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Integration Of Organizational Forms, Contractual Mechanisms, Value Chains, and Sustainability in Smallholder Commercial Farming

Musa Nkuba Shelembi[1]

Abstract

Adoption of environmentally friendly and economically sustainable farming practices among others, aims at realizing Sustainable Development Goals Number Two and Number Thirteen on Zero Hunger and Climate Action respectively. However, inapt agribusiness arrangements and climate change impacts obstruct these efforts. Hence, a need for further assessments on possible forms of institutional arrangements that are likely to enhance the adoption of sustainable farming practices. In that regard, this study explored the integration of smallholder organizational forms, contractual mechanisms, and value chains on the sustainability of smallholder commercial farming. The economic and ecological contexts of sustainability within conventional and organic farming value chains that smallholders engage in are studied. The study used qualitative data gathered through seven in-depth interviews and thirteen focus group discussions from the contracted conventional, contracted organic, non-contracted conventional, and non-contracted organic cases of smallholder commercial farming models.

The findings show that formally organized smallholders who integrate and contract with agribusinesses for ventures in the organic farming value chain indicate a high enhancement of economic and ecological sustainability. Such is recommended for realizing smallholder commercial farming endeavors that are both economically and ecologically sustainable. This paper contributes to the ongoing sustainability agenda, especially on methods that are adopted by smallholder commercial farming in developing economies. Different from other studies that reflect sustainable farming approaches on sole factors, the proposed approach is based on integrating three key parameters, which if actors take them on board, contribute to realizing sustainable development through sustainable smallholder-based commercial farming in developing economies.

Keywords: Institutional Arrangements, Organizational Forms, Contractual Mechanisms, Value Chains, Integration, Sustainability.

Introduction

The emphasis for smallholder commercial farmers to adopt environmentally friendly and economically sustainable farming practices in developing economies continues to be paramount (Delvaux *et al*., 2020; Newell *et al*., 2019). This parallels with the efforts towards the realization of sustainable development goal number two on zero hunger and goal number thirteen on climate action stipulated by the United Nations (UN, 2022). However, the inapt agribusiness modalities between smallholders and agribusinesses (Breitmeier *et al*., 2021; Jama & Mourad, 2019) and

[1] University of Dar es Salaam Business School
Email: nkubashelembi@yahoo.com

climate change effects such as variability in farming value chains (Kombat *et al*., 2021) are obstructing the apprehension of these efforts. In response, the adoption of inclusive and integrative approaches that contribute to addressing the challenges and fostering sustainable smallholder farming is suggested (Brenya *et al.,* 2022; Ros-Tonen *et al.,* 2019). Some of these approaches include actor integration towards smallholder access to inputs, credits, and markets. Such is observed through the proposed engagement of the public sector in facilitating land tenure to smallholders, provision of seed services by the private and public sectors, and provision of credit guarantee schemes to smallholders by banking institutions (Balana & Oyeyemi, 2022; Langyintuo, 2020). Another inclusive approach to addressing the challenges related to sustainable smallholder farming is through cross-sector partnerships and public-private partnerships. This involves different public and private sector actors who engage in activities such as research and innovation, agronomic service provision, training, and capacity building which all together contribute to transforming smallholder farming (Shoniwa, 2023; Aseete *et al.,* 2022). Other inclusive approaches include value chain collaboration, market integration, company-producer partnerships, climate-smart agriculture, and many more.

Within these varied views on the integrative approaches, institutional arrangements (smallholder organizational forms and contractual mechanisms in this context) and farming value chains are assumed to be among the elements that can be integrated into addressing the challenges. Institutional arrangements embody mechanisms that bring together, unite, and enhance smallholders' bargaining power towards farm inputs, services, and market access as partners to agribusinesses. Arrangements are depicted in the forms of smallholder cooperatives and other organizational forms (Kormelinck *et al.,* 2019). Other arrangements are practiced through contractual mechanisms that are set between smallholders and agribusinesses (Yeshitila *et al.,*2020; Maertens & Velde, 2017). Even though portrayed in varied contextualization, value chains are also spotted to be one of the key elements that determine the development of smallholder commercial farming. Value chains have been determinants of a marketing strategy by smallholder commercial farmers (Preißel & Reckling, 2010). Smallholder commercial farmers may decide to engage in a conventional farming value chain to meet a specific large product demand by a market. Else, smallholder commercial farmers may choose to engage in an organic farming value chain to meet a niche of sustainable and healthy food consumers. The effects of climate change are also causing the emergence of value chains in which smallholders choose to engage. Crop value chains that consider for instance, droughts, pests and diseases, yield time, efficient resource uses (Zhou, 2010), and crops' calorific values (Sakai *et al.,* 2020) are influencing smallholders' choices of value chains to engage.

