

**COMPARATIVE ANALYSIS OF INDIGENOUS AND NON-INDIGENOUS
HOUSEHOLD DIETARY DIVERSITY STATUS: THE CASE OF BAMBASI
DISTRICT, BENISHANGUL GUMUZ REGIONAL STATE, WESTERN
ETHIOPIA**

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ABSTRACT: *Low dietary diversity in the rural household is a major problem in developing countries due to different factors. The aim of this study is to assess dietary diversity level and its associated factors among indigenous and nonindigenous households in Bambasi district, Western Ethiopia. A cross sectional data which covered a sample of 260 households collected using a semi structured interview schedule. A multi stage sampling procedure was used. A household dietary diversity score based on 12 food groups was created using seven days recalls. A descriptive statistics analysis was applied. An order logistic regression model was used to determine the factors that influence both indigenous and nonindigenous household dietary diversity. The result of the study revealed that indigenous household had better dietary diversity status than nonindigenous household heads. Age of the household heads, access to extension and access to nearest markets are the major determinants of rural households in the area. Despite of this, access to credit, farm income, farm size and dependency ratio are the major determinants for nonindigenous household heads whereas participation in small scale irrigation and education are major factors of dietary diversity of the indigenous household heads. Therefore, we recommended that food and nutrition interventions focusing on improving dietary diversity and quality should due attention to develop community specific interventions instead of generalized interventions. However, further investigation focused on seasonal dietary diversity and individual level dietary diversity of the study area.*

Key words: Dietary diversity, Indigenous and Non-indigenous Household, Ordered logit model, Bambasi Ethiopia

INTRODUCTION

Globally, more than 800 million people were suffering from food insecurity and malnutrition due to consumption of monotonous food groups. The monotonous consumption habits of the population of the world related with low level of income, climate change, conflict and war, population growth and others (FAO *et al.*, 2018). This indicates the food insecurity directly or indirectly contributes for under-nutrition and over-nutrition, and high rate of multiple forms of malnutrition coexist in many countries especially low and middle-income counties and concentrated among the poor.

In developing countries, majority of households resides in rural areas and their livelihoods obtain from agriculture and other agriculture related activities; increasing agricultural productivity is seen as the critical step for ensuring sustainable food security (Headey, 2011; Kirimi *et al.*, 2011). The growing substantial evidence on dietary diversity indicates that the success of agricultural productivity depends on the expansion of market opportunity (Birhanu *et al.*, 2016; Jones, 2017; Somé and Jones, 2018), utilization of improved agricultural technologies, and improvement of access to different services like extension (health and agriculture), credit services, information access and expansion of formal and informal education in Ethiopia.

The prevalence and coexistence of different forms of malnutrition could be exists not only within the countries and communities but also within the households and individual persons may affects throughout their lifetime (FAO *et al.*, 2018). Malnutrition affects the whole segments of world population even if there is a disparity in the distribution, prevalence and forms of malnutrition.

The food consumption trend in Ethiopia is neatly associated with settlement of the population, cultural taboos and religious practices. For instance, the Orthodox church followers restrict to consume animal derived food sources during the fasting seasons which accounts for five to seven months per year for adults (Rakesh and Tafesse, 2010). Therefore, in Ethiopia, the consumption habits of foods largely depend on cereals and low dense food varieties and limited animal source foods (Girma *et al.*, 2015; Workicho *et al.*, 2016; Direslign *et al.*, 2016; Seleshi *et al.*; 2014).

The traditional dietary practices have been seen disparity among indigenous and non-indigenous households that involves the consumption of locally available and processed foods. It is the assumption of disparity is being driven in large parts by change in agricultural production system and eventually in food production and consumption. This disparity is bold in low and middle-income countries since these countries may use produce food and commercial crops and livestock in traditional way. This traditional production system of agriculture leads no or limited consumption of diverse and nutritious food groups to enhance health and health system of the people. According to Kuhnlein *et al.*, (2009), indigenous households had better food consumption habit than non-indigenous households since the indigenous households were consumed wild plants and animals in addition to farm products. This study aims to compare the dietary diversity status of the indigenous and non-indigenous household and to identify the major determinants of dietary diversity status of the two communities in the study area.

