

Smallholder Crop Commercialization and Food and Nutrition Security: A Review

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Abstract

The objectives of this review article were to look over the concepts and characteristics of commercialization and identify its drivers and influences on the food and nutrition security status of crop producers. A critical review method was used to address the aforementioned objectives. Books and research articles were sources of secondary data. As a result, while different authors define agricultural commercialization differently, the most acceptable and comprehensive definition is one that defines agricultural commercialization as the processes of agricultural transformation in which product selection and input-use decisions are based on market demand and profit maximization principles. Furthermore, population growth and demographic change, technologies, institutions, risks, transaction costs, asset holding, markets, food habits, and policy are identified as internal and external drivers that influence the performance of commercialization. Agricultural commercialization influences producers' food and nutrition security due to its role as a source of food, income, women's empowerment, employment, and energy. Moreover, this article revealed that the influence of crop commercialization is still mixed and inconclusive; as it has shown both positive and negative effects on smallholder crop producers' well-being. Therefore, in any agricultural development intervention project, there should be a critical scan of the environment to identify agricultural nutrition pathways that could significantly and positively contribute to the nutritional well-being of smallholder crop producers.

Keywords: Agriculture-nutrition pathways; Commercialization; Ethiopia; Food and nutrition security; smallholders

Introduction

Background

Food is recognized as a basic human right, and lack of or inadequate food consumption has serious implications for general body health and well-being, growth, development, and cognitive ability among children, as well as labor productivity [1]. In the coming decades, owing to a growing and increasingly rich and urbanized population, world agriculture will need to undergo major changes to meet future food demand [2]. According to UN estimates, the world population may reach 9.7 billion by 2050. This growth, along with rising incomes (which cause dietary changes more due to protein), is driving up global food demand, which is expected to increase between 59–95 % by 2050 [3].

In doing so, farmers worldwide will need to increase their crop production. Currently, there are about 500 million smallholder farmers worldwide; more than 2 billion people depend on them for their livelihoods [4]. They play a key role in the food security equation by producing 70–80% of the world's food demands, and 90%, 75%, and 97% of the contributions in agricultural outputs for supply in Sub-Saharan Africa (SSA), East Africa, and Ethiopia, respectively [5]. Despite making such contributions, they are among the poorest and most food-insecure people in the world (IFAD and UNEP, 2013; FAO, 2014).

Ethiopia's economy experienced strong, broad-based growth, averaging 10.3% a year from 2006/07 to 2016/17, compared to a regional average of 5.4%. Accordingly, the share of the population living below the national poverty line decreased from 30% in 2011 to 24% in 2016. Despite these positive economic growth trends, Ethiopia is continuing to face the challenges of reducing poverty and ensuring food and nutrition security for all of its citizens. According to the UNDP's multidimensional poverty index, 61.8 percentage of the population lived in severe multidimensional poverty in 2016. The Economist

Intelligence Unit's Global Food Security Index (GFSI), measuring vulnerability to hunger through affordability, availability, quality, and safety in 2018, placed the country in the global ranks of 100 out of 113 countries.

The 2016 Ethiopia Demographic and Health Survey (EDHS) estimated the national prevalence of stunting among children at 38 percentages, the prevalence of underweight at 24 %, and wasting at 10 %. The survey also revealed that the level of chronic malnutrition among women in Ethiopia is relatively high, with 22 percentages of women either thin or undernourished that is, having a body mass index (BMI) of less than 18.5 kg /m². This data indicates the scale of the challenges of meeting Ethiopia's development goals and impacting food and nutrition security.

The food insecurity situation in Ethiopia is highly linked to recurrent food shortages and famine, which are associated with recurrent drought. Droughts and other related disasters (such as crop failure, water shortage, land degradation, limited household assets, and low income) are significant triggers and important factors that increase vulnerability to food security and undermine livelihoods. Rapid population growth, weak institutions, conflicts, high levels of illiteracy, poor health, poor sanitation, etc. were triggers of food insecurity [6].

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In Ethiopia, promoting the commercialization of agriculture is considered a cornerstone of rural development and poverty reduction strategies. Following the strategies, crop development has been implemented via the facilitation of GOs and NGOs with considerable government and donor budget support. As part of a policy to turn millions of poor farmers into surplus producers for local and export markets, the government has been setting aside a sizable portion of its national budget (17%) for agriculture since 2015, which is more than the 10% that African governments committed to allocate to agriculture under the Maputo Declaration of 2003 [7].

