

## **Rapid rural population growth and its determinant factors in Wolaita zone, Ethiopia**

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### **Abstract**

Rapid population growth is one of critical problems for most of Sub-Sahara African economic development. As a result of this, imbalances between population number and existing resource were intensified in developing countries including Ethiopia. Most of empirical studies show that rapid population growth was determined by different biological, social, economic and institutional factors. This study aimed to assess rapid rural population growth and its determinant factors in Wolaita zone. Relevant data were collected both from primary and secondary sources. Diverse types of data including demographic, socio-economic and policy-related data were obtained from 300 randomly selected rural households. Data were analysed using both descriptive and inferential statistics. Wolaita is characterized by a high population density and a fast population growth rate above 3 %. Population growth was indeed higher than annual national growth rate. The average household size in the study area was about 6.7 members per household. Age at first marriage, educational level, daily income and livelihood security of household heads, and contraceptive practice are consistently significant and principal factors of large household size. The population theory aspect of Malthusian, Utility Cost Theory and Mediating Theory principles mostly aligned with the study area realities. Therefore, this study points out that managing rapid population growth by implementing a strict population policy/strategy in the study area is important.

**Keywords:** Contraceptive method, Fertility, Mean Child Ever Born /MCEB/, Rapid population growth, Households.

### **Introduction**

The rate at which the global population has risen over the past few decades is unprecedented. This rise is largely the product of a sharp decline in the death rate. At the current rate of

population growth, that planet will have less than one square foot of land per human in the next thousand years (Deneke, 2008; Rubenstein, 1989). The rapid rise in the world's population has resulted in environmental degradation, resource scarcity, food shortages, problems related towards livelihoods, expansion of conflicts due to scarce resources, and disease prevalence due to malnutrition, poverty and other social problems (WHO, 2018). The rapid growth in population is attributed to over-exploitation of natural resources, division of land holdings, cutting of trees for fuel and building purposes, over-grazing of grasslands by livestock, shortening of fallow periods, over-ploughing of farmland, air and water pollution, and also over-consumption of water resources (Raul and Chandi, 2013). Therefore, Ethiopia's rapid growth is one of the biggest barriers to economic and social development and hinders achieving sustainable economic progress.

Ethiopia is the second-most populous country in Africa, and its annual per capita income of around US \$500 is the lowest on the continent. About 30 % of the population lives below the poverty line, and the extent and severity of poverty are much higher in the rural areas. Most of rural areas face population pressure, with more than 300 people per square kilometre (CSA, 2016). The size of the landholdings is less than one hectare per household and in many cases, it is as low as 0.25 hectares per household (World Bank, 2011; FAO, 2004). The commonly accepted population growth determinants are occupation, education, marital status, amount of income of family and other cultural variables (Wako, 2012).

Wolaita Zone is one of the most densely populated areas in the country with an average density of 464 persons per square kilometre (WZFEED, 2018) and depend on subsistence farming activities. The population of the area is growing at above 3 % per year (CSA, 2016; 2007). Thus, the research is intended to provide responses for how rapid rural population growth occurred in study area and to fill gaps on policies and strategies.

#### Theoretical review

The relationship between population growth and resources has been one of the debated issues for a long period of time. It was Robert Malthus who introduced some important theoretical discussions on the topic. Since then, numerous types of written documents and a variety of theories and models, debates, views and concepts have been developed by different writers and scholars. These views are briefly explained in the following sections:

Malthus's *An Essay on the Principle of Population* was first published in 1798 (Malthus, 1798) and then again in six successive editions. The starting point of his analysis is the recognition of the basic difference between the laws that regulate population growth and the laws that regulate the growth in food production. As such, the capacity of the human population for natural increase is geometric, while on the other hand, the potential for expanding food production is highly constrained by the amount of agricultural land available. As a result, population growth would always seem in the long run to outpace food production (Tegegne, 2014; Newbold, 2010).

