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Blending Whey Powder with Haricot Bean Powder for Weaning Food Production

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Abstract

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Enriched foods consist of a mixture of cereals, pulses with vitamins and minerals, intended to provide a balanced intake of essential nutrients for vulnerable groups. Whey is the milk component remaining after removal of casein, as by curdling. The large amount of whey generated by dairy industries during cheese production currently is discharged into nearby streams, causing environmental pollution. The main aim of this study was to produce weaning food by blending whey powder with haricot bean powder. The raw materials used were whey and haricot bean (Phaseolus vulgaris), Roba 1 variety. Whey was filtered through an ultra-filtration membrane, permeate was stored at 5 °C and then pre-heated at 55 °C for 40 min. Vacuum pump was used to concentrate the soluble solid to 60%, and it was cooled to 5 °C. Finally, it was dried by means of a pressure-nozzle spray dryer, and powder product was obtained. The bean seeds were weighed into a plastic pan and soaked in distilled water for 12 h at 25 °C. The pan was covered with clean muslin and kept in darkness at 25 °C to sprout. Seeds that sprouted within four days were dried, ground and stored at 4 °C. The whey and haricot bean powder were mixed in various mix ratios and analyzed for their physico-chemical and bacteriological quality. The protein, iron and fat content of whey powder was 7.9%, 1.14% and 1.12% respectively. The fat was increased to 1.95%, protein to 13.94% and iron to3.02% through blending with haricot bean powder. The microbiological results of all fortified products were within the limits recommended. This study clearly indicates that there is a possibility of blending of whey powder with the high protein content of haricot bean powder, providing an option to develop low-cost weaning and supplementary foods from pulses. The nutritional content of a mix of whey: haricot bean powder in the ratio 80:20 was the best composition for fulfilling the nutritional requirements for young children.

Key words: fat, haricot bean, protein, whey, whey powder

INTRODUCTION

Whey is the milk component remaining after the removal of casein, as by curdling. Whey contains approximately half of the original nutrients of milk (Omar et al, 2005). When humans began to make cheese, the secondary product, whey, presented a challenge for utilization (Webb, 1998). Whey has a high biological oxygen demand (BOD), and must be treated prior to disposal. Bioconversion of lactose in whey to ethanol, yeast biomass or methane has been used to produce saleable products, while reducing the organic load by >75% (Karand Misra, 2000).

The food industry produces a considerable amount of waste products that are still rich in organic substances, although they are a potential source both for the extraction of valuable compounds and for the production of edible biomass (Carlo, et al. 1999). This is also true of cheese whey, which is the major by-product of the cheese-making industry, and which in the past was often regarded as a waste product, and caused environmental pollution by its disposal. Considerable efforts have recently been made to find new outlets for whey, and to reduce environmental pollution (Carloet al., 1999; Karand Misra, 2000). Whey is a strong pollutant when discharged into streams, its high organic matter content leading to a high BOD (Webb, 1998). Much has been done to concentrate or modify whey into another form, but such efforts have been inadequate, especially in developing countries, and utilization of whey is perhaps the most serious problem facing the dairy industry worldwide (Kosikowski, 2000).The bioconversion of whey is an important process from the viewpoint of human nutrition, especially for therapeutic purposes, with regard to economy, and is advantageous for reducing environment pollution (Karand, Misra, 2000).

Food products should be available to young children, which can provide a wide range of naturally occurring essential nutrients. When this is not possible, enrichment and fortification of foods becomes an option (World Food Programme (WFP), 1991). Close to 20 years ago, efforts were begun to develop, produce, and distribute protein-rich foods to alleviate protein malnutrition in developing countries (Beaton, 1995). The high price of proprietary fortified and enriched weaning foods and of vegetable and animal proteins, and the non-availability of low-priced nutritious foods, combined with faulty feeding practices and late introduction of supplementary foods, are mostly responsible for aggravating protein malnutrition among children (Wondimu and Nagappa, 2004). Enriched foods consist of a mixture of cereals, pulses, added fats, added vitamins, and added minerals, intended to provide a balanced intake of essential nutrients for vulnerable groups (Beaton,1995; Combs.et al., 1994).

Malnutrition among infants and young children is common in developing countries (Wondimu and Nagappa, 2004). Protein-energy malnutrition generally occurs during the crucial transitional phase when children are weaned from liquid to semi-solid or fully adult foods. During this period, because of their rapid growth, children need nutritionally balanced, calorie-dense supplementary foods in addition to mother's milk (WFP, 1991; Wondimu and Nagappa,. 2004). Consequently, the World Food Program (WFP) has supported the manufacture of locally designed and produced fortified blended foods, including

Unimix in Kenya, Famix in Ethiopia, LikinPhali in Malawi, and Indiamix in India (WFP, 1991).

Anti nutrients are some of the undesirable components in beans that could limit utilization of their protein and carbohydrate content. Inactivation or removal of undesirable components is essential in improving the nutritional quality and organoleptic acceptability of beans, and in turn helps the effective utilization of their potential as human food (Shimelis and Rakshit, 2005). Different processing methods such as boiling, hydration and germination have been used to increase the utilization of kidney beans. Germination has often been proposed as a means by which the nutritional quality of bean seeds might be improved (Shimelis and Rakshit, 2005).

A report of a widely representative regional committee in the United States of America recently identified the researchable problem of whey processing and utilization as having the greatest urgency for solution among all the current problems in dairy technology and production (Kosikowski,. 2000). Hitherto in Ethiopia, dairy industries have sold whey as animal feed or discharged it to the sewerage system, and consequently have caused ecological disturbance through the pollution of water bodies. Furthermore, there is no utilization of whey in the forms of value-added products. The main aim of the study was to investigate the utilization of whey as powder enriched with haricot bean, *Roba 1* variety.

MATERIALS AND METHODS

The raw materials used for the study were whey and haricot bean (*Phaseolus vulgaris* L.), variety *Roba 1*. Whey was collected from Lame Dairy PLC (Sholla milk enterprise) and haricot bean from Ethiopian Agricultural Research Organization, Awash Melkasa Agricultural research centre. The experimental work was carried out in the laboratories of Ethiopian Health and Nutrition Research Institute (EHNRI), Department of Chemical Engineering of Addis Ababa University, Kotebe teachers' training college and Lame Dairy PLC.

Whey Powder Preparation

The collected whey was filtered through an ultra-filtration membrane (Armfield FT-18 ultra filtration system micro-240 model; U.K. 2007); the permeate was stored in refrigerator at 5 °C, then pre-heated at 55 °C for 40 min. A vacuum pump (IP 54, LBi 07; FDR Germany 2007) was used to concentrate the soluble solid to 60%, and it was cooled to 5 °C. Finally, it was dried by means of a pressure-nozzle spray dryer (Tall Form spray drier FT80/81; FDR Germany 2006).

Haricot Bean Powder Preparation

The *Roba 1* bean seeds were weighed into large plastic pan and soaked in distilled water (bean:water ratio of 1:5 w/v) for 12 h at 25 °C (Shimelis and Rakshit, 2005). The pan was covered with clean muslin and kept in darkness at 25 °C for four days to allow the seeds to sprout. Seeds that sprouted within four days were dried on a tray dryer (Tauro-Padova, B/05EC, No. 11; U.K. 2006). The dried seeds were then ground in a mill (Retsch Gmbh, 5657 HAAN, Type S41; FDR Germany 2003) to pass a 150 µm sieve, and stored at 4 °C until analyzed.

Mixing Ratio

The whey and haricot bean powders were mixed in various ratios and analyzed for physico-chemical and bacteriological quality. The mixing ratio is shown in Table 1.

Table 1. Mix ratio of whey and haricot bean powder

Whey powder (%)	Roba-1 haricot bean (%)	Sample code
100	–	S_1
95	5	S_2
90	10	S_3
85	15	S_4
80	20	S_5
–	100	S_6
Fresh liquid whey		**S_7**

Methods of Analysis

Physicochemical and Proximate Analysis

The raw materials and blends were subjected to physicochemical and bacteriological analysis. The pH of samples was measured by digital pH meter. The meter was standardized using buffer solutions of pH 4, 9 and 10. Specific gravity was measured by lactometer and viscosity by viscometer. The moisture, ash, crude fibre and fat contents were determined according to AOAC (2003), and total protein by the semi-micro Kjeldahl method, using a conversion factor of 5.78. Carbohydrate was measured as the percentage difference from 100%. COD was measured on a multi-parameter bench photometer and BOD_5 by BOD reader. Metals were determined by means of a spectrophotometer (JENWAY model 6305UV/Visible range spectrophotometer, UK 2006).

Bacteriological Analysis

Bacteriological analyses for *E.coli* (faecal and total coliform), aerobic plate count, molds and yeasts, *Salmonella*, *Shigella*, *Clostridium botulinum*, *Bacillus cereus, Staphylococcus aureus*, were conducted by the methods set out in the Federal Drug Administration or Bacteriological Analytical Manual (2006). All tests were conducted at Ethiopian Health and Nutrition Research Institute laboratory.

Experimental Design and Data Analysis

Laboratory experiments were carried out using whey, haricot bean and the new products in duplicate, under a completely

randomised design (CRD). Statistical analyses for the results of proximate, bacteriological and mineral analyses were performed with SPSS (Statistical Package for Social Sciences) version 16.0. For the analysis of variance (ANOVA) procedure, significance was set at the 5% level. Each value was the mean ± SD of duplicate samples.

RESULTS AND DISCUSSION

Fresh liquid whey had a mean density of 1.02 g cm^{-3} density at 20 °C, 0.985 mpas of viscosity at 15 °C, 72,514 g ml^{-1} of COD and a BOD$_5$ of 48,538 g ml^{-1} (Table 2). The density and viscosity were in the normal range for fresh whey as indicated by Holsinger (2003), but COD and BOD$_5$ were higher than recommended According to Kailasapathy and Chin, 2000, the recommended values for fresh whey are 46,000 g ml^{-1} for COD and 40,000 g ml^{-1} for BOD$_5$, respectively. (Kosikowski, 2000) indicated that the greater the deviation of the value above the guidelines, the greater is the increase in pollution load on a water body.

Table 2. proximate composition of whey powder, haricot bean powder, enriched products and raw liquid whey

Samples	Moisture (%)	Protein (%)	Fat (%)	Crude fibre (%)	Ash (%)	Total Carbo-hydrates (%)
S1	11.25±0.35	7.99±0.04	1.12±0.06	1.63±0.37	17.23±0.24	60.87
S2	10.90±0.02	9.16±0.07	1.53±0.11	1.41±0.09	15.49±0.23	61.57
S3	10.60±0.54	10.13±0.36	1.83±0.16	1.64±0.16	13.63±0.24	62.17
S4	10.46±0.38	13.19±0.08	1.92±0.05	1.68±0.06	12.69±0.31	60.77
S5	10.22±0.21	13.94±0.05	1.95±0.08	1.72±0.01	6.73±0.21	65.48
S6	9.70 ±0.18	23.29±0.09	2.04±0.04	2.75±0.04	6.12±0.13	56.09
S7	93.020.13	0.75±00.24	0.1±0.21	0.32±0.02	0.55±0.12	5.26

N.B. All values are means ± SD

The moisture content of whey powder (S$_1$) was 11.25%, which is higher than the US standard for dried whey powder 5% (US standard for dry whey, 2000). This might be due to the hygroscopic nature of whey powder (Gharsallaoui et al., 2007). Ordinary

whey powder is hygroscopic and will therefore form cakes. The type of whey and local climatic conditions influence hygroscopicity and caking. Hygroscopicity, caking, and all the problems associated with the stickiness of ordinary whey powder are mainly due to lactose being present in an amorphous glassy state (Gharsallaoui et al., 2007). In the spray-drying of milk products, lactose is in an amorphous state and is not stable in atmospheric air or at normal humidity. The only form of lactose that is stable to humidity is α-lactose monohydrate. Since the lactose content of whey powder comprises more than 70% of the total solids in comparison with 30% in whole milk, the problem of the lactose content in whey powder is more severe in higher humidity (Sudika, 2004).

The moisture content of the other products decreased as the haricot bean content in the mixture increased, *i.e.* from S_2 to S_5. This might be due to the non-hygroscopic nature of the haricot bean powder component in the mixture. Monitoring of the moisture content of fortified commodities is important for assessing the potential for loss of micronutrients. A low moisture content of food retards losses of micronutrients, spoilage from moulds and insects, and adverse changes in flavor and color (WFP, 1991). Calculations of the moisture content of fortified products indicate that fortified, blended foods make an important contribution towards meeting the recommended nutrient content. Information on actual food intakes is limited, however, and it is recognized that fortified foods targeted for consumption by various vulnerable groups are shared among other family members or may be traded (Hoppe et al. 2006).

A WFP report recommends that the moisture content of cereal-based fortified foods should not exceed 10% (WFP, 1991). Studies have indicated that low moisture content can be achieved, and it has been recommended to maintain the moisture content of blended foods at 10% or less (Combs et al., 1994). The specifications set up by the European Commission for cereal-based weaning food require that the moisture content be governed by good manufacturing practices, to ensure minimum nutritive loss and to prevent the multiplication of microorganisms (Official Journal of the European Communities, 1991).

Proteins represent the main component of haricot bean and other pulses. This makes them preferable for the fortification of foods which have low protein content (WFP, 1991). The protein content of whey powder was 7.9%, which is less than the minimum value recommended by codex standard and the US standard for dried whey powder (10% and 9.5 %, respectively) (WHO 2003, US standard, 2000). As table 3 shows, the protein content of fortified whey powder was increased by fortifying it with various proportions of haricot bean. The increase was from 7.99% for the whey powder alone, to 13.9% in the fortified product. This increase was due to the high protein content of haricot bean, as described by other researchers (Dawit and Demelash., 2003).

The fat content of the whey powder was 1.12%, which is below the minimum recommended value of FAO and US (2% and 1.5%, respectively) (WHO 2003; US standard, 2000). Beaton (2005) recommended that fortification of this product with the high fat contents of cereals or pulses is necessary. The fat content of the fortified product increased from 1.12% in the whey powder alone, to 1.95% in S_5 This

indicate that, as the amount of haricot bean in the mixture increased, the amount of fat in the product also increased. Some researchers have suggested that fats may be added (no more than 10 g per 100 g of product) to increase energy density and palatability. High-fat-content pulses, vegetable oils and fats containing polyunsaturated fatty acids are preferred, but especially for vegetable oils and fats containing polyunsaturated fatty acids are preferred, where advanced packaging technology is available, otherwise they may reduce the shelf life because of oxidative changes (rancidity). Therefore, in many situations it is more advisable to add fat to the supplementary food at the time of feeding (Hofvander, 2005).

The powdered whey had a mean value of 17.23% ash, which is above the standard recommended by Codex Alimentarius (9.5%) (WHO, 2003). The ash content of the fortified product was reduced as the proportion of haricot bean in the mix was increased, *i.e.* 15.49% in S_1 to 6.12 % in S_5. This might be due to the lower ash content of haricot bean, which is in line with the results of Dawit and Demelash (2003).

Because dietary fiber are slowly absorbed and fermented by intestinal flora, thus causing a laxative effect, the crude fiber content of the supplementary food should not exceed 2% (WFP, 1991). The mean value of the crude fiber content of all mixed powder ranged from 1.41 % in S_2 to 1.72 in S_5, was in the recommended guideline range of the codex standard (WHO, 2003).

Table 3. Mineral contents of whey, haricot bean powder and blended product

Samples	Mineral content (mg/100g) on dry basis					
	Mn	Zn	Fe	Ca	Mg	K
S_1	0.08±0.02	1.31±0.01	1.41±0.01	33.93±0.01	3.64±0.02	15.13±0.06
S_2	0.10±0.02	1.22±0.01	2.12±0.01	30.35±0.02	3.62±0.01	18.05±0.01
S_3	0.13±0.01	1.10±0.02	2.36±0.01	33.46±0.13	3.60±0.01	18.31±0.06
S_4	0.22±0.01	1.12±0.02	2.75±0.01	32.36±0.01	3.43±0.01	19.15±0.02
S_5	0.21±0.01	1.93±0.02	3.02±0.01	24.34±0.02	3.45±0.04	19.33±0.04
S_6	0.30±0.01	3.23±0.08	7.58±0.02	15.83±0.01	3.51±0.01	20.21±0.08

As may be seen from Table 3, the haricot bean powder had a higher content of Mn, Zn, Fe and K, the values of which were 0.30, 3.23, 7.58 and 20.21 mg/100 gm, respectively, compared with the whey powder, while the Mg content of haricot bean was less than that of whey powder.

With regards to the Fe content of the mixed products, *i.e.* from S_2, 2.12 to S_5, 3.02, it was increased. This increase is a result of the high Fe content of the haricot bean, as indicated by Dawit and Demelash (2003). According to the Codex standard for infant formulas (codex stan.72-1981), the Ca, Mg and K content of the enriched foods of sample S_5 was within the recommended value (50, 5 and 80 mg/100 gm, respectively), while Mn, Zn and Fe were above the recommended value (5 µg, 0.5 mg and 1 mg per 100 gm, respectively).

Table 4 Microbial analysis of whey powder enriched products and liquid whey

Parameters	Result							Acceptable limit (cfu/ml)
	$S_{1(cfu/ml)}$	$S_{2(cfu/ml)}$	$S_{3(cfu/ml)}$	$S_{4(cfu/ml)}$	$S_{5(cfu/ml)}$	$S_{6(cfu/ml)}$	$S_{7(cfu/ml)}$	
Moulds and yeasts	$<1\times10^1$	$<1\times10^1$	$<1\times10^1$	$<1\times10^1$	$<1\times10^1$	$<1\times10^1$	$<1\times10^1$	< 50
APC [a]	1.2×10^3	1.4×10^2	2.4×10^4	1.5×10^6	2.3×10^7	4.8×10^7	1.48×10^4	$< 2\times10^4$
Fecal coliform	Nil	Nil	Nil	Nil	Nil	Nil	Nil	< 10
E. coli type 1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	< 40
Staphylococcus aureus	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Shall not be detected
B. cereus	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Shall not be detected
Streptococcus species	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Shall not be detected
Salmonella sp	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Shall not be detected
Shigella spp	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Shall not be detected

[a] APC Aerobic bacteria plate count at 37 °C for 48 h

N.B. All values are means ± SD

Microbial Data Analysis

The aerobic bacteria or total plate count of the fortified product indicates that there was a deviation from the acceptable limits as the proportion of haricot bean powder increased relative to the whey powder (S_1).This may have been due to unhygienic preparation, especially during the milling of the haricot bean. The results for molds and yeasts were within acceptable limits for all fortified products, as recommended by the US Standard for dry whey powder and National Standard of the People's Republic of China, Hygienic Standard of Whey Powder (50 and 40 cfu ml^{-1}, respectively) (United States Standards for Dry Whey, 2000; Ministry of Health of the People's Republic of China, 1999). Other parameters, *i.e. Salmonella, Shigella, Staphylococcus* species, *Bacillus cereus*, fecal coliform and *E. coli*, were nil,

which is in agreement with the standards recommended by WFP, US and China for dried whey powder (WFP, 1991; United States Standards for Dry Whey; Ministry of Health of the People's Republic of China, 1999).

CONCLUSIONS

The traditional technology mostly applied by Ethiopians, such as germination of cereals, legumes and pulses, could be used for increasing the nutritional value and palatability of food products, and as is indicated by most researchers, by reducing the anti nutritional factors which are present in them, is easily adapted to the development of low-cost weaning and supplementary foods from pulses. This study clearly indicates that there is a possibility of enriching whey with the high-protein-content haricot bean.

The results of this study also showed that the nutritional content of a blend ratio of whey: haricot bean powder of 80:20 is the best composition for fulfilling the nutritional requirements of children, especially in terms of protein and fat. Therefore, the utilization of whey as a value-added product is crucial from a nutritional and medicinal point of view. The advantage of blending whey powder with haricot bean, as compared with other cereals and pulses, lies in its economy, since haricot bean is locally produced in sufficient quantity, and contains a significant amount of protein and fat. Utilization of whey for various value-added products in the Ethiopian dairy industry can contribute to food security via strong marketing systems and advertising programs closely linked to the good health of consumers.

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ACKNOWLEDGMENTS

Ethnobotanical Study of Wild Medicinal Trees and Shrubs in Benna Tsemay District, Southern Ethiopia

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Abstract

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Medicinal plants and knowledge of their uses provides a vital contribution to human and livestock health care needs throughout Ethiopia. Despite the wide role of medicinal-plant use by local communities, traditional utilization and management practices are not well documented. The objectives of this study were to identify wild medicinal trees and shrubs and document indigenous knowledge about their utilization and management practices. Ethnomedicinal data were collected using semi-structured questionnaires, key informant interviews and vegetation inventories. Ethnomedicinal uses of 23 trees and shrubs were identified and documented, of which 56% were used to treat human disease, 35% to treat livestock disease and 9% to treat both livestock and human disease. Root was the most frequently used plant part used to treat human disease, followed by leaf. Human diseases commonly treated using these substances were malaria, wound, tapeworm and stomachache. Oral applications were widely used, followed, in frequency of prescription, by dermal applications. The most commonly treated animal diseases were external parasites, constipation and anthrax. Expansion of agriculture was found to be a major threat to the existence of wild medicinal trees and shrubs in the study area. The study's results indicated that wild medicinal plants are valuable resources to the local community. Thus, more research needs to be carried out on medicinal efficacies and methods of domestication and propagation of medicinal trees and shrubs.

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INTRODUCTION

Traditional medicine has been defined as health practices, approaches, knowledge and beliefs incorporating plant-, animal- and mineral-based medicines, spiritual therapies, manual techniques and exercises to treat, diagnose and prevent illness or maintain well being (WHO 2001). Since ancient times plants have been indispensable sources of both preventive and curative traditional medicines for human beings and livestock (Dawit Abebe and Ahadu Ayehu 1993; Dery et al. 1999). More than 3.5 billon people in the developing world rely on medicinal plants as components of their health care regimes (Ruffo et al. 2002; Keirungi and Fabricius 2005; Endashaw Bekele 2007; Tesfaye Bekalo et al. 2009; Gidey Yirga 2010). Besides their use in fighting various ailments among local populations, certain medicinal plants are also export commodities, valuable as sources of considerable income for harvesters and for use as raw materials for modern bio-pharmaceutical industries (Endashaw Bekele 2007).

In Ethiopia, about 80% of the human population and 90% of livestock rely on traditional medicines (Getachew Addis et al. 2001; Haile Yineger et al. 2008; Ermias Lulekal et al. 2008; Fisseha Mesfin et al. 2009; Gidey Yirga 2010). Traditional medicine is an integral part of the culture, belief structure and lifestyle of Ethiopian peoples (Dawit Abebe and Ahadu Ayehu 1993; Tesfaye Bekalo et al. 2009). The issue of medicinal plant conservation in Ethiopia today calls for aggressive studies and documentation before accelerated ecological and cultural transformation distorts the habitats of these plants and culturally held knowledge bases (Endashaw Bekele, 2007). Since most traditional knowledge in Africa is transmitted orally, from generation to generation, knowledge of wild plants is in danger of being lost as habitats, value systems and natural environments change (FAO 1996; Haile Yineger and Delenasaw Yewhalwa 2007; Fisseha Mesfin et al. 2009). Thus, valuable indigenous knowledge associated with medicinal plants warrants proper documentation (Tesfaye Awas and Sebsebe Demissew 2009; Ermias Leulkal et al. 2008; Tesfaye Awas et al. 2012).

