The Impact of Sustainability Cacao Farmers In Davao City

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ABSTRACT. Sustainable cacao farming encompasses environmentally conscious practices that prioritize biodiversity, equitable labor conditions, and resource conservation, all aimed at ensuring the enduring viability of cacao production while positively influencing both ecosystems and local communities. The impact of the sustainable cacao industry on Davao City was systematically assessed across economic, environmental, and social dimensions. This research aimed to uncover the diverse ramifications of the sustainable cacao industry and explored variations in effects based on demographic profiles. A quantitative research design was used in the study. The study focused on 300 cacao farmers in Calinan, Davao City, providing primary data during November 2022. The statistical tools are mean, mode, t-test, and ANOVA. The proponents of the study concluded that sustainable practices among cocoa producers in Davao City yield positive impacts on social, environmental, and economic aspects, fostering growth, preservation, and progress. Gender equality unlocks the full potential of women as change agents, a vital component for inclusive cocoa sustainability. Attaining sustainable cocoa cultivation in Davao City transcends civil status, emphasizing factors of greater influence. Educational resources in these areas drive social advancement, economic growth, and environmental stewardship. The researchers suggest advocating sustainable methods for heightened cocoa productivity, resilience against economic shifts, and farmer prosperity. Foster inclusive, efficient training to boost agricultural output, eco-care, and living standards. Educational resources and unbiased policies in Davao's cocoa communities aid overall sustainability.

Keywords: Sustainable, Cacao Farming, Profile of Respondents

INTRODUCTION

Cacao Cultivating cacao proves to be a challenge due to limited viability arising from scalability constraints, compounded by the meager valuation of cacao beans at the farm gate, accounting for just 6% of the eventual consumer price (Suh and Molua, 2022). Agricultural yields are hindered by the scarcity of soil nutrients, elevated expenses linked to pest, disease management, and plant nutrition, alongside the growing variability of climatic conditions (Suh and Molua, 2022). This confluence of factors poses a serious threat to the sustainability of the cocoa industry.

The International Cocoa Organization acknowledged an array of industry challenges in 2014, ranging from diminished productivity and soil fertility to inadequate farm management practices, the specter of climate change, and other factors (Ercili-Cura and Barth, 2021). The cacao communities also grapple with widespread poverty, harsh labor conditions, child labor concerns, and the instability of farm-gate prices (Ercili-Cura and Barth, 2021).

The study of Leng and Hall (2019) indicates that the decline in cacao yield within Mexico's agricultural sector might be emblematic of a global trend. The nation where cacao beans were first cultivated is experiencing a rapid reduction in cultivated acreage, raising concerns not only about the diversity of local production but also the

genetic and historical heritage as cacao plantations make way for more lucrative commercial crops.

While Cadby and Araki (2021) sheds light on concerns such as farmer welfare, labor ethics, and environmental impacts within the cocoa commodity industry, specialized studies focused on the intricacies of specialty cacao remain limited, despite the industry's increasing emphasis on sustainable development (Cadby and Araki, 2021). Notably absent are quantifiable analyses of specialty cacao pricing, comprehensive industry characterizations, and the multi-dimensional consequences that drive sustainable development in cacao-producing countries. As the specialty cacao sector continues to expand globally, establishing consensus on quality standards and terminology becomes paramount for its enduring success.

Abbott et al. (2018) further described cocoa planting as important in the economies of the main African cocoa producing countries, where it achieves three goals: providing foreign monetary exchange to the country, contributing to the state budget, and providing income to the rural inhabitants that rely on it.The cocoa value chain, on the other hand, is not sustainable. Producers frequently fail to break out from the vicious circle of poor productivity and low revenue, as well as a lack of investment in their plants and low yields. However, the elimination of forest area threatens the viability of farms that contribute to livelihoods from cocoa production in various African countries (Ayompe, et al., 2021). Similarly, Barrera (2022) underscores that the cocoa supply chain is widely recognized for its manifold social and environmental challenges, notably pronounced within African nations. Predominantly, this multibillion-dollar sector has grappled and continues to grapple with allegations of modern labor exploitation and the pervasive issue of child labor.

Nonetheless, Indonesia witnessed a steep decline in cocoa productivity in 2018, consequently slipping to the fifth position globally, trailing Côte d'Ivoire, Ghana, Ecuador, and Nigeria (Kozicka et al., 2018). This decline in cocoa yield was precipitated by the impact of pests and diseases, coupled with the advancing age of cocoa plants. The diminishing productivity was coupled with compromised cocoa bean quality and inefficiencies in farming practices, resulting in diminished profitability in the cocoa cultivation sector. Faced with the challenges of disease prevalence, pest infestations, low productivity, and limited income, farmers have been compelled to consider shifting away from cocoa cultivation.

