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# Limitations of Inclusive Agribusiness in Contributing to Food and Nutrition Security in a Smallholder Community. A Case of Mango Initiative in Makeni County, Kenya

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**Abstract:** Food and nutrition security remain at the top of development priorities in low income countries. This is especially the case for smallholder farmers who derive their livelihood from agriculture yet are often the most deprived. Inclusive agribusinesses have been championed as a key strategy to address local constraints that limit smallholders' participation in regional and global value chains, thereby enhancing their livelihood, and food and nutrition security, accordingly. In this paper, based on a mixed method research approach, we explore the potential food and security contribution of inclusive agribusiness in Makeni county, Kenya. We focus on the smallholders' constraints and needs, exploring the extent to which these are addressed by such purported pro-poor approach. First, using independent sample *t*-tests and a probit regression model, we explore who are able to participate in an ongoing intervention. We compare how participants and non-participants differ in terms of key socio-economic characteristics and establish which of these attributes are associated with successful integration into the business. Second, we again use independent sample *t*-tests to determine how the participants and non-participants compare in terms of their food and nutrition security. The household food and nutrition security is assessed with the conventional measurement tools: the household food insecurity access scale and the household food dietary diversity score. We find that participation in the inclusive agribusiness favors smallholder households with relatively higher production capacity in terms of better physical capital (land and number of mango trees, financial capital), access to loans, and human capital (age, education, and family size). Following income improvement, the participants' household food security situation is significantly better than for non-participants. However, participation does not improve household dietary diversity, implying that improvement in income does not necessarily lead to better household nutrition security. To address the limitations of inclusive agribusiness, we propose policymakers and development actors to critically explore the contextual background prior to intervention design and implementation, and accordingly devise a broader approach for more inclusivity of the very poor and marginalized, and better food and nutrition security outcomes as a result. Given that not every smallholder could benefit from inclusive agribusiness for their food needs due to resource scarcity, alternative livelihood supports, including social protection programs and safety net plans, should be considered.

**Keywords:** inclusive business; agribusiness; smallholders; food and nutrition security; land; Kenya

## 1. Introduction

Food and nutrition insecurity remain a major concern in developing countries, affecting about 14% of the total population [1,2]. The majority of the undernourished reside in sub-Saharan Africa [3–5], in which Ethiopia, Tanzania, Nigeria, Kenya, and Uganda have 32.1 million, 15.7 million, 11 million, and 10.7 million people, respectively, suffering from hunger [6]. Rural residents, specifically smallholder farmers, account for most of these people [7–9]. Improving the performance of smallholder farming, therefore, is perceived as key to improving food security in these countries. However, smallholders struggle with many constraints, including inaccessibility to input and output markets; lack of capital, knowledge and technology; poor infrastructure; and inability to reach economies of scale, which is essential to compete in the regional and global markets [10–15].

The inclusive agribusiness approach has been championed as a key strategy to address these challenges and, as a result, solve the persistent problem of food and nutrition insecurity in the Global South [16–19]. It entails the integration of low-income smallholder populations in commercially viable value chains, either as suppliers, distributors or consumers, thus contributing to poverty alleviation and food security [20–23]. According to George et al. [24], inclusive businesses provide opportunities for disenfranchised individuals and communities, which are otherwise inaccessible due to socio-economic, geographical, and structural barriers. Inclusive businesses are an extension of scholars' and policymakers' rising support for the private sector role in achieving global development goals such as food security [25–29]. Businesses that are inclusive are envisioned to contribute to local development via financial investments, transfer of knowledge and innovation, job creation, and the delivery of goods and services [25]. Accordingly, donors and governments have increasingly promoted the adoption of inclusive business models as the dominant strategy to address global development challenges [23,30–33]. Today, there exist thousands of inclusive agribusiness projects and initiatives, which are worth billions of dollars and involve private companies that are mainly supported by the public sector and civil society organizations [18].

According to Chamberlain and Anseeuw [34], inclusive agribusinesses have the potential to “contribute to investment needs in the sector and smallholder exposure to commercial markets”. Indeed, smallholders' participation in agribusiness models have been found to address the problem of market imperfection and reduce transaction costs, ultimately contributing to food security [17]. Nevertheless, their potential for local development and transformation requires understanding of a broader local context [34]. Specifically, a deeper insight into the local needs and characteristics, which go beyond the investment's limitations that are the focus of inclusive businesses (IBs), is needed. Thus far, only a small number of studies have been conducted on this latter topic, and their focus concentrates on the IBs' performance—specifically, their capacity to effectively “include” smallholders in the business model in terms of business value sharing [35–38]. Among the key aspects explored by these studies are “within business” parameters, including the control of assets—land, decision-making processes, risks, and benefit sharing. Hardly any research has studied IBs in the context of broader smallholder communities' needs, beyond such aforementioned business factors.

Given the inclusive business approach's dominance in the donors' and governments' development agenda for smallholder communities, its potential success and/or limitation warrant further exploration. This necessitates exploring the inadequacies within a smallholder community and the extent to which they are addressed by an inclusive agribusiness initiative. Hence, the goal of the present research: to unravel the potential contribution of inclusive agribusiness on smallholders household food and nutrition security by broadly focusing on smallholders' needs and constraints, and exploring the extent to which they are addressed by such purported pro-poor approach.

The research examines a case of inclusive agribusiness in Makueni county, Kenya—a fruit processing and marketing business targeted towards mango smallholders and aimed at enhancing local food and nutrition security. To comprehend the extent of the contribution of the initiative to local food security, we apply a multi-level analysis. First, we assess the local participation in the fruit business, by analyzing the characteristics of the business participants and non-participants. Second,

we scrutinize and compare the state of food security among the households that are integrated into the inclusive business initiative versus the households that are not.

The following section provides the study's theoretical background, discussing the literature on inclusive agribusiness and food security, while also presenting the analytical framework that guides the later analysis. Following this, the study methodology are described and then the findings and discussions will be presented. The final section presents the study's conclusions and policy implications.

## 2. Theoretical Background

### 2.1. Inclusive Business and Food Security Nexus

The concept of inclusive business is strongly embedded in the United Nation's 2030 Agenda for Sustainable Development, which vows "no one is to be left behind" in the present efforts to address the global challenges [39]. Central to the concept is the promise to deliver on both societal development goals, such as food security, and also profit for national and foreign private companies [21,23,40]. For smallholders, who have been long marginalized in the regional and global agri-food trade [19], it is argued that market-based solutions, like inclusive agribusinesses, are key to improving local livelihoods and food security. Such initiatives provide ways (e.g., capital, knowledge, and technology) to improve produce quality and productivity, remove restrictions to markets access, and empower rural producers [40–43]. Inclusive agribusinesses are presumed to leverage the synergy from close collaboration between businesses actors (smallholders and companies) and public actors (governments, civil society organizations, and donors) [22,40]. By combining their capacities, it is argued that businesses and public actors would be able to accomplish development goals, which have proven difficult when tackled independently by each individual entity [44,45].

