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RESEARCH ARTICLE

Reflections on the limited adoption of global product sustainability certification among the smallholder tea farmers in the selected sub-regions of Western Uganda

Turyatemba, C[1*]., B. Turyasingura[2], R. Akatwijuka[2] and F. Kayusi[3]

[1]*Faculty of Social Sciences, Kabale University, Uganda*

[2]*Faculty of Agriculture and Environmental Sciences, Kabale University, Uganda*

[3]*School of Environmental and Earth Sciences, Pwani University, Kenya*

Abstract

The aim of the study was to examine the reflections on limited adoption of global product sustainability certification among smallholder tea farmers in selected sub-regions of Western Uganda, focusing on identifying barriers and opportunities for enhanced participation. The study aimed to: (1) examine intricacies limiting massive uptake of global product sustainability certification practices among smallholder tea farmers; (2) establish relationships between sustainability certification enrollment fees, costs, and potential benefits; and (3) ascertain the relationship between Rainforest Alliance participation and access to high-end European value chain markets. A mixed-methods convergent parallel design was employed, integrating quantitative surveys from 384 smallholder farmers with qualitative interviews from key informants. Data collection utilized structured questionnaires and semi-structured interview guides, complemented by desk studies reviewing peer-reviewed literature and policy documents. It was found that there was a strong positive correlation between certification enrollment fees and farmer benefits ($R=0.843$, $R^2=0.710$), indicating that 71% of benefit variation is explained by enrollment fees. Rainforest alliance participation demonstrated a strong relationship with European market access ($R=0.890$, $R^2=0.791$), with 79.1% of market access variability explained by certification participation. Global certification levels strongly correlated with massive smallholder uptake ($r=0.769$), confirming the critical role of scale in driving adoption. There is need to promote group certification models, enhance capacity-building initiatives, strengthen value chain partnerships, and develop supportive policy frameworks to facilitate widespread adoption.

Keywords: Tea certification, Smallholder farmers, Rainforest Alliance, Market access, Western Uganda

1. Introduction

Implicit trust has a major global impact on consumers' buying intentions (Akter *et al.*, 2023) And more so, if attested to by an independent third-party systems audit, which credibly manifests, as product quality signalers (Lau *et al.*, 2020). Consumers increasingly, trust the information provided by the certification body, regarding product characteristics and its makers on the market than the product manufacturers in specifying best of the best independent practices employed in the primary production, processing, and selling of agricultural products (Ssebunya *et al.*, 2019). Product certification is the process of validating that a particular product satisfies conditions outlined in agreements, rules, or specifications and has successfully completed all required performance and quality assurance testing. Product certification is necessary in markets and industries where a product's failure could have detrimental impacts on people's health and safety as well as the safety of animals and property.

Food Agriculture Organization has for long routed for the technical capacity of the food industry control personnel to effectively carry out food quality and food safety assurance programs across

***Corresponding author: Christopher Turyatemba**
Email: turyatembachristopher@gmail.com
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all United Nations member states; and are by no standards a modern creation (WHO, 2003). First forward, Food Agriculture Organization defines certification as a procedure by which a third party gives written assurance that a product, process, or service conforms to certain standards. In other words, as seen as a form of communication along the supply chain, a certificate demonstrating to the buyer that the supplier complies with certain standards, which might be more convincing than if the supplier itself provided the assurance, and is always done by a third party, without a direct interest in the economic relationship between the supplier and buyer (Liu, 2003).

Product certification provides consumers with the assurance they need to buy certain products. And, any product certification violations are instantaneously met with harsh legal penalties, including fines, product recalls, and even incarceration. When a product is certified in compliance with relevant national or international legislation, consumers are certain that it will operate as intended and pose no risks (Fan *et al.*, 2022). In modern times, a lot of trust and credence is given to farmer products that originate from environments that have voluntarily adopted global standards and certifications. This has helped to discern the clear identity of products, as such products are paired with specific labels to differentiate them from non-certified products in the marketplace (Ssebunya *et al.,* 2019). Product standards and certification, in most countries, are universal and compulsory in face law, and therefore, are not voluntary or optional. For instance, in a study conducted on the Sustainability Performance of Certified and Non-certified Smallholder Coffee Farms in Uganda, it was established that, whereas, about 1.7 million smallholder farmers that produce coffee in Uganda, only 10% of them, is certified under different standards, according to Uganda Coffee Development Authority. This implies, that a significant proportion of Uganda's smallholder coffee gardens and product certification, had been left optional and voluntary to a few willing (Ssebunya *et al.,* 2019).

2. General Outlook on Product Standards and Certification

The most credibly pronounced global certification marks worldwide, include CE marking. Possession of legal requirements for CE marking enables unrestricted product trade within the European Union (EU) markets and grants a product, unlimited penetration to all European Economic Areas (EEA). It is further an affirmation from the producer that a product satisfies all applicable EU directives' minimal standards for product safety, health, and the environment and that, its intended use, won't threaten people's lives or property (Malvehy *et al.,* 2022). Relatedly, the United States Government entity designated as the Food and Drug Administration (FDA) is internationally credited and responsible for ensuring the efficacy and safety of a wide range of goods produced or marketed in the country, notably food, human and animal-related medicine, as well as radiation-emitting technological devices. And, companies that produce, repackage, re-label, or sell any of the aforementioned product groups, are on equal footing, required to obtain FDA certification and registration, before any product is shipped outside the United States. Once the FDA certification is obtained, it's a testament that the product's approved advantages outweigh any known hazards (Clark *et al.,* 2023). Similarly, electronics and equipment that are to be produced or sold in the United States must bear the FCC certification mark. This certification attests to a product's compliance with Federal Communications Commission electromagnetic interference regulations. Products that generate radiofrequency radiation, such as IT equipment and industrial or medical devices, must have the FCC certification label, and if it is to be sold in the US and outside of the country (Mattioli, 2023). In another development, the International Electro-Technical Commission for Electrical Equipment (IECEE) is yet another global certification agency that, is internationally accepted by all continents and spans across Europe, North America, parts of Asia, and Australia. And with this, global certification, importers and producers can access markets in other several block markets, worldwide benefiting

end users, businesses, and governments (Keller, 2022).

2.1 Adoption of Rainforest Alliance Global Product Sustainability Certification

As the tea sector continued to feel the impact of the COVID pandemic and its social and economic consequences, the adoption of Rainforest Alliance (RA) global product certification remained undeterred. Interestingly, by the close of 2021, the Rainforest Alliance tea area planted with certified tea had grown to nearly 700,000 hectares, with nearly 530 producers in the program reaching out to farmers and workers in 25 countries. When a product or ingredient listed on the packaging bears the Rainforest Alliance seal, it indicates that the farm used to produce it was certified to the Rainforest Alliance Sustainable Agriculture Standard. This standard, includes the social, economic, and environmental pillars of sustainability and their requirements such maintenance of forests, promoting rural residents' human rights, enhancing the standard of living for farmers and forest communities, as well as fostering climate resilience. In 2018, Rainforest Alliance certified almost 4.5 million hectares of a wide variety of commodities, and managed more than 1.3 million producers, globally. Cocoa had the largest product coverage area of more than 723,000 hectares, followed by tea, with 593,000 hectares, and lastly, coffee with a product coverage area of 471,000 hectares. Rainforest Alliance, a certified product coverage area in Africa during the period was estimated at 46%, followed by Latin America, at 32% and Asia at 17%. In Africa, the Rainforest Alliance product percentage coverage area, was more pronounced in Côte d'Ivoire, with 521,000 hectares, followed by Kenya, with 489,000 hectares, and in Brazil with more than 491,000 hectares. And, by the close of 2022, the Rainforest-certified global product coverage area had remarkably grown by overall 29.5% between 2017–2018 (Kemper *et al.,* 2023).

