Agricultural subsidies in a political economy: Can collective action make smallholder agriculture contribute to development?

Wisdom Richard Mgomezulu [a,b,*], Moses M.N. Chitete [c], Beston B. Maonga [b], Joseph Dzanja [b], Patrick Mulekano [c], Abubaker Qutieshat [d]

[a] *Malawi University of Business and Applied Sciences, Department of Economics and Law, P/Bag 303, Blantyre, Malawi*
[b] *Lilongwe University of Agriculture and Natural Resources, African Centre of Excellence in Agricultural Policy Analysis (ACE II AF-APA), P.O. Box 219, Lilongwe, Malawi*
[c] *University of Livingstonia, P.O. Box 112, Mzuzu, Malawi*
[d] *ODC, Oman, University of Dundee, UK*

A B S T R A C T

Malawi's economy is heavily dependent on agriculture, of which a majority are smallholder farmers. With smallholder farmers constituting more than 80% of the population, the government's policies have mainly focused on achieving redistribution goals of the society, minding less about the inefficiencies in smallholder farming. The current study assessed and compared the efficiency levels of large scale and small-scale farmers amidst huge government expenditures in agricultural subsidies on smallholder farmers. Through a SWOT analysis and literature review approach that dwelt much on the qualitative case study approach, the study found that it is only through attaining economies of scale that small farms can attain the efficiency levels of large-scale farms. Following this finding that large farmers are more efficient; the study proposes models that would mimic the behaviour of large farmers. In this study, we evaluated the strengths, weaknesses, opportunities and threats of various models proposed to improve efficiency of small farms. Three models were evaluated namely, contract farming, cooperative development and land consolidation models. These models were selected for review because the theory of collective action ensures that they mimic the farm behaviour of a large farmer. The paper recommends a hybrid of land consolidation model with selected elements of contract and cooperative development models.

Introduction

Since independence, Malawi's economy has been heavily depending on agriculture. According to a Government of Malawi (2018) report, 28 percent of the gross domestic product of the country is contributed by agriculture; making Malawi an agro-based economy. Interestingly, the Malawian agricultural sector is highly dominated by smallholder farmers (80 %). These smallholder farmers are mostly living below the poverty line (50.7 %), a factor which further affects their ability to invest in agriculture. Indeed, the Malawian smallholder agricultural sector is highly dependent on traditional methods of production with little use of improved technologies like hybrid seeds, fertilizers and mechanization. This has further raised debates on the productivity of smallholder agriculture in the country and how best to make the sector productive. With such a debate, agricultural subsidies as a means of promoting adoption of technologies, improving productivity, promoting food security, and reducing poverty amongst rural smallholder farmers have been a long contentious issue of the government and many political parties in Malawi.

It should be noted that Malawi's investment in agricultural subsidies has increased over the past two decades with political parties realizing that the most crucial need for the rural people (of which a majority are smallholder farmers) is the input subsidies. The government of Malawi re-introduced the input subsidy program in 2005/2006 under the name Farm Input Subsidy Program (FISP). Since then, different political parties that have led the Malawian government have always emphasized on heavy investments in the subsidy program. From the start of the program in 2005/06, the number of the beneficiaries has revolved around 1.5 to 2 million (about 36 % of farm households) per year (AGRA, 2017). Each beneficiary of the input program receives input

vouchers to redeem two 50 kg bags of fertilizer and 5 kg of hybrid seed, whilst paying less than one third of the cost. According to Doward and Chirwa (2010), the budgets for FISP have ranged from US$36 million to US$127 million per year between the 2005/06 and 2009/10 agricultural seasons. Over the same period, the actual costs for the program have ranged from US$51 million to US265 million, thus factoring in the costs of fertilizers, seed, transport and other logistical related expenses. It is not a secret that ever since the program was introduced it has accounted for a larger share of the Ministry of Agriculture's budget (IFPRI, 2013). Between 2010/11 to 2018/19, the cost of the program grew to US$157 million per year with its actual cost hovering around US$295 million.

Since the introduction of the program, every government has shown political will to invest a lot in smallholder agriculture. Recently in the 2020/2021 agricultural season, the program was given another name and called the Affordable Input Program (AIP), which saw a further increase in the number of beneficiaries and the cost of the program (GoM, 2021). The report further pointed out that the AIP was introduced to expand the scope of coverage of FISP in terms of the beneficiaries. Thus, since the re-introduction of the program in 2005/06, the beneficiary list has almost doubled. Indeed, the AIP targeted all smallholder farmers under the farming household database which is estimated at 4,279,100 smallholder farmers (GoM, 2021). Just like FISP, the AIP provided vouchers to redeem two 50 kg bags of fertilizer and 5 kg of hybrid seed. The government of Malawi thus allocated MK 160 billion (US$1 = MK800) in the 2020/21 agricultural season for the implementation of the AIP. Due to budgetary constraints the 2022/2023 season saw a significant decline in the number of beneficiaries from 4.2 million to 2.5 million and budgetary allocation from MK160 billion to MK109 billion. Due to devaluation of the Malawi Currency (The Malawi Kwacha) against the US Dollar to US$1 = MK1,700, the price of a 50 kg bag of fertilizer rose from about MK70,000 in the 2021/2022 season to an average price of MK85,000 in 2022/2023 season. During the two recent periods, the government of Malawi has been paying MK15,000 per 50 kg bag of fertilizer. Nevertheless, the trend has persistently shown an increase in budgetary allocation towards agricultural input subsidy program. The increase in the coverage of the program shows that there indeed exists the political will to attain food security at household and national levels and reduce poverty in the country. Nevertheless, poverty and food insecurity in the country have still remained on the rise.

Globalization on the other hand has ensured that countries operate in one global village, relying on each other for agricultural inputs and outputs. Hassen & Bilali (2022) illustrated how the Russian-Ukraine war posed a threat on the food security status of most African countries as the war resulted in a reduction in exports of fertilizers. The authors noted that the war resulted in the displacement and conscription of the population in Ukraine, which caused labor shortages, and further resulted in the country restricting the exports of fertilizers (Hassen & Bilali, 2022). Malawi was not spared to the effects of the Russia-Ukraine war as the AIP delayed its procurement of fertilizer in that agricultural season, further affecting the timely application of fertilizer in most smallholder maize farms. AGRA (2023) found that the Russia-Ukraine War caused disruption in the global fertilizer supply chain, surging fertilizer prices by 78 % in Malawi, Kenya, Nigeria and many other countries. This affected the cost of the countries input subsidy programs, posing a threat on global food security. This again raised the cost of the AIP, further questioning its sustainability over time.

This brings in the important question: why have things not improved in the last two decades of huge investments on smallholder agriculture? For how long then should the government adopt the same approach and expect to get different results (food security and poverty reduction)? The success of the Input Subsidy Program can best be explained in its efforts to alleviate poverty and improve food and nutritional status of vulnerable groups. However, the country has been experiencing high malnutrition incidences for the past decade. For instance, in 2017, Malawi recorded a 37 percent level of children under-five who were stunted and 3 percent who were wasted; 25 percent of women were classified as

mildly anaemic, 7 percent moderately anaemic and 1 percent severely anaemic (GoM, 2018). Nonetheless, majority (80 %) of the population depends on agriculture for their livelihoods; 50.7 percent of the Malawian population still lives below the poverty line with almost quarter of the population in extreme poverty.