While the potential contribution of inclusive agribusiness to local development is recognized by policy makers and scholars, concerns have been raised with respect to the nature and actual extent of inclusivity. Particularly critical is the question of which smallholders take part in the initiatives and the corresponding terms of inclusion [19,22]. According to Murphy [46], there is a considerable variation in the levels of marginalization that characterize smallholder farmers, in terms of access to resources, assets, capital, information, and technology. Against this backdrop, there is fear that due to profit interests and competition, there is a tendency for businesses to focus on less marginalized/more privileged smallholders in an effort to lower transaction costs [40,47]. This scenario has been exemplified by Ton et al. [48] through a systematic review of contract farming schemes aimed at enhancing smallholders' incomes. Such unintended outcomes risk exacerbating local inequalities across age, gender, and/or ethnicity, and furthermore, they may have a detrimental effect on access to land and other critical resources [47,49–51].

For the smallholders integrated in the agribusiness value chains, the concern relating to the terms of inclusion emerges from the fear of the businesses favoring companies over smallholders. This implicates the level of empowerment of smallholders in the business relations with the company—namely, "the actual terms of conditions under which people are included whether it is beneficial for SHFs [smallholder farmers] to be included in a value chain" [19]. According to German et al. [52], "ill designed collaborative models may establish unfair relations, involve coerced participation, create dependence on one buyer, or push disproportionate risk onto smallholders". Unequal local power relations may not only limit the benefits the smallholders obtain from participating in the businesses but could exacerbate local inequalities, especially when some farmers are unable to participate [50,51,53,54]. The above criticism emboldens the claim that "the profit, growth and market orientation of inclusive businesses as being incompatible with greater equity, sustainable development, and tackling the root causes of poverty" [22]. Based on these arguments, as pointed by Likoko and Kini [21], scholars "question the assumption that market forces should and will be willing, and able to sustain interest in the well-being of the poor".

In response to these concerns, the inclusive business concept has evolved into inclusive development that puts emphasis on “a transformative agenda that focuses on social, relational and environmental outcomes” [22]. Social inclusivity entails a focus on people’s well-being, as defined, first, by their living conditions and access to material resources (natural and financial, among others) that are critical for a satisfactory life, and, second, by their personal well-being relative to others [55–57]. Relational inclusivity pertains to empowerment, i.e., the ability of the poor and marginalized to make informed choices, have their voice heard and participate in policy and decision making [35,55,57,58]. Environmental inclusivity touches on the potential negative impact of business on the environment and the ability of business to foster environmental sustainability [55,58–61].

In this paper, we focus on social and relational inclusivity. For the former aspect, we explore inclusivity from the context of material access and other forms of livelihood capitals. Inclusive development seeks to improve the well-being of the most poor and marginalized. Its aim is to understand and address “the underlying norms, institutions and discourses that produce marginalization” [22]. In a smallholder-targeted approach, this implies acknowledging “heterogeneity of value chains, actors [particularly poor farmers] and networks involved in them, as key to ensure they are ‘more inclusive’ [22]. It calls for an analysis of ‘the underlying forces (factors and actors) that create, perpetuate and contest multiple inequalities at the local through to the global level and how these levels interact with each other” [55].

The contribution of IBs towards food security is expected to result mostly from increased farm productivity and improvements in households’ incomes. However, while some inclusive business studies have reported a positive effect on the engaged smallholders’ incomes [48,62–65], others have shown less encouraging outcomes [66–69]. Nevertheless, where inclusive businesses have boosted income, studies have observed a positive impact on food security. These findings, though, need to be interpreted cautiously. For instance, von Braun and Kennedy [70] found that food security is improved only in instances where an income rise is achieved consistently across time, instead of in the form of a lump sum payment. In the latter scenario, the income is often spent on assets or re-invested, rather than saved for food. Indeed, given that smallholders are confronted with many income needs, they are sometimes likely to give priority to the present ones over future food needs [11,71]. Elsewhere, studies have indicated that a focus on production for markets risks a decline in overall food production, adversely affecting, for example, the availability of diverse food in a community [72–74].

## 2.2. Analytical Framework

In this study, smallholders’ inclusion in the inclusive agribusiness models is presumed to be contingent on their socio-economic characteristics coupled with the institutional setup that guides the initiatives. To contextualize the reach of the business model in the research area, this study compares those who participate in the business model against non-participants, in terms of their livelihood assets [75]. According to Johnson et al. [76], in the context of agricultural development initiatives, “assets can influence the design, implementation, and outcomes of programs by determining who participates (and who does not) in the programs as well as how and how much they benefit”. Meinzen-Dick et al. [77] further add that “assets give individuals the capability to be and to act”. Based on these claims, we presume that the smallholders’ levels of assets dictate participation in the present business initiative. The nature of inclusion, and a closer scrutiny on how the initiative is operated, provides crucial details on the institutional environment of the business.

Relative to the smallholders’ asset levels, how do the business model participants and non-participants compare in terms of their food security? There is empirical evidence that a smallholder household’s access to productive assets is linked with improved food security status [78,79]. As such, if agribusinesses only engage smallholders that have relatively high resource endowment, those with fewer resources, and likely the most food insecure, remain vulnerable.

Does participation imply improved food and nutrition security? As discussed, merely being integrated in an inclusive business does not necessarily translate into improved household food and

nutrition security. Rather, it is dependent on several factors. For instance, inclusive agribusiness is envisioned to influence food security through income, i.e., when the enhanced income is used to procure diverse and nutritious food. However, such an outcome may not be achieved if food is unavailable in the local markets, it is very expensive when available, and/or the income is spent on other non-food needs. Furthermore, it is important to recognize that specializing in specific production for markets may hamper the food security prospect of households and the community. For rural households that are largely dependent on their own subsistence production for food security, low crop diversity, arising from a focus on market production, can lead to a decline in nutritional diversity for the households [80,81].

### 3. Materials and Methods

#### 3.1. Case and Study Area Description

The core of the business initiative researched for this paper is a fruit processing plant worth Ksh. 110 million (US \$1 million), established in 2017 in Kalamba, a small rural town in the county's interior. Funded through the Instrument for Devolution Advice and Support Program (IDEAS), a Kenya–EU bilateral program, the initiative is perceived to be among the key pathways to achieve local development, especially by improving food and nutrition security [82–84]. Smallholders in the community are linked to the processing plant through local farmers' cooperatives. Run by the local government, the initiative supports roughly 12,000 smallholders via value addition (conversion of ripe mango into pulp) and market linkage, with an expectation of better prices, reduced post-harvest losses, job opportunities, and, ultimately, enhanced local income. As mentioned above, an improvement in income is considered the means through which the initiative contributes to food security. The initiative is the first of several targeted by the European Union in 15 counties across Kenya to advance local economic development [84]. With a total budget of Ksh. 3 billion (US \$30 million), the funds are aimed at local processing and market development for fruits, milk, and fish; food storage; and seed production and multiplication in the various counties [85].