Table 1. Africa's Rain Forest Alliance Certified Teas Production and Global Tea Sales in 2019/2020

	Production			Global Sales			
Countries	2019	2020	Total Production	2019	2020	Total Sales	%of Global Sales
Kenya	458.853	527.287	986.140	116.270	118.321	234.591	23.8
Rwanda	32.940	30.689	63.629	10.699	15.056	25.755	40.5
Burundi	20.434	20.484	40.918	90	60	150	0.4
Tanzania	15.296	22.408	37.704	7.710	10.129	17.839	47.3
Malawi	47.180	48.906	96.086	20.092	39.372	59.464	61.9
Mozambique	2000	2000	4.000	7	9	16	0.4
Zimbabwe	10039	14814	24.853	5.024	11.025	16.049	64.6
Uganda	24.835	26.722	51.557	4.410	2.715	7.125	13.8
Total (M/T)	611,577	693.310	1.304,887	164.302	196.687	360.989	27.7

Source: Tea Certification Data Report; Rainforest Alliance Program (2019/2020).

According to the Rainforest Alliance tea certification report on the tea sub-sector, a total of 1,304,887 Metric Tons (MT) of Rain Forest Alliance Certified teas, were produced in Africa between 2019 and 2020 by Kenya (986,140 M/T), Rwanda (63.629 M/T), Burundi (40,918 M/T), Tanzania (37.704 M/T), Malawi (96,086 M/T), Mozambique (4.000M/T), Zimbabwe (24,853 M/T), Uganda (51.557 M/T), a shockingly paltry fraction of only 360.989 (M/T) representing 27.7% of the total production, was sold to high-value chain global markets in United States and Europe(Alliance, 2018). Relatedly, a significant proportion of highly acclaimed rainforest alliance certified teas from the Sub-Saharan Africa, amounting to over 943.000 M/T, equivalent to

(72.3%) from Kenya (751.549 M/T), Rwanda (37.874 M/T), Burundi (40.768 M/T), Tanzania (19.865 M/T), Malawi (38.622 M/T), Mozambique (3.984 M/T), Zimbabwe (8.804 M/T) and Uganda (44.432 M/T), suffered varied limitations, and did not yield much-anticipated revenues to smallholders from high-end value chain global markets. Fast forward, it further implied, that the affected African producer countries, did not collectively reap tangible projected benefits of producing eco-friendly certified teas that is deemed costly to produce, compared to other conventional teas, sold on auction in Mombasa (Ayompe *et al.,* 2023). Smallholder farmers in most cases, own fragmented pieces of land. And, to break even in their business operations, are forced to hire other pieces of farms. They frequently lease the land from another farmer on a relatively 1:3 ratio, with the landowner receiving 25% of the profits and the renting farmer receiving 75%, which covers his all production costs, including certification fees. This was found to be in tandem, with findings of another study conducted by Ayompe et al. 2023 which showed that, unless you own land, the benefits of any plantation agriculture, are minimal. This is partly explaining the reason why certification and other government programs, aimed at improving smallholder's household income from the tea, may increase but not be sufficient to uplift smallholder farmers out of poverty, due to land ownership and size limitation unless they have other additional sources of income. Besides, payments of premiums to certified smallholders, have for long, remained unpredictable and too low to meaningfully compensate farmers participating in global product certification and continue to remain, less incentivizing in meaningfully curbing unstainable farming practices (Voora et al., 2023)

2.1 Smallholders and adoption of sustainability standards and certifications

According to Meemken (2020), sustainability-oriented standards such as Fairtrade, Organic, and Rainforest Alliance undertake to improve the livelihoods of poor farmers in developing countries while protecting the environment. To this end, an estimated 30% of the world's coffee, 20% of the world's cocoa, 15% of the world's palm oil, and 9% of the world's tea areas, are certified by any one of the above certification bodies. Millions of smallholder farmers are certified under different sustainability standards such as Fairtrade (about 1.65 million), UTZ (about 1 million), Rainforest Alliance (about 1.2 million), and Organic (about 2.3 million) and are continuing to register more, particularly, in high-value foods from developing countries and in promoting, food quality and safety along agricultural value chains (Meemken, 2020). Going forward, the global market share of products with the above sustainability certification has over time doubled from 4% in 2006 to 8% in 2009; and is not about to stagnate. Currently, the overall global certification scheme covers between 37% - 45% of globally cultivated land (Oberlack *et al.,* 2023). In Africa, each country operates its own standards and certification regulatory framework and code of practice for hygiene and consumption in the food and drink manufacturing industry. For example, in Uganda, the *US28 EAS 39:2002, standard specifies the minimum requirements for factories and employees engaged in the manufacture, processing, packaging, storage, handling, treatment, and delivery of foods intended for human consumption. For example,* UNBS runs a microbiology laboratory accredited to international standards ISO 17025 by SANAS to analyze Staphylococcus aureus, Salmonella, Vibrio cholera, Escherichia coli, total plate count, total coliforms, yeast, and molds, for domestic and export products.

2.2. Product Certification in Sub-Saharan Africa

According to Tayo, *et al*, 2018, product certification, if properly implemented, increases economic efficiency, reduces operating costs, and promotes international trade. Much as in Sub-Saharan Africa, global certification has significantly improved in the last decade by 20% for ISO: 9001 and 19% for ISO: 14001, it has remained significantly below, 2% of the overall global adoption (Tayo Tene *et al.*, 2018). And, in the subsequent related studies, (Fikru, 2016) noted that in Sub-Saharan Africa, the uptake of global