METHODOLOGY

Research sample

Bambasi district was selected using a purposive sampling method. A cross sectional survey design was used. In this study, the total population of the district was divided into groups by using ethnics (indigenous and non-indigenous households). The participants were

selected from a list of communities from the selected kebeles. For this study, a total of 260 households was randomly selected from five kebeles of the district. Among the total sampled households about 111 indigenous households and 149 non-indigenous households were selected and interviewed to obtain information on the dietary diversity difference between these ethnic groups. A survey was conducted by using a semi-structured interview schedule. All respondents of indigenous households were local language speakers (*Bertigna*) in addition to Amharic language whereas the non-indigenous households were speakers of *Amharic* and *Affan Oromo*. Therefore, the interview schedules were initially prepared in English and translated into Amharic. This interview schedule consists of socio-demographic characteristics, economic activities, farming systems, food consumption habits, and other cross-cutting issues related to dietary diversity. This interview schedule was adopted from FAO (2011) guidelines and followed the standard procedures and technical issues of the survey instrument. The survey instrument was pre-tested and made comprehensive modifications based on feedbacks. Seven-day recall Household Dietary Diversity Score (HDDS) questionnaire with 12 food groups was used to determine dietary habits and quality of food consumption of these households (FAO, 2011).

A written permission for the collection of data was obtained from the Haramaya University department of Rural Development and Agricultural Extension, Ethiopian agricultural research institute and Bambasi district agriculture office. Both Microsoft Excel (Ms Excel 2010) and Statistical Package for Social Science software version 22 (SPSS Version 22) were used to analyze the data. Descriptive and econometric model analysis were used to assess the consumption and dietary diversity difference of rural indigenous and non-indigenous households. The model fitness and the presence of multicollinearity were assessed. The data was presented as mean, percentage and standard deviation.

Empirical model specification:

The general objective of this study was to examine the major determinant of rural indigenous and non-indigenous household dietary diversity of the study area. Determinants of dietary diversity are composed of many factors including socio-economic factors, biophysical, demographic factors, and other issues. Therefore, to examine the dietary diversity of rural households needs appropriate model to accommodate all these aspects of data and to reach feasible and pertinent outcomes. Research studies on household dietary diversity were analyzed by using different econometric models (Kiboi *et al.*, 2017; Taruvinga *et al.*, 2013; Puaza *et al.*, 2016; Samson *et al.*, 2017; Demeke *et al.*, 2017). However, this study was categorical and ordinal in nature. The outcome of this study represents an underlying continuous scale subdivided into three categories; the best modeling framework is an ordered logistic model (Green 2003; Gujarati 2004; Long and Freese, 2006; Ingelmo *et al.*, 2011). The ordered logistic model is widely used for analyzing such categorical dependent variables (Green 2003; Gujarati 2004; Train, 2009).

Dietary diversity is divided into three categories in ascending order of diversity and codes as: 0 = low dietary diversity, 1 = medium dietary diversity and 2 = high dietary diversity.

Let “y” denote the observed dietary diversity level in the household i , y^* the latent dietary diversity measure. “x” is the matrix of independent variables. In this study, $j = 3$. The latent regression of dietary diversity of the y_i^* is expected as:

$$y_i^* = x_i\beta + \varepsilon_i$$

Where i is the observation, β are the regression coefficients for “x”, ε_i is the identically and independently distributed error term.

Let μ_κ be the dietary diversity thresholds = 1, 2... j . level $\kappa = 1$ represents the minimum threshold (low dietary diversity). The values of “y” are represented as

$y = 0$ low dietary diversity if $y^* \leq \mu_1$

$y = 1$ medium dietary diversity if $\mu_1 < y^* \leq \mu_2$ (2)

$y = 2$ high dietary diversity if $y^* > \mu_3$

Where a “j” denotes number of dietary diversity levels (categories). The general form of the probability that the observed y falls into category j and the “ μ ”s and the “ β ”s are to be estimated with an ordinal logit model is

$$Prob(y = j) = 1 - L(\mu_{j-1} - \sum_i^k B_k x_k) \dots \dots \dots (3)$$

Where L = represents the cumulative logistic distribution. The “ β ” values for all j dietary diversity levels are the same. However, this parallel line assumption may very often not hold (Sasidharana and Menéndez, 2014)

RESULTS AND DISCUSSION

Socio-demographic characteristics

About 260 respondents were selected from Bambasi district using multistage sampling methods and among the 260 households 111 (42.69%) respondents were from indigenous households and the rest 149 (57.31%) were from non-indigenous households. Most of the sample (80.0%) of the head households was men. The age distribution of the respondents ranges from 23-71 years. The results in Table 1 show that, 80.18% and 83.22% of indigenous and non-indigenous household heads were married, respectively.