Numerous scholars agree on the impact of the subsidy program on improving yields, productivity and food security (Myroniuk et al., 2020; Doward & Chirwa, 2010; Chibwana et al., 2012; Chibwana et al., 2014). It has been noted that those that have benefited from the program have experienced notable differences in their yields. Nonetheless, the sustainability of such improvements is doubtful as the same farmers that benefit from the input subsidies seek further food aid through the Free Maize Program and cash transfers to cope up with food shocks in the lean months. As such, the cycle of assistance never ends. Different scholars have hence resorted to questioning the potential of the subsidy program at central level (Doward & Chirwa, 2010; Chibwana et al., 2012; AGRA, 2017). Thus, questions still exist on how the program should be structured in order to make the smallholder farmer efficient and food self-sufficient. AGRA (2017) in assessing the Farm Input Subsidy Program proposed a number of issues that needed to change to achieve the potential of the program. Firstly, the report pointed out the need for transforming Malawi's agriculture from primarily subsistence to commercial by promoting specialized higher yield production. Secondly, the report recommended that FISP should target smallholder farmers that make effective and efficient use of the inputs. Lastly, the report argued that FISP should be centered on making farming as a business. What is clear from the three recommendations is that farming is still subsistence and farmers benefiting from FISP are not efficient.

Despite being the most expensive program in Malawi, it also receives vast political support bearing in mind that it is delivered to the majority of the voters who are mostly smallholder farmers (AGRA, 2017). This implies that the only logical solution is to find ways to make the smallholder farmers benefit from these subsidies efficiently without compromising the political nature of the program. Hence, there exists an important question that needs to be answered to the benefit of tax payers' money: How do we implement the input subsidies in such a way that increases the efficiency of smallholder farmers? It is to that extent that the current paper analyzes the possible solutions to delivering subsidies to ensure that smallholder farmers are efficient and contribute to development. The study therefore proposes models that can increase farmers' efficiencies in light of input subsidies.

It is worth noting that input subsidy programs mainly achieve equity objectives and tend to have some limitations in addressing efficiency in the use of resources (Ghiasi et al., 2020). *Equity* and *efficiency* are fundamental economic concepts widely used in policy design and evaluation of economic outcomes. In the context of this paper *equity* refers to fairness in the distribution of resources and economic outcomes to society. Policies that aim at achieving equity seek to reduce disparities between individuals or groups, ensuring that everyone has access to basic needs, opportunities, and a decent standard of living (Silva et al., 2022). In Malawi's agricultural sector, the government tries to achieve equity through input subsidy program, targeting smallholder farmers who are mostly disadvantaged in accessing basic factors of production.

On the other hand, *efficiency* refers to the optimal allocation and utilization of resources to maximize overall societal welfare or economic output – getting the most out of the available resources. Efficiency is achieved when resources are allocated in a way that maximizes total benefits or output, thereby minimizing costs (Mankiw, 2022). Economic policies which aim at achieving efficiency tend to focus on improving resource productivity, promote competition, and free markets, with an objective of realizing economic growth, and cost-effectiveness in the use of resources. When pursuing policies designed to achieve efficiency objectives, three kinds of efficiencies arise: allocative, technical and economic efficiencies. Allocative efficiency focuses on the optimal allocation of resources among different uses. Technical efficiency is concerned with output maximization given the available resource

bundle and technology, while economic efficiency combines both allocative and technical efficiencies to realize the overall effectiveness of resource use and production in the economy.

Many times there exists some conflict between equity and efficiency because actions that promote one tend to have trade-offs. For instance, achieving equity through redistributive taxation or minimum wage laws, more often than not, reduce incentives for individuals to work hard or invest, leading to reduced economic efficiency. Conversely, policies that focus on achieving efficiency, tend to worsen income disparities and inequality, leaving some segments of society without essential services and support. However, while some trade-offs may be inevitable, the government needs to strike a balance in the design of economic policies to achieve both equity and efficiency objectives, realizing that the two goals are interconnected and tend to reinforce each other in the long-run.

Methodology

Theoretical framework

The current study explores much about the theory of collective action in trying to understand how smallholder farmers can operate when they come together to achieve a common goal. The logic behind is that the inefficiencies observed when farmers operate individual small farms can be solved when they unite to achieve a common purpose. Ostrum (2009) argues that collective action occurs when individuals decide to act in an interdependent manner. The reasoning behind is that if utilitarian individuals were to pursue their self-interests, the individuals would end up with actions that turn out with lower joint outcomes than would be achieved if they operated as a unit. Reisman (1990) compares collective action to a typical Nash equilibrium where a single iteration of the game results into a less socially optimum outcome. Ideally, the socially optimal outcome in a Nash equilibrium can in this case only occur when such individuals cooperated by selecting those strategies other than the ones prescribed by the Nash equilibrium. It should be noted that the Nash equilibrium is a concept of game theory. As such, the suboptimal joint outcome is in that case an equilibrium hence individuals have no incentives to deviate from their initial choice, given the predicted choices of the other players. This implies that if small farms were to come together, the social optimum realized would in this case yield higher gains than their individual joint outcomes. As such, no small farm would be independently motivated to change their choice given the predicted choices of the other small farms.

Abreau (1998) however argued that a coherent theory of collective action related to the use of common pool resources is a bit challenging. This shows that despite the knowledge that a socially optimum outcome exists, there still exists fear that some individuals might go for suboptimal outcomes (Lichbach, 1996). Just like how Hardin (1986) puts it in the book "Tragedy of the Commons", externalities in the common's dilemma imply that assumptions in attaining the Nash equilibrium rely on both the action situation and the psychology of the decision makers (Ostrum, 2009).

Simply put, small farms that have organized to come together to pursue a common interest are susceptible to the tragedy of the commons, as they have created a public good for the members involved. This implies that proper organizational rules and regulatory measures have to be put in place when a group of people decide to pursue a common interest. Indeed, some scholars (Hardin, 1968; (Ostrum, 2007) and (Ostrum, 2009)) have found out that it is theoretically inconsistent to assume that the public-goods provision dilemma can be solved in an effort to address the original common-pool appropriation dilemma. As such, development of collective action has to be accompanied with proper measures that provide solutions to the common's dilemma. Ostrum (2009) hence proposes that before members decide on venturing into collective action, a number of measures have to be employed. These include (i) defining clear group boundaries; (ii) the matching of rules

governing the use of common goods to local needs and conditions; (iii) ensuring that those affected by the rules equally participate in the modification of the rules; (iv) community should participate in monitoring members' behavior; and (v) provide accessible low-cost means to dispute resolution.

Empirical framework

The current study adopts a qualitative approach to research in its quest of understanding the environment in which smallholder farmers operate. Specifically, the study uses the SWOT analysis approach as proposed by Albert Humphrey in the 1960s in order to understand the strengths, weaknesses, opportunities and threats of different collective action strategies that can be employed in ensuring that smallholder farmers become efficient. Humphrey (2005) describes SWOT analysis as a tool that is mostly employed in various organizations for strategic planning and management. The notion behind the SWOT analysis approach is that organizations are wholes that interact with their environment (Gurel & Tat, 2017). Thus, two environments that organizations operate in exist: (1) the internal environment; and (2) the external environment. Table 1 gives a description of the two environments in coming up with a strategy for the organization. According to Humphrey (2005), the internal environment assesses the strengths and weaknesses of an institution or a policy or a strategy. These consist of those parameters that the institution has control over. The other side consists of external factors which are those parameters in the macro world that the institution has no control over. Different scholars have used the tool to assess institutions, policies and strategies. Abdolshah et al. (2017) studied the strategic planning of different agro-industries and employed a SWOT analysis. Achmad et al. (2013) also used SWOT analysis in assessing policies in beef cattle ranch development. Moghaddaszadeh et al. (2015) used SWOT analysis to recommend best policies that can develop the Persian food industry. The current study uses SWOT analysis to assess the different strategies that can develop the smallholder agricultural sector in Malawi.