The adoption of institutional arrangements and specific farming value chains indicates to contribute to the effective functioning and sustainability in smallholder commercial farming. However, within the advocates of integrative and inclusive approaches, the independent setting of institutional arrangements or independent choice of value chains dilutes the strength of building sustainable smallholder commercial farming. Therefore, the need for further assessments of other possible forms of institutional arrangements and other factors that are likely to enhance sustainable farming practices by smallholders arose. In this regard, this study questioned: *How does the integration of smallholder organizational forms, contractual mechanisms, and value chains lead to economic and ecological sustainability in smallholder commercial farming in Tanzania?* In line with this main question, the study identified the integration of smallholder organizational forms,

contractual mechanisms, and value chains in smallholder commercial farming models. The study further examined the integration of smallholder organizational forms, contractual mechanisms, and value chains on economic and environmental sustainability in smallholder commercial farming models. The significance of this study and its knowledge is in expressing one of the holistic approaches that can be adopted in unlocking the barriers that hinder sustainability in smallholder commercial farming.

The study developed a specific interest in Tanzania as it is among the developing economies of the Sub-Saharan Africa in which the transformation of smallholder agriculture from subsistence to commercial is being undertaken (Xiong & Tarnavsky, 2020; Tavenner *et al.,* 2019). Rises in many agribusinesses that partner with smallholder farmers in the production, processing, and supply of food in agri-food value chains are evident (Van Rooyen, 2014). Moreover, it is one of the countries in which more than 80% of its population is engaged in smallholder farming (Wineman *et al.,*2020). The engagement of this population in farming is thought to have economic benefits for smallholders. Smallholder commercial farming that is undertaken in sustainable ways that do not have adverse impacts on the environment and the entire biodiversity creates ecological advantages. However, sustainability in smallholder commercial farming in the country context in terms of economic viability and contribution to ecological sustainability is still in question. It is within these grounds that various approaches upon which smallholder commercial farming endeavors that involve partnerships with agribusinesses have been examined to see how they foster economic and ecological sustainability.

Literature Review

Institutional Arrangements

Literature refers to smallholder farmer cooperative societies or associations as institutional arrangements (Ma & Abdulai, 2016). Through these organizations, farmers strengthen the bargaining power towards farm inputs and services access and transaction costs reduction. Smallholder farmer groups are also referred to as another form of institutional arrangement (Kormelinck *et al.,* 2019). In this form, smallholders can associate from individuals to groups to create bargaining power towards farm inputs, credit, and market access as services they need for commercial farming (Fischer & Qaim, 2011). Moreover, smallholder farmers can unionize to create strength due to being perceived as the disadvantaged groups in the value chain (Muchara & Mbatha, 2016). Organizing smallholders into farmer organizations gives them access to many advantages. Such include increasing production, market challenges encounter, access to technology and farm information, access to loans, farm inputs, and mechanization (Bairagi & Mottaleb, 2021). Moreover, advancing smallholder farmer organizations to cooperatives is advantageous as it enables them to meet challenges that hinder them from growing. Contending on this idea, Naupane *et al.,*(2021) advocate on smallholders' use of agricultural cooperatives in developing countries. It assists in technology adoption, improving economic performance, provides them with better information and innovation, and assists smallholders' market participation. In these cases, smallholders' engagement in different organizational forms proves to be a beneficial tool in assisting them to encounter the barriers to agricultural development and economic growth.

The literature further refers to smallholder contractual mechanisms such as contract farming as institutional arrangements (Yeshitila *et al.,* 2020). Agribusiness firms contract production to

smallholder farmers through vertical coordination to enhance farmers' access to inputs, quality production, and supply, access to markets, and reduction of transaction costs. Moreover, some literature takes a combined notion of institutional arrangements. Organized smallholders operating within farming contractual arrangements entail an institutional arrangement (Gramzow *et al.,* 2018; Maertens & Velde, 2017). With this conception, organized farmers for instance ease the management of contracts and communication logistics to group members. Organized and contracted smallholder farmers create more value in the performance of commercial farming. This latter conception of institutional arrangements is what this study embodies. Contract farming has been a very beneficial institutional arrangement that farmers opt for. Smallholders use contract farming to foster agricultural growth, as it provides opportunities for smallholders to participate in intensive farming access to profitable export markets, and get included in the current models of agribusiness (Ncube, 2020). Moreover, through contract farming mechanisms, smallholders are enabled to share the production and marketing risks, access high-value markets, access credit services and farm inputs at lower rates, access reduced transportation and marketing costs, and access training and technical assistance services from agribusinesses (Abbasi *et al.,* 2021).

