National Research Conference on the theme “Best-fit research outputs and practices for improved livelihoods and sustainable development in Ethiopia”

Abstracts selected for presentation at the Conference

Complied by:
Dr. Alemayehu Regassa
Dr. Nebyou Moje
Foreword

On behalf of the Conference Organizing Committee, I am pleased to welcome all the invited guests and researchers on this National Research Conference hosted by Hawassa University. The aim of the Conference is to bring together researchers from different organizations, in order to discuss their research outputs which can contribute to the livelihood improvement and sustainable development of our country. The theme of the Conference is “Best-fit research outputs and practices for improved livelihoods and sustainable development in Ethiopia” under which four sub-themes; namely Natural Resources Management, Food Security and Nutrition, Health and Medicine, Socio-economic and institutional aspects and other cross cutting issues are identified.

In response to the Call For Papers from Hawassa University, a total of 350 abstracts were submitted by researchers from different universities, research centres, sector offices and private & non-governmental organizations. After meticulous evaluation by the respective professionals of the University, 90 papers were selected for presentation on the Conference (see part one of this booklet). The full articles of selected papers will be published in proceeding after the Conference. On the other hand, part two of this booklet consists of the abstracts collected from the completed researches reported by the academic staffs of Hawassa University during the last one year.

Hopefully, this Conference will create a forum for inter-disciplinary discussion and subsequent collaborations among the researchers and also across the institutions.

Thank you for you participation on our Conference!!!

Alemayehu Regassa (Dr.)
Director, Research Programs Directorate
Hawassa University
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PART ONE:

ABSTRACTS SELECTED FOR THE CONFERENCE
Phylogenetic Multilocus sequence analysis identifies Seven Novel Ensifer Genospecies isolated from a Less-Well-Explored Bio-geographical Region in East Africa

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ABSTRACT
The diversity of 71 rhizobial strains belonging to the genus Ensifer, isolated from root nodules of woody legumes growing in southern Ethiopia, was studied using multilocus sequence analysis (MLSA) and phenotypic approaches. Phylogenetic analyses based on core genes revealed that 43 strains were clustered in seven distinct and consistent positions (genospecies I–VII), while another 25 strains were also distinct but were discrepant in their placement on the different gene trees. The remaining three strains occupied the same phylogenetic branches as defined Ensifer species and thus were not distinct. Irrespective of their chromosomal background, the majority of the test strains were highly related with respect to their nifH and nodC gene sequences, suggesting that these symbionts might have acquired these genes recently from a common origin. On the nifH phylogenetic tree, the branch containing the test strains and reference species isolated from woody legumes in Africa was clearly separate from those isolated outside the continent, suggesting that these symbionts have a long history of separate evolution within Ensifer for this gene. A cross-inoculation study showed that our strains were capable of eliciting effective nodulation on the homologous host and on other host species. This suggests a potential to improve nitrogen fixation by selecting for broad-host-range inoculants. Our study confirms the presence of a wide diversity of Ensifer in East Africa and, while contributing to the general knowledge of the biodiversity within the genus, also highlights the need to focus on previously less-well-explored biogeographical regions to unravel as-yet-unidentified rhizobial resources.

Keywords: Rhizobia, Ensifer, genospecies, Symbiosis, Cross-inoculation
Community watershed management through integrating improved Beekeeping: The Case of Sasiga and Sagure Watersheds

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ABSTRACT

Due to physical, biological and socio-economic factors, numerous watershed areas in the state of degradation and climate change is the existing problems increased risks for local environment of Ethiopia. The viability of productive conservation depends on efforts to manage economic and ecological factors to ensure the relationship between communities and environment. Beekeeping is important as economic incentives that integrate biological conservation with economic development for the rural communities. The objective of the study was to integrate beekeeping as incentives to watershed rehabilitation through honey production. Two areas delineated as regionally important watersheds, namely Sasiga in East Wollega and Sagure in Arsi Zones were selected for the study. Participatory Rural Appraisal (PRA) was conducted and beekeeping is identified as one of the components that ensure the long-term watershed rehabilitation through sustainable income generation from honey production. Beekeepers around watersheds were purposively selected and data on socio-ecology implication of beekeepers, vegetation management practices, seasonal bee management and honey harvesting techniques were collected and analyzed. The study result revealed that most (92%) of traditional beekeepers around watershed areas have a culture to maintain diverse bee floral resources around their homesteads and farm boundaries designed to increase their honey production simultaneously enhances watershed rehabilitation. Practical training was given to 30 user group in each watershed on seasonal bee management practices, nursery management and maintenance, intermediate beekeeping construction, implementation and honey harvesting techniques integrated to watersheds rehabilitation. Most (86%) of the qualified watershed beekeepers each constructed and established four intermediate hives in their backyard around watershed. Most (72.6%) established bee colonies maintained in intermediate beehives and produced an average of 15.5 kg of honey per hive per harvesting season compared to traditional bee hives 5-6 kg per year. Moreover, 12,500 multipurpose bee forages consisting of different species multiplied in community nursery, distributed and maintained in backyards, watersheds, and watershed buffer to sustain bee populations for future surplus honey production and watershed rehabilitation. Therefore, if watershed conservation and livelihood preservation are to occur simultaneously, it is important to bring the influence of honey producers to the forefront of watershed rehabilitation efforts. Given the opportunity and potentials for increased demand for honey and beeswax in Ethiopia, it was recommended that the government at all levels should provide technical services for beekeeping aligned with watershed conservation so that income generation from honey production is increased and sustained.

Keywords: watershed rehabilitation, beekeeping, bee flora, honey production
Effects of Soil Tillage and Crop Residue Management on Run-off, Soil loss and Crop Yield in the Central Highlands of Ethiopia

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ABSTRACT
Soil management practices that reduced soil erosion, increase soil moisture and enhance crop yield are needed in Ethiopia highlands where crop productivity is highly affected by soil erosion. Conservation tillage (combined use of tillage and crop residue management) has been claimed for sustainable intensification that reduce soil erosion and increase crop yield. However, the effects of conservation tillage on runoff, soil loss and crop yield are rarely documented in Ethiopia. The effects of tillage and crop residue on runoff, soil loss and crop yield was studied for three years (2009-2011) at Holeta Agricultural Research Center under Nitisol condition. Three tillage intensities treatments (zero, minimum and conventional tillage) and three levels of crop residue (no crop residue, 1t/ha/yr and 2t/ha/yr) were used. A standard run-off plots (9m length and 6m width) with multisport divisor was used for this experiment. The experiment was laid out in a Randomized Complete Block arrangement with three replications. Daily runoff and soil loss were measured for each treatment using standard procedures while wheat grain and straw yield was recorded. The average run-off in conservation tillage (zero tillage with 2 tones/ha crop residue) was 260 mm while conventional tillage yielded 267 mm run-off. However, when 2t/ha crop residue is added to conventional tillage, the run-off became 198 mm. The average soil loss from conservation tillage plots was 16 t/ha and 30 t/ha from conventional tillage plots. The soil loss from conventional tillage plots reduced to 23 t/ha when 2 t/ha crop residue is added. Similarly, the average grain yield for conservation tillage was 1.25 t/ha while that of conventional tillage was 1.63 t/ha. In addition, the rainwater use efficiency (RWUE) for conservation tillage was lower (0.32 g/l) than conventional tillage (0.498 g/l). Generally, the result shows that conservation tillage reduced run-off and soil loss. Nevertheless, the bad news is that it reduced crop yield of wheat. This shows that there is a trade-off between regulating ecosystem service (e.g. regulating soil erosion and flooding) and provisioning ecosystem service (provision of yield). Since the experiment was conducted for only three years, a long-term evaluation of conservation tillage experiments is required to find out the optimum number of years in which crop yield in conservation tillage can be higher than conventional tillage.
Production and Characterization of Biodiesel from Brebra (M. ferruginea) Seed Oil

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ABSTRACT

Millettia ferruginea is a leguminous tree endemic to Ethiopia. Although brebra tree produces large quantities of seeds, currently the seed application is limited. The objective of this study was to produce standard biodiesel from brebra oil. Brebra seed contained 48.5 ± 0.99% oil. As analysis of fatty acid composition showed, 75% of the total fatty acid is accounted for by oleic acid (30.7%) and linoleic acid (44.3%). Refined oil obtained after removal of the hexane was used for biodiesel production using KOH as a catalyst. The resulting biodiesel was pure and showed excellent physical and chemical properties meeting international standards. Briefly, the specific gravity, viscosity, acid value, pH value, saponification value, and iodine value of brebra biodiesel were within specification of ASTM and EN. From the total refined oil, 81.6 and 17.18 biodiesel and glycerol was recovered, respectively. Therefore, brebra seed oil has potential application for biodiesel and glycerol production.

Keywords: Biodiesel, Fatty acids, Glycerol, Millettia ferruginea, Transesterification
The effect of pond depth and lining plastic color on nitrogen fixing capacity of cyanobacteria, Anabaena species strain E3

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ABSTRACT

The increasing cost and adverse effects on environmental quality are current pertinent problems associated with chemical fertilizer. Across the globe, these problems provoked the search for economically attractive and ecologically sound alternatives to chemical fertilizers for realizing the ultimate goal of increased productivity. Cyanobacteria are a cheap source of nitrogen and quite suitable for farmers of developing countries like Ethiopia. Mass production conditions of cyanobacterial based biofertilizer can greatly influence distribution and concentrations of photosynthetic as well as UV-screening pigments which, in turn, can critically alter light attenuation, photosynthetic rates and nitrogenase activity. Recently a series of research studies were conducted concerning Ethiopian cyanobacterial strains. The findings of the studies indicated that among 10 strains, strain E3 performed best under various experimental conditions in terms of growth parameters such as optical density, growth rate, heterocyst frequency, dissolved oxygen, dry biomass, pH and total nitrogen. However, the effect of pond depth and lining plastic color on nitrogen fixing capacity of Anabaena species strain E3 is unknown. Thus, this study was conducted with the objective to evaluate the effect of pond depth and lining plastic color on nitrogen fixing capacity of this strain. Factorial combinations of four pond lining plastic colors (transparent, blue, red and black) and two depths (20 cm and 40 cm) were laid out in a complete randomized design with three replications. The ANOVA result revealed that the shallower pond (20 cm) scored higher mean growth rate (0.063 OD day⁻¹), dissolved oxygen (17.63 mg L⁻¹), dry biomass (0.58 g L⁻¹) and total nitrogen (27.77 mg L⁻¹); Whereas the highest mean growth rate (0.089 OD day⁻¹), dissolved oxygen (19.068 mg L⁻¹), dry biomass (0.66 g L⁻¹) and total nitrogen (41.60 mg L⁻¹) were registered in the treatment with a transparent lining plastic color. Moreover, it was noted that the test strain under the treatment combinations of 20 cm depth and transparent plastic lining expressed the highest mean optical density (1.22), heterocyst frequency (2.92%) and pH (10.28). Therefore, it could be recommended that for mass production condition of E3-strain-based biofertilizer, the test strain could be grown in a 20 cm depth pond lined with transparent plastic. However, the safety issue concerning cyanotoxins cannot be overlooked. Hence, further research is needed to verify the absence of cyanotoxins in this biofertilizer.

Key words: Cyanotoxin, Dry biomass, Shallow pond, and Total Nitrogen.
Modelling Hydrological Impacts of Climate Change on Lake Hawassa Watershed, Southern Ethiopia

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**ABSTRACT**

In this study, hydrological impact of climate change on Lake Hawassa water balance components were estimated in response to the A2a and B2a emission scenarios. Observed climatic variables and future climatic variables were used to verify the hydrological impact. The future climate variables were predicted by using General Circulation Model (GCM) which is considered as the most used tool for estimating the future climatic condition. Statistical Downscaling Model (SDSM) was applied in order to downscale the climate variables to watershed level. Then, hydrological model (SWAT) was applied to simulate the water balance components and calibrated by SWAT CUP (SUFFI-2 algorithm). The simulation result revealed that, by 2020s, the total average annual inflow volume into Lake Hawassa will rise significantly up to 6.14% for A2a and 5.9% for B2a-scenarios.

**Keywords**: Climate Change, General Circulation Model (GCM), SDSM, SWAT Hydrological Model, SWATCUP, SUFFI2 algorithm.
Woody Species Diversity under Natural Forest Patches and Adjacent Enset-Coffee Based Agroforestry in the Midland of Sidama Zone, Ethiopia

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ABSTRACT

Agroforestry lands will be the most beneficial to the long-term preservation of biodiversity through preserving native species of plants and animals in tropical countries. Despites of its vital roles, the contributions of agroforests and forest patches for biodiversity conservation in Ethiopia have few studied. The aim of this study is to investigate status of woody species diversity in natural forest patches and adjacent Enset-Coffee based agroforestry (ECAF) with particular emphasis on their contributions to biodiversity conservation in midland of Sidama zone, Ethiopia. The two study sites (Wonsho and Shebedino districts) were selected purposively based on presence of forest patches and extensive practices of ECAF. Similarly, the three kebele in each sites were selected based on the presence of natural forest patches. A total of 96 quadrats (48 in each systems), having 20 m x 20 m area were systematically sampled. Our results shows that a total of 75 different woody species categorized under 31 families were recorded, of which 43 species under 30 families from the natural forest patches and the remaining 32 species under 21 families from ECAF. Twenty two woody species belonging to 15 families were common to both the natural forest patches and ECAF that makes 58.67% of similarity in woody species composition. Euphorbiaceae family had the highest number of woody species both in the natural forest patches and ECAF. Shannon and Simpson diversity indices of woody species from natural forest patches were significantly (p < 0.05) higher than the ones from ECAF. Of all woody species identified, 86.67% were native. Finally, it is concluded that ECAF play a major role in the conservation of native woody species.
**Keywords:** biodiversity, conservation, native, woody species, similarity
Forest Carbon Stocks and Variations along Altitudinal Gradients in Egdu Forest: Implications of Managing Forests for Climate Change Mitigation

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ABSTRACT

The role of forests in mitigating the effect of climate change depends on the carbon sequestration potential and management. Although a number of studies have been done on carbon stock estimations, the influence of environmental factors on forest carbon stocks has not been properly addressed. This study was conducted to estimate the carbon stock and its variation along the altitudinal gradients in Egdu dry afromontane forest. The carbon stock in the different carbon pools and analysis of the influence of the environmental variables were studied by collecting data in quadrat plots of 10 X 20 m distributed along transect lines. The mean total carbon stock density of Egdu Forest was found to be 614.72 ± 35.79 t ha\(^{-1}\) (ranging from 182.6 to 1416 t ha\(^{-1}\)), of which 278.08 ± 25.72 (19 to 782.28 t ha\(^{-1}\)) was contained in the above ground biomass, 55.62 t ha\(^{-1}\) (8.06 to 332.89 t ha\(^{-1}\)) in below ground biomass, 3.47 ± 0.2 (0.33 to 7.53 t ha\(^{-1}\)) in litter carbon and 277.56 ± 11.56 t ha\(^{-1}\) (148.74 to 551.30 t ha\(^{-1}\)) was stored in soil organic carbon (0-30 cm depth). The carbon stocks in above ground biomass, below ground biomass, litter biomass and soil organic carbon exhibited distinct patterns along altitudinal gradients. The above ground, below ground and soil organic carbon stock showed an increasing trend with increasing altitude while the litter carbon stock showed irregular patterns along altitude though statistically there was no strong relationship between each of these carbon pools and altitudinal gradients. This study concluded that the carbon stock value of Egdu Forest is large, and the carbon storage in different carbon pools of the forest area varies with altitudinal gradient.

Key words: Altitudinal gradient, Biomass, Egdu Forest, Forest carbon stock, Soil carbon
Experiences of Climate Resilient Sustainable Conservation Farming: the Case from Loko Abaya District, Sidama Zone

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**ABSTRACT**

Land degradation is a common phenomenon that threatens sustainable agricultural development in Ethiopia. It is related with a twin problem, mainly economic limitation and lack of awareness by the farming community. To redress these problems Conservation Farming Project was implemented for the last two years (2013-2014) to improve soil fertility, crop productivity and enhance food and nutrition security in the farming communities by active farmers’ participatory action and through continues farmers’ capacity building at Loko Abaya District, Sidama Zone, SNNPR State. The conservation tillage practices involved were included, (1) ripper + fertilizer (R+F), (2) ridger + fertilizer (Rg+F), (3) conventional + fertilizer (C+F), (4) conventional without fertilizer (C–F), (5) ridger + fertilizer + intercropping (Rg+F+I) and (6) ridger + intercropping without fertilizer (Rg+I–F). After harvesting at least 30% of crop residues were retained on all conservation tillage plots, while from conventional tillage plots crop residues were completely removed. The vegetation on the plots was killed by 2-4-D herbicide 2-4 weeks before plating. Then the plots were prepared according to the treatments by hoe culture. Conservation tillage practices (ripper, ridger and ripper +F+ I) resulted in significantly higher grain and Stover yield as compared to the two conventional tillages (C+F and C-F). For instance, ripper with fertilizer (R+F) improved maize grain and maize stover yield by 50.0% and 29.4%, respectively as compared to conventional with fertilizer (C+F) practices. While ripper with fertilizer (R+F) improved maize grain and maize stover yields by 157% and 76.3%, respectively over conventional without fertilizer (C–F) practices. The grain and stover yield were significantly (p<0.0001) varied among peasant associations (villages), perhaps related with the differences in inherent soil characteristics and farmers management practices rendered. For instance Dessie, Jirmancho and Sala Kebado peasant associations (villages) recorded 5.2, 4.2 and 2.4 t ha⁻¹ grain yields, respectively. In addition to the economic yield benefits, farmers reported that their soil health has been already improved. Furthermore, conservation tillage practices have saved farmers’ from investing more labour, time and money for repeated weeding as reported by host farmers. The results demonstrate that farmers’ food security improved through improving yield from unit plot of land through adopting conservation tillage practices. Therefore, we suggest the scaling up these conservation tillage practices to wider farming communities and enhance farmers’ capacity through continues training and field demonstrations.

**Keywords:** Conservation agriculture, land degradation, farmers’ participatory action research, grain yield
Opportunities and Challenges for Wildlife Conservation and Ecotourism Development: The Case of Alatish National Park, Northwest Ethiopia

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ABSTRACT

Wildlife continues to be lost at a rapid rate across the planet despite the fact that ecotourism has widely been promoted as an appropriate means for conservation of natural resources. The general objective of this study is to assess the opportunities and challenges for wildlife conservation and ecotourism development. Mixed research approach was devised and cross sectional research design was employed. Questionnaires, FGDs, Interviews and Observation Checklists were tools used for primary data collection. Secondary data were collected from related articles, researches and documents obtained from offices. To analyze quantitative data, descriptive statistical analyses of frequencies, percentage, mean and standard deviation were computed using SPSS version 16.0. The findings revealed that Alatish is an ideal ecological corridor for wildlife conservation and ecotourism development due to its spectacular undifferentiated geological features with variety and abundance of fauna and floras, and key historical and cultural attractions in the park’s vicinity as well. Opportunities for wildlife conservation are environmental policies of Ethiopia; attentions of international and national organizations towards wildlife conservation, the potential benefit of the park in terms of ecological and socio-economical significances. However, the habitat and wildlife of the Park can currently be described as badly degraded due to serious threat from a number of ongoing problems: huge amount of cattle of foreign nomads from Western and Eastern Africa, recurrent fire, shortage of seasonal water, unsustainable utilization of resources, conflict of interest over resource utilization of the park between host communities and foreign nomads, and lack of natural buffer zones. The research revealed that global increasing demand for ecotourism, government attentions for infrastructural development, the potential of the park to develop cross border tourism, and potential benefits of ecotourism for local employment are the opportunities to develop ecotourism development; nonetheless, there are challenges for ecotourism development like lack of basic infrastructures and facilities, inadequate promotion, extreme climatic variation, and lack of government bodies integration. The main conclusion drawn from the study is, being properly planned and managed, the park has the potentials for ecotourism development, an open air museum for wildlife conservation and act as a guard/green belt in preventing the expansion of Sahara and Sahel desert from adjoining Sudan region.

Key words: Ecotourism, Wildlife Conservation, Ecological Corridor, Opportunities, Challenges, Alatish National Park
Land Use/Land Cover Change and Its Effects on Bamboo Forest in Benishangul Gumuz Region, Ethiopia

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ABSTRACT

Benishangul Gumuz region was known as the land of lowland bamboo accounted for about 56 percent in Ethiopia. However, presently bamboo forest depletion has become a serious problem threatening the bamboo biodiversity and the people who depend on bamboo income. Previous studies mostly emphasize on mechanical, physical and biological characterization of the lowland bamboo. These studies rarely relay on measuring the trend and magnitude of bamboo deforestation. The purpose of this study is, therefore, to examine the rate and magnitude of bamboo deforestation and identify the driving factors of LU/LC change. Data for the study were obtained from geographic information system (GIS) with ground verification. To supplement the GIS and normalized difference vegetation index (NDVI) result, a random sample of 384 households was interviewed. In addition, key informants interview and focus group discussions were held to validate the required data. The result generally revealed the declining state of bamboo forest over the past 26 years. The 2006 year’s NDVI value shows that a household owned 3.846 hectares of forest land. This figure has declined to 2.027 hectare in 2012. This is equivalent to 1.819 hectare (52.704 percent) decline in forest land cover. Moreover, the survey result indicated that from 2009-2013, about a 0.014 hectares of bamboo forest was converted to agricultural land. An average, a household has converted an average of 0.081 hectares of forestland into agriculture land. Our evidence also shows that the lowland bamboo forest cover in the region has devastated due to anthropogenic and natural factors. This result implies that if the same trend continues, the available bamboo stock will vanish in shorter period of time. Therefore, quick rehabilitation and mass bamboo restocking policy shall be designed by the regional government in order to regenerate and conserve the lowland bamboo resources.

Keywords: Land use land cover, bamboo deforestation, GIS, NDVI, Benishangul Gumuz Region, Ethiopia
Economic Valuation of Composite Natural Resources through Travel Cost Method: The Case of Lake Tana. (An Issue of Non-Rivalry Resources Use, Recreational Value and Tourism)

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ABSTRACT

Lake Tana is a famous destination in Ethiopia for both domestic and foreign visitors. Although the recreation and tourism potential of the site is regarded as enormous, the value of the Lake through proper economic valuation systems and use of this information for better use of the resource remain missing. Thus, the main objective of this study was to estimate the recreational use value of Lake Tana and investigate the determinants of demand for recreation and tourism. The study employed Individual Travel Cost Method with Poisson regression model for count data generated from 180 samples of on-site survey. Result of socioeconomic characteristics shows that the site is well visited by males and those who have job, own business income source, higher education level, leisure time and low family size. The Truncated Poisson regression result indicated that visitors’ sex, education level, marital status, occupation, monthly income, leisure time, being in group and alternative sites were variables that significantly and positively determined visitation decisions. However, visitors’ recreation decision to the site was significantly and negatively determined by visitors’ total cost of visitation. The measure of responsiveness for recreation demand for a change in travel cost shows that price elastic demand while the income elasticity indicated that Lake Tana is normal good and in particular a necessity good. The estimation result shows that Lake Tana has huge annual recreational value of 17,579,345.52 USD and CS of 1,915,397.69 USD. The value attachment suggests that estimation of recreation value for Lake Tana is central component in the sustainable use and management of the resources for multiple purposes including its tourism paramount relevance. However, well controlled waste disposals and EIA, controlling a widely spreading invasive weed, effective revenue collection, strong regulatory practices on prices and tariffs are important considerations which need immediate interventions for better use of the Lake’s recreational services.

Keywords: Non-market valuation, Poisson model, Trip frequency, Truncated form, Total benefit, Consumer surplus
Impact of Water hyacinth (Eichhornia crassipes) on Water quality in the North Eastern part of Lake Tana, Ethiopia

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ABSTRACT
The intricate and unique structure of Eichhornia crassipes makes it one of the most resilient aquatic plants enabling it to infiltrate major water systems throughout the world. This study aimed at investigating the impact of water hyacinth on water quality in Lake Tana and its surrounding ecosystem. A total of 10 physico-chemical and biological Water quality parameters were measured and analyzed from 4 impacted and 1 non impacted sites during October 2012 to July 2013 in the months of post, dry and rainy seasons. Physico-chemical parameters measured were TDS, water temperature, conductivity, pH, transparency, dissolved oxygen, phosphate and nitrate. The data were subjected to one-way analysis of variance (ANOVA). There was significant difference at (p< 0.05) spatial variation in all physico-chemical parameters mentioned between the two habitats. The value ranged for TDS 66.73-160.01 ppm and 33.31-80.31ppm, water temperature ranged between 30.3 – 35.5°C and 17.9-24.4°C, dissolved oxygen 0.11-3.95mg/l and 4.26-8.45mg/l in water hyacinth infested areas and in open water respectively. Biological parameters measured were Chl-a, zooplankton and phytoplankton. Chl-a shows significant different at (<0.05) both in sites and seasons. A total of 8 zooplankton and 9 phytoplankton genus specimens belonging to 3 taxa were collected during this study period. The major zooplanktons were Rotifera. The abundance of zooplankton ranged from 7.69- 16.30 and 14.42-27.57 in water hyacinth infested areas and non-infested arear respectively. The major phytoplankton were Bacillariophyceae and their abundance is 6.49 -16.83 and12.42 – 25.57 in water hyacinth infested areas and non-infested arear respectively. It can be concluded that the presence of water hyacinth was found to have effect on the ecology of the lake and its utility. Therefore effective control of water hyacinth in Lake Ecosystem is important, in order to prevent both ecological and economic loss due to loss of biodiversity.

Keyword: Water quality, Eichhornia crassipes, Plankton, Physico-chemical parameter, proximate analysis
Optimizing Reservoir Operation Policy Using Chance Constraint Nonlinear Programming for Koga Irrigation Dam, Ethiopia

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ABSTRACT
One of typical problems in water resource systems modeling is derivation of optimal operating policy for reservoir to ensure water is used more efficiently. This paper introduces optimization analysis to determine monthly operating policies for five scenarios of predetermined cropping patterns for Koga irrigation scheme, Ethiopia. The objective function of the model was set to minimize the sum of squared deviation (SSD) from the desired targeted supply. Reservoir operation under different water availability and thresholds of irrigation demands has been analyzed by running a chance constraint nonlinear programming model based on uncertain inflow data. The model was optimized using Microsoft Excel Solver. The lowest SSD and vulnerability, and the highest volumetric reliability were gained at irrigation deficit thresholds of 20% under scenario I, 30% under scenario II, III and V, and at 40% under scenario IV when compensation release is permitted for downstream environment. These thresholds of irrigation deficits could be reduced by 10% for all scenarios if compensation release is not permitted. In conclusion, the total design command area of 7000 ha, denoted by scenario V, could be irrigated at maximum thresholds of 30% deficit irrigation with 100% reliability and without any vulnerability to water shortages. The developed model could be used for real time reservoir operation decision making. In this study system, attempt should be made to evaluate the technical performance of the scheme and introduce a regulated deficit irrigation application.

Keywords: Exceedance probability; Nonlinear programming; Performance measures; Reservoir operation policy; Sum of square deficit
Experimental Analysis of Solar Parabolic Trough Collector with Cavity and Tube Absorber for Water Heating

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ABSTRACT
A parabolic trough solar concentrator of aperture area of 1.2 m\texttimes{}2 m with concentration ratio of 15.5 has been designed, manufactured and the experimental analysis was performed with and without cavity absorber and the experimental analysis of solar parabolic trough collector with and without cavity absorber used for water heating. A 40mm\texttimes{}40mm steel square tube has modified to give a C-shape groove in one of its side to serve as a cavity tube absorber. The cavity absorber’s performance was compared with simple steel tube absorber of 25 mm external diameter using manual tracking mechanism. The experimental taken in the month of December, 2013 results have shown that the system with cavity absorber raised the temperature of water in the tank up to 88-90\textdegree{}C where as the system with simple a circular absorber has raised the temperature only up to 82-84\textdegree{}C. The daily average solar collector efficiency for the cavity system and the simple pipe absorber system were 25.6\% and 18.9\% respectively, whereas the temperature and efficiency difference between the system were 6\textdegree{}C and 6\% respectively. Hence, using a cavity absorber is preferable.