The major objectives of this study were to identify medicinal trees and shrubs and document local knowledge about their utilization and management in Benna Tsemay district of Southern Ethiopia. The study was intended to answer the following research questions: a) what different types of wild medicinal trees and shrubs are used for treatment of humans and livestock; b) which plant parts are formulated as medications; c) what traditional knowledge and practices for management and utilization of wild medicinal trees and shrubs is held by the study area's indigenous community; and d) what other roles might medicinal trees and shrubs have in land use systems?

MATERIALS AND METHODS

The Study Area

The study was conducted in Benna Tsemay district, South Omo zone of Southern Ethiopia (Figure 1). The district is located at $5^0.11' - 5.70'$ N latitude and $36^0.20' - 37^0.04'$ E longitude (BOFED 2007). The altitude of the district ranges from 500 to

1500 meters a.s.l. and the rainfall pattern is bimodal. The mean annual rainfall ranges from 400 mm to 920 mm and mean annual temperature ranges from 17.6^0C to 27.5^0C (SIM Alduba, unpublished report).

The dominant vegetation types in the district are *Combretum–Terminalia* and *Acacia-Commiphora* wood lands (Teshome Sormossa *et al.* 2004), and the major soil types are Eutric fluvisol and Chromic cambisols.

The livelihood of the local people in the district is based on mixed farming but pastoralism predominates over crop production. In addition, bee keeping and collection of wood and non-wood products (*e.g.*, wild edible and medicinal plants, incense, gum and *etc.*) are practiced. The human population of the district is 55,590 of which 28,087 are male and 27,503 are female (CSA 2007). The district is named after the two dominant local ethnic groups namely, Benna and Tsemay, which constitute 48.6% and 36.1% of the population respectively (CSA 2007). The remaining 15.3% of the population is composed of people of other ethnic groups.
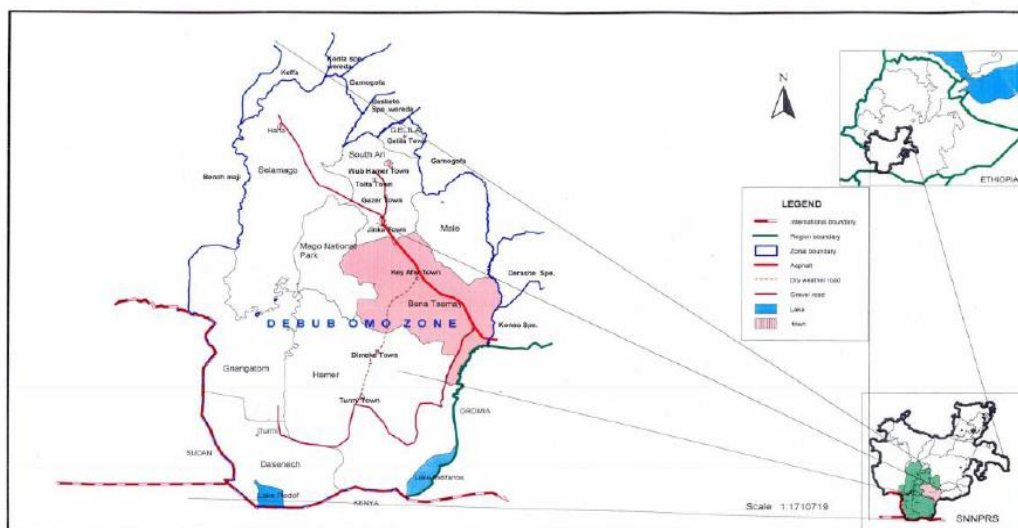
Figure 1. Geographical location of Benna Tsemay district, Southern Ethiopia

Ethnobotanical Data Collecton

Ethnobotanical data were collected using semi-structured questionnaires from randomly selected households, field observations and vegetation inventories. For the questionnaire survey, six *Kebeles*[1] were

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[1] A *Kebele* is the lowest-level administrative unit in Ethiopia with an area of about 800 hectares, accommodating 400-800 households. However, the number of households in the sparsely populated pastoral and agro pastoral areas is often lower

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selected from the 28 *Kebeles* of the Benna Tsemay district based on vegetation cover, altitude range and ethnic composition. Two *Kebeles* were located in lowlands (< 600 m.a.s.l) while the remaining four *Kebeles* had altitudes greater than 1200 m.a.s.l (Table 1). Semi-structured questionnaires were developed and interviews were conducted with 60 randomly selected households (ten households per *Kebele*). Data were collected on uses of medicinal trees and shrubs for humans and animals, types of trees and shrubs used, plant parts collected, diseases treated and preparation and utilization techniques.

Finally, information on other uses of these trees and shrubs, and on major threats to their continued existence, was collected using interviews and field observations. In addition to household interviews, 30 traditional herbalists (five per *Kebele*) were selected as key informants and interviewed to generate detailed information about traditional medicinal plants.

The key informants were selected using a snowball sampling method (Patton 1990) in which known traditional herbalists were contacted and each asked to name another person with similar knowledge and skills

Table1. Selected Kebeles, their vegetation type, altitude and dominant ethnic groups

No	Kebele	Vegetation type	Mean altitude (meters)	Ethnic group
1	Shala Kyayu	Desert and semi-desert scrubland	500	Tsemay
2	Luka	*Acacia–Commiphora* woodland	600	Tsemay
3	Alduba	*Combretum–Terminalia* woodland	1250	Benna
4	Shaba	*Combretum–Terminalia* woodland	1400	Benna
5	Olika Kibo	*Combretum–Terminalia* woodland	1500	Benna
6	Kako	*Combretum–Terminalia* woodland	1300	Benna

Source: Description of vegetation types is based on Friis, 1992

Vegetation Inventory

An inventory of the wild medicinal trees and shrubs was collected in order to assess the availability and abundance of trees and shrubs reported as being of medicinal value. In this paper the word 'shrub' is used to describe a woody perennial plant that remains of low height and produces multiple shoots from its base, whereas 'tree' refers to a woody perennial plant that produces one main trunk or bole and a more or less distinct and elevated crown (Huxley and van Houten 1997).

The inventory was carried out by means of systematic transect sampling. The major axis at sampling points was oriented in the same direction as the transect walk line. In each *Kebele* two transect lines were laid out 500m apart each extending for a distance of 600 m. Each transect was assigned either two 40 m×40 m (1600 m^2) or two 20 m×20 m (400 m^2) study plots depending up on the vegetation cover; *i.e.*, 40 m×40 m for the sparse vegetation of the lowlands (<600 m.a.s.l.),

and 20 m×20 m for the dense vegetation found at higher altitudes (>1200 m.a.s.l.). Four study plots were assigned in each *Kebele* providing a total of 24 plots for the whole study. Out of these, eight plots had sizes of 1600 m^2 and the remaining 16 plots were 400 m^2 each. In each plot, all medicinal trees and shrubs were identified with the help of the key informants and documented by vernacular names. Voucher specimens of all species of interest were then collected, mounted, labeled and submitted to the National Herbarium at Addis Ababa University for identification and taxonomic classification.

Data Analysis

Collected data were analyzed using descriptive statistics. Microsoft Excel and SPSS (Statistical PPackage for Social Science) Version17 software were used for the analysis.

RESULTS AND DISCUSSION

Diversity of Wild Medicinal Trees and Shrubs

A total of 23 wild medicinal trees and shrubs were identified and documented, of which 56.6% were used to treat human disease, 30.4% to treat livestock disease and 13% for treatment of humans and livestock (Table 2). Medicinal trees and shrubs collected belonged to 15 families and 20

genera. The plant family with the largest number of trees and shrubs of the study area used for medicinal purposes was *Fabaceae,* which comprised 13% of the medicinal trees and shrubs identified. This is in agreement with earlier studies conducted in Ethiopia that indicated that the *Fabaceace* had the largest number of medicinal plants (Haile Yineger and Delenashaw Yewhalwa 2007;

Haile Yineger et al. 2008; Earmias Leukal et al. 2008; Tesfaye Bekalo et al. 2009). All documented medicinal trees and shrubs were wild and native, as has been reported elsewhere (Lange 1997; Endashaw Bekele 2007; Gidey Yirga 2009; Tesfaye Awas et al. 2012).

The local community assigned vernacular names to all of the documented medicinal trees and shrubs. This indicates the existence of a very close interaction between the people and their plant resources. According to Munishi et al. (2004), the importance of plants in local culture is usually shown by the proportion of plants that can be identified by local people and by local names.

Assessment of the growth forms of these plant species indicated that shrubs had the highest proportion with 12 of the species (52%) (Table 2). The studies conducted by Bayafer Tamene et al. 2000, Mark *et al.* 2008, Ermias Lulekal et al. (2008) ,and Fisseha Mesfin et al. (2009) also showed that shrubs made up the highest proportion of medicinal plants, representing respectively, 46.83%, 56%, 47.83% and 43.2% of the species of interest identified in those studies.

Table 2. Wild medicinal trees and shrubs in the study area

No	Scientific name	Local name		Family	Growth habit	Medicinal role
		Benna	Tsemay			
1	*Acacia hockii* DeWild	Chaqkent		Fabaceae	Tree	Livestock medicine
2	*Acacia mellifera* Benth.	Dille	Boytekko	Fabaceae	Tree	Human medicine
3	*Albizia anthelmintica* (A.Rich) Brogn.	Dheta		Fabaceae	Tree	Human medicine
4	*Aloe macocarpa* Tod.		Dheri	Aloaceae	Shrub	Livestock medicine
5	*Cadaba farinosa* Forssk.	Lagee		Capparidaceae	Shrub	Human medicine
6	*Carissa edulis* (Forssk)Vahl.	Akama		Apocynaceae	Shrub	Human medicine
7	*Croton macrsotachyus* Hochst.ex.A.Rich.	Betta		Euphoiaceae	Tree	Human medicine
8	*Echinops amplexicaulis* Benth		Kera	Asteraceae	Shrub	Human medicine
9	*Euclea divinorum* Hiern	Unsi		Ebenaceae	Shrub	Human medicine
10	*Euphoribia borensis* M. Gilbert		Kera	Euphoriaceae	Shrub	Livestock medicine
11	*Grewia velutina(Forssk)*Vahl.	Breza		Tiliaceae	Tree	Livestock medicine
12	*Leucas abyssinica* Briq.	Kero		Lamiaceae	Shrub	Livestock medicine
13	*Maerua crassifolia* Forssk		Qalklko	Capparidaceae	Tree	Livestock medicine
14	*Olea europea* L.	Remite		Oleaceae	Tree	Human medicine
15	*Rhus tenuinervis* Engl		Kupure	Anacariaceae	Shrub	Human medicine
16	*Salvadora persica* L.		Eakko	Salvodoraceae	Shrub	Both
17	*Solanum incanum*. L.	Grent		Solanaceae	Shrub	Human medicine
18	*Solanum somalense* Fracnch.		Cumo	Solanaceae	Shrub	Human medicine
19	*Tamarindus indica* L.	Roqo	Ruka	Fabaceae	Tree	Human medicine
20	*Terminalia brownii* Fresen.	Ara	Ara	Combertaceae	Tree	Human medicine
21	*Ximenia americana* L.	Moqolo	Moqolo	Oleaceae	Shrub	Livestock medicine
22	*Vernonia amygdalina* Del.	Geri		Asteraceae	Tree	Both
23	*Zanthoylum chalybeum*	Geddae		Rutaceae	Tree	Livestock medicine

Medicinal Trees and Shrubs in Study Area Used for Treatment Of Humans

A total of 15 wild medicinal trees and shrubs were identified and documented as being useful for treating human disease. The plant parts used to treat human disease varied from species to species and from disease to disease. Leaf, root, seed, bark and sap were widely used for treating human disease. Roots were the most frequently used plant parts (40%) followed by leaves (33%) (Figure 2). This finding is in agreement with those of certain others (Dawit Abebe and Ahadu Ayehu 1993; Munishi et al. 2004; Ermias Lulekal et

al. 2008; Fisseha Mesfin et al. 2009 and Emiru Birhane et al. 2011) but disagrees with the finding of Gidey Yirga (2010) who found that leaves were the most commonly used plant parts. This deviation is probably due to differences in plant resource sites.   The present study was carried out in the wild, whereas that of Gidey Yirga (2010) was undertaken in home gardens. Obviously, medicinal woody plants grown in home gardens are expected to serve for long terms and, hence, garden owners might not harvest plant roots as that practice may cause the death of the whole plant.
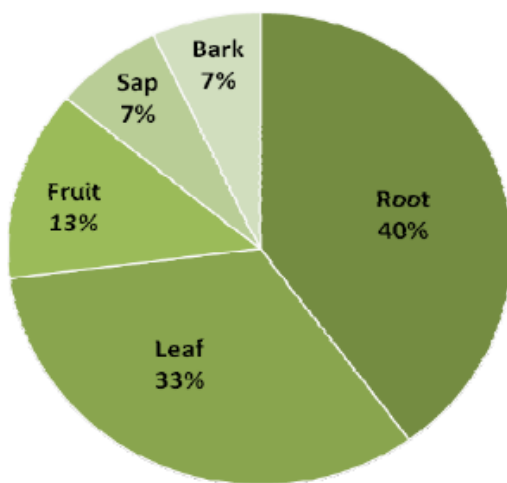
Figure 2. Percentage of plant parts used for treatment of human disease in Benna Tsemay district (n=60)

Disease Types, Preparation Techniques, Dosages and Routes of Application

Different disease types were reported as human health problems in the study area among which, malaria, skin infection, and diarrhoea were the most common. Wound, tapeworm and eye disease were treated by most people using traditional medicinal plants. However, only a few knowledgeable traditional herbalists treated some ailments, such as rabies and gonorrhoea.

Medicinal trees and shrubs in the study area were prepared in different forms. The most common mode of preparation was crushing (40%), followed by chewing (Table 3). This result is in agreement with the findings of Haile Yineger and Delenashaw Yewhalwa (2007) and Emiru Birhane et al (2011) who noted that the principal method of remedy preparation was through crushing.

Table 3. Methods of preparation of medicine trees and shrubs

No	Mode of preparation	Number of species	Percentage	Rank
1	Crushing	6	40.0	1
2	Chewing	4	26.7	2
3	Decortications	3	20.0	3
4	Tie and hold on	1	6.7	4
5	Dropping	1	6.7	4

There was no standard measure of dosage for herbal remedies in the study area. Dosage was determined in several ways including measurement of root length and leaf number. Various authors (Dawit Abebe and Ahadu Ayehu 1993; Endashaw Bekele, 2007; Tesfaye Bekalo et al. 2009 and Emiru Birhane et al. 2011) have also reported the absence of standardized dosing in the application of traditional medicines in Ethiopia and elsewhere. They noted that there were variations in the quantity of remedies, units of measurement and durations and times of application of traditional medicines prescribed by various healers for the same kinds of health problems. Application methods also vary by disease and medicinal plant species. Among the different routes of application utilized, oral application ranked first in frequency followed by dermal application (Figure 3). These results were similar to the findings of previous investigators (Dawit Abebe and Ahadu Ayehu 1993; Tilahun Teklehaymanot and Mirutse Gidey 2007; Haile Yineger and Delenashaw Yewhalwa 2007; Mark et al. 2008; Tesfaye Bekalo et al. 2009; Fisseha Mesfin et al. 2009 and Emiru Birhane et al. 2011) who noted that drinking (oral application) was the dominant method of administration.
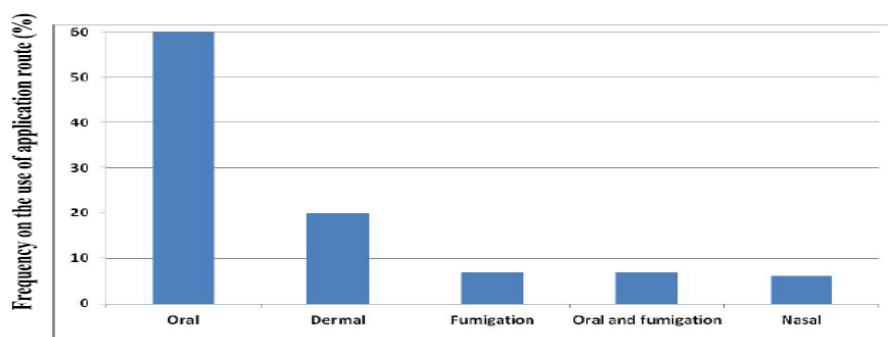

Figure 3. Route of application of traditional human medicinal trees and shrubs in Benna Tsemay district (n=60)

Techniques for Human Utilization of Wild Medicinal Trees and Shrubs

Most of the traditional medicinal trees and shrubs were used in fresh form (93%) while 7% were used after drying (Table 4). Gidey Yirga (2010) also reported that most traditional medicinal plants were used in fresh form.

Table 4. Utilization technique of human medicinal trees and shrub

No	Scientific name	Part used	Disease treated	Application	Utilization technique	Ingredient	Other uses
1.	*Acacia mellifera* Benth.	leaf	Body infection	dermal	- Shoot or young leaves are crushed and mixed with termite soil and the infected area is brushed with it.	Termite soil	Bee Forage
2.	*Albizia anthelmintica* (A.Rich) Brogn.	bark	Tape warm	oral	- Dry bark is grained decoction, used to prepare maize and sorghum bread and consumed.	Flour	
3.	*Cadaba farinosa* Forssk.	leaf	Malaria	oral	- Young leaves are crushed and the juice drank to treat malaria.	None	Fodder
4.	*Carissa edulis* Forssk Vahl.	root	Malaria	fumigation	- Roots are boiled. A decoction of the roots is used to treat malaria.	None	Edible
5.	*Croton macrostachyus* Hochst.ex.A.Ri.	leaf	Stomach distention	oral	- Young leaves are crushed, and the juice drank in small amount to treat stomach distention.	None	Firewood
6.	*Echinops amplexicaulis* Benth.	root	Stomach-ache Snakebite	oral dermal or fumigation	- Chewing the bark and swallowing the juice to treat stomach ache. - Crush and mix the root with butter and brush on the infected area.	None Butter	Firewood
7.	*Euclea divinorum* Hiern.	root	Gonorrhea	oral	- Roots of the shrub are crushed and the decoction of root drunk.	None	Edible
8.	*Euphoribia borenesis* Benth.	sap	Wound	dermal	- Sap from succulent stem is applied to newly injured body parts.	None	Fences
9.	*Olea europea* L.	leaf	Body weakness	oral	- The leaves are crushed and mixed with water and drank in small amount.	Water	Firewood
10.	*Rhus tenuinervis* Engl.	root	Rabies	oral	- The bark of the root are crushed and mixed with water and the decoction of the root is drank after 1 hour.	Water	Firewood
11.	*Salvadora persica* L.	leaf	Eye	nasal	- The leaves are squeezed and applied to the infected eye. It has burning effect.	None	Edible
12.	*Solanum incanum.*L.	root	Stomachache	oral	- Root is chewed and juice swallowed the to treat stomach ache.	None	Fodder
13.	*Solanum somalense* Ffresen.	root	Stomach ache	oral	- The root is chewed. The resulting juice is swallowed to treat stomachache.	None	Fodder
14.	*Tamarindus indica* L.	fruit	Stomach ache	oral	- Collect the fruit and consume the pulps to treat stomach.	None	Edible
15.	*Terminalia brownii* Fresen.	bark	Wound	dermal	- Tie the tree bark to the injured area.	None	Bee Forage

Ethno-Veterinary Medicinal Trees and Shrubs

Failures of crop production are more common in pastoral areas of Ethiopia due to the high temperatures and low and erratic rainfall prevalent in those areas. Livestock production is therefore an indispensable component of land use systems employed for survival in those areas. According to the government agricultural office of the Benna Tsemay district, disease is the major constraint on livestock production and this is exacerbated by a critical shortage of veterinary services. Hence, the role of traditional medicinal plants for the protection of animal health is vital.

A total of 10 wild medicinal trees and shrubs were identified and documented for treatment of livestock diseases (Table 5). Medicinal trees and shrubs widely used to treat livestock diseases in the area included *Grewia velutina* ForsskVahl, *Leucas abyssinica* Brig and *Maerua crassifolia* Forssk. The most common livestock diseases in the study area were CCPP (contagious caprine pleuropnemonia), anthrax, and blackleg (Benna Tsemay district Agricultural office, unpublished report). Leaves (50%) were the plant parts most widely used to treat livestock diseases. Ethno-veterinary studies conducted by Bayafer Tamene *et al*. (2000) and Tilahun Teklehaymanot and Mirutse Gidey (2007) also indicated that leaves were the most commonly used plant parts for treatment of livestock disease. Crushing and harmonization of the plant part with water is the most common method of remedy preparation (Table 5).

Table 5. Utilization techniques of ethno-veterinary medicinal trees and shrub

No	Scientific name	Part used	Disease/para site treated	Mode of application	Utilization technique	Ingredient	Other uses
1.	*Acacia hockii* De Wild.	Leaf	Eye disease	nasal	- Shoot or newly growing leaf squeezed and directly applied to infected eye.	None	Bee forage
2.	*Aloe macocarpa* Tod.	Sap	Ticks	dermal	- Brush the yellowish sap of succulent stem on the thick infested area; the thick is removed immediately from the animal body.	None	Fence
3.	*Euphorbia borensis* M.Gilberts.	Sap	Wound	dermal	- Apply the sap of succulent stem to the injured body part (wound).	None	Fence
4.	*Grewia velutina* Forssk.Vahl.	Root	Anthrax	oral	- Root is crushed and the juice drank to animals when bleeding occurs in their ear.	None	Edible
5.	*Leucas abyssinica* Brig.	Leaf	Leech	nasal	- Dried leaves pounded and mixed with water and poured through the nose of animals to remove leech.	Water	Bee forage
6.	*Maerua crassifolia* Forssk.	Leaf	Tympany	oral	- Leaves are crushed and mixed with water and drank to animals to treat stomach constipation.	Water	Fence
7.	*Salvadora perisca* L.	Leaf	Eye disease	nasal	- The leaves are chewed and the juice directly applied to the infected eye. It has a burning effect.	None	Edible
8.	*Vernonia amygdalina* Del.	Leaf	Tse-Tse fly	Oral	- Leaves are crushed and the juice drank by the animals.	Water	Bee forage
9.	*Xeminia americana* L.	Seed	External parasite	dermal	- Seed, roasted, and crushed; the powder mixed with animal butter and brushed to infected area to remove external parasites.	Butter	Edible
10.	*Zanthoxylum chalybeum* Engl.	Bark	Constipation	oral	- The bark is crushed and boiled in water and the animal let to drink it, to treat stomach constipation.	Water	Fodder

Routes of Application Of Veterinary Medicines

Oral application is most frequently employed (50%), followed by dermal and nasal applications which account for 30% and 20% respectively of reported application methods (Figure 4).

This result is in agreement with the finding of Haile Yineger *et al.* (2007) who reported that an internal mode of administration was more common (72.41%).
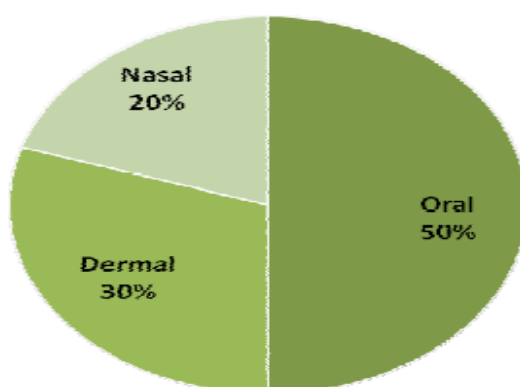
Figure 4. Route of application of veterinary medicinal trees and shrubs in Benna Tsemay district (n=60)

Threats to Wild Medicinal Trees and Shrubs in the Study Area

Various factors are considered as threats to existence of medicinal trees and shrubs in the study area among which expansion of agriculture and fire are the most important (Table 6). This result is similar to the findings of Endashaw Bekele 2007, Ermias Lulekal et al. 2008, Haile Yineger et al. 2008 and Fisseha Mesfin et al. 2009.