Agricultural Value Chains

In broader perspectives, a value chain represents a sequence of actors, agents, and markets that are interlinked to facilitate the availability and transformation of inputs into products and services for consumption (Hainzer *et al.,* 2019; Devaux *et al.,*2018). Value chains whose scope of operation is limited within a local setting create local value chains (Thomas-Francois *et al.,* 2020). Value chains that operate within extended scopes of global linkages create global value chains (Arora & Hartley, 2020). Specific to the agricultural sector exist agricultural value chains (van Dijk *et al.,* 2021). Further classifications of agricultural value chains to production such as horticulture farming define horticultural value chains (Krishnan, 2018). Literature also classifies value chains on the shelf-life or perishability characteristics of crops and defines perishable products' value chains (Ababulgu *et al.,* 2022). Moreover, the literature labels value chains on farming systems that either use agro technologies and synthetic fertilizers or conserve the natural environment and restore biodiversity. Under this context, conventionally undertaken farming creates a conventional farming value chain (Qiao *et al.,* 2017). Conversely, organically undertaken farming forms an organic farming value chain (Troosters *et al.,* 2020, Kindervater *et al.,* 2018; Kalibwani *et al.,* 2018). Other crop value chains extend to the crop calorific values that are either for commercial or consumption resulting in mixed crop value chains (Sakai *et al.,* 2020). Still, the impacts of climate change are promoting climate-adaptive farming systems. Drought-resilient, short yield time, or carbon sequestration products are exemplary forms of climate-adaptive farming value chains (Zhou, 2010). Among all value chains, this study focused on conventional and organic farming value chains that are reflected in institutional arrangements in smallholder commercial farming organic farming as conceptualized into a model indicated in Figure 1.

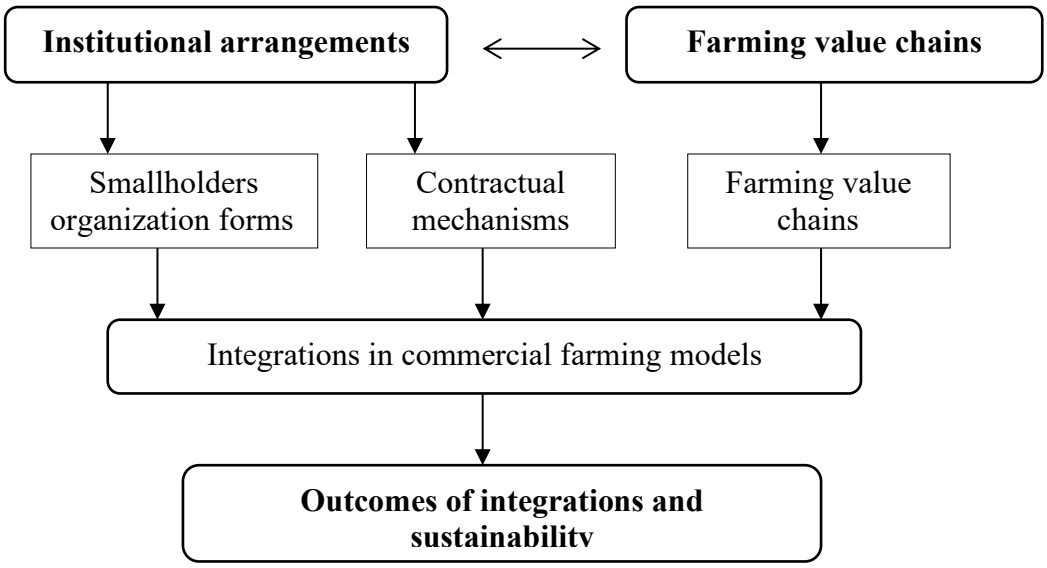

Figure 1. A conceptual framework for the variables of the study
Source: Adapted with modifications from Shelembi, (2020).