The Philippine cacao industry necessitates substantial attention not only from governmental entities but also from other key stakeholders in the industry. Acknowledging this imperative, a comprehensive Philippine Cacao Roadmap has been devised to guide the development of the nation's cacao sector over the forthcoming five years. This strategic blueprint aspires to establish a competitive and sustainable Philippine cacao landscape by 2022, aligning with the objectives envisioned by stakeholders within the cocoa domain. The peak of cocoa bean production in the Philippines occurred during the 1990s, amounting to 35,000 tons; however, this figure has subsequently dwindled due to aging and unproductive trees, unfavorable pricing structures for producers, and adverse meteorological conditions (DTI, 2017).

Lingatong (2018) highlighted that most cacao cultivators in Davao City exhibited suboptimal productivity levels, necessitating interventions from both governmental bodies and commercial entities to address the factors impeding farmers' potential for enhanced productivity. Predominant challenges encompassed the high costs associated with fertilizers, the limited uptake of efficacious long-term agricultural practices, and a prevailing dearth of pertinent information.

The focus of this study was to assess the ramifications of establishing a sustainable cacao industry within Davao City, encompassing its economic, ecological, and social dimensions. The researchers aimed to delve into the extent of influence exerted by the sustainable cacao industry on the various facets of the city's development.

The study aimed to assess the influence of the sustainable cacao industry on Davao City, focusing on its economic, environmental, and social ramifications. It addressed the question of how the sustainable cacao industry's impact manifests in these three dimensions. Additionally, the research explored whether any noteworthy variations exist in the effects of the sustainable cacao industry in Davao City based on different demographic profiles, specifically, the respondents' age, gender, civil status, and educational attainment.

Over the past two decades, the notion of sustainability has garnered escalating attention from scholars and practitioners globally, comprising three interdependent pillars (Greenland et al., 2022). As expounded by Mensah (2019), sustainability entails the harmonious amalgamation of economic, environmental, and social facets within the realms of economy, environment, and society. This integration aims to secure the well-being of present and future generations. The concept of sustainability encompasses diverse dimensions, encompassing economic, environmental, and social considerations. The triad of sustainability principles is intrinsically intertwined, necessitating simultaneous fulfillment to attain comprehensive development (Mensah, 2019).

Elf (2020) elaborates that sustainability, in its broadest context, involves the execution of various operations within a spectrum of quantities and variations, ensuring the absence of self-destruction and instead fostering enduring recurrence and regeneration. The sustenance of an object or structure correlates with its longevity while preserving its composition, aesthetic value, and intrinsic essence. This encompasses the judicious utilization and exploration of resources to ensure optimal utilization while safeguarding their legacy for subsequent generations. Tremblay et al. (2020) further assert that this perspective encourages innovative strategies for implementing sustainable development, embracing a cross-cutting approach that values the diverse cultures and knowledge of different stakeholders.

The United Nations has adopted sustainable development as a guiding principle encompassing economic, environmental, and social domains, aiming to fulfill current needs while safeguarding the ability of future generations to meet their own requirements, while equitably sharing ecological costs and benefits. Font and Mensah (2019) posit that sustainability rests upon a foundation of ethical principles and values, advocating for responsible and equitable behaviors that balance environmental and social repercussions of actions with economic objectives. The notion of sustainable development has gained pervasive currency, encapsulating the principles underlying the endeavors of governments, non-governmental organizations, corporations, and environmental advocates, alluding to the concept of minimizing environmental impact in the pursuit of needs and objectives. Malik (2019) underscores the necessity for an alteration in humanity's developmental paradigm.

Moreover, Leal Filho et al. (2018) underscore the mounting significance of sustainability research, facilitating the preservation and safeguarding of economic efficiency, the physical environment, and social equilibrium. This research stands as an instrumental junction between sustainable development and emergent policies, ultimately contributing to the achievement of sustainable development goals. Nashrah et al. (2021) assert that these sustainable development goals will guide endeavors in this direction, aiming to enhance the lives of all individuals while concurrently pursuing collective goals, including economic prosperity and decent livelihoods. Likewise,

Andreea and Gabriela (2020) assert that this aspiration hinges on the recognition of individuals' environmental impact and consumer behaviors, alongside governments' responsibilities in enacting requisite policies and instruments.