Table6. Priority ranking of factors perceived by the community as threats to Medicinal plants

Factors	Respondents(%)	Rank
Expansion of agriculture	25.0	1
Fire hazards	21.7	2
Overgrazing	18.7	3
Drought	13.3	4
Collection of wood for construction, tools and utensils	11.7	5
Collection of firewood	10.0	6

Other Uses of Medicinal Trees and Shrubs in the Study Area

In the study area, almost all of the interviewees indicated that their communities rely on natural vegetation for purposes such as medicine, construction material, farm tools, household utensils, firewood and charcoal. It was found that 96% of medicinal trees and shrubs have value other than as medicines. Analysis of the reported second most important uses of these trees and shrubs indicated that 26% of the species are edible and 22% are used for firewood (Table 4 and 5). This result is in agreement with the findings of Haile Yineger et al. 2008 and Ermias Lulekal et al. 2008.

CONCLUSIONS

A total of 23 wild medicinal tree and shrub species were recorded in the study area. The study revealed that the local community used traditional medicine widely, to treat both human and livestock diseases. This is likely due to lack of modern public health and veterinary services, in part, but also due to the availability of these low-cost locally sourced plant-based medicines. The study indicated that many wild species are under growing pressure from various anthropogenic factors and valuable indigenous knowledge is being lost along with species. These factors demand urgent attention, to conserve such vital resources so as to optimize their use in primary health care systems of humans and livestock, and for the benefit of the world's resource diversity and heritage.

Therefore, the following suggestions and recommendations are proposed for the better utilization and conservation of wild medicinal trees and shrubs in the study area:

- More research needs to be carried out on the medicinal efficacy and optimum dosages of medicinal trees and shrubs.
- Propagation and domestication of medicinal plants should be promoted through efforts of governments and nongovernmental organizations.
- Government and nongovernmental organizations should partner with the local community to enhance *in situ* conservation of wild medicinal trees and shrubs.
- Training and awareness creation should be given to traditional healers and the local community respecting the management of medicinal trees and shrubs, to encourage and permit their cultivation on a large scale.
- Wild medicinal trees and shrubs are open-access resources prone to overuse and degradation. Thus, community ownership of these resources needs to be strengthened with well-defined traditional institutions and bylaws to ensure their protection and sustainable utilization.

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ACKNOWLEDGMENTS

Farmers' Adoption of Soil and Water Conservation Technology: A Case Study of The Bokole and Toni Sub-Watersheds, Southern Ethiopia

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Abstract

Kebede Wolka & Mesele Negash , 2014. Farmers' adoption of soil and water conservation technology: a case study of the Bokole and Toni sub-watersheds, southern Ethiopia. *Journal of Science & Developement* 2(1) 2014, 35-48.

In order to investigate the rate of adoption, and factors affecting dissemination of soil and water conservation (SWC) technologies, a formal survey was conducted with 201 households in two sub-watersheds of Bokole and Toni in southern Ethiopia. Key-informant interviews and an archival search were also conducted. The majority of farmers perceived that SWC structures reduce surface run-off and erosion. Among ten variables, the binary logit test showed that farmland size (P<0.1) and workability of structures (P<0.05) were significantly correlated with adoption in Bokole sub-watershed. In Toni sub-watershed, the distance from the nearest local market showed significantly negative (P<0.05) correlation with adoption. Other variables such as number of cattle, family size, frequency of contact with development agent, age, educational level, responsibility in the kebele and perception of the seriousness of erosion, showed various effects. The study revealed that socioeconomic factors influenced the adoption of SWC technologies, and should therefore be considered in planning such interventions.

Keywords: adoption, Dawuro, socioeconomic factors, sub-watersheds, workability

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INTRODUCTION

Soil erosion is accelerated by exposure of the soil surface; hence land use frequently governs erosion to a greater extent than climate (Morgan, 1986). The greatest risk of land degradation arises when land is used merely for sustenance and income (FAO, 1983). Thus, man is acting both as the beneficiary and the destroyer of his environment and its production capacity (FAO, 1985). Soil nutrient loss due to erosion reduces land productivity; hence it hampers attempts to attain food security in developing countries such as Ethiopia.

The problem of land degradation due to soil erosion received great attention in Ethiopia following the 1973/74 famine (Lundgren, 1993). The rate of soil loss from Ethiopia is estimated to be about 2 billion Mg year^{-1} (Woldeamlak & Sterk, 2003). Erratic and erosive rainfall, steep terrain, deforestation, inappropriate land use, land fragmentation, overgrazing and farmers' management practices are among the factors that cause land degradation in the country (Osman & Sauerborn, 2001). Intense and continuous cultivation on sloping land, without supplementary use of soil amendments and conservation technologies, poses a serious threat to sustainable land use (Bekele & Holden, 1999). Traditional soil conservation practices and agronomic measures have been historically practiced in various parts of the country (Lundgren, 1993; Osman & Sauerborn, 2001). However, the importance of soil and water conservation technology for sustainable development and continuous production in agriculture has been recognized in recent decades.

A massive soil and water conservation (SWC) program was started during the 1970s and 1980s (Woldeamlak, 2007). A total of 1,252,000 km of terraces and bunds was constructed and 472 million trees were planted (Osman & Sauerborn, 2001).

A variety of conservation structures, applicable to different soil types, rainfall conditions and topography such as soil bunds, stone bunds, *Fanya juu* (to throw up') were developed (Hurni, 1986).

Hillside terraces were implemented extensively at the two study sites from 2000 onwards by the World Food Program (WFP) and Action-Aid Ethiopia. The WFP applied a 'Local Level Participatory Planning Approach' (LLPPA). It also supported a food self-sufficiency programme in localities with minimal rainfall, mainly in Bokole sub-watershed. In the Toni sub-watershed, an irrigation project was initiated to improve the farming practices of the *Mana* ethnic group (engaged in pottery). However, siltation became a problem in the constructed irrigation scheme in the downstream part of the sub-watershed. To alleviate this problem, physical and biological SWC measures were implemented.

In different parts of Ethiopia, factors influencing adoption and management of SWC have been investigated (Graaff et al 2008; Kassie et al 2008; Kato 2011; Teshome 2012). Although many resources (money, labour, grain) have been invested in the construction of SWC structures in sub-watersheds, but their socioeconomic impact and sustainability is not well studied. Furthermore, there is inadequate information on people's adoption for these SWC structures. Thus, this study is aimed to investigate farmers' adoption of SWC

technology, and the community's efforts to

sustain and maintain SWC structures.

MATERIALS AND METHODS

Study Sites

The survey was conducted on two selected sub-watersheds: Bokole and Toni, Dawuro zone, Southern Ethiopia. These sites are located between 6º56'N–7º36'N latitude and 36º34'E–37º64'E longitude, 500 km south of Addis Ababa, the capital of Ethiopia

(Figure 1) with an altitude between 1200-2400 m. Mean annual rainfall is 1400–1800 mm and the mean temperature is 18–27.5 ºC. The soils are grouped under Dystric Nitosols and Orthic Acrisols (SNNPRS-BoFED, 2004).
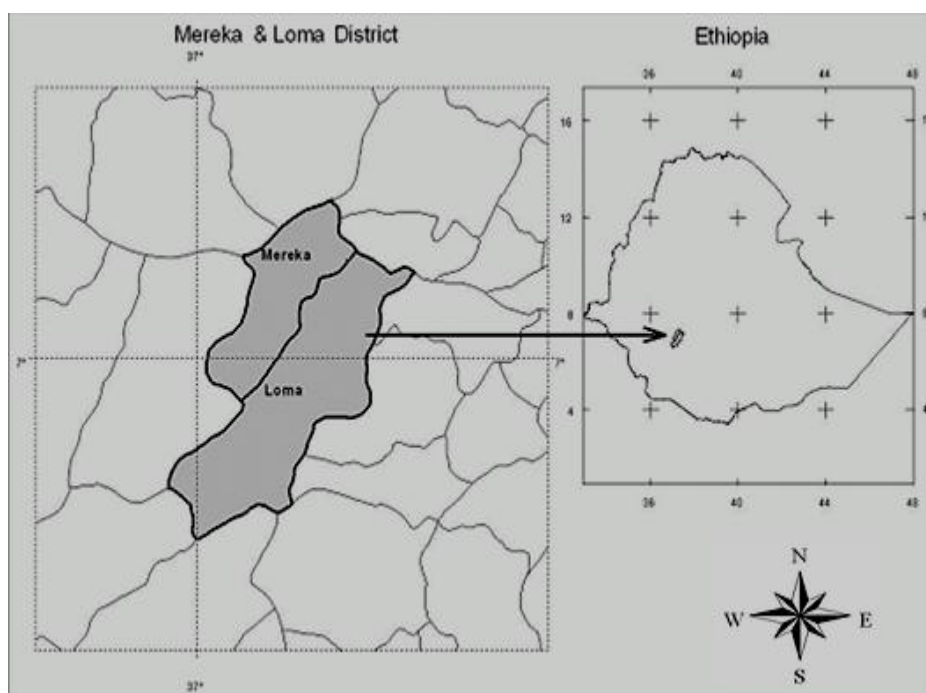
Figure 1. Location of the study sites.

The predominant economic activity and land use is mixed agriculture; having land use systems of agricultural land (mainly rainfed), grazing land, and forest/bush. The population of the study districts is *ca.* 235,800 (FDRE-PCC, 2008).

Methods of Data Collection

Two sub-watersheds, namely, Toni and Bokole were selected for the study where intensive SWC interventions were carried out for about seven years by the two NGOs of 'WFP' and 'Action-Aid

Ethiopia'. Multistage stratified random sampling methods were employed for selecting sample households. Each sub-watershed was stratified into upper, middle and lower sections; and based on SWC practices, farmers were grouped into 'adopters' (have already adopted SWC structures on at least one of their holdings) and 'non-adopters' (have not adopted on any of their holdings). Then, 10% of the households were randomly selected from each category for interview. A total of 201 households (125 adopters and 76 non-adopters) from both sub-watersheds were interviewed using a structured questionnaire.

In addition, a total of 60 key informants were selected, thus representing 30 from each sub-watershed and 10 to represent each from upper, middle and lower catchments. Discussions were held about the past and present SWC activities and adoption situation in the study areas. Those interviewed had lived in the area since birth and knew it well. Furthermore, discussions were held with three district agricultural office experts, six development workers and the area representative of the WFP in the southern region. Available secondary data, especially reports and records, were also reviewed to triangulate and complement the discussions.

Method of Data Analysis

Both descriptive statistics and the binary logistic regression model were employed using SPSS version 12 (2003). Rate of adoption, constraints and farmers' perception of SWC technologies were analyzed using descriptive statistics. The binary logistic model was used to analyze the effect of selected variables (Table 1) on the farmers' adoption of SWC. Moreover, the same model was used to compute the relationship between maintenance of structures and selected variables, by following the analytical approach of Mendenhall & Beaver (1994):

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \epsilon ,$$

Where y = response variable (adoption);

β_0 = unknown constant;

$\beta_1, \ldots B_{10}$ = unknown coefficients later computed using the SPSS program;

$X_1 \ldots X_{10}$ = family size, age of household head, responsibility in the *kebele*, number of cattle, educational level, farmland area, distance from nearest market, frequency of contact with development agent, perceptions concerning the seriousness of the soil erosion problem, and perceptions about the workability of SWC structures by farmers, respectively;
ϵ = error term.

Table 1. Variables of adoption and maintenance of SWC structures

Variables	Definition	Values
Adoption	Adopted soil and water conservation	0=not adopted (no structures on his/her farmland; 1=adopted at least one of the structures
Family size	Number of people in the family	Continuous
Age	Age of family head	Continuous
Responsibility	Responsibility in kebele	0=not responsible in kebele in any position; 1=responsible
Cattle	Number of cattle owned	Continuous
Education	Education level of the family head	0=illiterate; grade1, 2,..... (continous)
Land area	Landholding of the family	Landholding, hectares (continuous)
Distance from market	Distance from nearest local market	Hours, continuous
DA contact	Frequency of contact of the household head with development agent	1=every week; 2=every two weeks; 3=every three weeks; 4=every four weeks
Erosion Seriousness	soil erosion is serious problem	1=strongly agree; 2=agree; 3=agree to some extent; 4=disagree
Workability	Perception of workability of structures by farmers	1=easy to work; 2= moderate; 3= difficult
Maintain	Maintenance of structures when broken	0=not maintained; 1= maintained

RESULTS AND DISCUSSION

Household Characteristics and Income Sources:

Household (HH) characteristics and sources of income for the two sub-watersheds are given in Table 2. The average family size in both the sub-watersheds was approximately the same (8 persons/HH) for both adopters (7.79–8.15) and non-adopters (7.63-7.86), indicating the availability of family labour to construct and maintain SWC structures. The average age of the head of the family ranged between *ca.* 36–44 years, also

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showing the availability of a workforce for the same purpose. Farm size per HH averaged 2.13 and 1.7 ha in Bokole and 1.65 ha and 1.97 ha in Toni for adopters and non-adopters, respectively.

Table 2. Household characters and income sources in Bokole and Toni sub-watersheds

		Adopters		Non-adopter	
		Bokole (n=73)	Toni (n=52)	Bokole (n=39)	Toni (n=37)
House hold characteristics (mean)	Family size	7.79	8.15	7.63	7.86
	Household head's age	42.92	43.88	36.05	43.65
	Cattle (number)	5.74	5.21	6.21	4.11
	Farm size (ha)	2.13	1.65	1.7	1.97
Source of income (% of respondents)	Cash-crop	45.2	11.5	51.3	0.0
	Food crop	87.7	88.5	87.2	89.2
	Livestock	83.6	80.8	71.8	73.0
	Fruit	12.3	5.8	5.1	0.0
	Tree product	24.7	28.8	28.2	21.6
	Weaving	2.7	0.0	2.6	0.0
	Off-farm	31.5	13.5	12.8	8.1
	Remittance	2.7	1.9	2.6	0.0
	Honey production	1.4	1.9	0.0	13.5

The major source of income for both sub-watersheds was food crops (88% Bokole and 89% Toni), followed by livestock and its products for adopters (Table 2). The same pattern was noted for non-adopters. This implies the importance of environmental management for improving productivity and ensuring sustainable production.

Adoption and Perception of SWC

The relationship of variables about the adoption and perception of SWC is presented in Table 3. The age of the household head was negatively and insignificantly related to the adoption of SWC in both sub-watersheds. This may be explained by the fact that older farmers resisted the adoption of new technology.

The educational level of the household head was also negatively and insignificantly associated with adoption in both sub-watersheds. It is explained by the fact that, as the educational level increases, the tendency to seek off-farm employment increases, while attention to the rural lifestyle decreases. Moreover, educated young farmers are more interested in jobs and business, rather than in taking up cultivation as an occupation (Bagdi, 2005).

Responsibility in the *kebele*, family size, and farmers' perception of erosion, were all found to influence the adoption of SWC

technology positively in both sub-watersheds. Responsibility in the *kebele* provides an opportunity to participate in various meetings, and opportunities of obtaining information about newly introduced SWC technology corroborating the findings in Burkina Faso (Sidibe, 2004). An increase in family size increases the workforce at household level. The present study indicated that farmers in both sub-watersheds perceived erosion as a problem, and that the tendency to adopt the technology was correspondingly high. However, this result contradicts findings by Awdenegest & Holden (2007) in Southern Ethiopia, where farmers' own initiatives were minimal, even under serious, advanced erosion.

Table 3. Relationship for adoption and maintenance/repair of SWC structures

Variables	Adoption of structure				Maintenance of structure			
	Bokole		Toni		Bokole		Toni	
	Coeff.	P	Coeff.	P	Coeff.	P	Coeff.	P
Family size	0.098	0.460	0.051	0.615	−0.161	0.344	0.050	0.721
Age of household head	−0.043	0.178	−0.007	0.738	0.036	0.244	−0.026	0.399
Responsibility in kebele	0.732	0.273	0.384	0.771	0.893	0.379	−0.895	0.547
Number of cattle owned	0.055	0.309	−0.135	0.244	−0.041	0.765	−0.111	0.280
Educational level	−0.440	0.171	−0.244	0.409	0.825	0.070[a]	0.299	0.489
Farmland area	−0.415	0.082[a]	0.160	0.288	0.099	0.805	−0.219	0.517
Distance from nearest market	−0.074	0.426	−0.303	0.020[b]	−0.154	0.397	−0.317	0.078[a]
Frequency of DA contact	−0.016	0.950	0.106	0.688	0.310	0.404	−0.193	0.683
Perception of soil erosion seriousness	0.125	0.659	0.471	0.335	0.022	0.956	−0.267	0.794
Workability of SWC structures	1.391	0.005[b]	−0.863	0.386	−1.132	0.083[a]	0.686	0.636
Constant	−2.568	0.265	3.462	0.313	−0.527	0.868	2.374	0.648

[a] = significance at $P< 0.1$; [b] = significance at $P< 0.05$
Note: DA= development agent; S.E. standard error

The number of cattle, an indication of economic security, had a positive influence in the Bokole sub-watershed and a negative influence in the Toni sub-watershed. The discrepancy is attributed to the circumstance that the wealthier farmers in Bokole take risks by investing and adopting SWC technology; whereas in Toni such wealthy farmers have other resource options besides farmland and less concerned about adopting SWC technologies for improving productivity.

In both sub-watersheds, the distance to local markets was also negatively related to adoption. The shorter the distance to the market, the less time and money is spent on transportation. This would motivate farmers to produce more products, thus gaining a higher income. In turn, proper management of their land would allow them to improve their production.

The influence of development agents (DAs), however, showed inconsistent trends. In Bokole, DAs negatively influenced the adoption of SWC technologies by farmers due to their involvement in activities such as rural land-tax estimation. Farmers hesitate to contact the DAs, and thus are less likely to accept the technology. However, in Toni it was positive because of more frequent visits by DAs helped to convince farmers to adopt the technology.

Farm size had different results for the two communities. In Bokole, tendency to adopt SWC structures decreased as farmland area increased. However, in Toni adoption improved because farmers in this sub-watershed have smaller landholdings (Herwerge & Ludi, 1999).

Workability of SWC structures also showed different influences in Bokole and Toni sub-watersheds. Farmers in Bokole perceived the technology as being difficult to build and maintain, but they adopted the structures because of the seriousness of erosion. Farmers evaluated the workability of the structure in terms of the material resources, affordability, simplicity of application, cost-effectiveness and technical skills required. This finding agreed with findings of Woldeamlak Bewket (2007) in the northeastern highlands of Ethiopia. Bagdi (2005) also showed that the adoption of SWC can be influenced by the high cost, feasibility in field situations and the availability of resources to farmers.

Maintenance of the Structures

The binary logistic model test showed that, in Bokole sub-watershed, the age of the household head, responsibility in the *kebele*, education level, farm size, frequency of DA contact and perception of soil erosion seriousness, had positively but insignificantly affected maintenance of SWC structures. In Toni sub-watershed, family size, educational level and workability of structures showed a positive effect (Table 3). Both educational level and farmers' perception of the workability of the structures were significantly correlated with maintenance of the structures. In Toni sub-watershed, the distance from the nearest market was negatively and significantly correlated.

The positive effect of age shows that with increasing age, farmers accumulate experience about the importance of land management. Thus, the tendency to maintain the structures increases. From the standpoint of awareness point of view, responsibility in the *kebele* positively influenced maintenance of the adopted structures, as in the case of Bokole sub-watershed. However, those farmers who

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have responsibilities in *kebeles* have less time to work on farmland, and if they can obtain an alternative income, the tendency to maintain the structures may decline, as happened in Toni.

Contact with DAs showed a positive impact on the maintenance of SWC structures in Bokole. This confirms the thinking that rural farmers who maintain contact with officials of rural village institutions and extension agencies, are likely to contribute more effectively to the maintenance of structures (Bagdi, 2005). However, contact with DAs had a negative coefficient in Toni. This is probably due to the fact that development agents are not solely involved in agriculture and natural resource management activities, but also in other off-farm and extra-curricular affairs. For instance, involvement of development agents in issues related to rural land-tax collection may disrupt their acceptance in the community as extension agents. Daniel (2006) also indicated a less interest on the part of farmers to seek technical support of DAs, due to their involvement in 'unfavorable decisions' such as resettlement, tax assessment and collection.

An increase in landholding size in Bokole sub-watershed encouraged management of the land resource. This result agreed with findings in Baressa sub-watershed, central highlands of Ethiopia (Aklilu & de Graaff, 2006). Contrary results were obtained from Toni sub-watershed, indicating that farmers with large farms have alternative land to plough, and can allow for a fallow period; hence, they may neglect the maintenance of SWC structures. .

In addition, farmers who have large numbers of cattle may ignore structure maintenance, expecting frequent damage by cattle. Dung from a relatively large number

of cattle can, to some extent; substitute for nutrients lost by erosion, if properly managed and distributed, and thus can reduce attention to the maintenance of structures. In fact, the social significance of cattle in large numbers but of poor quality causes ecological stress (Hudson, 1981).

Family size was positively correlated with the maintenance of SWC structures in Toni showing that large families can provide more help in maintaining and repairing damaged SWC structures (Bagdi, 2005). However, a contradictory result was obtained in Bokole. This may be due to some family members attending school; consequently, have little time for and interest in participating in the maintenance of SWC structures. On top of this, an increase in family size demands more food. Thus, family members may become involved in off-farm work to generate income for securing a consistent food supply, confirming to the findings of Aklilu & de Graaff (2006) in the central highlands of Ethiopia.

Rate of Adoption of SWC

In Bokole sub-watershed, the percentage of farmers who adopted SWC was highest (44%) in 2005, and declined thereafter, whereas the number of adopters reached a peak in Toni sub-watershed in 2004 (Figure 2). These periods directly corresponded to the intensive implementation of SWC structures by the NGOs. It is attributed to the availability of financial incentives to farmers**.** After this, the rate of adoption declined abruptly, due to the phasing-out of project aid supporting the SWC interventions implying that farmers were heavily dependent on project interventions and resource support, rather than creating

their own capacity. This is partly attributed to the weak extension approach, in that the intervention focused on establishing the structures on the ground, rather than changing people's attitudes. A similar experience was also reported in northern Ethiopia (Woldeamlak Bewket, 2007).
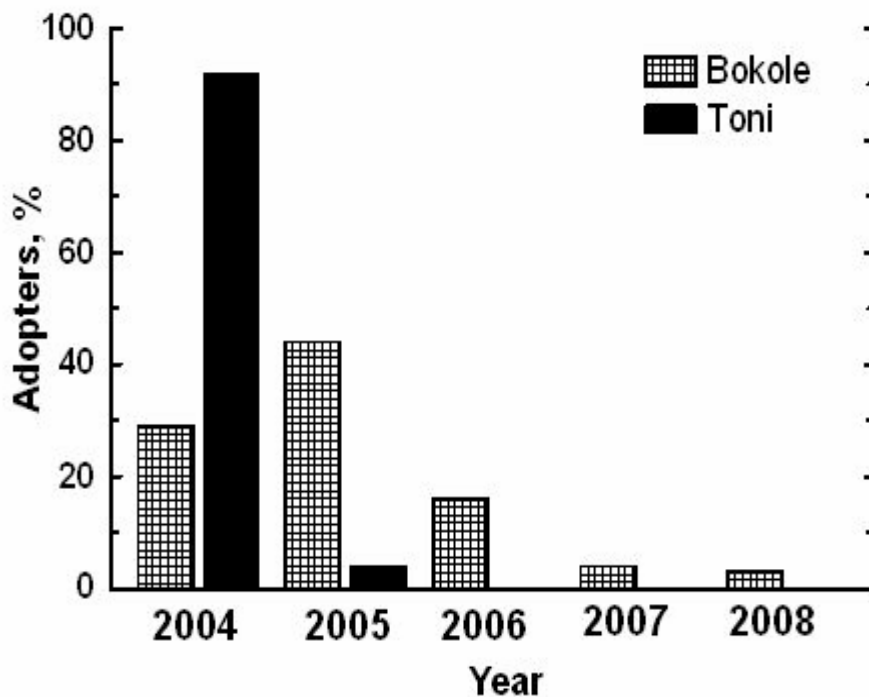
Figure 2 . Farmers (%) year wise to adopted SWCs, in Bokole and Toni sub-watershed.