Sustainability

Sustainability has its genesis in sustainable development. Sustainable development means development that intends to meet the needs of the present without compromising the ability of future generations to meet their own needs (Flint, 2013; Hansmann, 2012; UN, 1987). This study contextualizes sustainability within the sustainable development realm, centering specifically on the triple-bottom-line dimensions. The triple-bottom-line dimensions of sustainability advocate for the consideration of economic, social, and ecological/environmental criteria in production and consumption decisions in different sectors (Haggar *et al.,*2021; Ekardt, 2020; Matzembacher&Meira, 2019).Relating economic sustainability to economic viability entails the ability of a system to survive for a long time under changing economic conditions (Spicka *et al.,*2019; Smedzik-Ambrosy *et al.,* 2019). Under agriculture, economic sustainability is the ability of an agricultural system to meet its operational expenses, sustain productivity, increase incomes, ensure stable markets, and survive within its resources (Guth *et al.,* 2020). Ecological sustainability on the other hand focuses on the interactions of human activities and the ecosystems through the use of approaches that ensure systems meet human needs without compromising the health of ecosystems (Neher, 2018). Stoyanova (2020) further clarifies ecological sustainability in the context of farming practices that use environmentally friendly methods to produce high-quality and healthy foods. Organic methods do not use genetically modified seeds or treated soils with chemicals, do not use chemical fertilizers, pesticides, and herbicides are ecologically sustainable (Auerbach, 2020; Jouzi *et al.,* 2017). With a similar genesis from the sustainable development concept, social sustainability as another parameter of sustainability focuses on consideration of the basic human rights and freedom. This is achieved through operations and decisions that take concerns on basic human needs such as employment, shelter, healthcare, education, decent and quality life, justice, integration of deprived groups, and protection of future generations (Kalkanci *et al.,* 2019; Janker & Mann, 2018). Social sustainability generally focuses on how operations and

decisions contribute to fostering the social well-being of individuals and the society in which the operations are being undertaken.

Within these dimensions of sustainability, this study narrows itself to the economic and ecological dimensions. Measuring economic sustainability varies with the context under which studies are undertaken. In this context, economic and ecological sustainability are differently explored through smallholders' access to training and capacity building, extension services, farm inputs and implements, and reliable markets. These factors are significant in the enhancement of sustainable smallholder commercial farming in developing economies (Mapiye *et al.,* 2021; Sakai *et al.,* 2020). The conceptual underpinning lacks an extensive analysis of the combination of institutional arrangements and value chains and their influences on the sustainability of smallholder commercial farming in developing economies, a gap that has been addressed by this study.

Materials and Methods

This study adopted the case-based research design in which five cases of smallholder inclusive commercial farming agribusinesses that form five forms of smallholder commercial farming models were selected. These agribusinesses are the Njombe Out-growers Services Company (NOSC) which forms a Contracted Conventional Farming Model and Tanzanice Agrifoods Limited which forms a Contracted Organic Farming Model. The others are the Njombe Development Office (NDO) with CARITAS and the Njombe Agriculture and Development Organization (NADO) that form a Non-contracted Conventional Farming Model and the Madeke Organic and Horticulture Agricultural Producers Cooperative Society (MOHAP-COS) that forms a Non-Contracted Organic Farming Model. These empirical cases of smallholder-inclusive agribusinesses were identified and selected through key informant officers from the District Agriculture and Cooperatives Department. The cases were classified into groups that have similar characteristics and operate in similar modes. The classifications resulted in the formation of four mechanisms that the study defined as smallholder commercial farming models. These models were then visited for empirical data inquiries.

Qualitative methods of data collection and analysis were employed. Empirical data collection was done by using in-depth interviews with seven representative leaders of smallholder farmer organizations in the models. Among the in-depth interviewed respondents are three officers who represented the publicly managed farmer groups. The other interviewed were four managers who represented the private agribusinesses that work with smallholder farmers in the models. An understanding of smallholder organizational forms, contractual mechanisms, and value chains in which smallholders are engaged was captured from the in-depth interviews. Moreover, empirical data was collected from thirteen focus group discussions. The discussions were undertaken with selected smallholder farmer groups that represented specific commercial farming models. All thirteen groups were purposively selected from the models based on how strong and information-rich they were. Each focus group discussion involved not less than ten representative members who were randomly selected from each respective group. Empirical data on smallholder organizational forms, contracting mechanisms, and types of value chains that smallholders engage in each model was also captured through the group discussions. The collected data was analyzed through systematic content analysis. The analyses examined how smallholder organizational forms, contractual mechanisms, and value chains are integrated into every model. The study further analyzed how the integrations contribute to the economic and ecological sustainability in

smallholder commercial farming in the models. The results were compared to see how integrations foster sustainable smallholder commercial farming in models. Nevertheless, the use of case studies that were selected from commercial farming models that operate in one district implies a limited coverage in terms of the cases for the study. The study also used the qualitative approach in data collection and analysis, an aspect that indicates the need for further extension of data types and analysis methods. With this understanding, the study suggests other research to further knowledge in similar themes by expanding the geographical coverage and inclusion of surveys to expand the themes of the study. This option would also imply the adoption of extensive methods of data inquiry and analyses.