Neo-Malthusians also have serious doubts as to the potential or capability of human beings to expand food production to keep up with the rapid population growth. For them, contemporary world hunger and famine are strongly linked to population growth. According to the neo-Malthusians, in the next few decades, world food demand will greatly increase, mainly due to rapid population growth. In addition to this, some poor countries will probably experience mounting difficulties in obtaining sufficient quantities of food for their people (Mondal, 2015; Devereux, 2005; Dyson, 1994). This view may be currently clearly observed in the poor countries of Africa such as Ethiopia (Mulugeta, 2014; Deneke, 2008).

According to Utility theory, children are consumption goods because they provide direct utilities to their parents, and they are durable in that the costs and benefits of having children extend over a relatively long period of time (Mokgadi, 2004; Hussien, 2000). Secondly, the child's utility is perceived as a potential source of security to the parents in their old age. The third is that a child's utility is as a productive agent, as a person who may be expected eventually to work and to contribute to the family's income. The lower-income families need great support from their children during their old age because of the absence of social security. Lastly, the utility of an additional child as a consumption item is fixed in both high- and low-income families (Mokgadi, 2004). This view was critically observed in the rural parts of Ethiopia and in the study area. Because poor families in rural areas see their children as one aspect of their economic assets, and this practice leads to more births, which results in rapid population growth.

Mediating Theory explains the impact that political, social, institutional and cultural matters have on the relationship between the human population growth and resources (Ali et al., 2015; Sydenstricker, 2012). This view emphasizes the mediating role played by social, economic and institutional factors, and in particular, that of the government and its policies. The influence of these factors on the population growth-resources relationship is viewed as taking place on

multiple levels. The theoretical discussion above indicates that there have been different school of thoughts based on different arguments and perspectives pertaining to rapid population growth. This clearly indicates the fact that the debate on population growth and environment is complex, and requires further inquiry and understanding with new empirical evidence.

## **Methods and materials**

### Study area description

The Wolaita zone is one of fourteen zones of the Southern Nation Nationalities Region (SNNPR) of Ethiopia. The capital of the zone, Wolaita Sodo, is located about 330 kms away from Addis Ababa, the capital of Ethiopia to the south, and 160 km from Hawassa, the capital of SNNPR to the west. The Wolaita zone lies between 06<sup>0</sup>51' and 07<sup>0</sup>35'N latitudes, and 37<sup>0</sup>46' and 38<sup>0</sup>1'E longitudes.

Wolaita zone has been further sub-divided into 12 rural *woredas*/districts and three administrative towns. As indicated in the sampling frame section three rural *Woredas* out of 15 *Woredas* in the zone, were selected as the study sites. These were Damot Gale, Damot Pulasa, and Damot Sore, and from each of these, two *kebeles* (small administrative unit) were randomly selected as specific study areas. The criterion for the selection of three rural *Woredas* as study regions was the high population density.

### The research design

Explanatory sequential mixed methods designs were used to achieve the objective of the study. Regarding data collection procedure in cross-sectional study, firstly, collection of quantitative data was conducted followed by collection of qualitative data to help explain or elaborate the quantitative results.

This research, in the first place, is based primarily on describing and critically reviewing the existing population theories. Secondly, the study has mainly been based on an applied geography approach; it has the potential to elucidate the nature and causes of the stated problems and to inform the formulation of possible responses to the investigated problems in the study area.

### Sources of data

Multiple data collection strategies are more advantageous than a single data collection strategy in research work. Thus, the selected methods used in this study to collect the necessary data

included questionnaire/ interviews, focus group discussions (FGD, 8 members in 6 kebeles), observations and secondary sources (CSA, Wolaita Zone Socio-economic Profile).

#### Sampling frame and techniques

Head of households were taken as the sample frame from the 2018 Finance and Economic Development Department report of Wolaita zone. The total number of household heads under selected study Kebele's was 5,926 household heads and about 300 household heads were randomly selected as the sample for the study.

Three rural *woredas* from the twelve *woredas* of the Wolaita zone were purposively selected as the study area and based on population densities. From each of the selected rural *woredas*, a further two peasant administrative units or *kebeles* were randomly selected.

According to Gay and Peter (2000), for descriptive research it is common to sample 5 % to 10 % of the population although this range will change with the size of the population studied. If the total size of the population is around 1500, 10% should be sampled and if greater than 2000, 5-10% should be sampled. However, the total households of this study area was 5926 as stated in the above paragraph. Therefore, the researchers used 5.06 % from the above mentioned population and 300 rural households were selected by simple random method.