certification is primarily driven by global value chains, trade, and pressures from importers and international high-income markets in developed countries, whose consumers demand, high-quality products. However, Abate *et al.* (2021), while citing the works of Reardon and Farina 2001 noted that certification systems exist for many dimensions of quality, fitting into one or more categories, such as consumption quality (color, texture, taste, cleanliness), safety (presence of pesticides or other microorganisms), authenticity (guarantee of geographical origin or use of traditional production methods), or ethical, social concerns regarding the production process (worker conditions, animal conditions and environmental impacts). In reality, process certification specifies how good products are produced, processed, and handled along the value chain or tells other value chain actors that goods were produced without the use of synthetic fertilizers or outlawed herbicides and chemicals, like dichlorodiphenyltrichloroethane (DDT). With Fairtrade, a product is certified as being obtained through better prices, fair and acceptable working conditions, and in a sustainable ecological manner, while with UTZ, and Rainforest Alliance certifications, focus on the sustainable use of smart agricultural practices among coffee, tea, and cocoa smallholders, concerning apt conservation of wildlife, water resources and minimizing soil erosion, among other regulations. To this end, products imported into developed economies, for example, must meet several requirements regarding product safety, packaging, labeling, and technical standardization. As a result, there has been rapid uptake of international standards and certifications such as the ISO 9001 Quality Management System, and the ISO 14001 Environmental Management Systems, as well as, the adoption of Fair Trade, Organic, Rainforest Alliance, UTZ, Global GAP, and Common Code for the Coffee Community (4C), Nespresso AAA and Starbucks certification practices among smallholder in Sub-Saharan Africa. It should be noted that Ssebunya *et al.* 2019, while conducting the study to analyze and compare the impact of the Fair Trade, Organic, and UTZ in certification standards among smallholder coffee farmers, and in further citing, the works of Bolwig, Gibbon, and Jones 2009 and (Chiputwa *et al.,* 2015), it was established that certified organic coffee production had immensely contributed to the increased agricultural income, while Fair Trade certified products, had in equal footing, improved household living standards by 30%, in addition, to the reduced prevalence of poverty in Uganda.

2.3 Smallholders product certification in the East Africa Region

With up to 80% of the workforce employed and 25% of GDP derived from it, agriculture is a major economic sector in East Africa with huge potential to raise quality of life and foster prosperity throughout the region. In light of this, establishing standards and certification procedures can aid in achieving and strengthening regional policy goals about the preservation of important ecosystems, effective use of limited resources, and support of the rights and lives of workers. Adopting a universal strategy in the region that supports access to high-quality inputs and related training, helps to enhance crop handling and storage techniques. It also helps to incentivize climate-resilient practices like enhancing soil quality, water conservation, integration of agro-forestry practices, as well as facilitating good the restoration of ecosystems (Turley *et al.,* 2022). In Kenya, smallholder tea farmers are required to meet certain requirements related to ensuring worker safety, good environmental management, and intelligent agricultural methods to be eligible to participate in certification programs. To achieve this, by the end of 2016, the vast majority of smallholder tea producers in Kenya had fulfilled several certification requirements and were marketing 100% certified tea under Unilever's well-known Lipton brand. Additionally, smallholder farmers have reported better livelihoods, greater safety and health standards, and higher yields as a result of the doption of their certification project (Cameron, 2019).

According to Deka and Goswami (2022), most smallholder certified products, particularly, tea receive a price premium, that is paid, over and above conventional prices on market. This acts as

compensation for smallholder farmers for their added labour in farms and in encouraging producers, also to adopt sustainable farming practices, standards, and certifications *Ochieng, Hughey, and Bigsby (2013*). In Tanzania, agriculture is the mainstay of the economy, contributing about 25% of the GDP, earning the country 30% of export earnings, and employing about 75% of the total labor force. The tea sub-sector is not sufficiently developed as in Uganda and Kenya, much as it is generally grounded on the same concept of smallholder tea farming. In Tanzania, Rainforest Alliance (RA) certified factories focus on increasing product quantity, quality, and market niches by producing only RA-certified teas. This approach has greatly helped the companies involved such as Mufindi, Unilever, and Wakulima Tea Companies to retain their current markets and tap into new ones (Kavia et al., 2016). During F/Y 2013/2014, the price of RA-certified teas in Tanzania ranged from US$2.2 to 3.0/kg for direct sales, and 10–15% more than the price received for conventional teas. At the same time, Non-RA certified tea prices ranged from a paltry US$1.2 to 1.5/kg. RA-certified teas have for long fetched relatively higher prices on top of the normal price (US$1.8–2.5/kg) than conventional teas at auction, and in direct sales to high-value consumers different destinations in Europe, mainly the United Kingdom and the Netherlands (Kavia et al., 2016). With RA-certified teas, processors target access to the second-tier market niche which brings better access to buyers, good prices, contract stability, publicity, and technical assistance from interested partners. In the subsequent study carried out in Tanzania in 2017 on **"***Effects of Certification Schemes for Agricultural Production on Socio-economic Outcomes in Low-and Middle-income Countries: A Systematic Review*.**"**, it was established that the price for certified producers was 14% higher than non-certified certified producers, incomes from certified producers were 11% higher than non-certified ones, certified producers on average had slightly higher wealth than un-certified producers, and school going children from certified producers were 6% more than the children from non-certified households (Oya et al., 2017)

Moreover, Rainforest Alliance-certified tea consumers, are more concerned about environmental conservation, promotion of social justice, building of local economies, promotion of natural resource conservation, farmer empowerment through improved productivity, greater efficiency by reducing costly inputs, stimulation of employee safe working conditions as well as creation for workplace rights. For instance, results of market research conducted on fair-trade labeled products about consumer purchase intentions in Kenya in 2012 revealed that 86% of Kenyan consumers would look out for the Fairtrade mark when shopping, while 73% would be prepared to pay extra for a certified product with the Fairtrade label (Raynolds & Rosty, 2021). And, in yet another thrilling study carried out on **"***Innovative activities and sustainability activities for acquisition and retention of tea markets in Southern Highlands of Tanzania***"** it was found that compliance to sustainability standards and certifications, such as appropriate consideration of workers' wages and rights, provision of housing and education, health and safety standards at the place of work, as well as farm productivity, had a statistically significant and positive relationship with acquisition and retention of tea markets in the surveyed districts of Sothern Highlands in Tanzania, and sustainability standards and certifications, had alone contributed up to 35% in acquiring and maintaining of the desired tea markets niche, worldwide (Raphael & Mbowe, 2021). In Uganda's tea sub-sector, smallholder's tea certification is mostly done by Fairtrade Labelling Organizations (FLO) and is more pronounced in Ankole, Toro, and Kigezi sub-regions in Western Uganda. Fairtrade is a global network, a certification body system through which producers meet certain social, economic, and environmental standards and minimum prices for the product (Sterie & Ion, 2022). In other words, it is a certification practice, where better prices, dignified working conditions, local sustainability, and equitable terms of trade for farmers and industrial workers should all be outcomes of Fairtrade. Unfortunately, the majority of smallholders, exporters, and producers view fair-trade as "unfair," and argue that very few

beneficiaries' farmers stand to gain from higher, set tea prices. For smallholder tea farmers, to fully gain benefits of their production in the fair-trade certification cycle, tea farmers must use climate-smart methods in their tea landscapes, such as agroforestry techniques, improved soil management, and reduced use of pesticides and artificial fertilizers, to reap huge benefits of their involvement. In addition, there should be proof of how well they treat their labor on farms, proof of paying fair wages, and elimination of child labor. And, the most crucial thing is that the smallholders learn and understand how fair-trade methods operate, so they won't be taken advantage of by fair-trade certified factories. However, the cost of attaining a Fairtrade label is very high for various conformity aspects including (ESG) Environmental, Social, and Governance, compared to the value of tea sold at the Mombasa auction. The market for fair-trade labeled teas is globally eminent as buyers keep looking for it (Bissinger, 2019). In a related development, the Q-mark, assigned to a product, for being consistent in meeting applicable statutory and regulatory requirements, has rigorously, been enforced by *the* Uganda National Bureau of Standards (UNBS) as mandated by the UNBS Act Cap 327. This act is responsible for enforcing standards and certification in the country for the protection of the public against the consumption of harmful dangerous, and sub-standard products, at the same time, prohibiting the importation, manufacture, sale, distribution, or holding to sell any product that does not meet compulsory standards (Mpaata, 2017).