Results and Discussions

The findings inform on the varied integrations of institutional arrangements and value chains in the study models and their influences on economic and ecological sustainability in smallholder commercial farming in the study area.

Integrations of Smallholder Organizational Forms, Contractual Mechanisms, and Value Chains in Smallholder Commercial Farming Models

The study found incomplete, partial, and complete states of integrations of smallholder organizational forms, contractual mechanisms, and value chains in different smallholder commercial farming models. The incomplete integrations are found in all of the non-contracted farming models. Under these models, smallholder farmers are formally organized in ranges of groups and AMCOS and work with either the public sector or private farmer support initiatives in either conventional or organic farming value chains. However, they don't have any contractual mechanisms that guide and bind their partnerships despite facilitating, for example, access to extension, capacity building, farm inputs, farm finances, and market services. Smallholder round potatoes farmers in Itunduma AMCOS who work with the NADO initiative asserted this situation through focus group discussions:

"NADO links us with partners such as markets for our round potatoes but they do not have any contractual agreements with these buyers. Their focus is for example on round potatoes training and fostering the welfare of farmers. They can promise to seek for markets for us but not on a contractual basis (Itunduma AMCOS: 35 – 35)".

Moreover, smallholders in the related model, the MOHAP-COS who cultivate organic pineapples also vindicated the lack of contracted arrangements with agribusinesses, a situation that limits their effective organic farming business as they said: -

"Mama Putika is an entrepreneur who deals with small-scale industries in Njombe. She wanted to establish contractual agreements with our society that she should purchase the pineapples from us and supply them to processors in Dar es Salaam markets. She came once, took some products from the society but she did not come back (Madeke AMCOS: 33 - 34)".

Despite the existence of smallholder organizational forms and clearly defined value chains in the models, the lack of contractual mechanisms makes the integration to be incomplete. On the other hand, partial integration is found in the Contracted Conventional Farming Model. Smallholders are formally organized in groups, then in AMCOS and others further into a cooperative union. All

are engaged in the conventional tea farming value chain. Assessments of the contractual mechanisms that exist in the model found smallholders who concurrently adopted contractual arrangements with two agribusinesses. This made the study derive a Semi-contracted Conventional Farming Model. For example, smallholder farmers contracted for shareholding in the publicly owned Lupembe Tea Factory, an arrangement that had antagonisms between the parties. At the same time, smallholders contracted with the Ikanga Tea Factory which is a private agribusiness. Smallholders' contracts to access farm inputs, services, and tea markets were then indefinite between the Lupembe and Ikanga Tea Factories. These arrangements brought inconsistencies in farmers' access to training and capacity building, access to extension services, access to farm inputs and implements, and access to reliable markets, leading to a partial integration of the studied aspects. For instance, the concurrent taking of contracts between smallholder farmers and the public and private agribusinesses impaired the integration as one of the group members explained in the group discussion: -

"The Ikanga Tea Factory does not implement the contractual agreements as it is supposed to be. They can for example promise to bring farm inputs in October and they bring it in March. They do not facilitate us as actors in the business value chain (Lupembe AMCOS: 36 - 36).

The variations in contractual agreements between smallholder tea farmers and the two agribusinesses brought tradeoffs between parties that made the completeness of the integration be analyzed as partial. Moreover, completely integrated smallholder organizational forms, contractual mechanisms, and value chains are found in the Contracted Conventional Farming and Contracted Organic Farming models. All smallholder farmers in these models are found to be organized in formal groups, have definite contracts with agribusinesses, and participate in either conventional or organic farming value chains. In these models, for example, smallholder farmers sign business contracts with agribusinesses for the agribusinesses to cater for farm inputs, and agronomic and extension services. Agribusinesses also contract as markets for all smallholder farmers' products. Such agreements and service provisions are verified by smallholder farmers in some of the groups in the models when they participated in focus group discussions: -

"We mainly work with Tanzanice, a company that facilitates training and education on organic farming. The company is also the main buyer of our organically produced fruits (Itulike Farmer Group: 37 – 37)".

The contracted business partnership is further explained by a farmer in another conventional farming group: -

"We have contractual agreements with NOSC on the supply of farm inputs and provision of technical and agricultural extension services in our tea farming bloc. Through NOSC, we have contracts with Unilever Tea Factory that have contracted with us as the market for the tea we cultivate (Iboya Tea Farm Bloc: 36 – 37)".