Policymakers view commercialization as an essential part of the process of agricultural modernization, specialization, and structural transformation of the economy toward more rapid and sustainable growth. In line with this fact, agricultural services such as extension, credit, and input supply are expanding significantly to support commercial transformation (Gerba, 2018). And recently, Ethiopia has been following and implementing the Agricultural Commercialization Cluster (ACC) approach by budgeting 59.5 billion ETB from 2015–2017. It focuses on selected commodities and districts in Amhara, Oromia, SNNP, and Tigray regions based on their potential, with expected contributions to increased production and productivity, aggregation and storage, agro-processing and value addition, and the end market [8].

However, the status of smallholder commercialization in Ethiopia is very low and is predominantly found in the first phase of commercialization. In 2015, for example, only 15% of the output could be sold, while 67 percentages was consumed by households and 14 percentages was set aside for use as seed input. A small fraction of 4 % was used for animal feed, payment of non-household labour in kind, and other unspecified purposes. Despite having a low level of commercialization at the national level, there are significant variations within the country; there are many districts where the marketed output proportion is reached above 30 % and similarly many districts are found below 10 %. This paper intends to address the following objectives.

Objectives

General Objective

- In general, this article reviews the connections between agricultural commercialization and its generic effects, with a focus on assessing the characteristics of the agricultural commercialization process, determinants, and effects on food and nutrition security.

Specific Objectives

- To review the concepts and characteristics of commercialization and food security
- To review the determinants and effects of agricultural commercialization
- To review the effects of crop commercialization on food and nutrition security status of smallholder crop producers

Literature Review

Conceptual Review of Smallholders Agricultural Commercialization

This section mainly addresses the definition and characteristics of the smallholder agricultural commercialization process. It also deals with the determinants and effects of commercialization at different levels.

Definition of Agricultural Commercialization

Commercialization of agriculture as a process is more than whether or not a “cash crop” is present to a certain extent in a production system. It is not restricted to just “cash crops”: because there is a possibility that the so-called traditional food crops are also frequently marketed to a considerable extent and the so-called cash crops are retained, to a substantial extent, on the farm-for-home consumption [9]. According to Van Braun et al. (1994), commercialization is not necessarily identical to the expansion of the cash economy when there are considerable in-kind transactions and payments with food commodities for land use or labourers. Agricultural commercialization can occur on the output side of production with an increased marketed surplus. However, Pingali (2001) pointed out that commercialization is more than just the marketing of agricultural outputs; since it also involves the substitution of non-traded inputs for traded inputs and the marketing of the household labour supply. The most acceptable and broad definition is drawn from Pingali and Rosegrant (1995), who define agricultural commercialization as “processes of agricultural transformation in which production (product choice) and input-use decisions are based on the principles of market demand and profit maximization.”

Agricultural Commercialization Characteristics

Agricultural commercialization can be defined by examining a number of production system features that changed as the degree of commercialization increased. Pingali and Rosegrant (1995) classify food production systems into three categories: (i) subsistence, (ii) semi-commercial, and (iii) commercial. According to these scholars, the principal difference between the three systems is the purpose of farming. When the subsistence farmers produce only to meet their household requirements, in the semi-commercial system they produce for both household consumption and to sell the surplus in the market, and in commercial production, farmers are produced for sale rather than directly consumed in the household. In semi-commercial or commercial agriculture, the level of farm specialization is increased as a result of (i) the market orientation of farm production and (ii) the gradual substitution of non-traded inputs with traded (or purchased) inputs.

Other characteristics of commercial agriculture are the application of modern technologies, participation in complex marketing chains, and the availability of supporting infrastructure and services [10]. When the level of commercialization is increased, production systems tend to rely more on new technologies and supporting infrastructures such as irrigation, electricity, and formal financial systems. In these categories, products are channelled through private sector agents, including collectors, traders, processors, and exporters. The incremental involvement of private institutions in addition to public service delivery institutions plays a vital role in providing extension services and market information [11].

Mosher (1966) and Abbott (1987) explained that the transformation of peasant agriculture from a subsistence economy to a more commercialized system based on well-developed markets is critical to promoting economic growth and poverty reduction as shown in [Table 1]. They theoretically argued the rationales of agricultural commercialization are: (i) specialization, which raises productivity, expands trade, and raises their standard of living, and (ii) induced demand; which gives farmers an incentive to grow and produce for sale. This increases farmers’ cash income so that farmers form a growing market for domestic industry, and thus consumption by the peasant will develop, resulting in (iii) efficient resource utilization; markets

Table 1: (Source) Characteristics of food production systems with increasing commercialization (Summarized from Goletti, Purcell, and Smith (2003), Pingali (2001) and Pingali and Rosegrant (1995).