Keywords: - Solar Parabolic Trough Collector, Thermosiphon, cavity
Optimization of leakage power

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ABSTRACT
The power wasted by leakage current can no longer be ignored in submicron designs. As the size of transistors shrink, the amount of current due to leakage rises exponentially. In order to minimize the power lost due to leakage, techniques like power shut off (PSO) were developed. Till recently designers were using ad-hoc methods to implement PSO, which is time consuming and error prone, due to manual implementation. This is not feasible any more, as low power issues need to be addressed at every stage of design flow using multiple tools. As the industry moves to 65 nanometers and below, the challenges related to the design and manufacture of low-power products have increased exponentially. In response to these challenges, the Common Platform technology collaborators and Cadence Design Systems have developed a 65nm low-power reference flow using the Si2 Common Power Format (CPF) standard to provide a single specification of low-power intent throughout the flow. This paper explains how CPF (Common Power Format) methodology can be used to optimize leakage power effectively compared to ad-hoc methods and CPF enabled tools can be used to implement and verify that the low power features works seamlessly throughout the design flow. The paper will illustrate how the specification of design features such as Power Shut Off (PSO), State Retention (SR) Registers and Isolation (ISO) Cells can be inserted & verified and the advantages of using a CPF based flow over an ad-hoc solution.
Experimental Investigation of the Effect of Tilt Angle on the Dust Photovoltaic Module

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ABSTRACT
The accumulation of soiling (dust) on solar panels is natural and it can have a significant impact on the performance of PV systems in regions where rainfall is limited for a dry season of several months. This thesis investigates the effect of tilt angle on accumulation dust PV module on energy production and presents a module for predicting soiling losses for eight different tilt angles (0°, 5°, 11.6°, 15°, 21.5°, 25°, 30°, and 35°) including the latitude of Bahir Dar city (11.6°) and the tilt angle of 10Kw hybrid solar power plant PV module which is installed in Bahir Dar university. The outdoor experimental data have been recorded. Particularly, the performance of the clean panel has been compared with the corresponding of the soiled panels under similar tilt angle for four days for two different tilt angles using four similar PV modules which have 55w output power. The experiment has mostly conducted under clear sky, and different atmospheric conditions (e.g. ambient temperature, humidity, wind velocity etc.) each time, while the experiment read 4 measurements per an hour (approximately one read per 15 minute). The study has shown that during the experimental investigation period there was total loss due to soiling of approximately 32.32% and around 4.8KWh/m² total energy has been absorbed at 0° tilt angle. Modules at tilt angle of 11.6° and 21.5° tilt angles the total insolation loss were 21.92% and 16.78% respectively because of dust, but they have almost similar energy has been gained around 5.3KWh/m². However, at 25° tilt angle had a least insolation loss and largest amount of energy absorbed when compared to the remaining seven different tilt angles; it has only 10.77% of insolation loss and 5.7KWh/m² of energy has been absorbed. The remaining tilt angle where for 5°, 15°, 30° and 35° the total insolation loss were 25.45%, 19.08%, 14.20%, and 12.54% and also the total energy absorbed were 5.08KWh/m², 5.52KWh/m², 5.2KWh/m² and 4.59 KWh/m² respectively. Thus, soiling effect has present at any tilt angle, but the magnitude is evident: the flatter the solar module is placed the more energy it will lose.

Key words- Solar PV, soiling, tilt angle, insolation loss
The impact of sedimentation and climate variability on the hydrological status of Lake Hawassa, South Ethiopia

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ABSTRACT

Lake Hawassa is a topographically closed lake in the Central Main Ethiopian Rift Valley. The water level of this lake has been rising significantly with an average rate of 4.9 cm/year over the study period (1970-2010). The cause of this rise is not yet sufficiently investigated. The main target of this study is to investigate causal variables for lake level variability in general, and its resultant rise in particular. The study is based on two main hypotheses. The first is concerned with the effect of climate variability on the lake level variability; and the second is related to the effect of sedimentation on the storage capacity of the lake. The first hypothesis (the effect of climate variability) was investigated through the application of diverse statistical techniques. It comprises the coherence analysis to study the linear relationship between the 3.4 ENSO index and lake level changes. A sequential regime shift algorithm was employed to investigate the variations in the mean values of some selected hydro-climatic variables. Trend test was also used to investigate the variability of the hydro-climatic variables overtime. A simple water balance approach was applied to simulate the lake level variability so as to examine how the model behaves throughout the study period. The second hypothesis (the effect of sedimentation) was approached by conducting a new bathymetric survey. The result of the new survey was compared with the existing bathymetric map of 1999. The result of the coherence analysis between the monthly lake level changes and the corresponding changes in the ENSO index reveals that the two variables have significant linear relationship over frequencies ranging from 0.13 to 0.14 cycles/month or 1.56 to 1.68 cycles/year. This corresponds to a dominant average periodicity (coincident cycle) of about 7.4 months. Furthermore, the result of sequential regime shift detections show that most of the significant change points coincide with the occurrences of ENSO events and climate shifts. Generally, the lake level tends to be high during and low during La Niña years. The typical example is the coincidence of extreme historical maximum lake level to the strongest event of the century that occurred in 1997/98. The coincidence of climate regime shift in the Pacific Ocean in 1976/77 with an equivalent regime shift in the lake level and rainfall records of this period is considered as additional evidence. Comparison of the two bathymetric maps shows that the average accumulated sediment between the years 1999 and 2010 estimated as 14 ± 5 cm or 13.3 x 10⁶ m³. Assuming a constant rate, the mean annual average rate of sedimentation in the lake is about 1.2 cm/year or 1.1 x 10⁶ m³. Accordingly, the mean annual reduction in storage capacity of the lake due to siltation is 0.08%.
Challenges of Konso Indigenous Soil and Water Conservation Practices the Case of Segen Zone, Southern Ethiopia

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ABSTRACT
Farm households in Ethiopia have developed a variety of SWC practices over time. From that Konso peoples are very well known for their impressive ISWC practices, but others the surrounding peoples didn’t practices SWC activities as Konso people. Therefore, this study was conducted to assess the Challenges of Konso Indigenous SWC Structures Practices to the Study Areas. The cross sectional data was collected from 280 households (240 adopters and 40 non-adopters proportionally). A bulk of primarily empirical data was collected by employing survey questionnaire for quantitative analysis. The study findings were disclosed using descriptive statistical tools such as frequency, mean, standard deviation, t-test, chi-square test, and for regression analysis the study employed Binary Logistic regression model where appropriate. Further, focus group discussion, key informant interview, observation and measurement techniques were used to gain the relevant qualitative data. According to the findings indigenously practiced physical SWCS on the study area were Kawata (Bench terrace (Konso)), Mona (crop residue with soil embankment (Konso)), Mona (Ridge basin (Konso)), Harta (Konso cultural rain water harvesting pond), Dura (Stone bund (Burji)), Haqanta Deze (Cutoff drains/ Diversion ditch/embankment (Burji)) and Diqanta Deze (Soil bund (Burji)) were practiced and the agronomic ISWC practices on the study area were Crop rotation (both), Fallowing (Burji and some Konso), Growing legumes (both), Early plowing and sowing in dry time (Burji), Mulching (Konso) and Mixed-cropping systems (Konso and some Burji) were practiced. The descriptive analysis suggests that adopters and non-adopters differ significantly in some proxies; Among the selected challenges related to each practice of soil and water conservation structures variables, the major challenges in the study area were labor intensive, time consuming, difficult to turn Oxen during ploughing, source of construction material problem, it reduces farmlands, costly and it’s difficult to implement technically respectively in sequentially. According to the study Analysis Results on the Determinant Factors that Inhibiting to adopt Konso’s Indigenous SWC Practices to the Surrounding Areas; Topography, Proximity, Income, Off-farm economic activities, Awareness gap on natural resource degradation measures, Using crop residue, Tillage practice, Extension service, indigenous knowledge to transfer to the generation and ISWC knowledge sharing field program are significant factors that affecting negatively the adoption of KISWCS to the bordering area. The result from binary logistic analysis finds that farm households with Tree planting on farmlands is found to be significantly associated with the adoption of SWC positively and having farmland certificate, HH age <15 years, Average land holding with a number of parcels of fragmented and scattered farmlands, Annual average Income from crop by applying chemical fertilizers and Fallowing were found to be significantly associated with the adoption of ISWC negatively. Therefore, the program aimed to upscale of KISWCS practices in the study area could be successful if these all factors are taken into considerations.

Key Words: Segen Zone, Farm households, ISWCS, Adoption, Adopters, Non-adopters, Challenges, Bordering/Surrounding area
Offset Solar Concentrator for Cooking Purpose

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ABSTRACT
Energy for cooking is one of the basic uses of energy in many parts of our globe. Many developing countries use fuel wood as energy sources for cooking, backing and heating thus leading to environmental pollution, deforestation, ecological deterioration and consequent drought and famine. Solar energy can be one important alternate energy source if, even, a portion of it is harnessed for cooking applications. For efficient utilization of solar energy, an offset type of concentrating collector called scheffler was designed and manufactured for a cooking purpose having major and minor diameters of 90 by 80 cm respectively. It was tested for its thermal performance following standard testing procedures of the American society of agricultural engineers (asae) and the system was found useful with an encouraging results. Maximum temperature of 94⁰C was achieved in 25 minutes on the water in the cooking vessel. The standardized cooking power for a temperature difference of 50⁰C was found to be 40 w.

Key words- Scheffler, ASAE, cooking power, concentrator
Dye Sensitized Solar Cells Using Natural Pigments from Five Plants and Quasi-Solid State Electrolyte

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ABSTRACT

Dye-sensitized solar cells (DSSCs) were fabricated using natural dyes extracted from flowers of Amaranthus caudatus, Bougainvillea spectabilis, Delonix regia, Nerium oleander, Spathodea campanulata and a mixture of the extracts. The photoelectrochemical cell (PEC) performance of the DSSCs of these dyes showed fill factors mostly higher than 50%, the open circuit voltages ($V_{OC}$) varied from 0.45 to 0.55 V, and the short circuit photocurrent-densities ($J_{SC}$) ranged from 0.013 to 1.82 mA cm$^{-2}$. High open circuit voltage ($V_{OC} = 0.55$ V) and short circuit photocurrent-density ($J_{SC} = 1.82$ mA cm$^{-2}$) were obtained from the DSSC sensitized by the ethanol extract of flower of Amaranthus caudatus. The power conversion efficiency of the DSSC with the ethanol extract of Amaranthus caudatus flower reached 0.61%. The PEC performances of DSSCs of mixed dye solutions were also investigated. However, the mixed extract does not show any synergistic photosensitization compared to the individual extracts. Instead, the cell sensitized by the ethanol extract Amaranthus caudatus flower alone showed the best performance. The devices showed incident monochromatic photon-to-current conversion efficiencies (IPCE) varied from 4.7% to 52%. The results from the IPCE data are consistent with the results from the current density-voltage (J–V) curves.

Keywords: dye sensitized solar cells, natural pigments, quasi-solid state electrolyte
Assessing the Impact of UNESCO biosphere reserves on forest cover change
The case of Yayu Coffee Forest Biosphere Reserve in Ethiopia

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ABSTRACT
The Afromontane rainforest of Ethiopia is under the threat of deforestation and forest degradation, despite its significance as one of the only homes for wild populations of coffea arabica. One of the management initiatives was the UNESCO forest Biosphere Reserve (BR) aimed at strengthening policy and regulatory actions among local, regional and global governments and reconciling conservation with local development to monitor forest coverage changes. Assessing the impact of BR forest management and conservation on location, time and intensity of forest disturbances through Man and Biosphere (MaB) programme and REDD+ activities is important for regulatory actions. Empirical evidence on the achievement of this programme was not documented so far. This study is aimed at identifying the roles and assessing spatiotemporal impacts of this BR, together with measuring forest cover change dynamics and the drivers of such change in Yayu Coffee Forest BR of Ethiopia. Using multi-temporal Landsat datasets with in-situ field survey, the study employed BFAST monitor to detect historical forest disturbances and mobile devices to signal changes and collect the relevant data from households. Forest cover change was analysed both spatially (within the BR zones, and between the BR area and the leakage belt), and temporally before and after the implementation of the BR. Qualitative analysis on the role of the BR in tropical areas indicated that progresses in reducing deforestation were observed in areas where MaB aims were appropriately enacted. Landsat image analysis of the study revealed that transition zone has more deforestation rate than both buffer zone and core area within the BR, while relatively high deforestation rate was observed in the leakage belt than in the BR area. After implementation of the BR, average annual deforestation rate was declined from 0.29% to 0.16% in the BR area, and from 0.71% to 0.6% in the leakage belt, respectively, indicating the progress of BR program in reducing deforestation. Farm land expansion, mismanagement of coffee forest, access to forest, road and market were observed as the main drivers and underlying causes of forest cover loss. The findings of the study imply that BR efforts with MaB program and REDD+ activities have enhanced forest cover protections and carbon emission reductions in the study area. Therefore, promoting these initiatives at the local level is important for biodiversity conservation and climate change mitigation strategy of the country.

Keywords: UNESCO, biosphere reserve, deforestation, remote sensing, BFAST monitor, Yayu, coffee forest
Assessment of Climate Variability Context and Local Farmers’ Adaptation Strategies in Alaba Special Woreda, Ethiopia

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ABSTRACT
The main purpose of this study was to assess climate variability context and local farmers’ adaptation strategies in the Alaba special Woreda (district) of southern nations and nationalities regional state of Ethiopia. The mean monthly Precipitation data of 24 years (1989 up to 2012) was collected from National Meteorological Agency and socio-economic data was collected from 184 sample respondents selected using stratified sampling techniques. The Precipitation data was analyzed by transforming into standard precipitation index. The socio-economic data was also analyzed by using descriptive statistics. The study result manifest that the district is characterized by its recurrent drought and flood occurrence for the last two decades. It was assured that 58.33% of the years under investigation were characterized by drought occurrence with magnitude of one to four months in each year. On the other hands, the flooding was occurred in every year with magnitude of one to four months. To escape from adverse impacts of climate variability, the local communities developed proactive and reactive adaptation strategies. Inadition to the local community effort, the government of the country has been implementing watershed management projects to reduce the negative impacts of the extreme events of climate variability. In spite of having several local adaptation strategies, the smart adaptation strategies should be identified and scalped up.

Keywords: Adaptation strategies, Climate variability and Alaba Special Woreda
Structure, Diversity, Carbon Stocks and Management of Trees in Parkland Agroforestry Practices in the Central Rift Valley of Ethiopia

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ABSTRACT
Among several agroforestry practices in the Central Rift Valley (CRV) of Ethiopia, Acacia tortilis and Faidherbia albida dominated parkland agroforestry practices are common. But structure, diversity and carbon stock status of these parklands were not well-studied. A study was conducted to evaluate these parameters in the two study areas, in Debre Zeit and Bulbula. After reconnaissance survey tree inventory was carried out on 59 plots of sizes 5000 m$^2$ in the two selected sites. For woody species that have ≥5cm diameter, tree height, diameter at breast height (dbh) and crown diameter were measured and their species recorded. Tree density, basal area and canopy cover were computed to characterize structure of tree communities. Additionally, species diversity and carbon stocks were determined. Carbon stocks in the biomass were estimated by allometric equations, and soil organic carbon (SOC) was determined at 0–30 cm depth. Results showed that there was higher tree density (15.7 trees/ha), canopy cover (7.4%) mean aboveground biomass (AGB) (9.3 Mg/ha) and lower number of trees (5) in Bulbula when compared to Debre Zeit, the corresponding figures of which were 7.1 trees/ha, 2.4%, 5.5 Mg/ha and 7 respectively. Below ground biomass of the trees was estimated as 25% of the AGB. The SOC in Bulbula ranged between 5.7 Mg to 22.4 Mg/ha with a mean of 11.25 Mg/ha, while in Debre Zeit it ranged from 16.1 Mg to 23.3 Mg/ha with a mean of 19.8 Mg/ha. A significant difference was found in the density, canopy cover, tree height, dbh, and SOC among the two parklands. The structure, species diversity and carbon storage in the studied parklands are lower suggesting that there is a room for increasing tree component in the future. To realize this, there is great prospect and willingness from farmers’ side to further increase the woody component of the parkland agroforestry, which is required to enhance their role in sustainable crop production, increased benefits from trees and contribution towards climate change mitigation and adaptation.

Keywords: Bulbula; Carbon stock; Debre Zeit; Density; Species diversity; Parkland agroforestry
Analysis of Hydroclimatic Trends in Guder Sub-basin, Upper Blue Nile River Basin

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ABSTRACT

This study focused on analyzing the hydrological and climatic trend for this 21st century in the case of Guder sub-basin, Ethiopia. Climate and stream flow scenarios were developed to extrapolate data that was used for detecting trends in hydroclimatic series. Climate projection was made for five stations by down scaling the HadCM3 output for A2a and B2a emission scenarios using Statistical Downscaling Model (SDSM) calibrated with the National Center for Environmental Prediction (NCEP) reanalysis data. Hydrological simulation was made using SWAT model to produce synthetic stream flow data for the developed scenario. The synthesized climate and stream flow data were tested for long-term trend using Mann-Kendall statistical test and the magnitude of the trend was quantified by Sen’s slope estimator. The result showed that precipitation in the sub-basin might significantly (α = 0.05) increase at a rate of 0.283 mm/year under scenario A2a but insignificantly increase at a rate of 0.022 mm/year under Scenario B2a during the year 2001-2099. Temperature generally may show significant positive trend under both emission scenarios. Maximum temperature showed increase at annual rate of 0.0217 °C for A2a and 0.0171 °C for B2a whereas minimum temperature exhibited increase at 0.0064 and 0.0038 °C per year under scenario A2a and B2a respectively in this century. The corresponding stream flow also showed a significantly (α = 0.05) increasing trend with a change rate of about 0.947 MCM/year for scenario A2a and insignificantly increasing change of rate of 0.105 MCM/year and B2a respectively. The general increase in precipitation and stream flow may favor the agriculture, hydropower generation and water supply in the study area. However, the increase in temperature may have significant impact on these sectors especially the agriculture. Therefore, appropriate water management policies and strategies that focus agro forestry practice, soil moisture conservation, and rainwater harvesting have to be implemented.

Keywords: Guder sub-basin, Hydrological trend, SDSM, SWAT model, Mann-Kendall
Proximate Analysis and Determination of Heavy Metal Concentration from Water and in Common Fish Species in Lake Tana

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ABSTRACT

Three main fish species commonly utilized by commercial gillnet fishery from Lake Tana are Labeobarbus species, C.gariepinus and O.niloticus. As fish constitute an important part of human diet, it is imperative to examine the quality and safety aspects of fish that are of particular interest. Fish body composition is affected by exogenous and endogenous factors. A wide range of heavy metals are continuously introduced into the aquatic environment mainly due to anthropogenic pollution and hence accumulated in fish tissue. As matter of aforementioned facts, this study was aimed to investigate the proximate composition of often used fish species, and determined heavy metal (Cr, Cd and Pd) concentration of the common fish species and habituated water of Lake Tana. Six sites were systematically selected from Lake Tana. The selections of the sampling sites were based on their proximity to expected anthropogenic emission sources. A total of 72 fish specimens were collected along with six samples (replicated three time per site) water of Lake Tana in February 2014. At the spot of sample collection, measurements for temperature, pH, electrical conductivity, and total dissolved solids. Both fish and water samples were transported to Food Science and Nutrition laboratory under cool and aseptic conditions using ice box. Samples were dried at 60 °C for 72 hrs, pulverized in a mortar, and stored in polyethylene bag until analysis for proximate composition and heavy metal concentration. Analyses were made based main effects: location, sex and species. Proximate composition was determined following the procedure of AOAC while heavy metals were wet digested and estimated using GFAAS. Data were analyzed using factorial treatment arrangement of ANOVA. There was significant variation between sex, location and species with regard to nutritional value. Generally, female fish had higher nutritional value as compared to their counter male. Proximate composition significantly varied between different sampling locations. O. niloticus had significantly highest levels of protein(18.82%) compared to both C. gariepinus (15.2%) and L.intermedius(15.44%) fish species. However, L.intermedius had significantly highest fat content (2.36%) and gross energy (83.1Kcal/100g) relative to both L.intermedius and C. gariepinus. Likewise there was significant variation on heavy metal accumulation between different sampling location and fish species. The trend of heavy metals accumulation were in the order of magnitude of Cr > Cd > Pd in all sampling location and fish species. The heavy metal concentration and physicochemical variables of Lake Tana were within the range of the recommended limit of WHO (2008). Anthropogenic pollution of the lake seems to pose no threat of heavy metal accumulation regarding the studied fish species. The heavy metal content of the studied fish species remained in line with food safety and quality regulation of WHO (1993) guideline for consumption. Hence, it was concluded that the consumption of L.intermedius, C. gariepinus, O. niloticus from lake Tana are good sources of protein and other nutrients and may not lead to health hazards induced by heavy metals.

Key words: Lake Tana, L.intermedius, C. gariepinus, O. niloticus, Proximate composition Heavy metals Physico-chemical Bioaccumulation, Food safety
Utilization of biowaste from Awaday town as substrate for growing mushrooms (Pleurotus spp.)

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ABSTRACT
The Awaday town is a major marketing place of khat in Ethiopia. The town produces a large quantity of Khat leftover waste daily that makes the major share of municipal solid waste from that area. The increasing production and marketing of Khat is resulting in increased amount of wastes that can be effectively utilized by the farmers. Therefore, this study was carried out in 2014 at Haramaya University soil microbiology and mushroom research laboratory, Eastern Ethiopia, to evaluate the growth and performance of three oyster mushroom species: Pleurotus ostreatus, Pleurotus ostreatus florida and Pleurotus Sajocaju on khat leftover substrate. The khat left-over was obtained from Aweday city municipality. The moisture content of khat solid medium was adjusted to 55 - 60% and was filled in plastic bags (16 cm x 33 cm in size). The plastic bags were then autoclaved at 121ºC for 90 min. After inoculation, the bags were kept in laboratory in absence of light and ventilation. The moisture content of the substrate was maintained at 90% up to seven weeks of harvesting. This experiment had three treatments. The treatments were laid out in complete randomized design (CRD) with eight replications. The result of the experiment indicated a significant difference (P <0.05) of all investigated parameters among the three oyster mushroom species. Pleurotus sajor caju gave significantly higher number of primodial formation (NPF), fresh weight fruiting body (FWFB) and dry weight fruiting body (DWFB) production than the rest of tested oyster mushrooms. The highest FWFB was obtained from Pleurotus sajor caju (422.36 g/kg of dry substrate). The lowest FWFB (221.20 g/kg) was observed from Pleurotus oestreatus florida. A decline of FWFB, DWFB and NPH was observed with increasing time of harvesting. Biological efficiency (BF) of Pleurotus sajor caju was significantly higher than those obtained from other two oyster mushrooms, although the data indicated lowest BF when compared with previously reported for oyster mushroom. For this result, we can conclude that khat leftover is the relatively suitable substrate for Pleurotus sajor caju cultivation. This technology can be utilized by farmers and produce protein rich mushrooms and utilize the available organic wastes. Further research work would be recommended on different methods of pretreatments of khat leftover and optimal formulation of suitable substrate by adding different high nitrogen containing materials to improve the productivity on khat leftover.

Key word(s): Biological efficiency, Khat leftover, Oyster mushroom, Haramaya
Comparative Studies on Proximate, Nutritional, Mineral and Antinutrient Composition of Bamboo Trees Shoot and Leaves of Sweet Potato harvested from South West of Ethiopia: Potential Benefits in Human Nutrition and Health

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ABSTRACT
Leaves of sweet potato (Ipomoea batatas) and bamboo tree shoots grown in Tepi and masha area respectively were studied for their phytochemical screening, mineral composition, and proximate composition using standard analytical methods. The phytochemical screening revealed the presence of alkaloids, flavonoid, terpenoids, saponins, quinones, phenol, tannins, amino acid and proteins in the leaves. The proximate composition of leaves of sweet potato and bamboo shoot revealed the presence of ash (13.74% and 14.41% ,dry weight, DW), crude lipid (3.8% and 2.25%, DW), crude fiber (12.62% and 18.81% DW), crude protein (6.37% and 8.04%, DW) and carbohydrate (69.62% and 73.14%,DW respectively. The minerals composition also revealed potassium (6324.101mg/100g and 6324.101mg/100g), sodium (32.079mg/100g and 19.164mg/100g), calcium (320.125mg/100g and 60.449mg/100g), magnesium (390.0mg/100g and 118.75mg/100g), copper (1.828mg/100g and 1.429mg/100g), zinc (5.647mg/100g and 5.647mg/100g), iron (73.881mg/100g and 13.594mg/100g) and manganese (9.590mg/100g and 2.895mg/100g) respectively. The antinutrient content of the leaves of sweet potato and the bamboo shoot indicated very high amount of tannin (116.94mg/100gm and 786mg/100gm) and phytate (574.34mg/100gm and 308mg/100gm) respectively. They contained lower amount of cyanide (3.91mg/100gm and 2.87mg/100gm) and saponin (1.74mg/100gm and 1.54mg/1100gm) respectively. These results revealed that the leaves of sweet potato (Ipomoea batatas) and bamboo shoots contained essential nutrients which compare favorably well with those of wild edible leaves in literatures.

Keywords: Mineral composition, proximate composition, bamboo shoot, Ipomoea batatas
Poultry Value Chain Analysis in Dale Woreda of Sidama Zone, Southern Ethiopia

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ABSTRACT
This study was carried out to analyze poultry value chain in general and to map poultry value chain actors, estimate the marketing margin along the value chain, identify rules, service delivery and constraints of poultry value chain in Dale Woreda of Sidama Zone, SNNPRS in particular. Primary data were collected from 162 poultry actors composed of randomly selected producers (100), purposively selected collectors (28), retailers (6), processors (18), accidentally selected consumers (10), purposively selected focus group (3) and key informant (6) discussants. Both qualitative and quantitative data were collected using individual interview, focus group and key informant discussion and personal observation methods. The collected data were analyzed using qualitative and quantitative analysis. The main findings revealed that producers, collectors, retailers, processors and consumers were actors while Woreda Office of Agriculture, Awassa College of Agriculture, Awassa Agricultural Research Center, Omo Micro Finance Institute, Poultry Multiplication Centers, Regional Bureau of Hotels and Tourism and ACDIVOCA were support organizations involved in poultry value chain development in study area. Three birr and twenty-four cents, 6.6, 9.28 and 48.7 birr per chick was the marketing margin of producers, collectors, retailers and processors respectively. Findings also revealed that formal rules mainly access to credit, exotic breed package and tax; informal rules including seasonality, consumers' preference for specific quality attributes of poultry, access to information, education and financial and non-financial services were governors of the action of poultry value chain participants. Lack of chain specific input supply, poor husbandry practices and weak bargaining capacity of producers, lack of market transparency and poor market facilities, lack to understand consumers' preference and influence of rules and services on poultry value chain development were the key constraints for poultry value chain development in study area. In order to improve the performance of poultry sector in study area, it was recommended that all actors and support organizations should work in coordination and cooperation and Woreda Office of Agriculture and Rural Development should play the lead role of coordination of actors and support organizations.

Key words: Poultry, value chain
Staphylococcus: Epidemiology and its Drug Resistance in Cattle, Food Chains and Humans in Central Ethiopia

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ABSTRACT

The aim of this study was to quantify prevalence, determine associated risk factors in lactating dairy cows and identify Staphylococcus species and determine the frequency of its resistance to various antimicrobial agents in cattle, food, materials and humans in central Ethiopia (Assele, Addis Ababa, Bishoftu, Holeta and Adama). In order to isolate and identify Staphylococcus species from abattoir and dairy cow farms, a cross sectional study was conducted from October 2013 to May 2014. The results showed that the prevalence of Staphylococci spp. were 47.1%(140/297) udder milk, 58%(29/50) tank milk of the selected dairy farms, 34.4%(17/50) cow bucket swab, 38%(19/50) farm tank swab, 38%(19/50) hands and 70%(12/17) nasal swab of milkers, 38.5%(139/361) carcass swab, 37.8%(14/37) knife swab, 48.6%(18/37) slaughter line swab, 37.8%(14/37) hand and 46.7%(7/15) nasal swab of butchers with overall prevalence of 42.8%(428/1001). In addition, the prevalence of Staphylococci spp. were 48.6%(88/181), 47.7%(92/193), 40.7%(103/253), 40.2%(78/194) and 37.2%(67/180) in Assele, Addis Ababa, Bishoftu, Holeta and Adama respectively. The results of biochemical characterization of these isolates showed that S. aureus was the most frequently isolated species among different samples types accounting for 172 (17.2%) the population studied followed by S. hyicus 82(8.2%); S. intermedius 74(7.4%) and CNS 96(9.6%). Risk factors analysis revealed that the prevalence of Staphylococcus significantly differed with the sample source (P < 0.05) and sample type (P < 0.05) in central Ethiopia. Prevalence of Staphylococcus were significantly higher (p<0.02) in farms with prevalence 45.9% and 39.4% respectively. Sample types also influences significantly the prevalence of Staphylococcus. Similarly risk factors analysis for Staphylococcus from udder milk revealed that prevalence significantly differed with the family size (P < 0.05), breed (P < 0.05), income level (P < 0.05), herd size (P < 0.05) and lactation stage (P < 0.05). In the antimicrobial resistance trials, out of 428 Staphylococcus species isolates 244 (50.9%) were subjected to antibiotic susceptibility tests. 97.5% (238/244) strains revealed antimicrobial resistance properties to at least one of the antibiotics tested. A large proportion of the isolates were resistant to Penicillin G (10units) (90.2%), Cloxacillin (5µg) (70.9%), and Erythromycin(15µg) (70.9%), Nalidixic Acid(30µg)(59.8%), Cefoxitin(30µg)(53.7%), Vancomycin(30µg)(52.9%) and Nitrifurantoin(50µg)(47.5%). Only a small proportion of the isolates from total sample were resistant to Ciprofloxacin (5µg)(1.6%) and Gentamycin(10µg)(2%). This study revealed that, although the prevalence of Staphylococcus species have no statically significant difference among geographic region of the area sampled, antimicrobial resistance to the isolates have statically significant difference between them except for pencillin G, tetracycline, Streptomycin, Gentamycin and Sulphamethoxazole-trimethoprim. In addition, there was no statistically significant difference (p>0.05) between source and type of samples in determining resistance pattern to each antimicrobial except for Amoxicillin, Nalidixic acid, Streptomycin and tetracycline. Multidrug resistance was also observed in 218 (89.3%) of the total isolates. Staphylococcus became almost resistant to β-lactams and tetracycline. Hence, antimicrobial susceptibility should be conducted before treating dairy cows. Consequently, reduction in transfer of resistant Staphylococcus strains between humans and animals could possibly be made.