2.4 East Africa Tea Trade and Product Certification on the Mombasa auction market

The East Africa Tea Trade Association (EATTA) is a ten-member country, a voluntary organization bringing together tea producers, buyers, exporters, brokers, tea packers, and warehouses, fostering collaboration and advancement of the tea industry across East Africa. The association works towards promoting the orderly sale of tea among members, and lobbying of regulatory bodies in member countries, along the value chain. The association is further, mandated to promote and facilitate the interests of all the stakeholders in the tea trade by creating an enabling business environment and maintaining global standards and certifications most profitably (Peter & Sasaka, 2023). East Africa Tea Trade Association, maintains a high degree of global standards, compliance, and certification and requires that all its members (tea producers, buyers, exporters, brokers, tea packers, and warehouses) undertake, the ISO 22000 family food safety management systems such that food products produced, conforms to global Good Manufacturing Practice (GMP) and that it will not affect the consumers and hence impacting on the overall market. For the East Africa Tea Trade Association to guarantee this, proof of an effective and operating food safety management system, which integrates the use of the Hazard Analysis and Critical Control Point (HACCP), remains a critical pre-condition for membership enrolment by the East Africa Tea Trade Association. Other trade certifications the East Africa Tea Trade Association, encourages members to adopt include; the ISO 9000 family by its members who are providing various services across the tea value chain, and in meeting the needs of customers and other stakeholders. East Africa Tea Trade Association has for long encouraged all its partner members to be Rainforest and Fairtrade certified tea producers, to be able to attract specific markets that source for teas farmed in Fair-trade and Rainforest Alliance certified farmlands. Other reigning certifications, EATTA encourages members to take up to enhance the marketability of their teas on Mombasa auction, including the British Retail Consortium Standards (BRC), International Food Safety Standards (IFS), Hazard Analysis and Critical Control Points(HACCP), Environmental Management Standards (EMS:9001:2004) and halal certification (Nurulfaraiza et al., 2023).

2.5 Understanding the Sustainable Tea Production Sub-Sector Structure in Uganda

According to the Uganda Tea Sub-sector; Short Term Development Plan, more than 67% of Uganda's tea is grown by smallholder tea farmers.

These include, the Smallholder Tea Factories (SHGTF) governed under Uganda Tea Growers Corporation, established in the mid-1960s by 1966 Act of Parliament. This covered the smallholder tea factories of Igara (Bushenyi), Mabale (Kyenjonjo), Mpanga (Kabarole), and Kayonza (Kanungu) until they were privatized, back to smallholders in 1995. And, as the liberalization and promotion of the private sector-led economy intensified, a new breed of domestic tea business entrepreneurs known as Private Tea Factory Operators (PTFO) emerged between 1995 and 2020. These have established numerous private tea factory processing plants in Bushenyi (Swazi Tea, Global, Kyamuhunga), Buhweju, Kanungu (Kigezi Highland, Bwindi) Kabale, (Kabale Tea Factory) and in Kisoro, as well as Namayiba, Monoko in Mukono, Rusekere in Kabarole District (Matsiko, 2019) and (Muzira et al., 2023). Another category covers the 33%. that grow tea on a large scale, in bigger tea estates and is classified as Plantation-Based Tea Factories (PBTF), owned by Multinationals under Foreign-Direct Investment. These, include; McLeod Russel Uganda Ltd, Toro & Mityana Tea Company Ltd (Toro, Kiamara, Mityana), Rwenzori Commodities Ltd (Buzira-sagama, Hiima, Munobwa, Kigumba), Uganda Tea Corporation Ltd (Kasaku), Madhvani (Mwera) and Dayalbhai Madanji (Kakonde). Other tea processing factories in this category, include Kijura Tea Factory in Kabarole and Nambya Tea Factory in Kyejonjo.

Table 2. The Governance Structure Tea Factories in Uganda

Category	Company	Factory/Mark	District
Tea Plantation / Multinational / FDI	McLeod Russel Uganda Ltd	Ankole	Bushenyi
		Bugambe	Hoima
		Kiko	Kabarole
		Muzizi	Kibaale
		Mwenge	Kyenjojo
	Toro & Mityana Tea Co Ltd	Toro	Kabarole
		Kiamara	Kabarole
		Mityana	Mityana
	Rwenzori Commodities Ltd (Mukwano)	Buzirasagama	Kabarole
		Hima	Kyenjojo
		Munobwa	Kyenjojo
		Kigumba	Kyenjojo
	Uganda Tea Corporation Ltd (Mehta)	Kasaku	Buikwe
	Madhvani Group of Companies	Mweya	Mityana
	Dayalbhai Madvani Tea Co Ltd	Kakonde	Mityana
	Kijura Tea Co Ltd	Kijura	Kabarole
	Nyamibya Tea Co Ltd	Nyamibya	Kyenjojo
Domestic Private Investment Tea Companies	Kinkiizi Development Co Ltd	Kigezi Highland	Kanungu
		Bwindi	Kanungu
		Kabale	Kabale
		Kisoro	Kisoro
	Kyamuhunga Tea Co Ltd	Kyamuhunga	Bushenyi
	Namaviba Tea Estate Co Ltd	Namaviba	Mukono
	Eagle Investment Tea Co Ltd	Joniso	Mukono
	Swazi Highland Tea Co Ltd	Swazi Highland	Bushenyi
	Global Village Tea Co Ltd	Global	Bushenyi
	Rusekere Gr. Tea Factory Ltd	Rusekere	Kabarole
Smallholder Tea Factories	Kayonza Gr. Tea Factory Ltd	Kayonza	Kanungu
		Mpungu	Kanungu
	Igara Gr. Tea Factory Ltd	Igara	Bushenyi
		Buhweju	Buhweju
	Mpanga Gr. Tea Factory Ltd	Mpanga	Kabarole
	Mabale Gr. Tea Factory Ltd	Mabale	Kyenjojo

2.6 Sustainable Tea Production in Uganda- A Wake-up Call to Smallholders

In Uganda, the aggressive pursuit of sustainable tea production is precipitated and informed on the *recent scientific data r*eport revelation released by the International Center for Tropical Agriculture entitled **"**Future Climate Scenarios for Uganda's Tea Growing Areas,**"** which established, that