| Characteristics | Subsistence System | Semi-commercial System | Commercial System |
|--|--|--|--|
| Farmer's objective | <ul style="list-style-type: none"> • Food self sufficiency | <ul style="list-style-type: none"> • Surplus production | <ul style="list-style-type: none"> • Profit maximization |
| Source of inputs | <ul style="list-style-type: none"> • Household generated (non-traded) | <ul style="list-style-type: none"> • Mix of traded and nontraded inputs | <ul style="list-style-type: none"> • Predominantly traded inputs |
| Production mix | <ul style="list-style-type: none"> • Wide range | <ul style="list-style-type: none"> • Moderately specialized | <ul style="list-style-type: none"> • Highly specialized |
| Marketing | <ul style="list-style-type: none"> • No or very little marketable surplus | <ul style="list-style-type: none"> • Larger amount of marketable surplus | <ul style="list-style-type: none"> • Increased concentration on production for market |
| Income Source | <ul style="list-style-type: none"> • Predominantly Agri | <ul style="list-style-type: none"> • Agriculture & Non Agriculture | <ul style="list-style-type: none"> • Predominantly Non Agriculture |
| Technology | <ul style="list-style-type: none"> • Labor intensive • Undeveloped post-harvest operations • Little agro-processing | <ul style="list-style-type: none"> • Intensification and increased use of modern technology • More capital intensive • Increased use of post-harvest operations • More agro-processing | <ul style="list-style-type: none"> • High-importance of post-production activities • Highly capital intensive |
| Supporting infrastructure and services | <ul style="list-style-type: none"> • Poor transportation infrastructure • No rural electrification • Mostly rain-fed • Weak linkages with research and extension | <ul style="list-style-type: none"> • Improved road infrastructure, but access difficult in many areas • Rural electrification in towns and nearby areas • Irrigation schemes • Greater role of public and private research and extension | <ul style="list-style-type: none"> • Good year-round road access • Rural electrification available to all farmers • Year-round irrigation • Agricultural information, technology, and inputs provided by private firms |

contribute to development by providing a way to allocate resources, ensuring the highest value production and maximum consumer satisfaction. Access to markets can be a way to make use of underutilized resources, (iv) extract funds for industrial development; (v) market agricultural surplus to create capital for investment outside agriculture, and (v) address food insecurity. One of the major roles of agriculture is to ensure a sufficient amount of domestic food production and food security at the household level and also to decrease dependence on external food sources. But with the absence of appropriate markets, farmers' output can't reach the increasing urban population.

Determinants of Commercialization of Smallholders Crop Production

It is categorized as external and internal factors. The external ones are factors beyond the smallholder's control. The internal factors are household specific influencing factors. Some of these factors are briefly discussed below.

Population Growth and Demographic Change

Population growth and demographic changes are considered demand-side driving forces for smallholder commercialization resulting from the urbanization effect of economic growth. A study by Berhanu and Dirk (2008) provides evidence that both urban and rural population growth has a positive impact on food and cash crops. However, it must be noted that population growth may have a negative impact on land access for crop cultivation and may result in land degradation and lower productivity. A study by Afework and Endrias (2016) underlined that urbanization and agricultural transformation would equilibrate the demand for agricultural land in the long run. Hence, determining whether population growth has a positive or negative impact is difficult.

Technologies

Though in the short run increased commercialization could be achieved without a change in agricultural technologies, in the long run, it is an indispensable fact; demanding resource-saving and yield-enhancing technological innovations in cash and food crops by smallholder commercial producers is mandatory (Von Braun et al., 1994). Fafchamps (1992) and Jayne (1994) argued that, under loosely integrated food markets, focusing on technologies biased toward cash

crops may not bring the intended boost in cash crop production as poor households are still using a significant share of their resources for food crops. Thus, in addition to the improvements in cash crop technologies, there have to be resource-saving innovations in food crops that could guarantee higher food production using fewer resources. According to the same source, productivity increases in both cash and food crops using technologies are crucial, even if a country's objective is to increase cash crop production alone.

Institutions

Institution is defined as the rules of the game that influence human behavior and provide structure for human interactions that, in turn, affect economic performance, growth, and development. It is classified as formal or informal. Identifying and briefly discussing institutional environments and institutional arrangements help us to understand clearly the role of institutions in smallholder commercialization. Institutional environments refer to the fundamental political, social, and legal ground rules that establish the basis for production, exchange, and distribution. For instance, rules governing property rights and the right to contract fall under this category. Institutional arrangements, on the other hand, refer to relationships between economic units that define how these units can cooperate or compete, such as contracts, auctions, exchanges, co-operatives, and so on. According to Glover (1994), the distributional benefits of agricultural commercialization, access to commercialization opportunities, and sharing of commercialization risks are functions of institutional arrangements. The roles of both formal and informal institutions in the smallholder commercialization process are discussed below.