Key words: Staphylococcus, epidemiology, dairy farm and abattoir workers, dairy cow milk and beef carcass, equipment swab, antimicrobial susceptibility
Response of Chickpea to different planting Methods and Planting Densities under Dryland Condition

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ABSTRACT
Field study was undertaken at Kombolcha Agricultural College, in South Wollo Zone of the Amhara Region of Ethiopia during the belg season of 2012. The experiment was arranged in a split plot design and aimed to determine effect of three planting methods (flat planting, bed planting and ridge planting) and seven planting densities (33333, 285714, 250000, 222222, 190476, 166667 and 148148 plants ha$^{-1}$). Data was recorded on days to 50% flowering, days to maturity, plant height (cm), number of pods per plant, number of seeds per pod, 1000-seed weight (g), biological yield (kg ha$^{-1}$) and seed yield (kg ha$^{-1}$). Except plant height, all measured parameters were significantly affected by main effects planting methods and planting densities while the response of plant height was significant only to main effect of planting method. Among all measured parameters, only the number of pods per plant was significantly responded to interaction effect of planting method and planting density. The maximum significant seed yield (1187 kg ha$^{-1}$) was obtained from flat planting method. Similarly, the main effect of planting density gave maximum seed yield (1179.67 kg ha$^{-1}$) at 148148 plants ha$^{-1}$. Regarding treatment interaction, planting on flat land at density of 148148 plants ha$^{-1}$ gave maximum significant pod number per plant (81). Therefore, it can be confirmed that planting chickpea on flat land using density not exceeding 148148 plants ha$^{-1}$ would give maximum yield under belg season in the drylands area of northern Ethiopia.

Keywords: belg, kutaye, flat planting, bed planting, ridge planting, chickpea
Effect of Feeding Pulse Hulls in Concentrate Mixture on Nutrient Intake and Milk Yield of Dairy Cows

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ABSTRACT
In Ethiopia, the price of conventional feed ingredients and commercially formulated concentrate mixture are increasing at alarming rate from time to time. As a result, dairy farmers are facing critical problem. So, the present study was undertaken to assess the effect of feeding of non-conventional feed ingredients of field pea (Pisum sativum L.) and grass pea (Lathyrus sativa L.) hulls at different levels of inclusion in concentrate mixture on nutrient intake and milk yield of dairy cows. For the study, thirty lactating Jersey cows with similar range of body weight and first stage of lactation were selected from the herd maintained at Adaberga Research Station, West Shoa Zone, Oromia Regional State. Animals were blocked based on parity and milk yield under CRBD. There were 6 blocks having 5 animals in each and then the five treatments were distributed to each animal randomly. The five dietary treatments were: T¹ (control), maintained on native hay + concentrate mixture formulated with conventional feed ingredients (0% pulse hulls); T², T³, T⁴ and T⁵ were maintained on native hay + concentrate mixtures formulated with inclusive of 35% field pea hull, 50% field pea hull, 35% grass pea hull and 50% grass pea hull, respectively. Data were analysed using SAS software packages and Turkey's HSD multiple comparison technique was used for means separation. Results of the study revealed that the average DM, OM and CP intake (kg/h/d) were higher (P<0.01) as a result of feeding 35 and 50% field pea hulls and 35% grass pea hulls in concentrate mixtures as compared to the control. Milk yield was higher (P<0.01) as a result of feeding 35% field pea and grass pea hulls in concentrate mixture than the control. Therefore, it is concluded that alternative concentrate mixtures could be formulated by inclusion of 35% field pea and grass pea hulls in the concentrate mixture for dairy cows.

Key words: Dairy cows, Field pea hull, Grass pea hull, Milk yield and Nutrient intake.
Inclusion of dried ground sholla (Ficus sycomorus) fruits in layers diet on egg production, quality, fertility and hatchability of white leghorn layers

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ABSTRACT

The experiment was conducted at Haramaya University poultry farm in 2004 E.C. One hundred fifty six white leghorn (WL) chicken with similar body weight of 1021.7 ± 11.35 g (mean ± SD) and aging seven month were randomly distributed to 12 pens each with 13 hens and 2 cocks for feeding trial and kept in a deep litter housing system representing four treatments each with three replications in CRD. The treatment rations were formulated on an isonitrogenous (16-17% CP) and isocaloric (2800-2900 kcal/kg DM) basis. The treatment rations were formulated to contain different level of DGFSF with the percentage of 0 (T1), 7 (T2), 14 (T3) and 21 (T4). The experiment was designed to evaluate the effect of different levels of DGFSF inclusion in WL layers ration on egg production, quality, fertility, hatchability and profitability of partial budget analysis. Chicken were offered a weighed amount of feed and feed leftover was collected and weighed the next morning. Weight of experimental animals was taken individually at the beginning and at the end of the experiment. The experiment lasted for 90 days during which dry matter intake (DMI), laying performance and egg quality parameters were measured. Daily dry matter intake of birds fed diet consisting T1 (90.24±0.39g) and T2 (90.27±0.39g) was significantly (P<0.01) lower than T3 (92.00 ± 0.39g) and T4 (93.05±0.39). Daily mean body weight gain of hens fed T4 (0.59 ± 0.33) and T3 (0.52± 0.33) was significantly (P<0.05) higher than those of T1 (0.36±0.33) and T2 (0.38±0.33). The results of the experiment showed that there were no significant differences (P>0.05) among treatments in hen-day egg production (SEM= 0.94) and hen-housed egg production (SEM= 1.07), egg mass (SEM= 0.57), yolk diameter (SEM=0.013), shell weight (SEM=0.05). Similarly, Haugh unit, feed conversion efficiency, fertility, hatchability, embryonic mortality, chick length and chick visual score were not statistically different among the treatments. Results of Roche color reading revealed that eggs from hens fed T1 (1.78±0.077) and T2 (2.38±0.077) diet has significantly (P<0.001) lower yellowish yolk color than T3 (2.53±0.077) and T4 (2.81±0.077). Eggs laid by hens fed T1 diets has thinner egg shell thickness (0.31±0.002mm) than T2 (0.32±0.002 mm), T3 (0.32±0.002 mm) and T4 (0.32±0.002 mm). Day old chick weight of birds fed T1 diet (30.53±0.15g) was lower (p<0.05) than T3 (31.67±0.15g) and T4 (31.2±0.15 g). The result showed that feed cost slightly decreased with increasing levels of DGFSF and eggs were produced economically. Therefore, we concluded that DGFSF can be included up to 21 %, since this level of inclusion was more profitable and did not negatively affected laying performance and product quality.

Key words: Egg quality, Fertility, Hatchability, Ficus Sycomorus fruit, layer diet
Fermenter Technology Modification Changes Microbiological and Physico-chemical Parameters, Improves Sensory Characteristics in the fermentation of Tella: An Ethiopian Traditional Fermented alcoholic Beverage

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ABSTRACT
Tella is an indigenous, a home processed and commercially available traditional fermented alcoholic beverage in Ethiopia. It is a main source of income for low-income women in Ethiopia. Tella gets easily spoiled and causes economic loss, as result; brewed in small amount while there are many user of it in Ethiopian towns and cities. This study investigated effects of fermenter technology modification on microbiological, physicochemical parameters and sensory characteristic of tella brewed in both modified and traditional fermenters. Experiment was conducted using modified and traditional fermenters. Microbiological analysis was done for ingredients and the fermenting mashes at 12h interval using standard methods. Physicochemical parameters were determined. The physicochemical parameters consisted of pH, TA, Mash and environmental temperatures, Total carbohydrate, reducing sugar and ethanol content. Sensory evaluation was also performed for tella brewed in modified and traditional fermenters. Sensory parameters were appearance and color, aroma, taste, strength (alcoholic) and overall acceptability. Results indicated that Rhamnus prinoides and malt were the major sources of yeast and lactic acid bacteria respectively in ingredients. The counts of lactobacillus, lactococcus, yeasts and aerobic mesophilic bacteria showed increment during the first two phases in both fermenters but gradually decreased at phase IV in both fermenters. The counts of Enterobacteriaceae were high at day zero and not detected at phase II in both fermenters. Acetic acid bacteria were detected at the beginning of phase II in traditional fermenter but at phase III in modified fermenter. Total carbohydrate was 26.4mg/ml and 25.7mg/ml at day zero in modified and traditional fermenters respectively and reached 77mg/ml at phase III in modified and 78.1 mg/ml in traditional fermenter and then has shown decrement in next phases. Ethanol was detected at phase II in both fermenters and showed gradual increment with fermentation period. Aroma, taste and alcoholic strength were superior for tella brewed in modified fermenter. Using appropriate fermenter technology is important to brew tella with preferable sensory attributes, to make its brewing continuous, and generate continuous income.

Key words: Alcoholic beverage, modified fermenter, physicochemical parameters, sensory attributes, Tella.
Traditionally Used Milk Coagulant Plants in Agro-Pastoral Communities and Their Use for Cheese Making: the Case of Northeastern Ethiopia

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ABSTRACT
The increased demand of dairy products in Ethiopia coupled with the limited supply of calf rennet (Chymosin) which is costly and not affordable by rural farmers demands a shift to alternative milk coagulation means such as plants sources. Hence, this study aimed to identify traditionally used milk clotting plants in northeastern part of Ethiopia and examine the potential use of the most commonly used ones for commercial production of cheese. The study was conducted in selected ‘kebeles’ of Irob (Tigray) and Ab‘alá (Afar) districts and comprised of both questionnaire based field work and lab based analysis of plant extracts of selected species. Index method of ranking was used for the qualitative data such as frequency of use of the plants for clotting to select three most commonly used ones. Experimental data on milk-clotting activity (MCA), syneresis capacity (SC) and speed and cheese yield (CY) were compared with rennet, and the effect of concentration of crude extracts on milk clotting activity were schemed. The household survey revealed that respondents older than 35 years were significantly more knowledgeable about the milk clotting plants ($X^2= 10.4892, P < 0.05$, Irob and $X^2= 7.5002, P<0.05$, Ab‘alá) than the under 35 years indicating that the utilization of these plants for milk clotting has dwindled in the recent times. Conversely, the sex of respondents had no relation with plant knowledge ($X^2=0.0473, P > 0.05$, Irob and $X^2=0.1416, P > 0.05$, Ab‘alá). A total of 11 plant species were identified in both districts and the three most frequently used ones (Solanum incanum, Ficus carica and Rhus natalensis) were tested for their clotting efficiency. Accordingly, the highest Milk Clotting Activity (MCA) was obtained using crude juices of S. incanum ($1.51281± 0.096 \text{ u/ml}$) followed by F. carica latex ($1.50583± 0.051 \text{ u/ml}$), Chymosin ($1.13553±0.017 \text{ u/ml}$) and R. natalensis extracts ($0.45657±0.017 \text{ u/ml}$). The average SCs produced by calf rennet ($79.81±0.21 \%$) and S. incanum juice ($82.32±1.05 \%$) were similar while that of R. natalensis extract showed higher SC ($88.03±1.79 \%$). F. carica latex showed relatively lowest SC ($64.03±5.81 \%$) and this may be due to high water retaining property in the coagulum. The use of F. carica latex as a coagulant gave the highest curd yield ($347.11±7.11g/l of milk$) compared to chymosin ($285.69±4.40 g/l of milk$) and the extracts of the other two plants. Nevertheless, Application of R. natalensis extract as coagulant resulted in lowest fresh cheese yield (CY) ($206.16±9.50 \text{ g/l of milk}$) and this may be attributed to very high proteolytic property of the plant, indicating that it is relatively inconvenient in economic terms. The clotting activity of all the three plant extracts was significantly associated ($P<0.05$) with concentration of the coagulants. Based on the overall clotting characteristics, such as MCA, SC and CY, F. carica appears to be the best milk clotting plant and might substitute rennet for cheese making.

Key words: Calf rennet, cheese yield, Ficus carica, milk clotting plants, Rhus natalensis, Solanum incanum
Sheep Productivity Improvement in Eastern Ethiopia

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ABSTRACT

An experiment was conducted to evaluate growth and carcass traits of indigenous (Black-head Ogaden [B1] & Hararghe Highland [B2]) and crossbred (Dorper × B1 [B3] & Dorper × B2 [B4]) F1 lambs under different feeding regimens. The feeding regimens constituted feeding hay ad libitum supplemented with 150 g/head/day concentrate mix [D1] and hay ad libitum supplemented 350 g/head/day concentrate mix [D2]. The experiment was arranged as a 4 × 2 factorial (4 breeds and 2 levels of nutrition) and laid out completely at random. Hararghe Highland lambs had the highest (P < 0.01) TDMI (90.0 ± 1.4), g DM/kg W0.75 compared with B4. Lambs fed D2 had higher TDMI (P < 0.0001), TDMI per metabolic bodyweight (P < 0.01) than lambs fed D1. Dorper × Hararghe Highland had greater average daily weight gain (69.4 ± 4.1 g), empty body weight, hot (12.9 ± 0.5) and cold carcass weight (12.6 ± 0.5 kg) than did both B1 and B2. However, weight loss after chilling was higher (5.7 ± 0.3%) in pure Blackhead Ogaden compared with rest of lamb breeds. This study leads to the conclusion that crossing B2 with Dorper improved feed utilization, growth rate and carcass parameters, but crossing B1 with Dorper provided little benefit since the B1 tend to perform similar to the crosses in some economically important traits.

Keywords: Carcass, Crossbred, Indigenous, improvement, weight change
Effect of Sisal Foil Wrapped Milk Containers on Quality Parameters of Camel Milk Marketed in Borana Zone, Southern Ethiopia

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ABSTRACT
Recently, because of its outstanding performance in the arid and semi-arid areas of south-east lowlands of Ethiopia where browse and water availability are limited, pastoralists are relying on camel mainly for its milk production for a long period of time even during the dry season when milk from cattle is scarce. However, it is always consumed either fresh or in varying degrees of sourness of raw state without heat treatment and thus can pose a health hazard to the consumer. The study was designed to evaluate effectiveness of Sisal Foil Wrapped Milk Container in enhancing the shelf life of the camel milk that was transported long distance in Borana zone. Pastoralists were pre-informed to prepare clean and unadulterated fresh morning camel milk. Following standard procedure of Richardson (1985), samples of fresh morning camel milk were collected, transported and analyzed during the wet and dry seasons of the zone. Three treatments (Control, Unwrapped New Plastic Milk Container, and Wrapped New Plastic Milk Container) were intentionally designed with two replications based up on the systematical arrangement of the containers on public vehicle. Hence, the Primary Lactodency Meter Test indicated that the Specific Gravity of camel milk ranged from 1.020 to 1.022 at 20°c Lactodency Meter. At farm gate samples were negative for Alcohol Test that insured its freshness. All the samples in Wrapped Containers stayed negative for both Alcohol and Clot-on-Boiling Test at the terminal market, whereas, the rest were positive for Alcohol Test. Resazurin Test revealed that the entire samples didn’t show any significant variation in color change during the first 10min (p < 0.01). After one hour of incubation, however, sample in New Plastic Container Most Exposed to Sun Light was totally changed to pink followed by in Local Most Exposed Container that was changed to whitish pink only after 3hours of incubation. The sample in New Plastic Container Most Exposed to Sun Light cultured highest Microbial Load (6 x 10⁵) followed by sample in Local Most Exposed Container (4 x 10⁵) where as none of the sample in wrapped containers harbored significant load (4 x 10⁵).

Keywords: camel milk, marketed milk, milk container, milk quality and wrapping with sisal foil
Effects of Bradyrhizobia Inoculation on Growth, Yield and Yield Components of Cowpea Varieties (Vigna unguiculata (L.) Walp) at Hawassa, Ethiopia

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ABSTRACT
Declining soil fertility, especially deficiency of nitrogen is one of the major factors adversely affecting crop production in Ethiopia. Though the problem can be addressed through application of inorganic fertilizers, the unprecedented increase in the cost of fertilizer is increasingly limiting the use of this input. Increasing N-availability through Bradyrhizobium-legume symbiotic N-fixation process is a viable alternative for improving N-nutrition of crops. However, there is a need for identifying effective Bradyrhizobium strains compatible with specific varieties of leguminous crops. Therefore, this study was conducted to investigate the effect of Bradyrhizobium strains on growth, yield and yield components of Cowpea (Vigna unguiculata (L.) Walp) varieties at Hawassa. A factorial combinations of four treatments [three Bradyrhizobium strains GN100, GN102 and MB140] and a positive control], and five Cowpea varieties (Bole, Black eye bean, TVU, Assabot and Wonder) were laid out in RCBD with three replications. The plot size was a 2.2m x 3 m and cowpea seeds were planted with inter and intra row spacing of 50cm by 20cm respectively. Data on nodule number, nodule volume, nodule dry weight and agronomic parameters like shoot dry weight, leaf area index (LAI), plant height, number of branches, pods, seed per pod, grain yield, biomass yield, harvest index (HI), 100 seed weight, total plant N and some soil chemical parameters(OC%, P, N pH) were collected and subjected to ANOVA. Inoculation with Bradyrhizobium significantly increased the nodulation parameters, Agronomic performance, yield and yield components. Nodule parameters yield and yield components of the five Cowpea varieties inoculated with strain GN102 were significantly superior followed by GN 100 and MB 140. On Black eye bean and Assabot varieties, Strain GN102 increased the grain yield by 14 and 9%, respectively relative to the positive control. Cowpea varieties also varied significantly in their performance with respect to nodule parameters, yield components and total nitrogen content. Accordingly, Black eye bean variety performed best relative to the other four varieties. Bradyhizobia by varieties interaction effects were also significant in terms of yield and yield components. Compared to before planting, strain GN100, GN 102 and MB140 increased soil N by 51.6, 46 and 40%, respectively after planting. Despite the commonly reported non responsiveness of Cowpea for inoculation, the result presented here indicated the potential that exists to increase the yield of the crop through selecting and inoculating with effective Bradirhizobial strain.

Keywords: Biological N-fixation, Cowpea, inoculation, Nitrogen, nodulation and Soil fertility decline
Formulation of a Complementary Food Fortified with Broad Beans (Vicia Faba) in Southern Ethiopia

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ABSTRACT
Adequate nutritional intake enhances growth of children and decreases susceptibility to disease. Despite their high requirement of nutrients for growth and development, the diets of children in poor countries almost exclusively comprised of cereals or starchy root crops. Plant source food is deficient in key nutrients. Applications of food processing techniques like germination and fermentation both minimizes ant-nutritional factors and enhances nutrient intake and bio-availability. Laboratory based study was conducted at Hawassa University Food Science Laboratory and Ethiopian Health and Nutrition Research Institute Laboratory. The objective of the study was to formulate complementary diet following FAO/WHO/UNU’s recommendation of adding up to maximum of 40% legumes to cereal-based complementary food for young children. Samples were obtained from local market and bought in bulk. Barley and maize were soaked and roasted. Broad bean was processed by applying soaking, germination, and roasting. Four types of porridge were prepared by mixing broad bean as treatment and barley and maize as base food. Acceptance testing was conducted using mother child pair at Titecha Kebele of Sidama Zone. Laboratory result showed that processing significantly decreases phytate content of ingredients. There was significant increment in protein and iron content in 30% broad bean added sample. Sensory evaluation showed that participant children and mothers preferred the taste of 10% broad bean added porridge. All added broad bean porridges had overall acceptability to the maize-barley control. Thus, inclusion of processed broad bean can effectively be done to improve nutrient content and nutrient availability of traditional cereal-based complementary foods in this region of Ethiopia.

Key words: legumes, pulses, broad bean, phytate, Southern Ethiopia
Performance of *Mycobacterium bovis* antibody test for the diagnosis of bovine tuberculosis in Ethiopia

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**ABSTRACT**

**Introduction:** The intra-dermal tuberculin test is the standard test for the diagnosis of bovine tuberculosis [BTB] although it is not efficient in detecting all infected animals. This necessitates the need for a complementary testing scheme so as to maximize the detection of the BTB infection. The objective of this study was to evaluate *Mycobacterium bovis* [M. bovis] antibody test for the diagnosis of BTB.

**Methods:** A total of 459 [336 from dairy farms and 123 from abattoir] cattle were used for the evaluation of the test. Comparative intradermal tuberculin [CIDT] test, post mortem examination for TB lesion and mycobacterial culturing were used for the evaluation of the M. bovis antibody test. *M. bovis* antibody was measured using enzyme linked immunosorbent assay [ELISA] following the procedure described by the manufacturer.

**Results:** The sensitivity of *M. bovis* antibody ELISA was 50% at the cut-off value of 0.30 considering culture as a gold standard, while its specificity was 99%. On the other hand, receiver operating characteristics [ROC] analysis was performed and a cut-off value of 0.136 was proposed to be used in Ethiopian condition. At cut-off value of 0.136, the sensitivity and specificity of the test were 80% and 96%, respectively. The area under the ROC curve was 0.92. The agreements between *M. bovis* antibody ELISA and CIDT test was fair [k=0.254], while the agreement between *M. bovis* antibody ELISA and post mortem examination was moderate [k=0.437].

**Conclusion:** the sensitivity and specificity of *M. bovis* antibody ELISA recorded by the present study could suggest the possibility of using *M. bovis* antibody ELISA as ancillary test to CIDT test for the maximal detection of BTB particularly in regions where skin test is not regularly performed for screening of the disease.

**Key words:** Bovine tuberculosis, IDEXX *M. bovis* antibody, Sensitivity, Specificity
Participatory Evaluation of Selected Fish Processing and Preservation Technologies: The Case of Lake Tana, Ethiopia

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ABSTRACT
The study was conducted from March, 2013 to January 2014 to evaluate and compare rack drying, solar tent drying, smoking and traditional methods for quality fish produce, following the farmers’ research group approach. One trial site, namely Gorgora was selected based on the experience of traditional fish drying, market accessibility and better fish catches. One Fishers Research Group (FRG) with fifteen members (9 female and 6 male) were selected. Moisture content of each treatment samples was determined. Four hedonic scales were used to evaluate the processed samples organoleptically. Microbial load of processed samples of Labeobarbus species was done following standard procedures. Descriptive statistical analysis was used to analyze the mean and standard deviations of sensory evaluation and microbial load of the Labeobarbus species with respect to the processing methods. One way ANOVA was used to determine if there was statistical significant difference between the five treatments. Two ways ANOVA was used to see the effect of treatment and storage time on the shelf-life of the product. Sliced samples of Labeobarbus species dried with solar tent took shorter period of time (i.e. 2.25 days) than samples dried through other treatments except smoking (4.5 hours). The moisture content of sliced samples processed by solar tent drying was lower than samples processed by other treatments. Solar tent reduced the moisture content of the sliced sample to below 25% to the level where the growth of bacteria and yeast and moulds is suppressed. Organoleptically, sliced samples dried with solar tent had high acceptance of odor, taste, texture and color than the samples processed by other treatments. Sample dried by local method had high total plate count load (9.02x10⁸) followed by samples processed by smoke (8.60x10⁸) and solar tent following local procedures (5.80x10⁸) drying methods. The yeast and mould count of the sliced sample processed by solar tent drier was lower than other processing methods. Higher S. aureus count was found on fish samples processed by local (9.07x10⁷), smoking (8.55x10⁷) and rack (6.30x10⁷) drying methods. Very low count of enterobacteriaceae was found for solar dried sliced fish samples; 1.10x10³. The microbial load of sliced samples dried by solar tent had shown significant difference with samples dried by other treatments (p<0.05). Samples dried using solar tent following the local procedure, smoking, and rack were rejected after 30, 15, and 45 days, respectively. However, sliced sample dried using solar tent was in the acceptable range until the last evaluation; 75 days of storage. The interaction (treatment*storage time) had no significant effect on the shelf-life of the processed samples, however, treatment and storage time had significant effect independently (p<0.05).

Key words: FRG, Microbial load, Moisture content, Organoleptic test
Utilization of crop residues for finishing zebu bulls in the lowlands of Ethiopia

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ABSTRACT
In the pastoral areas of Ethiopia zebu cattle are sold at late age without finishing. Lack of skill and cross boarder trading of beef cattle are major problems for finishing for value addition. A study on finishing zebu beef cattle was undertaken using 42 bulls purchased from local markets in the lowlands of Ethiopia. Bulls were grouped into three feeding regimens and subdivided into younger and older groups, using RCBD, on the basis of dentition (Bulls with milk teeth as younger and bulls without milk dentition as older). Feeding regimens used as treatments were concentrate: roughage ratios of 50:50%, 35:65%, and 20:80% for treatments 1, 2, and 3 respectively. Concentrate supplement was composed of 30% wheat bran, 27% wheat middlings, 40% noug cake (Guizotia abyssinca), 2% Dicalcium phosphate and 1% salt. Roughage used were hay, wheat straw and teff straw (Eragrostis teff). Before the commencement of the trial all bulls were kept on these diets for two weeks for feed adjustment. As the trial started bulls were fed by dividing their daily allowances into morning and afternoon feedings. Bulls were fed ad lib in groups by keeping their respective concentrate: hay ratios. Orts were measured and recorded every morning before next feeding. Feed adjustment was made every two weeks by adding 20% if leftovers are less than 5% of the offers. Data were analyzed using SAS procedure for ANOVA. Concentrate intakes were decreasing as feeding of concentrate: hay ratio was decreasing (P<0.05) and roughage intake was increasing as concentrate: roughage ratio was decreasing (P<0.05). Older bulls had higher feed intake than younger bulls (P<0.05). Bulls supplemented 50:50% and 35:65% concentrate: roughage ratios had higher body weight gain than those supplemented 20:80% ratios (P<0.05). Younger bulls had higher feed conversion efficiency and daily body weight gain than older bulls (P<0.05). Concentrate: roughage ratios of 35:65% ratio and young bulls are recommended to be used for fattening zebu bulls in the lowlands.