Makueni county is a semi-arid region with a climate characterized by low and unreliable rainfall and temperatures ranging between 18–33 degrees Celsius. On a yearly basis, the driest part of the county receives 500–750 mm of precipitation [86]. Due to poor weather conditions, experiences of massive crop failure are common [87]. As a result, food insecurity incidences are notably high. For instance, during the short rain in 2016, “two-thirds of the households had no food stocks” [88]. The impact of climate change is expected to exacerbate this condition.

The county is the leading producer of mangoes in the country [89], which currently constitute the key source of livelihood in the region. Mango trees, being a perennial fruit crop, are more adaptable to harsh weather conditions, thriving in low rainfall and coping in a wide range of temperatures. Despite the crop's popularity, however, access to the market remains a key challenge. Historically, the majority of buyers are brokers who only buy the best fruits, creating unreliable market opportunities. Coupled with poor handling and transport, poor market access results in high post-harvest losses [87]. As such, improving the mango value chain is expected to contribute to better income and subsequently local food and nutrition security.

To reach the farmers, the mango business employs a cooperative model. The county government perceives cooperatives as a crucial channel for mobilizing communities for social and economic development [90]. Working with these cooperatives is considered key to promoting ownership of the initiative among the local population and to stimulate collective production and marketing. Following past collective training on good agricultural practices, cooperatives are perceived as having the ability to guarantee produce of the preferred type and quality. Furthermore, as the literature suggests, their collective production and marketing is assumed to allow for collective decision making and economies of scale, thereby reducing the business transaction costs and enhancing returns [91–95].

In this study, we focused on one of the two cooperatives, Makueni County Fruit Processors Cooperative Society (MCFPCS), that was contracted to supply mango to the plant. Central to its selection for this study were two factors: its linkage with a Dutch non-governmental organization that promotes inclusive agribusiness and an explicit goal to support local smallholders with mango production and marketing. Prior to the present initiative, early attempts to export mango to Dubai were unsuccessful due to complex and costly logistic issues. The initial members of MCFPCS comprised a collective of local elites (retired civil servants) but has remained open for willing smallholders in the community to join.

Membership in the cooperative, however, comes at a cost. The initial members paid a one-time fee of Ksh. 50,000 (US \$500) per person (key informant—MCFPCS board member). Since the fee was unaffordable for most smallholders, it was later brought down to Ksh. 2500 (US \$25). For the majority of smallholders, the membership cost remains too high [96]. Furthermore, to become a member of the cooperative, one must be a member of a farmer group. Consequently, while all the cooperatives, including those in the other sub-sector, are open to most, if not all, smallholders in the community, only a minority are members.

Presently, MCFPCS has a total of 144 active members, and claims to offer its members a stable produce market and various production provisions, including training, subsidized agricultural inputs, and credit. However, as Muthini [96] highlights, some of these services, particularly training, have only possible due to funding that was made available by the donor government.

Up until the establishment of the mango processing and marketing business, MCFPCS was unsuccessful in providing its members with the promised marketing services. Hence, prior to the first business cycle (early 2018), those with cooperative membership, whether long-term or short-term, hardly achieved better outcome from mango business than other smallholder farmers. In supplying mango fruits to the plant, due to the low cooperative membership in the first business cycle leading up to this study, the plant's capacity exceeded the total volume of fruits the cooperative members could supply. As such, the cooperative extended business participation to non-members, but only to aspiring cooperative members belonging to farmer groups.

### 3.2. Data and Empirical Methods

The present paper is based on an exploratory research design [97] to gather empirical evidence on the nature of smallholders' participation in inclusive agribusiness and to compare the state of food and nutrition security among the business initiative's participants versus non-participants in Makueni county. By examining the issues surrounding the business inclusivity aspects vis-à-vis smallholder constraints and needs, it is possible to draw some conclusions about the potential contribution of agribusinesses to the community.

To gather data, we adopted a mixed method approach, which combines quantitative and qualitative research methods [98]. Mixed method research provides "a more complete picture by combining information from complementary kind of data or sources" [99]. The data used in this study were gathered in June–August 2018 via a snapshot household survey, in-depth interviews, and focus group discussions (FDGs) among Makueni smallholders and the business initiative actors. In total, 200 respondents were involved in the study, 120 smallholder households took part in the survey, 35 in the in-depth interviews, and 45 in the focus group discussions. The smallholder respondents were spread across the different sub-regions of Makueni county, including Wote, Nziu, Kamunyolo, Matiliku, and Uona.

Of those who were engaged for the survey, the first category comprised 80 smallholders from households that participated in the business initiative, members of the cooperatives, and/or members of farmer groups. The second category of research respondents was made up of 40 households that did not participate in the business initiative. The cooperative members were randomly sampled from a list provided by the MCFPCS leadership. The rest of the survey respondents were identified randomly but through a snowballing technique. The sampled cooperative members were requested to identify

six non-member smallholders living nearby. From the six, two were sampled: a non-cooperative member business participant and a non-participant. The survey captured, among other information, household's socio-economic assets and status, the household head's age and education level, the family size, land size, general income, crop and livestock revenue, in- and off-farm sources of income, and, most importantly, the household's food security status.

Thirty-five in-depth interviews were conducted. This included 15 interviews with smallholders from each of the two smallholder categories and five key informants: the cooperative chairman, three board members, and one fruit processing plant employee. The focus group discussions comprised between six and eight cooperative members. Each was conducted in a different geographical area in the region where the survey was carried out. The interviews and focus group discussions were guided by a semi-structured questionnaire that mainly targeted issues relating to mango agribusiness and access to the business initiative.

To analyze the quantitative data, we used STATA statistical software (version 13). First, we obtained the descriptive statistics that provided the key socio-economic characteristics of the sampled smallholders and compared how they differed between participants and non-participants. The second step involved assessing the probability of participating or not participating ("0" non-participants, "1" participants), based on identified smallholder characteristics. We applied the probit regression model, a probability statistic model that allows for analysis involving dichotomous dependent variables [100,101]. The model allows us to establish whether there is an association between smallholders' socio-economic attributes and participation in the business initiative. It allows for the estimation of maximum likelihood (marginal effects) of participation in the business by individual independent variables, while others are held constant. The probit model equation is written as follows:

$$P = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots \beta_ix_i + \varepsilon_i \quad (1)$$

where  $P$  in (1) is the probability of smallholder participation and  $x$  represents smallholder characteristics;  $x_1, x_2 \dots x_i$  are the independent variables.