Farmers' Attitude and Major Constraints on Adoption to SWC

Farmers' responses concerning perceptions and constraints for adopting SWC are presented in Table 4. The perceptions of farmers contribute substantially to the acceptance and dissemination of SWC technology. Bagdi (2005) asserted that farmers having a favorable attitude to SWC readily adopt the new technologies. Correspondingly, both adopters and non-adopters perceived positive roles of SWC for improving crop productivity, reducing soil loss and run-off in the two sub-watersheds. However, a substantial proportion of Bokole adopter farmers (39.7%) indicated that the introduced SWC technology was incompatible with their farming. This was due to the narrow space between terraces, which caused difficulty for their ox-plough. In comparison, the majority of the Toni respondents (63.5%) positively perceived the existence of the structure on the farms. They explained that the removal of stones for the construction of stone bunds, especially in the lower and

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middle part of the sub-watershed, made the

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plot better for farming.

Table 4 . Farmers responses on perception and constraints for adoption of SWC

Attitudes on effect of SWC/ constraints		Adopters		Non-adopters	
		Bokole (n = 73)	Toni (n = 52)	Bokole (n = 39)	Toni (n = 37)
		%	%	%	%
Attitudes on effects of SWC	Improve crop production	78.1	94.2	69.2	100
	Reduce soil loss	87.7	100	84.6	97.3
	Reduce surface run-off	86.3	98.1	84.6	97.3
	Improve soil fertility	80.8	98.1	74.4	97.3
	Create better farming plot	39.7	63.5	41.0	73.0
	Labour	57.5	44.2	87.2	62.2
	Technical advice	13.7	25.0	17.9	5.4
Constraints	Government support	23.3	30.8	35.9	51.4
	Skills	15.1	32.7	41	54.1
	Awareness	12.3	46.2	33.3	54.1
	Material shortage	5.5	15.4	12.8	8.1

The three major challenges cited by adopters for adopting SWC were labour shortage, lack of awareness and lack of skills (Table 4). Labour constraints were also reported as the dominant challenge among non-adopters in both sub-watersheds. The SWC interventions are labour-intensive and this often challenges households.   Desta et al. (2005) also showed that soil bunds, *fanya juu* and stone bunds respectively demand a construction labour force of 150, 200 and 250 persons day^{-1} km^{-1}. In both sub-watersheds, shortage of construction materials was mentioned to be the least important problem. This is because SWC technology uses local materials.

The majority of respondents mentioned that government support for constructing SWC technologies was adequate, revealing that an incentive under some conditions can help in sustaining and promoting the introduced SWC technology. A study conducted in Australia on a land-care programme confirmed that well-thought-out and applied government incentives could be very effective in motivating land-users to continue and to utilize new and better conservation practices (Sanders and Dannis, 1999). However, the same report also pointed out that government support has a negative effect as land-users may ignore their conservations efforts once incentives are phased out.

Most of the survey responders stated that the technologies were difficult for the farmers to apply on their own. This will hamper the expansion of the technology, and together with other factors, will affect its adoption at the local level. Farmers' dependency on external assistance has remained unchanged from previously introduced SWC structures that were constructed by NGOs and government. Thus, the participatory approach that encourages self-help did not replace external support-seeking. This will be a challenge to the expansion of the technology in areas where the government or an NGO fails to provide sufficient support.

CONCLUSIONS

Farmers in the two study areas clearly understand that soil erosion is a serious problem affecting agricultural production. However, the introduced SWC program is technically, as well as economically difficult for farmers to construct and maintain. Thus, they should coordinate in a team approach. They also need on-going support by government or NGOs for the construction and maintenance of SWC structures. In addition, the feeling of dependence on the government and non-governmental aid has influenced the adoption and sustainability of the technology.

Responsibility in local-level administration units gives farmers better access to new technology. Distance to markets also influenced to improve land productivity through better conservation and management practice. However, the role of development agents in influencing farmers depends on the trust they build and on the extension inputs delivered and on the frequency of extension contacts. The perceptions of farmers concerning the seriousness of soil erosion and the workability of SWC structures are matters to be considered.

Further, implementation of sub-watershed management, including SWC, should be undertaken only after thorough discussion and agreement on the fate of the structures. The community should be committed to the continued maintenance of current structures and the construction of new erosion control devices. Finally, it is fair to conclude that every SWC intervention should critically consider the community's socioeconomic factors as well as the complexity of the technology, for effective implementation and sustainment of conservation structures.

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Factors Influencing HIV Voluntary Counseling and Testing (VCT) Service utilization among Youth of Hawassa town: a Health Belief Model Approach, Southern Ethiopia

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Abstract

In spite of its important role in the prevention and control of HIV/AIDS, Voluntary Counseling & testing (VCT) service is being utilized poorly (21.9%) by the youth. Identifying the influencing factors in the utilization of the service enables the behavioral change intervention process more effective & efficient. The study was conducted in Awassa town, Southern Nation & Nationality Peoples' Region(SNNPR) of Ethiopia t o assess factors influencing utilization of Voluntary HIV Counseling &Testing service among 18 to 24 years old adolescents in Awassa town. A cross- sectional qualitative study was conducted considering Health Belief Model (HBM) approach and 05 focus group discussions & 13 in-depth interviews were conducted using semi-structured guides and audiotape recorder and the data was analyzed manually using thematic frame work (Coding Book). The three major factors perceived as inhibiting for the utilization of Voluntary Counseling & Testing (VCT) service were fear of stigma and discrimination, fear of coping with positive HIV test result and high HIV risk perception. On the other hand, the three most commonly cited perceived factor to enhance the utilization of VCT service in this study were having marriage plan, presence of Care & Support including Anti Retroviral therapy (ART) and persuasion by health professionals. It is recommended that tailored Behavioral Change Communication (B.C.C) interventions on HIV/AIDS prevention and VCT utilization should be undertaken, Advocacy, at a local level, should be made on the importance of the "voluntary" component of VCT giving emphasis on the draw backs of persuasion for HIV test. The role of HIV risk perception as a factor in influencing VCT service utilization should be further studied.

INTRODUCTION

More than 80% of adults living with HIV reside in sub- Saharan Africa, where the epidemic still continues to spread .In the global scale, Ethiopia hosts the third largest number of people living with HIV/AIDS (PLWHA), and ranks sixteenth in terms of prevalence (CSA, 2005). Although Ethiopia has been hit by HIV /ADIS epidemic latter than many East African countries, the ministry of health (MOH) estimates adult prevalence to be 23.4%, 19%, and 18.7% in Bahir Dar, Jijiga and Nazret respectively in 2003 (MOH, 2006).

The primary aim of VCT is preventive to help people change their sexual behavior so as to avoid transmitting HIV to sexual partners if positive, and to remain seronegative if negative. Despite many limitations and difficulties in the implementation of VCT in sub – Saharan Africa, many studies have shown that it is effective in reducing HIV infection In Uganda. Increasing number of people coming for VCT indicated that marriage plan was the reason they wish to be tested; in 1992, 6% of those attending VCT did so because of premarital testing and this figure rose to 35% in 1998 (UNAIDS, 2001).

VCT is behavioral intervention not a mere diagnostic procedure. Therefore, such dramatically increasing prevalence rate of HIV necessitates the implementation of multifaceted prevention and control programs, and one of these approaches is voluntary counseling and testing. Many people with HIV in Ethiopia don't know that they are infected. Until 2000, only small percentages of those with HIV/ AIDS have had access to reliable VCT service. As there is no cure for HIV/AIDS, voluntary HIV counseling and testing remains a key strategy to control the spread of HIV and to provide care and support to those who are positive (MOH, 2006)

In one cross – sectional community based survey, which was under taken on adolescents of Harar town in 2005; it was found that only 21.9% of adolescents reported that they had ever been tested for HIV (Olijira, 2004). A qualitative study which was undertaken in Arbaminch town in 2007 on youths identified fear of stigma & discrimination and fear of coping with positive HIV test results as the two common factors where as presence of ART and having marriage plan were identified as enhancing factor for VCT service utilization).The study also revealed that HIV risk perception was found to be a debatable issue in that it was considered as enhancing factor by some participants and as inhibiting factor by others(Meshesha, 2007).

The major discrepancy, here, is that in spite of its important role in the prevention and control of HIV/AIDS, VCT service is being utilized poorly. The important research question is, therefore "why people don't utilize the VCT service as required and what factors contribute for utilizing and not utilizing the service". In doing this, the perception of individual participants and respondents will be considered taking the components of Health Belief model (HBM) as guideline or framework. In Ethiopia, different studies showed that fear of coping with the positive test results, low risk perception to HIV, fear of stigma and discrimination that follows positive test results, absence of community support, lack of perceived benefit of VCT, fear of partners' reaction were commonly cited reasons for not utilizing the VCT service (Olijira, 2004).

Most of the studies on this problem are quantitative and So far, there is no similar study undertaken in Awassa town community (as to my search), and hence this study will deeply assess the accountable factors of VCT utilization in lights of the findings in previous studies in other areas. In spite of its important role in the prevention and control of HIV/AIDS, VCT service is being utilized poorly (21.9%) by the youth. Identifying the influencing factors in the utilization of the service enables the behavioral change intervention process more effective & efficient.

The aim of this study is assessing influencing factors for utilization of VCT service for HIV so that an effective behavioral change intervention program can be developed based on the findings and hence it will specifically investigate issues related to risk perception, PIHCT, Coping with positive test results as important factors for VCT uptake in depth qualitatively.

MATERIALS AND METHODS

Study Design

A cross- sectional qualitative study was conducted using a Health Belief Model (HBM) approach.

Study Area and Period

The Study was undertaken in Awassa town, southern Ethiopia, from January 30 up to May 30/2011.

Sample Size and Sampling Technique

The 06 FGDs containing 6-8 participants (out of 10 planned FGDs because of information saturation), and in the same way   13 in-depth interviews key informants (out of 15 Planned) was conducted on (3 Religious leaders, 2 community leaders, 2 PLWHA, 2 street boys, 2 CSWs and, 2 counselors). A combination of convenient and maximum variation sampling technique was employed.

Measurements

Data Collection

Data were collected using FGD and in – depth interview guides by 12 trained data collectors; third year General Para med Medical Laboratory students. The FGD and the in-depth interview were audio – taped (recorded) and then Transcribed. The data collection instruments (guides and audio-tape recorder) were translated & pre-tested.

Data Analysis

Manual analysis of the data was made after a thematic framework is developed using responses, which were transcribed, coded & compiled in a logbook. Pre- test of the instruments was conducted one week prior to the actual data collection.

Study Themes: were developed in accordance with the constructs of Health belief model (HBM) taking the most common components making them align to the already formulated objective of the study: an approach to the MODEL but not for testing the MODEL.

Conceptual Framework
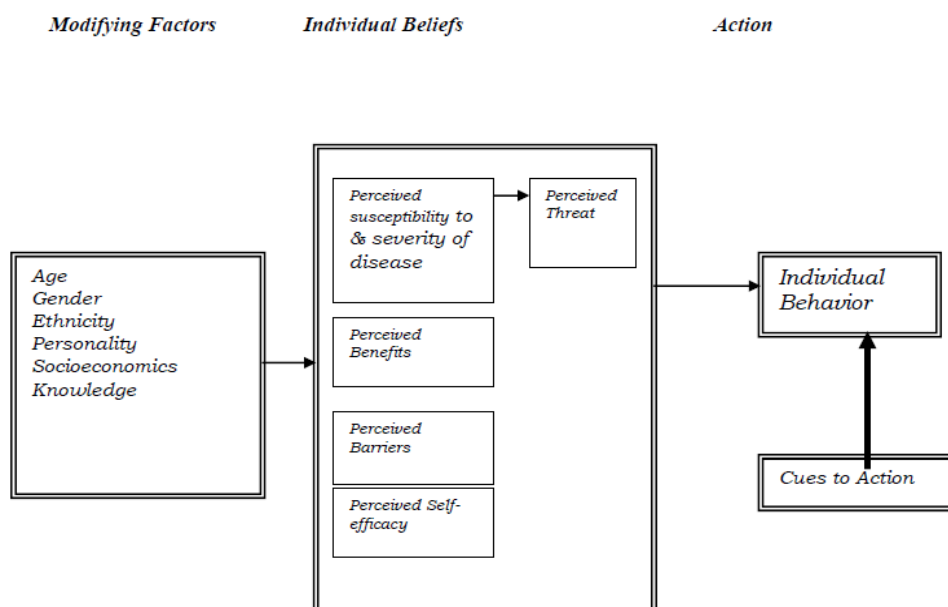
Fig. 1. Conceptual framework (Constructs of Health Belief model).

(**Source:** Karen et al, 2002)

Operational Definitions

Youths- are adolescents whose age group is between 18 & 24 years.

Street boys – are boys who pass the day and night time over the street regardless of their family status.

Commercial sex workers-are females working in bars during the night time taking sex as a primary source of income.

Quality Assurance

The quality of the data was assured by using translated & pre tested guides, training data collectors, making close supervision, providing data collectors and supervisors with field guide, using audio-tape recorder throughout the data collection period, and finally the data analysis process was done supported by the already transcribed, edited and Compiled data.

Ethical Issues

Officially written ethical clearance was obtained from Institutional Review Board of College of Medicine & Health Sciences, Hawassa University, and letter of Cooperation from College Head Office

RESULTS

A total of six (6) FGDs, out of the planned 10, were conducted because of the saturation of information and each FGD involved 6-8 participants from different population sub-group (strata) including male youths, female youths, and street boys in private settings each session lasting for 40 minutes on average. Age of the participants ranges from 18 to 24 years. The FGD sessions were successful in achieving meaningful interactions among participants and stayed focused throughout the sessions. There was an overall consensus on the major topics discussed in most of the FGDs where as there was hot argument and debate on some of the FGDs particularly on HIV risk perception level as a factor of VCT service utilization.

The explorations made by the FGDs were also made verified & further explored by IDIs of key informants: a total of 13 key informants' interviews, out of the planned 15, were undertaken because saturation of information. Each interview lasted 30 minutes on average and conducted in private settings. The key informants involved were counselors, PLWHAs, religious leaders, community leaders, CSWs, and street boys. Age of the key informants ranges from 18 to 60 years.

Theme: 1. Who Should be Tested for HIV?

On the discussion made among participants on whom to be tested for HIV, majority of the participants in most of the FGDs cited that everybody should be tested regardless of age, sex and occupation. This finding was also verified by the IDI's findings: The vast majority of the respondents think that everybody, regardless age, sex and health status should be tested for HIV. However, a protestant church leader mentioned that the test is important only for people who plan marriage and majority of the street boys identified night club workers, Street boys/girls and the non-missionaries as individuals who need to undergo the HIV test.

A 37 years old protestant church Pastor, when expressing his deep concern said: "It is only for couples who need to marry that HIV testing is encouraged and requested by our church; I think that the already married couples, who lead peaceful life and take the necessary preventive measures that the tested person would have taken, need not undertake the test, If the HIV testing leads to revenge, suicide, family and marriage distortion and social interaction break down, which were not problems before the test, I don't think that the test is no more important".

Theme: 2. Inhibiting Factors for Vct Service Utilization:

Concerning the factors which inhibit the utilization of VCT service, fear of stigma and discrimination and fear of coping with positive HIV test result were identified in all of the FGDs, and high HIV risk perception was identified in most of the FGDs, while lack of awareness, low risk perception and Lack of trust on both the validity & confidentiality of the test were identified as important factors in some of the FGDs.

> *A 20 years old grade 11 male student, when expressing his argument on the privacy issues, being nervous, said: "why do you think People go to WOLAYITA Sodo from AWASSA for HIV testing in the presence all these Health facilities here? It is for nothing but for their privacy!"*

The above FGD findings were also supported by the IDI findings: stigma and discrimination attached to HIV, seeking care & support and fear of coping with positive HIV test result were also mentioned by almost all the counselors as important inhibiting factors, and other factors include other cultural & environmental influences.

> *A 22 years old male counselor, when expressing the degree of frustration that clients manifest during HIV testing said: "Some Clients jerk when we draw blood sample, and when I see this reaction, I myself, let alone them, worry of their future. Some of them*

> *even faint (go to shock) when we declare their positive test result"*

Other inhibiting factors, explored from FGDs, include lack of proper pre-test counseling approach before taking blood sample and lack transparency at a family level on sexual issues.

> *A 19 years old grade 11 male student, reflected his deep concern on the approach of counselors said: "The counselor, after she drawn my blood sample, asked me what my reaction would be if my test result becomes Positive. I feel this wrong! How on earth my reaction is asked after the blood sample is already taken. It is very frustrating approach!!"*

The ideas further explored from the IDI are also suggestive of the concerns of FGD participants: fear of stigma and discrimination, fear of coping with positive test result and lack of awareness were mentioned by vast majority of the key informants, where as other factors such as hopelessness, low risk perception and, absence of privacy in the VCT centers were least mentioned.

> *A 32 years old grade 5 female, who has been living with HIV /AIDS for the last 13 years, and currently working as a chair person in one association of females who live with HIV /AIDS, when expressing her belief and experience on VCT service utilization said: " Recently, I was in one campaign to make people tested for HIV in rural*

community; I was very much disappointed by the poor readiness of the people, especially the youth, to accept VCT; they don't want to be tested!"

A 21 years old street boy has strong stand that it is fear of discriminations from society that makes people not tested for HIV, and said:

"They actually fear people not God!!" to capitalize his thought.

Theme: 3. Enhancing Factors for Vct Service Utilization:

The study has identified having marriage plan and presence of Care & Support (ART) as enhancing factors for the utilization of the VCT service in almost all of the FGD sessions, and high HIV risk perception and persuasion by health professionals were identified as important factors in most of the FGDs, while occurrence of repeated illness and planning for future life were identified in some of the FGDs. Other factors raised during the discussion include DV lottery, raised awareness level, importance of knowing HIV status and peer influence.

An 18 years old grade 9 male student, gazing and laughing at one of his friends, when arguing against the idea of his friend on importance of peer influence, said: "You see, It is you that should start being faithful to your partner even if you think that she may not be faithful to you so that you can influence her & be a model to other friends of yours!"

The issue of HIV risk perception level, generally, was a debatable topic in 1/3 of the FGDs in that some of the participants considered high HIV risk perception as enhancing factor for the utilization of VCT service while other participants considered it rather as an inhibiting factor for which a consensus was not reached through out the discussion sessions. It was noted that, there was no clear variation across the different population sub-groups (strata) in identifying fear of stigma and discrimination as inhibiting factors, and having marriage plan and presence of ART as enhancing factor for utilizations of the VCT service in the area.

The Key informants, in most of the IDIs, also verified that marriage plan and presence of care & support (ART) are important enhancing factors for the utilization of the VCT service: almost all counselors identified marriage plan, and some of the counselors mentioned Professional risk(exposure) , raised awareness and knowledge of people as a result of shared experiences from PLWHA who are on ART, influence of religious leaders, persuasion by health professionals (PIHCT approach) and changing friends(sexual partners) as most important enhancing factors for VCT service utilization among youth.

A 32 years old male nurse counselor, when expressing his deep concern on the influence of religious leaders on

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pre-marital testing said: "what should come first is healthy living not marriage. The religious leaders tell the couples just to be tested before marriage as a pre-requisite, but they don't tell them how to live with HIV or how to proceed after the test is declared, if the test result is found to be positive for HIV. I don't agree with such approaches as they are completely against the principle of VCT".

The counselors' response on the reaction of client before and after the HIV test revealed that all of them reported that clients who pass through VCT do cope with their positive HIV test results as compared to clients who are made to pass though a PIHCT approach. They also mentioned that ongoing counseling is not as such a common practice due to some internal and external problems.

Findings from other key informants also supplement to the ideas explored the FGDs above in one or the other way: a religious leader of the protestant church also suggested moral education, at the elementary school level, as a better remedy for prevention and control of HIV/AIDS than VCT service taking his own experience as a reference.

A 60 years old Orthodox Church Priest capitalized on importance of Care & support services to PLWHA, and said: *"When people are tested for HIV in seeking Care & support, if they are positive for the test, and not given the required support, they & other people lack trust on the service & the government commitment; I think the government should work harder in this regard!!"*

DISCUSSION

This study attempted to explore, verify and roughly compare the immediate and associated factors that influence the utilization of VCT service among youths in the study area.

The three major factors perceived as inhibiting for the utilization of VCT service were fear of stigma and discrimination, fear of coping with positive HIV test result and high HIV risk perception. On the other hand, the three most commonly cited perceived factor to enhance the utilization of VCT service in this study were having marriage plan, presence of care and support

(ART) and persuasion by health professionals. These findings are more or less similar to the findings of the 2007 Arbminch study. The findings are also supported by many other studies undertaken on the same study subjects using the same study design but at different areas of the nation (Meshesha, 2007).Literature showed that wider access to VCT and a large number of people's greater awareness of their HIV status within the community are important elements in challenging stigma, as in the case of Uganda. However, according to these literature, for it to be effective in

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challenging stigma, HIV testing has to be a voluntary process associated with counseling that helps people understand their status (UNAIDS, 2001).

HIV risk perception as a factor for utilization of VCT service was a debatable issue, as in the case in the 2007 Arbaminch study, which ended up with hot argument with no consensus in 1/3 of the FGD sessions in that some of the participants argued that high HIV risk perception is considered as enhancing factor and low HIV risk perception as inhibiting factor while other participants argued otherwise(vise versa)(Meshesha, 2007).

This study also identified other factors which inhibit and enhance utilization of VCT service that were not identified by other studies reviewed for this study purpose, and these include lack of trust on validity & confidentiality of the test as inhibiting factors while raised DV lottery as enhancing factor. Unlike the 2007 Arbaminch study, VCT service affordability & accessibility was not reported as an inhibiting factor. The difference in these particular findings may be attributed to the expanding service coverage, difference in awareness level & difference in the status of the study area used.

CONCLUSIONS

The study revealed, unlike the assumption of Health Belief Model, that low HIV risk perception enhances VCT service utilization. This indicates for need for follow-up triangulated study; employing both quantitative & qualitative designs to determine actual association of the two variables.

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Gender Power Relations in Reproductive Decision-Making: The Case of Migrant Weavers of Addis Ababa, Ethiopia.