Key words: local, bulls, concentrate, roughage, feeding
Exploring Spatial Variations and Factors Associated With Childhood Stunting in Ethiopia: Implication for National Nutrition Program Implementation

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ABSTRACT

Background: Stunting reflects failure to receive adequate nutrition over a long period of time. Hence it is the best measure of child health inequalities as it captures multiple dimensions of children’s health, development and the environment where they live. Objective: To investigate spatial variations and factors associated with childhood stunting in Ethiopia. Methods: This study is a secondary data analysis of 2011 Ethiopian Demographic and Health Survey. A total of 9893 children aged 0-59 months were included in the analysis. Getis and Orids spatial statistical tool was used to identify high and low hotspots of stunting. A multilevel multivariate logistic regression was used to identify factors associated with stunting. Result: Statistically significant high hotspots of stunting were found in Northwestern parts of the country whereas low hotspots of stunting were found in Central, East, and West parts of the country. In the full model of multilevel regression analysis, individual and community level factors accounted for 37% of childhood stunting variation across the communities. Being male, age above 11 months, short birth interval, presence of anemia, no formal education of mothers and partners, male household head and households with poorest wealth status were the factors that increased the odds of stunting at individual level. Unavailability of improved latrine facility and Northwestern parts of the region were the factors associated with stunting at the community-level factors. Conclusion: Childhood stunting was not random in Ethiopia with high hotspots at Northern part of Ethiopia. Both individual and community-level factors were significant determinants of childhood stunting. The regions with high hotspot of childhood stunting need more attention and the identified factors should be considered for nutritional interventions.
ABSTRACT

The purpose of this study was to explore agricultural product diversification, from the conventionally grown cereals and root crops to apple, and its role on farmers’ livelihoods. It was attempted to examine the challenges of apple production and marketing in the study area. Besides; the study tried to assess the role of NGOs in fostering farmers’ productivity. The study was carried out in the purposefully selected kebeles of Chencha: Tolola, Doko-shaye and Doko-mosho. Primary data was generated from the survey of 15% apple producing farmers which were selected using proportional sampling techniques and 3 separate FGDs which were made with key informants. Secondary data was obtained by reviewing published and unpublished documents. Data was analyzed quantitatively [using SPSS] and qualitatively [thematic description]. The result of the study revealed that apple production in Chencha has a multifaceted contribution to farmers’ livelihoods: constructing better dwelling units; educating children; change in dressing and feeding habits; leading urban lifestyles being in rural areas; saving money in banks and investment in various sectors of the economy. The study, however; revealed significant variation in the production of apple between the study kebeles. The length of years in apple production is found to be moderately correlated with the area of land used for its production \([r= 0.61]\). The study revealed fierce competition between the established 17 marketing associations [April 2014] as a major challenge for farmers productivity, because; it exposed them for the contraband system. Land fragmentation due to population pressure; lack of relevant agricultural inputs [watering jugs, storage boxes, grafting tools and cold rooms] and lack ample knowhow for managing apple from seedling to marketing were also conceived as challenges. Despite these challenges, NGOs, namely; Gamo Kalehiwot Church and World Vision have been helping farmers in various forms: offering training; distributing apple varieties and advertising of farmers’ products to realize their productivity. Installation of cold rooms for preserving products; introduction of small-scale processing units and monitoring and evaluation of apple production and marketing system in Chencha shall offset the challenges and enhance farmers productivity.

Key Words: Apple; Diversification; Livelihoods; Contraband
ABSTRACT
Pastoral cattle production in southern Ethiopia is becoming vulnerable to impacts of climate variability and rangeland degradation. Hence, the traditional cattle-based livelihood system is coming under increasing pressure, resulting in livestock diversification measures among herders as an adaptation strategy to environmental changes. Using a household survey (n=242), factors affecting livestock diversification and related functions, driving and limiting factors for livestock diversification and adaptive capacities of the different species were analysed. The results showed that all respondents were involved in keeping cattle, while 94%, 85%, 40% and 50% kept goats, sheep, camels and chicken, respectively. Herders’ perception showed that livestock diversification was triggered by the uncertainty of climate and rangeland resource degradation such as recurrent droughts, bush encroachment and increased cattle herd vulnerability to climatic risks. The functions (utilities) of livestock varied considerably among the different species. Milk production and cash revenues from live animal sales were of paramount importance, reflecting the dominance of subsistence objectives over mere production objectives of herders. Adaptability analyses showed that camels ranked first on six out of nine adaptive traits considered (tolerance to heat stress, drought, water scarcity, feed shortage, coping with bush encroachment and walking ability), but were ranked least in terms of pre-weaning survival rate. Cattle emerged best for their tolerance to heavy rainfall and tick resistance, and second best for walking long distances and young survival to weaning. But, they were rated least for five adaptive traits (tolerance to water scarcity, feed shortage, heat stress, drought and, coping with invasive woody plants). Goats were rated as second best for five traits and came in last regarding two traits while sheep were ranked third for seven of the traits and first for young survival to weaning. Overall comparisons showed that camels had a significantly higher adaptive capacity, with 2.5, 2.4 and 2.0 higher odds than cattle, sheep and goats, respectively. Results on vulnerability to drought also substantiate the adaptability rankings by indicating that cattle are the most vulnerable to drought followed by sheep, while camels are the most tolerant species. The average mortality rate differed significantly among the four livestock species (P < 0.0001) with cattle having 4.1, 2.9 and 2.5 times more death incidents in the drought compared to camels, goats and sheep, respectively. In conclusion, the study suggests the importance of multi-species herding as a commendable indigenous adaptation strategy for strengthening herders’ resilience to climate change by building their adaptive capacity on the existing strategies.

Keywords: Adaptive Traits; Multispecies; Production Objectives; Borana
Screening of Ethiopian sorghum (Sorghum bicolor (L.) Moench) landraces to explore useful genetic variation in resistance and tolerance to Striga hermonthica (Del.) Benth

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ABSTRACT
Striga hermonthica is a major constraint to sorghum production and productivity in sub-Saharan Africa. The objective of this study were to assess the variation for Striga resistance and tolerance in 49 sorghum genotypes based on their reaction to S. hermonthica and investigate the relationship between Striga resistance and tolerance indices. The measure traits were the Striga emergence count (SC), area under Striga number progress curve (ASNPC), grain yield (GY under infested and non infested conditions) and relative yield loss (RYL). Genotypes differed significantly in all measured parameters and in their reactions to Striga. The SC of the genotypes ranged from 1.1 to 34.6 Striga plants m-2, ASNPC from 19.4 to 565, GY from 395 to 2272 under Striga infestation, and from 1136 to 3870 kg ha-1 under non-infested conditions, and RYL from 22 to 78%. The genotypes were grouped in to 5 categories based on their reactions to Striga using cluster analysis. Eight, 17, 10, 9, and 5 genotypes were rated as resistant, moderately resistant, tolerant, moderately susceptible and susceptible, respectively. The wide variations in resistance and tolerance observed in the genotypes would be invaluable genetic resources for breeding for resistance and tolerance to Striga.

Key words: cereal breeding, genotypes, sensitivity, susceptibility, witchweed, yield
The Effect of SRP72 Gene in Barley Homologous gene on Growth Efficiency of Powdery Mildew Disease (BGH)

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ABSTRACT

Disease resistance in plants is yet an unresolved topic. If a plant is resistant to a certain disease, R (resistance) proteins in plants, recognize the Avr (avirulence) protein of the disease causing organism. After this recognition R protein starts a signaling cascade which results in the hypersensitive response; accumulation of hydrogen peroxide ($H_2O_2$) and sudden death of the attacked plant cell. By this mechanism plant stops the invasion. Blumeria graminis f.sp.hordei (Bgh) is one among the most dangers disease of Teff, Barley and Wheat. This work aimed to study the effect of SRP72 gene on the growth of Powdery mildew on barley (pallas01). To initiate infection with VIGS method, target gene (SRP72) was inserted to γ-plasmid. δ (Alpha transcript), β (beta transcript) and γ-transcript containing the target gene mixed in vitro transcription in 1:1:1 ratio. FES solution used to facilitate lesion on barley leaf and assist penetration of the BSMV virus containing gene of interest. 14 day old first leaf of barley was rubbed with transcript mix in order to infect the plant with BMSV virus cloned with SRP72 gene and knock down the interest gene in barley plant. After confirming the insertion and silence of SRP72 gene pallas-01 type barley interacts with Blumeria graminis f.sp.hordei Bgh95 (53/01). Barley seedling infected with BSMV Virus was incubated in growth chamber at a favorable condition. Silencing condition of SRP72 gene was checked through identifying viral symptoms on inoculated leaves and measuring mRNA percent using qRT-PCR. The fragments of leaves inoculated with Bgh95, Bgh105 and other control group stained with trypan blue at 3dpi and 5dpi. Barley-Bgh interaction was analyzed by observing the germination efficiency of spore and size of hyphae under light microscope connected with Computer. The silencing level of the target gene was found 57%. SRP72 gene silenced barley (Pallas01) infected with Bgh95 strain became more susceptible to the pathogen than the control barley group and intensive pathogen growth was observed. Bgh95 pathogen growth found double than control groups on SRP72 gene silenced barley. SRP72 found in this research as a gene, which take a role in disease resistance in Barley. This work is the first demonstration to indicate the function of SRP72 gene against plant disease resistance.

Key words: Barley, Powdery Mildew, BSMV Virus, Gene silencing, Plant disease resistance, SRP72 gene
Determinants of underweight, stunting and wasting among schoolchildren

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ABSTRACT

Background: The cause of under-nutrition in schoolchildren is complex and varying from region to region. However, identifying the cause is the basic step for nutritional intervention programs. Methods: School based cross-sectional survey was conducted among 450 schoolchildren aged 7-14 years, using multi-stage sampling techniques in Dale Woreda, southern Ethiopia. A structured questionnaire and 24-hour recall methods were administered to determine the socio demographic and dietary intake of participants. Stool microscopic examination was done. Weight and height were measured using a standard calibrated scale. Odds ratio generated from logistic regression was used to determine the strength of variables association. Results: Older age group (10-14 vs. 7-9) (AOR = 3.4; 95% CI, 1.7-6.6) and having Trichuris Trichura infection (AOR = 3.9; 95% CI, 1.4 -11.6) increased the risk of being stunted. Children whose mothers have completed primary education are less likely to be stunted than children whose mothers do not have formal education (AOR = 0.3;95% CI, 0.2-0.8).Having large family size (AOR = 3.3; 95% CI, 1.4-7.9) and inadequate intake of carbohydrate (AOR = 3.1; 95% CI, 1.4-6.8) were independent predictors of wasting. Children whose mothers completed primary education are less likely to be underweight (AOR = 0.3; 95% CI, 0.1-0.9). Children live in food insecure households are more likely to be stunted, under-weight and wasted than children live in food secure households (AOR = 2.5; 95%, 1-5.6; AOR = 3.9; 95% CI, 1.2-12.0; AOR = 4.8; 95% CI, 1.7-13.6). Conclusion: Household food insecurity, low maternal education and infection with Trichuris trichura were some of the major factors contributing to under-nutrition in the study area.

Keywords: Crossectional, Ethiopia, Determinant, Schoolchildren, Under-nutrition
Improved Immune Responses of Broiler Chicken (Hubbard JV Breed) Supplemented with L-lysine and DL-methionine to Infectious Bursal Disease Vaccination at Debre-Zeit Agricultural Research Center, Ethiopia

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ABSTRACT

Effective prevention and control of diseases such as Newcastle and infectious bursal diseases require multiple vaccinations in which immune supplements are needed. This study was aimed at evaluating the effect of L-lysine and DL-methionine supplementation on immune response of broiler chicken against infectious bursal disease vaccine at Debre Zeit Agricultural Research Centre from January to April, 2013. Randomized controlled design was used to allocate the experimental chicken into different treatment groups. Two hundred and twenty five chickens were randomized into 5 treatment groups of chicken comprising 45 birds per group. One of the groups served as negative control and did not receive any amino acid supplementation and one group was provided with the recommended dose of the amino acids (100%) and served as positive control. The remaining three groups were provided with 80%, 120% and 140% of the recommended doses by Hubbard JV broilers management guid of L-lysine and DL-methionine. The chickens were vaccinated against infectious bursal disease at day 7 and day 28. The antibody titer of the chickens in each treatment group was assayed using IBD antibody ELISA. Besides, the live body weight, weight of lymphoid organs and liver and differential leukocyte count were carried out. All the chickens were followed for 47 days. The results showed that the geometric mean antibody titre was statistically significantly different among treatment groups after booster vaccination was given (F = 23.83, P = 0.000). The highest mean titer was observed in chicken provided with highest dose of L-lysine and DL-methionine. No statistically significant difference was observed among treatment groups in live body weight but statistically significant (P < 0.05) difference was observed in the weight of lymphoid organs and liver except that of thymus among the different treatment groups. Higher weight was observed in chicken provided with higher doses of L-lysine and DL-methionine. Statistically significant difference (P = 0.000) was observed in differential leukocyte counts among the treatment groups except for basophils. In general higher counts were observed in chicken provided with higher doses of L-lysine and DL-methionine. There was no statistically significant difference in median survival time and the results of linear regression of the mean antibody titer against various predictors included but the weight of spleen was shown to cause significant mean rise in antibody titre after booster vaccination was given. The present work showed higher dose of L-lysine and DL-methionine improved immune response of chicken against infectious bursal disease vaccination. Further study under different management systems, using different breeds and challenge with wild virus is recommended.

Keywords: DL-Methionine, L-Lysine, infectious bursal disease, immune response, broiler chicken, Debre Zeit, Ethiopia
Assessment of prevalence and factors associated with chronic malnutrition among under-five children in Adama town, Oromia region, Ethiopia

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ABSTRACT

Background: Adequate food and nutrition are essential for proper growth and physical development to ensure optimal work capacity, adequate immune mechanism, and resistance to infection. Chronic malnutrition reflects long-term cumulative effects of inadequate diet and infection. It hinders cognitive growth of the child thereby leading to reduced economic potential and impairs host immunity. Objective: To assess the prevalence and factors associated with chronic malnutrition among under-five children in Adama town, Oromia region, Ethiopia

Method: A community based cross-sectional study was conducted on 616 parent-child pairs of under-five children in Adama town, Ethiopia from March to April 2013. A multistage random sampling method was employed using structured questionnaire and anthropometric measurements. The data were entered into a computer using Epi-info version 3.5.1 & WHO Antro software and then exported to SPSS for Windows version 20 for analysis. WHO new growth reference was used to convert height measurements into Z-scores of the HA indices considering age and sex of the children. Bivariate and multivariate logistic regression analysis was done at 95% confidence interval. Results: In this study 44.4% of under-five children were stunted. After controlling confounding factors; child age, mother educational status, number of under-five children in the house hold, decision making on the use of money only by husband, age of complementary foods started, presence of diarrhea and ARI were statistically significant association with stunting. Conclusion: Encouraging women education may improve child caring practice & health care-seeking behavior and ultimately reduce stunting.

Key words: Child, Child malnutrition, Stunting, Prevalence, Risk factors, Adama
Subtheme Three: Natural Resources Management

Phytochemical Analysis of Selected Medicinal Plants of Southern Ethiopia

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ABSTRACT
There are 6500 species of higher plants in Ethiopia making the country one of the most diverse floristic regions in the world. The greater concentrations of these medicinal plants are found in southern and south western parts of the country. Nevertheless, there are limited ethnobotanical information and knowledge on the chemical constituents of these traditional medicinal plants. In an ongoing project to identify the phytochemical constituents of medicinal plants of Southern Ethiopia, last year we have fully analyzed Zanthoxylum chalybeum, Aloe gilbertii, Millettia ferruginea, Tephrosia vogelli, Prunus Africana and Lantana camara. Phytochemical screening of the root and stem bark extracts of these plants were done accompanied by complete isolation and spectroscopic (UV-Vis, IR, NMR; 1D and 2D) characterization of secondary metabolites listed below. Of these, coniferyl alcohol derivative (1) and alkaloid (2) from roots of Z. chalybeum, flavonoids (3,4) from roots of T.vogelli, flavonoids (6,7) from roots of M. ferruginea, and anthraquinone (4) from roots of A.gilbertii were identified and fully characterized, respectively. Presently, a comprehensive phytochemical analysis of additional four medicinal plants; Senna didymobotrya, Polygonum presicaria, Dodonea angustipolia and Clerodendrum myricoides is ongoing.

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In-Vitro Antibacterial Activity of Acacia etbaica against Chloramphenicol and Penicillin Resistant Staphylococcus aureus

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ABSTRACT
It has been reported that Acacia etbanica had been used traditionally to treat diseases of humans and domestic animals by local communities in Kilte Awulaelo District of Tigray Region, Ethiopia. In this study, methanol extracts of leaf of Acacia etbaica was tested for its In-vitro antibacterial activity against chloramphenicol and penicillin resistant Staphylococcus aureus using agar disc diffusion method in Tigray region in the year 2013/2014. The discs were loaded with 1000µg and 500µg of plant extract. The Minimum Inhibitory Concentration (MIC) of the plant was also determined using micro-dilution method in 96-well plates. It was found that mean zone of inhibition of 14.34 mm (± 0.64) and 11.95 mm (± 0.72) diameter at a concentration of 1000µg and 500µg of plant extract respectively. The MIC of the plant was also determined to be 0.038mg/ml. The results suggest that the methanol extracts of Acacia etbaica could be a rich source of antibacterial compounds against chloramphenicol and penicillin resistant Staphylococcus aureus. Thus, further studies are recommended to identify and purify the active compounds of the plant against resistant bacteria, which is now a big health challenge globally.

Keywords: Methanol extract; resistant bacteria; traditionally used medicinal plants
Chromium Speciation from Waste Water of Modjo Tannery using Spectroscopic Techniques

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ABSTRACT
The International Cancer Research Institute (ICRI) has listed Cr (VI) compounds in the first group according to their carcinogenic and toxic effects. On the other hand, Cr (III) is known as an essential trace elemental species for proper metabolism of carbohydrates, lipids and proteins. In two oxidation states, Cr (III) and Cr (VI), the effect of chromium differs significantly in biological and toxicological behavior. Therefore, total Cr determination doesn't indicate the exact health as well as environmental effects of chromium. The major Cr (VI) pollution sources are directly related to the industrial activities including tanning industries. In this study, Cr (VI) was indirectly determined by UV-Visible spectrophotometer and the total chromium by flame Atomic absorption spectrometer (FAAS). Cr (III) was obtained by subtracting Cr (VI) from the total chromium which had been already determined by FAAS. The indirect method is based on oxidation of hydroxylamine (NH$_2$OH) to nitrite (NO$_2^-$) with Cr (VI). The generated nitrite ion in this reaction forms an azo dye having violet color which was measured at $\text{max } 572$ nm by UV-visible spectrophotometer. Based on these methods, the concentrations of total Cr, Cr (VI) and Cr (III)) in the five sample sites (discharge point (DP), before treatment (Bt), after treatment (At), downstream of Modjo River (Dns) and upstream (Ups)) were determined. The total Cr concentrations in the five sample sites were found to be 1076 ± 48.15, 123.43 ± 21.50, 104.33 ± 10.73, 26.32 ± 1.03 and 0.56 ± 0.11 ppm while concentrations of Cr (VI) were 15.75 ± 2.31, 3.43 ± 0.60, 3.15 ± 0.33, 0.59 ± 0.038 and 0.046 ± 0.0076 ppm, respectively. Each concentration is found to be extremely larger than the maximum permissible limit of discharge effluent set by World Health Organization (WHO) and environmental protection Agency (EPA) of USA (0.5 mg/L for total Cr, 0.1 mg/L for Cr (VI). The comparison of the amount of each Cr species before treatment (Bt) and after treatment (At) showed that the treatment plant is unable to retain the Cr species. The amount of each Cr species in the downstream of Modjo River (Dns) is by far greater than that of the upstream (Ups). This indicates the tannery is releasing large amount of Cr containing wastes to the surface water due to the poor nature of the treatment plant.
Determination of antimicrobial activities and antioxidant properties of selected medicinal plants

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ABSTRACT
A wide variety of plants in the southern nations, nationalities and peoples region of Ethiopia have been claimed to possess antimicrobial activities. To date most studies made on medicinal plants used in microbial treatments are usually incomplete descriptions. Lack of adequate scientific development on the dosage and efficacy has aroused consumer safety issues among scientific community. In this work, attempt has been made to determine and compare the efficacy and dosage regimes of Phytolacca dodecandra, Ajuga integrifolia, Artemisia afra, Artemisia absinthium, and Ruta chalepensis selected based on informant consensus agreement and fidelity factor regarding the claimed antimicrobial activities. Mechanistic insights were also deciphered through solvent programmed tuning of polarity of the extracts and subtraction methods. The results showed that methanol extract of Artemisia afra could inhibit all test bacteria and exhibited significant (P < 0.05) antimicrobial activity when compared with other herbs, with the zone of inhibition ranging from 18.33 ± 0.58 to 26.00 ± 1.73 mm. On the other hand, Artemisia absinthium demonstrated a moderate activity against the test bacteria with the zone of inhibition ranging from 5.57 ± 0.58 to 8.00 ± 1.67 mm. However, the methanol extracts of Ajuga integrifolia and Phytolacca dodecandra were active against Escherichia coli with the zone of inhibition ranging from 3.09 ± 1.47 but had no significant antibacterial activity against other test bacteria. Ruta chalepensis exhibited least activity against all test bacteria when compared with other herbs. The methanol extracts of the five herbs were the most efficient (Methanol > aqueous > petroleum ether) antimicrobial agents displaying the minimum inhibitory concentration and minimum bactericidal concentration of 0.1-2.5 and 1.2-2.5 (gm/ml) respectively against E. coli. A qualitative preliminary phytochemical screening of the methanol extract of Artemisia afra revealed the presence of alkaloids, flavonoids, steroids, terpenoids, phenolic compounds, saponins, and tannins. Mechanistic insight regarding the active principle is deciphered through alkaloid free against free alkaloid extracts. The results reinforced the fact that oxygenated metabolites are most responsible for the antimicrobials when compared with alkaloids. The antioxidant activity of the methanol extracts of Artemisia afra was evaluated using the DPPH scavenging method. The extract showed good antioxidant activity with an IC50 value of 20.2 µg/mL. Furthermore, the test of methanol extracts of the herb on real samples of water and cow milk showed significant effect in controlling of the proliferation of E. coli and Salmonella in water but no significant effect in cow milk unraveling the role of matrix in the antimicrobial activities of herbal extracts.

Keywords: Medicinal plant extracts, antimicrobial activity, antioxidant properties
The Pattern, Presentation and Risk Factors of Ocular Trauma Among Patients Treated at Hawassa University, Referral Hospital, Ophthalmology Department; A Retrospective Study

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ABSTRACT
Introduction: Ocular trauma is a significant public health problem which may lead to permanent visual impairment. Being preventable, the visual impairment can occur at any age in either sex and has significant socioeconomic burden especially in developing countries. In a study conducted in Grarbet, Ethiopia, 67.6% patients were presented for the treatment of trauma on the third day and later, but there are no studies on pattern, presentation and risk factors of ocular trauma in our study area. This study will provide information on pattern, presentation and risk factors of ocular trauma at Hawassa University, Referral Hospital, Ophthalmology Department and will serve as the basis for designing and implementing preventive and curative measures to be undertaken by respective authorities and organizations. Objective: The objective of the study is to assess the pattern, presentation and risk factors of ocular trauma among patients treated at Hawassa University, Referral Hospital, Ophthalmology Department, South Ethiopia, 2014. Methods: The study was conducted from October 25, 2014 to November 25, 2014. The study included all patients’ medical record, treated at Hawassa University, Referral Hospital, Ophthalmology Department from January 01, 2012 to July 31, 2014 for ocular trauma. Data was collected by trained optometrists, ophthalmic officer and ophthalmic nurses using pretested data abstraction form. Data entry and analysis was done using SPSS version 20 and the descriptive and analytic statistics was carried out. Results: A total of 773 patients were included in to the study. Among these, 549 were males and 224 were females. Maleness was associated with closed globe injury (P = 0.019, AOR = 1.58). Majority of ocular trauma was observed in children (62.87%) and rural dwellers (58.34%). Childhood age was significantly associated with open globe injury (P < 0.001, AOR = 2.06). The common object that causes ocular trauma was wood/stick (28.33%). In the study, open and closed globe traumas were comparable (47.09% and 47.74%). Corneal tear was the most frequently observed finding (39.33%). Surgery, secondary to trauma, had shown the association with open globe injury (P < 0.001, AOR = 9.37). Most of the patients (>90%) presented after 6 hours from time of ocular trauma and the treatment was commenced also after 6 hours in >95% of them. Among 84.61% patients whose VA was recorded at presentation, 12.23% of them were with VA of 6/6 and 65.90% of them were with VA of <3/60. Conclusion/ Recommendation: Ocular trauma was high in males, children, rural dwellers and low income families and most of the patients (>90%) presented after 6 hours from time of ocular trauma. Cornea was the most commonly affected ocular structure by trauma. Efforts should be made to focus on preventive strategies by providing trainings for health professionals and teachers. To respond effectively for ocular trauma emergences, there should be public awareness creation as well as health facilities should be equipped well. Keywords: ocular trauma, pattern, presentation, risk factor, Hawassa, Ethiopia
Molecular Epidemiological Characteristic of Mycobacterium tuberculosis complex Strains/species isolated from Tuberculous Lymphadenitis in Addis Ababa, Ethiopia

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ABSTRACT

Background: An estimated 9.0 million people developed TB and 1.5 million died from the disease in 2013 globally. Molecular epidemiological investigations have contributed significantly to the understanding of the epidemiology and control of tuberculosis by providing information on transmission dynamics. To this effect, adequate knowledge on the species and strains of mycobacteria which circulate among the human population in specific geographic location is required. Objective: To characterize and identify dominant genotype of species/strain of M. tuberculosis complex responsible for Tuberculous Lymphadenitis (TBLN) in Addis Ababa, Ethiopia. Methods: A cross-sectional study design was conducted between February, 2013 to October, 2013 in Addis Ababa, Ethiopia. Two hundred and six FNA and biopsy samples were cultured on Löwenstein-Jensen (LJ) slants and seventy four culture positives isolates were heat killed for molecular genotyping and region of difference (RD)-PCR analysis. Result: Majority (98.6%) of the causative agent of TBLN was M. tuberculosis while one isolate was SB1176 strain of M. bovis. Further characterization of 74 isolates to strain level by spoligotyping lead to the identification of 26 (consisting of 57 isolates) distinct spoligotype patterns shared international type (SIT) and 13 (consisting of 26 isolates) different spoligotype patterns which had not been reported to the SpolDB4.0. The most prevalent strains of M. tuberculosis isolated in this study were SIT149, SIT53, SIT26 and SIT37 comprising 52.6% of the total strains. The strains were further classified into families using SPOTCLUST web based program and the dominant families identified were T, CAS and Haarlem comprising of 81.1% of the isolates. Further classification of the strains into lineages lead to the identification of the Euro-American lineage as a dominant (66.2%) lineage. Conclusion: Molecular epidemiology is important in molecular typing of MTC and in assessing the global dissemination of strain and in understanding of the transmission as well. This finding indicated that the shared international spoligotyping of SIT 149, SIT53 SIT26 and SIT37 were the most dominant and prevalent strains identified. To understand the insight of epidemiology and genetic diversity of M. tuberculosis the most discriminative technique other than spoligotyping should be employed for more understanding of genetic diversity of MTB. Different strains of M. tuberculosis might elicit different immune response, so it is better if future researcher need to have further study on the strains and immune response of TB in humans and their immunogenicity and virulence.

Keywords: Tuberculosis lymphadenitis, MTC, RD9 and RD4 Typing, Spoligotyping, Mycobacterium family, Mycobacterium lineage and Addis Ababa
Prevalence and Genotypes of Enterocytozoonbieneusi at the Urban/Rural Interface in Ethiopia: An Implication for Public Health

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ABSTRACT

Enterocytozoonbieneusi, the most frequently diagnosed microsporidian species in humans, is also identified in a wide range of animals. The purpose of this study was to determine the prevalence and genotypes of Enterocytozoonbieneusi among calves and lambs in the urban/rural interface. A total of 838 fecal samples from calves and lambs were analyzed using a nested PCR targeting the internal transcribed spacer of the rRNA gene. All PCR positive specimens were sequenced to determine the genotype(s). Enterocytozoonbieneusi was found in 32/449 (7.12%) and 39/389 (10.02%) calves and lambs, respectively. Ten genotypes were identified from calves, belonging to the known genotypes KIN-I, CHN1, I, H, PigEBITS5 and 33302, and four novel genotype (CHN1, D, J and BEB6-like). Likewise, six genotypes were identified from lambs, belonging to the known genotypes COS-I, COS-II and BEB6, and three novel genotype (COS-II and BEB6-like). This study constitutes the first molecular characterization of Enterocytozoonbieneusi in Ethiopia, and suggests a potential risk of zoonotic transmission in this interface area. Studies in humans are necessary to assess the public health significance of Enterocytozoonbieneusi.

Keywords: Enterocytozoonbieneusi, genotypes, nested PCR, prevalence, internal transcribed spacer and zoonotic transmission
Evaluation of in vivo wound healing activity of methanol extract of Achyranthes aspera L

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ABSTRACT

Introduction: The leaves of Achyranthes aspera L. has been used traditionally for the treatment of wound in various parts of Ethiopia. However, the plant has not been explored scientifically for its wound healing activity. Therefore, this study was designed to investigate the wound healing activity of methanol extract of Achyranthes aspera L. Leaves.