The food security assessment employed the conventional measurement tools: the household food insecurity access scale (HFIAS) and the household food dietary diversity score (HDDS). The HFIAS measures the "access component of household food insecurity" based on information covering a four-week period [102]. It builds on nine questions that focus on a household's food access anxiety and uncertainty, as well as the quality and quantity of food consumed. The HDDS indicates the variety of food and dietary diversity that is accessible to a household [103]. The dietary diversity data is obtained through 24 h recall questions about the food groups consumed by a household. We also explored the households' spending on food to gain insight on nutrition diversity. The literature indicates there is a positive relationship between household spending on food and nutrition diversity [104,105].

Considering this study built on a cross-sectional study approach (snapshot survey), we were not able to assess the direct contribution of the initiative to local food security among participants. However, comparing the differences in the present socio-economic attributes of the participants and non-participants, and assessing the present individual state of the households' food and nutrition security, does paint a good picture of the business's potential contribution. Therefore, to assess the state of food and nutrition security among the business participants, we conducted two independent sample  $t$ -tests to compare HFIAS, HDDS, and households' spending on food against participation and non-participation.

The qualitative data were used to triangulate the findings from the quantitative assessments. Relevant parts of the data were coded and transformed into quantitative data from which summary statistics were derived. The transcriptions of the interviews were analyzed for common themes that validated, or indeed contradicted, the quantitative findings.

## 4. Results

### 4.1. Comparison of the Business Participants and Non-Participants

In Table 1, we compare participation in the inclusive business initiative in terms of the households' key socio-economic characteristics. The descriptive statistic output indicates that the participants' households have access to relatively more land than non-participants, averaging at 12 and 7 acres, respectively. The average age of participating households' head is higher (58 years) compared to that of non-participating households (48 years). The differences in sizes of land and age of the households' head are statistically significant. Only 8% of all the households are headed by a youth (<35 years), who owns an average of 3 acres.

**Table 1.** Characteristics of sample households by the categories of participants and non-participants.

Variables	Category	N	Mean	St. Err.	t-Value	p-Value	Sig.
Age	Non-participants	40	47.825	2.212	21.622	0.000	***
	Participants	78	57.795	1.177	49.108		
Family size	Non-participants	40	5.875	0.338	17.374	0.201	
	Participants	78	6.5	0.302	21.529		
Land	Non-participants	40	7.45	1.29	5.778	0.065	*
	Participants	78	11.511	1.41	8.162		
Crops income	Non-participants	40	68,125	9679.623	7.038	0.009	***
	Participants	78	147,542.31	20,905.576	7.058		
Livestock income	Non-participants	40	61,100	23,021.11	2.654	0.334	
	Participants	78	42,354.936	7316.365	5.789		
Mango trees	Non-participants	40	88.225	12.021	7.34	0.068	*
	Participants	78	127.334	13.898	9.162		

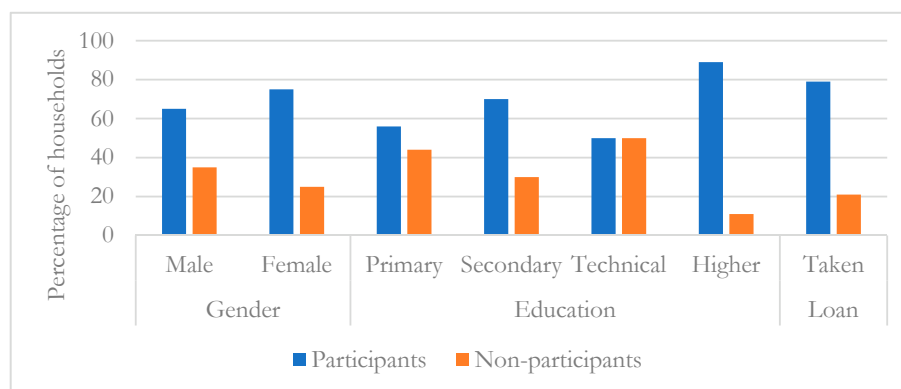
\*\*\*  $p < 0.01$ , \*  $p < 0.1$ .

The annual crop and livestock incomes are also considerably different between the two categories. The participating households have significantly more annual average crop income (Ksh. 147,542) than non-participants (Ksh. 68,125). Although the difference in the annual average livestock income is not significant, non-participants seemingly fare better (Ksh. 61,100) than participants (Ksh. 42,355). With respect to number of mango trees, participating households had significantly more trees in total (127) than non-participants (88). This indicates that the number of mango trees is proportionate to the size of land owned by the household. The period in which the trees were planted varies, with majority being planted in the 2000s and only a few in the early 2010s. All the households were reported to depend on family labor for mango production. Being a perennial crop, however, means there is not much labor involved in mango farming other than during the harvest season. It was reported by the smallholders during focus group discussions that the majority of the harvesting labor is provided by the buyer (the cooperative) at a cost. Nevertheless, it is apparent that, based on the family size, participants have a slightly bigger labor pool (seven) than non-participants (six), although the difference is not statistically significant.

Figure 1 compares participation in terms of the gender and education level of the household head, and whether the household had acquired a loan in the 12 months leading to the crop harvest period. We find that although only 14% of the sampled households were female headed, comparatively more female-headed households (75%) participate in the business than male-headed households (65%). Education-wise, in all levels, we find that participant households' heads are more educated than non-participants': primary (56%), secondary (70%), and higher education (89%). Although both participant and non-participant households had taken loans, the participant farmer group has a significantly higher number of the borrowers (47% against 25%). Besides agriculture, a significant proportion (59%) of the households also engage in off-farm livelihood activities, but involvement



differs between participants and non-participants: the number of the households' heads with formal employment is higher among participants (61%) than non-participants (39%). A similar case applies to business ownership, in which participants represent 71% and non-participants represent 29%. Conversely, a relatively higher proportion of non-participant households' heads earn their off-farm income from wage labor (53%) compared with participants (47%). Only the participant households receive remittances.



**Figure 1.** Percentages of households by gender, education level, and loan access.

The results of the probit regression model, estimating the likelihood of participation in the mango business, are presented in Table 2. The model's output ( $\chi^2 = 27.55$ ,  $p = 0.001$ ) indicates the presence of adequate information to explain the association between participation and smallholders' socio-economic attributes. The marginal effects are reported. We find that a household's land size is positively and significantly associated with participation. The estimated marginal effect indicates that an increase in land size by a single unit (an acre) increases the likelihood of participating in the business by 8.5 percentage points. Furthermore, loan procurement has a positive and significant effect on participation. Having a loan increases the likelihood of a household's participation in the business by 18.3 percentage points. Family size, in reference to a household's labor capacity, is also positively associated with participation. The estimated marginal effect of family size reveals that an increase by one unit (one person) is associated with increased likelihood of participation by 3.9 percentage points. Male-headed households have a significantly lower probability of participating, while those with a more educated head have a significantly higher probability of participating. The estimated marginal effect indicates that being a male-headed household reduces the likelihood of participation by 29.2 percentage points. Completion of secondary education and higher education by the household head increases the likelihood of participation by 18.8 percentage points and 35.9 percentage points, respectively.