Formal Institutions

Formal institutions facilitate the playing ground for economic actor that contributes to the overall smallholder commercialization process. For instance, a study by Gabremadhin (2001) on grain markets in Ethiopia showed how the scope of spatial and temporal arbitrages in grain marketing is limited due to a weak legal system for contract enforcement and the demand for personal inspections of the grades and quality standards of each grain delivery. Such poor institutional arrangements result in higher transaction costs of trade that must be paid by producers and consumers, which, in turn, results in a wide spread between farm gate and retailer prices. Lerman (2004)

emphasized the role of institutional arrangements, such as agricultural marketing and service cooperatives, in linking smallholders with input and output markets.

There are also institutional arrangements like sharecropping, interlocked contracts between labor and credit, and land leases adopted by smallholder farmers to solve problems related to market failure and asymmetric information. Rural financial institutions are also relevant in facilitating access to credit, which plays a vital role in the process of commercialization by allowing smallholder farmers to assume risks associated with commercial crop production [12]. Contract farming is also a risk-sharing institutional arrangement and is expected to promote the production of cash crops by smallholders. Contracting can also serve as an institution to overcome barriers to entry, although certain measures need to be taken to ensure contract enforcement and reduce transaction costs. One important point in this regard is whether contract agreements could be flexible or adjustable within a given limit when unanticipated external shocks occur.

Informal Institutions

Informal institutions, including values, norms, sanctions, taboos, cultures, traditions, etc., have an equivalent contribution to formal institutions in facilitating or hindering a smallholder commercialization process (i.e., the production and marketing decisions of producers). Socio-cultural and religious factors determine the consumption preferences of households and are, by implication, considered motivating or demotivating factors for household commercialization. Pender et al. (2006) explained the influence of religious fasting on prospects for commercial livestock production for the domestic market. The role of informal institutions in governing market exchange is paramount, particularly when formal institutions are missing.

Risks

In most rural economies, land, labor, financial, and insurance markets are either non-existent or imperfect. Under such circumstances, risk-averse semi-subsistence households tend to produce more consumption commodities, which are market-risky subsistence goods. This situation holds particularly when the effects of shocks are triggering changes in household consumption more than in income [13]. The higher the share of risky crops in the household's total consumption, the more household consumption is influenced by market shocks. In such cases, households tend to devote fewer resources to commercial commodities and more resources to food production for domestic consumption. In a situation where the demand for home-consumed risky crops is largely affected by changes in household income due to market shocks, households prefer to be self-sufficient in the production and consumption of risky crops rather than allocating resources to cash crops.

Transaction Costs

Market participation demands a cost. There are physical marketing costs like transport and storage costs, as well as related costs related to searching and processing information, negotiating contracts, monitoring agents, and enforcing contracts [14]. Generally, transaction costs can be classified into two types: fixed and proportional. Fixed transaction costs are high and household- or commodity-specific; they are not varied with the volume of transactions, like the costs associated with searching, monitoring, and screening, which basically discourage smallholder participation in markets. While, proportional transaction costs are costs that vary proportionally with the volume of the transaction,

There is no single public or private intervention that can reduce the cost of transactions because specific types and levels of transaction costs vary by households, locations, and commodities transacted (Pingali et al., 2005). So it is essential to focus on a variety of integrated arrangements that fit into the existing realities on the ground. Some of the arrangements are contract farming. The development of smallholder organizations aimed at reducing marketing costs and facilitating market information provision via improved telecommunications [15].

Asset Holdings

One of the determining factors in the smallholder commercialization process is household asset holdings that serve both in terms of capital for production and as a buffer to mitigate any production- and market-related shocks. The two principal arguments for household asset holding as a determining factor in smallholder commercialization are the production and consumption-side perspectives. From the production side, assets like land, oxen, farm implements, and human capital are essential for marketable surplus production at the smallholder level. Larger farm holdings enable households to exercise economies of scale by adopting modern technologies. These and other assets for surplus production become critical, especially when markets for land and oxen power are completely missing or less functional. On the consumption side, reductions in yields or unfavourable market prices may affect household income and consumption adversely. Under such circumstances and in the absence of credit markets for consumption, asset liquidation may be the only option available to households to smooth their consumption. Recently, human capital, including education, experience, skills, capabilities, etc., has been considered the most pertinent element for the success of commercializing smallholder agriculture.