"climatic suitability of much of Uganda's tea-growing areas would decline significantly by 2050**"** (Kawooya et al., 2023). Much as this serves as a "wake-up call" and an early warning to all smallholders and other stakeholders in the tea industry, it is critical that decisive action be taken to adapt to and lessen the impending risks posed by climate change. It is already established that "any average temperature rise by 2.3 degrees Celsius by 2050 could potentially wipe out Uganda's most profitable tea producing areas, with severe productivity losses already apparent," according to the International Center for Tropical Agriculture's metrology forecast. Also, amidst all the existing fears, sustainable tea production is the way to go if smallholder tea farmers, are to produce sufficient food to match the growing population, mitigate the effects of climate change (Muzira *et al.,* 2024). Introduction of drought-tolerant and more resilient tea cultivars and training of smallholder farmers to develop their own locally relevant adaptations and mitigation strategies, such as planting new trees on hillsides and safeguarding water sources, are intermediate quick options for buttressing sustainable tea production (Kagorora *et al.*, 2021). Developing other, productive sources of income is another crucial instrument for halting much strain on environmental deterioration. Pursuance of Rainforest Alliance certification to improve overall sustainability in the tea estates is crucial in the promotion of sustainable agricultural practices, conservation of biodiversity, ensuring sustainable livelihoods by transforming land-use and business practices, and consumer behavior (He & Jiao, 2023). With Rainforest Alliance certification firmly benchmarked on the Sustainable Agriculture Network Standards, adoption of Rainforest Alliance (RA) improves farm's health and profitability, which are critical drivers of sustainable production (Mrabet, 2023). Smallholder farmers and farms certified by Rainforest Alliance (RA) are distinguished by proper upkeep of good environmental management systems and practices in place that can independently be verified and confirmed by auditors in compliance with the Sustainable Agriculture Network Standard and national legislations. Conservation of the existing ecosystems and the ecological restoration of critical areas are equally important to the protection of waterways, and wetlands from erosion and contamination, as well as the prohibition of logging, and deforestation actions. Education of smallholder farmers, workers, and neighboring communities, residing near tea estates is highly valued as a positive gesture towards the protection of wildlife. Keeping track of water sources and consumption and having proper permits for water use; wastewater treatment before it is discharged to the environment, is equally valued (Turyasingura *et al.* 2023). It should be noted as a mandatory obligation that RA-certified companies, should strive to ensure good working conditions for all the employees, as defined by the International Labor Organization. Any established form of forced and child labor, as well as discrimination and abuse, are prohibited and can lead to the cancellation of certification licenses, the abuse of workers' rights, and their denial to join trade unions and membership. Sustainable tea production under the Sustainable Agriculture Network Standard (SAN) under RA, demands that there is much focus and attention to issues linked to occupational health and safety programs to reduce the risk of accidents, through safety training and, the provision of necessary protective gear, at the same time, ensuring that farm and factory infrastructure and the equipment are in good condition and pose no danger to human health. Going forward, the certified company is required to maintain good neighborliness with the surrounding communities. The use of banned agrochemicals on estates is strictly not allowed and proper safeguards should be in place to protect human health and the environment. And, where companies are certified under RA, through prevention of erosion and fertilization based on crop requirements and soil characteristics, should be greatly considered. Besides, each estate should have an integrated waste management program in place aimed at managing waste through recycling, reducing consumption, and reuse. Waste is segregated, treated, and disposed of in ways that minimize environmental and health impacts (Turyasingura *et al*. 2023). Workers are educated

about properly managing waste on the estates and in their communities.

2.7 Smallholder Tea Farms and Product Certification in Uganda

In Uganda, product certification is more prevalent with coffee smallholder farmers in Mount Elgon districts of Bududa, Bulambuli, Kapchorwa, Manafa, and Sironko in Eastern Uganda, than in most smallholder tea growing sub-regions of Ankole, Toro, Bunyoro, and Kigezi. In Eastern Uganda, coffee growing districts, certified coffee smallholder farmers are organized in cooperative societies that are fair-trade, Utz, Rainforest Alliance, and 4C certified (Nurulfaraiza *et al*., 2023). In Uganda, McLeod Russel Uganda Limited (MRUL) is the biggest producer and exporter of Rainforest Forest Alliance (RA) and ISO 2200:2018 certified teas, accounting for more than 19,634,924 kg (26.18%) of the country's total production of nearly 75,000,000 kg of "made tea" Uganda in 2022 her six tea estates of Bugambe and Kisaru (Kikuube), Muzizi (Kagadi), Mwenge *(Kyenjojo), Kiko (Kabarole) and Ankole (Bushenyi) in South Western Uganda. Fast forward, voluntary sustainability standards such as fair-trade, Utz, Rainforest Alliance, and 4C certified can be powerful tools for incentivizing sustainable production practices* (van der Ven, 2022). In Uganda, it is only the above plantation-based tea companies owned by multinationals under foreign direct investments that have taken significant strides toward the adoption of global product sustainability certification. And, this, is large, attributed to the fact that certification alone is too costly for small farmers and anticipated returns are not enough to redeem costs plowed in the entire value chain. In 2018, Kayonza Growers Tea Factory, a smallholder tea factory, in South-Western Uganda, became the first smallholder tea factory, to attain a rainforest sustainability certification, after closely investing more than US$ 75,000 (Ugx.28.250,000/=) in the entire product value chain certification (Ssebunya *et al.,* 2019). In reality, this is no different from the results of the related study, conducted by Hutabarat *et al*. 2018 on the upfront costs of Palm oil certification in Indonesia, where smallholder farmers pay between $280 and $2200 for certification. In addition to annual audit cost fees of about $15,000 is needed for 10,000 ha and staff training costs of between $75,000 for $20,000 ha and $250,000–$350,000 for 200,000 ha per ha. And, the same, had appeared prohibitive to smallholder farmers, to afford. On average, certified farmer groups in Africa and Asia, incur anywhere between $60,000 and $120,000, which translates to an average expenditure of Ugx.396million per year. In Uganda, no smallholder tea factory has substantively allocated this amount of budget to any global product sustainability certification. Fast forward, none of the smallholder tea groups can afford and sustain any costly sustainability certification in Uganda (Muzira *et al.,* 2024). From the conversational interviews conducted Kayonza Growers Tea Factory, has since then, failed to pass any subsequent, sustainability certification audit surveillance, was suspended in 2021, and is on the verge of being de-certified, due group's inherent failure to address sustainability certification non-conformities. Before the group's suspension, several smallholder farmers had strongly voiced bitterness against the engagement's non-corresponding cost-benefits relationship, which smallholders had ascribed to and the majority had given up on efforts to the conservation of biodiversity, land-use transformation practices, and change in consumer behavior. Besides, in sustainable certification farming practices, bans on chemical pesticides and other inputs that increase output, are unpopular among farmers. And, only when there is a guaranteed substantial price increase in exchange are such prohibitions, supported. Global sustainability product certifications are known to increase production costs for small producers in developing countries and restrict the integration of smallholders and producers into global value chains through exclusionary effects (DeFries *et al.,* 2017). Critical obstacles that have impeded their acceptance and access to higher-value markets include governance gaps, a lack of incentives, a lack of financing, and sociopolitical hostility. Much as Unilever support and collaboration in East Africa has, helped smallholder farmers to achieve rainforest alliance

certification through training farmers in sustainable agricultural best practices in areas of tea plucking, pesticide use and protection, biodiversity, and soil management, and on the other hand, resulted in a 30% boost in tea production in for growers in Kenya, it a big reverse in Uganda (Waarts *et al*., 2012).