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Abstract
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Reproductive decision-making is strongly affected by gender power relations. In many developing countries most of reproductive decisions are made by men although it is, as well, the concern of women. Hence, this study was undertaken with the objective of assessing gender power relations in reproductive decision-making. Three hundred seventeen married couples were randomly selected and data collected from them through structured questionnaire. Simple descriptive statistics and multinomial logistic regression was used to analyze the data.Accordingly, about 45% and 35% of the respondents reported that their husbands dominate the contraceptive use and maternal health service utilization decision-making, respectively. On the other hand, about 33% and 36% of respondents made the contraceptive use and maternal health service utilization decisions jointly with their husbands, respectively. From the multinomial logistic regression analysis results older women, literates, those having fewer children and media access made the contraceptive use decisions by their own or jointly with their husbands. Literates and working women made the maternal health service utilization decisions by their own or jointly. Women who are not victim of physical harassment or verbal abuse made the maternal health service utilization decisions jointly. Besides, working women and those having media access made the contraceptive use and maternal health service utilization decisions by their own, respectively. Empowering women through education and economic activities are recommended to realize egalitarian or women-centered reproductive decision-making.

Keywords: Contraceptives use; maternal health service utilization; gender; power relations; decision-making.

INTRODUCTION

In most societies, women usually have less power than men in all spheres of life (Eguavoen et.al., 2007). The patriarchal, hierarchical and polygynous organization of many African households, the young age at marriage for women, patrilocal residence after marriage, the large age difference between spouses, the unequal work burden between the sexes, the high bride price, and the low educational level of women tends to perpetuate the low status of women and make them voiceless and powerless in all spheres of life including sexuality and reproduction (Makinwa-Adebusoye, 2001; Bosureup, 1985). Consequently, women's needs and preferences are neglected, and their knowledge and experience are not used to help guide decisions in their family as well as in their community (Kuponiyi and Alade, 2007; Arkutu, 1995). Accordingly, in many developing countries, most of decisions regarding sexual activity, fertility, and contraceptive use are made by men (Oladeji, 2008).

The situation is similar in Ethiopia, where women generally do not have equal right with their husbands to have access for resources, to make decisions regarding their desire number of children, to use contraception and even to space or stop childbearing (Olokodana and Yeshi, 1998). Consequently, women's decision-making abilities remain constrained and subjugated to the political, socio-economic and cultural dominance of men (WHO, 1999). The consequent gender based power inequalities hinder communication between partners about reproductive health decisions, constrains their access to reproductive health services, prevent them from attaining the highest level of sexual health and pleasure and this, in turn, contributes a lot

to poor health outcomes (Blanc, 2001; Speizer et.al., 2005).

Understanding individuals, above all women's reproductive needs and identifying the key factors which influence reproductive negotiation process between husband and wife are necessary to formulate policies aimed at creating conducive environment to improve women's reproductive health, general well-being and their decision-making power (Xu, 1999). Furthermore, understanding the linkage between gender power relations and reproductive decision-making is among the key factors which can help to assess the extent of gender inequality. However, it has not been well assessed in Ethiopia. Thus, this study aimed to fill the knowledge gap by using data collected from weavers in Addis Ababa who are from Gamo Gofa zone of Southern, Nations, Nationality and People's Region (SNNPR).

Women of the weaver's community are highly responsible for both productive and reproductive activities. With background the research tried to answer whether women in the study population enjoy similar power and rights in making contraceptive use decisions as they take the lion share of production as well as reproduction activities in their households? In addition, majority of weavers are migrants from Gamo Gofa zone of SNNPR, particularly from Gamo highlands. As most part of Ethiopia, there is gender disparity in Gamo Gofa zone. Hence, the research tried to answer whether gender disparity in the zone reflected in Addis Ababa. The main research questions are: Who is responsible for reproductive decision-making in the household? What are the determinants of reproductive decision-making?

METHODOLOGY

Sampling and Data Collection Methods

Among ten sub-cities of Addis Ababa, the study site, Gulele sub-city, was purposely selected for the reason that majority of weavers are living. A multistage sampling procedure was employed to select the study respondents. Of ten kebeles[1] in Gulele sub-city, large concentration of weavers resides in two of the kebeles; namely kebele 18 and 19. In the first stage, two clusters were formed using the two kebeles. Using simple random sampling one of the cluster, kebele 18, was chosen. In the second stage every tenth household from the selected kebele were chosen. Then from each household both wife and husband, who satisfied the inclusion criteria, were interviewed. The inclusion criteria for the study respondents were: the couples should be living together in Addis Ababa during the time of the survey; the couples should be migrants from Gamo Gofa zone of SNNPR; women should be in the reproductive age category (15-49 years) and men should be in (15-69 years) age category.

The sample size was determined using the formula:

$$n \ = Deff\left(\frac{z_{\alpha/2}}{e}\right)^2 pq$$

where *Deff* is the design effect = 1.5; α is level of significance = 5%; *e* is level of precision = 5%; *p* is estimated proportion of joint reproductive decision-making and estimated to be 0.5. Substituting the values in the above formula and by adding 10% of the sample size to compensate for non response, 317 couples, i.e., 634 individuals fulfilling the inclusion criteria were selected for the study. Then the data was collected by using well designed structure questionnaire.

Two independent questionnaires were prepared for husband and wife. The husband's questionnaire contains the demographic, socioeconomic and cultural variables only whereas the wife's questionnaire contains reproductive issues and patterns of reproductive decision-making in addition to variables included in the husband's questionnaire. The data collection was undertaken from February 09, 2009 to February 16, 2009. The response rate of the questionnaire was 100%.

Ethical clearance was obtained from Addis Ababa University, Institute of Population Studies. All the study participants were informed about the purpose of the study, their right to refuse and assured confidentiality. Informed verbal consent was obtained from the respondents prior to the interview.

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[1] Smallest administrative unit in Ethiopia

Variables in the Study

The response variable of the study is the pattern of reproductive decision-making (decisions regarding contraceptive use and maternal health service utilization). It is categorized in to three: men-centered/husband-dominated, women-centered/wife-dominated and joint decision-making.

The explanatory variables included in the study are: age (15-24, 25-34 and 35-49 years), religion (orthodox and protestant), educational status (literate and illiterate), working status (working and not-working), number of children (0, 1-2 and 3+ children), media exposure (regular/occasional and no media access), physical harassment or verbal abuse (committed and not committed) and years lived in Addis Ababa (<11, 11-20 and >20 years).

Methods of Data Analysis

Descriptive data analysis like frequency distributions and cross-tabulations; and inferential data analysis like multinomial logistic regression were employed to identify the determinant factors of reproductive decision-making.

Let Yi be a random variable representing decision-making pattern of an individual. We assume that each respondent can have discrete, mutually exclusive choice of decision-making. The decision-making patterns (Yi) are functions of demographic, socioeconomic and cultural variables (X). The multinomial logistic regression model for decision-making specifies the following relationships between the probability of choosing option Yi and the set of explanatory variables xi as:

$$P(Y_i = j) = \frac{e^{\beta_j x_i}}{\sum_{k=0}^{j} e^{\beta_k x_i}}, \qquad j = 0, 1, ...J$$

where β_j is a vector of coefficients for category j and xi is the vector of explanatory variables for observation i. Moreover, model assumptions including multicollinearity, independence of irrelevant observations, outliers and influential values were checked and addressed accordingly. STATA version 10 and SPSS version 15 statistical software packages were used for the data analysis.

RESULTS AND DISCUSSION

Sample Characteristics

The mean and median ages of the wives were 27.3 and 26 respectively with standard deviation of 5.9 years and that of husbands were 33.5 and 30 with standard deviation of 10.1 years. On the average husbands were six

years older than their wives. About 12% of the couples do not have children while 46% have one or two children and the remaining 42% have three or more children. On average a couple had 2.88 children. About 49%, 30% and 21% of women have been living in Addis Ababa for less than 11 years, 11-20 years and 20 plus years, respectively. Among the men respondents, about 18%, 42% and 40% have been living in Addis Ababa for less than 11 years, 11-20 years and above 20 years, respectively. Regarding educational level, 66% of women were illiterate, 28.7% primary and 5.3% are secondary and above; this figures were 30%, 57.4% and 12.6% for men respondents, respectively. There is discrepancy in the educational attainment between couples. Women are underestimated than men in the sample. Concerning religious affiliation, about 68% and 74% of women and men, respectively, were Orthodox Christians and 32% and 26% of women and

men, respectively, were Protestants. About 57% of women were engaged in income generating activities and the remaining 43% were not. All men respondents were primarily engaged in weaving activity and generate their own income. The media exposure indicated that 57.4%, 22.4%, 20.2% of women had no access, occasional, and regular access to media, respectively, while 4.7%, 67.2% and 28.1% were the respective figures for men respondents. Women are more disadvantaged than men in media consumption. This might be due to the language barriers together with the lower educational status, social status and restricted freedom of movement for women. Majority of surveyed women (69%) claimed that their husbands committed physical harassment or verbal abuse while the remaining 31% reported that they have never been harassed or abused. (see Table 1 below)

Reproductive Decision-Making of Women

All surveyed women have heard about at least one method of contraceptive. Injectables and pills were known by all of them whereas only 24.4% knows sterilization. About 60% of the women respondents have ever used contraceptive methods. Of 279 women who ever give birth, about 69% have obtained antenatal care from health centers and only 20% were assisted by health professionals for

their last delivery. Regarding decision-making, about 45, 33 and 22 percent of the women respondents reported that the contraceptive use decision was made by their husbands, jointly and by self, respectively, and this figure was 35, 36 and 29 percent, respectively, for maternal health service utilization (antenatal and delivery care) decision-making. (see Figure 1.

Table 1: Percentage distribution of sample of weaver by selected demographic, socioeconomic and cultural characteristics in Addis Ababa, 2009.

Characteristics	Women (n=317)		Men (n=317)		Total (n=634)	
	N	%	N	%	N	%
Age						
15-24	105	33.1	46	14.5	151	23.8
25-34	162	51.1	144	45.4	306	48.2
35+	50	15.8	127	40.1	177	28.0
Number of children						
0	38	12	35	11	73	11.5
1-2	150	47.3	142	44.8	292	46.1
3+	129	40.7	140	44.2	269	42.4
Educational level						
Illiterate	209	65.9	95	30	304	47.9
Primary	91	28.7	182	57.4	273	43.1
Secondary and above	17	5.4	40	12.6	57	9.0
Religion						
Orthodox	216	68.1	235	74.1	451	71.1
Protestant	101	31.9	82	25.9	183	28.9
Work status						
Working	181	57.1	317	100	498	78.5
Not working	136	42.9	0	0	136	21.5
Media exposure						
Regular	64	20.2	89	28.1	153	24.1
Occasional	71	22.4	213	67.2	284	44.8
Never	182	57.4	15	4.7	197	31.1
Physical harassment/verbal abuse						
Committed	219	69.1	75	23.7	294	46.4
Not committed	98	30.9	242	76.3	340	53.6
Years lived in Addis Ababa						
Below 11	156	49.2	59	18.6	215	33.9
11-20	96	30.3	132	41.6	228	36.0
Above 20	65	20.5	126	39.8	191	30.1

Note: age 35+ is (35-49) for women and (35-69) for men.
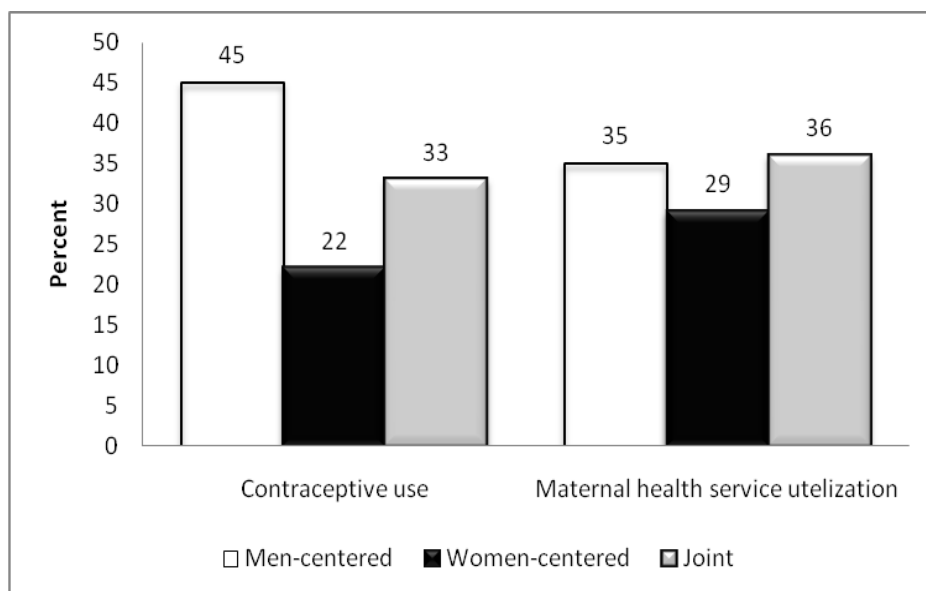
Figure 1: Reproductive decision-making among sample of women respondents, Addis Ababa, 2009.

Determinants of Reproductive Decision-Making

The following discussions are based on the multinomial logistic regression analysis output (Table 2 below).

Compared to older women (35-49 years of age), younger women (15-24 years of age) and middle aged women (25-34 years of age) are less likely to participate in the contraceptive use decision-making. This might be due to the lower bargaining power of younger women coupled with their low socioeconomic status and information exposure made them to live in the household where husband dominated the contraceptive use decision-making. This result is in line with the study conducted by Lapeyrouse (2002) that younger women have low bargaining power regarding contraceptive use.

Literate women made the contraceptive use decision alone or together with their husbands. Additionally, the maternal health service utilization decision-making is their own business. The higher the level of education for women, the more knowledge she acquires for the use of family planning methods (CSA and ORC Macro 2006), increase the desire to limit or space births and increase the use of and the intention to use contraceptives (Hogan et.al. 1999). Furthermore, women's education provides them with more opportunity to participate in the process of modernization and enable them to bring about changes in the economic and social situation. This, in turn, improves their knowledge and practice of reproductive health rights and improves their decision-making power in their household. Moreover, this finding is in agreement with different research findings which concluded that education for women

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positively affects conjugal communication and facilitates egalitarian decision-making (Chapagain, 2006; Hossain, 1998; Laban and Gwako, 1997).

Having fewer children is attributed to have women-centered or joint contraceptive use decision-making. The possible explanation for this result is that women who delay or avoid births can bring about significant economic advantages over women with large number of children when terminating consensual union. Therefore, having fewer children can improve a woman's ability to end an unsatisfactory relationship (Dixon-Mueller, 1993) and it enables them to exercise more freedom within marriage. Prasadja et.al (1997) concluded that women with two or fewer children have greater control of their reproductive lives than women with three or more children.

Compared to not-working women, working women (women generating their own income) are more likely to participate in contraceptive use decision-making. Also working women made the maternal health service utilization decision alone or jointly with their husbands. Having own income for women increases their economic independence and challenges the traditional belief of men dominance in decision-making and hence improves their bargaining power within the household. Cash work and control over earnings for women improves women's autonomy and stimulates spousal communication and hence creates decision-making power (Chapagain, 2006; Hossain, 1998; Laban and Gwako, 1997; Gage, 1995).

Women with regular access to media are more likely to make the contraceptive use decision by their own than those women with no media access. They also take the lion share of maternal health service utilization decision-making process in their household. Exposure to media, especially programs related to family planning, widens the scope of understanding issues related to contraceptive use and helps in realizations of its importance in achieving desired family size (CSA and ORC Macro, 2006). Thus, better media consumption will equip them with information about the reproductive health issues including reproductive health rights and it encourage them to make active participation in the reproductive decision-making process in their household.

Women who have not harassed or abused by their husbands are more likely to make joint maternal health service utilization decisions in their household than those who have harassed or abused. This finding corroborates the study result of Chapagain (2006) which concluded that women experienced violence from their husbands are less likely to participate in antenatal care decision-making.

Table 21. Multinomial logistic regression analysis result of reproductive decision-making of weavers in Addis Ababa, 2009.

Characteristics	Contraceptive use decision-making						Maternal health service utilization decision-making					
	Wife Vs Both		Husband Vs Both		Wife Vs Husband		Wife Vs Both		Husband Vs Both		Wife Vs Husband	
	Se(β)	RRR	Se(β)	RRR	Se(β)	RRR	Se(β)	RRR	Se(β)	RRR	Se(β)	RRR
Age												
15-24	0.74	0.18	0.82	14.4**	0.94	0.01**	0.74	1.21	0.96	1.56	0.49	0.77
25-34	0.6	0.3	0.62	1.3	0.71	0.22*	0.33	0.71	0.37	0.76	0.48	0.93
35-49 (ref)												
Educational status												
Illiterate (ref)												
Literate	0.56	0.59	0.59	0.05**	0.66	11.00**	0.92	2.24*	0.13	.27**	0.95	8.14**
Religion												
Orthodox (Ref)												
Protestant	0.56	5.5	0.54	2.15	0.55	2.57	0.34	0.92	0.4	1.1	0.33	0.84
Number of children												
0	0.96	4.4	1	0.55	1	8*						
1 – 2	0.56	1.9	0.66	0.24*	0.74	7.9**	0.32	0.79	0.51	1.2	0.29	0.64
3+ (ref)												
Work status												
Working	0.55	1.4	0.47	0.51	0.6	2.7*	0.23	0.66	0.07	.22**	1.1	3**
Not working (ref)												

(Table 2, Continued)

Characteristics	Contraceptive use decision-making						Maternal health service utilization decision-making					
	Wife Vs Both		Husband Vs Both		Wife Vs Husband		Wife Vs Both		Husband Vs Both		Wife Vs Husband	
	Se(β)	RRR	Se(β)	RRR	Se(β)	RRR	Se(β)	RRR	Se(β)	RRR	Se(β)	RRR
Media exposure												
Regular/Occasional	0.57	2.9*	0.62	0.81	0.63	3.6*	0.71	1.76	0.28	0.66	1.1	2.7*
No access (ref)												
Physical harassment/ verbal abuse												
Committed (ref)												
Not committed	0.48	1	0.45	0.74	0.51	1.34	0.15	.41*	0.22	0.63	0.27	0.65
Years lived in Addis												
Below 11 (ref)												
11 – 20	0.6	1.5	0.51	1.85	0.64	0.84	0.22	0.56	0.19	0.49	0.51	1.15
Above 20	0.7	2.1	0.79	0.41	0.84	5.1	0.77	1.54	0.68	1.22	0.64	1.25
LR chi2(22)	*109.30*						*109.30*					
Prob > chi2	*0.000*						*0.000*					

**Significant at 1%; *Significant at 5%; ref- indicates reference category; unmarked- indicates insignificant variables; RRR- relative risk ration; Se(β)-standard error of the coefficient; the significant LR statistics (Prob>chi2=0.000) shows that all the regressors have significant impact on decision-making pattern.

CONCLUSIONS

The study investigated the gender power relations in reproductive decision-making of migrant weavers, who are living in Addis Ababa, from Gamo Gofa zone of SNNPR. The objectives were assessing the reproductive decision-making pattern and identifying the determinant factors associated with reproductive decision-making in the study population. To meet the objectives, respondents were asked a series of questions related to reproductive decision-making. Accordingly, age, educational status, number of children, work status and exposure to media are found to be determinants of contraceptive use decision-making. On the other hand, educational status, working status, media exposure, and physical harassment/verbal abuse are determinants of maternal health service utilization decision-making.

The result underscores women's empowerment through education and economic activities for enabling them to make the reproductive decisions by their own or jointly with their husbands. Thus, policies which advocate women's empowerment (policies like National Policy of Ethiopian Women, National Population Policy, The Ethiopian Education and Training Policy, Health Policy and others) should be implemented in well organized and integrated way. Moreover, efforts should be made to foster the elimination of gender imbalance and promote gender equality in the study communities, especially among those categories who have reported men-centered reproductive decision-making (younger, illiterate, not working, having no media access, having more than two children and women who have victim of physical harassment or verbal abuse).

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Human Cultural Names In Gugage: Roles, Patterns and Dynamics of Change

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Abstract

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This article reports a descriptive account of naming practices in Gurage society. It specifically aims to investigate the socio- cultural roles of names; if the names have formal and semantic patterns; and the extent to which the cultural naming practices are maintained through time. Qualitative research methodology was followed in the study. Socio-cultural and linguistic data were collected using key informants. The collected data were analyzed thematically; they were grouped based on gender differences, formal patterns, and meanings. Trend analysis was used to show degree of maintenance or endangerment of cultural name giving practices. The results of the study showed that names, which are often given by grandparents, parents, or neighbors express the name givers aspirations, fears, beliefs, gender roles and power relations. The naming patterns largely changed form cultural or ethnic personal names into Amharic and religious names. The causes for such changes were found to be denigration, religion, and Amharic hegemony. It was further found that giving cultural personal names to newborn babies were revitalized in the last two decades.

Key Words: endangerment, Gurage, names, patterns, roles

INTRODUCTION

The People and the Language

The Gurage[1] people live in the Southern Nations Nationalities and People's Regional state, in the Gurage Zone. The Gurage people are farmers; mainly growing Ensete plant (Needham, 1969), cereals, and vegetables. They also rear animals, such as cow, horse, mule, sheep and goat. The stable food in many parts of the Gurage is Wusa 'bread of Ensete plant'. The Gurage people are also renowned traders who have scattered across Ethiopia (Henry, 2006). The total population of Gurage is 1,867, 377 (CSA, 2007). Though Gurage people differ in language and religion, their culture, economic and social organization is basically the same Shack (1966).

The languages of Gurage are collectively called *Guragina,* which has twelve varieties (Gabreyesus, 1991; Fekede, 2013). They are grouped into *North Guragina* (Kistane and Dobi), *West Guragina* [(Central: Muher, Mesqan, Ezha, Cheha, Gumer, Gura), Peripheral: Geto, Inor, Indegegn, Ener)], and *East Guragina* (Welene)[2]. The present study is based on the Gumer variety of Guragina.

Names have been studied in different fields of study. Historians study toponyms , animal names, throne names (Mehari, 2007) to construct historical past; philologist study names to establish the etymologies of words, and anthropologists study names to uncover human relations, such as their genealogies. This study falls under the ethnography of communication, how names communicate circumstances, wishes, aspirations, wisdom, power relationships, identity, which is reflected at different periods and social systems of the Gurage ethnic groups. To my knowledge ethnic personal naming pattern in Gurage was not studied so far. The naming practice has been endangered largely. This study would enable to fills in the existing research gap. The finding will help to create awareness thereby to preserve the culture of giving ethnic personal names.

Objective

The main objective of the study is to find out the extent cultural personal names in Gurage are preserved or endangered. The specific objectives are:

1. To find of formal patterns in cultural personal names.
2. To uncover literal and social or pragmatic meanings encoded in personal names.
3. To find out the dynamics of change in naming practices.

MATERIALS AND METHODS

Interview guide and linguistic questionnaire were used to collect sociolinguistic data. Five key informants who lived for several years in the village called Deweshe of the Gumer district were used. Three of them were males whereas two of them were

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[1] Gurage refers to a geographical name (Hetzron and Bender, 1976); it is a combination of Gura 'left' and –ge 'land or village' (Tenkir, 1991;Fekede, 2002;).

[2] Silte and Zay, which are spoken in Silte Zone in Oromiya region, respectively are not considered.

females[3]. The sociolinguistic data were audio recorded and phonemically transcribed. As the data collected was textual, qualitative method was used to analyze it. Socio-linguistic data were thematically grouped based on gender, formal similarity and meaning associations. The data regarding change of personal names over time were analyzed using trend analysis (cf. Kumar 2002).

Roles of Human Names

Construction of Identity: Names in any culture have the role of identifying an individual, group, race, ethnicity, etc. Names have referential role in one side, and are markers of social identity on the other (cf. Baye, 2006). The question asked, however, is if there is any relationship between social identity and naming in particular and language in general. Thus, it is worth to examine what has been said by different scholars regarding the relationships between language and identity.