The presence of these institutional arrangements within a specific value chain characterizes a complete integration of the elements. This gives both parties to the contracts the high potential to reap the value of commercial farming.

As the study conceptually postulated, smallholder organizational forms, contractual arrangements, and farming value chains exist in the study cases although with varied experiences. The varied findings on the study parameters with their respective integrations found in the study models are summarized in Table 1.

Table 1: Integrations of smallholder organizational forms, contractual mechanisms, and value chains in smallholder commercial farming models

Commercial farming models	Integrated aspects			Integration status
	Institutional arrangements		Value chain	
	Smallholder organizational forms	Contractual mechanisms		
Model 1: Semi-contracted Conventional Farming	Smallholder farmer groups, AMCOS and Cooperative unions	Semi-contracted	Conventional farming	Partially complete
Model 2: Contracted Conventional Farming	Smallholder farmer groups	Contracted	Conventional farming	Complete
Model 3: Contracted Organic Farming			Organic farming	Complete
Model 4: Non-contracted Conventional Farming	Smallholder farmer groups and AMCOS	Non-contracted	Conventional farming	Incomplete
Model 5: Non-contracted Organic Farming			Organic farming	Incomplete

Source: Research filed data and contextualized analysis, (2022).

Integrations of Smallholder Organizational Forms, Contractual Mechanisms, Value Chains and Economic Sustainability in Smallholder Commercial Farming

The study found incomplete integrations of smallholder organizational forms, contractual mechanisms, and value chains in the Non-contracted Conventional and the Non-contracted Organic Farming models. The incompleteness in integration due to the lack of contractual arrangements hinders smallholders' access to farm inputs, services, and markets. For example, the organic pineapple farmers in the MOHAP-COS get extension services only from the government, services that are not contracted and guaranteed. They produce large volumes of pineapples but many remain unsold due to the lack of reliable markets. The provision of economic services such as inputs and reliable markets for the farm produce define the economic sustainability of business undertaking between smallholder commercial farmers and an agribusiness in this context. The lack of such economic services and assured markets in models with incomplete integrations impair the economic sustainability in smallholder commercial farming under the models. Contract farming

arrangements are emphasized in facilitating smallholders' production and profitability (Mugwagwa, 2020; Ragasa *et al.,* 2018). The mere organization and engagement of smallholders in farming value chains without economic services and markets, a majority of which are guaranteed through contracts, weaken the economic sustainability of smallholder commercial farming as observed in the two models. Opined similarly, notwithstanding the farm income benefits, organized smallholders are easily integrated into policy if they access markets and other capabilities that support farming (Bizikova *et al.,*2020).

Under the Partial or Semi-contracted Conventional Farming Model, the existence of unstable business conditions caused by conflicted contracts leads to partial economic sustainability. For example, the conflicted and controversial modes of shareholding between MVYULU tea farmers and the Lupembe Tea Factory led the farmers to take simultaneous contracts with a private agribusiness, the Ikanga Tea Factory. This led to the existence of an unstable tea business between partners. Smallholders remain unguided on where to access the economic services and tea markets. The found contractual instability impairs the long-term economic sustainability of smallholder commercial farming within the model. This is consistent with Gatto *et al.* (2017) who contended that the importance of the contractual arrangements for smallholders to benefit depends on how they are well structured. The finding also concurs with Maloku *et al.* (2021) who found that conflicts between trading partners influence contract farming.

Within the complete integrations of the study variables found in the contracted farming models, formally organized smallholders who engage in either conventional or organic farming value chains access training, extension services, farm inputs and implements, and reliable markets. The availability of farm inputs, agronomic services, capacity building, and reliable markets define the economic sustainability of a business undertaking. For example, Unilever-Tanzania through NOSC serves all the agronomic services, inputs, and market services to its contracted smallholder tea farmers. Costs are recovered through a loan repayment modality. Smallholder farmers engage in conventional tea farming with the assurance of the business as the main input and post-production economic needs that facilitate commercial farming are available. The found completeness in the integration of smallholder organizational forms, contractual arrangements, and value chains fosters the availability of the economic inputs and services and market access that enable sustained farming, and hence, the economic sustainability of commercial farming in the models. The value and benefits of extensive integration of smallholders in the farming value chain are evident (Hanf *et al.,* 2018; Kissoly *et al.,* 2017). The scholars contended that the integration of smallholders in various activities of the value chain and observed sustainable benefits that smallholders obtain, make the integration meaningful to smallholders.