Further to that, the current paper adopts the case study qualitative research design approach to critically understand the environment in which smallholder agriculture operates in Malawi: the challenges faced and possible solutions. Cresswell and Miller (2000) pointed out that the case study research approach is best used when the researcher has a case that is bounded by time and/or a place and which can inform a problem. The current study adopts the case study approach as the researcher possesses a case on the environment which smallholder agriculture operates and what can be done to help the smallholder farmer. The research hence collects data through the review of literature on the initiatives that different policy implementers have done in Africa and beyond. Suzuki et al. (2007) also argued that the case study approach is essential as it helps the researcher clearly understand what has worked before and what has not in the quest of finding solutions to the prevailing problem. Morse and Field (1995) described the case study approach to qualitative research as one of the best approaches when

Table 1
Components of the SWOT Analysis.

Environment	Parameter	Description
Internal	Strengths	Characteristics that give advantage over others in the industry
	Weaknesses	Characteristics that place an organization/policy/industry at a disadvantage relative to others
External	Opportunities	External elements that give benefits for the organization/policy/program
	Threats	External elements that might give trouble to the organization/policy/program

Source: Adapted from Gurel and Tat (2017).

developing an in-depth understanding of how different cases or scenarios provide an insight into the main issue at hand, hence providing evidence of the existing problem and possible solutions presented by different cases.

Similar to the narrative research design, the case study approach also involves collecting data through the understanding of individual or group stories which help to form a basis for gathering facts around the problem. However, the distinction with narrative research resides in that case study research design relies on multiple data sources, and not only individual stories as observed in narrative research (Creswell & Miller, 2000). It would be worth noting that the case study approach has had different applicability in qualitative research. Hamel (1993) used the case study approach and traced the modern social science problems in anthropology and sociology. Through their work, different scholars today have a range of well critiqued approaches from which to choose. Yin (2003) compared quantitative and qualitative approaches and described the benefits of explanatory and descriptive qualitative case studies. Merriam (1998) also agrees with Yin (2003) that the case study approach provides a more detailed analysis with evidence of the facts surrounding the problem. Creswell (2007) also agrees with the authors before him on the strengths of the case study design. Considering that the current problem revolves around cases and scenarios in the smallholder agricultural sector over time, and in different places around the world, the case study qualitative design is in this scenario the best empirical approach.

Results and discussions

At this stage, it is obvious that agriculture determines the pace of development in Malawi. Malawi's agriculture sector is divided into smallholder farming and estate/large scale farming. Smallholder farmers often operate under structural constraints such as access to suboptimal amounts of resources, technology and markets (Khalil et al., 2017). Smallholder farmers mostly struggle to be competitive, either because their endowments of assets compare unfavorably with those of more efficient producers in the economy or because they confront missing or under-developed markets. According to FAO (2009), smallholder farming refers to those farmers that operate on less than 2 ha of land. On the other hand, estate farming refers to large scale production, usually of one crop on a large piece of land, for an extended period of time. This chapter discusses the differences between efficiency levels of smallholder farmers and estate/large scale farmers, and the possible strategies that can make smallholder farmers efficient.

Efficiency of smallholder farmers vs large scale farmers

As mentioned earlier, Agriculture in Malawi is smallholder based and, hence, faces several constrains such as lower output prices relative to input costs, unfavorable commodity and input markets, lack of farmer organizations, lack of extension services, lack of productive assets and labour (Tchale, 2009). These constrains have resulted into low productivity in the production of maize which is the country's staple food, cultivated over 90 % of arable land. Nevertheless, the Malawi Government efforts have over the past decades been streamlined towards improving the productivity of the resource constrained smallholder farmer (GoM, 2007). Indeed, the government of Malawi clearly differentiates between small and large farms in the country (GoM, 2007). The state thus understands the economic differences that exist between small and large farms, and the need to focus on equity and not necessarily efficiency goals of the societal resources. Equity is mostly concerned with the relative distribution of resources in a society based on fairness and justice (Hyman, 1989). On the other hand, efficiency is achieved when all the resources in a society are employed towards their most productive use.

It should be noted that literature on farm efficiency (in the whole World and in Malawi) is quite extensive (Lall et al., 2001; Tchale, 2009;

Maganga et al., 2012; Chirwa & Dorward, 2013; Mapemba et al., 2019; Muyanga et al., 2020). What is quite clear from different scholars is that these small farms face barriers to economic competitiveness and are in majority of the instances less productive than their large-scale counterparts. Lall et al. (2001) explained that farmers mostly face an L-shaped cost function, as such, costs per unit of output produced declines rapidly as production and henceforth farm sizes increase and later flatten out. The economic principle of increasing production until the costs function flattens out (Hyman, 1989), can be attributed to the need for ensuring that agricultural farms achieve economies of scale.

At this stage it is quite agreeable that equity and efficiency are very different, and in a majority of the times, they are incompatible goals of the society (Lall et al., 2001). However, there exists a need for developing countries, including Malawi (MoAFS, 2010) to achieve both without compromising the other. Indeed, if the goal was to achieve efficiency in the use of the taxpayer's money, then the Malawi Government would have best allocated the more than 70 % share of the agricultural budget (subsidies) to large scale farms. However, equity goals remain as important as achieving efficiency in the use of public funds. In a recent study on the "impact of FISP on efficiency of maize production in Malawi", Chiromo (2018) noted that smallholder farmers in Malawi are experiencing decreased returns to scale and are hence technical, allocative and economic inefficient. The author however acknowledges the role that FISP has played in improving efficiency of smallholder farmers. Interestingly, the author recommends that the government should support only *energetic farmers – targeting especially those who are youthful and strong in the economically active age group (≥18 to 60≤)*; advocate for family planning to reduce population sizes; and increase cash transfers to economically empower the smallholder farmers to complement FISP in purchasing inputs. Muyanga et al. (2020) also emphasizes on the need to clearly assess the future of smallholder farming in Malawi amidst high population growth and a decline in farm sizes which is further resulting into decreased returns to scale.

Based on the presentation in the above paragraph, it is clear that the smallholder farmer has to be empowered. Economic empowerment is needed because population is still increasing at an exponential rate whilst arable land remains fixed in the country. Therefore, without tangible economic empowerment, the smallholder farmer will continue to be small and inefficient. Table 2 shows that there exist high levels of inefficiencies in the smallholder agricultural sector. It is obvious that smallholder farmers in Malawi have over the past years failed to cope to the realities of the new economic environment. The revolution in agricultural technologies which have seen not only the introduction of biological technologies (seeds, fertilizers and chemicals) but also mechanical technologies (irrigation equipment and farm machinery) implied that small farms could not cope to the economic efficiency of large farms.

Lall et al. (2001) went through the struggle of comparing small and large farms in Kansas State amidst the concern of improving productivity of agricultural land and feeding the ever-growing population of the USA. As observed in Table 3, the authors found that small and large

Table 2
Efficiency Rating of Smallholder Farmers in Malawi.