To begin with, let us see what an identity is and how people identify themselves and then look at how it links with language. Identity refers to who someone or somebody is. According Wardhaugh (2006:6) identity is "…constructed from interaction with others and it is the sense of self each of us has achieved, the result of our socialization, i.e., our experience with the outside world as we have dealt with that world in all its complexity."

There are different means of expressing a sense of self. We may identify ourselves or be identified by others by: physical appearance (morphology, color), psychological identity (how one includes to

or excludes from a group), geographical identity (from where someone is), social identity (kinship, tribe, class, cast; race, ethnicity, religion). We may also identify ourselves contextually, that is, identity ourselves as it is suited to a situation and setting (cf. Fought, 2006:21-23).

It is also possible for an individual to identify himself or be identified by others by combination of factors: physical, psychological, geographical, sociological and linguistic at the same time. For instance, *zəbərga* 'looks Gurage' morphologically, as people from certain localities have identifiable physical make up due to genetic and environmental factors. Psychologically, he may identify himself as Gurage and others can identify him by associating his name with Gurage cultural name. As geography is the area socio-cultural groups live in, there is no question that *zəbərga* is again identified with Gurage. Linguistically, it is easy for one to identify himself with his language or is identified by others linguistic features, such as accent and/or using a single phoneme. Finally, it is possible for *zəbərga,* for example*,* to contextualize his identity: change his social identities based on his tribe, religion, etc. when he finds it relevant.

Though people may identify themselves by different means, many scholars agree that the strongest of the identifying factors is a language. Wardhaugh (2006:6) affirms this when he says: "…language is a profound indicator of identity, more potent by far than cultural artifacts such as dress, food choices, and table manners".

Language by its nature has two functions in terms of expressing identity. It shows that an individual belongs to one group and at the same time he doesn't belong to another

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[3] Males: Amerga Nida (age 62), Akmel Surir (age 60) and Gazu Minuta (age 57); Females: Yibker Zerga (age 57) and Tamechet Megwe (age 58).

group. This has succinctly been explained by Fasold (1984:3) as follow:

> "Role language plays in nationalism is what Fishman (1972c:52) calls 'contrastive self identification' and Garvin and Mathiot (1956) call the 'unifying and separatist functions'. Simply stated, these terms refer to the feeling of the members of a nationality that they are united and identified with others who speak the same language, and contrast with and are separated from those who do not".

Language is social entity that doesn't exist outside its speakers. Speakers of a language identify themselves and are identified by others with their language. There is argument, however, that there is no strict relationship between language and identity. Language can potentially be acquired by anyone irrespective of blood ties. So, there may be relationship between the two but that relationship is weak. This later view has been objected by many as in a multilingual country, an individual who is speaking many different languages is still identified with people speaking his first language than with people he speaks their language as a second language. What is more, in a multilingual country where language is important for claiming national identity, there is no question that language and identity are inseparably related. When people want an ethnic or a national power, they usually emphasize the use of their language and identify themselves with it.

A strong evidence of language and identity relationship comes from the Holy Bible when a survivor from Ephremites asked the Gileads to allow him to cross the Jordan passage denying his identity and claiming that he belonging to Gileads. What the Gileads did to know the survivor's identity was to order him to pronounce the word: *ʃibbolez*. Unfortunately, but as it was expected by Gileads, the Ephraimite failed to pronounce the first sound's of the word: **/ʃ/** correctly, and he pronounced it: /**s**/, hence: *sibbolez*. Consequently, the Gileads seized the man and killed him at the passage way of Jordan (Judges 12: 5–6).This shows that language and identity are inseparably related. Naming, which is embedded in socio-culture of a society, undeniably reflects identity.

Degeneration of Identity: It is possible a constructed identity is degenerated due to socio-cultural and political factors. For instance, people from low class, poor economic status are looked down and stigmatized by others; and the same is done to their language. Such people may deny their identity; abandon using their language, and shift into another prestigious language to escape the stigma associated with their ethnic group and language. In addition, political power, economic advantages, and prestige certain ethnic groups have as opposed to the stigma associated with the other ethnic groups, and the wrong assumption that language "A" is less complete than a language "B" may cause someone to deny his linguistic and social identity. Abandoning bestowing ethnic names to children due to social, political and economic reasons implies shifting into the naming practice of prestigious language speaking group.

RESULTS

Role of Gurage Cultural Names

Gurage names, such as *Zəbərga,* designate an individual as distinguish from other

individuals, say *Teni*. Mark, John, and Stone in European cultures may have only referential roles. In Gurage and in many Ethiopian languages (cf. Baye, 2006; Zelealem, 2003), names are more than references. They express wishes, success, failure, sorrow, happiness, sickness, health, peace, war, death, birth and many more. They express circumstances, aspirations, and relationships of the society. Gurage names also show the way people think about realities and imaginaries. Individual, group and ethnic Identities are reflected in names. Gurage names also reveal power relations reflected in politeness and intimacy language use.

Gurage names are classified formally and semantically. It is important to reveal that the lists of Gurage names given are only scenario. They are also based on names only from West Gurage. Other possible patterns might be found if a comparative study of naming in various Guragina speaking groups is made.

Classification

Personal names in Gurage can be grouped into four: honorific, intimacy, proper, and common names. Each of these is discussed below.

Title Names: are given by the community for individuals for doing something extraordinary: bravery, charity, negotiating, etc. The name giving process usually entails a feast, which includes slaughtering of a sheep or an ox depending on the social and economic status of the named. Though such naming is mainly practiced for men, women also deserve honor names. Examples of honorific names of men:

Title	Gloss	Meaning
abə-gaz	father-war	' war-leader'
e-sɨhʲ-arɨb	NEG[4]-leave-war	'warier'
wənʒət-arɨb	vulture-war	'fast/ active'
bər-dəfər	door-courage	'courageous'
wɨjo	honey	'sweetie'
bər-kəfət	door-open	'donor'
ti-tʃən sarə	3SM-come happy	'kind'
ʃakatʃ	negotiator	'reconciler'
azmatʃ	leader	' leader'

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[4] The abbreviations used are NEG= negative, F=female, N=nominalizer, CO=copula and GEN=genitive.

The titles *abə-gaz, esih^j-arib, wənʒət-arib* and *bər-dəfər* are given to warriors. The titles differ in rank, the first being the highest and the fourth the lowest, respectively. Title names may be given to those who have different social contributions in the community. For instance, *bər-kəfət* and *titʃən-sarə* are given for doing charity; *ʃakatʃ* is given to individuals who settle disputes; *wijo* is given for individuals who are exemplary in behavior. Calm and friendly person is given honorific name *ekʃəʃ*. The title *azmatʃ* is used both to war leaders and tribal kings leading the community in various socio-political affairs. The common title offered to women is *adʒijət* 'hand-wise'. It is given for dexterity, being good cook, and donor. The fact that women have only one honorific name, which is associated with cooking and dexterity, shows the social roles such as fighting, negotiating others, governing the community are limited to men. Titles offer individuals a power and respect even after death. Males and females with titles deserve special mourning ceremony called *wərko* and *m^wərə,* which are performed by men and women, respectively.

*Intimacy and Respect Names***:** Names in Gurage can show degree of intimacy and respect. Young boys, who are age mates and close friend use *somme* to call each other. It is used by both the addresser and addressee. Similarly, intimate young girls call each other with, *mere*. A *fedwət* is a used by girls and women who have been possessed by a spirit called *m^wəjət*. Such girls and women have a special language or an argot which is not clearly known to other community members.

A few title names express both intimacy and respect. For instance, *aba, adi, nik'-aba and nik'-adi* meaning 'papa', 'mama', 'grand papa', 'grand mama,' respectively are used to reveal intimacy, endearment and respect. These names are used by children in addressing their parents and grand parents. Titles like *bobo, dode*, and *gaʃe* are used by younger brothers and sisters in addressing their elder brothers. They are more of respect markers. Elder sitters receive a respect name *awo*.

In Gurage culture, a bride never calls her husband and his relative names until after she gives birth. Thus, she gives them a nick name. After giving birth, she calls the husband "X's father' where X is the child's name. There are no consistent nick naming patterns, but the brides tend to avoid using a name or letters consisting of their husband's given name. In some cases, the name the brides use is just a pronoun. I witnessed the proper names: *dʒəmal* and *tadəmu* substituted by *ahəma* 'you' and *ing^wəd-səb* 'another person', respectively. Brides use pronouns of respect in addressing relatives of the husband even though the addressee is younger than the bride. In this case, it is not age that offers respect but the marriage custom.

*Proper Names***:** Proper names in Gurage can morphologically be grouped as simple or compound. The simple nouns may be free or bound morphemes whereas the compounds nouns are combinations of nouns, noun-verb, noun-adjective or adjective-noun. Proper names also differ by gender; however, there is a less frequent use of gender marker. Gender is marked only in a few female names.

As we have two ways differences: simple-compound and male-female, we use pairs simple-male/female names, and

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compound male/female names. These combinations give us: simple women names, compound women names, simple male names, compound male names, and compound female and male names.

Women Names

Most women names have feminine marker *{–(v)t}*. It is worth mentioning that names in Gurage have no gender markers except that they are [+ANIMATE and +HUMAN]. All inanimate nouns and animals are considered masculine grammatically though gender distinction may be made lexically. Below are a few lists of 'simple' women names:

Proper name	Gloss	Meaning
taməʧe-t	Sweet-F	'sweetie'
ʃədu-t	Share-F	'my part'
wərd-wə-t	Obligation-F	'the presser'
numd-at	Expensive-F	'precious'
ərmʷədʒ-at	Like-F	'beloved'

A few examples of women names which are compound and ending with {-i} are given below:

Proper name	Gloss	Meaning
mura-e-ʧi	full-NEG-leave	'full is not let it go'
muan-e-ʧi	who-NEG-leave	'everyone dies!'
nɨm-e-ʧi	Pride-NEG-leave	'pride will not be left'
məl-e-ʧi-t	guess-NEG-leave-F	'effort shall not abandoned'
zər-məʧʼi	race-nice	'race-clean'

Compounds with *wərk'* 'gold' as an initial component:

Proper name	Gloss	Meaning
wərk'-wət	gold-of	'the gold like'
wərk'-e-ʧi	gold-NEG abandon	'best is not let go'
wərk'-bəsa	gold-over	'much is gained'

Names with *wərk'* 'gold' at a final position:

Proper name	Gloss	Meaning
mura-wərk'	full-gold	'all your part is gold'
dən-wərk'	belly-gold	'child is gold or property'
nɨm-wərk'	pride-gold	'pretty/ having 'good' name'
bad-wərk'	country-gold	'home / country is like a gold'
hʲin-wərk'	heart-gold	light-hearted', 'honest'
ʃɨm-wərk'	name-gold	'having good reputation'

Nɨm 'pretty', is further extended in meaning and it is used as 'having good reputation'.

Male Names

A few male names in Gurage end with a suffix {–*ga*}. Probably, most Ethiopians know such Gurage names. Such names are limited and their frequency is either diminishing or vanishing currently. The suffix {–*ga*} has the meaning 'new day or year' as in the noun: *Zəbər-ga* 'year-new', which mean 'a better time '. But, the meaning '*new*' is not maintained in all nouns with {-*ga*}. So, it is better to considered it as a nominalizer that changes verbs, adjectives and other nouns to proper names. Some lists of 'simple' nouns with {–*ga*} are given below:

Proper name	Gloss	Meaning
nɨma-ga	grow-N	'be grown'
nur-ga	grace-N	'be graceful'
atra-ga	help-N	'helper'
bər-ga	happen-N	'let new day come'
nɨ-ga	Cool-down	'settle'
amər-ga	conduct-N	'be of good conduct'
ker-ga	peace-N	'let peace come'
zər-ga	summer/race-N	'let sprig season come'

The *-N* under literal meaning refers to the nominalizer *{-ga}*. The noun *zər-ga* has two possible interpretations: 'summer' and 'race'. One aspect of its meaning is that summer, which associated with cold and food scarcity in Gurage, may pass and a bright season spring may come. In the other context, it means 'let bright day come to our race'. The bound morpheme a*tra-* does not have clear meaning. It occurs with words such as: *atra-raʃ* 'one with less appetite', *atra- kaʃ*, 'one who cause people to quarrel', *atra-ʃat*, 'a tied item that can be pick with '*matraʃə*', ' pairs of woods used to pick up a load'.

Some male names ending with {-ni} or {-bi} show wish and prayer addressed to God as in:

Proper name	Gloss	Meaning
te-ni	leave-me	'God, don't kill him '
nɨga-ni	settle-me	'be settled for me'
bɨza-ni	Plenty-me	'grow and be multiply'
sɨba-ni	fat-me	'let be good, wit person'
an-ʧə-bi	NEG-leave-me	'God didn't let me down'
at-se-bi	NEG-search-me	'please, pardon me'

As can be seen from the examples, names with benefactive form /-ni/ show parents wish to their children (*bizani, sibani*), prayers for God to keep their children safe (*teni*) and prayer for parents themselves (*nigani)* 'let bright day come for me'. Words with malefactive form {-bi} can be used as prayer (atsebi) or thank giving (anʧəbi).

Nouns ending with {-əta}:

Proper name	Gloss	Meaning
amd-əta	thank-his	'his thanks'
ank'-əta	truth-his'	'his truth'
bad-əta	territory-his	'his territory'
gɨw-əta	Glory-his	'his glory'
ker-əta	Peace-his	'his peace'
ʃi-kəta	1000-worry'	'many has worried'

Here, 'his' refers God. Such names either thank God for giving them a child, health, property as in *amdəta*; or to look for truth and peace from God: *ank'əta* and *kerəta*; to grant their property as if it belongs to God: *badəta;* and to offer glory to God and other super powers: *giwəta*. The name *ʃikəta* is compound of: *ʃi* "1000" and *kitʃa* 'worry'. It is also worth mentioning that *ʃi* is borrowed from Amharic and the actual form in West Guragina is *hum*.

Nouns ending with –u

Proper nouns in this category are derived from common nouns. The morpheme {*-u*} functions as a copula: '**is**'.

Proper name	Gloss	Meaning
zər-u	race-CO	'he's bloodline'
bar-u	lake-CO	'he's patient'
kʷər-u	saddle-CO	'he's my power'
kɨbr-u	honor-CO	'he is honor'
tɨzaz-u	order-CO	'It is order from God'
murad-u	wish-CO	'he is my wish'
t-adəm-u	with-people-CO	'It is with people'
halət-u	knowledge-CO	'It is knowledge'

Names with –jə suffixes

Human names that end with {– jə} have agent roles:

Proper name	Gloss	Meaning
məndʒ–jə	help-GEN	'the helper'
ʃikur–jə	thank-GEN	'the thanks giver'
zəpɨr–jə	return-GEN	'the return causer'
amd–jə	glory-GEN	'the glorifier'
gəkɨr–jə	shape(v)-GEN	'the shaper'
an-k'aʃ–jə	NEG-lay-GEN	' Who doesn't let one down'
nund–jə	expensive-GE'	'the precious'
ank'–jə	truth-GEN	'the truthful'

The name *zəpɨr–jə* is often given for boys if the mother was divorced and fortunately she is re-married to the same person. *Məndʒ–jə* is given to a child with an expectation that he will help his parents; *ʃɨkur-jə* and *amd–jə* have nearly similar meanings; they refer to glorifying God. *Ank'aʃ–jə* is given when God listened to parents in giving them a child or for fulfilling parents' wishes. *Ank'–jə* is given when parents were looking for a justice and have got one.

i.   'Compound' Male Names

Many names are formed with *səb* 'man'/ 'person' as initial constituent of the compound name:

Proper name	Gloss	Meaning
səb-huari	man-know	'a person is evaluated'
səb-muari	man-mercy	'a person is excused'
səb-məka	man-shortage	'be helpless'
səb-tʃˤɨza	man-medicine	'human beings are medicine'
səb-gaze	man-shiver	' many frightened'
səb-e-tʃi	man-NEG-abandon	'a man is not let down'
səb-tawi	man-left	'a beloved is dead'
səb-taga	man-turn'	'people changes with the haves'

A child gets name *səbhuari* when his parents had faced a problem, and checked who their real relative or friend is. Similarly the name, *səbtawi* is given to a new born child when some member of the family was dead before the child's birth.

Names with a **kor** 'saddle' as a constituent are related to power. Some examples of such names are the following:

kor as initial constituent:

Proper name	Gloss	Meaning
kor-abza	saddle-plenty	'add power'
kor-gazə	saddle-shivered	'power is troubled'
kor-tawi	saddle-left	'power is lost'
kor-nɨma	saddle-grow	'increase power'
kor-nɨsa.	saddle-pick	'take power'
kor-sawi	saddle-search	'seek power'

Kor 'saddle' is used in the same extension as 'chair' in English. *kor* in Gurage is associated with power because leaders used to travel with horse or mule to various places for administrative purposes, and during war to fight against enemy.

Many names are formed with **ker** 'peace'. Below are a few examples of compound nouns with **ker** as initial components:

Proper name	Gloss	Meaning
ker-sɨma	peace-listen	'I wish you listen a peace'
ker-aga	peace-turn	'Everyone has peaceful time'
ker-əta	peace-his	'God's peace'
ker-abza	peace-plenty	'God, multiply peace!'
ker-wari	peace-spent.day	' Let the day be peaceful'
ker-alla	peace-Allah	'Allah is peace'
ker-tina	peace-us	'let peace be with us'

A few names have *səma* 'listened' as final component of compound nouns as in the examples below:

Proper name	Gloss	Meaning
dar-səma	boundary-listened	'everyone heard of'
ker-səma	peace-listened	'peace listened of'
nur-səma	grace-listened	'glory is heard'

A few compound names are formed with *gazə* 'shivered' as their second constituent:

Proper name	Gloss	Meaning
dar-gazə	border-shiver	' all people shivered with fear'
kor-gazə	saddle-shiver	'power is troubled'
səb-gazə	man-shiver	'exodus'

Names with *gazə* are often given during times of trouble. It could be during death of an important person often a house hold, a king, mother, father, or during a war.

A line of descent and race are also expressed with proper names; hence, the role of names as identity marker is tripled: referring to an individual, the race, and line of descent. For instance, *ker-o* 'peace-N' and *azmandjə*, which is a blend of title name *azmatʃ* 'leader' and *amd-jə* 'the glory,' were names for two brothers. Now, they became tribal names, and individuals from this tribes are called: *jə-kero-dən* 'of Kero's line' and *jə-azmandjə-dən* 'of Azmandye's line'. The word *dən* refers to 'belly' and it is metaphorically extended to 'born'.

'Compound' Female and Male Names

Compounds with *zər* 'race' or 'blood tie' can be used for giving names to men or women. A few examples of such names with *zər* as initial constituent are shown below:

Proper name	Gloss	Meaning
zər-mətʃˀi	race-clean	'from decent family'
zər-e-tʃi	race-NEG-leave	'one never abandons his race'
zər-abza	race-multiply	'multiply your race!'
zər-huari	race-know	' known race'
zər-sawi	race-search	'baby/race wanted'

Some compound nouns referring to both genders are also formed with *tʃˀɨza,* 'medicine' as a final constituent as in the following examples:

Proper name	Gloss	Meaning
dən-tʃˀɨza	belly-medicine	'child is medicine'
səb-tʃˀɨza	man-medicine	'man is important '
hʲin-tʃˀɨza	heart-medicine	'wisdom or thinking is medicine'

Here medicine is used metaphorically 'important as medicine'. For instance, a child is medicine as it helps his parents; people are important during bad times. Gurage people conceptualize that a person thinks with his heart; hence, a 'wise heart' is as good as a medicine.

Now we proceed to common names showing jobs, attributes, physical appearance and birth.

Common Names Showing a Profession:

ak'ʲaʧˤ	'butcher'
ʧəwaʧ	'farmer'
nəfurə	'smith'
buda	'tanner'
gazənə	'warier'
fuga	'craft person'
ʃəhɨrwət	'she-potter'
fak'ʲət	' she-scraper'.

Common Names Showing Attribute: Names showing human behavior are formed by reduplication and then affixation of a nominalizer *{-tənə}* as in the examples below:

Common name	Gloss	Meaning
nəgrəg-tənə	wishing-N	'wishing someone's food'
dɨbubur-tənə	borrower-N	'someone who tends to borrow'
kərkər-tənə	pretend-N	'Someone who pretends'
watwat-tənə	worry-N	'some one who easily worries'
zəgzəg-tənə	be.needy-N	'one who worries for others and his needs'.
walwal-tənə	Coma-N	'someone in coma'
ʤəgʤəg-tənə	wander-N	'wanderer'

Names showing size/height and handicaps:

dunɨr	'sb. without hands and legs'
funɨr	'sb. without fingers and/or lips'
aʧˤir	'short'
k'imuʧˤir	'dwarf
bunɨr	'toothless'

Dɨrədɨg 'mercy!' and **bərʧə** 'let transcend!'

In Gurage, *dirədig* and *bərʧə* are used to avoid and transcend, respectively by the power of a spirit an instance or state of any thing bad. For instance, if one gives birth to a *dunir*, 'a child without hands and/or legs', the interlocutor who tells the instance for the others first has to say: *dirədig* 'God's mercy' and begins to narrate; the listener who hears the instance also says repeatedly *dirədig* to seek mercy. If the interlocutors do not say that and try to mock or laugh at the instance, the person who gave birth to *dunir,* in this case, or someone who faced any sort of problem says *bərʧə*, 'let the same evil happen to you' to those who laughed or mocked.

Common Names Related to Birth:

jəmarʧʼə	'last born'
jəbəhɨr	'first born'
jəsamɨrjə	'eighth/tenth born'
jərəmʧɨjə	'twins'

In Gurage, giving birth to twins was considered evil; hence, families who gave birth to 'twins' or 'triples' used to prepare a cleansing ceremony, which often requires 'feast'. A feast was also necessary when a woman gave birth to eighth or tenth children. The feast was meant for blessing the children and their mother.

The Dynamics: Changes in Naming

Naming as social phenomena is dynamic and changes through time. This change doesn't seem random but patterned. Gurage human names have dominantly changed into Amharic at some stages and religious names in the last 50 years.

Trend Analysis

The following names are from four families in three generations (G-1…G-3). They were randomly selected from a Deweshe village of Gumer district. Religious names are not considered ethnic names.

	Family-1			Family-2			Family-3			Family-4		
G-1	**Name**	**S**	**A**	**Name**	**S**	**A**	**Name**	**S**	**A**	**Name**	**S**	**A**
	mɨnuta	M	65	amərga	M	66	zəbərga	M	70	nɨkranə	M	72
	taməʧet	F	63	emʷaʧi	F	64	adəbsaj	F	65	wərdwət	F	68
G-2	**mulunəʃ**	F	43	fɨk'rе	M	45	tənkɨr	M	50	ʃədut	F	45
	jərmʷədʒja	F	41	**taddəsə**	M	41	fətta	M	47	dəmisis	M	44
	fəkədə	M	39	bɨrk'e	F	33	ləgga	M	45	səbməka	M	42
	kəbədə	M	35	ʧ'əwa	F	33	bək'əna	M	43	taddəssə	M	40
	tenaje	F	31	tafəsə	M	31	**kabtu**	M	38	**wəgu**	M	38
	gɨzaʧəw	M	27	get'e	F	29	fudʒwət	F	35	dula	M	32
	ababə	M	25	bəjənə	M	27	kələm	F	18	….	…	…
G-3	bərnabas	M	15	rədet	F	13	rut	F	14	adanə	M	12
	nəbju	M	12	hɨlina	F	10	betel	F	12	kɨbəbu	M	10
	lɨdət	F	9	bruk	M	2	hanna	F	8	kabtamu	M	8
	…	…	…	…	…	…	bersabe	F	5	səbsɨbe	M	5

Table 3. Naming trends in Gurage

Names listed under the generation-3 are the children of the family names in bold in generation -2: *mulunəʃ, taddəsə, kabtu* and *wəgu.*
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Family-1: In G-1, both the father, *mɨnuta* 'my wish' and the mother, *taməʧet* 'sweetie' whose age was above 60, have Gurage names. When we come to their children's name in generation-2, only one person, *jərmʷədʒja* 'let be loved' whose age was 41, is given Gurage name. The other six out of the seven are given Amharic names. In the third generation, no one has Gurage name as *bərnabas* is biblical and *nəbju* and *lɨdət* are Amharic names.