As the findings have indicated, the lack of economic services due to partial or lack of contractual arrangements impairs economic sustainability in smallholder commercial farming whereas the opposite enhances it. These economic conditions with their respective impacts on sustainability in smallholder commercial farming are summarized in Table 2.

Integrations of Smallholder Organizational Forms, Contractual Mechanisms, Value Chains and Ecological Sustainability in Smallholder Commercial Farming

In agriculture, ecological sustainability is reflected in farming practices that are environmentally friendly and do not use genetic modifications and synthetic fertilizers (Auerbach, 2020; Jouzi *et al.,* 2017). Even though smallholders are organized in formal groups and some smallholder farming activities are contracted with agribusiness, since the farming practices are done by using chemicals and synthetic fertilizers, they miss the qualities of ecologically sustainable farming. With this understanding, all commercial farming activities that are undertaken conventionally in case models indicate to be ecologically unsustainable. The ecologically unsustainable farming conditions concur with the contentions on the negative effects that the adoption of conventional farming methods causes on the environment (Lu *et al.,* 2020; Yuttitham, 2019). Nonetheless, environmental protection practices such as contour farming, soil hedging, afforestation, and proper handling of farm chemical wastes are undertaken depending on the needs of the models. Some are facilitated by public and private agencies such as the Rainforest Alliance (RFA) and Tanzania Forest Services (TFS).

The study also found incomplete integration of smallholder organizational forms, contractual mechanisms, and value chains in the Non-contracted Organic Farming Model. The lack of contracts by organic pineapple farmers in MOHAP-COS led to the lack of reliable organic farm inputs, services, and markets. They access through their initiatives and government facilitation instead. Nevertheless, smallholders within the society undertake environmentally friendly agriculture and are locally certified organic, hence, farming practices in the model indicate to be ecologically sustainable. The farming system under the model enhances ecological sustainability as it is similarly contended by other researchers (Veisi *et al.,* 2022; Dhiman, 2020). However, the lack of reliable markets due to the lack of business contracts between smallholders and agribusinesses in organic products markets threatens this sustainability. The long-term existence of unreliable markets for organic products will discourage smallholders from producing and in the long run, they will stop organic farming and the respective created ecological values will no longer be realized. These conditions ultimately impair the ecological sustainability of smallholder commercial farming in the model. The finding concurs with the decreased and ceased organic production due to smallholders' lack of connection and support to access organic products markets (Luczka & Kalinowski, 2020).

Furthermore, the complete integration of organized smallholders, contractual mechanisms, and value chains was found in the Contracted Organic Farming Model. In the model, for instance, the integration enables organic avocado farmers in the Wikichi and Itulike groups to access agronomic services, farm inputs, and extension services from Tanzanice Company that lead to effective production. Also, markets are assured as the Company readily purchases organic avocados.
The existence of arrangements that foster access to agronomic services, farm inputs, extension, and reliable markets in organic farming value chains enhances ecological sustainability in the model. These findings correspond to Winter *et al.* (2021) who link the success of organic farming to integration within value chains. Actors' integration in undertaking organic farming accelerates the advantages to nature and ecosystems and hence fosters ecological sustainability. Conclusively, conventional models and the ones with incomplete integrations of variables have ecologically unsustainable smallholder commercial farming. Models with completely integrated variables in organic value chains have ecologically sustainable smallholder commercial farming. These findings are summarized in Table 2.

Table 2: Integration of smallholder organizational forms, contractual mechanisms, value chains and sustainability in smallholder commercial farming

Farming model	Integration	Sustainability indicators		Sustainability	
		At input level	At output level	Economic	Ecological
Model 1: Semi-contracted Conventional Farming	Partial	Agronomic capacity building Farm inputs Extension services for conventional tea farming (by public &private)	Unstable markets for conventional tea (Fluctuate b/n Lupembe and Ikanga Factories)	Partially sustainable (weakened by the lack of stable contracts)	Not sustainable (conventional)
Model 2: Contracted Conventional Farming	Complete	Agronomic capacity building Farm inputs Extension services for conventional tea farming (by private)	Reliable and stable markets for conventional tea(Unilever-NOSC)	Sustainable	Not sustainable (conventional)
Model 3: Contracted Organic Farming	Complete	Farm inputs(self-made)Agronomic capacity building Extension services for organic avocado farming (by private)	Reliable and stable organic avocado fruits market(Tanzanice)	Sustainable	Sustainable (organic)
Model 4: Non-contracted Conventional Farming	Incomplete	Agronomic capacity building Farm inputs Extension services for conventional farming (by public and private)	Unreliable markets for conventional maize, soy-beans and potatoes (Fluctuate b/n public and private)	Not sustainable	Not sustainable (conventional)
Model 5: Non-contracted Organic Farming	Incomplete	Farm inputs(self-made)Agronomic capacity building Extension services for organic farming (by public sector)	Unreliable markets for organic pineapples(unpredictable, individual buyers)	Not sustainable	Potentially sustainable (however, weakened by the lack of reliable markets)

Source: Research filed data and contextualized analysis, (2022).