Markets and their Integration

Successful agricultural commercialization demands the existence of low-cost, well-integrated, and efficient rural markets. Resource allocation to cash crops substantially diminishes in the absence of food markets since the aim of food self-sufficiency at the household level takes prominence [16]. Barrett (2008) also indicated that well-integrated markets have a significant contribution to household market participation and better returns from technology adoption.

Food Habits

It is considered a limiting factor for farmers to be commercialized, especially in situations where farmers have small farm sizes and unreliable food markets (Von Braun, 1994; Pender et al., 2006). Even if markets exist for some food commodities, preferences to consume one's own production are sometimes cited as justifications for self-sufficiency goals.

Policy

A smooth transition from subsistence to commercial agriculture requires appropriate government policies. Indicated areas for government interventions, according to the same authors, are investments in the development of rural markets, transportation and communication infrastructure, research and extension, the development of a liberalized capital market, and the provision of market information, credit and extension services, health, sanitation, and nutrition to rural households. Again, Pingali (2006) summarized the role of government policy as investing in rural infrastructure and undertaking institutional reforms by emphasizing the policy environment for higher participation of the private sector in the development of the rural economy. North (2000) placed emphasis on influencing the role of government in specifying

property rights and enforcing contracts to promote specialization and reduce the costs of market exchange.

Effects of Agricultural Commercialization

The effects of agricultural commercialization can be positive or negative. These effects are generally grouped into three major categories: (i) effects on households, (ii) socioeconomic effects, and (iii) environmental effects.

Household Effects

Commercialized agricultural production is expected to enhance yield, increase farm household income, improve food security, and build farmers' resilience to shocks (Van Braun and Kennedy, 1994). Commercial production can contribute to food security by increasing surplus food production or by increasing the income available to purchase food, and Kuijpers (2018) aimed to examine the impact of commercialization on rural households' food security and showed that commercialization has a positive effect on smallholder farmers' food security through an increasing pattern of food consumption expenditure.

Though it is not specific to Ethiopia, study results indicated that the poor also have a chance to improve their welfare through the implementation of commercialization. Furthermore, staple crops have the potential to significantly improve income and food security. According to Asante et al. (2016), the impact of commercialization on the welfare of Ghanaian maize-growing farmers discovered that increases in maize sales result in increased purchases of food items required meeting household food security needs. The study results in Zambia also showed horticulture commercialization could increase income by over 300% for female-headed households, those cultivating less than one hectare, and the extremely poor [17].

A number of publications confirmed that increased income and savings generated by commercialization are likely to lead to improved household well-being; increased household income has been linked to improved children's nutritional status, better health care, and improved housing conditions. As a sample, Leykun and Jemma's (2017) and Kuijpers's (2018) study results in Ethiopia confirmed this argument. The combination of increased income and well-being makes farmers more resilient to risks and shocks, which affect only some individuals or households in a locality but not others [18].

On the negative side, commercial monocropping farming systems often expose farmers to price fluctuation and exploitative contractual arrangements, which can intensify the prospect of increased indebtedness, and further deterioration of farmers' livelihoods. A market structure with only one or a few outlets creates farmers' dependency. Adequate infrastructure and strong institutions are pertinent in reducing transaction costs, improving market integration, and reducing price volatility [19].

Commercial mono-cropping is also associated with the intensive use of synthetic pesticides to control pests and diseases, leading to an increase in household health costs. Agriculture-related health losses account for up to 25 percent of all disability-adjusted life years lost and 10 percent of deaths in low-income countries. From a gender perspective, commercialization may adversely affect intra-household income distribution. A study in Kenya on farm households who shifted their production from maize to sugarcane out-growers showed that higher income from cash crops in the lump-sum payments was usually spent within a short time and more on non-food commodities. Ultimately, it affects household food and nutrition security. This

problem was exacerbated by the absence of well-integrated financial systems that promote savings from cash-crop income [20]. The positive and negative influences of crop commercialization at household and individual levels were further discussed in session 2.4.2.2. The empirical evidences presented in detail in this section, focused on the effects of commercialization on food and nutrition security.

Socio-economic Effects

Agricultural commercialization can help to expand employment opportunities in rural areas, stimulate growth in non-agricultural sectors of the rural economy, and reduce the rural-urban income gaps. At the community level, labour-intensive operations required by cash crop production can absorb surplus labour and reduce rural-urban migration. Commodities that need processing within the village before selling offer more jobs for community members. A study by Salau et al. (2018) examined the effects of agricultural commercialization at the household level on fertilizer use and demand for hired labor in Nigeria. Results revealed that commercialization had the potential to increase demand for fertilizer usage and hired labor among maize farming households. This empirical result confirmed the theoretical assumption of the role of commercialization in increasing rural employment and the impact on input suppliers. Increased production and more market participation have a direct and positive impact on actors along the value chain, such as input suppliers, output traders, transporters, processors, financiers, etc. This is due to the economies of scale emerging from increased demand and supply that tend to decrease the average cost per unit of operation.