Table 1. Socio-demographic characteristics of the study population of Bambasi district, 2018

| Variable | Indigenous (N=111) | | Non-indigenous (N=149) | | <i>t</i> - test or <i>x</i> ² test |
|-------------------------------------|-----------------------|--------|---------------------------|-------|--|
| | Mean or % | SD | Mean or % | SD | |
| Family size (AE) | 4.95 | 1.994 | 4.11 | 1.364 | 4.041*** |
| Dependency ratio | 1.08 | 0.765 | 0.87 | 0.672 | 2.393** |
| Age of household head | 45.00 | 10.435 | 47.54 | 9.521 | -2.045** |
| Farm size (ha) | 2.12 | 0.896 | 1.37 | 0.785 | 7.218*** |
| Livestock Ownership (TLU) | 5.76 | 3.962 | 4.74 | 3.530 | 2.191** |
| Crop diversity (CDI) | 0.28 | 0.057 | 0.27 | 0.072 | 0.559 |
| Annual farm income (ETB) (x 1000) | 9.60 | 0.529 | 9.30 | 0.854 | 3.195*** |
| Off/non-farm income (ETB) (x 1000) | 1.47 | 3.270 | 2.95 | 4.137 | 3.109*** |
| Market distance (km) | 7.18 | 1.215 | 10.75 | 2.010 | -16.594*** |
| Sex (being male) | 78.38 | | 81.21 | | 0.318 |
| Marital status | | | | | |
| Married | 80.18 | | 83.22 | | |
| Divorced/separated | 9.01 | | 7.38 | | 9.026* |
| Widowed | 10.81 | | 9.40 | | |
| Educational Status | | | | | |
| Illiterate | 30.63 | | 26.17 | | |
| Able read and write | 27.93 | | 28.19 | | 0.836 |
| Primary school | 36.94 | | 41.61 | | |
| Secondary school | 4.50 | | 4.03 | | |
| Home gardening (yes %) | 94.59 | | 87.25 | | 3.950** |
| Participation in irrigation (yes %) | 90.09 | | 43.62 | | 59.230*** |
| Access to Extension (yes %) | 90.99 | | 79.19 | | 6.664** |
| Access to credit (yes %) | 84.68 | | 62.42 | | 15.621*** |

Source: field survey, 2018

The mean age of indigenous household heads and non-indigenous household heads were 45 ± 10.44 and 47.54 ± 9.52 years, respectively. The descriptive and inferential analysis result of the two ethnic groups shows mean significance difference between age of household heads from indigenous and non-indigenous household at less than one percent. The comparison in family sizes was recorded higher from indigenous households (4.95 ± 1.99) than non-indigenous households (4.11 ± 1.36) in the study area. The *t*-test result revealed that there is a significant mean difference of family size between indigenous and non-indigenous households at less than one percent (Table 1).

There is a significant mean difference between indigenous and non-indigenous households of the household head annual farm income (9600 ± 529 and 9360 ± 854 in ETB, respectively). Similarly, mean annual off/non-farm income of the household heads show, there is a significant mean difference between two ethnic groups in the study area. About 30.63% of indigenous household heads were illiterate while 26.17% of non-indigenous were illiterate. Similarly, the non-indigenous household heads have higher number of attending formal education than indigenous household heads (Table 1).

The comparison in the participation of in an irrigation scheme revealed that the indigenous household head were higher than to their counterpart in the area. As indicated in Table 1 about 90.09 % of indigenous households and 43.62% of non-indigenous households were participated in small scale irrigation scheme to produce seasonal and perennial crops. This shows there is statistically significant proportional difference between those societies at $p < 0.0001$ ($\chi^2 = 59.23$).