Year	Technical Efficiency	Economic Efficiency	Crop	Author
2004	61 %	_	Maize	Edriss et al. (2004)
2007	46.2 %	_	Maize	Chirwa (2007)
2009	53 %	38 %	Maize	Tchale (2009)
2018	66.9 %	59.2 %	Maize	Chiromo, J. (2018)
2019	_	44 %	Common Beans	Mapemba et al. (2019)
2021	63 %		Maize	(Pangapanga-Phiri & Mungatana, 2021)
2023	66 %	55 %	Maize	Mgomezulu et al. (2022)

Table 3
Means and Distribution of Efficiency Indices by Farm Size in Kansas State.

Efficiency	Technical		Allocative		Economic		Overall	
	Small	Large	Small	Large	Small	Large	Small	Large
Mean	0.604	0.894	0.522	0.752	0.308	0.672	0.324	0.592
Distribution (%)								
<20	0	0	0	0	6	0	22	9
20–30	3	0	0	0	10	3	39	7
30–40	6	0	2	2	18	7	16	8
40–50	14	0	8	6	18	11	3	13
50–60	15	4	13	11	15	19	7	11
60–70	8	3	21	13	13	14	4	15
70–80	11	6	21	26	8	8	3	13
80–90	13	19	19	21	6	18	2	7
>90	30	68	16	21	6	20	4	17

Source: Lall et al. (2001).

farms exhibit large differences in their technical, allocative and economic efficiency levels. The results further show that a substantial proportion of large farms had efficiency levels of greater than 80%. Again, in farms with less than 20% efficiency levels, the proportions were larger for smaller farms than large farms. The authors concluded that the overall efficiency of small farms was 25% lower than that of larger farms.

Looking at the literature reviewed to this stage, it is far more understandable why there exists an equity versus efficiency debate in the use of tax payers' money. The literature on inefficiency of smallholder farmers is quite extensive. On the other hand, the need for the government to achieve its equity goals cannot be overlooked. However, previous studies on efficiency of smallholder farmers in the use of public funds have totally ignored the fact that these smallholder farmers are operating in a state-influenced political economy (Tchale, 2009; Maganga et al., 2012; Chirwa & Dorward, 2013; Mapemba et al., 2019; Pangapanga-Phiri & Mungatana, 2021; Mgomezulu et al., 2022; Chiromo, 2018)), and hence equity goals are as much important as efficiency goals (MoAFS, 2010). The political economy will in this case not allow society to achieve efficiency without achieving equity first. So agricultural economists in this case face a totally different societal problem: *how does the government achieve equity goals through the implementation of agricultural subsidies whilst achieving efficiency goals of the society*?

Indeed, agricultural economists have the obligation of ensuring that tax payers' resources are used in the most efficient manner. Moreover, it is obvious at this stage that achieving efficiency will involve allocating the resources to large farms. Nevertheless, the political economy will not allow that, as equity has to be attained in amalgamation with efficiency. As such, the presence of the economic principle of economies of scale is an inducement for farms to grow in size, hence achieve higher levels of efficiency. Fig. 1 clearly shows that the long run average cost curve

Fig. 1. Graphical Presentation of Economies of Scale. Source: Adapted from Hyman (1989).

lowers with an increase in production. Large farms are able to lower the average costs associated with production as output increases, at least to a certain threshold.

Models for making small farms big

This subsection provides the details of the approaches that can be adopted in ensuring that smallholder farmers are able to attain economies of scale just like their large farmer's counterparts. It is quite clear that Malawi's developmental goals will not be achieved without involving the smallholder farmer. On the other hand, tax payer's resources will continue to be used inefficiently if the smallholder farmer continues to operate with lower levels of technical, allocative and economic efficiencies. Thus, models of how the smallholder farmer can operate like a large-scale farmer are needed to ensure development.

Contract farming

The smallholder agricultural sector has over the years seen vast changes in the operationalization and marketing of agricultural produce. One of the biggest concerns in the sector has been associated with stable and reliable markets for smallholder farmers, a prerequisite for improving profit efficiency. Contract farming has hence been touted as one of viable vertical coordination mechanisms of sustainably moving produce from the farm to the final consumer. In the recent past, the food systems have mainly been driven by open markets where the forces of demand and supply were allowed to influence price signals and hence allocation of food commodities. This, however, resulted into unstable and unreliable markets for the smallholder farmer which further resulted into a lot of post-harvest losses. To that regard, a close cooperation-coordination system between the producers and buyers was developed in the form of contract farming. According to Rehber (2007), contract farming accounts for about 15 percent of the agricultural output in developing countries.

Rehber (2007) further points out that the 'bargaining problem' was the major reason why contract farming was introduced in order to ensure the efficient distribution of benefits between producers and buyers. It should be noted that agricultural transformation in Malawi and the Sub-Saharan Africa will only occur when agricultural production is effectively linked to marketing systems. Schrader (1986) pointed out that under contract farming, each farm retains its own separate identity. However, one or more decisions to do with production, marketing and use of farm assets is left under the control of another firm. Many scholars have hence studied the effect that contract farming has on improving technical and allocative efficiency of smallholder farmers. The school of thought behind is that contract farming reduces farmer transaction costs whilst solving the problems that come with imperfect markets (Silva, 2005; Otsuka et al., 2006)). For instance, Mishra et al. (2017) studied the technical efficiency of smallholder farmers under contract farming and observed that technical efficiency of paddy seed
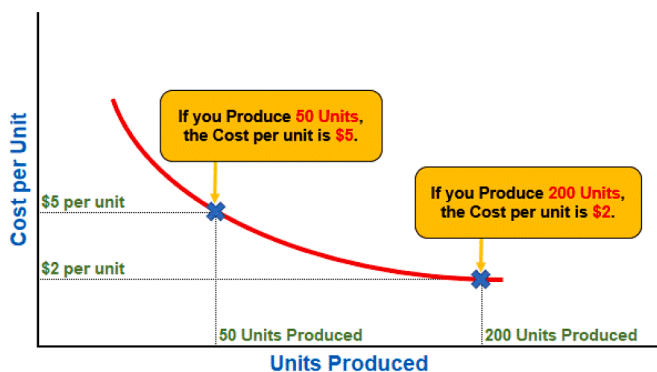
and ginger producers averaged an impressive 94 % and 97 %, respectively. Nguyen et al. (2017) again studied the effect of contract farming on productivity, technical efficiency and poverty reduction. The authors found that the technical efficiency of tea producers under contract farming was 5 % higher than that of their counterparts not under contract farming. On top of that, contract farming was found to have a positive and significant effect on productivity. Nonetheless, the authors observed non-significant findings on poverty reduction, a crucial parameter for ensuring that smallholder farmers contribute to development.

In Malawi, little research has been done on the impacts of contract farming. However, the few that have been done have focused on the cash crops, especially on tobacco. For instance, Shawa et al. (2007) studied Tobacco contractual arrangements in Malawi and their impacts on smallholder farmers. The authors noted a number of complications like side-selling, asymmetric information, moral hazard and strategic contract default by smallholders which further affects the smooth operations of the contract. However, the authors proposed encouraging farmers to be working in groups as such groups reduced monitoring costs and further resulted into better quality tobacco. The authors went further to estimate a treatment effect model and observed that contract farming increased farmer incomes by 46 %. Nonetheless, the study strictly points out that those income differences between contract and non-contract farmers were strongly dependent on landholding sizes, a prerequisite for attaining economies of scale when farmers come together in groups. Table 4 provides a thorough SWOT analysis of the contract farming model. The results however indicate that inefficiencies still remain when these smallholder farmers operate as single units with small land holding sizes.