Conclusion

The study has presented an analysis of how varied forms of integrations of smallholder organizational forms, contractual mechanisms, and value chains lead to sustainability in smallholder commercial farming. Since the ultimate goal of the study is to reveal the sustainability states based on the integrations, respective conclusions are therefore drawn. Regarding economic

sustainability, all models that are found with complete integrations of smallholder organizational forms, contractual mechanisms, and value chains are indicated to be economically sustainable. This is based on the fact that commercial farming activities are completely supported from production to the market access levels. Production activities are enabled through farmer organizations and contractual mechanisms and market levels through access to markets that are contracted by smallholders and agribusinesses. These complete the commercial farming value chains and hence the economic sustainability under such models is enhanced.

The partial and incomplete integrations of smallholder organizational forms, contractual mechanisms, and value chains make the economic sustainability of smallholder commercial farming in respective models either partially or completely unsustainable. The unclear contractual agreements between smallholders and agribusinesses impair the provision of economic services such as markets a situation that leads to partial economic sustainability within models. The lack of contractual arrangements between smallholders and agribusinesses on the other hand limits smallholders' access to inputs, agronomic services, and markets and hence leads to smallholder farming businesses that are economically unsustainable. All these imply that, for smallholder commercial farming to be economically sustainable under this context, comprehensive and complete integrations of smallholder organizational forms, contractual mechanisms, and value chains need to be embraced. For instance, collaborations between organized smallholders and agribusinesses to operate in for example, a conventionally contracted farming value chain fosters the economic sustainability in smallholder commercial farming. Such collaborations ensure the supply of inputs, agronomic services, product prices, and markets for smallholder commercial farming. On the contrary, undertaking smallholder commercial farming in definite value chains but with incomplete integrations with other partners impairs economic sustainability.

Regarding ecological sustainability, it is concluded that all smallholder commercial farming undertakings in models that are engaged in conventional farming are ecologically unsustainable. The use of synthetic chemicals, fertilizers, and pesticides in farming endangers soils and the entire ecological biodiversity. Smallholders' engagement in such forms of commercial farming voluntarily leads to ecologically unsustainable farming practices. On the other hand, incomplete integrations of smallholder organizational forms, contractual mechanisms, and organic farming value chains that are not contracted to organic agronomic services and markets portray smallholder commercial farming undertakings that are ecologically unsustainable. The unsustainable condition is caused by a lack of markets for organic products, a situation that discourages sustained organic farming by smallholder farmers. Certainly, complete integrations of smallholder organizational forms, contractual mechanisms, and organic farming value chains that are contracted to organic agronomic services and reliable markets foster ecologically sustainable smallholder commercial farming. This entails that, ecological sustainability is attained through the integration of smallholder organizational forms, contractual mechanisms, and organic farming value chains. However, the sustenance of the attained ecological sustainability in organic farming value chains highly depends on the presence of reliable and sustainable market contracts for smallholder organic farmers.

With the varied views on sustainability, the study generally implies that partnerships that comprehensively integrate smallholder organizational forms, contractual mechanisms, and value chains are significant for smallholder commercial farming endeavors that are economically

sustainable. Moreover, partnerships that comprehensively integrate smallholder organizational forms, and contractual mechanisms within organic farming value chains foster economically and ecologically sustainable smallholder commercial farming. To foster smallholder commercial farming endeavors that are economically sustainable, comprehensive integrations of smallholder organizational forms, contractual mechanisms, and organic farming value chains are recommended. Yet, for ecologically sustainable smallholder commercial farming, integrations of smallholder organizational forms, contractual mechanisms, and organic farming value chains are recommended. To realize smallholder commercial farming endeavors that are both economically and ecologically sustainable, policy decisions that promote the integration of smallholder organizational forms and contractual mechanisms within organic farming value chains are recommended. This contributes to the realization of the United Nations Sustainable Development Goals Two and Thirteen on zero hunger and climate action respectively. Further research on devising strategies to increase crop yield volumes through organic farming is proposed. Moreover, research can be extended to include value chains that are for example adaptive to climate variability or that consider the calorific value of the crops.

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