Food consumption of indigenous and non-indigenous households

In Ethiopia the consumption pattern of the population is diverse, and, unlike other developing countries, no single crops dominate the national food baskets (Berhane *et al.*, 2012). This indicates that the food basket of Ethiopian households consists of a wide variety of staple and grains. In this regard, the quality, quantity and composition of food consumption vary by place of residence, agroecology, ethnic cultural trends, socioeconomic level of the people and livelihood strategy.

The regional consumption patterns generally relay on staple starch food and food grains. For instance, Benishangul Gumuz consistent with production potential of cereal crops such as maize, sorghum, finger millet, the population were the highest consumers of cereal crops as well as legume crops (ground nut, chick pea) (Berhane *et al.*, 2012). Therefore, the consumption behaviors of the sample household were relied on cereal and legume or protein rich source of food.

Table 2. Food group consumption between indigenous and non-indigenous households

| Food group | Indigenous (n=111) | Non-indigenous (n=149) | Chi-square test (X^2) |
|--------------------|--------------------|------------------------|------------------------------|
| | Percent | Percent | |
| Cereals | 100.00 | 100.00 | - |
| White root & tuber | 41.44 | 26.80 | 6.122** |
| Vegetable | 62.16 | 75.17 | 5.087** |
| Fruits | 17.12 | 19.46 | 0.233 |
| Meat | 42.34 | 46.31 | 0.405 |
| Egg | 49.55 | 23.49 | 19.087*** |
| Fish | 7.21 | 1.34 | 5.917** |
| Legume | 37.84 | 44.30 | 1.092 |

| | | | |
|-----------------------|-------|-------|-----------|
| Milk & dairy products | 84.68 | 61.74 | 16.44*** |
| Oil | 91.89 | 90.60 | 0.131 |
| Sweet | 77.48 | 73.15 | 0.634 |
| Spice | 80.18 | 94.63 | 13.014*** |

***, and ** statistically significant at 1% and 5%, respectively

The observed distribution of food varieties consumption suggests that on average, both societies' diets are commonly dominated by food groups of cereals, oils, condiments and sugars (sweet). This may show the communities of the study area the consumption of food variety are more crops and crops products rather than animal derived food groups (exceptional milk and dairy products). Table 2 shows the proportional consumption of various food groups by the indigenous and non-indigenous households of the study area. There is statistically disparity between indigenous households and nonindigenous households in consumption of some food groups: white and root and tubers, vegetables, spices, eggs, milk and dairy products and fish. Therefore, the study shows the indigenous households were consumed better in food variety than the nonindigenous households. Similarly, as compared within the animal derived food, based on the proportion consumption, all other animal derived foods; milk had the highest consumption and fish had the least food groups by both indigenous and non-indigenous households in the study area. From animal derived food groups, the indigenous households were better consumer than the non-indigenous households. Evidently, the consumption of white root and tuber, eggs, fish milk and dairy products, oils, and sugar and sweets food groups by indigenous households were much higher than the nonindigenous households. In general, the culinary and consumption habits in each of the society are homogeneous in consumption of cereals, oil and spice food groups.

Dietary diversity of indigenous and nonindigenous households

The dietary diversity categories of the study population were conducted by adapting the FAO (2011) version of dietary diversity guideline. According to the FAO guideline we create mutually exclusive categories of dietary diversity as derived from 12 food groups into; low, medium and high dietary diversity. Based on this category, Figure 1 shows that the three categories of indigenous and non-indigenous household heads dietary diversity status. Generally, the study revealed that the indigenous household heads have the smallest number of low dietary diversity status than the nonindigenous household heads. Comparing dietary diversity status of the two ethnic groups, indigenous household heads have better than the counter part in the study area (fig. 1). This distinct proportional difference in household dietary diversity status was statistically significant at ($\chi^2 = 9.514$) $p < 0.001$. The mean dietary diversity score for indigenous household heads were 2.14 ± 0.06 and for nonindigenous household heads were 2.03 ± 0.07). This shows that indigenous households were relatively higher dietary diversity score than non-indigenous household heads. About 84.70 % of the indigenous households and 70.5% of non-indigenous households were

consumed more than four food groups within seven days recalling period.