Table 1. Sample size from the sampled `Kebeles` of the study area

Name of Sample PAs	Woreda	Total No of Hhs	No of Sample HHs	% of Sample
Hareto Kontola	Damot Gale	990	50	5.06
Gacheno	Damot Gale	766	39	5.06
Sheyemba Kilena	Damot Sore	1015	51	5.06
Gunino Hamus	Damot Sore	885	45	5.06
Gale Buge	Damot Pulasa	1174	59	5.06
Zamine Welisho	Damot Pulasa	1096	56	5.06
Total		5926	300	5.06

Note: 291 households responded the survey.

#### Methods of data analysis

The data drawn from questionnaires were analysed by both descriptive and inferential statistical techniques such as percentiles, averages, ratios, and multiple linear regression. Graphical and

tabular analyses were used to examine the demographic and socio-economic situations of the study area. The data obtained through interviews, focus group discussions and observation were analysed in a qualitative way. Moreover, population growth was analyzed by using logarithmic formula.

### Definition of variables

#### The dependent variable

Large number of children or household size at household level is the main direct factor for rapid population growth in the study area, in particular and in the country, in general. According to the CSA (2016) report, rural household size in Ethiopia is 5.2, and this figure is considered as a cut-off point to say large family size or small household size for the study at current study districts. Thus large or small household size from the national average is defined as a dependent variable for this study. That is the outcome of various fertility determinant factors.

#### The independent variables

Once the number of households is identified, the next step is to identify independent variables that are correlated with the availability of a large number of children. Such important household characteristics, which potentially contribute to the large household size, would be identified. The linear relationship between the dependent variable and predictor variables is used as by (Arega and Yalewelet, 2018; Dawit, 2015; Guengant and John, 2001; Jobson, 1991) as follows:

$$X = a + b_1y_1 + b_2y_2 + \dots + b_iy_i + e$$

Where: X=Dependent Variable

a= Constant (the intercept)

$y_i$ = Independent variable

$b_i$ = Regression coefficient

E= Error term

The independent variables, which are expected to have association with large family size, and identified as demographic and socio-economic factors relevant to large household size issues of the study area are defined below.

One of the signs for rapid population growth in the study area is called 'age at first marriage'. It is expected that the family with a relatively large number of dependent family members negatively correlated with age at first marriage. Practice of contraceptive methods, educational

status of household heads, the daily income of household heads, the livelihood situation of household heads and economic value of children are the most important basic factors of large household size in the study area. The numbers of the above mentioned factors are significant reasons for rapid population growth which occurred in the study zone.

## Results and discussion

### Population growth indication from secondary data sources

According to the first population and housing census of Ethiopia in 1984, Wolaita zone had a total population 976,455. However, after ten years in the second population and housing census of Ethiopia, Wolaita zone population reached 1,166,182 making up 10 % of the Southern Nation Nationalities Region of Ethiopia. The above figure became 1,501,112 in the third national population and housing census of Ethiopia. Recently according to the 2017 population and sample survey report of the Central Statistical Authority of Ethiopia, Wolaita zone had a total population of 2,091,842. Wolaita zone is characterized by a high population density (464p/km<sup>2</sup>) and a high population growth rate (3%). This revealed there was rapid population increment in Wolaita zone (Table 2).

Table 2. Population size and density of Wolaita zone (1984-2017)

Year	Male Population	Female Population	Total Population	Density/ km <sup>2</sup>
1984	485364	499091	976,455	216.4
1994	560882	572231	1,133,113	251
2007	739533	761579	1,501,112	333
2008	760740	783248	1,543,988	342
2009	785961	807559	1,593,520	353
2010	808175	832746	1,640,921	363
2011	833886	857982	1,691,868	375
2012	859386	884016	1,743,402	386
2013	885704	910875	1,796,579	398
2014	911539	938586	1,850,125	410
2016	1003146	1027220	2,030,366	450
2017	1030876	1060966	2,091,842	464

Source: Calculated by the researcher from the socio-economic profile of Wolaita zone (2018, 2014 and 2005) and SNNPR (2012); NB: The total area coverage considered was 4511.7 km<sup>2</sup>

The national and regional growth rate of population is estimated to be 2.7% and 2.8 % per annum respectively (CSA, 2016), while the population in Wolaita zone is growing at above 3.0 % per year. And also this rapid population growth was reflected on rapid population density increment and which were 216 person/km<sup>2</sup> in 1984 and it reached 464 person/km<sup>2</sup> in the year 2017 (Table 2). Which mean within 33 years gap in Wolaita zone population density were increased by more than 100 %, it is also one of a good indicators for rapid population increment of the study area.