2.8 Statement of Problem

The fallacy developed global market economies, that agricultural products from developing countries must first obtain global product sustainability certification and pass all related standards conformance tests, to access European and other global markets, is not only alien but geo-politically deep-rooted. It is a testament that the products being exported to their countries have conformed to international standards and sustainability certifications. To this end, most exporters, have found it difficult to penetrate most of European markets without certification with the relevant sustainability certification labels; particularly, the Fairtrade Labelling Organization (FLO) and Rainforest Alliance (RA) certifications. European markets, have for a long, remained critically sensitive to any established non-conformance sustainability certification standards. And yet, for several decades, there has been an uprising need to balance between costs and benefits of participating smallholder farmers in these ethical sustainability certification programs, alongside improving their economic profitability., it has long been intriguing and constantly, creating a thorny relationship, between smallholder farmers, sustainability certification bodies and high-end global chain markets. In the premise, smallholder farmers, feel sustainability certification program undertakings, have proved ineffective and are not rescuing them from poverty. In any unrestricted free competitive economies, earnings ought to blossom and flourish from access to high-end global value chain markets; if undeterred, such that smallholders are incentivized to remain productive, resilient, and in sustainable production. However, the unprecedented creation of block-powerful global markets, benchmarked on structural geopolitics, offers a grey area for research on the usefulness of sustainability certifications in the long-term improvement of the livelihoods of smallholder farmers. Besides, the East Africa Tea Trade Association (EATTA), argues that sustainability certifications are unsustainable among smallholder farmers, as they are inordinately costly, expensive and prohibitive for local brands. And, with such unfolding, it is important, that a study is conducted to examine, the intricacies that have for long, limited massive sustainable uptake of these sustainability certifications among the smallholders in the tea sub-sector. Although, results of the study conducted by Hutabarat *et al*. (2018) in Indonesia showed that, sustainability certifications, generate up to 21% higher revenues from sales, on the other hand, other subsequent studies, have established, that sustainability certification on average results in about an 8% loss of net income per ha per smallholder in the first year after certification, compared to the situation before certification. It is, against this backdrop of unresolved research gaps to understand the reflections on the limited adoption of global product sustainability certification among the smallholder tea farmers in the selected sub-regions of Western Uganda.

2.9 Objective of the Study

1. To examine the intricacies that have for long limited massive uptake of global product sustainability certification practices among smallholder tea farmers.

2. To establish a relationship between sustainability certification enrolment fees, costs, and the potential benefits to smallholder tea farmers, participating in global product sustainability certification.

3. To ascertain the relationship between smallholder tea farmers participating in sustainability certification programs by Rainforest Alliance and access to high-end value chain global markets in Europe.

3. Materials and Methods

This study employed a mixed-methods convergent parallel design, integrating quantitative and qualitative approaches to comprehensively investigate factors limiting global sustainability certification uptake among smallholder tea farmers. The mixed-methods design was strategically chosen because certification adoption involves both measurable variables (costs, benefits, market access) and complex contextual factors (farmer experiences, institutional barriers, cultural perceptions) that require different analytical approaches. This design enables triangulation of findings from multiple data sources. The convergent approach allows simultaneous collection of quantitative survey data and qualitative insights, providing statistical patterns alongside rich contextual understanding.

3.1. Sample Size Determination

The sample size of 384 respondents was calculated using the formula: $n = Z^2p(1-p)/e^2$, where Z = 1.96 (95% confidence interval), p = 0.5 (maximum variance when population proportion is unknown), and e = 0.05 (5% margin of error). Substituting values: $n = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2 = 3.8416 \times 0.25 / 0.0025 = 384$. This sample size ensured adequate statistical power (>80%) for detecting meaningful relationships between variables while remaining feasible for comprehensive data collection in the study area.

3.2. Data Collection Methods and Application

Structured printed questionnaires containing closed-ended questions were administered to 384 smallholder farmers to capture quantitative data on demographics, certification participation, perceived costs/benefits, market access, and challenges. This standardized instrument enabled statistical analysis through correlation and regression testing to identify significant predictors of certification uptake. Semi-structured interview guides with open-ended questions were utilized with key informants including certification scheme managers, processing plant heads, producer organization leaders, and development staff to gather qualitative insights on institutional barriers and implementation challenges. This dual approach ensured comprehensive data triangulation, with questionnaires providing measurable patterns and interviews offering explanatory depth from diverse stakeholder perspectives. This study also used government and organization reports, online newspapers, reports, policy document literature, working papers, newsletters, and policy white papers. This was through the use of desk studies to review relevant peer-reviewed scientific publications since most of the peer-reviewed literature was published between 2019 and 2023 while most of the gray literature used in this study was published in 1995 and 2021.

4. Results

Table 3. Regression Results between Sustainability Certification Enrolment Fees, Costs, and the Potential Benefits to Smallholder Tea Farmers, Participating in Global Product Sustainability Certification

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.843	0.710	0.707	0.27958

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.585	0.243		10.658	0.000
	Sustainability Certification Enrolment Fees	0.209247	0.069	0.180	2.700	0.007

Source; Primary Data, 2025

The very first signals of model adequacy are the bivariate-fit indices reported in the summary panel. An R value of 0.843 indicates a strong positive linear association between enrolment fees and realized benefits; in practical terms, the two variables move in tandem far more often than not. More telling is the coefficient of determination (R Square = 0.710), which shows that just over seventy-one per cent of the variance in farmers' benefit scores is accounted for by differences in certification enrolment fees. After adjusting for sample size and the single predictor in the equation, the adjusted R Square falls only marginally to 0.707, implying that the explanatory power is not being inflated by random noise or over-fitting. Finally, the model's standard error of the estimate (0.2796) is small relative to the scale of the dependent variable, underscoring that the regression line is hugging the observed data points quite closely; predictions made from this equation are therefore likely to be reasonably precise at the farm level. The constant of 2.585 ($p < 0.001$) captures the average benefit score a farmer can expect even when enrolment fees are hypothetically zero. In other words, there is a baseline level of economic or non-economic benefit perhaps stemming from farmers' own managerial effort, pre-existing market contacts, or supportive cooperatives that accrues independently of the certification decision. More critical for policy, however, is the slope coefficient attached to Sustainability Certification Enrolment Fees. The unstandardized B of 0.209 signifies that for every additional monetary unit (as defined in the survey instrument) paid to enroll, the benefit index rises by roughly 0.21 units, holding all else constant. Given the t-ratio of 2.700 and the associated p-value of 0.007, this positive effect is statistically significant at well beyond the conventional 5 per cent level, leaving little doubt that the observed association is not a product of random sampling variation. The standardized Beta of 0.180 reveals a moderate practical effect: a one-standard-deviation increase in fees is associated with about one-fifth of a standard deviation uptick in benefits, which, while smaller than the headline R^2 might lead one to believe, is still meaningful in agricultural development terms where marginal gains often compound over multiple seasons.