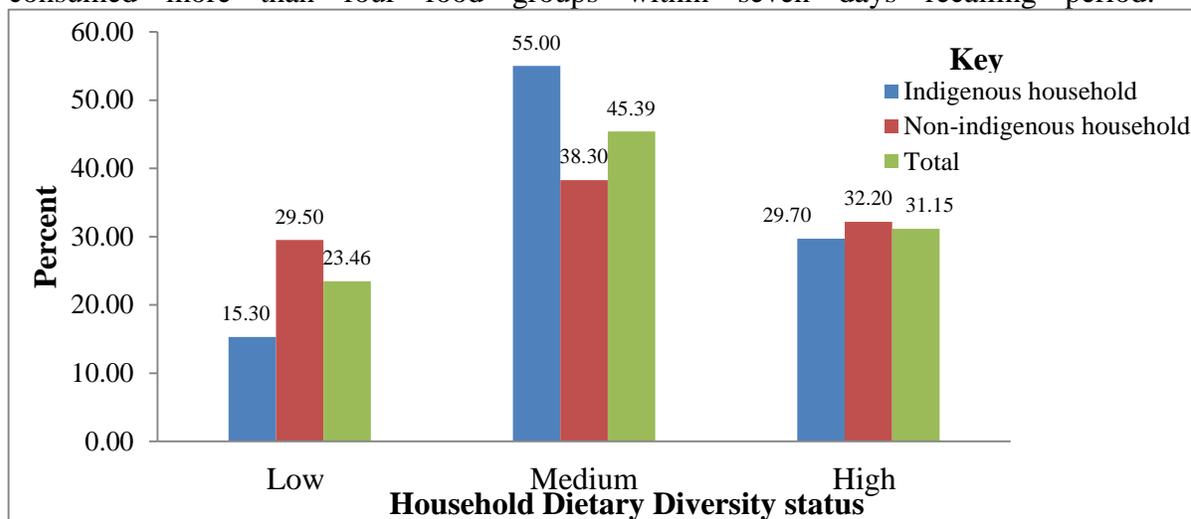


Figure 1. Comparison of dietary diversity condition of indigenous and nonindigenous households

Determinants of household dietary diversity

This section presents the major determinants of household dietary diversity of indigenous and nonindigenous households. Many variables assumed to be major determinants of dietary diversity status of the study society were tested for their significance prediction on the outcome variable. All necessary tests were made to check the multicollinearity effects of predictor variables. The ordered logistic regression analysis shows that age of the household heads was an important determinant of dietary diversity status of the study area. This was true for both study societies, but the marginal effects analysis of the household dietary diversity has different values. A one year increases in the age of the indigenous and nonindigenous household head increases by the probability of falling into higher dietary diversity by nearly 1% reduces the likelihoods of being low dietary diversity by 0.32% and 0.87% of indigenous and nonindigenous households of the study population, respectively. Those who are old aged household heads may have more experiences in social and physical environment and have accumulated knowledge of farm production as well as food nutritional values than young aged household. This study result supported by studies done in Kenya (Demeke *et al.*, 2018) and Ethiopia (Gebrehiwot, 2008).

The other significant factor for study households was dependency ratio. It was found that households with lowest dependent members in the households found to be in higher household dietary diversity. This was true for nonindigenous society but not for indigenous society. The result show that dependency ratio has strongly and negatively significant relationship with better dietary diversity ($P < 0.001$). The household could diversify their job opportunities by coordinating and contributing their labor for agricultural production and income generation. It expected that when the household members are involved in

different job opportunities for diversifying their income, they can improve the purchasing power of various food items and enable the household to become high dietary diversity status. This result supported by study done in Ethiopia (Workicho *et al.*, 2016) and India (Parappurthu *et al.*, 2015).