Human population numbers are always going to change from time to time. Here seeing the three study districts' past population changes may be important for the present and future estimation of population figures. This makes its own contribution to the study of socio-economic status of rural households and the livelihood situation of the study population. As explained in methodology part earlier, the study was focused on three districts or *Woredas* of Wolaita zone in Ethiopia, namely Damot Gale, Damot Pulasa and Damot Sore.

As depicted in the above Table 3 the population growth rate in the study zone/Wolaita/ and at the three selected rural *Woredas* specifically are greater than the national growth rate of 2.7 % annually. This implies there is rapid population growth in the present specific study districts or *Woredas*.

Table 3. Population growth rate in the study districts

Name of Place/ Districts	Year of National Census			Population Growth Rate B/n Two Census in %	Population Density per Km <sup>2</sup>
	1994	2007			
Wolaita Zone	1,166,182	1,501,112	3.0		386.4
Damot Gale	100,355	151,079	3.2		627
Damot Pulasa	75,646	105,157	2.9		722
Damot Sore	70,347	100,683	3.1		620

Source: Calculated by the researcher from CSA Data (1994, 2007)

Note: Population growth of the above table is calculated by using the following logarithmic formula:



$$r = \left( \sqrt[t]{\frac{p1}{p0}} - 1 \right) \times 100$$

Where r=annual rate of population increase in %

p0= population at the beginning

p1= population at the end

t= time

#### Causes of rapid population growth in the study area

The objective of this study was to identify the presence of rapid population growth and its causes in the study area. Therefore, this part of the study focuses on the detailed discussion of the social, cultural, political and economic factors, which stimulated fast population growth.

#### Age at marriage and the subsequent high rate of fertility

In the study area, it is not uncommon for girls to enter into marriage when they reach the age of 15. As FGD discussants said parents of the ladies are very glad when their daughters are requested for marriage as early as possible. A girl older than 20 years and staying at the family home is regarded as *azinay ettidorro* (literally meaning ‘remained without having a husband’). This is considered as a curse and is shameful for both the girl and for her parents. This induces that girls marriage before 18 years of age results in high fertility.

In order to analyse the effect of age at first marriage on fertility, the respondents were divided into five categories (CSA) in terms of their age during their first marriage, namely: below 15 years, 15-18 years, 19-25 years, 26-30 years, and above 30 years (Table 4).

Table 4. Ages at first marriage and MCEB (Mean Parity) of respondents

Age at first Marriage	Frequency	%	No of ever born children	MCEB
Below 15	42	14	339	8.1
15-18	100	33.33	780	7.8
19-25	107	35.7	696	6.5
26-30	40	13.33	175	4.4
Above 30	2	0.7	5	2.5
Total	291	97	1995	6.9

Source: Survey data; the calculation considered only 291 ever married HHs.

The result obtained from the study based on the survey indicated that 14 % of the ever married women in the study area got married for the first time before they attained the age of 15. About 33.33 % married at ages between 15-18 years (Table 5). This shows that 47.33 % of women joined their marital union before they reached the age of 18. This indicates that a large proportion of women who were visited in the survey were the products of the regime of low ages at first marriage.

In all the study districts, the largest numbers of children were found in the families whose parents had coupled between the age of 15 and 18. As the age at which parents began marriage increases, the number of children in the family decreases subsequently. The reason for this was the shorter duration of marriage union for those who married late than for those who got married early to give birth for more children. Furthermore, in the study area women who got married before the age of 15 are characterized with the highest Mean Children Ever Born/MCEB/ of 8.1 children. The women age categories of 15-18 and 19-25 are 7.8 and 6.5 MCEB respectively (Table 5). The general MCEB for all age category women in study zone is 6.9 but it is lowest for late married women. Therefore, this is one of a factor for the presence of rapid population growth and large household size in Wolaita zone.