Cooperatives

Improving the smallholder sub sector has been touted as a solution for reducing poverty in the sub-Saharan Africa (SSA) region (Sherlund et al., 2002). This is particularly evident in Malawi as 80 percent of the population comprises smallholder farmers (USAID, 2020). The smallholder sector accounts for the bulk of food production in Malawi, but the sector is characterized by low productivity and vulnerability to natural vagaries such as droughts and floods. Low productiveness in the smallholder sector usually comes due to low adoption levels of improved technologies and the subsistence nature of most smallholder farmers. It is to that realization that different scholars have used the theory of collective action to bring together smallholder farmers and improve their access to technologies, extension services and financial credit.

Following the theory of collective action, cooperatives remain one way of ensuring that smallholder farmers come together and improve their bargaining power with a collective voice. The government has been promoting the formation of farmer organizations such as associations and cooperatives. It is envisaged that collective action, through a cooperative model would therefore enhance market participation amongst small-scale farmers; strengthen farmers bargaining power in the market; and enhance growth in the rural areas (Chirwa et al., 2005). It would also help farmers to access markets further down the chain, by being able to meet contract requirements. It is for these reasons that Nkhoma (2011) acknowledged that the realization that smallholder farmers have to move from subsistence farming to commercial production led many rural communities to form cooperatives to have better access to markets. The author carried out cooperative member interviews and observed that a majority of the farming members joined cooperatives to improve their livelihoods through better access to capital (loans) and product markets.

So how do cooperatives operate in Malawi? Makiyoni (2019) explained that by 2017, Malawi had 920 registered cooperatives, which cut across all sectors of the economy: 70 percent agro-based cooperatives, 10 percent financial cooperatives and the remaining 10 percent in the service sector in areas such as furniture and cleaning. In 1997, the Government of Malawi developed a Cooperative Development Policy with a goal of creating an enabling environment for sustainable development by enhancing the economic and social well-being of the cooperative members. Nonetheless, different authors (Chirwa et al., 2005; Nkhoma, 2011; Makiyoni, 2019)) have found out that cooperatives in Malawi still face problems ranging from inadequate policy, weak regulations and poor governance. But how do the most innovative cooperatives which are deemed sustainable operate in Malawi? To clearly elaborate this, Makiyoni (2019) explained the Integrated Cooperative Business (ICB) model for sustainable cooperatives. The author argues that the ICB model, unlike the traditional cooperative approach, addresses farmer's constraints by integrating agricultural production, finance and marketing (see Fig. 2).

Indeed, what the smallholder cooperatives need at this stage is to integrate production, finance and marketing of their products in their business models. Chirwa et al. (2005) further agree that smallholder farmers stand a better chance of improving their efficiency when they operate as a unit. In addition, in working as a unit, we imply whilst using the Integrated Cooperative Business model. However, do these smallholder farmers operate as a unit in the cooperatives that they form? Some might argue yes, and most might argue no. Nevertheless, what all scholars can agree on when it comes to cooperatives, especially Malawian cooperatives, is that the integration of production, finance and marketing is not to a 100 percent. Most cooperatives that have been deemed sustainable have only operated as a unit when it comes to acquiring finances and marketing of produce, but not production. Examples include cooperative members of Associations like Milk Bulking Groups under Milk Producers Associations (Northern, Central and Southern), smallholder cereal or legume farmers under Farmers Union of Malawi (FUM) and National Smallholder Farmers Association of Malawi (NASFAM). Smallholder farmers who are members of cooperatives farm on their small pieces of land. Thus, production remains at smallholder level and average costs remain high, failing to attain economies of scale. Aggregation however starts at marketing stage in order to bargain good prices. This further explains why the inefficiencies are still rampant even in the presence of cooperatives (Edriss et al., 2004; Tchale, 2009)).

Therefore, our question remains: how do we entirely turn the smallholder farmers into large scale farmers? It is clear that the cooperatives are only crucial when it comes to access to finance and marketing of products. How about the biggest chunk of costs of production and land use management? It is obvious that the smallholder farmer in the cooperative model still produces as an individual. Hence, productivity remains low and inefficiency keeps rising. This is so as land is fragmented and we need small farms to start producing as a unit. What is clear is that the cooperative model is not working, at least not for its intended purpose. Smallholders still continue to work individually. Farms are getting smaller and smaller with increased population sizes.

Table 4
SWOT Analysis for Contract Farming Model

Strengths	Weaknesses
• Access to inputs e.g., fertilizer, seed, chemicals • Easy access to market information • Provides training for members • Reduced monitoring costs • Easy access to markets • Improved incomes	• Susceptible to moral hazard • Prone to farmer's side-selling • Inefficiency in production due to small land holding sizes
Opportunities	**Threats**
• Financial institutions willingness to work with groups • Exploration of reliable markets • Good quality produce for export markets	• Competition from large scale farmers • Difficulty in getting skilled labour • Economic uncertainty • Low commodity prices of goods • Lack of policy incentive and initiative

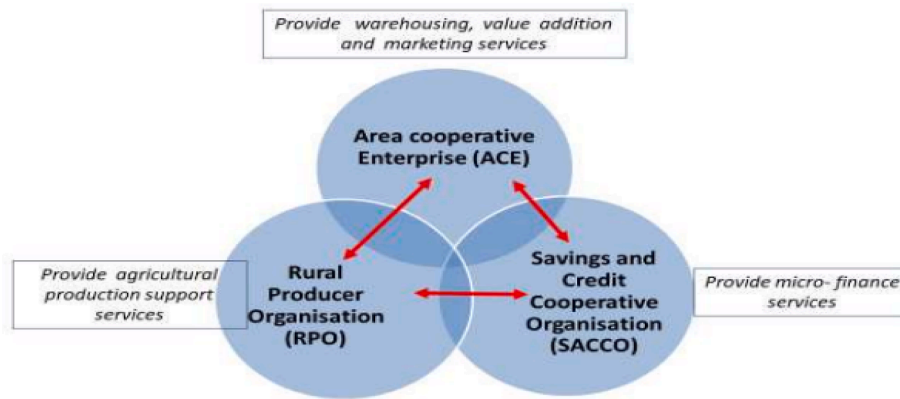**Source:** Authors findings from literature review.

Fig. 2. A Graphical Illustration of the Integrated Cooperative Business Model. Source: Makiyoni (2019).

Costs of delivering extension services and farm inputs are still increasing. The smallholder farmer remains an individual farmer with limited support and economic opportunities. This calls for a better model that integrates all the aspects of production in the cooperative model.

Table 5 gives the results for the SWOT analysis for the cooperative model. The analysis reveals that a lot of strengths and opportunities that farmers can explore when they operate in a group setting exist. Nonetheless, there still exists the need for government support in coming up with good policies that aid the development of cooperatives in the country. In addition to that, farmers have to deal with the inefficiencies that exist in production as they produce as individuals and not in groups. Lastly, the model remains susceptible to the problem of the tragedy of the commons hence the need for proper regulatory frameworks to prevent free riding.