Methods: Incision and excision wounds were inflicted on albino rats of either sex, under diethyl ether anesthesia. Group I served as positive control and was treated with 1% silver sulphadiazine, group II, III, IV treated with simple ointment containing 2.5%, 5% and 10% (w/w) methanol extract of the leaves of Achyranthes aspera L., respectively, whereas group V served as negative control and was treated with simple ointment. All the animals were treated topically once a day. Wound healing potential was assessed with excision and incision wound model. Excision wound model was used to assess the change in percentage contraction of wound, epithelisation time, DNA content and histological features whereas rats inflicted with the incision wounds were used to determine breaking strength.

Results: Based on the results of percentage wound contraction, the DNA content and epithelization time, all groups of rats treated with the extract showed significant (P<0.05) wound healing activity compared to group of rats treated with simple ointment (negative control) group. The difference in breaking strength was, however, significant (p<0.05) only for the 5% and 10% extract of Achyranthes aspera (w/w) ointment treated groups. Histological evaluation showed well organized epidermal layer, increased number of fibrocytes, remarkable degree of neovascularisation and epithelisation which was comparable to the standard on the 21st day after treatment; especially in the 5% and 10% (w/w) extract treated group.

Conclusion: The present study provides a scientific rationale for the traditional use of the leaf extracts of Achyranthes aspera L. in the treatment of wound.
Knowledge, Attitude and Practice (KAP) Related to Occupational Health and Safety among Micro and Small Enterprise Wood and Metal Workers in Hawassa, SNNPRS

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ABSTRACT

Background: All over the world, every year some two million men and women lose their lives through accidents and diseases linked to their work. In addition, there are about 270 million occupational accidents and 160 million occupational diseases each year. Reports reveal that the causing agent of 90% of workplace accidents is human error and developing countries share the largest incidence of job related accidents and diseases, the youngsters being among the high risk groups. Micro and small enterprises (MSEs) are in rapid expansion in Ethiopia and since they consist mostly of the youngsters who are just joining the work force any damage to this group poses far reaching consequences to the work force of the nation. To our knowledge there is no similar work done so far addressing occupational health and safety (OHS) among MSE workers in Ethiopia. Objectives: To assess the knowledge, attitude and practice (KAP) related to occupational health among metal and wood workers in Hawassa. Materials and Methods: The study was conducted in Hawassa (Jan. to Mar., 2014) among 354 respondents, all eligible workers at MSE wood and metal workshops in Hawassa. The study design was institution based cross-sectional and the data were collected by interviewer administered semi-structured questionnaires which included demographic characteristics, and questions specifically designed to assess the KAP of the study subjects. Knowledge and attitude were measured using composite score and data were analyzed using SPSS version 20 computer software. Result: The response rate of the study was 89%. Majority, 84.5% (299), of the respondents were male, 36.2% (128) were aged 25 – 29 years and 30.8% (109) completed secondary school. Regarding their work environment 94.2% (325) reported presence of excessive dust, 99.2%(350) disturbingly high sound, 89.5%(316) radiation from welding and 99.4% (338) use of chemicals in the workplace during painting / spraying. Only 30.5% (108) knew that exposure to chemicals (inhaled sprays, spilled on body) during work causes problem on health. Regarding knowledge items related to OHS 83.1% (294) responded 75% and above correctly and regarding attitude 87.2% (309) have shown to have 75% and above favorable attitude towards acceptable OHS principles. Concerning practice, out of six common personal protective devices mentioned, only 37.3% (132) reported they use three or more of them sometimes or always. Only 33.9% (120) and 5.4%(19) of the respondents reported that they had training on OHS before they stared work and within the last one year respectively. Conclusion and recommendation: The overall knowledge, attitude and practice related to OHS of the Hawassa MSE wood and metal workers pose a public health concern. This calls for urgent intervention in providing on job training on the topic as well as implementing safer work environment and improved pre-service training for new staff. Key Words: Occupational health and safety, Micro and Small Enterprises, Knowledge, Attitude and Practice
Effects of *Hypericum revolutum* (Vahl) tree on major soil nutrients and selected soil Physico-chemical properties in Goba District, Oromia, Ethiopia

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**ABSTRACT**

The study was initiated to quantify the effect of *Hypericum revolutum* on major soil nutrients and soil properties were traditionally retained on farmlands at Goba District of Oromia Region, Ethiopia. Sampling was done in Randomized Complete Block with two factors: 1) distance from tree trunk (at 0.5m under the canopy, at 2m at edge of the canopy and at 10m in the open area), and 2) soil depth (surface soil; 0 – 15cm and subsoil; 16– 30cm). Bulk density was not significant in distance wise, but it showed significant difference along soil depth. Soil texture showed significant for silt and sand fractions while clay fractions showed no significant as distance increases from tree base to open area. Available Phosphorus and soil organic carbon (SOC) were significantly higher under the canopy than open field. Available Phosphorus was not significant (P=0.66) along the soil depth while SOC was significant (P=0.0001). Available Potassium showed not significant (P=0.17) as distance moves from under tree to open area while it was significant (P=0.04) along the soil depth. Total Nitrogen was found to be significant both distance and depth wise. Inclusion of *Hypericum* tree on farmlands has a potential to improve organic sources of nutrients.

**Key words:** Parkland agroforestry, Soil nutrients improvement, Tree based land use systems.
Prevalence and determinant factors for home delivery practice after antenatal care follow up among mothers who gave birth during the last two years in Gozamin district, northwest Ethiopia

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ABSTRACT

Introduction: Ethiopia is one of the countries with the highest rates of maternal deaths in the developing world. The major causes of maternal deaths in Ethiopia are similar to most developing countries: infection, hemorrhage, obstructed labor; abortion and hypertension in pregnancy are some of the causes. Only ten percent of births in Ethiopia are delivered at a health facility - 9 percent in a public facility and 1 percent in a private facility. **Objective:** To assess prevalence and determinant factors for home delivery practice among mothers who gave birth at home after antenatal care follow up during the last two years in Gozamin District, northwest Ethiopia, 2014. **Methods:** Community-based cross sectional study design was carried out. A total of 497 respondents were participated in the study. Data entry was done using Epi data 3.1 and analysis was done using SPSS version 20. Binary logistic regression was done to see the impact of each factor on the pattern of home delivery. **Results/Findings:** Three hundred seventy four (75.3%) of the respondents gave birth at home. The prevalence of home delivery after four and more antenatal care follow up was 52.2%, and it was 80.5% among those respondents who attended one to three antenatal care follow ups. Respondents with educational status of unable to read and write were more likely to give birth at home compared to respondents with primary and above education [AOR = 6.91, 95% CI 1.99, 15.10]. Being farmer was also significantly associated with home delivery [AOR = 9.42 95% CI 3.29, 26.94]. Respondents who didn’t have trust and confidence on the ANC service were four times more likely to give birth at home compared to those who had trust and confidence on the ANC service[AOR = 3.76, 95% CI 1.72, 8.24]. **Conclusion and Recommendations:** The prevalence of home delivery after antenatal care follow up in Gozamin district was still very high. Mothers’ decision making power within the house hold, husbands’ preference to wife’s birth attendants and birth places, mother’s occupation and educational status were found to be important predictors for home delivery practice. The government of Ethiopia should strive to empower females and should also make the health facilities comfortable and give attention to cultural issues.

Key words: Antenatal care, home delivery, practice
Mortality and its Predictors in Adults on Antiretroviral Therapy: a Cohort Study Focusing on Tuberculosis Co-Infection, South West Ethiopia

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ABSTRACT

Background: Available data is inconsistent regarding the impact of tuberculosis on mortality of people living with HIV (PLWHs) while they are on first line antiretroviral therapy (ART) and evidence is lacking in Ethiopia being the seventh country in the world from TB/HIV co-infection death. In this study, we hypothesized that tuberculosis co-infection independently increases the risk of mortality in such patients even if they are on ART. Therefore, this study was aimed at investigating this hypothesis among cohort of adult PLWHs in south west Ethiopia.

Study Design: Facility based cohort study was conducted in which we followed each patient retrospectively for one year. The study was conducted from August through December 2012 at Jimma University Specialized Hospital (JUSH) ART and tuberculosis (TB) clinic, South West Ethiopia.

Methodology: 130 HIV/TB co-infected and 520 only HIV infected patients initiating ART between 2008 and 2011 at JUSH were included using simple random sampling. The survival was compared by Kaplan Meier and the effect of TB co-infection on all-cause mortality was assessed using Cox proportional hazard model.

Results: in crude analysis, all-cause mortality of TB co-infected patients was higher by 6.5% at the end of the study (P =.004). However, after adjusting for other confounders, we found that TB co-infection didn’t increase mortality (Adjusted hazard ratio, 1.31[0.573-3.007], P = .52). Instead, factors which independently increased the risk of death were low baseline functional status, malnutrition, CD4 count <100cells/mm³ at the initiation of ART.

Conclusion: Similar to previous studies, we confirmed that the presence of TB co-infection did not independently increase mortality provided that patient is on ART. Therefore, beside TB, paying due attention to improve patient’s nutritional status and intervention to facilitate early presentation to health facilities before they deteriorate functionally and immunologically is mandatory to reduce mortality on ART.

Keywords: HIV/TB Co-infection; ART; JUSH; Ethiopia
Factors affecting intention to use long acting and permanent contraceptive methods among married women of reproductive age groups in western Ethiopia: A community based cross sectional study

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ABSTRACT

Background: Long-acting and permanent contraceptive methods are the most effective methods for preventing unintended pregnancies. In Ethiopia majority of married women practiced predominantly short acting contraceptive methods, whereas the proportion of women who were using long acting and permanent contraceptive methods was only 4%. Method: A community based cross-sectional study design was used. Multi stage sampling procedure was used to select 802 married women. Data collection was carried out from April 10 to April 25, 2014 using a pre-tested structured questionnaire. The data were entered into a computer using Epi-info 3.5.1 and then exported to SPSS for Windows version 20 for analysis. Bivariate and multivariate logistic regression analysis were done, odds ratio and 95% confidence interval were calculated. Result: Intention to use long acting and permanent contraceptive methods was 18.2%. The majority of women intended to use implant (51.4%). The finding showed that a significant positive association between intention to use long acting and permanent contraceptive methods and women’s education (AOR=1.82, 95%CI = 1.09 – 3.04), women’s occupation (AOR = 2.56, 95% CI = 1.47 – 4.46), joint fertility related decision (AOR = 2.76, 95% CI: 1.40 – 5.42) , and discussion with health care provider about long acting and permanent contraceptive methods (AOR = 2.08, 95% CI: 1.40 – 3.09). Conclusion and Recommendation: In this study prevalence of intention to use LAPMs was (18.2%). Thus program manager and stakeholders should empower women through education, create awareness on LAMPs and address misconceptions and fears of clients on LAPMs. Every woman who seeks family planning information or services should be counseled on LAMPs of contraceptives to enable informed choice.

Key word: Factors, Intention, Unintended pregnancy, Nekemte.
Culturable aerobic microbiota Tightly Associated with Colon Cancer Epithelial Cells

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ABSTRACT

Background: Modern researches focus on metagenome, metatranscriptome, and metaproteome of microorganisms associated with the incidence of colorectal cancer (CRC). Based on assays of fecal samples, it is difficult to obtain unambiguous conclusion about contribution of certain microorganisms to CRC. Bacteria tightly associated with colon mucosa could provide more insight into CRC mechanisms and give a basis of future approaches for microbiota modulation and new therapies development. Objectives: Here, we characterize aerobic cultivable bacteria isolated from biopsy samples of human neoplastic and normal colon epithelia, to compare the spectrum and some physiological features of bacterial habitants of the biological niche, which nearby parts differ on a level of oncogenic transformation. Methods: 98 cultured bacterial strains from 28 patients with CRC were isolated, cultivated and identified using matrix-assisted laser desorption ionization time-on-flight mass spectrometry (MALDI-TOF MS). Antibiotic susceptibility of isolated bacteria was characterized using disk diffusion method. RNase activity was also measured using polymorphic yeast RNA as a sole source of phosphate, nitrogen and carbon substrates. Conclusions: From colon biopsies cultivable Escherichia coli, Serratia marcescens and representatives of the genera Bacillus, Pseudomonas, Klebsiella, Enterobacter, Aeromonas were identified. No significant differences were observed in total number and resistance of bacteria from malignant and non-malignant epithelium, though certain patients have these distinctions. We found at the first time that RNase activity of E.coli strains isolated from malignant epithelium is higher than of the same bacteria from normal tissue. While some RNases are known as antitumor agents, activation of extracellular RNase synthesis could be a part of mechanism by which microbiota protects its native habitat.

Keywords: colorectal cancer, biopsy, microflora, antibiotic susceptibility, secreted RNase activity
Evaluation of the anti-diarrheal activity of the solvent fractions of *Croton macrostachyus* Hocsht.ex Del. (Euphorbiaceae) leaves in mice

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ABSTRACT

Traditional healers in Ethiopia use a wide range of medicinal plants with antidiarrheal properties. Among these, *Croton macrostachyus* is one such plant claimed to have an antidiarrheal activity in Ethiopian folklore medicine. Previous studies showed that the crude extract is endowed with the claimed property and this study was undertaken to further the claim by screening different fractions for the said activity so that it could serve as a basis for subsequent studies. The fractions were obtained by successive soxhlet extraction with solvents of differing polarity (chloroform & methanol) followed by cold maceration of the marc of the methanol fraction with distilled water. The antidiarrheal activity was evaluated using castor oil induced diarrheal model, charcoal meal test and anti-enteropooling test in mice. The test groups received various doses (300, 400, 500 mg/kg and an additional dose of 1000 mg/kg for the aqueous fraction) of the fractions, whereas positive controls received either Loperamide (3 mg/kg) or Atropine (5 mg/kg) and negative controls received vehicle (10 ml/kg). In the castor oil induced model, the chloroform (at all test doses) and methanol (at 400 & 500 mg/kg) fractions significantly prolonged diarrheal onset, decreased the frequency of stooling and weight of feces. The aqueous fraction was, however, devoid of significant effect at all doses tested. Similarly, in the enteropooling test, whilst the chloroform and methanol fractions produced a significant dose dependent decline in the weight and volume of intestinal contents, the aqueous fraction was without appreciable effect. Results from the charcoal meal test revealed that all the fractions produced a significant anti-motility effect either at all doses (chloroform fraction) or at middle and higher doses (methanol and aqueous fractions). Taken together, the present study demonstrated that the chloroform and methanol fractions possessed significant anti-diarrheal activity due to its inhibitory effect on castor oil induced gastrointestinal propulsion and fluid secretion. Nevertheless, the aqueous fraction showed only significant anti-motility effect at the higher dose (1000 mg/kg) employed in the study.

Key words: Antidiarrheal activity, Castor oil induced diarrhea, gastrointestinal transit, anti-enteropooling, Croton macrostachyus
Modeling of Time to Major Micro Vascular Complications among Diabetes Mellitus Patients: Case Study Ayder Referral Hospital, Tigrai, Ethiopia

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ABSTRACT

**Background:** Diabetes Mellitus (DM) is a chronic metabolic disorder characterized by hyperglycemia in which body’s unable to produce enough insulin or cells could not respond to the insulin that is produced. Major micro vascular complications are mostly associated with this chronic metabolic disorder.

**Objective:** To estimate survival probabilities of developing major micro vascular complication of diabetic patients under follow up at Ayder referral hospital and identify risk factors for the developing of micro vascular complication for diabetes patients during treatment period of 3 years. **Methodology:** A retrospective cohort study was conducted on diabetic patients who were on treatment follow up in Ayder referral hospital from February 2003 E.C to January 2006 E.C. A total of 277(60.6% males and 39.4% females) patients were included in the study. Kaplan-Meier estimator was used to estimate the survival experience of patients and Cox proportional hazards model and Weibull proportional hazards model were used to identify the risk factors for major micro vascular complications.

**Results:** Results showed that about 118 patients have developed the micro vascular complications during the follow up period of which 50.8% and 15.3% complication occurred with 365 and 720 days of treatment initiation respectively. The overall mean estimated survival time was 462.6 days. Factors associated with increased risk of micro vascular complication were older age, cox model (HR=1.113, 95% CI: 1.069-1.159, p=0.000) and Weibull model (HR=1.098, 95% CI: 1.058-1.139, p=0.000), sex who were female (HR=1.780, 95% CI: 1.225-2.587, p=0.002) and insignificant for Weibull model, patients with Type II diabetes (HR=56.704, 95% CI: 7.348-437.572, p=0.000) and the interaction of older age and being type II diabetes type using cox model(HR=0.923, 95% CI: 0.883-0.964, p=0.000) Weibull model (HR=0.939, 95% CI: 0.902-0.978, p=0.002). **Conclusion:** The risk factors for major micro vascular complication were older age, female sex, type II diabetes type and the interaction of older age and type II diabetes type by cox model and older age, type II diabetes type and interaction of older age and being type II diabetes type by Weibull model. Comparatively Weibull model was best fitted for this data.

**Key Words:** Diabetes Mellitus, Survival Analysis, Cox proportional hazards model, Weibull proportional hazards model, Major Micro-vascular complications, Diabetic patients, Ayder referral Hospital
Effect of thermal treatment on phenolic content, antioxidant, and α-amylase inhibition activities of *Moringa stenopetala* leaves

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**ABSTRACT**

*Moringa stenopetala* is a socioeconomic valued tree that is widely available and cultivated in Southern part of Ethiopia. The leaves have been traditionally used as a food source with high nutritional and medicinal values. The present work was carried out to evaluate the effect of thermal treatment on the total phenolic content, total flavonoid content, antioxidant activities and α-amylase inhibition of aqueous leaf extracts obtained from *M. stenopetala* during maceration and different decoction time interval (5, 10 and 15 min). The total phenolic and flavonoid contents were determined by the Folin-ciocalteu and aluminum chloride methods, respectively whereas antioxidant activities were determined by 2,2-diphenyl-1-picryl-hydrazyl (DPPH) radical scavenging, reducing power, phosphomolybdenum and ferrous ion chelating assays and α-amylase inhibition potential was determined using 3,5-dinitrosalicylic acid method. Total phenolic and total flavonoid contents ranged from 34.35 ± 1.06 to 39.47 ± 1.33 mgGAE/g and 10.44 ± 0.61 to 20.36 ± 0.93 mgQRE/g, respectively. Decoction for 10 min extract showed ferrous ion chelating (92.52 ± 0.17 %), DPPH radical scavenging (91.52± 0.59 %), α-amylase inhibition (69.06 ± 0.14 %), ferric reducing power (0.765 ± 0.14) and total antioxidant activity (0.329 ± 0.32), respectively. DPPH, reducing power, α-amylase inhibition activities and ferrous ion chelating activity showed positive linear correlation ($R^2$=0.716, $R^2= 0.765$, $R^2=0.805$ and $R^2= 0.752$), respectively with total phenolic content but total antioxidant activity were found to be weakly correlated ($R^2=0.077$). Based on present investigation, it could be concluded that major lose of total phenolic content, antioxidant and α-amylase inhibition activities of the crude leaf extracts of *M. stenopetala* leaves were observed at decoction time for 15 min. Therefore to maintain the total phenolic content, antioxidant and α-amylase inhibition activities of leaves, cooking practice should be at the optimum decoction time (5-10 min).

**Key words**: Moringa stenopetala, antioxidant, total phenolic content, α-amylase inhibition
ABSTRACT

Background: Medicinal use is one of the services that plants provide for human welfare. The practice of traditional medicine is common in Ethiopia although it is not utterly studied and documented. Studies conducted so far are limited and focused on the perceptions and practices of modern and traditional health practitioners about traditional medicine. Objective: the aim of this study is to assess ethnopharmacology of medicinal plants used to treat human diseases by traditional medical practitioners in Dega Damot woreda, West Gojjam zone, Amhara, Northwestern Ethiopia

Materials and Methods: A total of 45 informants were selected purposefully from the study area. Semi-structured interviewees, observation and field walks were employed from January 10 to February 30/2014. Descriptive statistical methods such as percentage and frequency were employed to analyze and summarize the data.

Results: A total of 60 species of medicinal plants distributed in 42 families were collected and identified for treating 55 human ailments. The most commonly treated ones were evil eye, malaria, wound, peptic ulcer disease and rabies. The commonly used plant parts were leaves (36.5%) and thirty nine percent of the preparations were decoctions. Oral route, 43 (44%) was the commonly used route of application whereas most (54.8%) remedies were administered only once. Fourteen percent of preparations caused vomiting in addition most (40.4%) of the formulations was contraindicated for pregnant patients. Only seventeen percent of the formulations possessed drug food interactions. Most preparations were stored within clothes, 31 (29.8%). There exists a high (ICF=0.8) uniformity of plant consumption among healers for treating respiratory problems. Alliumsaativum (FI=0.75) for evil eye, Phytolacca dodecandra (FI=0.8) for rabies and Croton macrostachyus (FI=0.78) for treating malaria were medicinal plants with highest fidelity levels showing conformity of knowledge on species of best healing potential. The principal threats of medicinal plants were reported to include drought, overgrazing and firewood collection.

Conclusion and Recommendation: Dega Damot woreda is rich in its medicinal plant composition and the associated indigenous knowledge though medicinal plants are highly affected by drought, overgrazing and firewood collection. Awareness should thus be created among the woreda’s community by concerned bodies regarding the usefulness of medicinal plants. The efficacy and safety of the claimed medicinal plants need to be evaluated before recommending them for a wider use.

Key words: Medicinal plant, Traditional medical practitioner, Ethnopharmacology
Hepatoprotective activity of Vitex Altissima (Verbenaceae) against Carbon Tetrachloride induced toxicity in Experimental Rats

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ABSTRACT
Liver diseases have become one of the major causes of morbidity and mortality in man and animals all over globe and hepatotoxicity due to drugs appears to be the most common contributing factor. Plants have potent biochemical components of phytomedicine. The present study was conducted to elucidate the hepatoprotective activity of aqueous extract of Vitex altissima against Carbon tetrachloride induced liver damage in rats. The aqueous extract of Vitex altissima (100mg/kg) was administered orally to the animals with hepatotoxicity induced by Carbon tetrachloride (0.7ml/kg). Liver damage was studied by assessing the biochemical parameters such as serum enzymes alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP) and bilirubin. The plant extract (100mg/kg) was effective in protecting the liver against the injury induced by Carbon tetrachloride in rats. This was evident from significant reduction in serum enzymes alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP) and bilirubin. The hepatoprotective activity was also supported by histopathological studies of liver tissue. The hepatoprotective effect of Vitex altissima was comparable with the standard drug Silymarin. It was concluded from the result that the aqueous extract of Vitex altissima possesses hepatoprotective activity against Carbon tetrachloride induced hepatotoxicity in rats.

Keywords: Vitex altissima, Carbon tetrachloride, hepatoprotective and Silymarin
ABSTRACT

Background: Infant and young child feeding is a cornerstone of care for childhood development. The first two years of life provide a critical window of opportunity for ensuring children's appropriate growth and development through optimal feeding. Any damage caused during this period could lead to impaired cognitive development, malnutrition, poor growth and development, compromised educational achievement and low economic productivity. Objective: To assess infant and young child feeding practices and associated factors among mothers of under 24 months children in Shashemene Woreda, Oromia Region. Methods and materials: A community based cross sectional study was conducted from 01/08/2006 to 30/08/2006 E.C. A total of 423 mothers who had child less than two years were included in the study using simple random sampling technique. Female Public Health students collected data using semi structured interviewer administered questionnaire. Bivariate and multivariate logistic regression analyses were conducted to identify factors of infant and young child feeding practices. Statistical significance was determined at p-value level less than 0.05. Result: A total of 417 (98.6%) mothers with their index child were interviewed. The ever breastfeeding rate in this study was 98.3% while the timely initiation rate of breastfeeding and exclusive breast feeding were 58.0% and 87.8% respectively. The prelacteal feed and colostrums feeding rate were 49.4% and 65.5% respectively. One fourth (28.7%) of mothers reported using of nipple bottle for feeding. The minimum food diversity and minimum meal frequency were 39.1% and 82.0% respectively. The proportion of timely introduction of solid, semi-solid and soft foods was 65.7%. The prevalence of inappropriate infant and young child feeding practice in study area was 67.9%. Being Government [AOR=9.81(1.90, 50.65) and private [AOR=7.66(1.40, 41.94)] employee of husband, poorest socio-economical status[AOR=1.39(1.30,6.48)], not attending ANC (AOR=4.32(2.27,8.21)], child age 0-5 months [AOR=16.01(5.01,50.03)], negative attitude of mothers [AOR=2.50(1.14,5.47)] and number of children 3-4 [AOR=5.37(1.67,7.42)] were positively associated with inappropriate feeding practices. Conclusion and Recommendation: A wide range of inappropriate infant and young child feeding practices exist. Socio-economic status, age of child, number of children, ANC and attitude of mothers affect infant and young child feeding practices. Increasing ANC coverage for further improvement of infant and young child feeding practice is recommended.
Performance Evaluation of Emergency Surgical Officers (IESOs) in selected Hospitals of SNNPR, Ethiopia

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ABSTRACT

Introduction: Despite expansion of health infrastructure and development of human resources, access to surgical emergency service is still low in Ethiopia. The service is inadequate in rural than urban areas. Patients demanding surgical emergency services need to travel long distance to the services. Cognizant of this fact, the Federal Ministry of Ethiopia in collaboration with academic institutes has implemented training of Surgical Emergency officers (ESOs) as of 2009 in order to make the services accessible to the rural community. Objective: The general objective of the study is to evaluate the performance and assess improvement in access to emergency surgical and obstetrics care services in hospitals of SNNPR where ESOs are assigned. Methods: A retrospective cross sectional study conducted in hospitals where ESOs are actively engaged. Eight hospitals were randomly selected out of 16 hospitals where ESOs, are working. Data were collected from operation registry that recorded operations as of recruitment date of ESOs. In addition, in depth interviews have been undertaken with medical directors, surgeons and operations team of each hospital. Both qualitative and quantitative data were collected by trained medical doctors and public health officers. Result: A total of 4074 major operations and procedures have been performed from June 2012 to November 2014 in eight Hospitals where emergency surgical officers are working. Of all hospitals, Butajira hospital performed the largest operations i.e 1418/4074 (34.8%). Caesarean section (C/Ss) is the highest obstetric operation (58.3%) of all operations performed by emergency officers. Butajira hospital also performed the largest proportion of C/Ss. Exploratory laparotomy is the most common emergency surgical procedure that has been performed by ESOs. Out of the sampled hospitals, 50% has surgical specialist in addition to ESOs. In depth interview participants emphasized that accessibility to surgical emergency services has remarkably improved since the assignment of ESOs. Conclusion: The result shows that ESOs made significant improvement in making surgical emergency services accessible to the community. It is observed that the training of emergency surgical operations has provided timely solution to curb a shortage of trained health professionals who give lifesaving health services. Joint assignment of both surgical specialist and ESOs in a hospital may not fully address the primary objective of the Program. Recommendation: ESOs officers should be deployed in Hospitals without surgical or obstetric and gynaecologist specialists. ESOs need to focus on performing emergency surgical services. Mentoring of ESOs and team work should be encouraged in hospitals where presence of surgical specialist is necessary. Regular on job trainings should be devised to improve skills of ESOs. Further study is recommended to assess the quality of services provided by ESOs.
Assessment of Knowledge, Attitude and Practice of Disaster Preparedness Among Tikur Anbessa Specialized Hospital Health Care Workers, Addis Ababa, Ethiopia

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ABSTRACT

Background: Disasters are parts of human life; they will never ask for permission to occur in particular area. The world over, they have been caused disastrous complications, disrupting human lives, and exposing the world economy to untold cost. In times of disasters, hospitals are among the most crucial institutions as they are considered as sanctuaries where victims seek ministration. Although major disasters and accidents are always to be expected, past disasters and more recent events demonstrate that communities are still often not fully prepared for dealing with disaster issues. Objective: The study was intended to assess current awareness, attitude, and practice of Tikur Anbessa specialized hospital health care workers regarding disaster preparedness and its plan. Furthermore, the intention of the study was to check the presence of disaster plan and to find out what arrangements were in place should a disaster occur at the hospital.

Methodology: The study utilized both quantitative and qualitative research methods. Data collection was made through self-administered questionnaires and semi-structured key informant interviews. All health care workers at the hospital were involved in the study. Minimum sample size was determined using simple proportion sample size calculation formula. Thereafter, respondents were stratified into categories set for the study purpose. The key informant interviewees were initially purposively selected and the snowball technique was thereafter used during data collection. Data analysis: Quantitative data from the questionnaires were coded and then analyzed using descriptive statistics with Epi-info and Statistical Package for Social Sciences (SPSS). Qualitative data from key informant interviewees was organized into themes and summaries. The data was organized into four sub-topics: disaster policy, hospital disaster plan, vulnerability assessments, and training and education.