At the national level, commercialized agriculture contributes to the economy via four channels. First, the commercialization of agriculture creates rural markets for agro-inputs and rural supply bases for urban industries and consumers, and it boosts investment in agricultural modernization and the distribution of farm products through trade. Second, when more farms are commercializing, this generates more income, employment opportunities, and economic growth, leading to a reduction in rural poverty and, hence, in overall poverty levels. Third, increased revenue from the agricultural sector may be associated with increased demand for goods and services from the manufacturing and service sectors, stimulating their growth. Fourth, the linkage of smallholder commercialization to export markets may enhance foreign currency earnings.

Commercial farming has also been criticized for widening regional income inequalities and productivity gaps. Commercialization attracts investors and new migrants to the growing areas, resulting in competition for resources, displacement, social conflict, and the loss of cultural identities. Agricultural commercialization can also generate socioeconomic differences by modifying access to inputs, finance, and technologies among farmers, thus creating new forms of class disadvantage and poverty.

Environmental Effects

Agricultural commercialization can have significant environmental consequences, particularly if appropriate policies and legal frameworks to protect the natural resource base are not adopted and enforced. Expanding the area of crop cultivation can result in widespread deforestation. Agricultural intensification also generally leads to greater reliance on agrochemical inputs, specifically fertilizers, pesticides, and herbicides, which can result in serious environmental consequences such as land and water degradation, biodiversity loss, etc. However, the net effect of agricultural commercialization on the environment will vary depending on the specific circumstances under which it takes place.

Effects of Agricultural Commercialization on Food and Nutrition Security

Definition and dimensions of food and nutrition security

The World Food Summit defined food security as existing ‘when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life’. However, households are said to be food and nutrition-secure when food security is attained and combined with adequate feeding and care practices, health services, water, and sanitation. The widely accepted definition agreed upon at the World Food Summit points out that there are four key dimensions of food security.

Food availability refers to the physical presence of food at various levels, from the household to the national level, not its affordability. Such food can be supplied through household production, other domestic output, commercial imports, or food assistance. It is achieved when sufficient quantities of food are consistently available at different levels [22].

Food access refers to the household’s ability to acquire adequate amounts of food. The essence is that food may be available but not accessible to certain households. It may be through production, exchange, or transfer. In earlier theories, the food security problem was a result of shortages in food availability. However, Amartya Sen developed the entitlement approach that focused on household access to food. According to him, people are starving because of a lack of access rather than the availability of food. In a sense, income, or purchasing power, is the most limiting factor for food security [23].

Food Utilization: The definition of food security speaks of “sufficient, safe, and nutritious food for an active and healthy life.” An active and healthy life requires, at the cellular level, that the person’s body is able to extract and use the nutrients in the food consumed. Thus, how the food is prepared (which affects its nutritional value) and the health status of an individual (which affects the body’s ability to absorb and use the nutrients) affect food security. Efforts to provide safe drinking water; control, treat, and prevent disease; and offer improved nutrition education all contribute to food security through improving food utilization and, in some cases, may contribute more to food security than increasing local food production [24].

Food stability: The stability of access to adequate food at all times, independent of shocks (such as economic or climate-related crises) or cyclical patterns. This includes issues of seasonal food insecurity, such as the agricultural period before harvest.

The relation between the first three dimensions is unidirectional: utilization requires accessibility, which requires availability, but it is not true the other way around. Food security results not only from producing enough food but also from physical and economic access to food and from good health conditions that allow the body to absorb energy intake.

Food security cannot be achieved without nutrition security, and vice versa. Nutritional security is an essential element of food security. Experts have recognized this connection and are increasingly using the term “food and nutrition security,” which merges both concepts to emphasize both the food and health requirements for populations.

Effects of Agricultural Commercialization on Food and Nutrition Security

Agriculture-Nutrition Pathways

Literature has noted several pathways through which agriculture

can influence nutrition. They identified six pathways through which agricultural interventions can impact nutrition: (1) food access from own-production; (2) income from the sale of commodities produced; (3) food prices from changes in supply and demand; (4) women’s social status and empowerment through increased access to and control over resources; (5) women’s time through participation in agriculture, which can be either positive or negative for their own nutrition and that of their children; and (6) women’s health and nutrition through engagement in agriculture, which will have either positive or negative impacts, depending on exposure to toxic agents and the balance between energy intake and expenditure; The pathways are illustrated below [25].

