

*Full Length Research Paper*

# Population dynamism and agrarian transformation in Ethiopia

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**Ethiopia is the second most populous country in Africa yet one of the least urbanized in the world. Despite the population of Ethiopia are overwhelmingly living in the rural area and agriculture has immense role in the national economy, the relationship between population and agrarian change is underrated. The objective of this paper is to comprehend agrarian change with population dynamism in terms of agrarian population and agricultural growth and productivity. It is construed based on desk research. The paper employed the population theory of Boserup to underpin the analysis. It found that the performance of agriculture is poorly hampered by its own structural problems. It failed to increase production and productivity neither properly feed the population. This is mainly the historical biases against agriculture; government poorly advised and devised policies, low investment in the sector, high population growth, climatic challenges, and uneven population distribution. It is also observed that population growth is not solely responsible for slow and lag of agrarian transformation. Instead, there are several structural and policy issues that setback agrarian transition. Finally, it is concluded that under slow rate of rural-urban migration and low agricultural productivity, the rate of agrarian transformation is slothful.**

**Key words:** Population, Ethiopia, agrarian, agricultural growth, transformation.

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## INTRODUCTION

Ethiopia, with population of 94.351 million in 2014, is the second most-populous country in Africa (Central Statistical Agency, 2013), yet it is one of the least urbanized countries in the world with 79.8% rural population in the same year. The economy remains largely agrarian<sup>1</sup>. The small-scale farmers produce 94%

of the food crops and 98% of the coffee; the latter being Ethiopia's leading export good and large-scale private and state commercial farms produce just 6% of food crops and 2% of the coffee grown (Patterson, 2007). These commercial farms use about 5% of the total cultivated land (Atsbaha and Tessema, Undated). However, with the current boom in investment on agricultural production, the size and share of land of the commercial-private-large-scale farms are growing. It is, thus, not overemphasized that Ethiopia is predominantly

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<sup>1</sup> In this paper rural population is used synonymous to agrarian however the rural community engage in non-agricultural activities and the urban and peri-urban community engage in agricultural livelihood portfolio. The fact that most rural communities in Ethiopian context is overwhelmingly agrarian and diversify their livelihood side by side away from it may tempted me to equate with well recognition of the role of non-agricultural economic activities in rural Ethiopia. The facts that Central Statistical

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Agency (CSA) all 1984, 1994 and 2007 estimated nearly 95% of rural people are practicing agriculture.

an agrarian country unable to produce sufficient food for its population for long time. Being agrarian society, Ethiopia's agriculture is amenable to challenges with paradoxes. The country's agricultural productivity per hectare as well as labour productivity is the lowest in the world. On one hand, this agrarian society are mainly peasantry and responsible to produce sufficient food for both rural and urban population, raw materials for industry, surplus transfer to other economic sector, pay tax for central government, and generate export earnings. On the other hand, they are the majority and a potential effective demand for industrial products that absorb trade commodities, and release labour to industrial sector.

Despite the growing population and the need for more resources, the issues of population were missed in agrarian change while a process of transformation undergoing. Hence, from 1928 to 1991, the nexus between population and development was completely ignored. And it has had no concern of population related policies and practices until the Transitional Government of Ethiopia declared National Population Policy of Ethiopia in 1993. It was under the pressure and financial support of United Nation Population Fund. In agrarian change, age structures of agrarian population, sex, productive labour, land to labour ratio, fertility, mortality, Contraceptive Prevalence Rate, among others that clearly informs characteristics of population and demographic dividend and hence contribute to agrarian transition. Moreover, demographic pressure, land scarcity, and land fragmentation drive greater agrarian vulnerability and poverty, marked by decreased food security, inadequate response to such natural disasters as drought or pest infestations, weakened resilience to shocks, and poor health undermine agrarian transformation in Ethiopia. Thus, the analysis of the link between agrarian change and populations in Ethiopian is a primacy not a luxury.

The objective of this paper is to comprehend the state of agrarian change with population dynamism in terms of agrarian population and agricultural growth and productivity. The paper also questions whether agricultural growth is growing in pace with population and the implication for development policy making using trend data of productivity, rural population growth and agricultural productivity and overall contribution to the agrarian change; whether population is the causality for sluggish agrarian transformation in Ethiopia. The paper is construed based on desk research and assembles data from Population and Housing Censuses, Ethiopian Demographic and Health Survey (EDHS), relevant databases, published and unpublished documents. The data are presented using tables and figures.

The next sections of the work are organized as follow. The second and third parts present theoretical underpinning to understand the agrarian community and population of Ethiopia, and materials and methods employed in the research, respectively. This is followed by the discussion about population growth and agriculture. It looks at the trend of population increment and agricultural growth. The fifth section elucidates the state of agriculture and its performance from agrarian growth lens. The sixth part presents different demographic and other challenges for the agrarian change. The final section concludes key points discussed so far.

## THEORETICAL FRAMEWORK

The relationship between agricultural change and population dynamism is not a recent phenomenon to underpin agrarian communities throughout the world. It is the very old concept. Particularly, the relationship between agricultural population and food production/supply has remain a controversial essence since the emergency of the classical school of thought in the 18<sup>th</sup> century English agrarian transformation that led to industrial revolution. The most prominent work of Malthus (1826) and Boserup (1965) often echoed and referred. These are also, with particular focus in developing country, categorized into the two antagonistic views- the pessimistic and optimistic views.

According to the classical school of Thomas Malthus, the pessimistic view, increased population demands parallel increase in food production which can be achieved either through bringing more land under cultivation (supplying more land) or cultivating the existing land intensively (through applying more labour). In other words, sufficient food can be supplied under population growth either through extensive and intensive margins of cultivation. However, the classical thought rejects both as options to cope up with population growth. Often respond to the critique of Malthus, the neoclassical thinkers-neo-Malthusians who propound that the agrarian population is a key predicament for agrarian change in the context of developing countries are evident. Neo-Malthusians argue that the natural system that provides for food, raw materials, fossil fuels, and the ecological system that supports life and absorbs wastes have limited capacity and, rapid growth in human population and its activities are threatening it with damage and destruction (Hardin, 1998; Brown, 1996). They further explained that land scarcity due to a larger population, and the unequal distribution of that population, compels people to cultivate marginal land, such as high-altitude

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pastures and steep hillsides. Accompanied by deforestation and vegetative removal, cultivation of marginal land drives environmental degradation. In addition, the loss of common pasture and other non-arable land means that families are forced to keep fewer and smaller livestock, which in turn yield less manure and decreased soil fertility. The school of thought is criticized as it is linear and technological progress is not the part of the debate on agrarian change and population.

On the contrary, Boserup (1965) viewed from different angle- optimistic view. She analysed the pre-industrial society- overwhelmingly agrarian society of African and Asian peasantry<sup>2</sup>. She brought to light that population growth is an autonomous factor and given which induce steady intensification in agriculture which in turn leads to change in economic and institutional set up of agrarian community. Other study (Yang, 2013), basing China as example, concluded that the major engine for boosting agricultural productivity is population pressure consistence with Boserupian view and the major reasons for agricultural productivity were improved seed, substitution of rice with other grains (modest), multiple cropping practices, increased irrigation and flood control, better farm implements, increased input of fertilizer, mainly animal fertilizer and right soil. Ultimately, China, being the world most populous country, has been able to reduce rural poverty and feed millions with only one-tenth of an average landholding of Ethiopia. The application of Boserupian thesis in general and implication of Chinese mode of agricultural development are tremendous for vast agrarian society of Ethiopia.

It must be noted that the Chinese agrarian transformation is its own. The population of China was predominantly agrarian. In the process of transformation, it followed partially the Boserup theory and partially the frontier model of agricultural growth. The population growth had been accompanied by the expansion of farmland until in the 1950s when China adopted modern techniques of intensification, which consequently increased agricultural yield (Yang, 2013). After the 1950s, China adopted modern techniques of intensification through the utilization of chemical fertilizers and High Yield Variety seeds. Hand in hand, the country implemented a package of policies such as population control, the generation of off-farm activities and promotion of the migration of population to the industrial zones so as to change the living standard of rural poor (Dejene, 2011).

Moreover, several studies in Asian, Africa and Latin America have conceptualize and generated and

explained the interface between agrarian change and population growth in different context but supported the thesis of Boserup with some limitations. To cite an example, the study of Machakos community of Kenya demonstrated a positive interaction between rising population, environmental conditions and agricultural production (Tiffen et al., 1994), Kusasi community in Ghana (Webber, 1996), Negri Simbilan rice farming community of Malay (Lewis, 1976). Thus, it is a fundamental theory need to be considered in the context of smallholder peasantry under resource scarcity and population pressure. However, the theory seemingly does not rely on industry for farm inputs and technological innovations.