Table 3. Maximum likelihood estimates of ordered logistic regression analysis for indigenous households (N= 111)

| DD1SLEVEL | Coef. | Std. Err. | Z | P> z | Marginal effects of HDDS level | | |
|--------------------|--------|--------------|-------|----------|-----------------------------------|---------|---------|
| | | | | | LDD | MDD | HDD |
| | | | | | dy/dx | dy/dx | dy/dx |
| AGE | 0.075 | 0.030 | 2.52 | 0.012** | -0.0032 | -0.0059 | 0.0092 |
| SEXHEAD (Female) | 2.281 | 1.708 | 1.33 | 0.182 | -0.0983 | -0.1805 | 0.2789 |
| MARTALST (Married) | 1.981 | 1.123 | 1.76 | 0.078* | -0.0854 | -0.1568 | 0.2422 |
| ADULT_EQUVT | -0.175 | 0.178 | -0.98 | 0.326 | 0.0075 | 0.0138 | -0.0214 |
| DEPRATIO | -0.314 | 0.417 | -0.75 | 0.452 | -0.0135 | -0.0249 | 0.0384 |
| ILLITRATE | 3.873 | 1.503 | 2.58 | 0.010** | 0.1671 | 0.3066 | -0.4737 |
| ABLREADWRT | 3.126 | 1.462 | 2.14 | 0.032** | -0.1348 | -0.2475 | 0.3822 |
| PRIMARY | 2.524 | 1.402 | 1.8 | 0.072* | -0.1089 | -0.1998 | 0.3087 |
| FARMSIZE | 0.165 | 0.389 | 0.42 | 0.673 | -0.0071 | -0.0130 | 0.0201 |
| CDI | -9.458 | 5.415 | -1.75 | 0.081* | -0.4079 | -0.7487 | 1.1566 |
| TLU | -0.046 | 0.070 | -0.66 | 0.509 | 0.0020 | 0.0037 | -0.0056 |
| HOMEGARD | -0.092 | 1.127 | -0.08 | 0.935 | 0.0040 | 0.0073 | -0.0112 |
| FARMICOME | -0.509 | 0.678 | -0.75 | 0.452 | 0.0220 | 0.0403 | -0.0623 |
| OFF-INCOME | -0.084 | 0.079 | -1.06 | 0.228 | 0.0036 | 0.0067 | -0.0103 |
| ACCEXTN | 4.152 | 1.198 | 3.47 | 0.001*** | -0.1791 | -0.3287 | 0.5077 |
| CREDIT | -0.421 | 0.719 | -0.59 | 0.558 | 0.0182 | 0.0333 | -0.0515 |
| MARKDIS | 1.050 | 0.285 | 3.69 | 0.000*** | 0.0453 | 0.0831 | -0.1284 |
| PARTCIRR | 3.722 | 1.057 | 3.52 | 0.000*** | -0.1605 | -0.2946 | 0.4552 |
| /cut1 | 4.535 | 9.353 | | | | | |
| /cut2 | 9.380 | 9.398 | | | | | |

The household educational level was relationship with dietary diversity. In the present study, indigenous household heads were more significantly influenced by education status. This could be education have a significant relationship with household dietary diversity. However, the magnitude and the direction of the predictor variables were not similar. As indicated in Table 3 the household who have not attending formal education (illiterate) have a negative and significant influence on high dietary diversity while the household who

able to read and write has a negative and significant relationship with household dietary diversity for indigenous households; however, this was not true for nonindigenous households. This could be that more educated household will ensure the household members to be diversified food consumer through gaining information from various sources. Education improves the knowledge health and nutrition but also lowers the cognitive cost associated with consuming variety of food items. The educated household head assign a significant proportion in food budget to various food groups (Block, 2003; Parappurathu *et al.*, 2015) that are nutritionally dense mainly since they have greater awareness and understanding of health benefits of food groups (Smith, 2004).

Table 4. Maximum likelihood estimates of ordered logistic regression analysis for nonindigenous households (N= 149)