Land consolidation within cooperatives and contracts

At this stage, it is again clear that cooperatives in Malawi have not entirely helped the smallholder farmer to be efficient, nor has contract farming. The integration of the theory of collective action has not been done to a convincing extent that allows smallholder farmers enjoy the economies of scale enjoyed by large farmers. Malawian smallholder farmers hence need a better model to that of cooperatives and contract farming that integrates the theory of collective action at every stage of the value chain. One way to do that is to ensure that cooperatives are

Table 5
SWOT Analysis for the Cooperative Model

Strengths	Weaknesses
• Access to financial services e.g., loans • Easy access to information • Provides training for members • Reduced costs of inputs • Improves use of inputs e.g., improved seed, fertilizer, machinery etc. • Democratic management • Reduces poverty and food insecurity	• Free riding • Limited capital • Inefficient management • Inefficient production techniques
Opportunities	**Threats**
• Financial institutions willingness to work with groups • Exploration of new markets	• Increasing business competition • Rampant state corruption • Difficulty in getting skilled labour • Economic uncertainty • Low commodity prices of goods • Lack of policy incentive and initiative

Source: Authors findings from literature review.

implemented starting from the production side through land consolidation policies. Indeed, fragmentation of agricultural land in the rural areas is a big challenge in Malawi. According to FAO (2009), parcels of land in rural settings are often scattered around the community and distanced from each other. Land fragmentation is the situation in which a single farm consists of numerous spatially separated parcels. It is caused by four main factors of inheritance, population growth, land markets, and historical/cultural perspective (Demetriou et al., 2013). Land fragmentation restricts agricultural development and reduces the opportunities for sustainable rural development due to diseconomies of scale.

Most of these farms are of irregular shapes, a thing which complicates agricultural land cultivation and limits the use of modern mechanization. Inadequate agricultural infrastructure, field roads passing through arable land, non-existent drainage and irrigation systems make agricultural activities difficult. Consequently, farmers are facing limited production volumes, high transportation and production costs, limited agricultural income, lack of opportunities to apply modern production technologies, difficulties in realizing farm development plans.

Land fragmentation can be thought of different parcels of land that a family owns but located in different places. That indeed is a compromise to efficiency at household level. For the sake of this article, we argue that the farmers who are members of these cooperatives have fragmented land. If the cooperative is supposed to operate as a unit, then it needs to have a single piece of land. As such, access to inputs through subsidies has to be granted to that single unit that is operating at a large scale, of course thanks to the consolidated land. Indeed, land consolidation can be used to address the inefficiency in smallholder agriculture.

Land consolidation is one of the most efficient instruments in improving the structure of agricultural land. It is a planned readjustment of land parcels that are fragmented (FAO, 2009). This system is usually applied in order to form larger land holdings, which is more suitable for agricultural production and with better access to rural infrastructure such as access roads, irrigation or drainage systems. Land consolidation comes with benefits for farmers. Such benefits include reduced cost for agricultural land cultivation; there is increased income and profitability per hectare and in addition to that, larger and regularly sized land enables easy use of modern mechanization (FAO, 2009). AGRA (2017) also applauds the initiatives of the government of Rwanda that resulted in the introduction of the Land Use Consolidation (LUC) initiative through its Crop Intensification Program (CIP) in 2008. Through the LUC, subsidy vouchers are given as incentives to farmers for land consolidation. Thus, the government is in this case dealing with an efficient farmer.

As such, cooperatives have to consolidate their land and operate as a single unit from production to marketing. The AIP has to now distribute its inputs to these cooperatives with consolidated land of at least not less than 50 ha. The same inputs distributed to smallholder farmers are now distributed to large scale farms, only that now in their efficient state. But

how would this work? Different farmers have to come together and form a cooperative of course. Just like any association, an executive committee has to be elected which is to be chaired by a president for that year. So, all the members in the cooperative will have an obligation of contributing shares equal to the share of land (and/or managing the land) they have under the cooperative. Obviously, we do not expect all land holdings to be the same. As such, the contributions and gains for individual farmer have to be different, and that has to come out clear in the memorandum of understandings that are to be developed. The right to ownership will have to remain to the individual farmers. However, the right to use the land has to be transferred to the cooperative. The management/committee has to make decisions on what to grow, when and how. What is however interesting from such a model is that not only will it reduce the cost of supplying inputs of production (subsidies, extension and credit) to farmers, but will also make the smallholder farmer attain economies of scale. The smallholder farmer is in this particular instant, a single large-scale farmer.

Nonetheless, how this is supposed to be implemented is as quite important as the outcome. FAO (2009) suggests the following basic principles which should rule modernland consolidation approaches. These include (i) the objective of land consolidation initiatives should be to improve rural livelihoods rather than to improve only the primary production of agricultural products; (ii) the end result should be community renewal through sustainable economic and political development of the whole community, and the protection and sustainable management of natural resources; (iii) the process should be participatory, democratic and community-driven in practice and not only in concept; (iv) the intervention should be to assist the community to define new uses for its resources and then to reorganize the spatial components accordingly; and (v) the approach should be comprehensive and cross-sectoral, integrating elements of rural and broader regional development including the rural–urban linkages.

Table 6 gives the results from the SWOT analysis for the land consolidation model. It is clear at this stage that land consolidation increases production, improves efficiency in use of inputs, creates employment and small farms can easily attain economies of scale. Weaknesses for the model include low activity for the owners once land is consolidated and that processes of land consolidation are costly. However, these weaknesses can be turned into strengths. With proper government and private sector support, the processes involving land consolidation can be subsidized or incentives can be provided to farmers that are going through the land consolidation process. Again, once the farm has been well established, the group can engage in other value addition activities that may create jobs for the members.

So where has land consolidation been implemented in the world?

Table 6
SWOT Analysis for Land Consolidation with Cooperatives Model

Strengths	Weaknesses
• Increased production • More efficiency of inputs • New jobs • Promotes sustainable agriculture • Competitive agriculture is formed • It can improve land administration systems • Better conditions for the development of rural infrastructure • It can promote improved management of natural resources • Attain economies of scale	• Low activity of land owners • It is costly to set up
Opportunities	**Threats**
• Growth of other sectors in the economy hence possible backward and forward linkages • Increased opportunities for public and private investments in agriculture-related infrastructure.	• Climate change • Lack of policy • Tedious legal procedures

Source: Authors findings from literature review.

Zeng et al. (2018) explains that China has since the year 2000 implemented a large-scale land consolidation program. The whole purpose of the program was to deal with land fragmentation and again minimize farmer costs of production. To achieve this purpose, China had to go through massive land tenure transfers to ensure that land is no longer fragmented. The authors were however interested in the impact of the land consolidation initiative on the technical efficiency of consolidated farms. The authors employed a stochastic frontier approach and observed that the technical efficiency of consolidated farms was at an impressive score of 92.4 percent (Zeng et al., 2018). The logic behind land consolidation is that fragmented land often times increases transaction costs and affects the overall agricultural growth.