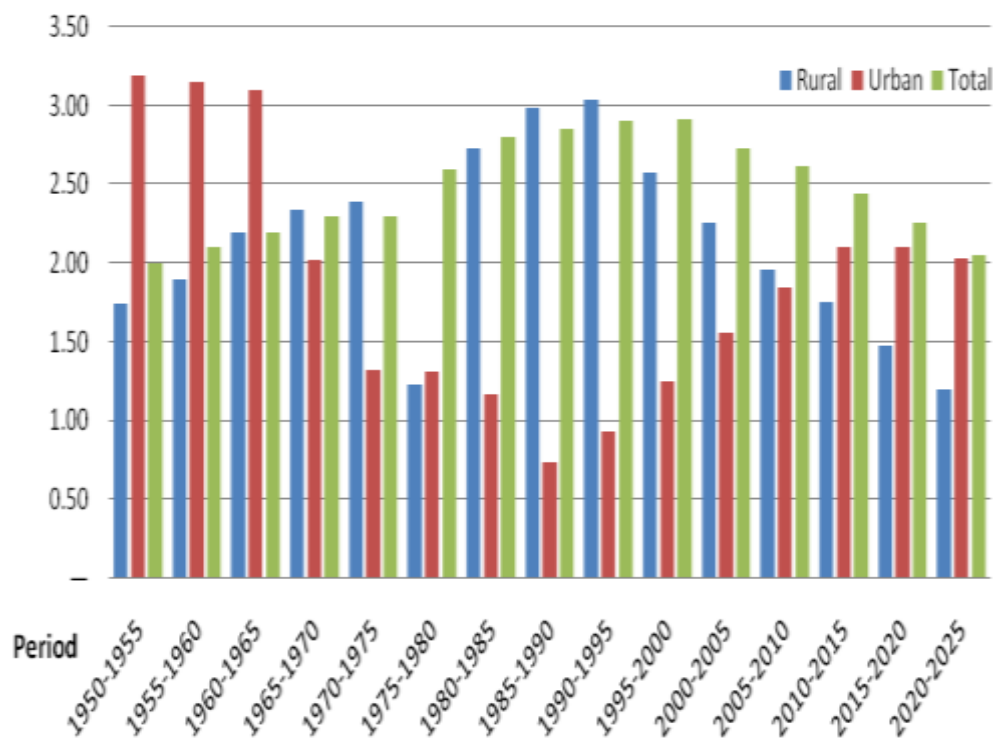
In Ethiopian context, the Boserupian thesis can be employed to underpin population and agrarian change in Ethiopia. Though extensification is almost closed in the highlands of Ethiopia, where the majority of agrarian population dwellers, overcoming its limitations, the theory can fit into the agrarian system of Ethiopia in the mixed farming system in the highlands through considering industrial inputs and technological innovations for transformation of agrarian population of Ethiopia. Consistent with Boserup (1965) view “under the pressure of increasing population, there has been a shift in recent decades from more extensive to more intensive systems of land use...”, recently, it is observed that even in the previously land surplus areas of Ethiopia intensification is undergoing.

More practically, according to Dejene (2011), the concept and interaction of agriculture and population can be approached and operationalized from three perspectives. First, the consumption approach focuses on the size of agricultural population and the area can support (the carrying capacity of land) at a certain standard of personal consumption. Here, the population pressure of agrarian society becomes a key entity in this perspective. Second, there is the production approach which is defined in terms of the standard number of producers or the optimum population required for agricultural production in a given country. It is mainly depends on agricultural productivity and output per workers.

Third, the mobility concept of agricultural population, which is defined as the number of people whose productivity of labour is zero or close to zero. This is entered at the classical theory of economics that explains the existence of agricultural surplus labour productivity that can possibly mover to urban industrial area. In this paper, the three contexts are used to explain agrarian change vis-a-vis population dynamism either in isolation or in combination.

Agrarian change can be conceived as proximity of change in productivity, technology use, migration, livelihood diversification away from agriculture. There are several indicators of agrarian change. Some are structural transformation of the economy predominantly agriculture to industry in the form of movement of labour and capital.

<sup>2</sup> In this paper peasant, smallholders, and farmers were used as synonymous as far as Ethiopian farming community concerned whereas agrarian society/community is the collection of farming community who mainly engaged in agricultural activities. It does not mean that there is some scope of non-agricultural activity in the rural milieu. According to Bernstein (2010), peasant widely and often loosely, used to describe “subsistence”-oriented “small” farmers or “family” farmers in different historical conditions and periods, from pre-capitalist agrarian civilizations to capitalism today, especially in the South.



**Figure 1.** Trends of Ethiopian population growth rate 1950 to 2025. Source: Processed from the United Nations Division (2012) and Aynalem (Undated).

The other is economic transformation from heavily reliance on agriculture to industry/manufacturing or service sector. It is the change when most economic output is from other than agriculture which manifested in the form of output per capita or output per worker- and economic growth sign. Indeed, it is believed that Green Revolution and other form of agricultural revolution is a precondition for agrarian change. History shows that agricultural revolution is achieved through increase in agricultural labour and land productivity.

## MATERIALS AND METHODS

The empirical material is gathered from literature, official reports and policy documents from Central Statistical Agency (CSA), National Bank of Ethiopia (NBE), Ministry of Finance and Economic Development (MoFED), Demographic Health Survey (DHS) and international organizations such as IFAD, FAO, UNEPA and other relevant organizations. Moreover, databases of CSA, FAOSTAT, DHS, United Nations, Department of Economic and Social Affairs, Population Division were used.

The data collection covers a time period from the 1950s to 2015 and beyond in case of projection but not consistently depicted due to data unavailability. The particular focus of the study is on the period from the 1991 to 2015. During this period, new population policy came to existence for first time and several versions of agricultural development and transformation policies, strategies, programs and projects were implemented.

The data are entered to Excel data sheet and analysed. The outcomes of analysis are presented using graphs and tables.

## POPULATION GROWTH AND AGRICULTURE

### Population growth in Ethiopia

Ethiopian population is growing fast for a century. The growth of rural population was tremendous as there was negligible urban population at the beginning of 20<sup>th</sup> century. Despite, the rate of population growth is declining, mainly because of contraceptive prevalence; the absolute increment is still high. Figure 1 presents the trends of national, rural and urban population growth in Ethiopia since the beginning of 1950 and prediction up to 2025; the time benchmark when the country aspires to be a level of middle-income country. It also shows Ethiopian population has sharply increased between 1950 and 1995, except the period 1975 to 1980, then decline. The prediction is also showing that it will keep declining. Yet, the demographic transition has lagged in the past (Teller et al., 2007) seems to occur in Ethiopia without agrarian transformation.

Regarding the rate of population growth in urban and rural, urban population growth is higher as compared to rural. It is worth to note that Ethiopia is the least urbanized country in Sub-Saharan Africa and probably in the world. Despite the population growth rate and proportion of rural population is declining at slow rate (88.8% in 1984, 86.2% in 1994, 83.8% in 2007, 82.4% in 2010, 79.8%, in 2014), the actual size of population in

rural area is increasing. Following the demographic transition, expected to occur when the urban population is increasing and rural population is declining, as shown in Figure 1. Though it is slow, the urban population are growing, and proportion of rural population is decreasing with the recent economic growth (Dorosh et al., 2011). This could trigger agrarian transition through augmenting labour productivity, shift from heavy reliance on agriculture to non-agricultural activities, and emergency of other economic subsector like service and manufacturing/agro-processing spurs.

The population density in urban area is high and the livelihood base is wage employment or trade/manufacturing. In rural area, unlike urban areas, the implication of the population density is immense. In Ethiopia, being an agrarian societies (over four-fifths of the population is engaged in traditional subsistence farming), a different measure of population density known as agricultural density would be more appropriate than just crude density. This measure also referred to as physiological density that relates the number of rural inhabitants to the size of arable land. It is difficult to compute agricultural densities here, mainly, due to the unavailability of data on rural population sizes, and the exact sizes of arable land for all districts or sub-divisions of districts. However, it is possible to speculate that, based on the national trend and population settlement, the agricultural density is by far higher in the highlands than the lowland areas and population distribution is not even.

