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Research Article

Major Cereal Crops Production in South Omo Zone, Southern Ethiopia

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ABSTRACT

Increasing agricultural production and productivity require fostering the linkages between the agricultural and non-agricultural sectors that are growing in agriculture do not occur without non-agricultural sectors. The production and productivity of the major cereal crops in South Omo Zone is very low in relation to the land coverage due to poor agricultural technology utilization by the producers and low skill on-farm management practices. To solve these problems and increase production and productivity, strong farmers training centers and research extension system is important. The study was conducted in Debub Ari, Malle, Bena- Tsemay, Hammer, and Dasenech Districts of South Omo Zone. The major cereal crops grown in the area are maize, sorghum, teff, wheat, barley, and finger millet.

Keywords: Production; Productivity; Area coverage; Inputs used; Disease; Pests

INTRODUCTION

Agriculture is considered as a strong option and fundamental instrument for spurring growth and sustainable development, poverty reduction, and enhancing food security in developing countries like Ethiopia. Agriculture employs more than 65% of Africa's productive labor force [1] and the sector has been identified as the main source of income for most rural households the continent. Africa in general and Sub-Saharan Africa in particular ranks high in the world in terms of the proportion of people living in poverty, and agriculture has been identified as one of the potentials for reducing poverty and promoting economic growth and development in the region [2]. However explained that there is the need to improve the production and productivity of the sector for it to have higher impacts on the aggregate economic indicators and ultimately to reduce poverty.

Ethiopia is one of the rising economies in sub-Saharan Africa with a median GDP increase rate of 8.3% consistent with the annum and the agricultural sector has been a dominant contributor having a median of 45.4% to the overall GDP within 2002 and 2011 [1]. Agriculture is the core component and driver for Ethiopia's growth and long-term food security. The contributions are high: 15 to 17 percent of the Government of Ethiopia's expenditures are committed to the sector. Agriculture directly employs 80 percent of the total population, 43 percent of gross domestic product (GDP), and over 70 percent of export value [2].

These include agriculture's contributions to socio-economic development through income growth, food security, household livelihoods, poverty alleviation, gender empowerment, and environmental sustainability [3]. Particularly in Ethiopia, smallholder farmers cultivate approximately 95 percent of the total area cultivated and produce more than 95 percent of the total agricultural output [4]. The major part of the sector consists of smallholder farmers operating on less than 2 hectares of land. On the other hand, the productivity of the sector was and is almost stagnating over the last decades, e.g. for cereal crops, it is approximately 1.2 tons/ha.

Agriculture is the most important sector of the Southern Nation Nationality and Peoples' Regional State of Ethiopia's economy and it will continue to play important role in the overall economic development of the region. However, the agricultural production system in the region is at its subsistence level. The livelihood of over 93% of the people of the region depends on it, level and food insecurity problems are increasing at a shocking rate [5]. Moreover, rapid natural resource degradation is prevalent. Also, Agricultural production activities in the country as a whole and in regions, in particular, have been taking place under widely varying dynamic contexts such as physio-graphic, agro ecology, climate, and soil conditions. The

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success in the agricultural sector is then strongly influenced by topographic settings, degree of human interference, and underlying biophysical features.

The food insecurity problems in the region caused by complex factors ranging from natural ones such as recurrent drought, degradation of natural resources, lack of appropriate technologies, weak institutional support, and lack of alternative employment. Also, farming practices brought disturbances to the ecosystems particularly on soils by disrupting the stable natural biochemical processes of the nutrient cycle, causing rapid nutrient depletion [6] and attributing to changes in the landscape characteristics.

Six major cereal crops (maize, sorghum, tef, wheat, finger millet, and barley) contributing the major part of crop production in Southern Ethiopia in general and South Omo Zone in particular. Other important crops grown in the Zone, like root and tubers, pulses, fruits, and vegetables play their great role in food security in the area. Oil crops like Sesame, ground net, and Sunflower are an important source of cash income for the households. So; this paper highlights the production of major cereal crops in the South Omo Zone of Southern Ethiopia.

MATERIALS AND METHODS

The study was conducted in Five Districts (Malle, Bena-Tsemay, Hammer, Dasenech, and Debub Ari,) of South Omo Zone. The districts were selected purposively based on crop production from eight districts found in the Zone. From these eight districts, one agrarian from two agrarian districts and two pastoralist districts from four pastoralist districts were selected by probability sampling respectively, whereas the two agro-pastoralist districts were taken as they are purposive because there are only two agro-pastoral districts in the Zone. The study was conducted by agricultural economics and gender issue researchers of Jinka Agricultural Research Center. Before starting the study, the agricultural economics and gender issue researchers' team made a short discussion on the preparation of a checklist that helps to cover the study areas in accordance with the objective of the study.

Based on the checklist in collaboration with each district Agricultural and natural resource management office data were collected from previously documented hard and soft copy materials with the help of crop extension and protection experts as well as from the Zonal office from the year (2005/2013-2009/2017) onwards.