Pathway 1: Agriculture as a source of food

• Agriculture ◊ Own production ◊ Household access to calories/micronutrients ◊ Individual intake ◊ Nutrition outcome

Pathway 2: Agriculture as a source of income for food and non-food expenditure

• Agriculture ◊ Income ◊ Food and non-food expenditures ◊ Household nutrient availability ◊ individual nutrient intake ◊ Other nutrition-relevant goods and services ◊ Nutrition outcome

Pathway 3: Food prices affecting food consumption

• Supply and demand factors (policies, taste, prices) ◊ relative prices of various food items ◊ household calories/micronutrients ◊ individual intake ◊ nutrition outcome

Ex.: Lower food prices resulting from increases in food supply: A decrease in food prices leads to an increase in de-facto income. This could lead to improvements in nutrition if this means households are actually purchasing more nutritious foods

Pathway 4: Women in agriculture and intra-household decision-making and resource allocation

• Agriculture ◊ Women in agriculture ◊ Women’s decision-making power ◊ Intra-household resource allocation ◊ Nutrition outcome

Pathway 5: Female employment in agriculture and child care and feeding

• Agriculture ◊ (Female) Employment ◊ Caring capacity/practice ◊ Nutrition outcome

Pathway 6: Women in agriculture and women’s nutritional and health status

• Women in agriculture ◊ Energy expenditure ◊ Female adult BMI

In general, the nutritional effects of agricultural commercialization are mediated through a set of complex factors at the community, household, and individual levels. It depends on various exogenous factors, such as population demographics, the availability of new technologies, government policies, infrastructure development, and the health environment, which can affect the farmer’s decision to participate in market-oriented production. On the other side, commercialization of the production process has also had outcomes, either positive or negative, along different pathways for the nutritional status of the producer family.

Effects of Commercialization on Food and Nutrition Security

It is argued that better access to food depends on income growth, in particular for most African smallholders, where agriculture is the main source of income. This implies that improving the degree of market participation can have a big impact on the status of farmers’ food security.

Similarly, Van Braun (1995) also argued that commercialization has a direct effect on the household income level, which possibly leads to an increase in food and non-food expenditures.

A study done by Ismael (2017) on the outcomes of smallholder market participation in rural household food security in the major coffee-growing districts of southwest Ethiopia indicated that commercialization has a positive effect on food security. A national study done in rural Ethiopia provided evidence that households with higher levels of commercialization have shown an increasing pattern of food consumption expenditure. Another national study in Ethiopia by Kuijpers (2018) on the effects of commercialization on farm household dietary intake confirmed there is a positive consequence of commercialization on dietary diversity, which is a proxy indicator for nutrition security. To look at the commercialization effect at the intra-household level, Leykun and Jemma (2017) have done a study in central Ethiopia aimed at examining commercialization effects on child nutrition measured using anthropometric indicators. The results revealed that farm households with a high degree of market participation are better off in terms of child nutrition outcomes than those with a low degree of participation.

In an Ogotuet et al. (2017) study in Kenya about the effect of commercialization on food security measured in terms of calorie and micronutrient consumption at the household level, the result showed a positive effect on food security and dietary quality because it allowed the households to purchase more food from the market. Awotide et al. (2016) study results in Nigeria revealed that an increase in the farmers' welfare is conditional on the probability of the farmer participating in the rice output markets. In the same study area with different crops, Emilola (2015) has done a similar study, and its result also indicated there was a significant and positive relationship between the level of commercialization and the status of food security at the household level.

At the farm household level, increased commercialization is typically accompanied by specialization in the production of a few profitable crops or livestock products. Specialization leads to reduced farm production diversity and declining levels of household food self-sufficiency. With advancing agricultural transformations, farm production diversity gradually becomes less important for household dietary diversity until household food consumption is largely decoupled from on-farm production in a well-integrated rural market economy. However, African farmers, especially in remote areas, continue to face severe market failures that may not allow them to separate farm production decisions from household consumption decisions. This non-severability rationalizes maintaining high farm production diversity at the (potentially high) cost of sacrificing profits to mitigate consumption risks. In this regard, a study by Degye et al. (2012) provided evidence that crop diversification and the food security status of households have shown a significantly strong positive link. It means crop diversification has influenced daily calorie intake and dietary diversity. A study by Ecker (2018) in Ghana also showed that farm production diversification was strongly associated with increased household dietary diversity.