#### Perception towards contraceptive practices

Inadequate family-planning practices at community level have been another factor causing the rapid population growth in the study area. Contraception is believed to be the most proximate determinant of fertility. The researchers observed the Health Extension Workers (HEW), the Development Agents (DAs), and the peasant administrators attempting to orient people regarding the role and impacts of family planning in reducing the number of births. However, there are different problems confronting such endeavours. The social, economic and cultural constraints in the study area hinder the practice of contraception. Examples include the resistance by the beneficiaries themselves to the existing services for various reasons, such as the desire to have more children, the conflict between the use of birth control measures and religious teaching, and the belief that the female contraceptive pill is dangerous, particularly to those who cannot afford a balanced diet. According to the survey conducted at the household level, 95.7 % of the households were aware of the availability of one or more methods of contraception but only about 56.3% of the households were using the methods owing to the problems indicated in Table 5.

Table 5. Contraceptives knowledge and practice of surveyed household heads

Study <i>Woredas</i>	All Hhs	Hhs who had ever heard of a method		Hhs who had ever practiced a method	
		No	%	No	%
		Damot Sore	96	92	95.8
Damot Gale	89	83	93.2	50	56.2
Damot Pulasa	115	112	97.4	60	52.2
Total	300	287	95.7	169	56.3

Source: Survey data, 2018

According to Table 5, there is a wide gap between the knowledge of households about modern contraceptive methods and their actual use of them. Of the total surveyed households in the three surveyed *Woredas* of the zone, about 56% were actually using the methods, but the remaining 44 % were not using contraception. There were even variations in the practice of using contraceptive methods from one *woreda* to the other. For instance, in the Damot Sore *woreda*, more than 60 % of the respondents replied that they had used a contraceptive method, but in the Damot Pulasa district, the figure declined to 52 %. This may be the effect of variations in the infrastructural development from one place to another.

As explained above, there are different cultural and socio-economic factors that inhibit households from using family planning services. The factor that takes the lion's share for low practice of contraceptive method in the area is so as to have more births (41.8 %). There are also other reasons such as women's perception that the contraceptive pill is not good for their health, especially for those who cannot maintain a balanced diet (18.4 %). In addition, fears of sterilization, economic value of children, religious view, fear of child death, reluctance of husband/wife, sex preference and other factors are playing a great role for not practicing of contraceptive methods in the study area (Table 6).

Table 6. Reasons for not using contraceptives by sample households

Reasons	Proportion	
	Frequency	%
To give birth	59	41.8
Found the pills unhealthy in the absence of balanced diet	26	18.4
Fear of infertility	15	10.6
Religious view	12	8.5
Economic value of children for agricultural activity	10	7.1
Fear of child death	7	5.0
Sex preference	6	4.2
Reluctance of wife/husband	4	2.8
Unable to give birth	2	1.4
Total	141	100

Source: Survey data, 2018

Note: All the % cases are calculated from the total not practicing contraceptive Hhs of 141

#### Level of formal educational attainment of household heads

Education is described as one of the key factors which controls fertility. There is an evidently inverse correlation in many cases between the degree of education achievement and fertility. As indicated in Table 7, the findings of the study depicted that from the total 300 sample households 41 % were illiterate with a mean parity of 8.0 children. The cumulative of three study districts or *Woredas* show that the mean number of children a woman could have since survey date decreases with increasing educational level. The proportions of literate (particularly above grade 9) respondents are very low, however. About 25 % are in the attained grade1-8 category and 19 % completed grade 9 and above with mean children ever born of 7.6 and 5.9, respectively. Educational attainment in the study zone is still low. As it increases, the MCEB decreases.

According to the survey data, as presented in Table 7, almost above one-third of the rural respondents were illiterate and about one-fourth had attained a Grade 1 to 8 level of education. Thus, high fertility levels were observed among non educated groups. This implies that as the educational level increases the magnitude of fertility decreases because the awareness of educated families is better than non-educated families in practicing of family planning methods.