In sum, the population density measure offers a glimpse of the agrarian pressure and concentration in resourceful areas. However, a simple reliance on crude is potentially misleading, into how the population of a country is distributed, and whether or not there are too many", or too few, persons per unit area. It is useful to stress here, however, that the terms "too many" and "too few" can be deceptive since no threshold population sizes could be accurately defined for a given geographical location.

When we see the structure of agrarian population, it is a predominantly rural and young society, 84% living mainly in densely populated highland settlements. While the urban population is growing at around 4% per year, the rural population is still growing at around 2.3%. The proportion of the population under age 15 is 45%, with only 3.2% above age 65 (Ringheim et al., 2009). About half of Ethiopian agrarian population (50.65%) is not economically active. They are depending on the economically active population (female is 22.46%, male 26.89%) (Figure 2). According to this figure, the agrarian population is scrambled with high dependency and, principally due to land scarcity and low productivity.

### **Structural bottlenecks of Agriculture**

Agriculture employs about 82.4% of total population and

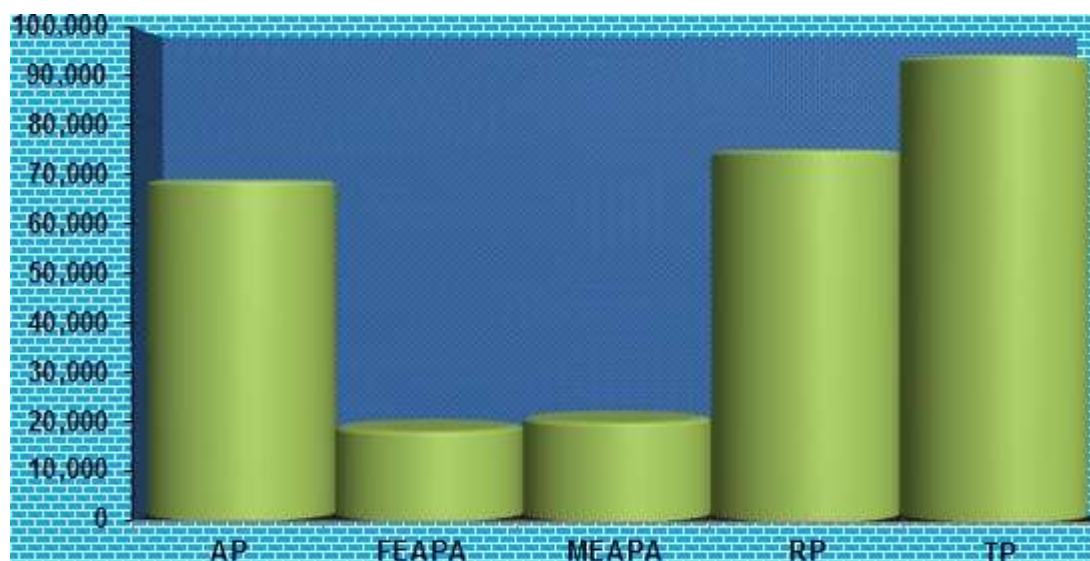
still so as the rate of rural-urban mobility is low. Only about 8.2 million people were added to the urban population during the past 40 years (1962/63 and 2002/03), while the rural population increased by about 38 million during the same period (Samuel, 2004). The same trend shows over the last decade the population of urban is almost constant (only increased by three millions) while the rural population increased by 20 million. This is due to the influence of geography and structural economic features associated with low levels of income. Moreover, there are evidence that the government policies have slowed the rural-urban transformation through land regulations and restrictions on labour mobility. Government investment policies, particularly those related to levels and locations of investments in roads, electricity and telecommunications, greatly influence the relative pace of income growth in rural and urban areas (Dorosh et al., 2011).

The food producers, majority of peasants, to consumers is very high. The economy is also characterized by high food insufficiency problem and its population is chronically food insecure, in addition to millions of seasonal food insecurity problem. The agrarian community relies on rainfall in which distribution as well as reliability is uneven. The subsistence mode of production is the doldrums since agriculture started mainly producing to meet the food need. It is generally the least commercialized with little surplus production by the peasantry.

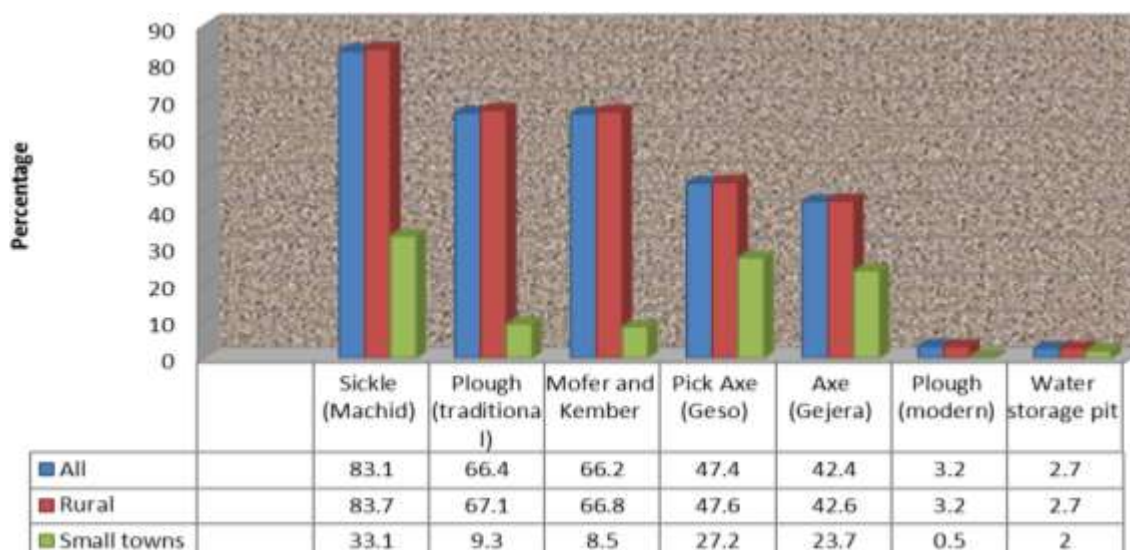
One area in which there has been little change over the years in Ethiopian agriculture is the utilization of agricultural technologies. Except for some small areas of the highlands where hoe cultivation is practiced, all land preparation is carried out with oxen pulling- the traditional plough. It is believed that the Ethiopians inhabiting the highlands were introduced to animal traction between 1000 and 400 BC. The traditional plough, sickles, hoe, *Mofer* and *Kember*, axe and pickaxe which remained unchanged, requires several passes to prepare land for planting. In most highland areas, some 5 or 6 months of the year are spent on seedbed preparation, which involves a pair of local zebu oxen pulling the traditional plough. This is also another structural problem of Ethiopian agriculture to propel the economy mainly because it employs backward tools and far from technology.

According to Ethiopian Rural Sample Survey (ERSS) report (CSA and the World Bank, 2013), the majority of the Ethiopian farmers are engaged in traditional implement for cultivation and agricultural operation. Sickles, traditional plough, pick axe and ordinary axe are the common tools among the agrarian society of Ethiopia that also features the traditional mode of production. Only 3.2% are using modern plough (Broad Bed Maker-BBM) (Figure 3). The implication is that with overwhelming involvement of backward agricultural implements, huge labour has to engage in to operate the agricultural





**Figure 2.** Active agricultural population in Ethiopia (Thousands). Note that AP = Agricultural population; FEAPA = Female economically active population in Agr; MEAPA = Male economically active population in Agr; RP = Rural Population; TP = Total Population. Source: Processed from FAOSTAT (FAO, 2013).