**Table 2.** Probit regression results estimating factors associated with participation—marginal effects.

Variables	Marginal Effects	Std. Err.	z	P > z	[95% Conf. Interval]	Sig.	
Gender	−0.292	0.075	−3.890	0.000	−0.439	−0.145	**
Education							
Secondary	0.188	0.094	1.990	0.046	0.003	0.373	*
Higher	0.359	0.125	2.870	0.004	0.114	0.603	**
Family size	0.039	0.018	2.230	0.026	0.005	0.074	**
Land	0.085	0.048	1.770	0.078	−0.009	0.179	*
Total income	0.056	0.040	1.390	0.166	−0.023	0.134	
Loan	0.183	0.081	2.260	0.024	0.024	0.342	*
Mean dependent var	0.661		SD dependent var		0.475		
Pseudo r-squared	0.187		Number of obs		115.000		
Chi-square	27.549		Prob > chi <sup>2</sup>		0.001		
Akaike crit. (AIC)	137.756		Bayesian crit. (BIC)		162.460		

\*\*  $p < 0.05$ , \*  $p < 0.1$ .

The age of a household's head and the number of mango trees the household owns are also positively and significantly associated with participation in the business. Nevertheless, these variables were excluded in the present regression model to avoid multicollinearity [106]. Both variables were highly correlated with the variable "land" and consequently were causing "adverse effects on the estimated coefficients" of the model [107]. The variable "total annual income" does not have a significant effect on business participation.

These results corroborate claims made in interviews by smallholder farmers, who were excluded from the business initiative, that the cooperative only targeted farmers capable of supplying a high volume of produce. While we could not obtain specific information about this claim, the descriptive information on the disparity in the land size, number of mango trees, access to loans, and the annual income substantiate these assertions. Nevertheless, according to the cooperative chairman and the board members interviewed, all smallholders in the community are welcome to join the cooperative membership. By default, therefore, everyone has access to the business opportunity irrespective of production volumes. Despite this, the board indicated that they found it difficult to recruit the farmers. Our household surveys and interviews with non-participants pointed to a lack of interest in working with the cooperative. Their reasons for not joining: up to 83% of all the non-participants surveyed expressed either a lack of trust in a cooperative and/or an absence of adequate information about its existence and operations. As identified by a handful others, trust issues that relate primarily to the fear of collapse leading to loss of revenue, which is a common occurrence in Kenya's cooperative sector, prevent farmers from joining. Indeed, cooperatives in Kenya "suffer common problems associated with weak legislation, poor financial management, leadership, governance and political interference among many others" [108].

There is an apparent absence of youth in the business participation. Based on our survey, out of all smallholder households engaged in mango farming, only 20% are participants. This situation is largely attributed to the inaccessibility of land. Much of the land is owned by parents, who have not yet shared it with their children. Furthermore, even if they did receive their share, there is high likelihood that their portion would be relatively small, similar to that of the non-participants in the present analysis. Nevertheless, a handful of the youths in the community have benefited from the business initiative through job opportunities that have emerged from the establishment of the processing plant. Based on interviews with all the key informants, some 450 youths from the community have been employed along the value chains to perform various activities, including fruit picking, weighing, loading, offloading, and even in the processing activities.

It is evident that resource-poor smallholder farmers do not participate in the business. As a result, we expect the contribution of the business initiative to these households' food and nutrition security to be negligible or nonexistent. For participating households, according to interviews and FGDs, the business has had a positive impact on income, hence better household food and nutrition security is to be expected. Following their integration in the business initiative, participating households maintained that they have seen a considerable increase in overall returns, a change they linked to the establishment of the fruit plant, which, unlike in the past, has allowed them to sell all their produce. According to one of the smallholder farmers (W):

*"Previously, brokers and other buyers would only pick fruits that are "best in quality", often in small quantities and would leave the rest. This would lead to major losses that we are currently able to escape (W)."*

Nevertheless, to ascertain the overall contribution of the mango business initiative to local food and nutrition security in Makuani, it is critical to closely review how the participants and non-participants compare in their respective households' food and nutrition security statuses.

#### 4.2. Contribution to Local Food and Nutrition Security

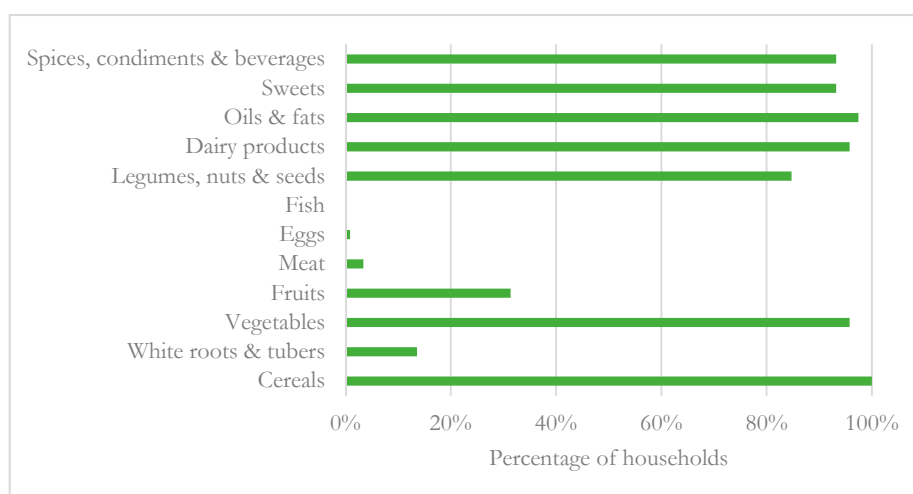
Table 3 presents the results of the independent sample *t*-test, comparing the Household Food Insecurity Access Score (HFIAS) and Household Dietary Diversity Score (HDDS) between participating and non-participating households. We find that, on average, participants have a significantly lower score (4.2), which implies better food security status than non-participants (6.0). There is no significant difference in the average HDDS between participants (7.1) and non-participants (7.2). Despite participants having a slightly bigger family size, their average weekly spending on food is slightly lower (Kshs. 1094) than for non-participants (Kshs. 1170). This difference, though, is not statistically significant.

**Table 3.** *T*-test results comparing Household Food Insecurity Access Scale (HFIAS) and Household Dietary Diversity Score (HDDS) between participants and non-participants.