| DD1SLEVEL | Coef. | Std. Err. | z | P> z | Marginal effects of HDDS level | | |
|-------------------|--------|--------------|-------|----------|-----------------------------------|---------|---------|
| | | | | | LDD | MDD | HDD |
| | | | | | dy/dx | dy/dx | dy/dx |
| AGE | 0.050 | 0.021 | 2.37 | 0.018** | -0.0087 | -0.0007 | 0.0094 |
| SEXHEAD (Female) | 0.416 | 0.886 | 0.47 | 0.639 | -0.0728 | -0.0056 | 0.0784 |
| MARTALST(Married) | 0.042 | 0.548 | 0.08 | 0.939 | -0.0073 | -0.0006 | 0.0079 |
| ADULT_EQUVT | 0.230 | 0.150 | 1.53 | 0.126 | -0.0402 | -0.0031 | 0.0433 |
| DEPRATIO | 0.881 | 0.301 | 2.93 | 0.003*** | 0.1540 | 0.0118 | -0.1658 |
| ILLITRATE | 2.745 | 1.867 | 1.47 | 0.142 | 0.4799 | 0.0369 | -0.5168 |
| ABLREADWRT | -2.070 | 1.808 | -1.14 | 0.252 | 0.3618 | 0.0278 | -0.3896 |
| PRIMARY | 1.582 | 1.810 | 0.87 | 0.382 | -0.2765 | -0.0213 | 0.2978 |
| SECONDARY | 0.660 | 2.095 | 0.32 | 0.753 | -0.1154 | -0.0089 | 0.1243 |
| FARMSIZE | 1.109 | 0.336 | 3.30 | 0.001*** | -0.1939 | -0.0149 | 0.2088 |
| CDI | 0.042 | 2.627 | 0.02 | 0.987 | -0.0074 | -0.0006 | 0.0080 |
| TLU | -0.001 | 0.061 | -0.01 | 0.995 | 0.0001 | 0.0001 | -0.0002 |
| HOMEGARD | -0.186 | 0.557 | -0.33 | 0.739 | 0.0325 | 0.0025 | -0.0350 |
| FARMICOME | 1.494 | 0.352 | 4.25 | 0.000*** | -0.2612 | -0.0201 | 0.2813 |
| OFF-INCOME | -0.001 | 0.044 | -0.03 | 0.976 | 0.0002 | 0.0000 | -0.0002 |
| ACCEXTN | 1.399 | 0.437 | 3.21 | 0.001*** | -0.2446 | -0.0188 | 0.2634 |
| CREDIT | 0.781 | 0.383 | 2.04 | 0.042** | -0.1365 | -0.0105 | 0.1470 |
| MARKDIS | 0.259 | 0.101 | -2.56 | 0.010** | 0.0454 | 0.0035 | -0.0489 |
| PARTCIRR | -0.004 | 0.367 | -0.01 | 0.991 | 0.0007 | 0.0001 | -0.0008 |
| /cut1 | 22.286 | 13.472 | | | | | |
| /cut2 | 24.609 | 13.501 | | | | | |

According to the study, farm size was another determinant of dietary diversity in the area. However, this was not true for indigenous society. Farm size of the nonindigenous household heads influenced positively and significantly household dietary diversity at less than 1% probability level. A one unit increase in the land holding of the household head increases by the likelihood of falling into higher dietary diversity nearly 21% and reduces the probability of falling into lower dietary diversity by 19.39%. This could be explained by the probability that more farm size increases farmers cultivate more diverse crop types which in turn would help them to produce more yields. The successful more production helps to enhance and improves the consumption of diversified food groups of the households. This study has consistent with the study done by Mbwana (Mbwana *et al.*, 2016).

The other significant and important determinant of household dietary diversity was household annual farm income. It was found that households with the low annual farm income were more likely to be lower dietary diversity compared to the higher farm income. But this was not true for all study societies. Annual farm income was positively and significantly influence on the nonindigenous household but not indigenous household of the dietary diversity conditions. A one unit (ETB) increase in the annual farm income of the nonindigenous household head increases by the likelihood of falling into higher dietary diversity by 28.13% and reduces the probability of falling into lower dietary diversity by 26.12%. This might be since the nonindigenous rural households obtain their wealth (income) from selling of agricultural products and purchase food crops to fill nutritional requirements. However, the indigenous households might be attaining nutritious foods through gathering and hunting wild animals and plants in addition to purchasing and on farm production. This study finding is consistent with study results reports from India (Parappurathu *et al.*, 2015), China (Liu *et al.*, 2014), and Malawi (Jones *et al.*, 2014).