Result: About half of (50.8%) health care workers at Tikur Anbessa specialized hospital had good knowledge about hospital disaster preparedness and its plan. The remaining 49.2%) had low knowledge. Their general attitude towards the issue was largely positive as 64.8% of respondents had favorable attitude. Low practice (8.3%) of disaster preparedness at the hospital was observed. Moreover, the hospital had neither disaster preparedness plan nor other forms of arrangements and preparations for occurrence of disasters.

Conclusion and Recommendations: The present study found that the health care workers at the hospital had fair awareness and largely positive attitude on disaster preparedness. The hospital, however, had not prepared for disasters. There were negligible arrangements in place should a disaster occur at the hospital. The study also found that sufficient attention has not been given to hospitals disaster preparedness by national health policy. Therefore, taking into account how hospitals are valuable in times of disasters strike and how we are lagged behind towards their protections, all stakeholders including Federal Ministry of Health and managements of hospitals should be awaken.

Key words: Emergencies, Disaster preparedness, Disaster preparedness plan
Mycobacterium tuberculosis-specific Functional Immune Response in Pregnant Women with Human Immunodeficiency Virus and Latent Tuberculosis Co-Infection

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ABSTRACT

Background: Immunity to tuberculosis is suppressed due to HIV co-infection and this suppression could further be enhanced by pregnancy. However, no study has evaluated tuberculosis specific immune response of pregnant women with HIV and latent tuberculosis co-infection. **Objective:** To determine M. tuberculosis specific functional immune response in pregnant women with HIV and Latent Tuberculosis Co-Infection. **Method:** A cross-sectional study was conducted in five hospitals and two health centers in Addis Ababa, Ethiopia from April 2013 to July 2014. Blood was collected from 267 women with no active TB (86 HIV positive pregnant, 74 HIV negative pregnant and 107 HIV positive non-pregnant women). TST and QFT-GIT tests were done to screen latent tuberculosis. Peripheral Blood Mononuclear Cells (PBMCs) were isolated and IFN-γ, IL-4 and IL-10 ELISPOT were performed in stimulation with α-CD3, PPD and ESAT-6/CFP-10. Plasma was separated from latent tuberculosis infected and uninfected women to measure TB specific IgG using ELISA. **Result:** HIV negative pregnant women had higher proportion of QFT-GIT positivity (29.7%) than HIV positive pregnant (19%) and HIV positive non-pregnant women (23.4%). The agreement between TST and QFT-GIT ranges between substantial to excellent. The median frequency of IFN-γ secreting cells to PPD and ESAT-6/CFP-10 were not significantly different between HIV positive and HIV negative pregnant women. However, HIV positive non-pregnant women had significantly higher IFN-γ secreting cells to PPD and ESAT-6/CFP-10 than HIV positive pregnant women, \( p = 0.0407 \) and \( p = 0.0438 \), respectively while IL-4 response didn’t show significant difference. HIV positive pregnant women had more IL-10 in response to PPD and ESAT-6/CFP-10 than HIV positive non-pregnant control, \( p= 0.0206 \) and \( p=0.0024 \), respectively. The frequencies of tuberculosis specific IFN-γ, IL-4 and IL-10 secreting cells were not significantly related with CD4\(^+\) T cells count. The median concentration of IgG was not significantly different between latently infected HIV positive and HIV negative pregnant women. **Conclusion and recommendation:** Our results support the hypothesis that HIV positive pregnant women are at higher risk of failing to control tuberculosis infection due to suppression of Th1 response. However, their antibody response remains intact. Need more prospective studies to assess risk of HIV positive pregnancy in post partum tuberculosis, evaluate performance of TST and QFT-GIT in HIV positive pregnant women. **Key terms:** Pregnancy, TST, QFT-GIT, ELISPOT, IFN-γ, IL-4, IL-10, CD4 count
Subtheme Four: Food Security and Nutrition

Efficacy of Farmers Training Centers in Agricultural Development: A Cross Sectional Assessment

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ABSTRACT
As agriculture is the backbone of the Ethiopian economy and contributes for about 41% Gross Domestic Product and 75% of export earnings, the Federal Democratic Republic of Ethiopia has devised Agricultural Development Led Industrialization (ADLI) strategy. However, it is characterized by subsistence farming system using backward traditional farm tools, with low productivity. To this end, the government has been implementing development strategies with the aim of changing the backward farm practices. One of the strategies was the establishment and organization of Farmers’ Training Centers (FTCs) to provide training and other agricultural extension activities to the farmers by the professionals. However, there is dearth of evidence about the effect of those FTCs on agriculture development and the factors affecting their performance in the study area. Hence this paper examines the effect of FTCs on agricultural development in Sankura Woreda. To address the objectives, multi-stage random sampling procedure was adopted to select the district, FTCs and sample farmers. Accordingly 210 sample farmers from 6 functional FTCs were identified through proportionate random sampling techniques. Both primary and secondary data were used to address the objectives and primary data was collected through semi-structured interview. Descriptive statistics, chi-square and Linear Multiple Regression model were used to analyze the data. As the results of shows, the FTCs based extension services were not well performed in achieving their goals. On the other hand, farmers’ accesses to the extension services were better in accepting technologies and applying modern practice than non participant farmers. The extension services are also found contributing a significance change on agricultural production, however the activities related to training methodologies, training periods, information services, demonstration visit, experience sharing, extension agents’ support and training need assessment were not much satisfactory. Among hypothesized variables; skill and knowledge of DAs, lack of demonstration, poor monitoring and evaluation, poor linkage with different institutions, lack of resource, materials and infrastructures and awareness of farmers are found as significant variables which influence the performance of FTCs. Based on the results recommendations are forwarded.

Key words: Farmers’ Training Centers, Agriculture Development, Efficacy, Extension
Gender Sensitivity in Higher Education Settings: a Rhetoric or a Reality?

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ABSTRACT
Higher education plays a key role for social, political and economic developments of communities. However, as higher education programmes are influenced by the environment, principles, norms and rules that exist in communities, higher education institutions could be gender socializing forces; teachers and educators would act as agents of gender-socialization. They mould gender roles of their students, affect their academic achievements thus having impact on quality of life and power distribution in contemporary society. This paper, therefore, examines the reality and rhetoric of gender sensitivity at higher education, particularly at Addis Ababa University. The study employed a critical discourse analysis approach, with mixed-methods of data collection and analysis, focusing on programme documents, teaching-learning materials, perceptions of teachers, perspectives of students, and observations of classroom interactions. The findings revealed that attempts have been made to promote gender equity in programme documents. Some positive supports are also provided; but these are seen only from female students’ perspectives. Moreover, teaching modules focus on subject matter contents and are written in gender neutral or gender blind language. Teachers believe that they give equal opportunities to girls’ and boys’ learning, but focus group discussions with students and the classroom observations revealed that was done rarely. In most classroom interactions, girls were invisible; it was acknowledged that boys were dominant in many aspects of the teaching-learning process. For higher education to be gender sensitive, efforts should no longer focus exclusively on obvious abuses such as sexual harassment. They must also extend to a carefully considered outlook that informs the whole teaching-learning process of the University, in the educational materials produced, as well as in the everyday teaching-learning activities.

Key Terms: higher education, gender sensitive education, gender equity,
Economic Analysis of Small Scale irrigation Based Vegetable Production in Wondo Genet District of Sidama Zone, Southern Ethiopia

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ABSTRACT
This study was aimed at analyzing the profitability of small scale vegetable production, identifying the major determinants of gross annual income and identifying the major farm and market level constraints of small scale vegetable enterprise in Wondogenet district of Sidama Zone, Southern Ethiopia. The major vegetables grown were potatoes, tomatoes, cabbage, carrot and onion in order of importance. The study used descriptive statistics to address the first and the third objectives and multiple regression analysis to address the second objective. Out of the total sample (100), 80% and 20% respectively used irrigation and rain fed farming in vegetable production. The study revealed that the age of sampled household ranged from 18 to 70 years, with mean age of 39 years. Majority (60%) of the respondents attended primary school. Although the total land holding ranged from 0.25 to 2.5 ha, majority (40%) of the respondents had land ranged between 0.25 to 0.75 ha, from which the proportion of irrigated land ranged from 53% to 91% of total land held. Borehole was reported to be the main source of water for irrigation for 60% of the respondents. Input cost accounted for the largest share (78%) of the total vegetable production and marketing cost. The survey result further portrayed that the benefit cost ratio and net benefit cost ratio was 1.72 and 0.72, respectively implying that vegetable business at small scale level was profitable. About 49% of the respondents indicated that farm level vegetable activities were shared among the family members including husband, wife and children; whereas 42% of the respondents indicated that marketing tasks of vegetable were performed by either husband or wife only, excluding children. According to 60% of the respondents, whole seller was the main buyer of their vegetables. In marketing process, direct contact was the major way to find buyer, reported by 67% of respondents. Among variables used in multiple regression, number of vegetable grown, land irrigated, education, seed cost, fertilizer cost, and irrigation costs were statistically significant and positively correlated with gross income implying that the use of these inputs was less than the optimal level while marginal contribution of each additional input unit was positive. On the other hand, number of working people was negatively correlated with gross income and statistically significant at 10% because of increased off farming activities. Age and age squared were statically insignificant; however, they had negative correlation with annual gross income implying that older age was inefficient in vegetable business. Thus, accordingly, addressing these policy variables is paramount so that return from vegetable at small scale level will be scaled up as per government’s awesome endeavors.

Key words: constraints, vegetables, profit, margin
Constitutionality and the Socio-economic Impacts of the Ethiopian Urban Land Lease Holding System

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ABSTRACT
Pragmatic differences in terms of social, economic and cultural setups have made adoption of different land policy and law schemes in dissimilar societies inevitable. Accordingly, Ethiopia had gone through different land tenure systems. Until a radical land policy change was introduced by the Dergue regime in 1975, there were the usufructuary and private tenure systems. Thus, it was possible to own land privately during the era of Emperor Haile Selassie. Then, the Dergue regime came up with a totally new land policy which abolished private land ownership once and for all. The current Ethiopian government is also following the same land policy but doesn’t include the nationalization policy of the Dergue regime which even takes away extra houses and improvements over land without compensation. The factors on ground determine the land policies and laws to be introduced or adopted by a country. It is in light of the prevailing facts that the FDRE constitution declared that both urban and rural land and other natural resources are owned by the state and peoples of Ethiopia and thus cannot be owned privately (Art 40(3) of the FDRE constitution). Individuals cannot own land privately doesn’t mean that they don’t have any property right which may be exercised over land. Every Ethiopian has full property right to the immovable property he/she builds and the permanent improvements he/she makes on the land. This work has reviewed the developments related to the Ethiopian urban land lease holding system. The investigator has used data including official decisions by government authorities, interviews, questionnaires, official legal and policy documents including the constitution of Ethiopia, the current and previous urban land lease holding proclamations, the civil code, urban land related regulations and directives and other available primary and secondary sources. The researcher has also considered some relevant lessons that Ethiopia may draw from other jurisdictions. This research explored on the right to property, urban land lease holding, urban land market, tenure security and social justice in land administration. At the core of this work are issues including but not limited to constitutionality of the federal and regional urban land lease laws, socio-economic implications of the Ethiopian urban land lease system and land governance and social justice in Ethiopia. This research has shown that the present urban land lease holding system has many flaws. The existing urban land lease system has left the majority of urban residents in Ethiopia in an economically detrimental condition. It has set aside the poor out of the deals over urban land through tender procedures which reward only the highest bidders who are the rich in almost all cases and thus favored the rich by enabling them accumulate real estate in their hands using their financial means at the expenses of the right of poor persons to have access to urban land. As this lease system doesn’t incorporate rules which allow the lower class of the society get urban land for free or at the lower prices, it cannot bring about stable and healthy economic development in Ethiopia.

Key words: Constitution, urban land lease, tenure security, property rights
Land Grabbing in Ethiopia: towards Attracting Foreign Direct Investment

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ABSTRACT
Large scale land acquisition is a buzz of the day in the world, more so in Ethiopia. The issue is indeed polarising, in one hand it is dubbed as land grab and seen as ultimate scramble for land. On the other hand, it is often depicted as key to development, technology transfer and boost in productivity of an otherwise idle land available in Ethiopian lowlands. Hence, many million hectare of land are being given away everywhere in the world, in Ethiopia the government has put over 3.3 million hectare of land in a land bank for investment especially foreign direct investment. This land is often found in the lowlands of the nation where sparsely populated pastoralists often live. In the highlands, especially surrounding the capital city and big cities, flower companies have taken substantial land for flora productions. Globally, several push and pull factors are involved underlying the causes of the large-scale land acquisition. These include food security concerns, particularly in investor countries, which are a key driver of government-backed investment. Food supply problems and uncertainties are created by constraints in agricultural production due to limited availability of water and arable land; by bottlenecks in storage and distribution; and by the expansion of biofuel production, an important competing land and crop use. These and related factors apply to Ethiopian situation as well. However, many problems are cropping up ranging from the way the land is identified for investment, to the manner of negotiation and lease contracts, to evictions, human rights violations, empty promises of compensations, and environmental destructions. It is also undeniable that the investment might bring substantial change in the production of food and ensuring food security, expediting development where handled and negotiated well in the framework of sustainable development. Thus, the main focal point of this work is to show the nature of the land acquisition in Ethiopia in terms of the existing land governance and its implication for human rights, environment and conflict patterns.
The Empowerment of Women through Microfinance Services in SNNPR: Assessing the Distribution and Impacts of MFIs

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Abstract
Following the issuance of the proclamation in 1996, many microfinance institutions have been established in Ethiopia. In SNNPR, even if there are seven main microfinance institutions (MFIs), the major one to act in the region is OMFI covering 80% of the regional service. By the end of 2013, it has around 2 million active clients of which 30% of them are women. This research was done in collaboration with Bureau of Women and Children Affairs (BOWCYA) with dual purpose in mind. First, it is an impact assessment of MFIs in women's socio economic life and secondly it is intended to have an indicatory role by pointing out the major determinants to membership in MFIs. To disclose their condition, 11,162 households were interviewed from 43 Weredas (districts), focus group discussions (FGDS) were undertaken, and village elders and microfinance staffs were interviewed as key informants. The outcome indicated that only 17% of the women were beneficiaries in the region and among them only 56% of them use the borrowed money for income generating activity. However, these women experienced a major change in their life both within their family and community. For instance, the percentage of households who earn above Birr 2000 increased from 2% to 28%; around 75% repay their loan from their profit and more than 90% of them started to involve in voluntary saving activities. Moreover, the logistic regression result indicated that educational status, size of land holding, age, religion, job status, husband's education level, family size, type of crop they grow and the use of informal credit sources are the main determinants of women's participation in MFIs. On the other hand, high withdrawal rate of the saving, insufficient provision of entrepreneurial trainings on skill development and financial outlay, frequent dropouts, weak market access and connectivity are the major challenges of MFI services. Moreover, lack of awareness and the negligible role of Medias in promoting the service made the larger part of women to stay out from the service.

Key Words: Empowerment, Microfinance, Voluntary Saving, Withdrawal
ABSTRACT
In recent years, CSR has gradually become a leading issue in business. Heightened corporate attention to CSR has not been entirely voluntary. Many companies awoke to it only after being surprised by public response to issues they had not previously thought were part of their responsibilities. But despite their intent, the practice and what drives them to engage is not lucid. Thus, the prime essence of this study was to assess the level and drivers of corporate social responsibility practice in large manufacturing industry in Tigrai region. The study used both qualitative and quantitative research approaches as well as it considers primary and secondary source of data. Two type of structured questionnaire were developed to get data from the respondents, the first type of questionnaire were used to get data from 61 respondents composed of managers/CEO of those large manufacturing industries and the second type of questionnaire was distributed among 39 trade (labor) union heads found in those large manufacturing industries. Besides, focused group discussion was carried out among inhabitants living around those manufacturing industry. Data processing and analysis used descriptive statistics such as sample mean and percentage to describe the responses obtained. Moreover, the drivers for CSR was analyzed using econometrics analysis of logit model that involves finding the best relationship to explain how variation in the outcome (dependent or CSR) variable depends on the variation in a predictors (independent like environmental, community, workplace and marketplace dimensions) variables. The finding shows that the main driver for large manufacturing industry to engage in CSR is the need to meet their marketplace dimension of CSR which accounts to administrative/government related legal activities. Based on the finding the probability of regular application in CSR increases by 38.02% with 1% increase in the marketplace dimension programs. Moreover, 1% increases in workplace dimension leads to 31.96% increase in the application of CSR regularly. Hence, the magnitude from these two dimensions shows that market place and workplace dimension has highest marginal effect and are the main drivers for CSR application based on their marginal effect after Logit result. Besides, based on the group focus discussion, inhabitants’ living around these manufacturing industries designate that “the support they gain from the companies in the name of CSR is insignificant comparing their annual profit” but the residents ascertain that these manufacturing industries are undeniably alleviating unemployment in their area. Furthermore, the result implies that, the current strive for environmental management especially to reduce the environmental impact on inhabitants living around those large manufacturing industry is encouraging but not comprehensive. Above and beyond, those large manufacturing industries are acting unilaterally on the field to reducing environmental impact in which they are expected to work together with community, suppliers and other concerned parties.

Key words – corporate social responsibility, large manufacturing industry
Practices, Challenges and Opportunities of Community Participation in Tourism Development: A Case of Dinsho area of Bale Mountains National Park, Southeastern Ethiopia

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ABSTRACT
Community participation has long been recognized as a central issue in sustainable tourism development endeavor. However, most destinations of developing countries have often failed to trigger the broadest benefits of tourism development for the communities. Aimed at assessing the practices, challenges, and opportunities for community participation in tourism development in Dinsho area of Bale Mountains National Park (BMNP), both qualitative and quantitative data were collected using semi-structured interviews, household survey, field observation, focus group discussion, and documents. Qualitative data were analyzed using narration and presented thematically whereas quantitative data by using percentage, mean, standard deviation, cross tabulation, and Pearson chi-square and presented through tables and graphs. It is found that tourism is growing and results in increasing awareness of communities about the contribution of, and has positive attitudes towards their participation in, tourism development. As a result, except members of ecotourism associations, majority of the communities are not significantly benefiting from tourism due to the absence of partnership and cooperation with other tourism stakeholders, lack of start-up capital and tourism businesses knowledge and skills, and unfair distribution of income from tourism. Similarly, communities are not participating in decision making aspects of tourism development due to the absence of chances given for the communities by the park management and local government and conflicting interest among those two parties arising from illegal grazing, farming, settlement, and deforestation. Consequently, communities’ participation is at the level of non-participation (manipulation and informing). However, growing government attention, communities’ awareness, stability and good image, establishment of infrastructure and facilities, increasing tourist flows, and diversified tourism resources are the likelihoods for communities’ participation in tourism development.

Key Words: tourism, community participation, benefits sharing, decision making
Effects of Problem Based Learning on Students’ Academic Achievement and Attitude towards Applied Mathematics: The Case of Higher Public Institution of Ethiopia

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ABSTRACT

In the rapidly changing world and in the development of sciences and technology, Mathematics plays a vital role. Clearly knowing better method of teaching are required for producing qualified professionals to fill the gap of human resource development in Ethiopia. The main goal of the study was to determine the effects of problem-based learning on students’ academic achievement and attitude towards Applied Mathematics. The total number of observations was determined by scientific sample size determination (n=180) and stratified random sampling procedure was also applied in the study areas. In the study, data were obtained through the use of pre-test and post-test on experimental and control groups model in each three universities. Two types of instruments were used for measurement achievement tests and designing questionnaires. Descriptive and inferential Statistics mainly independent samples t-test, paired sample t-test and ANOVA were used to see significance difference between experimental and control group in academic achievement and attitude towards Applied Mathematics-II. The data were analyzed by using SPSS Version16.0. The result of Independent sample T-test reveals as there was a statistical significant difference between control and experimental group achievement of students in the three Universities ($t_{cal}=3.593$, $P_{value}=0.000$). The result of the study also reveals that, there was statistical significant difference in the experimental groups of post -test among the three universities($F_{cal}=1843.2$, $P_{value}=0.000$&$F_{cal}=19373$, $P_{value}=0.000$). The results in this study shows that implementing PBL approach improved by 5.81% of students’ academic achievement at Ambo University, 6.4% at Addis Ababa University(5Kilo Institute of Technology) and 7.8% at Addis Ababa Science and Technology University. And students developed positive attitude towards PBL; their academic achievement and attitude towards Applied Mathematics were positively correlated in each three Universities. At higher institutions, instructors are encouraged to implement PBL method in teaching science concepts, especially Applied Mathematics. It is advisable if the government and university management would pay their attention in providing PBL teaching mechanisms than the previous methods.

Key Words: PBL, Control group, Experimental group, Applied Mathematics and ANOVA
Challenges in Implementing the Environmental Pollution Control Legislation of the Federal Democratic Republic of Ethiopia

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ABSTRACT
At present, there are various laws in Ethiopia relevant to environmental pollution control. However, the problem of pollution has not been controlled and continues to adversely affect the environment, the health, social and economic aspect of human beings. Thus, a study towards the major causes for the lack of effective implementation of the environmental pollution control legislation is important. In order to achieve the objective of the study, literatures were reviewed, and questionnaire, key informant interview and focus group discussions were used as main research instruments. Evaluation packages were prepared; to measure the level of prevailing institutional capacity, coordination, and awareness raising programs; based on the relevant requirements stipulated under the national Environmental Pollution Control Proclamation and on the basis of the standards issued by UNEP for African countries. The result has indicated that, lack of institutional capacity both from the side of EPA and sectoral agencies, low/weak inter-institutional coordination between EPA and relevant sectoral agencies and inadequate environmental awareness raising programs were identified as major challenges for the proper implementation of the environmental pollution control legislation. Thus, improving the institutional capacity of EPA and relevant sectoral institutions, strengthening the coordination between relevant institutions through creating an enabling environment for multi-stakeholder partnership, and enhancing the environmental awareness raising activities are recommended to improve the implementation of the Environmental Pollution Control legislation.
Assessment of Socio-Economic and Environmental Contribution of Biogas Technology: The Case of Meskan Woreda, Southern Ethiopia

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ABSTRACT
One of the major constraints of rural development in developing countries is lack of efficient and affordable energy technology and low level of crop production due to scanty use of fertilizer. Adopting a new technology that provides basic energy needs is an important issue for the rural people of Ethiopia where the majority of farmers are living at subsistence level. Biogas technology can play a vital role in enhancing the socio-economic status of the farmers by providing environmentally friendly and economically beneficial energy from animal dung. The by-product/bioslurry can be used as organic fertilizer for enhancing crop production. The objective of the study was to assess the socio-economic and environmental contribution of biogas technology in Meskan woreda, Southern Ethiopia. It further captures the current challenges facing the adoption of the technology and its impact on development, effective application and dissemination. Data were collected using structured and semi-structured questionnaires from households (HHs), extension agents and woreda experts and by conducting focus group discussion. The study was carried out by surveying forty HHs whose biogas plant has already started production, and 36 key informants and woreda experts. The sample was taken from four purposely selected kebeles of the woreda. Data were analyzed using Microsoft Excel. The result of the study revealed that biogas provides different social, economic and environmental benefits such as, provision of organic fertilizer, clean and healthy environment, reduced use of fuelwood and agricultural residues, reduction in cost of kerosene and chemical fertilizer, gender benefits and costs, creation of employment and overall contribution to household income. Enhancing crop production by using the bioslurry also contributes to food security, local and global environmental protection. 36(90%) households used the slurry as organic fertilizer out of 40 households. The remaining 4(10%) households used both composted slurry and slurry form. In addition to reduced use of kerosene, chemical fertilizer and fuelwood, the surveyed households of the study area have obtained total savings of ETB 13824 per HH and year. Financial, technical and institutional was the common challenges in adopting biogas technology. These constrains have influence on development and dissemination of the technology. Therefore, serous focus should be given from the government as well as other developmental organization for better dissemination and scale-up of the technology.

Key words: Biogas technology, bioslurry, environmental benefit, rural development, fertilizer
Rural Youth Outmigration and its Impacts on Migrant-sending Households in Gojjam and Wolayta, Ethiopia

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ABSTRACT

Rural outmigration of young people from densely populated agricultural areas is a common phenomenon throughout Ethiopia. The objective of this study was to assess the impacts of outmigration of young people on the socioeconomic and demographic behaviour of the migrant-sending rural households. Primary data were gathered through a survey that covered 300 migrant-sending households; from focused group discussions and in-depth interviews. The findings revealed that the major causes of outmigration were limited access to land and livestock resources; the need to pay off parental debts; expansion in rural education; and the lure of urban centers. Migrant-family linkages are expressed in terms of remittances, gifts and visits. Remittances, though small and irregular, are considered important by the migrant-sending households. Remittances are predominantly used to purchase farm inputs and implements; buy clothing and household goods/furniture; and repay loans and for land tax payment. Remittances enhance rates of asset formation and technological change, increase levels of consumption, reduce the necessity to incur debt and improve debt repayment position, and augment family member's education and medication. The results from multiple linear regression analysis revealed that the leading determinants of the amounts of remittances received by the migrant-sending households were number of migrant members, number of times the household received money within a year; and type of job the migrant is engaged in a destination. The study underscored the positive impacts of internal migration in terms of poverty reduction and rural households’ livelihoods enhancement.

Keywords: Youth, outmigration, remittance
Utilizing Folklore for Development: An Inquiry into Gurage Proverbs

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ABSTRACT
Folklore has been classified into material culture, performing arts and oral literature. Oral literature itself has been sub-classified into a number of genres including tales, proverbs, riddles, work place songs, cursing, etc. This article focuses on the proverbs of Gurage, one of the South Ethiosemitic languages spoken in the Gurage Zone of the Southern Nations, Nationalities and Peoples Regional State of Ethiopia, used for development purposes. As to how the folk culture in general and proverbs in particular can be utilized for development endeavors have not been studied in the Gurage contexts. This article, thus, attempts to fill in this gap. The main purpose of the article is to find out the way proverbs in Gurage were and can be used to inculcate and sustain socio-economic developments in the Gurage community and the country at large. The research design used is cross-sectional and descriptive. It follows hermeneutic approaches to qualitative research method in which social phenomena is systematized, thematically analyzed and interpreted. To elicit the proverbs, key informant interview (KII) was used. Eight elders with good knowledge of Gurage culture and language were purposefully sampled. As Gurage has a number of language varieties, Central West Gurage language varieties, namely, Cheha, Ezha and Gumer were sampled among other twelve varieties. Though the proverbs are common to all the Central West Gurage, the linguistic data was transcribed with the Cheha variety. The finding showed that Gurage people, particularly elders, use proverbs to inculcate development issues (e.g.: jäčotä bäkam ančotä fäkam ‘one who tilled became self sufficient, the other who did not do so migrated), to denounce laziness (e.g.: jawša t’amäžä jak’i bämäšä ‘lazy person’s barely is roasted and chewed in December soon after it was harvested’), to express and fight corruption (e.g.: bäsär bïmar č’arim g*ānčä gäkït b’arim ‘meat is laden on a donkey, and hyena is ordered to accompany the donkey’). It is also found that development agents in Gurage neither are using the Gurage proverbs nor the Gurage language in general for mobilizing the community to bring development and alleviate poverty in the area. The study suggested the ways proverbs may be used for social mobilization towards development issues despite the unofficial status of the Gurage language.

Key words: culture/development/ Folklore/Gurage/proverb
Exclusive breastfeeding and maternal employment in Ethiopia: A comparative cross-sectional study

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ABSTRACT

Background: Promotion of exclusive breastfeeding is the single most cost-effective intervention to reduce infant mortality in developing countries. Exclusive breastfeeding for the first six months has greater benefit than formula feeding for the prevention of mother to child transmission of HIV. in Ethiopia, the prevalence of exclusive breastfeeding among infants less than 6 months is 49%, with limited information on associated factors of exclusive breast feeding. Understanding the associated factors that influence exclusive breastfeeding is crucial to promote the practice in Ethiopia. Objective: To compare exclusive breastfeeding and its associated factors among employed and unemployed mothers in Injibara Town, Awi Zone, North west Ethiopia. Method: A community-based comparative cross-sectional study was conducted from March 24-April 14, 2013. A total of 524 mothers of children age ≤1 year were included in the study. A structured, pretested and self-administered questionnaire was used to collect data. Descriptive Statistics were performed to compare exclusive breastfeeding among employed and unemployed mothers. Multiple logistic regression analysis was conducted to identify independent predictors of exclusive breastfeeding. Results: The prevalence of exclusive breastfeeding was 44% and 65% among employed and unemployed mothers respectively. Employed mothers were 32% times less likely to breastfeed exclusively than the unemployed mothers (OR= 0.32). Place of birth (OR=4.4), belief of breast milk sufficiency (OR= 3.6), religious fathers support of exclusive breastfeeding (OR=2.7) and maternal age of 18-23(OR=9.4) were independently predictors of exclusive breastfeeding among employed mothers. Whereas, husbands’ support of exclusive breastfeeding (OR=1.9), knowledge on duration of exclusive breastfeeding (OR=2.8), timely initiation of breastfeeding (OR=2.9), Awareness of exclusive breastfeeding (OR=2.2) and delivery attendance (OR=2.2) were independently predictors of exclusive breastfeeding among unemployed mothers. Conclusions: A large proportion of infants are not exclusively breastfed. Exclusive breastfeeding status of unemployed mothers was significantly better than that of employed mothers. Therefore, the government should promote exclusive breastfeeding by creating breastfeeding friendly working environment.