Moving to Africa, Nilsson (2019) studied the role of land consolidation in improving yields and agricultural productivity in Rwanda. The author argues that since the Green Revolution, there exists enough evidence that land consolidation improves productivity, aggregates income and reduces poverty in Asia, Europe and other South American countries (Niroula & Thapa, 2005; Pašakamis & Maliene, 2010)). Nonetheless, little evidence exists to regions that have less favorable agro-ecological conditions and low technology adoption like most African countries. Rwanda implemented a land consolidation program in 2008 with an aim of reducing fragmented land, and hence improving productivity of agricultural land. In their assessment of the effect of the program, the authors found that land consolidation significantly increased productivity and yields, thus agreeing to the theory that larger farm sizes are more efficient as compared to smaller farm sizes (Timmer, 2002). What is however interesting from the case of Rwanda is that its implementation of land consolidation policy was a bit different from how land consolidation has been done in other countries. The emphasis of the land consolidation policy in Rwanda was that land consolidation should focus on the use of land rather than ownership of land. This is crucial as issues of land tenure management are tricky and farmers have to be sure that they will keep the ownership of their land intact. Later on, the government used the input subsidies to provide incentives for land consolidation. Interestingly, over the 8 years of using the subsidies as incentives for land consolidation, the Government of Rwanda's contribution towards the input subsidies declined by 70–80 percent. The consolidated farms turned out to be more efficient and stopped relying on subsidies.

Conclusions and recommendations

The Malawian agricultural sector is highly dominated by resource constrained smallholder farmers. Since these smallholder farmers are constrained by resources, a thing that affects access to productive inputs, government thought of subsidizing the farm inputs. The main aim was to achieve efficiency and increase food production. In this study, we evaluated farmers' efficiency amidst farm input subsidy programs. The results of the review show that most smallholder farmers are not efficient despite government's effort to improve their efficiency through subsidies. Following this finding that large farmers are more efficient; the study reviewed models that would increase agricultural production. In this study, we evaluated the strengths, weaknesses, opportunities and threats of various models, namely contract farming, cooperative development and land consolidation proposed to increase agricultural production. These models were selected for review because they mimic the farm behaviour of a large farmer.

The paper has revealed that out of the three models, the land consolidation model is relatively a potentially holistic approach, regarding both strengths and opportunities, in addressing efficiency challenges associated with smallholder agriculture. Nevertheless, the model has been revealed to have weaknesses and threats which would require attention in order to achieve its intended benefits.

In order to address the weaknesses and threats as well as make good use of the strengths and opportunities associated with the reviewed models, we would like to recommend a hybrid of land consolidation

model with selected elements of contract and cooperative development models. On one aspect, the model should address capacity building of the smallholder farmers, involving skills development to enhance economic activity of land owners, and enabling them to access economic opportunities arising from the agricultural development initiative.

Equally important is to emphasize on achieving sustainable agricultural development. This should include, among others, integrated farming systems, fertility enhancing practices such as agro-forestry, soil and water conservation – to address cost implications and climate related threats associated with the land consolidation model.

Last, but not least, we recommend an enactment of a regulatory framework to address policy issues and potential legal challenges culminating from the land consolidation initiatives that embrace elements of both contract and cooperative farming arrangements.

CRediT authorship contribution statement

Wisdom Richard Mgomezulu: Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Moses M.N. Chitete:** Writing – original draft, Visualization, Validation, Supervision, Resources, Formal analysis. **Beston B. Maonga:** Writing – review & editing, Funding acquisition, Formal analysis, Conceptualization. **Joseph Dzanja:** Writing – original draft, Supervision, Investigation, Formal analysis. **Patrick Mulekano:** Methodology, Investigation, Formal analysis. **Abubaker Qutieshat:** Visualization, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

References

Abdolshah, H. F., Beshehli, S., & Norouzim, A. (2017). Strategic planning for agriculture section using SWOT, QSPM and Blue Ocean- case study: Eshrag agro-industry company. *International Journal of Agricultural Management and Development (IJAMAD), 8*(2), 149–162. https://doi.org/10.22004/ag.292528

Abreau, D. (1998). On the theory of infinitely repeated games with discounting. *Econometrica, 80*(4), 383–396.

Achmad, M., hartoyo, S., Arifin, B., & Didu, M. S. (2013). Model Policy Design for the Beef Carrlr Ranch Development in South Sulawesi. *Annnual International Interdisciplinary Conference, (AIIC),* 24-26.

AGRA. (2017). *Improvement of Malawi's farm input subsidy program (FISP): Learning from ISP best practices.* Nairobi: Alliance for Green Revolution in Africa.

AGRA. (2023). *Review of Agricultural Subsidy Programmes in Sub Saharan Africa: The Impact of the Russia –Ukraine War.* Nairobi, Kenya: Hub for Agriculture Policy Action. Retrieved from https://agra.org/wp-content/uploads/2023/09/03-HAPA-PB03-Input-Subsidy-Programmes.pdf.

Chibwana, C., Fisher, M., & Shively, G. (2012). Cropland allocation effects on agricultural input subsidies in Malawi. *40,* 124-126.

Chibwana, C., Shively, G., Fisher, M., Jumbe, C., & Masters, W. (2014). Measuring the impacts of Malawi's farm input subsidy program. *African Journal of Agricultural and Resource Economics, 9*(2), 122–134.

Chiromo, J. (2018). *The impact of farm input subsidies on economic efficiency of maize production in Malawi.* University of Cape Town.

Chirwa, E. W. (2007). *Sources of technical efficiency among smallholder maize farmers in southern Malawi.* Nairobi, Kenya: African Economic Research Consortium.

Chirwa, E., & Dorward, A. (2013). *Aagricultural input subsidies; the recent Malawi experience* (1st ed.). oxford: Oxford University Press.

Chirwa, E., Doward, A., Kachule, R., Kumwenda, I., Kydd, J., Poole, N., & Stockbridge, M. (2005). *Farmer organisation for market access.* Principles for Policy and Practice.

Creswell, E. W., & Miller, D. L. (2000). Determining validity in inquiry. *Theory into Practice, 39,* 124–130.

Creswell, J. W. (2007). *Research design: Qualitative, quantitative, and mixed methods approacges* (2 ed.). CA: Sage : Thousand Oaks .

Demetriou, D., Stillwell, J., & See, L. (2013). A New Methodology For Measuring Land Fragmentation. *Computers,Environment and Urban Systems,* 71-80.

Doward, A. R., & Chirwa, E. W. (2010). A review of methods for estimating yield and production impacts. Paper prepared for Malawi Government/DFID Evaluation of Malawi Farm Input Subsidy Programme. London: SOAS, University of London.

Edriss, A., Tchale, H., & Wobst, P. (2004). *The Impact of labour market liberalization on maize productivity and rural poverty in Malawi.* Retrieved from http://www.pasd.uni-bonn.de.

FAO. (2009). *State of food and agriculture.* esa-publications.

FAO. (2009). *State of food and agriculture.* ESA- Publications.

Ghiasi, M., Esmaeilnamazi, S., & Fathi, M. (2020). Role of renewable energy sources in evaluating technical and economic efficiency of power quality. *Technology and Economics of Smart Grids and Sustainable Energy, 1–13.*

GoM. (2007). *Economic report.* Lilongwe, Malawi: Ministry of Economic Planning and Development.

GoM. (2018). *Malawi National Social Support Programme II.* Lilongwe, Malawi: Government of Malawi.

GoM. (2021). *Report on the monitoring of the 2020/2021 affordable input program.* Lilongwe, Malawi: Anti-Corruption Bureau.

Government of Malawi. (2018). *Main report, Malawi population an housing census.* Zomba: National Statistical Office.

Gurel, E., & Tat, M. (2017). SWOT analysis: A theoretical review. *The Journal of International Social Research, 10*(51), 995–1006.

Hamel, J. (1993). *Case study methods* (1st ed.). Newbury Park: Sage.

Hardin, G. (1986). Science 162. In *The Tragedy of the Commons* (pp. 1243-48).