Variables	Participation	N	Mean	St_Err.	<i>t</i> -Value	<i>p</i> -Value	Sig.
HFIAS	Non-participants	40	5.85	0.598	9.79	0.0125	***
	Participants	78	4.218	0.344	12.257		
HDDS	Non-participants	40	7.15	0.163	44.05	0.6592	
	Participants	78	7.064	0.112	63.351		
Weekly Spending	Non-participants	40	1170	80.419	14.549	0.5363	
	Participants	78	1093.59	77.916	14.036		

\*\*\*  $p < 0.01$ .

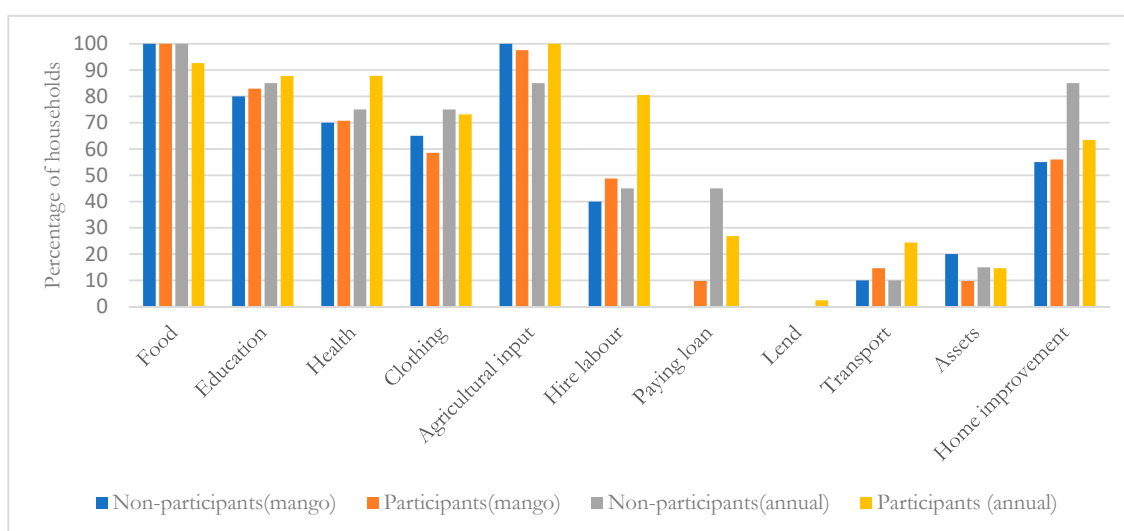
The lack of a significant difference in HDDS implies that there is no variation in the type of diets consumed locally. Figure 2 presents the type of food consumed as part of the local diet. Cereals, vegetables, dairy products, oil and fats, sweets, spices, condiments, and beverages predominate the local diet. Based on the data, chai, a hot beverage made up of milk, tea, spices, sugar, and water, is the primary source of dairy products and represents dairy products, sweets, spices, condiments, and beverages in the diet. Up to 15% of households do not consume legumes, nuts, or seeds. The consumption of fruits, white roots, and tubers is notably low, as they are only consumed by 14% and 31% of the households, respectively. None of the households consume fish, and only 1% and 3% consume eggs and meat, respectively.



**Figure 2.** Types of foods consumed in the local diet.

Remarkably, while improvement in income among participating households likely contributed to better food security as measured by the HFIAS, compared to non-participating households, it is revealed that it has not affected these households' nutrition security (Table 3). The analysis

on income spending between business participants and non-participants, whether on food or other needs—education, healthcare, clothing, agricultural inputs, labor, paying a loan, transport, assets, and home improvement—does not vary significantly. Furthermore, we find that the annual income spending compared to mango income spending on main items, including food, education, and agricultural inputs, is consistent across the households, whether they are participants or non-participants (Figure 3). This implies spending trends across all households match closely. In addition, the results of weekly spending on food indicate an insignificant difference between participant and non-participant households. This implies that non-participants, with a lower resource endowment and capacity to produce, spend proportionately more than their counterparts, who have more ability. Overall, one factor that partly explains a lack of improvement in nutritional diet, despite the larger income accrued by participating households, is the fact that smallholders primarily buy staples and “commercial” ingredients rather than food that is essential for improving overall dietary diversity. The following statement summarizes interviews with key informants and focus group discussions on the issue:



**Figure 3.** Spending mango and annual incomes—participation versus non-participation.

*“The food bought items from mango income is mainly staples (maize and beans) during ‘hunger periods’ and generally common ingredients for food and hot beverages preparations such as cooking oil, onions, tomatoes, tea leaves and sugar. Only on rare and special occasions do households spend money on ingredients from special meals such as wheat flour for chapati, rice, eggs and meat.”*

Notably, an impending impact on local food security of the mango business initiative relates to land-use change associated with local mango plantation sizes. It is anticipated that the market opportunity provided by the plant and its promise of economic growth has prompted an expansion in mango plantations in Makeni. The following quotes from smallholders X and Y represent a growing determination to increase their mango tree plantations:

*“I have been planting new mango trees. I have done so because in the future I expect to fill one lorry or more to be taken to the factory (X).”*

*“I have been grafting the local variety to Apple or Ngowe varieties and increasing the total number of trees to increase their productivity and marketability (Y).”*

Indeed, the majority (60%) of the interviewed smallholders indicated that they had increased the number of mango trees on their land. Those that did not either replaced the old ones with new varieties recently or do not have enough land to expand their plantation, as informed by two different respondents.

## 5. Discussion

### 5.1. Variables Associated with Participation in the Business

This study's findings indicate that participation in the inclusive business initiative favors smallholder households that are relatively well off in terms of critical resources—physical capital, including land size, number of mango trees; financial capital (loan procurement); and human capital (education and family size—labor pool). This poses some challenges for inclusive business initiatives. For one, land access in the sub-Saharan context is an ever-growing challenge among smallholder households, whose land sizes have continued to decline due to a growing population [109]. Furthermore, studies have shown that households with more-educated heads are positively associated with access to land, which also positions them better to swiftly seize the opportunities and innovations that are emerging in the agricultural sector [109]. The comparatively larger land sizes, the greater number of mango trees, the more educated household heads, greater access to loans, and the availability of a larger labor pool all highlight a profile of smallholder households with a higher production capacity, and hence, a better farming income. These assertions are effectively backed up by the fact that participating households have significantly higher annual crop incomes. In addition, as we learnt from the interviews, the company targets smallholders capable of producing comparatively higher volumes. Indeed, drawing on Gebru, Rammelt (73) study in Ethiopia, which found livestock size as a major productive resource for households to engage in a malt barley business, it seems reasonable to assert that participation in the mango business is “a function of wealth”. Other studies share similar findings [69,74,110–112].