Keywords: Exclusive Breast Feeding, Maternal Employment, Injibara Town
Employee Profile and Employment Practices in Micro and Small Enterprises of Wolaita Zone, SNNP, Ethiopia

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ABSTRACT
Small scale industries are playing an ever-increasing role in the industrial structure of the developing economy. They slightly higher shares of employees working part time, employees with a high school diploma or less education, and employees 65 years or older show that small firms are able to fill some gaps in the opportunities available for these groups (Brian, 2000). The main objective of this study is to investigate the employee profile and employment practices in Micro and small enterprises of Wolaita Zone. With two step sampling technique, stratified sampling was used to categorize sectors according to their similarity where the strata are different sectors of Micro and Small Enterprises whereas convenience to select available employees and owners during data collection. The survey involved 150 (100 employees and 50 owners) of the selected Micro and Small Enterprises. The researchers used SPSS (version 20) in coming up with the statistical analysis of all the data for this study. In general, the results of the study indicated that small businesses have greater proportion of male owners and workers (66% & 63% respectively) than their female counter parts. Majority (36%) of the owner participants are bachelor degree holders and followed by 28% with TVET (10+1, 10+2, 10+3, 10+4) level of education. Network is found as the major source (46%) of recruitment used by almost all participants under this study. In general, 18.75%, 16.67%, and 64.58% of business owners responded as there are equal, more female (F>M), and more male (M>F) workers working in their business respectively.

Key words: Micro and small enterprises, Employees, Sources of Recruitment, Gender, Education, Age, Experience
Pastoral Conflict, Climate Change and Indigenous Copying Mechanisms in Southern Ethiopia: A case Study of the Nyangatom and Dasanach

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ABSTRACT
This study examines the climate change induced resource scarcity-conflicts relationship and the indigenous copying mechanisms in southern Ethiopia by taking the Nyangatom and Dasanach as a case study. The study employed a qualitative approach and exploratory case study research design. The techniques of data collection include data from primary and documentary sources and secondary literature. Climate change brings newer and more complicated challenges to pastoralists of the lower Omo valley. Supply and demand induced scarcity of resources consecutively due to the declining trends of rainfall as a result of changing climatic patterns and the steady increase in human and livestock populations in a very fragile environment has made inter-ethnic and cross-border pastoral conflicts very complex and complicated. The increasing shrinkage of natural resources due to frequent droughts has been undermining the resilience capacity of the Nyangatom and Dasanach communities to drought – related food insecurity, environmental stress and conflicts. The study reveals a relationship between climate changes induced resource scarcity and pastoral conflicts. In this regard, the long-term conflict trends consistently show frequent violent conflicts during the dry seasons in the area. Nevertheless, the inter-ethnic and cross-border conflicts are very complex and strongly challenge the idea of a direct causal link between concrete climate change adversaries and small scale conflict acts. The study further reveals that the subdivision of common grazing areas to ethnic pastoral administrative territory in the post 1990s and persistent inter-ethnic historic animosity and hostility limits pastoral mobility and hinders efficient use of resources, constrains the pastoral production system and alters traditional mechanisms for negotiating access to rangelands resources. In addition to using mobility as adaptation to drought and rangeland resources, the Nyangatom and Dasanach use herd diversification, herd splitting, livelihood diversification, restocking and local alliances as the indigenous copying mechanism to adverse impacts of climate. However, this copying strategy sometime led to protracted inter-ethnic and cross-border conflicts mainly on the side of the Nyangatom. The new large-scale development projects in lower Omo valley may significantly contribute to the development of the area. This would in fact depend on proper understanding of the existing social structures and people’s life choices.

Key words: Climate Change, Conflict, Indigenous knowledge and Resource
Assessment of Work Related Stress and Associated Factors among Nurses Working in Public Hospitals of Addis Ababa, Ethiopia: A cross-sectional study

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ABSTRACT

Background: Work related stress among nurses is a pattern of reactions occurring when work demands not matched to their knowledge, skills or abilities, and challenges their ability to cope. This affects nurse’s health, resulting in burnout and high turnover to staff and poor patient care. Hence, this study would add a body of knowledge about the magnitude and associated factors of stress among nurses working in public hospitals of Addis Ababa, Ethiopia. Objective: The objective of this study was to assess prevalence and associated factors of work related stress among nurses working in public hospitals of Addis Ababa, Ethiopia. Methods: An institution-based cross sectional study was conducted in public hospitals of Addis Ababa in 2012. A total of 343 nurses were included in the study. Ethical clearance was obtained from Institutional Review Board of the University of Gonder and Amanuel Mental Specialized Hospital. Informed consent was obtained ensuring privacy and confidentiality throughout the data collection process. Data were collected by pre-tested and self-administered questionnaires using nursing stress scale. Data were coded, entered and analysed using SPSS version 20 software package. The associations between variables were analyzed using logistic regression. Results: A total of 320 nurses were participated, yielding a response rate of 93%. Mean age was 31 years ± 8.9 years. Thirty seven point eight percent of nurses were stressed. Significant associations were found between nurses’ stress and gender (AOR=2.47, 95%CI (1.28, 4.77)), work shift (AOR=5.719, 95%CI (2.54, 12.9)) and illness (AOR=3.09, 95%CI (1.21, 7.89)). There were also significant associations between stress and marital status and work site/unit of the nurses. Conclusion: Prevalence of work related stress was high. More than one third of nurses working in public hospitals were stressed in their work places. For nurses to perform their jobs safely and proficiently, all stake holders should design stress reduction and management programs.

Key words: Stress, work related stress, nurse, public hospitals, Ethiopia
PART TWO:

ABSTRACTS FROM RESEARCH PROCEEDINGS AT
HAWASSA UNIVERSITY
The Effect of Feeding Graded Levels of *Moringa stenopetala* Leaf Meal on Feed Intake, Growth, Carcass Characteristics and Meat Quality Traits of Arsi-Bale Goats

Aberra Melesse and Sandip Banerjee
(School of Animal and Range Sciences)

**ABSTRACT**
A study was conducted to assess the intake, growth, carcass and meat quality parameters of Arsi Bale bucks reared on different levels of *Moringa stenopetala* leaf meal (MSLM). The bucks were divided into four treatments based on their initial body weight. The rate of supplements offered was calculated @ 2.5% of the body weight on dry matter basis, MSLM was provided @0 (T1), 35 (T2), 50 (T3) and 65% (T4) of the offered supplement. Hay and water was provided at lib. The amount of hay offered was so calculated that at the end of the day there was atleast 15% refusal. The results indicate that the crude protein intake dry matter intake (DMI) organic matter intake (OMI), NDF=neutral detergent fiber intake (NDFI) and acid detergent fiber intake (ADFI) increased with the inclusion levels of MSLM with no significant difference between the bucks reared on T3 and T4 diets and those reared on T1 and T2 diets, however significant difference was observed between the two groups (T1; T2 and T3, T4). The body weight gain was observed to be higher among the bucks reared in T4 diet. The average daily weight gain, final body weight and total weight gain too showed similar pattern i.e the bucks receiving T3 and T4 diets had higher values for the parameters. The carcass traits indicated that the bucks receiving T3 and T4 diets had higher values for all the slaughter cuts (neck, thorax, rack and lumber) besides the dressing percentages and rib eye area besides the weights of the stomach, kidney and the large intestines, The meat quality parameters too indicated that the values for protein and ether extract too was higher among the bucks reared on T3 and T4 diets when compared to the other two treatments. Hence, it can be concluded that *Moringa stenopetala* leaf meal if affordable has a beneficial effect on weight gain, carcass traits and important meat quality parameters of bucks

**Keywords:** *Moringa stenopetala* leaf meal, weight gain, carcass traits, Arsi Bale goats
Effect of Substituting Wheat Bran for Green Pod of Moringa Stenopetala on Feed Intake, Digestibility and Growth Performance of Adilo Sheep Fed Natural Grass Hay as a Basal Diet

Aberra Melesse and Ajebu Nurfeta
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ABSTRACT

Conventional sources of feed supplements are costly and mostly unavailable for smallholder farmers. Moringa stenopetala is locally available protein supplement. The study used twenty-four yearling male Adilo male sheep with an average initial body weight of (14.09 ±0.78 kg) to evaluate the effect of M. stenopetala green pod substituting wheat bran. The parameters used to assess the effects of M. stenopetala green pod inclusion were dry matter and nutrient intake, digestibility, growth performances, nitrogen utilization and economic evaluation. The experimental design of the study was CRD where six sheep were randomly assigned to the four treatment diets. The four treatment diets, T1, T2, T3 and T4 contained 0, 15.5, 27.9, 46.5 percent M. stenopetala green pod, respectively as a substitute for wheat bran. The growth trial lasted for 70 days and followed by digestibility trial. Feed intake and body weight were measured on a daily and weekly basis, respectively. All the collected data were subjected to ANOVA using the general linear model procedure of SPSS. Dry matter (539.4g/day) and crude protein intakes (g/kg\(^{-1}\)BW) (57.8g/day) were higher for T4 (p<.001). The dry matter digestibility coefficient (74.35) were higher for T1 (p<0.05 and CP digestibility coefficient was higher for T4 (83.25) (p<0.001). Average daily gain was higher for T4 (50.5 g) and final body weight (19.2 kg) for T3 (p<.05). Cost per kg feed, cost per feed intake and cost per average daily weight gain values were higher for T4 (p<.001). Feed and protein conversion ratio values were higher for T1 (13.31) (p<.05). The results of this study indicated that substitution of wheat bran by M. stenopetala green pod up to 46.5 per cent in diet of sheep have positive responses on feed intake, digestibility and nitrogen utilization. Moringa stenopetala green pod is a cost effective and easily accessible alternative source of supplemental feeding as substitute for wheat bran.

Keywords: Moringa Stenopetala green pod, wheat bran, sheep, growth, digestibility, intake
The Effect of Feeding Stinging Nettle (Urtica simensis s.) Leaf Meal on the Feed Intake, Growth Performance and Carcass Characteristics of Hubbard Broiler Chickens

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ABSTRACT
The effect of dietary inclusion of stinging nettle leaf meal (SNLM) on growth and carcass parameters of growing Hubbard broiler chickens was investigated. Five iso-nitrogenous and iso-caloric grower diets, T1 (the control), T2, T3, T4 and T5 were formulated to contain 0, 3, 6, 9 and 12% of SNLM, respectively as a replacement for soybean meal of T1. After 2 weeks of brooding period, 200 unsexed chicks were weighed and randomly allocated to the dietary treatments with four replicates of 10 chickens each. The experiment lasted for 6 weeks, during which feed intake and body weight were measured on daily and weekly basis, respectively. Daily body weight gain (DBWG) and feed conversion ratio (FCR) were calculated. At the end of the experiment, two chickens (cockerel and pullet) per replicate of each treatment were randomly selected, fastened overnight, weighed and slaughtered for measurement of carcass parameters. Dry matter, crude protein, and calcium intakes were higher for T4 but crude fiber intake relatively higher for T5 (p<0.01). T3 was comparable to T5 for crude protein and calcium intakes but lower of T1 (p<0.01) for the same parameter. No significant difference was detected on ether extract, phosphorous and metabolizable energy intakes across treatment groups. Higher (p<0.01) DBWG and final body weight were observed in chickens fed on T4 diet than the rest. Chicks fed on T1, T2 and T5 were similar in these parameters. Moreover, body weight difference was not observed between T1 and T5 or T2 and T3. Significantly (p<0.001) higher dressing % was obtained from chickens fed with T2, T3 and T4 diets. The results of the present study revealed that inclusion of stinging nettle leaf meal up to 9% in broiler diet could be an alternative feeding strategy by substituting soybean meal.

Keywords: Stinging nettle leaf meal, broiler chicken, growth, carcass, feed intake
Evaluation of Replacement Value of Kocho with Maize on the Growth Performance and Carcass Characteristics of Broiler Chickens

Ajebu Nurfeta and Aster Abebe
(School of Animal and Range Sciences)

ABSTRACT
A total of 180 day-old Hubbard chicks were purchased from Debre Zeit Agricultural Research Centre to investigate the potential of kocho as a substitute to maize. Feed ingredients (kocho, maize, wheat bran, noug cake, vitamin premix) were purchased from Hawassa, Zeway and Addis Ababa. Kocho (starchy product processed from enset for human consumption) was sun dried to reduce its moisture content. Treatments were inclusion of kocho at 0% (T1), 33% (T2), 67% (T3) and 100% (T4) levels substituting maize in broilers diet. The house and equipments were cleaned and disinfected before arrival of chicks. After brooding period, chicks were allocated to the four treatments each with three replications. Feed and water were provided ad libitum. The feeding trial was conducted for 49 days. Parameters studied include; feed intake, body weight, nutrient efficiency and retention and carcass traits. Feed intake was recorded as feed offered minus feed refused. Nutrient retention was determined by comparative study technique. Twenty four chickens (six/treatment) were randomly selected and killed for evaluation of carcass traits and nutrient retention following feeding trial. Data were analyzed by general linear model of Statistical Analysis System. Dry matter intake was similar but significant differences (p>0.05) were observed in nutrient intakes. Average daily weight gain, final and slaughter body weights were similar between treatments. Total edible ranged from 1665.0 in T1 to 1363.1 T3 and was significantly (P<0.05) different. Dressing percentage, however, remained similar despite varying levels of kocho in the diet. The study revealed potential of kocho to replace maize grain in broilers diet in areas where the product is available and less costly.

Keywords: Carcass, Chicken, Kocho, Nutrient retention
Effect of Feeding Different Levels of *Furfurame* on Growth Performance and Carcass Traits of Hubbard Chickens

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(School of Animal and Range Sciences)

**ABSTRACT**

A study was conducted to investigate the potential of furfurame in a concentrate mix on feed intake, growth performance and carcass traits of Hubbard chickens at Hawassa University. Furfurame is by-product obtained from kocho in a process of preparing Sidama cultural dish. It was collected from the hotels and restaurants in and around Hawassa and dried under sun to remove excess moisture. Maize, soybean, noug cake, wheat bran were purchased from local markets and vitamin premix and amino acids purchased from Addis Ababa. Furfurame substituted maize at four levels in the diet; T1 (100% maize); T2(33% furfurame); T3(66% furfurame); and T4 (100% furfurame). The house and equipments were cleaned and disinfected before arrival of chicks. After the brooding period, chicks were randomly allocated to 12 pens each with 10 chicks, making four treatments. The feeding experiment lasted for 56 days. Feed intake and body weight were measured daily and weekly, respectively. For nutrient retention and carcass trait evaluation six chickens per treatment were randomly selected, kept off feed overnight, weighed and slaughtered. Data were analyzed by the general linear model procedure of SAS (version 9.1). There was significantly higher (*p*<0.05) dry matter (DM) intake for T3 and T4 (152 g and 158 g, respectively) compared to T1 and T2 (137 g and 143 g, respectively). The daily weight gain and final body weight of T1 (43 g, 2811 g) was similar to T2 but significantly higher than T3 and T4 (38 g, 2554; 33 g, 2284 g). Birds in T1 had significantly (*p*<0.05) higher weight for slaughter (3216 g vs 2266 g), carcass components (2114 g vs 1553g) and edible offal (198 g vs 121g) compared to T4. However, dressing percentages were non-significant between treatments. It was concluded that furfurame can be used as energy source at lower level without compromising weight gain of birds.

**Keywords:** Carcass, Chicken, Furfurame, Growth, Nutrient retention
Assessment of Microbial Quality and Safety of Traditional Fermented Milk—
‘Irgo’ Collected from Hawassa City, South Ethiopia

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(School of Animal and Range Sciences)

ABSTRACT
Milk in Ethiopia is mainly produced under three livestock production systems, notably the pastoral, the mixed crop livestock and urban/peri-urban dairy systems. Although proximity to market favors urban dairy producers, there still exist various challenges among which are safety and quality issues. The aim of this study was to assess the microbial qualities and safety of fermented milk—Irgo, which is one of the most prevalent forms of dairy products produced and marketed by urban dairy producers and intermediate traders in Hawassa city, southern Ethiopia. A total of 120 samples (raw milk=60 and Irgo=60) were collected from dairy shops in Hawassa city. Formal interviews on milk and Irgo handling practices were followed by microbial analysis of the products. The mean aerobic mesophilic bacterial count (AMBC), coliform count (CC), Staphylococcus count (Staph. C) and lactic acid bacterial count (LABC) of the raw milk samples was 6.85, 6.14, 6.13 and 7.19 log cfu ml$^{-1}$, respectively. Irgo samples had mean AMBC, CC, Staph. C and LABC values of 6.79, 5.6, 5.55 and 6.13 log cfu ml$^{-1}$, respectively. Although, the counts of hazardous microbes were lower in Irgo samples than the raw milk, the overall microbial count in the sampled products is much higher than the minimum standards, which reveals the poor handling practices of dairy products in the city. This poor handling of dairy products have consequences to the public health, hence it require due attention in order to minimize its effect on the health and safety of consumers.

Keywords: Milk handling, Microbial quality, Irgo, Hawassa
Assessment of Community-Based Irrigation Water Management in Wondo Genet Woreda of Sidama Zone, Ethiopia

Kinfe Asayehgn and Dawit Daniel
(Animal Sciences and Range Sciences)

ABSTRACT
The survey results showed a significant difference in mean total household income between irrigation user and non-user livelihoods. In specific the findings show that 7.7% of the irrigation users do not have any income from rain-fed crop production other than irrigation products. With regard to livestock production, irrigation dependent households gain income from livestock 13.8% larger than irrigation nonusers do. It is also found that 63.1% of the users and 67.7% of the nonusers of small-scale irrigation do not participate in any off-farm activities. Thus, households depend their livelihood on non-farm and on-farm income portfolios. In relation to the above income portfolio and livelihood of the households, 56.9% of the users and 60% of the nonusers of small-scale irrigation households do not depend on non-farm income and activities. From the total respondents, 10.2% of the users and 7.7% of the nonusers of small-scale irrigation receives a remittance from relatives and friends. Remittance covers 1.5% and 2.2% of the total income of the users and nonusers of small-scale irrigation respectively. The mean total income and purchasing power of the households also shows that irrigation user livelihoods are better than non users.

Keywords: Crop production, Irrigation, Household income, Livestock production, Water management
Enrichment of Maize and Wheat Grains with Zinc: an Investment for Humanity and Crop Production

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ABSTRACT
Zinc deficiency is a well-documented problem in food crops, causing decreased crop yields and poor nutritional quality. Generally, the regions in the world with Zn-deficient soils are also characterized by widespread Zn deficiency in humans. Recent estimates indicate that nearly half of world population suffers from Zn deficiency. Cereal crops play an important role in satisfying daily calorie intake in developing world, but they are inherently very low in Zn concentrations in grain, particularly when grown on Zn-deficient soils. Maize (Zea mays L.) and wheat (Triticum aestivum L.) are high nutrient demanding crop but sensitive to zinc (Zn) deficiency in soil. Application of Zn fertilizers could be a viable option to fulfill the crop demand for Zn and also to increase its contents in grains. A pot experiment was conducted to evaluate the effect of different rates and methods of Zn application on maize and wheat cultivars. A selected maize hybrid (BH-540) and a wheat variety (HR-1685) were grown at three different rates and two methods of Zn application along with recommended doses of nitrogen, phosphorus and potassium. Plant height, ear height and grain yield were measured and analyzed. Response of maize and wheat varied to different methods of Zn application. Maximum maize (296gm/pot) and wheat (46gm/pot) grain yield was obtained for soil + foliar application of Zn followed by soil application of Zn at the rate of 50kg ha-1. Plant height also responded to application of soil + foliar Zn in both maize and wheat. The non-significant (p<0.05) difference observed for seed number per plant but significant difference (p<0.05) for seed yield in wheat indicates that yield gain was due to seed weight rather than increased spicklets per head.

Keywords: Yield, Zn deficiency, Zn fertilizer, Wheat, Maize, Nutritional quality
The Effect of Waterlogging at Different Phases on Growth, Productivity and Nodulation of Desi and Kabuli Chickpea (Cicer arietinum).

Walelign Worku
(School of Plant Sciences)

ABSTRACT
Chickpea is mainly a rain fed crop, which is exposed to terminal drought stress. Terminal drought could be mitigated by planting earlier. However, this may coincide with heavy rainfall, which creates waterlogging problem. Moreover, global climate change is likely to increase the occurrence of waterlogging and inundation. An experiment was conducted to examine the physiological and agronomic response of Desi and Kabuli chickpea to severe waterlogging. The Desi type maintained consistently higher stomatal resistance against waterlogging during each of the three phases. Number of nodules, root and nodule dry matter was significantly reduced by flowering and seed filling waterlogging but not by vegetative waterlogging. The most sensitive phase for productivity was the flowering phase followed by the seed filling phase.

Keywords: Climate change, Dry matter, Nodulation, Productivity, Waterlogging
ABSTRACT

Background: Tuberculosis (TB) is a chronic infectious disease that causes major health problem over the centuries. The Human Immune Deficiency Virus (HIV) has substantially altered the epidemiology of TB by increasing the risk of reactivating latent TB, increasing the chance of TB infection once exposed to tuberculosis bacilli (re-infection) and by increasing the risk of rapid progression soon after infection. Objective: To determine the prevalence of tuberculosis and its determinants among HIV patients. Methods: This study employs a retrospective review analysis of patient medical records. A total of 499 HIV infected patient cards was reviewed and required variables were recorded. Frequencies and odds ratios were calculated to determine prevalence and associated risk factors, respectively. Results: Ninety one (18.2%) of the study participants were found to have tuberculosis, of which, 20 (22%), 58 (64%) and 13 (14%) were smear positive, smear negative and extra-pulmonary tuberculosis cases, respectively. In binary logistic regression, being female (AOR=0.39; 95% CI:0.20-0.77), WHO clinical stage 3 (AOR=5.66; 95% CI:1.79-17.94), WHO clinical stage 4 (AOR=7.89; 95% CI:2.01-30.96), and functional status being ambulatory (AOR=2.22; 95% CI:1.06-4.64) were independently associated with tuberculosis-HIV co-infection. Conclusion: Prevalence of tuberculosis among the study subjects was high. Among TB positive cases, smear negative cases were dominant. TB was also found to be high among patients with CD4 cell <200/ml, advanced HIV disease stage, and INH non-prophylactic group.

Key words: HIV infected, Tuberculosis
Association between substance abuse and risky sexual behaviors among selected high school adolescents in Sidama Zone, South Ethiopia

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ABSTRACT

Background: High school adolescents are assumed to be exposed to many risky sexual behaviors. However, little has been explored about the magnitude of risky behavior and its predictors in the context of high school adolescents in Ethiopia. The study was conducted to determine prevalence of risky sexual behavior, substance abuse and the predictors of risky sexual behavior in high school adolescents of Ethiopia. Methods: Cross-sectional study was conducted in sampled high school students. The data were presented using frequency distribution, percentages. Logistic regression was used to determine the predictors of risky sexual behavior. Results: Five hundred seventy seven sampled high school students with mean age (SD) of 17.0 (1.8) years included in the study. About 53% were males. Prevalence of current use of alcohol, khat, cigarette and marijuana were 11.5, 5.0, 2.8, and 0.5%, respectively. About 24% of the study participants ever had sexual encounter and 20% were involved risky sexual behavior in the preceding month of the survey. Alcohol use adjusted odds ratio (AOR) 95% CI: 12.0 (5.26-27.4) and khat chewing AOR 95% CI: 3.29 (1.28-8.45) were predictors of risky sexual behavior. Conclusion: Alcohol use and khat chewing were the predictors of risky sexual behavior. We recommend awareness campaigns and integrated interventions on sexual behavior and substance abuse prevention programmes for high school adolescents in Ethiopia.

Keywords: Risky sexual behavior, substance abuse, HIV/AIDS.
Reaction of Medical Students to Experiences in Dissection Room

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ABSTRACT

Background: As preclinical medical students start and/or enter the course, they go through the anatomy curriculum, which involves interaction with cadavers and cadaveric material. The objective of this study was to determine the reactions of preclinical medical students from year two and year three to the dissecting room.

Methods: The study was conducted in Hawassa University, Ethiopia. Questionnaire was distributed to all second and third year medical students. The questionnaire was designed with the objective of identifying specific patterns of attitudes held and problems faced by the students in their first exposure to the human cadaver. The results are analyzed statistically using the SPSS 16.0 software and P value of 0.05 was taken as the level of significance.

Results: The commonest symptoms experienced were loss of appetite (43.3% year 2 and 34.9 % third year students). The commonest cause of their symptoms was studied and the result shows that it was the smell of the dissection room, as reported by 67.0% of year two students; and 54.12% for year 3 students.

Conclusion: The present study findings show that smell of the dissection room, touch and fear of cadaver were the commonest cause of their symptoms experienced while study in dissection room for the majority of students. Thus, instructors should give awareness raising education before the commencement of the dissection session to the students both mentally and emotionally ready to do their work enthusiastically and confidently. Moreover, it is necessary to make the laboratory tidy for the students so that they develop a love for the dissection room.

Keywords: Anatomy, dissecting room, preclinical students, student reactions, stress, learning Methods
ABSTRACT

Background: Cheating in academic institution is a worldwide issue. Cheating among medical and health professionals has dire consequences on human life, societal values and economy. This study was conducted to determine the prevalence of cheating and identify factors that influence cheating behavior among students of Hawassa University College of medicine and health science.

Methods: A cross sectional study was conducted from May - June 2013. A pre-tested self-administered structured questionnaire was used for data collection. The collected data was entered, cleaned, coded, and analyzed using SPSS version 20. Descriptive statistics was used for data summarization and presentation. Degree of association was measured by Chi-Square test, with significance level set at \( p=0.05 \). Bivariate and multivariate logistic regression analyses were used to assess associations.

Results: The prevalence of self-reported cheating among this study participants was 19.8% (95% CI=17.4-21.9%). About 12.1% (95% CI=10.2-13.9%) of students disclosed cheating on entrance examination (16.2% females, 11% males, \( p \)-value=0.027). A greater number of females than males reported cheating at both high school and university, showing a statistically significant difference (\( p=0.001 \) and \( p=0.005 \), respectively). The majority (80.1% (95% CI=77.9-82.3)) of students disclosed that they would not report to invigilators even if they witness cheating. Using multiple regression model, students who cheated at high school were found to be more likely to cheat in the university (adjusted OR=1.8, 95% CI=1.01-3.19). Dining outside the university cafeteria and receiving pocket money of Birr 300 or more were strongly associated with cheating (AOR=3.1, 95% CI=1.54-6.16 and AOR=1.7 (95% CI=1.05-2.72), respectively. The odds of cheating who went to private high school, substance users and missed one or more lecture class were significantly higher.

Conclusion: About one-fifth of the study participants admitted that they have cheated exam. Strong association of cheating was observed among students with good financial income. Increasing supervision levels during entrance examination, decreasing lecture class absenteeism and discouraging substance use are likely to reduce cheating behaviors.

Key words: Cheating, Academic dishonesty, higher institutions
ABSTRACT

Introduction: Although the burden of stroke in Sub-Saharan Africa, including Ethiopia, is increasing, there are few available data on stroke in Ethiopia. Objective: To describe the magnitude of risk factors, sub-types and in-hospital outcome of stroke at Hawassa University Referral Hospital (HwURH), Ethiopia.

Methods: A prospective hospital-based study was conducted with all adult patients admitted to HwURH with stroke diagnosis between May 2013 and April 2014. Computerized tomography scan was done to all patients to confirm the diagnosis and type of stroke. Risk factors were identified based on clinical, laboratory and other relevant investigations. Stroke severity at admission was assessed by the National Institute of Health Stroke Scale. Stroke outcome at discharge was measured using the modified Rankin stroke scale.