Hassen, T. B., & Bilali, H. E. (2022). Impacts of the Russia-Ukraine War on Global Food Security: Towards More Sustainable and Resilient Food Systems? *Foods, 11*(15), 1-15. Retrieved from https://doi.org/10.3390/foods11152301.

Humphrey, S. (2005). *SWOT analysis for management consulting.* SRI Alumni Association Newsletter.

Hyman, D. N. (1989). *Modern microeconomics: Analysis and application.* Boston: Richard Irvin.

IFPRI. (2013). *Malawi strategy support program: Budget allocation, maize yeild performance, and food security outcomes under Malawi's farm input subsidy program.* Lilongwe, Malawi: International Food Policy Research Institute.

Khalil, C. A., Conforti, P., Ergin, I., & Gennari, P. (2017, June 17). *Defining small scale food producers to monitor target 2.3. of the 2030 agenda for sustainable development .* Rome: food and agriculture organisation.

Lall, P., Norman, D. W., & Langemeier, M. R. (2001). A compratave analysis of productive efficiency among Kansas crop farms: small versus large farms. *Journal of the ASFMRA.*

Lichbach, M. (1996). *The Cooperator's Dilemm. Ann Arbor.* Michegen: University of Michigan Press.

Maganga, A., Edriss, A. K., & Matchay, G. C. (2012). Unexploited profit among smallholder farmers in central Malaw: What are the sources? *International Journal of Applied Economics, 9*(2), 83–95.

Makiyoni, K. (2019). *The role of cooperatives in agribusiness sustainability.* Lilongwe, Malawi: Canadian Development Foundation. Retrieved from https://unctad.org/system/files/non-official-document/ditc-ted-21112019-Malawi-CDF.pdf.

Mankiw, N. G. (2022). *Government debt and capital accumulation in an era of low interest rates.* Cambridge: National Bureau of Economic Research.

Mapemba, L., Mgomezulu, W. R., & Kalua, G. (2019). Analysis of profit effiency of smallholder common bean farmers in Malawi.International association of agricultural economists. 2019 Sixth International Conference. Abuja, Nigeria. Retrieved from https://doi.org/10.22004/ag.econ.295784.

Merriam, S. B. (1998). *Qualitative research and case study applications in education.* San -Francisco: Jossey- Bass.

Mgomezulu, W. R., Machira, K., Edriss, A. K., Pangapanga-Phiri, I., & Chitete, M. (2022). Responding to inefficiencies on smallholder maize farms: Can sustained adoption of sustainable agricultural practices make a difference? *African Journal of Agricultural and Resource Economics, 17*(4), 313–329.

Mishra, A. K., Shaik, S., Khanal, A. R., & Bairagi, S. (2017). Contract farming and technical efficiency: Evidence from low-value and high-value crops in Nepal. *Agribusiness, 8*(2), 462. https://doi.org/10.1002/agr.21533

MoAFS. (2010). The Agriculture Sector Wide Approach (ASWAp). In *Malwi's prioritised and harmonised agricultural development agenda.*

Morse, J. M., & Field, P. A. (1995). *Qualitative research methods for health professional* (2nd ed.). CA: Sage: thousand Oaks.

Muyanga, M., Nyirenda, Z., Lifeyo, Y., & Burke, W. J. (2020). *The futyre of smallholder farming in Malawi.* Lilongwe, Malawi: Mwapatata Institute.

Myroniuk, K., Voznyak, O., Yurkevych, Y., & Gulay, B. (2020). Technical and economic efficiency after the boiler room renewal. *International Scientific Conference EcoComfort and Current Issues of Civil Engineering,* 311–318.

Nguyen, A. T., Dzator, J., & Nadolny, A. (2017). Contract farming, agriculture productivity and poverty reduction: Evidence from Tea Estates in Viet Nam. *Asia Pacific Sustainable Development Journal, 25*(1), 109–145.

Nilsson, P. (2019). The role of land use consolidation in improving crop yields among farm households in Rwanda. *The Journal of Development Studies, 55*(8), 1726–1740. https://doi.org/10.1080/00220388.2018.1520217

Niroula, G. S., & Thapa, G. B. (2005). Impacts and causes of land gragmentations, and lessons learned from land consolidation in South Asia. *Land Use Policy, 22*(4), 358–372.

Nkhoma, A. G. (2011). *Factors affecting sustainability of agricultural cooperatives: Lessons from Malawi.* New Zealand: Massey University. Retrieved from https://mro.massey.ac.nz/bitstream/handle/10179/2889/02_whole.pdf.

Ostrum, E. (2007). *A diagnostic approach for going beyond panaceas [under review].* National Academy of Sciences.

Ostrum, E. (2009). *Analyzing collective action.* Center forthe Study of Institutional Diversity: Arizona State University.

Otsuka, K., Nakano, Y., & Kazuchi, T. (2006). Contract farming in developed and developing countries. *8*(1), 353-376.

Pangapanga-Phiri, I., & Mungatana, E. D. (2021). Adoption of climate-smart agricultural practices and their influence on the technical efficiency of maize production under extreme weather events. *International Journal of Disaster Reduction, 61*(1).

Pašakamis, G., & Maliene, V. (2010). Toward sustainable rural development in central and Eastern Europe: Applying land consolidation. *Land Use Policy, 27*(2), 548–549.

Rehber, E. (2007). *Contract farming: Theory and practice.* Hyderabad, India: The ICFAI University Press.

Reisman, D. (1990). *Theories of collective action. Adam smith's sociological economies.* New York, USA: Palgrave Macmillan.

Schrader, L. F. (1986). Responses to forces shaping agricultural marketing contracting. *American Journal of Agricultural Economics, 68*(5), 1161–1166.

Shawa, A. K., Edriss, A. K., Mangisoni, J. M., & Phiri, M. A. (2007). Tobacco contractual arrangements in Malawi and their impact on smallholder farmers: Evidence from burley tobacco contracts. *International Food Policy Research Institute Working Paper*.

Silva, C. A. (2005). *The growing role of contract Farminf in Agri-food systems development: Drivers, theory and practice.* Rome: FAO Publishing Management Service.

Silva, P. M., Moutinho, V. F., & Moreira, A. C. (2022). Do social and economic factors affect the technical efficiency in entrepreneurship activities? Evidence from European countries using a two-stage DEA model. *Socio-economic Planning Sciences,* 10–26.

Suzuki, L. A., Ahluwalia, M. K., Arora, A. K., & Mattis, J. S. (2007). The pond you fish in detrmines the fish you catch: Ezploring strategies for qualitataive for data collection. *The Counseling Psychologist, 35,* 295–327.

Tchale, H. (2009a). Efficiency of smallholder agriculture in Malawi. *A paper for the World Bank,* 102–104.

Tchale, H. (2009b). *The Efficiency of Smallholder Agriculture in Malawi., 3*(2), 101–105.

Timmer, C. P. (2002). Agriculture and economic development. *Handbook of Agricultural Economics., 2,* 1487–1546.

Usaid. (2020). *Guidance and tools for global food security programs.* Lilongwe: Feed the Future. United States Agency for International Development.

Yin, R. K. (2003). *Case study research : Design and methods* (3 ed.). CA: Sage : Thousand Oaks .

Zeng, S., Zhu, F., Chen, F., Yu, M., & Zhang, S. A. (2018). Assessing the impacts of land consolidation on agricultural technical efficiency of producers: A Survey from Jiangsu Province, China. *Sustainability, 10*(2490). https://doi.org/10.3390/su10072490