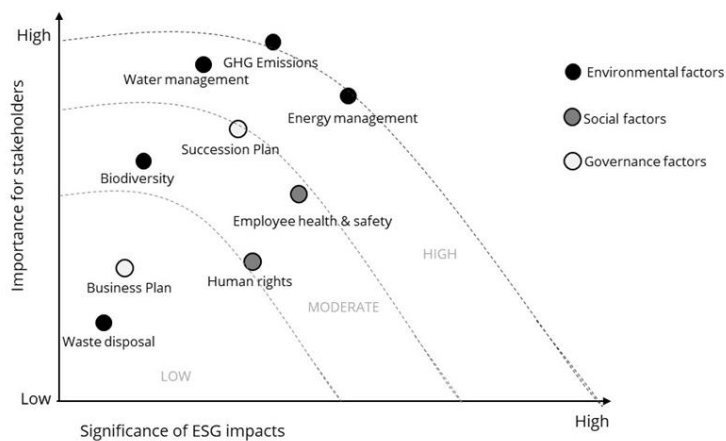


Figure 2. Example of a materiality matrix.

Stakeholder engagement is crucial in this step to prioritise ESG impacts, and it is used to build the materiality matrix. Farmers can engage with their stakeholders in distinct ways such as in-person meetings, surveys, community events, or emails. Farmers can use the Stakeholder Map built in Step 1 as a reference to deploy the stakeholder consultation. Once farmers and stakeholders have prioritised the ESG material issues, the materiality matrix can be built to easily visualise the material topics.

Once the materiality matrix is built, we suggest that farmers determine metrics and indicators to quantify material topics, establish a sustainability baseline, and measure progress toward sustainability over time. The metrics and indicators will be the basis for creation of a sustainability baseline and ESG strategy. The sustainability baseline is a measurement of ESG impacts/material topics that provides a starting point to analyse sustainability progress over time. The indicators will be used to establish the sustainability baseline and compare data over time.

Regarding the ESG strategy, we suggest farmers include in their strategy:

- a) commitments to sustainability,
- b) aspects related to governance,
- c) scope (on-farm),
- d) mitigation strategies considering the relevant short, medium, and long-term time horizons,
- e) results of the materiality assessment and the materiality matrix, and

f) metrics associated with the material topics.

Step 5 Report on material topics

Step 5 is focused on writing a report to communicate material information about sustainability-related risks and opportunities. The report will summarise the progress and commitments towards the ESG strategy. While there is some speculation that ESG reporting will become compulsory, it is currently voluntary for farmers. As such, depending on reporting requirements, there are several standards and methodologies that could be used to develop a report. Regardless the framework adopted to report, it must provide the key metrics used to measure progress and manage risks. We suggest farmers/ primary producers use the sustainability baseline as a reference to report.

The preliminary trial

The selected organisation suggested that the ESG on-farm framework was easy to apply and provides a platform for farmers to develop their initial ESG self-assessment, create a sustainability baseline and their ESG strategy. The selected organisation shared that the ESG on-farm framework can add value to farming management and recommended the framework be piloted by other farmers.

The ESG on-farm framework allows farmers to collect and use their own data, and thus does not need to be collected by another party (unless they want it to be). However, the baseline data, specifically those data related to soil carbon, carbon emissions and chemical residues, were considered very challenging to be collected by the selected organisations.

CONCLUSIONS

Our study provides a comprehensive and practical ESG on-farm framework aiming to support farmers to develop an initial ESG self-assessment. The framework also provides guidance for farmers to establish a sustainability baseline, facilitating the measurement of sustainability-related risks and opportunities over time, and develop their ESG strategy.

Our expectation is that the ESG on-farm framework presented in this paper can help other farmers to develop an initial ESG self-assessment, enabling the development of an ESG strategy, contributing to increase resilience, enhance sustainability performance, and facilitate the transition to a more sustainable production system.

From industry to farmer focus. Considering that current ESG frameworks were not designed to be used by farmers/ producers, our effort was focused on providing an easy and practical framework for farmers to get started with an ESG analysis.

Multistakeholder approach. Our framework was structured using the GRI as its main source but also includes other relevant international standards. In our opinion, the multistakeholder approach is essential for a comprehensive understanding and prioritisation of material topics. It can also facilitate engagement with stakeholders.