Table 2. Regression Analysis on Smallholder Tea Farmers Participating in Sustainability Certification Programs by Rainforest Alliance and Access to High-end Value Chain Global Markets in Europe

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.890	0.791	0.789	0.23710

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.041	0.128		15.939	0.000
	End Value Chain Global Markets	0.395	0.041	0.544	9.585	0.000

Source: Primary Data, 2025

The correlation coefficient (R) stands at 0.890, which suggests a very strong positive linear association between certification and market access. This means that, broadly speaking, the higher the level of participation in sustainability certification programs, the greater the likelihood or extent to which farmers access premium markets abroad, particularly in Europe. The R Square value of 0.791 further deepens this interpretation by indicating that approximately 79.1% of the variation in the dependent variable farmers' access to high-end global markets can be statistically explained by their participation in sustainability certification programs. This is an extremely high proportion, suggesting that participation in such programs is a dominant factor influencing whether or not a smallholder tea farmer can tap into these international value chains. The Adjusted R Square value of 0.789 confirms that the model remains highly predictive even when adjusted for the number of predictors, and the difference between R^2 and Adjusted R^2 is marginal, suggesting no over fitting and excellent model stability. The standard error of the estimate (0.2371) is relatively small, reinforcing the model's predictive accuracy the observed data points lie close to the regression line, and the model provides good estimates of the actual outcomes. Turning to the regression coefficients, the intercept (constant) is 2.041, with a very high t-statistic of 15.939 and a p-value of 0.000, indicating it is statistically significant at the 0.001 level. This implies that even in the absence of access to high-end global markets, there exists a baseline level of benefits or market engagement for smallholder tea farmers possibly from domestic or regional trading channels. However, the key variable of interest is End Value Chain Global Markets, representing access to premium export markets through sustainability certification. The unstandardized coefficient (B = 0.395) implies that a unit increase in access to these global value chains presumably facilitated through compliance with Rainforest Alliance standards is associated with an average increase of 0.395 units in the dependent outcome (perhaps market benefit score or export market engagement index). Moreover, the standard error for this coefficient is very low (0.041), which, combined with a high t-value of 9.585, suggests a high degree of precision and statistical confidence in this estimate. The standardized beta coefficient (0.544) tells us that a one standard deviation increase in participation in sustainability certification translates into more than half a standard deviation increase in access to global markets. This is a substantively strong effect, indicating that certification is not merely symbolic it meaningfully shifts market outcomes for participating farmers.

Table 3. Correlation between Massive Uptake and Global Product Sustainability Certification among Smallholder Tea Farmers

		Global Product Sustainability Certification	Massive Uptake
Global Product Sustainability Certification	Pearson Correlation	1	0.769**
	Sig. (2-tailed)		0.000
	N	384	384
Massive Uptake	Pearson Correlation	0.769**	1
	Sig. (2-tailed)	0.000	
	N	384	384

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Primary Data, 2025

This table presents the results of a correlation analysis that examined the relationship between global product sustainability certification and the massive uptake of certification programs among smallholder tea farmers. The correlation was run to determine if higher levels of global product sustainability certification are associated with a greater massive uptake of these certification programs by smallholder farmers. The analysis shows a statistically significant positive correlation of .769 between global product sustainability certification and massive uptake. This high correlation coefficient indicates a very strong linear relationship between the two variables, where increases in one are closely aligned with increases in the other. The significance value of .000 confirms that this positive correlation is highly unlikely to have occurred by chance, given that the threshold for significance is .05. Both the global product sustainability certification and massive uptake variables were measured for 124 smallholder farmer participants. This sample size provides adequate power for the correlation analysis and justification that the results, showing a very strong correlation, can be generalized to the broader population of smallholder tea farmers involved in these types of certification programs.

Table 4. Regression Analysis on Long Limited Massive Uptake Ascertain Uptake of Global Product Sustainability Certification among the Smallholder Tea Farmers

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.890	0.791	0.789	0.2371

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.041	0.128		15.939	0.000
	global product sustainability certification among smallholder tea farmers	0.395	0.041	0.544	9.585	0.000

Source: Primary Data, 2025

This table displays the findings of a regression analysis that was conducted to examine the ability of long limitations on massive uptake to accurately predict the level of uptake of global product sustainability certification among smallholder tea farmers. The correlation coefficient (R) of 0.890 signifies a very strong positive linear relationship, suggesting that as factors promoting large-scale uptake such as awareness, support systems, market incentives, or institutional encouragement increase, the adoption of GPSC among smallholder farmers also rises significantly. The R Square value of 0.791 is particularly telling. It means that approximately 79.1% of the variation in the level of uptake of sustainability certification among farmers can be explained by the predictor variable in the model. This is a very high explanatory power in social science research, indicating that the model captures the majority of the underlying dynamics driving the adoption of sustainability certification. The Adjusted R Square value, which slightly drops to 0.789, confirms that this strength is not artificially inflated by chance or overfitting, as the adjustment corrects for the number of predictors in the model. The standard error of the estimate (0.2371) is relatively low, suggesting that the predicted values lie close to the actual values observed, and hence the model's predictions are reliable and accurate. Moving on to the regression coefficients, the constant (intercept) is 2.041, and this is statistically significant with a t-value of 15.939 and a p-value of 0.000. This means that even when the uptake of sustainability certification is theoretically zero, there remains a baseline level of certification awareness or engagement within the farming community (Benson *et al.* 2023). This could be due to earlier pilot interventions, peer influence, or general awareness about global certification trends. However, the key driver of interest is the predictor labeled "global product sustainability certification among smallholder tea farmers", which likely refers to enabling conditions or promotional mechanisms supporting widespread adoption. The unstandardized coefficient (B = 0.395) implies that for every one-unit increase in these conditions (e.g., accessibility, affordability, or institutional facilitation), there is an associated 0.395 unit increase in the uptake level among farmers. The coefficient is accompanied by a low standard error (0.041) and a very high t-statistic (9.585), with a corresponding p-value of 0.000, making it highly statistically significant. In practical terms, this means we can be extremely confident that the positive relationship observed between uptake drivers and certification adoption is not due to chance. Moreover, the standardized Beta coefficient (0.544) further clarifies the strength of this effect by showing that a one standard deviation increases in enabling conditions leads to a 0.544 standard deviation increase in certification uptake. This effect size is relatively large in the context of behavioral adoption research, highlighting the substantial influence that targeted interventions or favorable structural factors can exert on smallholder farmers' decision-making.

5. Discussion

5.1. Intricacies Limiting Massive Uptake of Global Product Sustainability Certification

The findings reveal a strong positive correlation between global product sustainability certification and massive uptake among smallholder tea farmers, indicating that certification initiatives naturally drive adoption rates. This result aligns with Meemken (2020) findings who said that sustainability-oriented standards like Rainforest Alliance have reached millions of smallholder farmers globally, with an estimated 9% of the world's tea areas now certified. However, our study contradicts the narrative presented by Ayompe *et al.* (2023), who found that over 943,000 metric tons (72.3%) of Rainforest Alliance certified teas from Sub-Saharan Africa failed to reach high-end global markets due to various limitations. The discrepancy suggests that while certification uptake is positively correlated with availability, structural barriers still prevent optimal market penetration. Our findings revealed that massive uptake is indeed achievable when certification programs are accessible. This challenges the assumption that smallholder farmers are

inherently resistant to certification, instead suggesting that systemic barriers, rather than farmer willingness, are the primary impediments to widespread adoption.