Based on the present findings and with the presumption of participation as inclusion in the an “inclusive” business initiative, the mango business initiative in Makueni is not inclusive. The limited production capacity, emerging from the level of physical, financial, and human capital among the excluded smallholders, would amount to high transaction costs, should the business make an extra effort to integrate more resource-poor farmers. Instead, considering the business profit motive alongside the development objective to guarantee viability, it is understandable that the mango business initiative focuses on smallholders who meet a certain production capacity threshold. Nevertheless, smallholders' asset constraints and the presumed business potential to meet these inadequacies constitutes the rationale and the institutional basis that inform inclusive businesses [113]. Building on the debate on inclusive development, specifically social and relational inclusivity [22,55,114], the business case in Makueni does not make an effort to reach the more vulnerable and marginalized smallholders in the community. Worse, in the current state, it actually serves to perpetuate the existing inequalities. The lack of attention to the poorest of the poor in the community highlights a significant limitation of inclusive business in delivering to local development needs. Instead of putting the onus on the inclusive business to meet the needs of the poor, it requires the poor to adapt to the needs of the business in order to benefit [42]). This defies the fundamental claims of inclusive business initiatives.

In view of the shrinking land sizes in smallholder communities [108,115–117], where access to reasonable land size is central to farmers' livelihoods, diversification becomes a crucial strategy to meet households' livelihood and food security needs. According to Headey and Jayne [115], for the farmers most affected by land scarcity, this necessitates either increased investment and intensive farming, renting out more land, or relying more on off-farm income. Based on our findings, the first two options are not possible for the excluded Makueni smallholders, considering the reported financial constraints unless external funding is increased. This could only be remedied if businesses were to step in to assist, which is also highly unlikely due to the abovementioned transaction costs. This leaves us with the prospect of the third option, off-farm activities. With this option, besides other development interventions that support smallholders with farming-related activities, the land-scarce farmers could benefit from external contributions to develop and exploit off-farm opportunities. Alternatively, a development initiative could target a farming opportunity that best suits the smallholders' socio-economic context and conditions. We find, for example, that smallholders

who are excluded from the mango business have comparatively better annual livestock incomes than the business participants. Our assumption is that keeping dairy cattle does not need as much farming space as producing mango. Therefore, land-poor farmers focus on livestock production and have a better outcome. This implies that a development initiative simultaneously aiming to support resource poor smallholders with such endeavors alongside the mango business would at least, to a certain extent, offset their exclusion from the mango business.

Inclusion/exclusion aside, the present contribution of the mango processing and marketing business in Makueni is still welcome. Despite the initiative's limitations in reaching all smallholders in the community, the mango value chain gaps that the business occupies is critical in Makueni. As our findings demonstrate, those participating do get to enjoy the benefit promised by an inclusive business approach. Similar positive outcomes have been reported elsewhere [19,24,40,42]. In Makueni, the inclusive aspects are manifested through value addition services and marketing opportunities made possible by the establishment of the processing plant. Furthermore, participating farmers receive transportation services provided between farm gates and the market, and the few already with cooperative membership have gained from technical knowledge through good agricultural practice trainings and access to subsidized input and credit. The value addition component in the form of fruit processing at the plant often raises the revenue by enabling smallholders to reach and compete for the market opportunities that offer premium prices [118–120]. It is claimed that a combination of market access and value addition form a recipe for sustainable agri-sector growth, which is believed to be critical for poverty alleviation [121–123].

Overall, from social and relational inclusivity perspectives, an inclusive agribusiness initiative should especially focus on the very poor and/or marginalized to ensure more inclusive development [22]. It is evident that the mango business initiative in Makueni is far from inclusive, given that this category of smallholder is excluded. While this may partly be tied to the cooperative bias of the initiative's participant selection, the findings highlight a structural pattern with respect to the local socio-economic attributes and pre-existing inequalities between resource-rich and resource-poor households. As demonstrated, the households that do not participate in the business initiative comprise those with relatively lower production capacity. Ideally, their significantly more pronounced inadequacies, which in turn dictate their present livelihood status, means they ought to have been the primary target in an initiative aimed at promoting inclusivity [22,55]. Nevertheless, although inclusive businesses are presented as a pro-poor strategy to reach the poor and marginalized, they are businesses whose success is simultaneously contingent upon them being profitable. This justifies their decision to work with smallholders with relatively higher production capacity. Indeed, as van Westen, Mangnus [124] indicates, businesses "work within bounded rationalities and market pressures may actually limit their horizon". This perspective implies that some of the shortcomings that prevent Makueni smallholders from being included in the initiative, particularly land and number of trees, are arguably beyond the scope of the inclusive features of the business. Yet these resources, particularly land, are the primary basis for smallholder resource accumulation and enhancing their capacity to participate in a profitable agribusiness initiative. The present scenario, though pragmatic, highlights the limitation of private sector approaches such as "inclusive" agribusiness in fostering actual inclusive development outcomes. Because of the business interests, there will always be a bottom line, beyond which the actors will not cross to reach the low-income population.

## 5.2. Contribution to Food and Nutrition Security

The findings on the state of food security among the business participants and non-participants are consistent with other studies that associate access to productive assets to better household food security [78,79]). As indicated above, the non-participants, who are less well-off in terms of production capacity and, subsequently, more food insecure, are excluded from the mango business initiative. Their exclusion means that they miss out on the value addition and marketing opportunities that the business provides to the participating households. Ultimately, they miss out on a possibility to

ameliorate their meagre resources, which is essential to improve their food security status. In the present scenario, by focusing on the well-off smallholder farmers, and in the absence of an alternative initiative to reach the more resource-poor households, the business initiative risks perpetuating, or even worsening, the existing socio-economic inequality in the community. The continued alienation of the smallholders with low production capacity means they will remain stuck in the current situation of limited livelihood-enhancing opportunities and food insecurity, accordingly.

Given that the mango business is the primary source of income for the smallholders in Makueni, our findings show that the improvement in revenue linked to participation in the initiative has contributed to better household food security status. Indeed, previous studies have indicated that improved farm income positively impacts household food security [63,65,125]. However, while our findings show that participation does come with better food security status, we also learn that better income does not correspond to improvements in the household dietary diversity. As illustrated above, both groups of smallholders consume the same types of food groups—severely lacking in some critical nutrients. The lack of contribution by the business to household nutrition diversity is in contrast to some studies that have found that an improvement in farm income has a positive effect on a household's dietary diversity [63,65,126,127]. Nevertheless, the findings are consistent with the fact that the business participants, who happen to have relatively higher incomes, spend similar amounts on food as non-participants. Studies have found that an increase in spending on food is positively associated with improved dietary diversity [104,105]. This has not happened among participant households in Makueni. Furthermore, it is evident that the food bought is not aimed at improving nutrition diversity but, rather, is simply focused on basic calories intake. Ultimately, these situations highlight the critical gap in the initiative's effort to address local food and nutrition security. More income does not necessarily translate into better nutrition security.