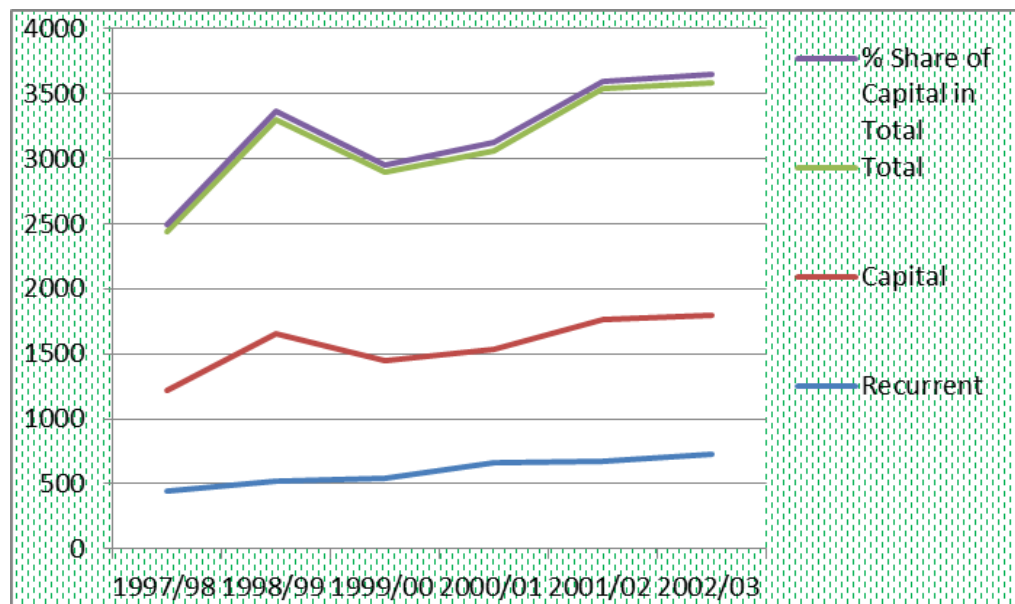


**Figure 3.** Ownership and employment of farm implements among Agrarian Society of Ethiopia. Source: Central Statistical Agency and the World Bank (2013).

activities and show labour extensification. This is also seemingly the mystery that agriculture accommodates huge proportion of population. As Boserup explained, agrarian population has to innovate technologies, as necessity is the mother of innovation but Ethiopian agrarian system fail to do so for centuries.

Another indicator of structural problem is labour productivity in agriculture. It is possible to guess agricultural labour productivity from the proportion of population engaged in agriculture. As Allen (undated)

puts if countries are self-sufficient in food and if per capita consumption is a constant, then agricultural labour productivity is the reciprocal of the fraction of the population in agriculture. If half of the people, for instance, are farming, then each farmer has to produce enough food for two people-himself and one counterpart off the farm. Output per worker is, therefore, two. If only one quarter of the people is farming, each must support four people-himself and three off the farm-so output per worker in agriculture is four.



**Figure 4.** Trends in public spending on agriculture and food security (in millions). Source: Ministry of Finance and Economic Development (MoFED) (2006).

Obviously, the assumptions of self-sufficiency and constant consumption are simplification but they provide a rough standard to see Ethiopian in long-term agriculture. In this regard, Ethiopia is very much to do-agricultural labour productivity is only about 1.2- an Ethiopian farmer can feed him/herself and other 0.2 off farm worker. Notwithstanding is the declining trend in rural labour productivity; together with declining per capita food production, not only indicates the structural weakness of the agricultural sector but also the sector's declining capacity to serve as the engine of the economy.

The other key structural problem is raised from fiscal commitment in agriculture and agricultural research and technology and food security is not negligible between 1997 and 2003. In some instances, it shows a declining trend. Figure 4 shows the trend of public spending on agriculture and food security. The astonishing thing is that the government policies are rural focused without allotting a budget to realize the policy. These shows obsolescence between the policy and the reality on the ground.

However, there was a complete shift in strategies, plans and interventions notably a Plan for Accelerated and Sustained Development to End Poverty (PASDEP), 2005/06-2009/10, Productive Safety Net (PSNP) since 2005, and Growth and transformation Plan (GTP) 2010-2015 have changed the agricultural production and productivity in general and food security conditions in particular. It is the outcome of this endeavours that the Ethiopian government declared that the country has achieved food self-sufficient although it is believed that food access and stability is still questionable.

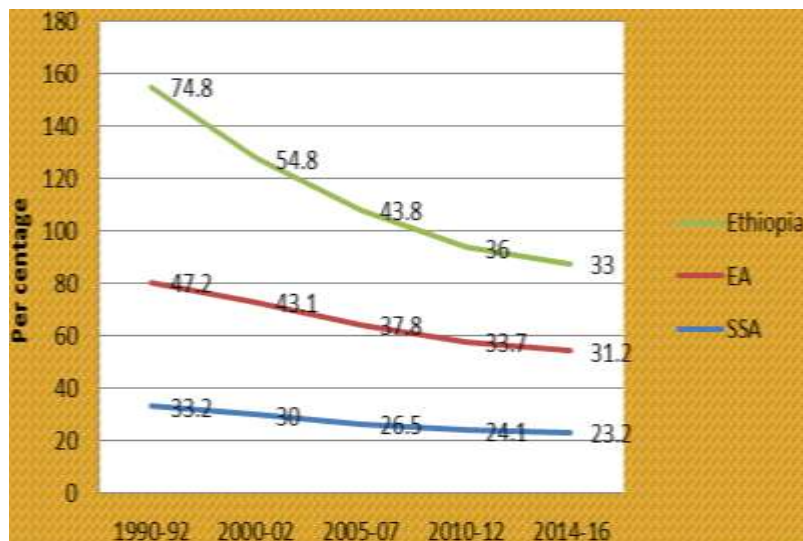
Concomitantly, the Food and Agriculture Organization of United Nation declare that Ethiopia met the Millennium Development Goal (MDG) -1c target by halving the proportion of hungry people or bringing it under 5% by 2015. The country cut off the proportion of under nourished population by more than half (Figure 5) in the last two and half decades. However, this is not sufficient but a piece of precondition for agricultural transitions/transformations. The proportion of undernourished population is the highest even in Sub-Saharan African standard. Despite this, in the last two decades there are tremendous achievements in this regards and yet much has to be done to eradicate poverty and hunger.

Overall, Ethiopian agriculture and agrarian community are sluggish if not stagnant at all to transform to a dynamic and high productive economic activities. This is a mainly attributed to the structural bottleneck of the sector which in turn triggered by poor commitments, policy biases, and weak performances of the sector. The next section presents an evidence of the poor performance of agriculture manifesting its structural problems and its failures to act as a propeller of economic growth.

## POPULATION AND AGRICULTURAL PERFORMANCE

### Agricultural GDP growth

One of the major hallmarks of agrarian transformation in Ethiopia was begun after 1974 land reform. During the Socialist regime, annual growth of agricultural GDP



**Figure 5.** Proportion of undernourished in total population. Source: Based on FAO (Food and Agriculture and Organization), IFAD (International Fund for Agricultural Development) and WFP (World Food Program) (2015).

**Table 1.** Growth rate of real GDP in 2011/12 (in percent).

Sector	2005/06 - 2009/10 average performance	2010/11 performance	2011/12		2010/11 and 2011/12 average	2010/11 and 2011/12 average plan
			Planned	Actual		
Over all real GDP	11.0	11.4	11.1	8.5	9.95	11.2
Agriculture and allied activities	8.4	9.0	8.5	4.9	6.95	8.6
Industry	10.1	15.0	17.9	13.6	14.3	20
Services	14.4	12.5	11.5	11.1	11.8	10.6

Source: MoFED, 2013.

plunged below zero in seven years after 16 years (1975 to 1990). However, the aggregate GDP for the same period grew by an average of 2% per annum of which negative records for four years. Between 1975 and 1984, agricultural GDP per annum stagnated, while attained 2% per annum from 1985 to 1990. In general, agricultural growth rate was much lower than the agricultural rate of pre-reform era, particularly between 1964 and 1974. Moreover, between 1974 and 1990, per capita GDP declined at the rate of 0.8 per annum and poor agricultural performance was mainly responsible for it (Alene, 2003).