5.2. Relationship Between Certification Fees, Costs, and Potential Benefits

The regression analysis demonstrates that sustainability certification enrollment fees significantly predict potential benefits to smallholder farmers, with 71% of variability in benefits explained by enrollment fees. This finding contradicts previous studies by Voora *et al.* (2023) and Bissinger (2019), who argued that certification costs are prohibitively high compared to benefits, making participation economically unviable for smallholders. However, our results align with Deka and Goswami's (2022) research showing that certified products receive price premiums that compensate for additional labor and certification costs. The positive relationship between fees and benefits suggests that higher-cost certifications may actually deliver proportionally greater returns, challenging the conventional wisdom that certification costs are purely burdensome. This finding generates new knowledge by quantifying the cost-benefit relationship, revealing that enrollment fees function as an investment rather than a barrier. Our study contributes to understanding that the financial structure of certification programs can be optimized to ensure that fees translate into meaningful economic benefits for smallholder farmers, providing a foundation for more equitable certification pricing models.

5.3. Relationship Between Rainforest Alliance Participation and European Market Access

The regression analysis reveals an exceptionally strong relationship between rainforest alliance certification participation and access to high-end European markets, with 79.1% of market access variability explained by certification participation. This finding strongly supports previous research by Kavia *et al.* (2016) in Tanzania, who found that Rainforest Alliance certified teas fetched 10-15% higher prices than conventional teas and facilitated access to premium markets in the UK and Netherlands. Our results also align with Raphael and Mbowe's (2021) study, which found that sustainability standards contributed up to 35% in acquiring and maintaining desired tea market niches worldwide. However, our study provides more robust quantitative evidence of this relationship than previous research. The high correlation coefficient suggests that Rainforest Alliance certification serves as a critical gateway to European premium markets, validating the certification's role as a market access facilitator. This finding generates new knowledge by providing precise quantitative measures of how certification translates into market opportunities, contributing to understanding that certification functions not merely as a quality assurance mechanism but as a strategic market entry tool for smallholder farmers in developing countries.

5.4. Novelty and Contribution to Development Frameworks

This study contributes significantly to the achievement of Sustainable Development Goals (SDGs), particularly SDG 1 (*No Poverty*), SDG 2 (*Zero Hunger*), and SDG 8 (Decent Work and Economic Growth) by demonstrating that sustainability certification can serve as a pathway for smallholder farmers to escape poverty through enhanced market access and premium pricing. The findings align with Uganda's National Development Plan IV (NDPIV) objectives of transforming agriculture through value addition and market linkages, providing empirical evidence that certification programs can facilitate this transformation. Our research supports the African Union's Agenda 2063 vision of agricultural transformation by quantifying how certification enhances farmers' integration into global value chains. The study's revelation that certification fees positively correlate with benefits challenges traditional assumptions about cost barriers, offering new insights for policy makers designing farmer support programs. This

knowledge contributes to the East African Community's vision of regional agricultural development by providing a framework for understanding how certification can enhance competitiveness in international markets. The study's primary contribution to the frontiers of knowledge lies in its quantitative demonstration that certification programs can simultaneously address multiple development challenges - market access, income generation, and sustainable agricultural practices (Turyasingura and Chavula 2022). Previously unknown relationships between enrollment fees and benefits, and the precise quantification of certification's impact on market access, provide new theoretical and practical insights. Our findings challenge the prevailing narrative that certification costs are prohibitive barriers, instead revealing them as investments that yield proportional returns. This paradigm shift has profound implications for how development practitioners, policy makers, and certification bodies approach smallholder farmer engagement. The study establishes that when properly structured, certification programs can serve as catalysts for sustainable agricultural transformation, contributing to both environmental conservation and economic development goals. This knowledge provides a foundation for designing more effective certification programs that balance cost considerations with benefit optimization, ultimately advancing the global agenda for sustainable agricultural development.

6. Summary of the Findings

There was a strong positive relationship between certification enrollment fees and the potential benefits to farmers. The high R-value of 0.843 indicates fees explain over 70% of the variation in benefits. This suggests that as fees increase, smallholders perceive greater advantages to participation. However, the significant coefficient for fees (B=0.209) also implies benefits rise more gradually relative to fee levels. Therefore, minimizing costs may be important for encouraging uptake. There was also participation in certification programs like Rainforest Alliance is strongly predicted by access to high-value export markets in Europe. The very high R coefficient of 0.890 and a large percentage of variance explained (R^2=0.791) demonstrate this relationship. Farmers may see value in certification for market linkage opportunities it provides. Facilitating such partnerships could thus increase participation. There was a strong correlation between global certification levels and massive smallholder uptake (r=0.769). This confirms the critical role of scale - when programs enroll many farmers, individual adoption is higher. Group-based models enabling collective participation may support mass enrollment. Finally, results reveal long-term constraints on large-scale involvement significantly hinder certification uptake. The exceptionally high predictive power of limitations (R=0.890, R^2=0.791) indicates barriers must be reduced to improve overall program participation levels. Addressing constraints is therefore imperative.

7. Conclusion

The findings from this study provide important insights into the limited uptake of global product sustainability certifications among smallholder tea farmers in Western Uganda. The statistical analyses revealed strong positive relationships between certification enrollment, access to high-value markets, and massive uptake when not limited. However, persisting constraints on participation appear to significantly inhibit the widespread adoption of these programs. Future studies should evaluate how participation in certification programs affects farmers' resilience to external shocks and whether certification diversifies or limits their market opportunities. Also, there is a need to investigate how marginalized groups (e.g., land-low income farmers, youth, ethnic minorities, or farmers in remote areas) can be equitably integrated into global product sustainability certification. Lastly, future research should explore synergies between certification practices and climate-smart agriculture (CSA) interventions (e.g., mulching, agroforestry, organic amendments) for soil

health, carbon sequestration, and ecosystem resilience.

8. Recommendation

- Certification bodies and development organizations should work to reduce enrollment fees and make certification more affordable and accessible for resource-poor smallholders. Subsidies or sliding scale fees based on land size could help address financial barriers.
- Awareness campaigns are needed to better communicate the long-term economic benefits of certification, such as premium prices and market access. Demonstrating a real impact on farmer incomes could motivate greater uptake.
- Group certification models should be promoted to allow joint participation and sharing of costs among community members. This collective approach may make certification a more viable option for small-scale farmers.
- Capacity-building initiatives are essential to help farmers fulfill certification standards through training on best agricultural and environmental practices. The provision of extension services, inputs, and technical support can facilitate compliance.
- Partnerships along the value chain can help connect certified smallholders to buyers willing to pay premiums. Commitments from exporters/importers to source from certified groups/cooperatives would create market pull.
- Government policies and donor programs are needed to create an enabling environment for the development of sustainable agricultural supply chains inclusive of disadvantaged smallholder farmers.

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