According to the study, access to agricultural extension services was other determinants of household dietary diversity. Access to agricultural extension services was positively and significantly correlated with high dietary diversity of the study populations at less than 1% probability level. But the magnitude of significant influence of access to extension on household dietary diversity was varied across the two societies. For instance, as indicated in Table 3 and 4 the household who have the access to extension services the probability of the indigenous and non-indigenous household falls into high dietary diversity increases by 50.77% and 26.34% and reduces the likelihood of being low dietary diversity by 17.91% and 24.46%, respectively. The probable reason could be extension service widens the farmers' knowledge, skill, and experiences with regards to the utilization of improved agricultural technologies and farm management practices. This successful utilization of farm operation helps to promote the farm production and productivity as well as improves the consumption of diversified food groups – solve nutritional problems of chronic energy deficiency and micronutrient deficiencies of rural households.

Another factor that was correlated with household dietary diversity of both societies is the walking distance (in kilo meters) to a market distance which was negatively influence the higher dietary diversity situations. The findings of this study reveal that households that are walking more distance for getting market place are more likely to have lower dietary diversity than the households who are less walking distance. This confirms that reducing the walking distance to the local market by one kilo meter would have a larger positive effect on household dietary diversity. This imply that the nearest market access matters for dietary quality of farm households (Birhanu *et al.*, 2016). However, the magnitude of significance influence of the market distance on household dietary diversity was different across the societies. For example, being all other things constant, a one unit (km) increase in the market distance for the indigenous and nonindigenous household head decreases 12.84% and 4.89% by the likelihood of falling into higher dietary diversity nearly 13% and 5% and increases the probability of falling into lower dietary diversity by 4.53% and 4.54%, respectively. A shorter and better market access has positive influence on household dietary diversity since the household head able to be purchased better quality and various food items (Pauze *et al.*, 2016; Babatunde *et al.*, 2007).

According to the study, participation in small scale irrigation scheme was another determinant of dietary diversity in the area. Participation in small scale irrigation scheme of the household head influenced positively and significantly household dietary diversity at less than 1% probability level. However, this was not true for nonindigenous society. This imply that the indigenous household who were participating in small scale based agricultural production more likely to have better dietary diversity at household level. This could be explained by the probability that participation in an irrigation farming of households leads to cultivate more diverse crop types which in turn would help them to produce more yields since they can produce two or more within one cropping season. Eventually, the production of varied crops through irrigation that improves the consumption of diverse food groups from on production as well as earns more income from selling their farm products. This finding is consistence with Taruvinga *et al.* (2015) who reported that access to irrigation significantly and positively affects the household dietary diversity.

Access to credit is one of the most important determinants of household dietary diversity in study area. The coefficient of access to credit service by the household were positive and significant in households indicating that the households who have access to credit services were likely to be better dietary diversity status. This is not true for nonindigenous societies. A possible explanation of the credit services receipts is economically equipped with the knowhow and awareness how to utilize the financial resources effectively and efficiently. The positive influence of access to credit on household dietary diversity has been well acknowledged in the theoretical and empirical literature. For instance, Degye, *et al.* (2013) and Anduamlak *et al.* (2018) have reported a positive and significant effect on household dietary diversity of access to credit. Therefore, our findings are consistent with the theory and past empirical study findings.

CONCLUSION AND RECOMMENDATION

The purpose of this study is to examine the factors that affects the dietary diversity status among indigenous and nonindigenous rural household in Bambasi district. The study found difference in dietary diversity status between indigenous and nonindigenous households. The dietary diversity status in study revealed that about nearly 3/4th and 2/3rd of indigenous and nonindigenous households were consumed more than four food groups. Comparatively indigenous household that have better dietary diversity status than nonindigenous one. The major factors which affect dietary diversity status of both societies are age of household head, access to extension service and distance to market. Despite of this, access to credit, farm income, farm size and dependency ratio are the major determinants for nonindigenous household heads whereas participation in small scale irrigation and education are the major factors of dietary diversity of the indigenous household heads. Therefore, we recommended that food and nutrition interventions focusing on improving dietary diversity and quality should due attention to develop community specific interventions instead of generalized interventions. Food and nutritional security interventions focusing on promoting market access and enhancing and creating better access to extension service of the societies. Additionally, interventions in all significant factors the enhancement and improvement may recommended to help the household to improve the diet quality and diversity in the study area. However, further investigation focused on seasonal dietary diversity and individual level dietary diversity of the study area.

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