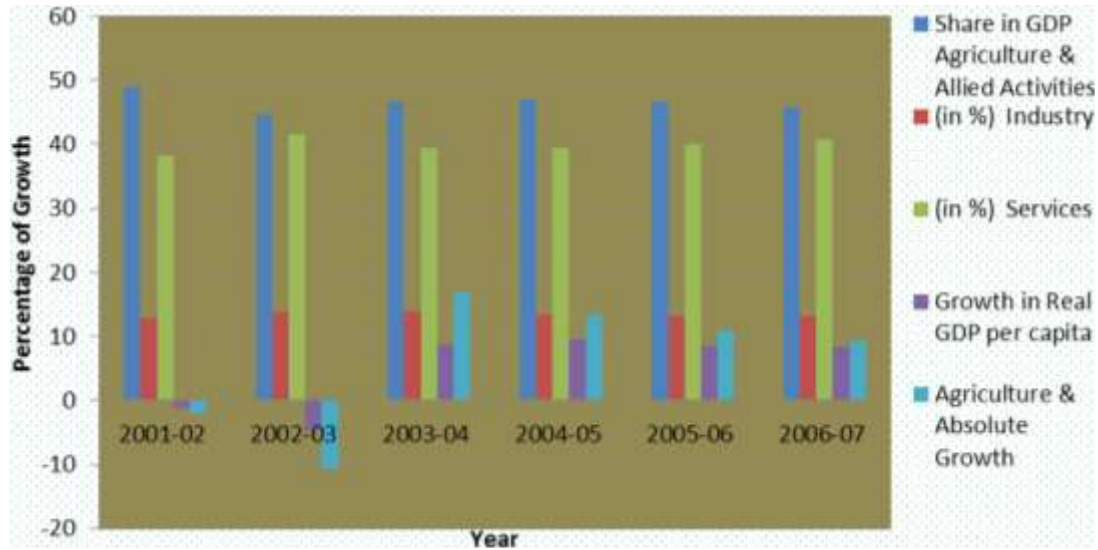
Over the period of four decades, agricultural value added is steadily declining. Consequently, during this period harvest had fallen, food and raw material deficient economy was created, agricultural production growth rate is less than the population growth rate, and failed to act as an engine of economic growth. However, beginning from 2003/04, annual GDP is increasing at the rate of 10.1 to 12.7% until 2011/2012 as shown in Table 1. The

performance of agriculture is also high but with great fluctuates of the agricultural subsector; the performance of crop production is high- as high as 25.6% in 2003/04 bumper year as Figure 6 portray (MoFED, 2013). Still, millions of populations are food unsecured.

### Food production per capita

One of the key roles of agriculture is to supply sufficient food for agrarian and metropolitan populations. To this end, agrarian population has to produce sufficient food beyond their own consumption. The increase in production of food should be judicious with population growth and food demand. This is measured in terms of per capita food availability per person per year. Over the last five decade, the population of Ethiopia has increased about 2.7 folds, while food production has grown by 2.4 folds. Moreover, the food net import over the same period has tremendously increased- by more than 43 times.





**Figure 6.** Sectorial contribution to GDP and GDP growth. Source: Based on National Bank of Ethiopia (NBE) (2007).

Despite increase in local production and exponential growth of net import of food, the food availability per capita per person is merely raised from 133.4 to 156.3 kg/person/year between 1961/62 and 2008/09 (Figure 7).

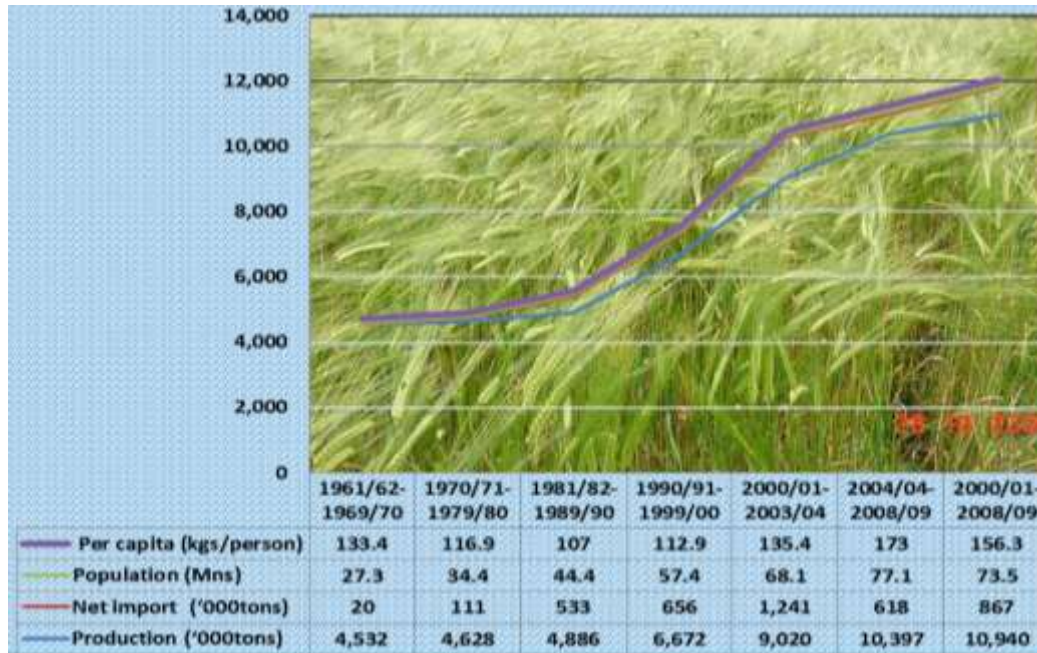
The figure further demonstrates that the production of food in Ethiopia is by far lower than the total population. As a result, the country has been the new importer of food over the last five decade. The absolute volume of the import has shown an increasing trend. However, the per capita availability of food, given the local production supplemented by import of food, has been steadily increasing but not sufficient to evade food shortage. In other word, agriculture is not in position to produce sufficient food for and the problem of food insecurity is still prevailing year in year out.

The above evidence is also overtly confirming that agriculture is not in position to provide sufficient food over the time in steady its growth is stagnant, even some times negative. This is due to the poor performance of agriculture attributed to poor agricultural development policies, which had affected the livelihoods of the agrarian people as well as the economy as a whole. Several evidences (Samuel, 2004; Tadesse and Belay, 2004; Sharp et al., 2006; Dorosh, 2011) indicated that agricultural performance is poor because it is vulnerable to the vagaries of nature; natural resource degradation; employ backward technology and traditional production tools, methods, crops and livestock.

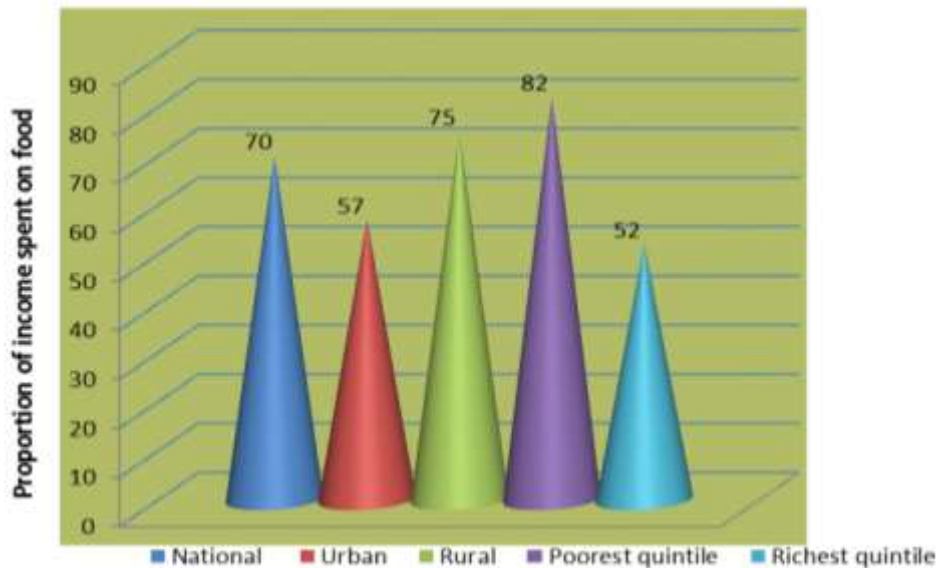
There are paradoxes within efforts to improve agriculture and overcome food poverty. On one hand, the new national agricultural extension program that has promoted a new technology package of high-yielding seeds and fertilizers to peasants has helped to improve national grain production. As farmers adopted the new

technology and weather conditions favoured, cereal output in the last half of the 1990s averaged 10 million metric tons a year- 4 million more metric tons per year than in the 1980s. On other hand, despite this seeming success, nearly 14 million Ethiopians faced starvation in 2002/03 (Samuel, 2004). According to FDRE Ethiopian Government Communication Affairs Office (2016), in 2015/2016, the country is facing one of the most serious droughts in history and at least 10.2 million people are receiving emergency food aid. Still Diao and Pratt (2007) suggested that under a high population density in most of Ethiopia's rural areas, boosting 'land productivity is the only feasible strategy for improving food security'. This implies that Ethiopia has to intensify the existing land through promoting agricultural technologies and conservation strategies to feed increasing population. In this regard, Boserup thesis (1965) is theoretical relevant and can inform the agrarian change of Ethiopia to employ technological induction for increasing the production and productivity of highly populous areas.