Family-2: In G-1, both the father, *amərga* 'of good conduct' and the mother, *emʷaʧi*

'no anger' have Gurage names, but no Gurage name is found in the second and third generations.

Family-3: In G-1 names *zəbərga* 'new-season' and *adəbsaj* 'look for peace' are Guragina; in the second generation, two male names: *tənkɨr* and *bək'əna* 'be strong' and 'if God wills', respectively and a female name: *fudʒwət*, 'grace' are Gurage names. In the third generation, all the names are biblical.

Family-4: In G-1, *nɨkranə* 'let us go up' and *wərdwət* 'the presser' are Gurage names. In G-2, *səbməka*, *wəgu*, *dula* and *ʃədut* referring to 'man lacked', 'it is surprise', 'great surprise', and 'my share', respectively are Gurage names. In G-3, there is no one with Gurage cultural name.

Though the samples taken are a few, they clearly show the trend that the naming practice is changing dominantly into Amharic.

We shall call the tendency to shift from ethnic names into non-native language's a *naming endangerment*. Naming endangerment reflects the general tendency towards a language threat or endangerment. The change of names in the third generations of the four families above is an example of naming endangerment in which the names shifts from typical Gurage names to Amharic or biblical names.

Causes for Naming Endangerment

Denigration: This is a negative stereotyping that involves giving undesirable attribute to an individual or a group. Some names which were popular and prototypical, through time become stereotypical and tend to be stigmatized. As a result, they are not used in the naming practice. As Wardhaugh (2006:145) expounds, the stereotyping is intentional:

> "A stereotype is popular and, therefore, conscious characterization of speech of a particular group…. Often such stereotypes are stigmatized. A stereotype need not conform to reality; rather, it offers people a rough and ready categorization with all the attendant problems of such categorizations."

For instance, *Zəbərga, Zərga, Atraga* are typical Gurage names. Any one having names like Fekede, Kebede may be nicknamed '*Zəbərga*' when one is referring to the ethnic group of Fekede and Kebede, if they are from Gurage ethnic groups. This is true at least when intimate friends from different ethnic groups are mocking one

another. The fact that the comedian Kibebew Geda, in his Comic: '*Gash folisu*,' uses names '*Zəbərga*' and '*Mutʃag*' shows how such names are prototypical and at the same time stereotyped. These days, no Gurage parent gives his child names like *Zəbərga*. Parents do not want to give their child a 'cheaper' name that may cause him stigma.

Religion: Many Gurage names are endangered because of religion. Gurage kids tend to take their Christian name when baptized. Christian names in Gurage come from Ge'ez because Ge'ez was the sacred church language. So, names like *wəldə-jəsus, gəbrə-jəsus*, are from Ge'ez and it sounds funny if one is given a Gurage equivalent Christian names like: *təʧ'ənə-jəsu* and *mena-jəsus*, where the Ge'ez *wəld* and Gurage *təʧ'ənə* refers to 'born' and *gəbr* and *mena* to 'work' , respectively. This is because languages are empowered for certain function in a society. Such power had been given by Ethiopian Orthodox church only to Ge'ez.

The same is true that children from Muslim religion are given Arabic than Gurage names. Names like: *Mahmud, Nəsru, Awəl, Sult'an, Məhamməd, Hussien, ʤəmal* and *Tofik'* are not Gurage names. Some Gurage names taken from holly books are localized and in some cases morphologized as in *hassən* becoming *assəna*.

Religion is one of the main factors that endanger local names because almost every family belong to either, Muslim, Orthodox or protestant religions; hence, they feel at ease if they bear their child a name from one of the Holy books.

Amharic Hegemony: The prestige Amharic had in the past as a result of being an official language, used in education, court

and everyday communication had caused the Gurage naming practice to shift into Amharic naming patterns.

*Identity, Right and Empowerment***:** Though it is individuals' and ethnic groups' right to identify themselves with their language, the socio-political situations may force people to use non-ethnic names. To the contrary, the rights and powers given to people may encourage ethno-linguistic groups to use their own cultural names. It is, for instance, observed that personal names began to change back to Gurage names in the present government. Names like *sarem* 'I am happy', and *nɨk'u* 'he is great' have been recorded in recently given names. This might be the result of the rights and the associated powers given to ethnic groups, together with the increase in the feelings of ethnicity in Ethiopia. Trade names reflecting Gurage identity have also flourished in the recent past. A few examples are: Haroni ('know it for me') International Hotel in Hawassa, Adot Tina ('Mother with us'), Aberus Complex ('family complex'), and Wehemeya ('holy-day'), all in Addis Ababa.

When human right in general and language use right in particular is threatened, ethnic groups tend to change their names to escape the waves of politics that threaten them. This threatening may not be stated in constitutions but reflected in many ways including in the form of stigma, in media (in the form of jokes, entertainment comedies, and in everyday social interactions).

*Language attitude***:** Individuals or groups may have positive attitude towards their language and want to express their loyalty to it through using it in all sorts of language use, where naming is one. To the contrary, linguistic groups may be less loyal to use their language. Loyalty to once ethnic group may, however, be expressed by other means other than language. Thus, it might be difficult to say that a person is not loyal to his language for not identifying himself in naming practice. Of course, names are given by parents depending on the existing social, political, economic and cultural situations. Individuals may be advocates of their tongue though their names are not ethnic names. The individuals might have taken Gurage names if they had the chance to name themselves. This is one of the loose points where names and identity may correlate only weakly. Furthermore, language attitude may be affected by sociopolitical factors. A person from a high economic class and speaking a prestigious language, which is used in media, administration and court, may tend to identify himself with his language and give his ethnic name to his child than a person who is from low class and speaking functionally reduced language.

CONCLUSIONS

In this paper, we have shown that Gurage cultural names are morphologically patterned and have referential and pragmatic meanings. We have argued that sociological and political factors including: *denigration, religion, hegemony, rights, and language attitude* have negatively affected the cultural naming practice in particular and the development of Guragina in general. We have also shown that human

names play symbolic roles by expressing ethnic identity including races, gender, and many more. The fact that ethnic naming practice is endangered implies the endangerment of ethnic identity and reflects lack of loyalty by its speaker to the language.

It is recommended that parents from Gurage should consider giving their child Guragina name. Interventions are needed to revitalize the cultural naming practice and to safeguard Gurage language varieties from endangerment through awareness creation, sensitization and documentation.

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Inherent Intelligibility among Guragina Varieties

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Abstract

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This article examines the inherent intelligibility among six Guragina varieties, which are systematically selected to represent the major linguistic variation within this cluster of closely related dialects or languages. Three types of comparisons, lexical, phonological and morphological are used. The lexical comparison was based on 255 lexical items of frequent use and the Swadish wordlist, which is said to be change resistant. The phonological variation was established through 38 sound correspondences found in 122 words selected from the lexical comparison. The morphological comparison was based on 44 inflectional and derivational affixes. The morphemes were first described in sets and then the numbers of shared and non-shared morphemes were statistically computed. The lexical comparison provided the following result (from the Guragina variety with the highest to the lowest amount of shared vocabulary): Mesqan, Muhir, Cheha, Kistane, Welene and Inor. According to the phonological comparision, the following grouping was established: Mesqan, Muhir, Kistane, Cheha, Welene and Inor. The morphological comparision resulted in: Mesqan, Muhir, Welene, (Cheha, Kistane) and Inor. If the three groupings are combined, the following hierarchy occurs from the variety with most shared items to the variety with the least shared ones: Mesqan, Muhir, Cheha, Kistane, Welene, and Inor.

Key terms: Guragina, intelligibility, lexicon, morphology, phonology, varieties

INTRODUCTION

Gurage refers to the people and geographical area of the Gurage Zone, which is one of the Zones in the Southern Nations Nationalities and Peoples Regional State (SNNPRS). The Gurage people speak a South Ethiosemitic language called Guragina, which has twelve varieties – all spoken in the Gurage Zone. The total population of Gurage is 1,867,377 of which only 1,280,483 live in the Gurage Zone (CSA, 2007:75).

The extent in which the different Guragina varieties are intelligible is not well known. Previous studies (Gutt, 1980) and Ahland (2010) attempted to show some similarities and differences among some of the Guragina varieties. While Ahland's work included relatively large number of sample varieties, it was not comprehensive. Gutt's work compared only three languages hence being less representative.   The lack of such study has hampered language planning and use in the Gurage Zone. This article aims at finding out the level of inherent intelligibility among Guragina varieties to fill in this gap.

Inherent intelligibility refers to the extent in which languages or varieties of a language are structurally similar hence can easily be understood, or are different, therefore cannot easily be understood. The study of inherent intelligibility has two main advantages. First, it shows the degree of similarity among languages thus enables to understand intelligibility levels while keeping interlingual learning and sociolinguistic variables constant. Second, it explains why some linguistic groups perform better in interlingual comprehension since degree of inherent

intelligibility contributes to an interlingual comprehension.

The term **language variety** is used instead of dialect because the difference between languages or dialects of a single language is not clearly known theoretically and might be influenced by non-linguistic factors. In fact, what have been called dialects of a language based on pure linguistic criteria may turn out to be different languages or what have been different languages may be considered as dialects of a language due to political reasons, language attitude or other socio-historical factors.

MATERIALS AND METHODS

A questionnaire was used to elicit linguistic data. The data was collected in six sites representing the respective Guragina varieties: Cheha, Inor, Mesqan, Kistane, Muhir and Wolane. Two informants from each variety, i.e. a total of twelve speakers, participated in the research. The linguistic data were audio recorded and transcribed phonemically, and then analyzed and grouped into lexical lists, phonological rules and morphological affixes. To find out the levels of similarities and differences among the Guragina varieties, the lexical lists, phonological rules and the inflectional and derivational affixes were compared using descriptive statistics, mainly percentages. A rank position value was proposed to cluster the varieties from the one with the highest amount of shared items to the one with the least amount.

RESULTS

Lexical Comparison

For lexical comparison, 255 words including nouns, pronouns, adjectives, verbs and adverbs were phonemically transcribed and compared from each of the varieties Cheha, Inor, Kistane, Mesqan, Muhir and Welene. Based on the level of similarities and differences; the words are grouped into three: completely similar, partially similar and completely different.

Words are considered completely similar if they have the same consonants and vowels, such as *bet* 'house' (in Cheha, Muhir, and Mesqan). Hence, *bid* 'house' in Inor is not considered identical with *bet* in the other varieties. The words that are said to be formally similar also have the same meaning. Words with the same meaning but differ in one or two sounds, such as in *bet*
and *bid* 'house' in Cheha and Inor, respectively, are considered partially similar. Sonorant alternations, such as *gunnən* and *gunnər* 'head', and other correspondence sets, like *nik'jə* and *niʔjə* 'big' are also considered partially similar. Words are considered completely different if they have different consonants and vowels but the same meaning, such as *neba* and *fəngəja* 'thief' in Cheha and Inor, respectively.

Completely Shared Vocabulary

The raw unshared, completely shared and partially shared lexical items, out of 255 words, were converted into percentages. The completely shared lexical items are shown in (1) below. The shared similarity between two language varieties is the value that we find at intersection point of columns and rows.

(1) Percentages of completely similar vocabularies:

IN	KS	ME	MU	WE	
49.4	27.5	59.2	49.8	13.7	**CH**
	20.8	28.2	29	12.9	**IN**
		43.1	42.7	27.9	**KS**
			57.7	18	**ME**
				20.4	**MU**

The values in (1) show that the Cheha words are largely shared by all other varieties except Welene. The shared percentages range between 13.7% (with Welene) and 59.2% (with Mesqan). The completely shared words of Cheha with Muhir (49.8%), Mesqan (59.2%) and Inor (49.4%) are nearly similar and high. Inor has less completely shared words (12.9% with Welene and 29% with Muhir) except with Cheha where it is 49.4%.   Kistane shares, from the highest to the least, Mesqan (43.1%), Muhir (42.7%), Cheha (27.5%), Welene (27.9%) and Inor (20.8%). Mesqan shares words with Cheha (59.2%), Muhir (57.7%), Kistane (43.1%), Inor (28.2%) and Welene (18%). Muhir is one of the varieties whose words are shared

highly with Mesqan (57.7%), Cheha (49.8%), Kistane (42.7%), Inor (29%) and Welene (20.4%). Finally, Welene has the least commonly shared words with Kistane (25.9%), Muhir (20.4%), Mesqan (18%), Cheha (13.7%) and Inor (12.9%). Based on the commonly shared vocabulary, we can rank the varieties, from the highest to least, as *Cheha, Mesqan, Muhir, Kistane, Inor and Welene.*

Partially Shared Words

The percentage of partially shared words of the six Guragina varieties is shown in (2) below.

(2) Percentages of partially similar vocabularies

IN	KS	ME	MU	WE	
36.1	34.5	27.5	34.9	31.4	**CH**
36.1	41.2	45.9	28.6	**IN**	
24.7	27.5	21.2	**KS**		
25.5	28.6	**ME**			
26.3	**MU**				

Cheha has nearly equal partially shared vocabularies, ranging between maximum 36.1% (Inor-Cheha) and minimum 27.5% (Mesqan- Cheha). Mesqan has less partially shared words (27.5%) with Cheha because the two language varieties have many completely shared vocabularies. In fact, the two language varieties have very low completely different words as shall be discussed later. Inor has many partially shared words with most Guragina varieties, such as the maximum 45.9% (with Muhir) and minimum 28.6% (with Welene). The question is, why Inor has higher partially shared but lower completely shared vocabularies The linguistic data show that Inor is in the state of divergence phonologically. For instance, many of the ejectives of other Guragina varieties are changed into glottal stops in Inor:

Gloss	Inor	Others
'bone'	aʔɨm	atʼɨm (in the other 5 Guragina varieties)
'hundred'	bəʔər	bəkʼɨr (CH)
'dry'	dərəʔ	tʼərəkʼ (CH, KS & ME)
'short'	eʔir	atʃʼɨr (CH, KS, ME, MU &WE)
'leaf'	kʼəʔər	kʼɨtʼər (CH, ME, MU & WE)
'grind'	fiʔ	fitʃʼ (CH, Ks, ME, MU & WE)

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The ejective versus glottal stop correspondence between Inor and other Guragina varieties is often maintained in non-word initial position. There are also many other phonological variations that Inor exhibits compared to the other Guragina varieties. One such variation is in voice quality:

Gloss	Inor	Other Guragina Variety
'die'	mud	mut (CH, KS, ME, MU, WE)
'he'	hud-a	hut-a (CH)
'neck'	angəd	angət (CH, KS, ME, MU, WE)
'tongue'	anəbəd	anəbət (CH, KS, ME, MU, WE)

Here, the alveolar voiceless stop t of other Guragina varieties becomes voiced, often at word final positions, in Inor. There are also variations caused by sonorant alternation, which applies to many of the Guragina varieties. Root reduction, which results in compensatory lengthening, and nasalization of consonants which is often triggered by either nasal sound or traces of deleted nasals as in maʔã 'came' (compare from: ʧənə-m in Cheha and bəssa-m in Muhir, mət'a in Welene), are the other causes for Inor to be divergent.

Mesqan and Muhir have higher partially shared morphemes with Inor. Kistane also has the highest partially shared lexicon with Inor (36.1%) but lower with others.

Welene, as it was the case in completely shared lexicons, has the least partially shared lexicons with all the five Guragina varieties.

Completely Differnt Vovabulary

The percentage of comletely different vocabulary of the Guragina varieties is displayed in (3) below.

(3) Percentages of completely different vocabularies:

IN	KS	ME	MU	WE	
14.5	38.4	13.3	15.3	55.3	**CH**
	43.1	30.6	25.1	58.4	**IN**
		32.2	29.8	52.9	**KS**
			16.9	53.3	**ME**
				53.3	**MU**

The maximum completely unshared vocabularies are observed in Welene. Almost in all cases, more than 50% of Welene vocabulary is not shared. The maximum unshared lexicon is 58.4% (between Welene and Inor), and the minimum is 52.9% (between Welene and Kistane). Next to Welene, higher completely unshared vocabularies are observed in Kistane; maximum 52.9% with Welene and minimum 29.8% with Muhir. Cheha, Inor, Mesqan and Muhir have low completely divergent lexicons. The least

(13.3%) divergence in completely different vocabularies is between Cheha and Mesqan.

What is interesting is that the lexical comparison puts Mesqan much closer to Cheha unlike the previous studies that grouped Mesqan at higher node of West Gurage languages in a family tree of Gurage language classification (cf. Hetzron, 1972: 119).

To summarize, the lexical comparision shows three relationships among the Guragina varieties; that is, highly intelligible varieties: Cheha, Mesqan, Muhir and Inor on one side; the relatively intelligible variety Kistane, and the least intelligible variety Welene. The fact that Inor has higher partially shared vocabularies with many of the varieties reveals that it is in the state of divergence. Language adaptation programs and standardization may help to level this tendency.

Clustering the Language Varieties

In order to find the cross-language relationships among Guragina varieties, a rank position value (hence forth RPV) is computed. First, the language varieties are ranked based on their percentage values as 1st, 2nd … 6th. Then, RPV are assigned. As the varieties compared are six, we shall give the maximum RPV *6* for the target language assuming a 100% similarity for it is compared with itself. The RPV 5 is given to a language which is the first highly similar variety to the target language or that stood second in rank order, 4, is given for the second closer language variety or to the one that stood third in rank order, etc. When two language varieties are equally similar (have the same rank order) to a language, their rank is added and then is divided into two; hence each of the two language varieties receives the result of the divided numbers. The language variety that have a rank next to the language varieties that received an equal RPV receives a third or fourth rank based on its position because the preceding two languages varieties that received equal values are considered as they have received consecutive ranks instead of a shared equal value.

The rank orders and the RPVs proposed are used to cluster the language varieties based on lexical, phonological, morphological and overall structural relationships among the Guragina varieties. For the lexical comparision, we use only the completely sharedvocabularies though the partially shared ones can also contribute for intelligibility.

The relational rank order in (4) is based on the percentages of completely shared vocabulary items.

(4) Relational rank based on completely shared vocabularies:

Target Language	Relational Rank, high to low, left to right				
CH	ME	MU	IN	KS	WE
IN	CH	ME	MU	KS	WE
KS	ME	MU	WE	CH	IN
ME	CH	MU	KS	IN	WE
MU	ME	WE	CH	KS	IN
WE	MU	KS	ME	CH	IN

A target language with a rank order of 1st mean a highest similarity whereas a rank order of 6th mean the least shared to the target language. For the purpose of getting the overall relationship instead of the relationship among a target language and its close relatives, we shall use a RPV. In a RPV, 6 mean the highest and 1 mean the least value; in other words, a RPV is the reverse of rank order in terms of degree of the similarities of the language varieties. The relational ranks based on completely shared lexicons in (4) above are converted into a RPV as in (5).

(5) RPV based on completely shared lexicons:

	CH	**IN**	**KS**	**ME**	**MU**	**WE**
CH	6	3	2	5	4	1
IN	5	6	2	4	3	1
KS	2	1	6	5	4	3
ME	5	2	3	6	4	1
MU	3	1	2	5	6	4
WE	2	1	4	3	5	6
Total	23	14	19	28	26	16

Based on the shared vocabularies, we can cluster the six languages varieties, from the highest to the least as: *Mesqan, Muhir, Cheha, Kistane, Welene and Inor*.

Phonological Comparision
The phonological comparison is based on 122 lexical items (cf. Fekede, 2013:249-250) selected from the 255 (cf. Fekede, 2013:239-248) words used for lexical comparison. The 122 words were selected because they showed systematic variations. The phonological comparison shows

sounds correspondence governed by phonological rules and variations based on distributions of sounds (occurring initially, medially, finally, between vowels, etc.).

From the 122 words selected for phonological comparison, 38 phonological rules and/or distribution are used for comparisons. The raw counts of the shared phonological rules among Guragina varieties are shown in (6).

(6) Phonological similarity counts

	CH	IN	KS	ME	MU	WE
CH	X	15	19	22	21	13
IN	15	X	4	10	8	5
KS	19	4	X	27	22	22
ME	22	10	27	X	29	16
MU	21	8	22	29	X	17
WE	13	5	22	22	17	X

The raw counts are changed into percentages and shown in (7).

(7) Percentage of phonological similarity

IN	KS	ME	MU	WE	
39.5	50	57.9	55.3	34.2	**CH**
	10.5	26.3	21.1	13.2	**IN**
		71.1	57.9	57.9	**KS**
			76.3	42.1	**ME**
				44.7	**MU**

Cheha shares phonological similarities with Mesqan (57.9%), Muhir (55.3%), Kistane (50%), Inor (39.5%) and Welene (34.2%).

Inor phonologically deviates from the other Guragina varieties; it is less shared among the compared varieties. Inor's maximum

percentage of shared phonologically similarity is 39.5% with Cheha, and 26.3% with Mesqan. Mesqan has relatively the highest shared phonological rules, except with Inor. The percentage of phonological similarities with Mesqan, from maximum to minimum, is 76.3%, 71.1%, 57.9%, 42.1% and 26.3% with Muhir, Kistane, Cheha,

Welene and Inor, respectively. Kistane and Muhir as well have highly shared phonological rules. Welene, as it was the case in completely shared lexicons, has less shared phonological rules. We can better understand the phonological relationship by ranking the percentage values of each Guragina varieties as in (8).

(8) Relational ranks based on phonlology

Target language	Relational rank order (highest to lowest from left to right)				
CH	ME	MU	KS	IN	WE
IN	CH	ME	MU	WE	KS
KS	ME	(MU-WE)		CH	IN
ME	MU	KS	CH	WE	IN
MU	ME	KS	CH	WE	IN
WE	KS	MU	ME	CH	IN

The relation ranks of each Guragina variety against five others is changed into RPV to get the overall relationships as in (9).

(9) Rank position value matrix based on phonology:

	CH	**IN**	**KS**	**ME**	**MU**	**WE**
CH	6	2	3	5	4	1
IN	5	6	1	4	3	2
KS	2	1	6	5	3.5	3.5
ME	3	1	4	6	5	2
MU	3	1	4	5	6	2
WE	2	1	5	3	4	4
Total	**21**	**12**	**23**	**28**	**25.5**	**16.5**

Based on shared phological rules, the language varieties can be clustered, from highest to the least as: *Mesqan, Muhir, Kistane, Cheha, Welene and Inor.* This

implies that Mesqan is highly similar to all the others; hence, is more intelligible linguistically. The next intelligible language variety is Muhir and then

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Kistane. Cheha , Welene and Inor are the fourth, fifth and sixth intelligible vrieties, respectively.