RESULTS AND DISCUSSION

Trends in the area coverage of major cereal crops

The majority of farmers in Ethiopia in general and in the study area in particular are smallholder farms. These farms, though small, are often fragmented, produce mostly for own consumption, and generate only a small marketed surplus [7-10]. Of the total arable land cultivated annually, cereals occupy the greatest proportion of area coverage accounting for about 81.27 % of the total acreage of all grain crops in Ethiopia and it also covers the highest area in the study Zone [11,12]. Among the major cereals, maize accounts for the largest acreage followed by sorghum, wheat, teff, barley, and finger millet. Figure 1 below shows the percentage of area coverage under major cereal crops in five consecutive years (2005/2013-20092017).

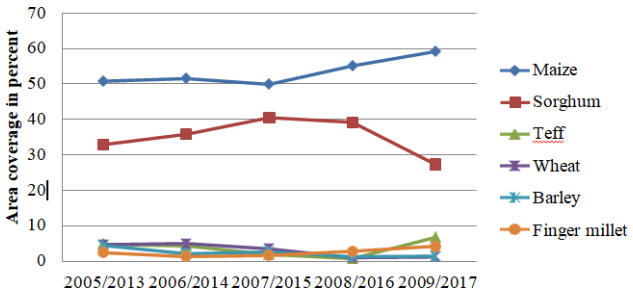

Figure 1: Area coverage of major cereal crops in percent.

As shown in Figure 1 above, out of the total area under major cereal crops in the year 2005/2013, the area under maize, sorghum, teff, wheat, barley, and finger millet was 50.8%, 32.9%, 4.8%, 4.7%, 4.4%, and 2.4% respectively. In 2006/2014 the area of maize, sorghum, and wheat increased to 51.5%, 35.8%, and 5%, while the area of teff, barley, and finger millet decreases to 4.3%, 2.1%, and 1.3% respectively. In 2007/2015 the area of maize, teff, and wheat decreased to 49.9%, 1.9%, and 3.5% while the area of sorghum, barley, and finger millet increased to 40.5%, 2.6%, and 1.6% respectively. From 2008/2016-2009/2017 the area under maize, teff, wheat, barley and finger millet increased from 55.1% to 59.2%, 0.7% to 6.7%, 1.01% to 1.2%, 1.22% to 1.4% and 2.8% to 4.2%, while only the area under sorghum decreased from 39.17 to 27.3 respectively.

Trends in the production of major cereal crops

Cereal crops account for the highest share of the farming system for household's production and consumption activities. Only five major cereals (barley, maize, sorghum, teff, and wheat) account for about 70 percent of area cultivated and 65 percent of output produced [13-16]. The contribution of cereal crops to the national income is also high. According to the available estimates, cereal contribution to agricultural Gross Domestic Product (GDP) is about 65% [9]. Figure 2 below shows the production of major cereal crops in the study area from 2005/2013 to 2009/2017.

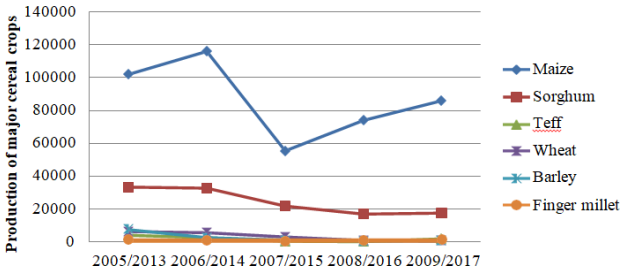

Figure 2: Production of major cereal crops.

As shown in Figure 2 above the production of major cereal crops maize, sorghum, teff, wheat, barley, and finger millet were 102006.5 tones, 33349.8 tones, 4157.32 tones, 6410.8 tones,

7511.4 tones, and 1317.3 tons respectively in the year 2005/2013. In 2006/2014 only the production of maize increased to 116031.1 tones, while the production of sorghum, teff, wheat, barley, and finger millet decreased to 32763.39 tones, 2658.99 tones, 5696.55 tones, 2624.4 tones, and 782.5 tons respectively in the production years.

Trends in the productivity of major cereal crops

The national average grain yield of cereals in Ethiopia is relatively low amounting to about 1.7 t ha-1 for tef production 2.1 t ha-1 for barley production, 2.7 t ha-1 for wheat production, 3.8 t ha- 1 for maize production, 2.5 t ha-1 for sorghum production, and 2.8 t ha-1 for rice production in 2016 (CSA, 2017). This, amongst others, is due to the widespread use of low yielding varieties coupled with unimproved traditional practices that ultimately contribute to the low national average yield of major cereal in the country. Figure 3 below shows the productivity of major cereal crops in the study area from 2005/2013 to 2009/2017.

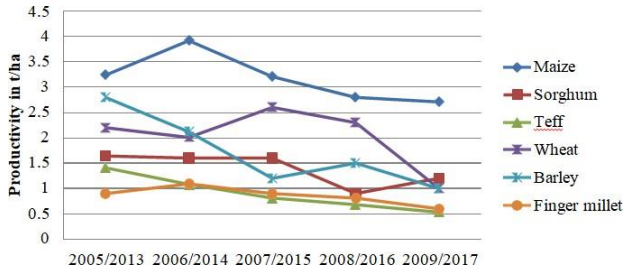

Figure 3: Productivity of major cereal crops in t/ha.