Besides that, education also increases the age at first marriage for female sexes. To sum up, in Wolaita zone, as the above data revealed, for rapid population increment, low educational attainment of rural households' mother impact is great.

Table 7. Educational attainment of households and MCEB (Mean Parity)

Educational Level	Frequency	%	No of ever born children	MCEB
Not Educated	123	41	984	8.0
Grade 1-8	75	25	570	7.6
Grade 9-12	58	19.3	340	5.9
Diploma & above	35	11.7	101	2.9
Total	291	97	1995	6.9

Source: Survey data, 2018

Note: The data considered only 291 ever married Hhs.

#### Socio-political and cultural factors

In this study respondents were asked to indicate the main socio-cultural and political causes of rapid population growth which they observed and occurred in their community. According to the data collected from sample households, population policy related problems got the priority. This means there is a gap between policy documented at national level and its implementation strategy which was not stringent at the local community level. The policy is like the neo-Malthusian view which favoured giving great emphasis to the campaign for contraceptive utilization through media and the education system rather than using a strict birth quota system for couples throughout their lives. Thus depicted on Table 8, 32.7 % of respondents replied as lack of clear stringent population policy implementation strategy was factor for rapid population growth which observed in the study zone.

Table 8. Socio-political and cultural causes for population growth in study area

Causes of Rapid Population Growth Rate in Study Community	Frequency	%
Lack of Stringent population policy	98	32.7
Cultural impact	54	18
Religious teaching	48	16
Fear of child death	40	13.3
Economic benefit of child	28	9.3
Poverty	32	10.7
Total	300	100

Source: Survey data, 2018

After socio-cultural factors which obtained first choice by respondents as causes for rapid population growth after the policy implementation gap were cultural influences to give more birth and religious dogmatism at 18 % and 16 %, respectively. The rural community in the study zone considers large numbers of children as increasing their ability to gain social respect in the community. They perceived that households with a large number of children cannot be attacked by other households during social conflicts in the neighbourhood. According to their outlook, households that have a few children are easily attacked when there is social disagreement in the area. The religious teaching that, “be...multiply and replenish the earth” principle was another factor which limited the practice of contraceptive utilization in the study area. Because of this a certain portion of the community rejected the family planning method and considered it as ‘a sin to limit the number of children, which are a gift from God’.

As revealed in Table 8, other additional socio-cultural factors which positively contributed to rapid population growth in the study districts were fear of child death, economic value of children and poverty at 13.3 %, 9.7 % and 10.7 %, respectively. There is a direct relationship between child mortality and fertility. That means, high mortality leads to high demand for children and consequently to high fertility when parents perceive community health conditions to be such that they have to either hoard children in order to be sure that enough children would survive to adult-hood or try to replace a child lost through child mortality to secure a given household size before the end of their reproductive ages (Deneke, 2008). Poverty is another

factor which tends to push poor families to have more children (Mondal, 2015; Wako, 2012). The parents are of this conviction because they expect the children to help them to escape from poverty during their old age. In the study area, particularly in the case of the poor agrarian families, children are considered to be a “money deposit into their bank account” to solve their socio-economic problems during old age and to resolve dangerous situations which might face the family.

According to the researcher’s observation and FGD made with the community leaders and rural *kebele* administrators, large numbers of children are considered as important productive resources of households to help them during farming in their land. The cultural attitude for the rural community in the study area is “the more the number of children, the better they produce”. According to Marxian and Boserupian population theories, the local people believe that more hands produce more food and guarantee more security in old age (Mulugeta, 2014). But what is contrasting to this attitude is that large numbers of family members are more vulnerable to food shortages than households with fewer household members. This suggests the negative impact of large household size on the household’s livelihood situation.