The question is why Mesqan has most phonologically shared features across the five other Guragina varieties. Though we cannot exactly tell the cause, the linguistic data shows that Mesqan has sonorant /n/ and /l/ shared with Kistane, Muhir and Welene. It also has /r/ shared with Cheha and Inor. On the other hand, Cheha and Inor often lack /l/, which is found only in a few words, such as *ləmtʃa* 'twins', for which they either use /n/ or /r/ as in *neba* for *leba* 'thief'. In other words, there is a kind of merger of /l / into / n/ or /r/ in Cheha and Inor. What is more, Mesqan, has vocabularies highly shared by the other Guragina varieties because Mesqan is geographically in contact with north Gurage (Kistane), east Gurage (Welene) and West Gurage (Muhir). It takes linguistic features from all the language varieties it is in contact with.

Comparison of Morphemes
To compare the morphemes statistically, the main inflectional and derivational affixes that are overtly shown in the six Guragina varieties are discussed. The morphemes are grouped into noun and verb affixes. The affixes are subdivided into inflection and derivation. The morphemes are based on elicitation from fields and literature including Meyer (2006), Tsehay (2008) and Alemayehu (2011).

Affixes of Nouns

Inflection affixes
Inflectional affixes show grammatical relationships**.** The inflectional affixes of nouns compared include definiteness, number and case markers.

i)   *Definiteness and number*

Definiteness in Cheha and Inor is marked with pronominal suffixes, such as {-xino}; in Kistane and Welene it is marked with {-i}; and in Muhir it is marked with {-we}. The plural is not marked in Cheha, Inor and Mesqan but pronominal suffixes, such as bet-*xut* (house-3smpro) 'the house' versus bet-*xino* (house-3ppro) 'the houses', can express the notion of plural. Kistane and Welene have plural markers {-otʃ} and {-tʃə}, respectively. The examples in (10) show the definite and plural forms of nouns.

(10) **Definiteness and plural**

LangVar.	Definiteness	Number
CH	*səb-xino* man-pro 'the men'	*səb* man 'man'/'men'
IN	*səb-xino* man-pro 'the men'	*səb* man 'man'/'men'
KI	*səb-i* man-def 'the men'	*səb-oʧ* man-pl 'men'
ME	*gərəd-i* girl-def 'the girl'	*səb* 'man'/ 'men'
MU	*gərəd-we* girl-def 'the girl'	*səb-xinəm^w* man-3pm 'the men'
WE	*gar-i* house-def 'the house'	*səb-ʧə* man-pl 'the men'

ii) Case

The nominative case in Gurage languages is shown syntactically, and the accusative case, which is {jə-} in most Guragina varieties is overt only when the object noun is definite. Therefore, we use the overtly shown morphemes, such as genitive, dative, instrumental and locative case markers for our comparison. In (11) are case markers of the six Guragina varieties:

(11) Case markers

LangVar.	Genitive	Dative	Instrument	Locative
CH	*jə-əbərga* of-Z	*jə-əbərga* to-Z	*bə-genzo* with-ax	*bə-bet (pp)* in(on) house
IN	*ə-xuda bid* of-his house	*ə-gərəd* to- girl	*bə-wisə* with ax	*bə-bid (pp)* Loc-house (pp)
KI	*jə-gərəd* of-girl	*jə-bajji* to boy	*bə-makəl* with ax	*bə-ge lalə* Loc-house-on
ME	*jə-gərəd* of-girl	*jə-gərəd* to-girl	*bə-genzo* with-ax	*bə-beti (pp)* Loc-house (pp)
MU	*jə-gərəd* of-girl	*jə-gərəd* to-girl	*bə-genʒəm^{w}ə* with-ax	*bə-bet* on-house
WE	*ji-xetə* of-my	*lə-nure* to-Nure	*bə-gənzəmo* with-ax	*bə-gar-dər* Loc-house-on
Gloss	'Of-NP'	'to-NP'	'with-NP'	'Loc-NP-PP'

Derivation Affixes

Noun derivational affixes including abstract, verbal noun, group identity, instrument, result and agent nominal affixes are shown in (12).

(12) Nominal derivation affixes

LangVar	Abstract	Gerundive	G-identity	Instrument	Result	Agent
CH	səb -nət	sɨbr-ot	fərəz-*ənə*	mə-ktəf-ja	mɨk-at	səf-i
IN	səb -nəd	ə-swɨrt	ə-fərəzjə	mə-kətəfə-ja	mɨk-at	səf-i
KI	səb -nnət	wə-sbɨr	fərəz-əɲɲə	wo-ktɨf-ja	mɨk-at	səf-i
ME	səb -nnət	wə-sbɨr	fərəz-əɲɲə	mə-ktəf-ja	mɨk-at	səf-i
MU	səb -nnət	wə-sbɨr	fərəz-əɲɲə	wə- ktəf-ja	mɨk-at	səf-i
WE	miʃ-nət man-hood	sɨbər-ot	fərəz-əɲə	mə-ftʃa 'opener'	mɨk-at	səf-i
Gloss	'humanity'	'breaking/ to break'	'horseman'	'instrument to chop with'	'problem'	'tailor'

Abstract nominal is derived with {-nət} but the morpheme initial /n/ is geminated in Muhir, Mesqan and Kistane, and the morpheme final /t/ becomes /d/ in Inor. Verbal noun is derived with {-ot} in Cheha and Welene, {wə-} in Kistane, Mesqan and Muhir and {ə-} in Inor. Kistane further derives gerundive nominal with {–a}: wəzəl-a 'working'; səbər-a 'breaking'; t'ərəg-a 'sweeping' (Tsehay, 2008:80). Group identity nominal is derived with {-əɲɲə} in Kistane, Mesqan, Muhir and Welene (ɲ is degeminated in Welene), and with {-ənə} in Cheha. Inor uses {ə-} to derive group identity nominal.

Affixes of Verbs

Inflection Affixes
The verb inflection affixes compared include past, present and future tense markers, imperative and jussive. What is

   (13) Tense and mood affixes

more, negation of verbs in different tenses and moods are discussed in (13).

Lang Var	Past	Present	D-future	Ind-future	Imperative	Jussive
CH	*səpərə-m* he broke	*ji-səbir* he breaks	*ji-səbir-te* he will break	*ji-sbir-ʃə* he may break	*sibir* break	*jə- sbir* let him break
IN	*səpərə̃* he broke	*ji-səbir* he breaks	*ji-səbir-kʷe* he will break	*ji-sbir-se* he may break	*sibir* break	*ə- sbir* let him break
KI	*səbbərə* he broke	*ji-səbir-u* he breaks	*ji-səbir-jən-* he will break	*ji-səbir jɨkonu* he may break	*sibər-* break	*jə- sbir-* let him break
ME	*səbbərə* he broke	*ji-səbr-* he breaks	*ji-səbur-ew* he will break	*ji-səbur-ew* he may break	*sibur* break	*jə- sbur-* let him break
MU	*səbbərə-m* he broke	*ji-səbir-u* he breaks	*ji-səbr-ətn-* he will break	*ji-səbr-ətn-* he may break	*siwir* break	*jə- swir-* let him break
WE	*səbərə-* he broke	*ji-səbr-an* he breaks	*li-səbr-in-* he will break	*li-səbr-əjnon* he may break	*sibər-* break	*jə- sbər-* let him break

The morpheme {-m} is considered as past marker and occurs in Cheha and Muhir with affirmative forms of verbs. In Inor the {-m} is often deleted but surfaces in some carful speech. The deleted {-m} leaves its traces and nasalizes any vowel occurring in a word final position. The third person singular marker of imperfective is {jɨ-}, which becomes {li-} in Welene in future tense forms. The definite future markers are {-te} and {-kʷe} in Cheha and Inor, respectively. The indefinite future is marked with {- ʃə} in Cheha and {-se} in Inor. Mesqan and Muhir do not distinguish definite and indefinite future forms. Kistane and Welene use auxiliary verb jɨkonu and -əjnon 'may', respectively to express indefinite future.

The imperative form does not have an affix but is shown by internal modification of vowels. Thus, we have $C_1iC_2iC_3$ in Cheha, Inor and Muhir; $C_1iC_2əC_3$ in Kistane and Welene; and $C_1iC_2uC_3$ in Mesqan (where C refers to a consonant and the subscript numbers indicate the consonants are not identical). The jussive form has {jə-} in all the Guragina varieties compared except in Inor where it is {ə-}.

The negative markers in the past, present future, imperative and jussive are compared as in (14):

(14) Negative affixes

LangVar	Past	Present	Future	Imperative	Jussive
CH	*an-səpər-ə-* he didn't break	*e-səbir* he doesn't break	*e-səbir* he won't break	*at-sɨbir* don't break	*e-sbir* let him not break
IN	*an-səpər-ə-* he didn't break	*aj-səbir* he doesn't break	*aj-səbir-ka* he won't break	*at-sɨbir* don't break	*aj-sɨbir* let him not break
KI	*al-səbbər-ə-* he didn't break	*aj-sbər* he doesn't break	*t-səbir* he won't break	*at-i-sbər* don't break	*aj-sbər* let him not break
ME	*an-səbor-ə-* he didn't break	*e-səbur* he doesn't break	*e-sbur* he won't break	*at-i-sbur* don't break	*e-sbur* let him not break
MU	*an-səbbər-ə-* he didn't break	*e-səbir* he doesn't break	*e-swur* he won't break	*at-i-swɨr* don't break	*e-sbir* let him not break
WE	*al-səbər-* he didn't break	*aj-səbər-* he doesn't break	*ɨl-səbɨ* he won't break	*at-sbər* don't break	*aj-i-sbər-* let him not break

The negative marker in the past is {an-} in Cheha, Inor, Mesqan and Muhir; it is {al-} in Kistane and Welene. In present, negative affix is {e-} in Cheha, Mesqan, and Muhir; it is {aj-} in Inor, Kistane and Welene. The negative in the future tense becomes much different: {e-} in Cheha, Mesqan and Muhir (similar to the present negative form), {aj-} in Inor, {t-} in Kistane and { ɨl-}in Welene. In imperative form, all the language varieties use the same form {at-}. The negative form in jussive is the same as the negative in the present tense form in all the six language varieties.

Derivation Affixes

The verb derivation affixes compared are causative, double causative (also called causative of causative), passive and frequentative. In (15) are examples of verb derivations.

(15) Verb derivation affixes

LangVar.	Causative	Double causative	Passive	Frequentative
CH	*a-ʧəfər-ə-m*	*at-ʧafər-ə-m*	*tə-ʧəfər-ə-m*	*at-ʧifəfər-ə-m*
	he fed	he caused to feed	it is fed	he fed again & again
IN	*a-ʧəfor-ə-*	*at-ʧafor-ə-*	*tə-ʧəfor-ə*	*at-ʧifafor-ə*
	he fed	he caused to feed	it is fed	he fed again & again
KI	*a-tekəm-ə-m*	*at-tkakəm-ə-nə-mu*	*tə-tekəm-ə-mu*	*at-tekakəm-ə-mu*
	he fed	he caused to feed	it is fed	he fed again & again
ME	*a-ʧəkəm-ə-m*	*at- ʧakəm-ə-m*	*tə-ʧəkəm-ə-m*	*at- ʧikəkəm-ə-m*
	he fed	he caused to feed	it is fed	he fed again & again
MU	*a-ʧəfər-ə-m*	*at-ʧafər-ə-m*	*tə-ʧəfər-ə-m*	*at-ʧifafər-ə-m*
	he fed	he caused to feed	it is fed	he fed again & again
WE	*a-xərət-ə-*	*at-xrarət-ə*	*tə-xrarət-u*	*a(t)-xrarət-ə-*
	he fed	he caused to feed	it is fed	he fed again & again

In the derivation of verbs, the six Guragina varieties have more uniform affixes. The causative marker is {a-}; the double causative is {at-}; the passive is {tə-} and the frequentative is {at-} plus reduplicating the second radical of a word.

SUMMARY

So far, we have seen a brief description of the inflectional and derivational affixes of Guragina varieties. Now, we quantify the morphemes and find out the extent the Guragina varieties share or do not share the morphemes. A number *1* represents that a language has a particular morpheme and *2* to show that a particular language does not have a particular morpheme. Thus, if two language varieties have both *1* and *1*, we call it '*we have*', that is, the two varieties possess that morpheme; if two language varieties have *2* and *2*, we call it '*we do not have*', that is, both language varieties lack that morpheme; if two languages have *1_2* or *2_1*, we call it '*I have- you do not have*', that is, when one language has a particular morpheme, the other language variety lacks that same morpheme.

We consider '*we have*' and '*we do not have*' are the shared values for two language varieties because they either have or do not have the morpheme in common. The '*I have - you do not have*' is the difference that two languages do not share because when one language has *1* (*I have*) the other variety has *2* (*I do not have*). The

number of '1', '2' and '1_2/2_1' shared between two varieties is shown in (16).

(16) The shared or not shared 1's, 2's and 1_2/2_1's
We shall first merge '*we have*' and '*we do not have*' (the communality between two languages) and then compare it with '*I have-you do not have*' as in (17).

(17) Shared and unshared morphemes among Guragina varieties

Language Pairs	*1=We have*	*2=We do not have*	*1_2/2_1=I have- you do not have*	*Total*
CH-IN	11	12	21	44
CH-KS	13	12	19	44
CH-ME	17	19	8	44
CH-MU	18	18	8	44
CH-WE	13	13	18	44
IN-KS	11	11	22	44
IN-ME	12	15	17	44
IN-MU	12	13	19	44
IN-WE	12	13	19	44
KS-ME	15	16	13	44
KS-MU	16	15	13	44
KS-WE	17	16	11	44
ME-MU	19	21	4	44
ME-WE	14	16	14	44
MU-WE	14	14	16	44

Language Pairs	We have & we do not have (1 & 2)	I have- you do not have (1_2/2_1)	Total
CH-IN	23 (52.27%)	21 (47.72%)	44 (100%)
CH-KS	25(56.81%)	19(43.18%)	44(100%)
CH-ME	36(81.81%)	8 (18.18%)	44(100%)
CH-MU	36(81.81%)	8(18.18%)	44(100%)
CH-WE	26 (59.09%)	18 (40.9%)	44(100%)
IN-KS	22 (50%)	22(50%%)	44(100%)
IN-ME	27(61.36%)	17(38.63%)	44(100%)
IN-MU	25(56.81%)	19 (43.18%)	44(100%)
IN-WE	25(56.81%)	19(43.18%)	44(100%)
KS-ME	31(70.45%)	13(29.54%)	44(100%)
KS-MU	31(70.45%)	13(29.54%)	44(100%)
KS-WE	33 (75%)	11(25%)	44(100%)
ME-MU	40 (90.9%)	4 (9.09%)	44(100%)
ME-WE	30 (68.18%)	14 (31.81%)	44(100%)
MU-WE	28 (63.63)	16 (36.36)	44(100%)

In (17) the raw shared count and its percentage (a value in parenthesis) is shown. As the unshared morphemes do not contribute for intelligibility, we compare only the shared morphemes to show the relative similarities and differences among the Guragina varieties. The matrix in (18) shows the percentages of shared morphemes more clearly.

(18) Shared morphemes among six Guragina varieties:

IN	KS	ME	MU	WE	
52.27	56.81	81.81	81.81	59.09	**CH**
	50	61.36	56.81	56.81	**IN**
		70.45	70.45	75	**KS**
			90.9	68.18	**ME**
				63.63	**MU**

In (18), we can see the relative similarity of a language variety against the other five language varieties. For example, Cheha shares maximum morphemes with Muhir and Mesqan (81.81% each), Welene (59.09), Kistane (56.81) and Inor (52.27). Muhir shares more morphemes with all the varieties: Mesqan (90.9%), Cheha (81.81), Kistane (70.45%), Welene (63.63%) and Inor (56.81%). Mesqan's morphemes, like the Muhir's, are highly shared by the majority of Guragina varieties: Muhir (90.9%), Cheha (81.81%), Kistane (70.45%) ,Welene (68.18%) and Inor (61.36%). Kistane's morphemes are relatively well shared by Welene (75%),

Mesqan and Muhir (70.45 % each), and relatively less shared by Cheha(56.81%) and Inor (50%). Welene's morphemes are on averaged well shared. It has higher shared morphemes with Kistane (75%), Mesqan (68.18), Muhir (63.63%), Cheha (59.09%) and Inor (56.81%). Inor shared relatively less morphemes with all the five language varieties: Mesqan (61.36), Muhir and Welene (58.81% each), Cheha (52.27%) and Kistane (50%).

To find the distance among the language varieties based on the shared morphemes, we rank their percentage value and then label their RPV as in (19).

(19) Relations of language varieties to a target language with a RPV

Target language	*Language varieties closer to target language (left to right)*	*Rank Position Value (RPV)*					
CH	(MU-ME)-WE-KS-IN	6	4.5	4.5	3	2	1
IN	ME- (MU- WE)-CH-KS	6	5	3.5	3.5	2	1
KS	WE- (ME –MU)-CH -IN	6	5	3.5	3.5	2	1
ME	MU-CH- KS -WE-IN	6	5	4	3	2	1
MU	ME- CH- KS- WE-IN	6	5	4	3	2	1
WE	KS-ME-MU-CH-IN	6	5	4	3	2	1

To find the center of all the language varieties from which each of the language varieties may access morphological information at different levels, we shall arrange the RPV as in the matrix in (20).

(20) A 6- by- 6 matrixes RPV

	CH	*IN*	*KS*	*ME*	*MU*	*WE*
CH	6	1	2	4.5	4.5	3
IN	2	6	1	5	3.5	3.5
KS	2	1	6	3.5	3.5	5
ME	4	1	3	6	5	2
MU	4	1	3	5	6	2
WE	2	1	5	4	3	6
Total	*20*	*11*	*20*	*28*	*25.5*	*21.5*

Morphology makes Mesqan the center of all the Guragina varieties. Its morphemes are shared nearly by all the sample groups in a better way. It is the first highly shared language variety to Cheha, and Muhir. It is the second most shared language variety to Inor, Kistane and Welene. The inherent intelligibility based on morphology, from high to low, is: *Mesqan, Muhir, Welene, (Cheha, Kistane) and Inor.* As some of the language varieties differ only slightly in terms of morphology, we can regroup them as in the Figure 3.
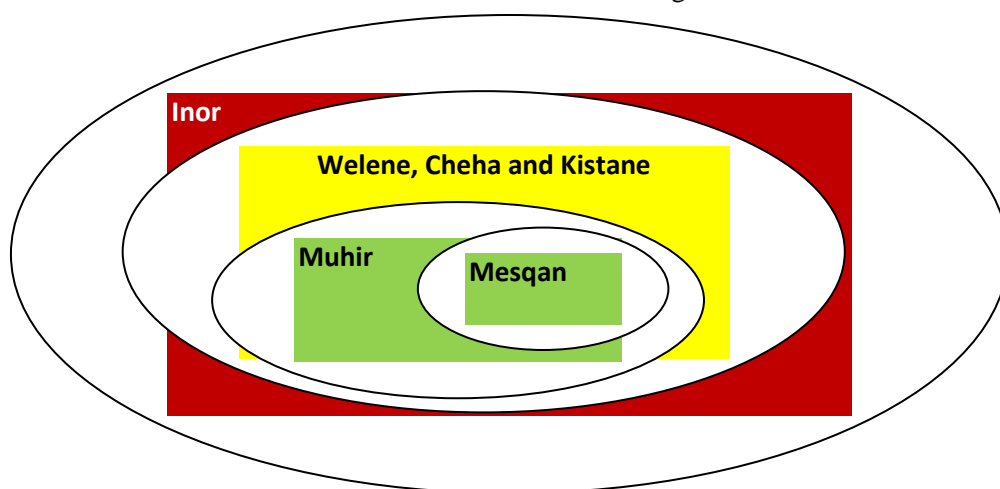
Figure 1. Cross-language relationship based on shared morphemes.

The language variety in the inner circle, Mesqan, is the center of all the other five Guragina varieties based on morphostatistics. Information from the center to the language area in the second inner circle (Muhir) can be more accessible compared to the language areas in the third circle (Welene, Cheha and Kistane) and in the fourth or the outer circle (Inor).

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Overall Structural Relations

The overall structural relationships based on **lexicon**, **phonology** and **morphology** among the Guragina verities are aggregated in (21).

(21) Relative ranks in three categories

Category:	Language varieties(from high to low similarity):
Lexicon	Mesqan, Muhir, Cheha, Kistane, Welene and Inor.
Phonology	Mesqan, Muhir, Kistane, Cheha, Welene and Inor
Morphology	Mesqan, Muhir, Welene, (Cheha, Kistane) and Inor.

The RPV for the above structural categories is summarized as in (22).

(22) Structural similarities among Guragina varieties

Category	*RPV of each category*						
	CH	IN	KS	ME	MU	WE	*Total*
Lexicon	23	14	19	28	26	16	126
Phonology	21	12	23	28	25.5	16.5	126
Morphology	20	11	20	28	25.5	21.5	126
Total	*64*	*37*	*62*	*84*	*77*	*54*	*378*

The overall structural similarity, from highly to less shared, groups Guragina varieties as: *Mesqan, Muhir, Cheha, Kistane, Welene, and Inor.* Two Guragina varieties, Mesqan and Muhir, can be grouped together as a highly shared varieties that may be intelligible each other and to all the other Guragina varieties. Cheha and Kistane can fairly be grouped together as the second intelligible varieties. As the gap between Welene, sum of RPV 54, is wider than that of Inor, sum of RPV 37, the two languages cannot be categorized into the same group. Therefore, we can group, as shown in the Figure 3.2, the six Guragina varieties as: *Mesqan and Muhir, Cheha and Kistane, Welene, and then Inor,* from highest to least intelligible groups, respectively.
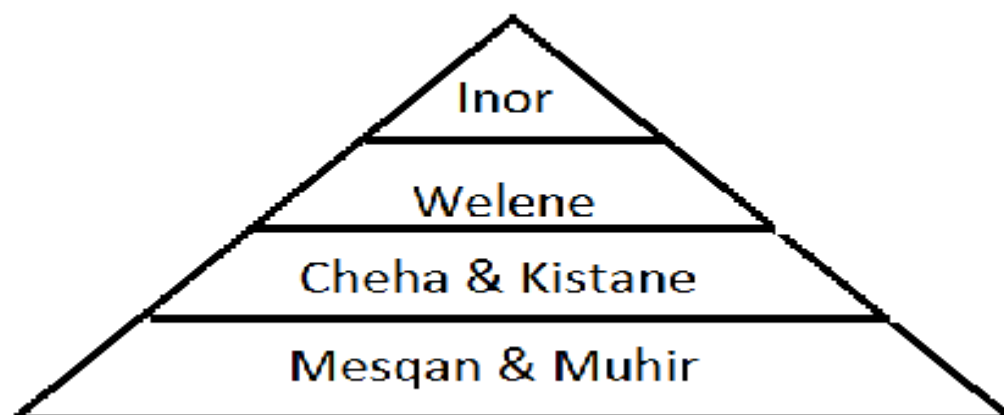
Figure 2: Overall inherent intelligibility among Guragigna Varaities

CONCLUSION

In this article, we have discussed inherent intelligibility among six Guragina varieties based on lexicons, phonological rules and morphemes shared among six Guragina varieties. The comparison showed that Mesqan, Muhir, Cheha, Kistane, Welene and Inor are shared from the highest to the least, respectively among the six Guragina varieties speakers. The present finding confirms the (Gutt, 1980) findings with regard to less intelligibility between Kistane and Cheha. It, however, differs from Hetzron (1972) by grouping Mesqan genetically closer to Muhir and Cheha than to other West Guragina varieties.

This study provides very good means for language choice and use in the Gurage Zone. However, further research on intelligibility test, sociological survey on in-group and out-group relationships, the way each groups identify themselves and the historical ties among different Guragina speakers is required. This has to be compared against the structural similarities and differences to make decisions on language use for various purposes including local mass media, mother tongue education, and court in the Gurage Zone.

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