A study by Mukuka and Kuhlitz (2016) deals with the impact of agricultural diversification and commercialization on child nutrition in Zambia. Results revealed that commercialization has a negative effect on short-term nutrition outcomes, leading to underweight and wasting. This could indicate that in areas with less everyday access to a range of food items, capital accumulation may not help to avoid deficiencies in child nutrition. Results indicated that diversification and commercialization at the household level matter for the nutritional

status of children. A study by Mango et al. (2018) on the role of crop diversification in improving household food security in Malawi concluded that crop diversification is one viable option in smallholder farming that can ensure the establishment of resilient agricultural systems that can contribute significantly to household food security. A study by Kibrom et al. (2015) on the link between production and consumption diversity with household-level data from Indonesia, Kenya, Ethiopia, and Malawi showed that on-farm production diversity is positively associated with dietary diversity in some situations, but not in all. When production diversity is already high, the association is not significant or even turns negative because of the foregone income benefits of specialization.

Scholars argue that the types of crops produced—food crops and non-food crops—will have an influence on nutrition security. Especially in rural areas with a market problem, the allocation of farmland for non-food cash crops may decrease household food supply unless the households have other sources of off-farm income that could be used for food purchases. The Vietnam study, which sought to investigate how smallholder vegetable production can improve child diet quality, yielded evidence that vegetable production is significantly associated with children's dietary diversity outcomes. Even when they are faced with limited access to product markets, they could have gotten the chance to consume the vegetables grown in their households, thereby improving their diets.

Kennedy and Cogill (1987) argued that who manages the income generated from crop commercialization influences expenditure patterns that affect food and nutrition security status at the household and individual levels. A study by Ogotu et al. (2017) in Kenya analyzed the effects of commercialization on gender roles and examined who within the household controls the income from farm output sales by the type of crop. Incomes from typical cash crops are often controlled by men, whereas for income from food crops, the situation is more diverse. As a result, male control of income is associated with lower consumption of calories, vitamin A, and zinc from purchased foods. In other words, women spend more on food and dietary quality than men. A study done by Randolph (1992) in Malawi also showed that agricultural commercialization exerted a negative influence on child nutrition, with higher-income households preferring to spend more of their cash crop income on non-food items. The study done by Bouis and Haddad (1990) on sugarcane-producing households in the Philippines, argued that raising household incomes appeared to be a necessary but not sufficient condition for substantially improving child nutrition.

Another concern is that increasing women's engagement in agriculture could negatively affect nutrition by limiting the time available for nutrition-improving reproductive work. A study by Komatsu et al. (2018) titled "Does women's time in domestic work and agriculture affect women's and children's dietary diversity?" Evidence from Bangladesh, Nepal, Cambodia, Ghana, and Mozambique revealed that working long hours in agriculture is negatively associated with women's dietary diversity score in non-poor women, but is positively associated with poor women's dietary diversity and poor children's minimum acceptable diet. This suggests that agriculture as a source of food and income is particularly important for the asset poor. This result confirmed that women's time allocation and nutrition responses to agricultural interventions are likely to vary by socioeconomic status and local context.

This review paper found that the effects of smallholder crop commercialization are mixed. The successes and failures of crop commercialization outcomes highly depend on the types of crops (food

and non-food) in low-market integrated areas, diversification choices (maintenance of subsistence production), their economic backgrounds, the control of production and income, the allocation of household labor, etc. As Goletti et al. (2003) emphasized in their review paper, the presence or absence of a network of functional value chains could play a vital role in the development of agricultural commercialization.

Conclusion

The debate over the effects of agricultural commercialization, despite its recognized potential for increased household incomes in low-income agrarian economies, is centered over food security concerns. The optimistic view is that agricultural commercialization enhances productivity, generates income, and increases food availability and affordability, thereby leading to an improvement in the health and nutritional status of the producers. However, as noted by Von Braun and Kennedy (1994), it is also widely argued, commercialization of subsistence agriculture reduces, or may have a chance to negatively affect food security of the community, household or individuals that resulting in a deterioration of the nutritional status of the poor. Agricultural commercialization may limit women's access to resources; unequal access to labor and inputs means that women's plots often achieve lower yields than men's in addition to limit to control over household income, consequently nutritional benefits of the households may not be realized. Again, it is capitalized as the low inputs accessed by women leads low output (lower yields) and differences between men and women in expenditure patterns trends using the income generated from sales of produce affects food and nutrition security of the households. Commercialization may also increase women work load, thus affecting the well-being of women themselves and their children. The type of crops commercialized being food or non-food crops and production diversity may also have considerable influence on improving food and nutrition security as a result of affecting food availability and dietary diversity.

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None

Conflict of Interest

None

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