Finally, some limitations of this work are the limited sample with just one trial incurring restricted interpretation of our findings. We are developing new trials to also include individual farmers in order to better evaluate the ESG on farm framework and verify the type of assistance farmers will need to develop the materiality assessment, create the sustainability baseline and the ESG strategy.

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REFERENCES

ASD - Association for Supporting the SDGs for the UN (2023) UN SDGs. Accessed October 31, http://asdun.org/?page_id=2528&lang=en

- Chang YL, Ke J (2023) Socially responsible artificial intelligence empowered people analytics: a novel framework towards sustainability. *Human Resource Development Review* 23: 88-120.
- European Union (2014) Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups Text with EEA relevance. Accessed November 15, 2023.
- European Union (2021) Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'). Accessed September 26, 2023.
- Gardes-Landolfini C, Prasad A, Stewart FE, *et al.* (2023). Activating alignment: applying the G-20 principles for sustainable finance alignment with a focus on climate change mitigation. Washington, DC: World Bank. Accessed September 21, 2023. <https://www.imf.org/external/np/g20/pdf/2023/091323.pdf>
- G&A (2002) Sustainability reporting on focus. Accessed October 6, 2023. <https://www.ga-institute.com/research/ga-research-directory/sustainability-reporting-trends/2022-sustainability-reporting-in-focus.html>
- ITFA ESG Committee, Harding R (2023) The regulatory reporting reality of making trade sustainable. Accessed October 31, 2023. <https://itfa.org/the-regulatory-reality-of-making-trade-sustainable-may-2023/>
- Jinga P (2022) The Increasing Importance of Environmental, Social and Governance (ESG) investing in combating climate change. *Intech Open*: doi: 10.5772/intechopen.98345.
- Johnson G, Scholes K (1993) *Exploring corporate strategy: text and cases. 3rd ed.* Prentice Hall, New York.
- Jørgensen S, Mjøs A, Pedersen LJT (2022) Sustainability reporting and approaches to materiality: tensions and potential resolutions. *Sustainability Accounting, Management and Policy Journal* 13:341-361.
- Mendelow AL (1991) Environmental Scanning: The impact of the stakeholder concept. Proceedings from the Second International Conference on Information Systems, pp. 407-418. Cambridge, USA.
- Olander S, Landin A (2005) Evaluation of stakeholder influence in the implementation of construction projects. *International Journal of Project Management* 23: 321-328.
- QHSE - Quality & EHS Management in the digital age (2023) ESG Strategies to Achieve the UN's Sustainable Development Goals. Accessed October 5, 2023. <https://www.blog-qhse.com/en/esg-strategies-to-achieve-the-uns-sustainable-development-goals>
- Sachs J (2015) *The age of sustainable development.* Columbia University Press: New York.
- SFAC - Sustainable Finance Action Council (2022) Taxonomy roadmap report. mobilizing finance for sustainable growth by defining green and transition investments. Accessed September 27, 2023. <https://www.canada.ca/content/dam/fin/publications/sfac-camfd/2022/09/2022-09-eng.pdf>
- S&P Global (2020) How is agriculture impacted by ESG investing. Accessed May 30, 2023. <https://www.spglobal.com/en/research-insights/articles/how-is-agriculture-impacted-by-esg-investing>.
- Su X, Wang S, Li F (2023) The Impact of Digital Transformation on ESG performance based on the mediating effect of dynamic capabilities. *Sustainability* 15: 13506.
- Tang KHD (2023) A review of Environmental, Social and Governance (ESG) regulatory frameworks: Their implications on Malaysia. *Tropical Aquatic and Soil Pollution* 3: 168-183.
- TCFD (2021) Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures. Accessed September 20, 2023. <https://www.fsb-tcfd.org/recommendations/>
- The Global Compact (2004) Who Cares Wins Connecting Financial Markets to a Changing World Recommendations by the financial industry to better integrate environmental, social and governance issues in analysis, asset management and securities brokerage. Accessed May 20, 2023. https://www.unepfi.org/fileadmin/events/2004/stocks/who_cares_wins_global_compact_2004.pdf
- United Nations (2015) United Nations Framework Convention on Climate Change. Paris Agreement. United Nations: Bonn.
- Wang D, Dong L, Mei J (2023) An advanced review of climate change mitigation policies in Germany, France, and the Netherlands. *Environmental Research Letters* 18: 103001.
- Zuber-Skerritt O (2002) The concept of action learning. *The Learning Organization* 9: 114-124.