The slow rate of agricultural growth in the previous decades meaningfully contributed to income of the entire population. The price of food kept increasing and people spent much of their income on food than saving. In poverty driven agrarian community or agriculture based economy, food accounts for a large percentage of household expenses. This is also a trend in Ethiopia that the whole population in general and rural population in particular are not saving and not adequately accumulating assets for reinvestment in the economy. In 2012, the domestic saving rate is estimated to be 12.6 and 16.5% of GDP. Despite recent effort to encourage massive saving, it is long way to go to contribute to agricultural development and transformation. Figure 8 shows the



**Figure 7.** Trends of population growth and food availability. Note: 1961/62 -1979/80 from FAO production data and 1981/82-2008/09 CSA production data. Source: Compiled from CSA (2006/07); CSA (2007), Dorosh (2011), and CSA and ICF International (2012)



**Figure 8.** Proportion of income spent on food in Ethiopia. Source: Based on United Nation Development Program (2012).

proportion of income went to food in rural and urban areas as well as poor and rich segments of Ethiopia.

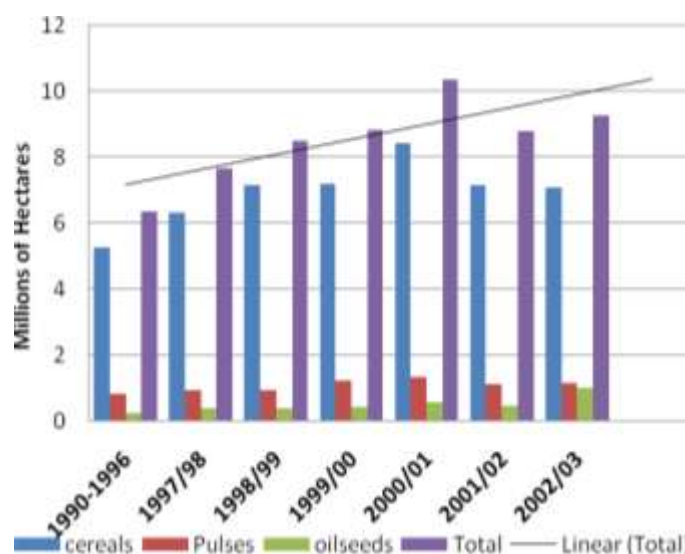
Ethiopian agriculture is exhibiting high variability in terms of cultivable area and production over the past decade. Table 2 shows the percentage change of total area cultivation between 2000/01 and 2010/11. It depicts

the percentage change of total area cultivation declined by 30.83 whereas production fall by 29.24 due to rainfall fail in 2001/2002 and in consequence, 14 million people were starved in 2002/2003. It clearly demonstrates the vulnerability of Ethiopian agriculture under vagaries of nature on one hand and the high correlation of area

**Table 2.** Growth of area cultivation and total production over a decade.

Year	Cultivated area	Total production	Percentage change of area	Percentage change of production
2000/01	9,445.47	106,159.86	30.85	16.48
2001/02	7,813.00	99,394.38	-30.83	-29.24
2002/03	7,849.62	73,637	7.53	1.37
2003/04	8,664.01	103,509.01	12.83	39.44
2004/05	9,807.00	119,057	27.37	57.33
2005/06	10,158	133,744	3.6	12.3
2006/07	10,576	149,404	4.1	11.7
2007/08	10,930	160,654	3.3	7.5
2008/09	11,176	170,791	2.3	6.3
2009/10	11,503	180,685	2.9	5.8
2010/11	11,822	203,485	2.8	12.6

Source: Based on CSA (2006/07), CSA (2007) and CSA and ICF International (2012).

**Figure 9.** Area cultivated under peasant holding.

under cultivation and production on other hand- extensification path way followed among Ethiopian agrarian community to increase production than intensification using improved technologies of production. As population increases labour is used intensively. The marginal productivity of labour may be zero or even negative under such circumstances. It seems contrary to Boserupain thesis in first sight.

In general, the area cultivation has been increasing as rural population grows. With the slow growth of non-agricultural sectors, the new entrants in the peasant society are absorbed by agriculture. They have either to share farmlands from their parents or bring uncultivated lands such as grazing land, forestland, and marginal lands into cultivation at expense of environmental problem it may triggers. The area under cultivation of cereal is even fluctuating; pulse and oilseeds are

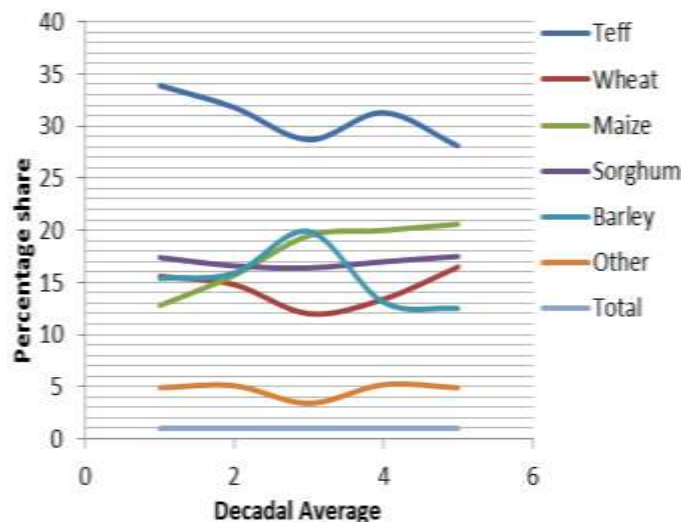
gradually increasing. However, there is no tendency for the introduction or expansion of cash crops or new crops (Figure 9).

Over the period of five decade, traditional crops such as *Teff*, in which its productivity is very low, continues dominating the Ethiopian agriculture. Other traditional crop such as wheat, maize, sorghum, and barley productivity is perhaps the least per person as well as per hectare. The trend of productivity and area cultivated is depicted in Figure 10.

On other hand, the area cultivated has increased by more than 1.24 times (6.23 to 7.72 million hectares) in the same period only for the major staple crops. The increment has attributed to the conversion of forestland, marginal areas like valley bottom, mountainside, and grazing land, which might have implication on environment and trade-offs on livestock production. Regarding percentage share of total cultivated area, *Teff* constitutes one-third of the cultivated area mainly in the fertile highland of Ethiopia where population pressure is high. While maize and sorghum share are gradually increasing, barley is declining and the trend for wheat and *Teff* is even fluctuating over time.

In addition to crop production, the agrarian population is rearing livestock for different purposes. The sub-sector plays an important role in the Ethiopian economy. The majority of peasants depend on animals for draught power, cultivation and transport of goods. The sub-sector makes also significant contribution to the food supply in terms of meat and dairy products as well as to export in terms of hides and skins which make up the second major export category (Belay and Manig, 2004). However, the livestock sector is also not satisfactory despite Ethiopia has high population of livestock resources in Africa and the world. The country's livestock resource is estimated at 43 million heads of cattle, 23.6 million heads of sheep, 18.6 million heads of goats in 2006/2007 mainly kept by smallholders (MoFED, 2013) (Figure 11). The livestock sector provides multiple





**Figure 10.** Trend of major cereal decadal average. Source: Based on data from Dorosh (2011)

functions, such as source of food, cash, draught power, and transport to mention but a few. For example, smallholders' dairy farms, though not specialized, contribute 97% of total national milk production and three-quarters of commercial milk production (Nagayets, 2005).

Despite the huge livestock resource and important role expected of it, the sub sector is characterized by low productivity and production even in SSA average (MoFED, 2013). An average yield per slaughtered cattle and goats are estimated to be 105 kg of beef and 10 kg of mutton, respectively. Similarly, milk yield per cow is 213 kg and 40 to 60 eggs per hen per annum (Ethiopian Economic Association (EEA), 2005).

According to the Ethiopian Economic Association Report (2005), like the crop production, livestock production and growth rates are very low (0.15%) and lag behind the human population growth (2.5%). According to the same source, the per capita consumption of milk, meat, egg, fish and honey is approximated at 19 L, 8 kg, 1.23 kg, 0.25 kg and 0.29 kg, respectively, putting Ethiopia as the least even in comparison to the neighbouring countries. The report further shows that the annual consumption per capita of meat and milk is 43 and 49% of 14 kg and 20 L, respectively, below the African average.

Both the livestock and crop subsectors are low productive and operated under peasant population with traditional mode of production. These remain the challenge of Ethiopian agriculture which is far from commercialization. There is an increasingly recognized that the commercialization of surplus output from small-scale farming is closely linked to higher productivity, greater specialization, and higher income. It is also

suggested that in a world of efficient markets, commercialization leads to the separation of households' production decisions from their consumption decisions, supporting food diversity and overall stability (Bernard et al., 2007). Sadly, the Ethiopian peasants are still producing for consumption and traditional cereals are overwhelmingly their production portfolio. They are not surplus producers neither shifts to higher output and/or high value crop and hence the economy is food deficient. There are trade-offs between livestock sub-sector and crop production, however.