To put the nutrition diversity outcome into perspective, in a low-income smallholder community, it is crucial to acknowledge that addressing food and nutrition security is one among many household's needs that smallholders are confronted with. This is why there is a broad acknowledgement in scholarship and development communities that poverty is multi-dimensional, and touches on different aspects of household needs, including living standards, healthcare, education, food and nutrition security, among other basic necessities [39,128–130]. Notwithstanding the possibility of some incremental growth in overall production returns, following participation in the business initiative, smallholders still belong to a low-income population that faces diverse needs, all assigned different priorities. Therefore, just having something to eat may often be enough of a priority. Commonly, any extra money is spent on other objectives and immediate priorities. In Makueni, we find that a significant proportion of the households' incomes is spent on education, healthcare, clothing, and home improvement, while other money is reinvested in farm production—buying inputs, paying loans, acquiring labor, and when necessary, procuring basic food items.

It is also worth noting the future implications for household food security if farmers continue to focus on and expand mango plantation sizes. An increased shift towards mango production, which is primarily a cash crop, could have implications for the food available for the involved households, as this move would shift production away from subsistence crops. Such a change could have implications for the availability of locally produced food in the local markets, which would mean higher costs to access the food which would be coming from outside regions. Furthermore, more mango trees, especially for farmers with small land sizes, means that fewer crop varieties are maintained. Studies indicate that a decline in food crop diversity could have a negative effect on households' food diversity [80,81].

## 6. Conclusions and Policy Implications

In this paper, we explore the potential contribution of an agribusiness initiative, presumed to be inclusive, on household food and nutrition security in a smallholder community in Makueni county, Kenya. Mango farming is the primary source of livelihood in the region, but market access for the produce is a major challenge, leading to heavy post-harvest losses and, ultimately, income losses.

The setting up of an “inclusive” fruit processing and marketing business, with the help of European Union funding, presents a critical opportunity to improve smallholders’ incomes, and ultimately local food and nutrition security. Although all the smallholder farmers in the community share similar needs, in terms of marketing opportunities, that the business set out to address, we find that participation is not inclusive of all smallholders in the community. The study findings reveal that the participating and non-participating households vary significantly in a variety of socio-economic attributes, including land size, crop income, number of mango trees, loan procurement, and the age and education level of the households’ heads. Our analysis indicates that participation in the business is associated with the household’s land size and number of mango trees; access to loans; family size; the age, gender, and education level of the household’s head. From these findings, it is evident that integration in the business is largely determined by the smallholder household’s production capacity. The more well-off households are better positioned to benefit from the business initiative, while the more resource-poor households are excluded.

Our findings demonstrate that inclusive business does offer a comprehensive marketing opportunity and value addition services and, as a result, improved incomes for those able to participate. In a context like Makueni, such achievements have otherwise proven to be difficult, without external support. This implies that, where possible, there is a scope for expanding participation by increasing the external business investment to incorporate more resource-constrained smallholders. Inclusive business initiatives ought to recognize the heterogenous nature of smallholders’ socio-economic attributes and how this affects participation. At the same time, however, it is critical not to overlook the fact that inclusive businesses are externally funded and profit oriented. Hence, their long-term success in contributing to development objectives upon the withdrawal of external funding is pegged on the commercial viability of the businesses. The inclusion of smallholder farmers with relatively low production capacity and high transaction costs would neither profit the farmer nor the business. Worse, it could prove to be counterproductive by making the business unprofitable, which may lead to a collapse of the business. Furthermore, as Rammelt, Leung [131] asserts, the inclusion of the poorest in inclusive business might not be the ideal development strategy, in conditions where, due to resources constraints, it would mean their engagement may leave them worse off. Instead, for the excluded smallholders in the “poorest” category, policy and development actors should target them with alternative initiative(s) that would be more effective in improving their livelihoods. By doing so, the increased socio-economic inequality that may arise from their exclusion in an initiative, like in the mango business in Makueni, can be avoided.

Our findings show that the inclusive business contribution to local food and nutrition security is partial and only applies to participant households. By improving the income of the smallholders engaged in the business, their household food security situation is significantly better than those excluded. Nonetheless, the comparatively better income has not improved the nutrition diversity for the participants, suggesting that more money does not necessarily translate to better food intake. This is primarily due to competing household needs, such as education and healthcare, among others. Understanding such shortcomings is critical for interventions whose objective is to deliver food and nutrition security in a smallholder community. To address such limitations, we propose that policy makers and development actors explore the contextual background of the community prior to intervention design and implementation, and devise solutions accordingly. We agree with Gebru, Rammelt [73], that addressing nutrition and other diet-related bottlenecks via an inclusive agribusiness initiative would require expanding an initiative scope “beyond market facilitation, by integrating other actors that work on the food and nutrition components of rural livelihoods”. For the most resource poor smallholders, who may still struggle to earn a decent livelihood and meet their food needs despite external assistance, policy makers and development actors should promote alternative strategies such as social protection programs and safety net plans [132–134].



### Limitations and Future Research Direction

This study would have benefited from broadening its scope by incorporating the other farmers' cooperative that is part of the inclusive agribusiness initiatives in Makueni. Although the authors were prudent in selecting the present cooperative to ensure research reliability, it is likely that there is variation in contextual issues within the individual cooperatives that could have contributed to enriching the research findings. Furthermore, while the research methodology adopted in this paper provided the collection of information with adequate depth that met the paper's objective, the study would have been richer if a more extensive data collection methodology was used. We relied on a cross-sectional study approach that built on a snapshot household survey, meaning there were some limitations in terms of timeline and the data gathered. This is primarily because of the short research timeframe and the fact that the initiative in Makueni was underway at the time of the research. A more extensive data gathering approach, such as a longitudinal study (panel survey), would have provided a more comprehensive documentation of the business initiative's progress from the commencement period to completion, ensuring that periodic dynamics were captured, and hypothesis testing would have been possible.

Summing up, the present research shed light on the application of an inclusive business approach in a smallholder community. We focus on "inclusion" in reference to who is able to participate and who is not, which is one of the ways to contextualize inclusivity. Another vital conceptual framework is one that encourages the assessment of how the value created by inclusive businesses is shared in terms of ownership, voice in decision making, and risk and reward [135]. It adds depth to the understanding of the nature and quality of the inclusivity for the actors involved. For future research, in addition to incorporating the just proposed methodological approach, we recommend that studies on inclusive business should broaden their conceptual framework to incorporate the value sharing component. This would ensure that the true value and contribution of an inclusive business in smallholder communities are captured.

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