Furthermore, Fouseki et al. (2019) define sustainability as an undertaking or process that ensures the tangible or intangible existence of an object or structure. This encompasses actions that uphold the form and structure of an entity, ensuring its functional integrity. This initiative safeguards an entity from self-destruction, ensuring its conservation and restoration. In the backdrop of these principles, significant players within the chocolate industry have initiated a gamut of initiatives and programs framed within the language of sustainability, aimed at convincing cocoa cultivators to remain invested in the field (Fouseki et al., 2019).

As posited by Andreea and Gabriela (2020), the concept of sustainable economic growth encompasses any form of growth or development that mitigates the environmental impact stemming from economic activities. Sustaining economic growth involves ensuring the sustainability of production and consumption patterns, enhancing the efficiency of material resource utilization, revitalizing value-added manufacturing enterprises, and striking an equilibrium with the services sector, which has undergone substantial expansion in recent years. Foremost among the obstacles to achieving sustainable economic growth lies in the substantial costs associated with implementing environmental safeguard measures within the production processes. This dilemma presents two global predicaments: limited capacity to absorb environmental costs within the constraints of finite financial resources or a reluctance to compromise profitability, favoring the preservation or augmentation of competitiveness through innovative approaches (Technavio, 2018).

METHOD

In this study, the researchers employed the descriptive method. Descriptive analysis, as defined by Bosco et al. (2022), involves examining the characteristics of a phenomenon or the world, addressing questions related to who, what, where, when, and to what extent. This approach is valuable for tasks such as identifying and explaining trends and variations in populations, creating novel measurements of significant phenomena, or delineating samples in studies focused on causal relationships. The role of description in the broader scientific process, and particularly in educational research, is pivotal. Hence, the descriptive method was deemed fitting and optimal for investigating the impact of the sustainable cacao industry. This method facilitated the collection of specific information from participants through a rigorously structured questionnaire.

The study encompassed 300 cacao farmers situated in Calinan, Davao City, who were well positioned to supply primary data required for this research. The investigation was executed at designated cacao farms in Calinan, Davao City, during the month of November 2022.

The researchers adopted and utilized the study of Pettersson (2016) in developing a questionnaire, which was subsequently subjected to revision by the research adviser and validation by a panel to ensure its reliability. The questionnaire comprised two main sections. The first section captured the demographic profile of the cacao farmers, encompassing age, gender, marital status, and educational attainment. The second section pertained to the independent variable, specifically the evaluation of sustainability within the cacao industry in Davao City. This assessment was gauged through indicators centered around economic, social, and environmental sustainability. Respondents utilized a five-point Likert scale to provide their responses, ranging from 1 to 5. This scale corresponded to varying levels of agreement: "strongly agree,"

"agree," "moderately agree," "disagree," and "strongly disagree." The responses of participants were then categorized into five distinct levels, employing the following criteria.

The researchers conducting this study will skillfully employ a diverse array of analytical methods to thoroughly analyze the gathered data. In order to comprehensively evaluate the influence of tourism on mountaineering in Davao City, a carefully chosen to set of statistical tools will be utilized, including Frequency Count, Percentage, Mean, Pearson correlation coefficient (r), t-Test, and Analysis of Variance (ANOVA). Each of these methods will be applied judiciously to ensure a comprehensive and insightful analysis. Frequency Count will be adeptly employed to provide precise quantification of the number of respondents falling within distinct demographic categories. The utilization of Percentage will facilitate the determination of proportional distributions within each category, enriching the understanding of the data. Through the application of Mean and Pearson correlation coefficient (r), the researcher will quantitatively assess the degree of impact generated by the sustainable cacao industry in Davao City and explore potential relationships between variables. These methods will contribute to a nuanced comprehension of the interplay between factors under investigation. Finally, the deliberate implementation of ANOVA will serve to effectively discern significant disparities in the impact of the sustainable cacao industry when dissected based on respondents' demographic profiles. This meticulous statistical approach underscores the commitment to thoroughness and precision in the data analysis process. Such scrupulous statistical treatment underscores the rigorous nature of the data analysis process, thereby enhancing the robustness, validity, and depth of the research findings. In doing so, this study will provide invaluable insights into the multifaceted impact of the sustainable cacao industry in Davao City, contributing substantively to the broader discourse on this important subject.

RESULTS AND DISCUSSION

Level of the impact of sustainability Cacao Farmers

Table 1 shows the result for the test of level of impact of sustainability of Cacao farmers in Davao City. It can be observed from the table that the average result of all the statements in all indicators, namely the social, environmental, and economic acquired a close value in terms of their mean and standard deviation. The data shows that the mean score for social, environmental, and economic are 4.51, 5.00, and 4.50, respectively, which indicates that most of respondents strongly agree with all the statements in all the sub-portion of this part. On the other hand, the standard deviation recorded on all the indicators ranged from 0.00 to 0.180. To summarize, the overall mean for the impact of sustainability of Cacao farmers in Davao City have an approximate value of 4.67, which indicates that most of the respondents strongly agree with statements. Meanwhile, the overall standard deviation acquired an average value of 0.076, which indicate that the data are grouped around the mean, less spread out, and are reliable.