As shown in Figure 3 above the productivity of major cereal crops maize, sorghum, teff, wheat, barley, and finger millet were 3.24t ha-1, 1.64t ha-1, 1.41t ha-1, 2.2t ha-1, 2.8t ha-1, and 0.9t ha- 1 respectively in 2005/2013. In 2006/2014 only the productivity of maize and finger millet increased to 3.92 t ha-1 and 1.09 t ha-1 while the productivity of sorghum, teff, wheat, and barley decreased to 1.6t ha-1, 1.08t ha-1, 2.01t ha-1, and 2.12t ha-1 respectively. From 2008/2016-2009/2017 only the productivity of sorghum increased from 0.9t ha-1 to 1.2t ha-1 while the productivity of maize, teff, wheat, barley, and finger millet decreased from 2.8t ha-1 to 2.71t ha-1, 0.68t ha-1 to 0.53t ha-1, 2.3t ha-1 to 1.0t ha-1, 1.5t ha-1 to 1.0t ha-1 and 0.81t ha-1 to 0.6t ha-1 respectively.

Source and utilization of inputs for major cereal crops

Estimates of market demand for agricultural inputs in Ethiopia are based entirely on official projections that are developed at the local (kebele) level and then transmitted through official channels to zonal and regional levels, after which they are aggregated nationally to produce estimates of the type and quantity (but not preferences for specific varieties or traits) of seed that needs to be supplied in the coming season [10]. Yet, shortcomings in seed quality and timeliness of delivery have been longstanding issues in Ethiopia. Poor cleaning, broken seeds, low germination rates, and the presence of mixed seeds have been reported in ESE- supplied seed (DSA 2006). In addition, reports are common of seed being distributed after the optimal planting time or of varieties being distributed that are not appropriate to changes in farmers' expectations of seasonal weather conditions at the local level. Above indicates, in the study area producers' uses the well-known inputs like seed and fertilizer in which some of the seeds they utilize were from a government source and the majority of the seed were from local or farmers themselves. Most of the time they use the improved seed for cereal crops like maize, sorghum, and teff.

Chemical fertilizer is a more obvious private good than seed, also possesses several features that complicate early stages of market development. On the demand side, the cost of creating fertilizer markets is high where final consumers are widely dispersed geographically, or where their small landholdings and limited cash resources mean that they purchase only small quantities of fertilizer that are more costly for retailers to sell. Furthermore, in rainfed areas, fertilizer consumption is highly seasonal (a two to three month market window), and year-to-year fluctuations in rainfall patterns contribute to high inter-year variability in demand for fertilizer, with corresponding risks to dealers of high carryover stocks from year to year. Most of the time they use fertilizer for cereal crops like maize, teff and wheat, which is below recommended rate.

Diseases and pests of major cereal crops and their controlling methods

Crop production and productivity are mainly affected by biotic factors. Among the biotic factors economically important endemic diseases and insects pests which result in huge losses of yield are common problems in cereals. Diseases and insect pests attacking cereals under field and storage conditions have been identified in below. Diseases and insect pests affecting the major cereal crops are Maize Lethal Necrosis Disease, gray leaf spot, cut worm and fall army worms for maize, Leaf blight, Anthracnose and grain mold for sorghum, Teff rust, head smudge, damping-off and leaf spot for teff, Leaf/brown rust, yellow/stripe rust and stem/black rust for wheat, Powdery mildew, head blight and covered smut for barley and Rust and finger millet blast for finger millet respectively.

CONCLUSION

Agriculture remains the key sector for food security, employment, growth, despite improper land use, agro-ecological zones, and production and consumption patterns. Agriculture lead growth has the largest impact on reducing the depth of poverty. The livelihood of over 93% of the people of Southern Nation Nationality and peoples Regional state of Ethiopia dependent on agriculture; however, agricultural system in the region is at subsistence level. Much effort has been needed to Produce or adapt agricultural technologies that would help to boost production and productivity but only few technologies adopt by the end users. There are a number of production problems which occurs at different section of production like input utilization (seed and fertilizer), land fragmentation pests and diseases. Producers in the study area do not uses production inputs in a recommended amount for all of the crops listed at a right time to enhance the production and productivity. To enhance production and productivity of the major crops

introduction of packages of modern inputs like improved seeds, fertilizers, pesticides and chemicals that dramatically increases crop production is important at recommended amount and right time to enhance food security. To address the packages to the small holder farmers, public interventions were crucial, so there should be strong relationship between research, extension, and the small land holding farmers involved for alleviating these production, and technological problems. Finally adoption of improved technologies which helps in production and marketing of these agricultural products are very essential in the studied area as a result all of the crops and others are recommended based on amount of land, market demand and other natural and manmade factors which affects productivity.

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