#### Multiple linear regression analysis of factors affecting large households size

Household size was regressed on hypothesized factors of determinants of fertility of households with those acquiring equal to the national household size 5.2 children and less than this average. The regression analysis of Table 10, shows that age at first marriage, educational level of household heads, contraceptive practice, daily income of household heads, and livelihood security of household heads are consistently significant and principal factors of large household size in Wolaita zone. This is in agreement with a research done by Arega and Yalewelet (2018) in northern Ethiopia. As the results show, age at first marriage of households is significantly and negatively ( $r=-0.853$ ) affected household size, which is the major factor for rapid population growth in the area. Economic values of children with large number of family size was not statistically significant. From six independent factors included in the analysis, five were found to have strong explanatory power on the households’ probability of large family size, explaining 76.39 % at less than 0.01 confidence levels, while the remaining 24 % were determined by other unexplained factors.

Table 9. Regression analysis result with all basic explanatory variables for large household size

Predictors	R	R <sup>2</sup>	% of Explained	Sig. Level
y1	0.853	0.7276	72.76	0.000
y1, y2	0.858	0.7362	73.62	0.000
y1,y2,y3	0.861	0.7413	74.13	0.000
y1,y2,y3,y4	0.865	0.7482	74.82	0.000
y1,y2,y3,y4,y5	0.870	0.7569	75.69	0.000
y1,y2,y3,y4,y5,y6	0.874	0.76.39	76.39	0.000

Source: Survey data, 2018

As depicted in Table 10, household size has been found to be negatively affected by age at first marriage ( $r=-0.853$ ). This is from the pre-assumption that households with smaller number of family members are the effect of late marriage. This is to be considered as ages at first marriage in the study area become the main causes of large household sizes as well as rapid population growth. But observation taken by the researcher and discussion made with community elders suggest that currently age at first marriage of the society is increasing. This may be caused by health extension work expansion in rural areas and the impact of modern education.

Table 10. Regression analysis of all independent variables for large household size

Predicators	Description	R	R <sup>2</sup>	% of Explained
y1	Age at first Marriage of Women	-0.853***	0.7276	72.76
y2	Contraceptive Practices of Hhs	-0.693***	0.4802	48.02
y3	Educational Status of Hhs	-0.761***	0.5791	57.91
y4	Daily Income of Hhs	-0.673***	0.4529	45.29
y5	Livelihood Status of Hhs	-0.601***	0.3612	36.12
y6	Economic Value of Children	0.201	0.0404	4.04

\*Significant at 0.01 level

Source: Survey data, 2018

When the educational status of households became higher, the probability of households to have a fewer number of children has been confirmed with the study done by Dawit (2015) at national



level . Those educated farmers in the study area had better access to contraceptive knowledge and practice, and more benefited from resources than the uneducated farmers. It is the second most important factor after age at first marriage of household heads for large household size in the study area. As earlier stated, uneducated families have been characterized with large family size in the study area.

In addition to this, the practice of contraceptive methods, daily income of household heads and livelihood status of household heads affect large family size and population growth of the study districts. However, the economic value of children had an inverse result despite the presumption that rural farmers would have a greater interest in child labour than craftsmen and petty-trade farmers. In all accounts, rapid population growth blocked the farming population from access to possession of abundant farmland and resource utilization. It also squeezed them within the vicious circle of poverty in general and low livelihood status in particular in the Wolaita zone.

### **Conclusions**

Wolaita is characterized by a high population density (464p/km<sup>2</sup>) and a high population growth rate above 3 %. Population growth rate in the zone and in the selected three rural *Woredas* specifically are greater than the national growth rate of 2.7 % annually. The average household size for all the surveyed households was about 6.7 members per household. This is well above the estimated national rural area average household size of 5.2 in 2016 demographic and health survey report of Ethiopia.

The determinant factors for rapid population growth were age at first marriage of girls, low practice of contraceptive methods, low level of educational attainment of rural communities, and socio-cultural and political causes like religious teaching, lack of stringent population policy implementation strategy, fear of child mortality and poverty. Moreover, regression analysis shows that age at first marriage, educational level of household heads, contraceptive practice, daily income of household heads, and livelihood security of household heads are consistently significantly associated with large household size. Therefore, the above mentioned independent factors are the major causes of the rapid population growth rate in Wolaita area. Thus, to combat this problem, joint strategies on implementation of birth control need to be devised by various stakeholders such as the government, NGOs, researchers, experts in education, the health sector, community elders, rural administrators, and religious leaders. A motivating strategy is also required for rural households that manage the number of births in the study area.

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