Table 1. *Level of the impact of sustainability Cacao Farmers in Davao City*

Indicators	$\bar{x}$	***SD***	**Description**
Environmental	5.00	0.000	Highly Observed
Social	4.51	0.180	Highly observed
Economic	4.50	0.137	Highly observed
Overall	**4.67**	**0.076**	**Highly Observed**

The Pinardi et al.'s (2023) research highlights the profound impact of sustainable practices on cacao cultivation, spanning social, environmental, and economic dimensions. Adopting sustainable techniques enhances living standards, education,

and healthcare access for farmers and communities, supported by fair-trade measures. Agroforestry maintains ecosystems by growing cocoa alongside native plants, and economically, these practices boost production, revenue, and resilience through effective methods, technology adoption, and market links (Vargas et al., 2022). This approach facilitates diversification into high-value goods like organic chocolate, extending positive effects to promote social progress, environmental conservation, and economic growth not just within cacao but also in broader contexts (Hernandez et al., 2022). Encouraging robust sustainability among Davao City's cacao producers resonates widely—socially, it improves living conditions and education, while economically tapping ethical luxury markets. This model intertwining social well-being, environmental preservation, and economic growth establishes the region as an exemplar of sustainable cacao cultivation.

Significant Difference of the Impact of Sustainability of Cacao Farmers in Davao City When Analyzed According to the Profile of Respondents

The results from Table 2 reveals that, notwithstanding a small difference in favor of female respondents, both sexes agree that sustainability has a good impact on a cacao business. The independent samples t-test findings show that there is a statistically significant difference in how men and women view the influence of sustainability. It is further proven when the corresponding p-value resulted to a 0.006, which indicates a degree of statistical significance below the usual cutoff of 0.05. Therefore, it can be concluded that gender has a visible influence on how the cocoa business perceives and views sustainability.

Table 2. *Independent samples t-test results showing the differences in the impact of sustainability Cacao Farmers in Davao City when analyzed by sex*

Variable	Group	n	$\bar{x}$	*SD*	*t*	*p*
Sustainability Cacao	Female	83	4.692	0.083	-2.80	0.006
	Male	217	4.663	0.072		

*$p<0.05$

Nangia and Tata's (2020) research underscores how gender dynamics in the cacao industry, with a prevailing division of labor favoring men in decision-making and women in post-harvest tasks, hinder equal resource access and women's engagement in sustainable practices. This imbalance obstructs comprehensive gender-sensitive sustainability policies, marginalizing women's contributions (Chand et al., 2020). Empowering women through equitable resource distribution, inclusive training, and meaningful participation in decision-making is essential for enhanced inclusive cacao sustainability. Gender-responsive policies considering social, environmental, and economic aspects promise more effective and equitable outcomes (Kaschek, 2021). These dynamics extend to Davao City's cocoa sector, with men in authoritative roles and women mainly in post-harvest tasks, leading to limited female representation, resource disparities, and reduced sustainability involvement. Integrating gender concerns with responsive strategies encompassing social, environmental, and economic dimensions will amplify fairness and effectiveness of sustainability efforts in Davao City, necessitating a holistic approach acknowledging gender's tangible impact for genuine progress in the cocoa sector.

Table 3 shows that the F- statistics acquired a value of 2.37, which then resulted to a p-value of 0.09525. Therefore, the proponents of the study concluded to fail to reject the null hypothesis since p value is greater than the significance value of 0.05, which

means that civil status does not have a visible influence on how the cocoa business perceives and views sustainability.

Table 3. *Summary of ANOVA for the significance in the impact of sustainability Cacao Farmers in Davao City when analyzed according to civil status*

	Sum of Squares	**df**	**Mean Square**	**F**
Between Groups	0.02705	2	0.01353	2.37
Within Groups	1.69259	297	0.00570	
Total	1.71964	299		

P : 0.09525
*p<0.05

Peprah et al.'s (2019) research underscores that the civil status of a farmer does not correlate with the sustainability of cocoa cultivation. Regardless of marital status—be it married, single, divorced, or widowed—factors such as soil and resource management and biodiversity protection hold greater significance. The absence of a direct link between civil status and cocoa farming sustainability suggests the need for objective and impartial measures to achieve sustainability goals. In examining the relationship between civil status and cocoa agricultural sustainability in Davao City, the results reveal the lack of connection between these two variables. The absence of civil status in official records indicates that farmers' marital status does not influence their ability to implement sustainable farming practices. Instead, attention should be directed towards variables with a more substantial impact on sustainability, such as soil and resource management and biodiversity preservation. It is advised that farmers equally prioritize personal growth and productive, sustainable farming methods, both of which are essential for environmental preservation and production continuity.