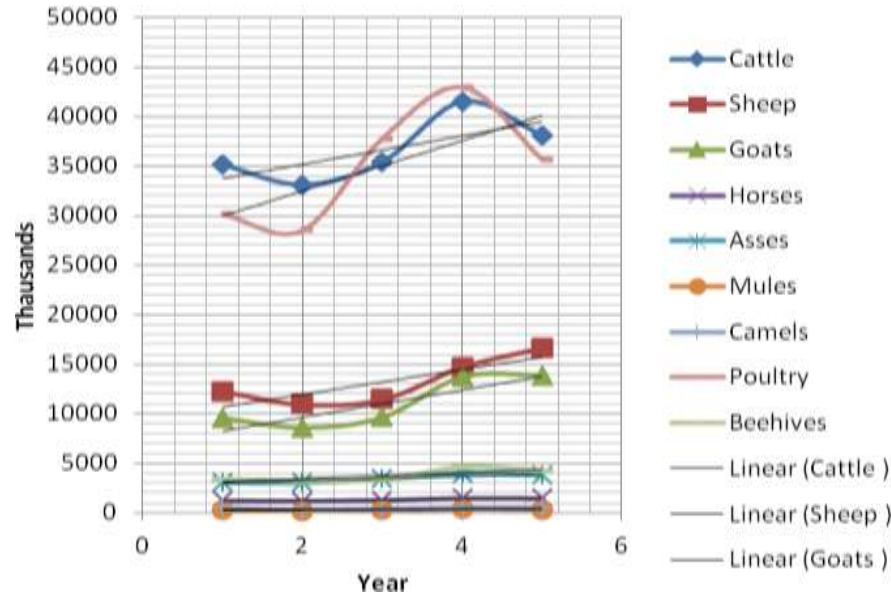
## DEMOGRAPHIC CHALLENGE FOR AGRARIAN CHANGE

### Agricultural productivity and population

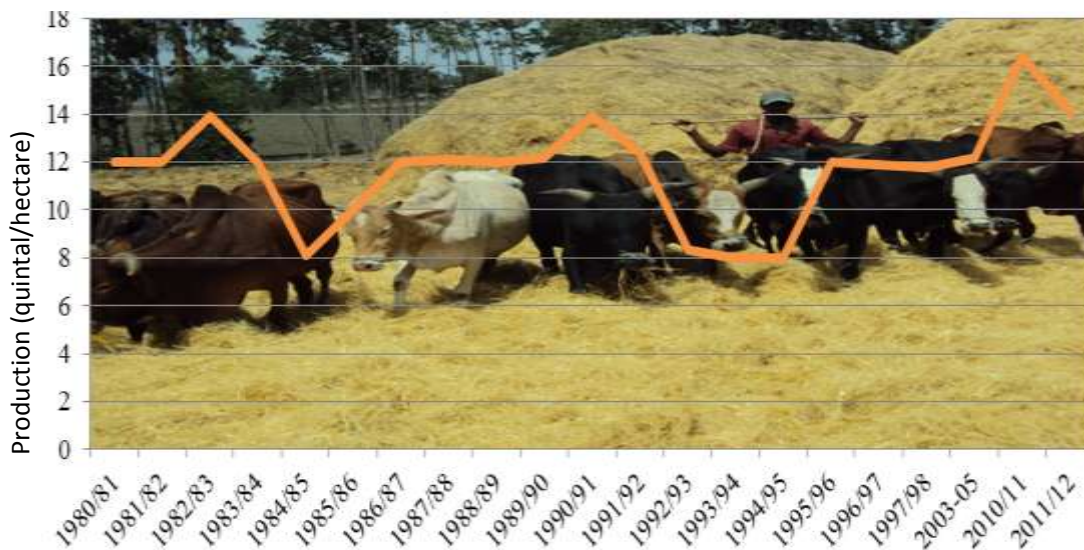
Agrarian mode of existence is a long history in Ethiopia. Evidences showed that the ox-plough system, the dominant form of agriculture in Ethiopia, began in the highlands more than 2,000 years ago (Patterson, 2007). The system is still the most popular among smallholders without technological transition except a piecemeal approached for trail. This remains the paradox and absurdity of the agrarian history of the country. It is also not surprising that employing the traditional technology, the smallholder agriculture accounts for over 95% of the cultivated land and production and responsible for more than 90% of the total agricultural output. The production system is largely characterized by subsistence orientation, low levels of external inputs, dependency on rainfall, and limited integration into the market. About 12.7 million smallholders produce 95% of agricultural GDP (IFAD, 2012). Figure 12 depicts the trends of crop production in Ethiopia. Accordingly, it is highly fluctuating and even declining in some instances. Climate is the major cause for this. For example, the yield sharply dropped in 1984/85 great drought. Over the same period, the population growth was high as seen in section three above.

The other challenge of agrarian community was the dwindling of landholding due to increase in farm population, expropriation in the name of development program and 'land grab', land degradation, inheritance customs led to a steady decrease in rural land holdings, from an average of 0.50 ha per person in the 1960s to 0.21 ha per person in 1999 in highly populated areas. As the culture of sharing and intensity of investment underwent, the shrinking of the landholding size is further shrinking. It is a noticeable effect of rapid population growth that declines land holding size, which accompanied by growing landlessness and this in turn one of the main constraints for achieving food security in Ethiopia (EEA, 2004).

Notwithstanding is an even distribution of population. Population density is varied as low as two persons per



**Figure 11.** Livestock Population of Ethiopia from 1998/99 to 2004/05. Source: Based on CSA (2006/07), CSA (2007), CSA and ICF International (2012).



**Figure 12.** Trends of food production per hectare in Ethiopia. Source: Computed from Alene (2003); EEA (2005); CSA (2012).

square kilometre in the pastoral area to as high as more than 1121 person per square kilometre in highly populated area of Wonago, SNNPRS, for example (Aynalem, Undated). The population distribution follows altitudinal and agro-ecological lines mainly for suitability in agriculture or absence of infectious diseases. The highlands (*dega*) are the most densely populated where most agricultural practices vastly takes place, while the lowlands (*k'olla*) have the lowest population densities where the calamity is dry spelt and not conducive for crop

production (Selome and Assefa, 2010). As a result, nearly 80% of the population lives on only 37% of the total area of the country, while the remaining 20% lives on 63% of the country's land area (Aynalem, Undated). This is one challenge of the agricultural sector under the traditional system of production and where agricultural technology is minimal.

Owing to the low productivity/low production and insignificant saving, the smallholder producers are predominantly caught in the poverty trap. Lack of saving



constrains capital investment in expansion and intensification of production. Hence, with low external input, the crop cultivation and natural resources management operates at an imbalance between nutrient input and extraction leading to soil and land degradation, with consequent declining productivity and production. The rising population pressure particularly in the highland agricultural zones has exacerbated the problem in relation to declining farm holdings and land fragmentation (Berhanu, 2006). For example, on cultivated farmland in 2009/10, only 4% used improved seeds, 12% used chemical fertilizer, 15% used natural fertilizer, and just 1% used irrigation (Dorosh et al., 2011).

### Policy challenges

Over the last two decades, since 1994/95, Ethiopian agrarian societies are guided by Agricultural Development Led Industrialization (ADLI) policy framework. The essence of Agricultural Development Led Industrialization (ADLI), the present strategy, strives around productivity enhancement of smallholder agriculture and industrialization based raw material with labour-intensive technology. In order to achieve this goal, different strategies were envisaged. These include improvement of agricultural practices, improving animal husbandry and utilization of better seeds, development of agricultural structure, such as small-scale irrigation, fertilizers, and agrochemicals and increasing farm size that would take place alongside the shifting of population from agriculture to non-agricultural activities (MoFED, 2006).