Table 4 shows that the results also show that the F- statistics acquired a value of 2.65, which then resulted to a p-value of 0.03350. Therefore, the proponents of the study concluded to reject the null hypothesis since p value is lesser than the significance value of 0.05, which means that age does not have a visible influence on how the cocoa business perceives and views sustainability.

Table 4. *Summary of ANOVA for the significance in the impact of sustainability Cacao Farmers in Davao City when analyzed according to age*

	Sum of Squares	df	Mean Square	F
Between Groups	0.05973	4	0.01353	2.65*
Within Groups	1.65991	295	0.00570	
Total	1.71964	299		

P: 0.3350
*p<0.05

Akrofi-Atitianti et al.'s (2018) research emphasizes that considering age is essential when assessing the sustainability of cocoa cultivation. Experienced cacao farmers possess knowledge and skills vital for effective resource management and environmental preservation, while less experienced counterparts may lack the same degree of production and sustainability. Thus, prioritizing comprehensive training programs is crucial to equip farmers with optimal cocoa growing methods, enabling better control, efficacy, and sustainability. This approach not only supports ethical chocolate production but also enhances welfare, health standards, and income (Agbenyo et al., 2022). The outcomes highlight age as a significant factor influencing cocoa production sustainability in Davao City, where seasoned farmers possess essential expertise for maintaining sustainable practices, unlike their younger counterparts. Investing in training across all age groups is imperative, fostering effective and sustainable chocolate production while safeguarding the environment

and ensuring the well-being of farmers and their families. Ensuring accessibility and inclusive development of these initiatives are vital steps toward sustaining cocoa cultivation in Davao City.

Table 5 shows that the F- statistics acquired a value of 0.17, which then resulted to a p-value of 0.084375. Therefore, the proponents of the study concluded to fail to reject the null hypothesis since p value is greater than the significance value of 0.05, which means that educational attainment does not have a visible influence on how the cocoa business perceives and views sustainability.

Table 5. *Summary of ANOVA for the significance in the impact of sustainability Cacao Farmers in Davao City when analyzed according to educational attainment.*

	Sum of Squares	df	Mean Square	F
Between Groups	0.00197	2	0.00098	0.17
Within Groups	1.71768	297	0.00578	
Total	1.71964	299		

P: 0.84375
*p<0.05

Peprah et al.'s (2019) research underscores that the sustainability of cacao farming is not solely contingent on farmers' educational levels. While education can serve as a conduit for promoting sustainable practices and environmental awareness, it is not the sole determinant of practice adoption. Factors such as resource availability, training opportunities, and cultural context hold equal weight in influencing farming techniques (Fosu-Mensah et al., 2022). While education is pivotal for sustainable agriculture, its effectiveness hinges on complementary training programs. The results suggest that in Davao City, insufficient education among cocoa farmers could impede their ability to implement advanced farming techniques or access new markets, potentially leading to poor crop quality, diminished yields, and reduced income. Without adequate training, the relevance of sustainable farming practices might not be fully understood, contributing to the risk of land degradation. In this context, offering educational resources becomes paramount, serving as a catalyst for social progress, economic growth, and environmental stewardship within cocoa-producing communities.

CONCLUSION

Based on the results and data analyzed, the following are the conclusions of the study.

When cocoa producers in Davao City practice sustainability, it positively influences social, environmental, and economic elements, promoting growth, preservation, and development.

The entire potential of women as change makers can only be realized via gender equality, which is essential for achieving inclusive cocoa sustainability.

The achievement of sustainability in cocoa cultivation in Davao City is not directly correlated with civil status; instead, attention should be paid to factors that might have a greater influence on sustainability.

In areas in Davao City that produce cocoa, educational resources are crucial for promoting social growth, economic development, and environmental stewardship.

RECOMMENDATION

Promoting the use of sustainable practices may increase productivity, protect against economic changes, and assure the long-term prosperity of cocoa farmers.

Programs for training that are inclusive, efficient, and emphasize best practices can raise agricultural output, environmental stewardship, and living standards.

In Davao City's cocoa-growing villages, educational resources may aid in the advancement of social, economic, and environmental conditions; similarly, an emphasis on impartial and non-discriminatory policies can aid in the advancement of sustainable cocoa cultivation.

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