These very much-hoped strategy to shed light on agrarian transition of Ethiopia- Agricultural Development Led Industrialization (ADLI), remain a mere hope than a fruit bearing policy framework that guided a several policy agendas. ADLI's failure is manifested by persistent food insecurity and reliance on food aid: More than seven million Ethiopians are 'chronically food insecure' and receive regular support from the cash- and food-for-work Productive Safety Net Programme (PSNP), while in any given year several million others face shocks requiring emergency assistance. Food aid constitutes 11 to 50% of domestic supply since 2000 and the country is net importer of food and subsidized to low-income groups due to inflationary economy since 2008. For instance, the Ethiopian population affected by drought over the last two decades ranges more than 7.5% in 1978 to 20% in 2002 with an annual increase at the rate of 3.4% (EEA, 2004). Since 2008, there was exorable inflation, mainly food price spike that was kept down through food import and huge subsidy.

The question here is where is impact of ADLI in increasing production and productivity since the mid 1995? Where is the power of agriculture as 'engine of economic growth'? Some has tried to provide the premises of failure in ADLI mainly due to limited

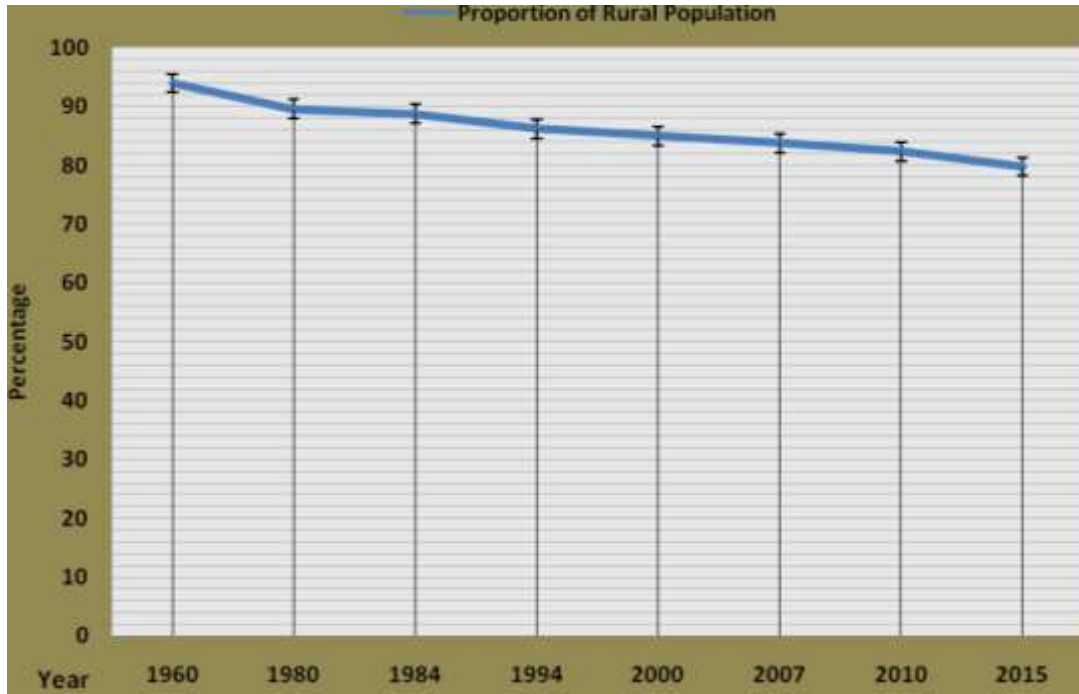
production of agricultural inputs, insufficient context-specific agricultural research, lack of infrastructure and lack of credit markets. Whereas government tries to reflect the current 'economic growth' successes are the result of policy pursued. Of course, since 2004 progresses are thriving but multitudes of home works remain to be done to climb the ladder of agrarian transformation.

The other policy challenge to the agricultural population is the incomplete liberalization of agricultural inputs and outputs. The state has withdrawn interventionism partially. For example, in Ethiopia fertilizer subsidy was withdrawn since 1994. While fertilizer subsidy was removed at expense of poor smallholder farmers and held in the hand of cooperatives and semi- autonomous party owed companies; the output market was somehow liberalized except some cash crops operated by Ethiopian Commodity Exchange (ECX). The paradox is that: What is the use of output liberalization without input liberalization for the same? The few cooperatives and state owned firms created an oligopoly market to supply agricultural inputs particularly fertilizers and improved seeds. Hence, agrarian population is not accessing sufficient agricultural inputs in case they have capital to do so unless state developmentalism get move.

Moreover, literature widely denounce that both the Ethiopian land and Population Policies discourage the rural-urban mobility and transformation. The world economic history shows that predominant agrarian society transit to urban as economy grew and land and labour productivity enhanced. This is restrained in Ethiopia for political, economic and social reasons. Thus, the country's policy plays its part in the process of population dynamism and agrarian transition.

### Slow urbanization

The peculiar characteristics of Ethiopian agrarian population are the highest proportion are still in rural engaging in agricultural activities and millions of this population is either seasonally or chronically food unsecured, high prevalence of malnutrition and one-third live under absolute poverty trap. The agrarian society remain high even after the 1974's agrarian reform and large proportion of population of the country live and work in rural. Yet, there are some sort of agrarian changes due to technological change, population pressure, migration and economic growth. In 1960, the rural population was 94 per cent of the total population as compared to 92.6% for Eastern Africa and 81.3% for Africa as a whole. In 1980, the proportion had decreased to 89.6% compared to 85.3% for Eastern Africa and 72.1% for Africa as a whole, while in 2007 the proportion in Ethiopia declined to 84% compared to 79% for Eastern Africa and 64% for all of Africa. By 2010, the proportion of the rural population shrunk to 82.4, 76.3 and 60% for Ethiopia, Eastern Africa and Africa, respectively (Bernard et al., 2007) (Figure 13).



**Figure 13.** The trend of decrease in proportion rural population in Ethiopia. Source: CSA (2013), Bernard et al. (2007), Dorosh et al. (2011) and CSA (1984, 1994, 2007).

This suggests that the country is still predominantly an agrarian society with very slow transformation even by African standards if it hoped that agrarian transformation to industrial and service community is an engine of growth.

According to Selome and Assefa (2010), medium variant projection, by 2020, one out of every five Ethiopians will be living in an urban area, and by 2030, half of the country's population will be living in urban centres and only half remain in rural-agricultural activities. Therefore, gradually agrarian change is inevitable to occur and government has to be prepared through devising appropriate policies and strategies and unleashing the potential of demographic transition to ignite the process of transformation in context of population distribution and structure.

## Conclusions

The foregoing discussions and evidences confirmed that Ethiopian agrarian population is not seemingly changing due to its scramble in high dependency, low productivity, food insecurity, out-dated technologies, low investment on agricultural sector, and ill devised and poorly understood policies. Population growth is not solely responsible for slow and lag of agrarian transformation. Instead, there are several structural, institutional, social, geographical, calamity, and policy issues.

Over several decades, the rate of growth of population is higher than food production and the need was met through food imports. There are geographical disparities in production. The distributions of Ethiopian agrarian population are not even. High concentration in highlands and sparsely populated in the lowlands. Though high population pressures in highland and drought in the lowlands have their own part, the structural problem of agriculture and government own policy of labour restriction, land policy and urban-based huge investment not only slowed down agrarian transition but also triggered economic vulnerability.

The current regime has designed a policy framework called Agricultural Development Led Industrialization (ADLI) such as the recent Growth and Transformation Plans (I, II) to shift agrarian population from agriculture to non-agricultural activities through externally induced highly productive farm technologies. ADLI, the much hoped policy framework and that guided several policies, remained hope and unable to shift economic structure. The strategies have brought about fast economic growth but without distribution of benefits to the rural majority. Moreover, the policy is not allowing smallholders' freedom to obtain sufficient inputs on competitive base in the market. The land and population policies are also implicitly discouraging agrarian transition. Still, government hopes agriculture as a potential and a promise for economic transformation and devising another generation of Growth and Transformation Plan. This demands

commitment to introduce high farm production technologies, changes of farm practices, augmenting productivity and production, amendments of land and allied policies, and sturdy investment in the agricultural sector.

It was also observed that under low rate of migration, diminishing soil fertility, slow rate of non-agricultural activities and dwindling landholding size, increase in population seems Malthusian trap. However, family farms are diversified and intensified and create a sort of agrarian change in farm a management practices as Boserup stated. Theoretically, the Boserupian thesis may work partially in the highly populated Enset-Root crop complex as well as the highly populated highlands where land is extremely fragmented, scarce, intensively used for centuries, and hence degraded. However, intensification under traditional technology is not as such responsive. Thus, the Boserup thesis worked contextually and partially in Ethiopian context though the rate of agrarian transition is extremely slow in Ethiopia.

### Conflict of Interests

The authors have not declared any conflict of interests.

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