Results: One hundred and sixty three patients (108 males; 66.3%) with stroke having a mean age of 53.1 ± 16.9 years at presentation were recruited. Out of the total, 82 (50.3%) patients had ischemic stroke while 81 (49.7%) had hemorrhagic stroke; with intracerebral hemorrhage and subarachnoid hemorrhage accounting for 43.6% and 6.1% respectively. Stroke risk factors included hypertension (50.9%), cardiac diseases (16.6%), diabetes mellitus (7.4%), alcohol (10.4%), cigarette smoking (4.9%) and tuberculous meningitis (3.1%). In-hospital stroke mortality was 14.7%. The main predictors of in-hospital stroke mortality were stroke severity at admission, hemorrhagic stroke, decreased level of consciousness and seizure.

Conclusion: Stroke in Ethiopian patients occurs at a relatively young age and the proportion of hemorrhagic stroke is higher than that reported in Western countries. Hypertension is the most common risk factor for stroke. In-hospital stroke mortality at HwURH is higher than that of high income countries. We recommend implementing stroke prevention strategies and establishing stroke unit in Ethiopia to reduce stroke burden, stroke mortality and post stroke disability.

Keywords: Ethiopia, risk factors, stroke outcome, stroke, Sub-Saharan Africa
Antimicrobial effect of *Alchemilla abyssinica*, *Alchemilla haumannii* and *Alchemilla fisheri* crude extracts on common pathogenic bacteria

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**ABSTRACT**

**Background:** The genus Alchemilla, Family Rosaceae, is an herbaceous perennial plant widely distributed in cool temperate regions and on high mountains of the tropics. Different Alchemilla spp are claimed to have various medicinal value while *A. diademata* and *A. pedata* are reported to pose antimicrobial activity which provided good ground for this investigation. **Methods:** In this research, EtoAc/H₂O (96% v/v) crude extracts of dried aerial parts of *A. abyssinica*, *A. haumannii* and *A. fisheri* ranging from 20-40 mg/ml were tested for their antimicrobial activity against *Staphylococcus aureus*, *Escherichia coli*, *Streptococcus pneumoniae*, *Proteus vulgaris*, *Streptococcus pyogenes* and *Pseudomonas aeruginosa* by the agar dilution method using Muller Hinton agar for the first five and blood agar for *P. aeruginosa*. Six standard drugs were used as positive controls. **Results:** Except *A. abyssinica* crude extracts on *S. pneumonia* the low concentrations up to 20 mg/ml of all the three Alchemilla spp had no antibacterial effect on any bacterial strain tested. *A. abyssinica* crude extract on the other hand showed no effect up to 40 mg/ml concentration on *E. coli*, while all the other extracts tested have shown antibacterial effect on all strains at this 40 mg/ml concentration. Varying MICs ranging between 20-40 mg/ml were obtained at lower concentrations for the different strains tested. The extracts used in this study are shown to perform significantly similar effect with standard drugs: Penicillin (10µg), Ceftriaxone (30µg), Ciprofloxacin (5µg), Chloramphenicol (30µg), Amoxicillin (30µg) and Ampicillin (10µg) for *S. aureus*, *S. pneumonia*, *P. vulgaris* and *S. pyogen*. Moreover, they are shown to be more effective than Ampicillin for *P. aeruginosa*. **Conclusion and recommendations:** The results of the present study showed that *A. abyssinica*, *A. haumannii* and *A. fisheri* poses dose-dependent antimicrobial activity against *S. aureus*, *E. coli*, *S. pneumonia*, *P. vulgaris*, *S. pyogen* and *P. aeruginosa*, which could be beneficial for human and animal bacterial infection. Testing the other taxonomically related plants for the same effect or on wider microbial pathogens, and further chemical work of the crude extracts to identify the compound(s) responsible for the antimicrobial activity is recommended.

**Key words:** antimicrobial activities, Alchemilla spp., minimum inhibitory concentration
Patient Satisfaction with Outpatient Health Services in Hawassa University Teaching Hospital

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ABSTRACT
The level of patients’ satisfaction is one of the mechanisms used in assessing the quality of health care services. This cross sectional study was conducted in Hawassa University Teaching Hospital to assess level of satisfaction of patients with outpatient health services and factors associated with it. Multiple logistic regression was used to assess the relationship between patients’ satisfaction and possible predictors. Four-fifth (80.1%) of patients reported to be satisfied with the hospital’s outpatient services. Respondents who claimed to have had a long stay in the hospital were found to be more satisfied than those who claimed to have had a very long stay (AOR = 4.5, 95% CI: 2.38, 8.65). Furthermore, there was negative association between patients’ satisfaction and not getting required services in the hospital (AOR = 0.8, 95% CI: 0.41, 0.96), lack of privacy (AOR = 0.5, 95% CI: 0.27, 0.78), and absence of good communication with outpatient service providers (AOR = 0.3, 95% CI: 0.12, 0.41). Health managers and service providers should develop innovative ways to reduce waiting time, have good communication with patients, and maintain privacy of patients in order to improve the level of satisfaction of patients.

Key words: Patient, outpatient, satisfaction, hospital.
Total Delay in Treatment among Smear Positive Pulmonary Tuberculosis Patients in Five Primary Health Centers, Southern Ethiopia: A Cross Sectional Study

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ABSTRACT

Background: The global burden of tuberculosis (TB) remains enormous, and this is evidenced by an estimated 8.7 million new cases of TB globally in 2012 only. Delay in tuberculosis diagnosis may also lead to a more advanced disease state at presentation, which contributes to late sequelae and overall mortality. This study is conducted to determine the total delay before treatment among smear positive pulmonary tuberculosis (PTB) patients. Methods: A health institution based cross sectional study was conducted in six primary health centers in southern Ethiopia from June to December 2012. A total of 328 smear positive PTB patients were enrolled in this study. A structured and pre-tested questionnaire was used. Median patient, diagnostic, and treatment delays were calculated to determine the total delay. Multiple logistic regression analysis was used to identify factors associated with total delay. Results: Among the study participants, 51.8% were females. Around 17% have never heard of TB before their current TB disease. Cough was the main complaint (63%) of patients to seek medical care. The median patient, diagnostic, treatment and overall delays measured in days were 30 (Inter quartile range 20.2, 60), 7 (IQR: 3, 14), 3 (IQR: 1, 4) and 45 (IQR: 34.5, 69.5) days, respectively. Patients for whom treatment was not initiated within 30 days of onset of symptom/s (total delay) constituted 49% of the study participants (59.5% among males and 39.2% among females; P<0.001). Total delay was not associated with being female [AOR=0.3, 95% CI: 0.18-0.62] and having tertiary level education [AOR=0.1, 95% CI: 0.02-0.55], but perceived stigma during the current TB illness [AOR=2.2, 95% CI: 1.07, 4.42]. Conclusion: Total delay in initiating anti-TB treatment was high in the study area. Furthermore, patients’ knowledge on TB infection was inadequate. Therefore, a concerted effort should be taken in order to improve awareness of the community on TB and to reduce delays from seeking care after experiencing suggestive symptoms.

Key words: Cross sectional, Ethiopia, health center, pulmonary TB, smear positive, treatment Delay
Validation of the Condom Use Self-Efficacy Scale in Ethiopia

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ABSTRACT

Background: The measurement of condom use self-efficacy requires contextually suitable, valid and reliable instruments due to variability of the scale across nations with different cultural and ethnic backgrounds. This study aims to construct a condom use self-efficacy scale suitable to Ethiopia (CUSES-E), based on the original scale developed by Brafford and Beck. Methods: A cross-sectional study was conducted on a random sample of 492 students at Hawassa University. A self-administered questionnaire containing 28 items from the original scale was used to collect the data. Principal Component Analysis (PCA) with Varimax rotation was used to extract factor structures. Cronbach’s alpha and item-total correlations were used to determine the internal consistency of the scale. The convergent and discriminant validity of the scale was verified using a correlation matrix. Results: The PCA extracted three factors containing a total of 9-items. The extracted factors were labeled as: assertiveness, fear for partner rejection and intoxicant control, with internal consistency coefficients (Cronbach’s alpha) of 0.86, 0.86 and 0.92, respectively. Altogether, the factors explained 77.8% of variance. An evaluation of CUSES-E showed a significantly higher self-efficacy score among students who ever used condoms (P<0.001). The correlation matrix revealed that all the convergent correlations were higher than the discriminant ones, providing evidence in support of both types of validity. In the split sample validation, the communalities, factor loadings and factor structure were the same on the analysis on each half and the full data set, suggesting that the new scale is probably generalizable and replicable. Conclusion: The current study found a different dimension to emerge, suggesting that the scale should be validated to local contexts before application. The CUSES-E is valid, reliable and replicable. Therefore, health professionals and researchers in Ethiopia can apply this scale to promote condom utilization to Ethiopian school youths.

Key words: Validation, CUSES-E, Hawassa University
Nutritional Status of Adolescent Students in Leku Town, Sidama Zone, Southern Ethiopia

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ABSTRACT

Introduction: The stage of adolescence has been defined as ages 10 to 19 years. Adolescents are tomorrow adults, and 85% of them live in developing countries. Adolescence is considered to be the most important and versatile period of life where growth and development are accompanied by physical, physiological, behavioral, and social changes. Objective To assess the nutritional status of adolescent students in Leku town elementary and junior Schools. Methods: School based cross-sectional study was done from December 25 to January 2, 2012 in Leku town. The sample size was 288 and these students were allocated proportional to the number of students to each class. The two elementary and junior schools were included in the study and one class from each grade from 4-8 was included randomly. From the selected class students were selected by using systematic random sampling technique. Height and weight measurements were made using electronic scale and wooden stadiometer, respectively. Socio demographic data were collected by pretested structured questionnaire. Epi-Info version 3.5.1 and SPSS version 16 were used to enter and analyze data, respectively. BMI is compared with age and sex specific cut off points recommended by CDC. P- values of 0.05 was taken as level of significance. Results: Of the total study subjects 132(45.8%) were males and 156(54.2%) were females. The mean height, weight and BMI of the respondents were 1.54m ± 0.1, 46.5 kg ± 9.7, and 19.3 kg/m² ± 2.8. The mean weight of male and females were 46.3±9.6, 46.5±9.7 respectively while the mean height of male and female were 1.6m ± 0.1 and 1.5m ± 0.1 respectively. Being female 0.3 (0.19, 0.57) and age group of 14-18 0.2 (0.11, 0.35) were protective factors while rural residence 1.1 (1.06, 1.98) and absence of latrine1.8 (1.81, 3.36) were found to be a risk factor for underweight. Conclusion: The prevalence of adolescent underweight in this study was 40.6%. The results show that there is a need for intervention not only at the household level but also at the school level to bring about some real change. The researcher recommends that schools officials should focus on nutrition education to create awareness on nutrition because today's adolescents are the future of the country.

Keywords: Adolescent, Body mass index, Under weight
Predictors of immunological failure of therapy among HIV patients in Ethiopia: a case control study

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ABSTRACT

Background: In resource constrained settings, immunological assessment through CD4 count is used to assess response to first line Highly Active Antiretroviral Therapy (HAART). In this study, we aim to investigate factors associated with immunological treatment failure. Methods: A matched case-control study design was used. Cases were patients who already experienced immunological treatment failure and controls were those who didn’t experience immunological failure after an exactly or approximately equivalent duration of first line treatment with cases. Data were entered, cleaned and analyzed using SPSS v16.0. Both conditional univariate and multivariate analysis were carried out. Results: A total of 134 cases and 134 controls were included in the study. At baseline, the mean age ± SD of cases was 37.5 ± 9.7 years whereas it was 36.9 ± 9.2 years among controls. The median baseline CD4 counts of cases and controls were 121.0 cells/µl (IQR: 47-183 cells/ µl) and 122.0 cells/ µl (IQR: 80.0- 189.8 cells/ µl), respectively. The median rate of CD4 cells increase was comparable for the two groups in the first six months of commencing HAART (P=0.442). However, the median rate of CD4 increase was significantly different for the two groups in the next 6 months period (M_6 to M_12). The rate of increment was 8.8 (IQR: 0.5, 14.6) and 1.8 (IQR-8.8, 11.3) cells/µl/month for controls and cases, respectively (Mann-Whitney U test, P=0.003). In conditional logistic regressions grouped baseline CD4 count (P=0.028), old age group and higher educational status (P<0.001) were significant predictors of immunological treatment failure. Conclusion: Patients with immunological treatment failure have an optimal rate of immunological recovery in the first 6 months of treatment with first line HAART, but declines at a later period, notably between 6 and 12 months. Patients with low baseline CD4 count, old age and with higher educational status are more likely to experience immunological treatment failure.

Keywords: Immunological failure, HIV, HIV treatment, Predictors.
The Relationship between Condom Use and HIV Risk Perception among Hawassa University Undergraduate Students

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ABSTRACT

Background: The relationship between individuals' perception of their risk for acquiring HIV and condoms use is poorly understood. Studies on this area were not addressing university students who are at most risk of HIV. This study was designed to assess the relationship between undergraduate students' HIV risk perception and condom use as a protective behavior. Methods: A multistage sampling techniques with proportional allocation of the sample size using simple random sampling of the departments was done. Results: From 602 respondents 232 (38.5%) were sexually active accounting to 65% and 35% males and females respectively, among this group 224 (96.5%) had sexual intercourse in the last 12 months. The mean and median age at sexual initiation was 18.3 and 18.0 yrs. Lifetime experiences show 62.1% have only one partner, 20.3% had two sexual partners. Regarding ever use of condom among these groups; in the last 12 months 107 (48%) used but only 32 (13.8%) always used condom, also 64.2% used condom in their recent sex in the preceding 12 months. Among sexually active male students 25.6% had sexual contact with sex workers and 94.6% used condom consistently. The majority of the students 462 (79%) perceive themselves as having no/low risk of HIV; however, only 70.1% correctly assessed their risk. Ever use of condom was associated with gender, condom use during first sex, condom use at the recent sex, believing that HIV can be transmitted during first sex and not identifying (reporting) type of sexual partner. Conclusion: Low HIV risk perception and low use of consistent condom use among students were identified. Interventions including reproductive and sexual education for high school and university students; and making condom available and accessible are needed.
Factors affecting fertility desire of people living with HIV, the case of Hawassa University Referral Hospital, South Ethiopia

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ABSTRACT

Background: The desire of HIV infected persons to have children has implications for the transmission of the HIV virus to their sexual partners and newborns. Thus, the fertility desire of HIV infected persons is a subject that needs investigation.

Objective: The objective of this study was to assess the level and factors affecting fertility desire among HIV positive peoples attending Hawassa University Referral Hospital, South Ethiopia.

Methods: A cross sectional study was conducted during a period of January to February 2012. The sample size was determined using single population proportion and every fourth HIV positive women (18-49years) and HIV positive men (18-59years) attending the ART clinic were interviewed. Data was collected after explaining the purpose of the survey using a structured and pretested questionnaire. Then the data were entered using SPSS 12.1 for windows statistical package, cross checked for reliability and analysis was done.

Result: Overall, 49% of the participants desire to have a child. Those who desire to have a child; 76.8% of them want it in two years period. Wish to leave behind a "legacy, peer or family pressure and concern that avoiding a pregnancy may generate suspicion about one’s HIV status were some of the reasons that caused them desire to have a child. Women and men in the age group of 18 to 35 years and males were more likely to desire to have children than those of age above 35years and women (AOR 2.95; 95% CI 1.66,5.24) and (AOR 2.35; CI 1.38,3.97) respectively; those having children less than two were more likely to desire to have children than their counterparts (AOR 2.82; CI 1.57,5.06) and those who had HIV negative sexual partner were less likely to intend to have children (AOR 0.29; CI 0.15, 0.60).

Conclusion: Nearly half of the interviewed People Living with HIV/AIDS (PLWHA) desired and intended to bear child in the near future. In addition, a significant number of the study participants were either not using contraceptive recently or they are not using dual protection. The health care service provider should give attention to counseling on reproductive health for PLWHA’s in order to improve and maintain the health status of the patients and the family in advance.
Potential Bacterial Pathogens of External Ocular Infections and Their Antibiotic Susceptibility Pattern

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(Department of Medical Laboratory Science)

ABSTRACT

Introduction: Bacterial external ocular infection is a common health problem in parallel with increased multidrug resistance in Ethiopia. This study was aimed to identify bacterial etiologies of external ocular infections and their antibiotic susceptibility pattern in patients attending Hawassa University Referral Hospital.

Methodology: A cross sectional study was conducted from December 2012 to April 2013. Samples were collected from 281 consecutive individuals with suspected external bacterial ocular infection. All samples were processed for direct microscopy, culture and biochemical test following standard methods for identification. Susceptibility testing was done by Kirby-Bauer method as per CLSI guideline. The data were coded and entered into SPSS software version 16.0 windows program for analysis.

Result: Among 281 study participants, 140 (49.7%) had conjunctivitis; 55 (19.6%) had blepharitis; 31 (11.0%) had keratitis; 19 (6.8%) had dacryocystitis; and 36 (12.9%) had other infections. From 137 (48.8%) specimens, different bacterial species were isolated. The gram-positive cocci comprised 61.5% and the predominant isolate was Staphylococcus aureus (34.1%) followed by coagulase negative staphylococcus (29.5%). Gram negative bacteria accounted for 38.5% and the predominant isolate was Klebsiella (16.4%) followed by pseudomonas species (12.7%). Most gram-positive isolates were susceptible to amoxicillin-clavulanic acid (95.5%) and vancomycin (96.6%). Gram-negative isolates were susceptible to ciprofloxacin (89.1%) and gentamicin (83.7%). Multi-drug resistance was observed in 69.9% of the bacterial isolates.

Conclusion and Recommendation: Staphylococcus aureus was the predominant isolated pathogen followed by coagulase negative staphylococcus, S. pneumoniae and Klebsiella species. Gram positive isolates were more susceptible to amoxicillin-clavulanic acid and vancomycin, whereas gram-negative isolates were more susceptible to ciprofloxacin and gentamicin. Relatively, ciprofloxacin was effective against all isolated pathogen. Based on our result, we recommend culture and sensitivity tests prior to prescribing any antimicrobial agents for ocular infections.

Key words: Antimicrobial agents, external ocular infections, susceptibility pattern.
Level of contamination and antibiotic resistance of bacterial isolates from mobile phone of HCP’s in Hawassa referral hospital

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ABSTRACT

Background: Nosocomial infections increase day by day and such infections cause a significant rate of mortality and morbidity. The etiological agents of hospital infections may spread through the hands of healthcare personnel (HP), thermometers, stethoscopes, and even toys in the paediatric intensive care units of hospitals. Objective: The aim of this study was to determine the contamination rate of the health care workers (HCWs’) mobile phones in the Hawassa referral Hospital. Methods: A cross-sectional study was conducted on Hawassa University at college of Medicine and Health science at referral hospital where 152 Mobile phones was randomly sampled from, wards, laboratory, ICU and operating rooms of senior doctors, GP doctors, nurses, Laboratory Technologists and other healthcare staff–was screened. A sterile swab moistened with sterile saline was rotated over the surface of both sides of mobile phones; second swab was rubbed over the entire ventral surface of the dominant hand (including ventral surfaces of the thumb and the fingers) of HCWs. The standard microbiological analysis was done using different test methods. Results: The rate of bacterial contamination of mobile phones was 97.4%. It was found that 50.6% of phones grew one bacterial species, 25.0% two different species, 24.8% three or more different species and no bacterial growth were identified in 2.6% of phones. The bacterial species isolated from mobile phone and hands of the HCWs were S. aureus, CoNS, Streptococcus spp, E. coli, K. pneumonia, Proteus spp, Citrobacter spp, Shigella spp, and P. aeruginosa. Ampicillin and Penicillin was less effective against the identified bacteria, whereas, Gentamicin, Ceftriaxone, Doxycycline and Ciprofloxacin were most effective. Conclusion: Our study reveals that mobile phones may get contaminated by bacteria (such as Escherichia coli, Pseudomonas aeruginosa and Klebsiella pneumoniae), which cause hospital infections, and may serve as a vehicle for the spread of nosocomial pathogens. It is needed to work at various levels to minimize the risk of mobile phones as vectors for pathogen transmission.
Diagnostic Performance Evaluation of SD BIOLINE Malaria Antigen P.f/P.v Test (SD FK80) in Malaria endemic area, Southern Ethiopia

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ABSTRACT
Background: Rapid diagnostic tests (RDTs) capable of detecting and differentiating Plasmodium species are needed in areas where microscopy is unsuitable. This study was conducted to evaluate the diagnostic performance of SD BIOLINE Malaria Antigen P.f/P.v test (SD FK80) in an endemic area. Methods: A total of 253 clinically malaria suspected patients (153 Plasmodium positive and 100 negative) in a health center in Southern Ethiopia were recruited in this study from April to July 2013. Microscopic examination of Giemsa-stained blood films were performed for Plasmodium species detection and parasitaemia determination. Alongside, blood samples were tested for Plasmodium antigens using SD FK80 test. Results: The overall sensitivity of SD FK80 test was 81.2% for P.falciparum infection. Its sensitivities were 88.2 and 76% at parasite densities >1,000/µl and ≤ 500/µl, respectively. The overall sensitivity was 92.2% for P. vivax infection and 100% at parasite densities >1000/µl. The specificity, PPV, and NPV of SDFK80 test for the diagnosis of P. falciparum were 98.4, 94.9, and 93.3% respectively. The specificity, PPV and NPV of the test for the diagnosis P. vivax were 99.4 %, 98.8%, and 95.9 %, respectively. Conclusion: The SDFK80 test performed well in diagnosing of P. falciparum and P. vivax infections in endemic setting. A lower performance of SDFK80 was shown with decreasing malaria parasite density. Therefore, this point- of- care test could be used as alternative to microscopy in settings where both Plasmodium species are co-endemic and microscopy is unsuitable. Keywords: Plasmodium, SD FK80, SD BIOLINE, RDT
Nosocomial Bacterial Infection Acquired through Surgical Site And Catheter Related Urinary Tract Infections among Patients Admitted in Surgical Wards at Hawassa Referral Hospital, Hawassa, Ethiopia.

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(Department of Medical Laboratory Sciences)

ABSTRACT

**Background:** Nosocomial infections well-known as major global concern for both patients and health-care professionals. From this nosocomial urinary tract infection is a leading health care associated infection worldwide and surgical site infection is secondly reported. In developing countries the magnitude of the problem remains underestimated or even unknown. As a result the aim of this study was to find out the extent of nosocomial infection and to isolate the bacterial etiologic agents in Hawassa referral hospital in Ethiopia. **Methods:** A total of 300 hospitalized patients were followed prospectively from November 2011 to March 2012. Specimens from patients were determined using standard techniques. **Results:** A total of 63/300 (21.0%) admitted patients developed nosocomial urinary tract and surgical site infections (SSI and UTI) based on the positive wound and urine culture results. Of the bacterial isolates, 51/69 (74.0%) were Gram negative and 18/69 (26.0%) were Gram positive. Escherichia coli (30.4%) and Klebsiella spp (17.4%) were the major causes of surgical site and urinary tract infections. **Conclusions:** The rate of SSI and UTI nosocomial infection in the hospital was high. There is a need to reduce the problem with continuous surveillance and implementation of infection prevention strategies. **Keywords:** Hospital acquired infection, UTI, SSI, Southern Ethiopia.
ABSTRACT

Background: Surveys that rate the satisfaction of medical practitioners on clinical laboratory service are considered a requirement in laboratory accreditation.

Objectives: To evaluate medical practitioners satisfaction with the clinical laboratory services of health institution in southern Ethiopia.

Methods: A questionnaire based cross sectional survey was undertaken from June 2013 - April 2014, which involved 290 medical practitioners from 19 health institutions. A questionnaire with 1-5 Likert scale [1(poor), 2(below average), 3(average), 4(good), 5(excellent)] and an ‘NA’ option when appropriate were used as a tool to measure the satisfaction rate. Data entry and analysis were performed using SPSS version 19.

Result: The mean overall satisfaction score was 3.36 (SD 0.87). For most of specific service categories the highest rating was ‘good’. The highest mean score was for clarity and readability of result 4.09 (SD 0.99), while the lowest was for blood bank service 1.72 (SD=1.88). Similarly, clarity of results and professional manner were given the highest rating in excellent/good report, 76% and 73.3%, respectively. Contrarily, the highest below average / poor reports were blood bank service (36.6%) followed by availability of senior laboratory experts (pathologists) for consultation (33.1%). No statistically significant association was observed between medical practitioners’ satisfaction and years of experience.

There was an association between medical practitioners’ type and satisfaction on some service categories. Medical practitioners working in health centers were more satisfied than those in hospitals. In addition, 16.2% of the respondents answered ‘No’ and 33.1% ‘Yes’, when they were asked if they recommend their laboratory for another medical practitioner. For open ended questions necessity of additional tests were rated with highest frequency followed by supply of regular materials and reagents.

Conclusion and recommendation: This study identified a wide room for improvement in the services provided from clinical laboratories. Corrective actions for the less satisfied service categories and continuous monitoring of laboratory activities are essential for the development of quality in clinical laboratories of health institutions in southern Ethiopia.

Key words: medical practitioners, clinical laboratory service, satisfaction rate
ABSTRACT

**Background:** Sexually Transmitted Infections (STIs) are caused by more than 30 different pathogens including bacteria, viruses, protozoa, fungus and ecto-parasites. If left untreated, STIs can cause serious consequences: infertility, ectopic pregnancy, cervical cancer, menstrual disturbances, pregnancy loss and low birth weight babies. **Objective:** To determine prevalence and etiologic agents of STIs among women attending Gynecology outpatient department in Hawassa Referral Hospital. **Methods:** A hospital based cross-sectional study was conducted in a total of 401 women from September 2011 to January 2013. Cervical or vaginal swab was collected and transported to Microbiology Laboratory. The swabs were cultured on selective agar. The Presence of STI causing organism was confirmed by Gram staining, culture and biochemical test. Total prevalence and prevalence for each agent within specific age groups were calculated. Chi-square test and odds ratio was used for analysis. **Results:** The prevalence of STI was 1.75% out of which 3 were positive for T. vaginalis and 4 (1%) positive for N. gonorrhoea. 97.5% of the positive cases were in the age group of 15-24 yrs. The highest prevalence of STI, 2.46% (6/244) was observed in those whose income was above 1000 birr. The prevalence of the disease among married groups was 2.1% (6/281). High prevalence of STI was observed among illiterates, which was 7.14 (2/28). The prevalence of STI was higher among merchants 4.1% (4/97). The prevalence STI in the two settings is: 1.04% (3/289) for urban and 3.6% (4/112) for the rural. With the exception of age category, all variables were not statistically significant. **Conclusion:** Young married women are more prone to reproductive tract infection. High STD infection rate among these groups are clear signs that ways to reach those at risk must be developed and promotion of early recourse to health services, especially routine mandatory and early screening of all women for STDs cannot be over emphasized. Proper treatment of all STDs like use of correct and effective medicines, contact tracing and treatment of sexual partners and education of the general population should not be overlooked in our locality.

**Keywords:** Sexually transmitted infections, Gonorrhoea, Trichomoniasis
Performance evaluation of point-of-care test for detection of Cryptosporidium stool antigen in children and HIV infected adults

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ABSTRACT

**Background:** Gastro-enteritis is associated with significant morbidity and mortality in patients with HIV/AIDS and children, and Cryptosporidium is the most important parasite implicated. To date, several commercial companies have developed simple and rapid point-of-care tests for the detection of Cryptosporidium infection; however, information is scarce regarding their diagnostic significance in Ethiopia. This study aimed at evaluating the performance of a rapid diagnostic test (RDT) for the detection of Cryptosporidium stool antigen. **Methods:** A hospital-based cross-sectional study was conducted in Hawassa University Hospital, Southern Ethiopia from May to November 2013. Faecal samples were collected from a total of 100 children and 250 HIV infected individuals with diarrhea or CD4 T-cell count lower than 200 cells/µl. Specimens were processed using direct, formol-ether concentration and modified Ziehl-Neelsen techniques for diagnosis of Cryptosporidium and other parasites. One hundred faecal samples (50 positives for Cryptosporidium, 35 positives for other parasites and 15 negatives for any intestinal parasites) were tested using the CoproStrip™ Cryptosporidium kit (Savyon Diagnostics Ltd, Israel). Test parameters were calculated using microscopy of the modified Ziehl-Neelsen stained stool smear as reference method. **Results:** The performance of the RDT was first compared to routine microscopic analysis (examination ≤10 min). The CoproStrip™ Cryptosporidium RDT correctly detected 31 of 42 positive samples and 49 of 50 negative samples (i.e., 11 false negatives and 1 false positive). Sensitivity, specificity, PPV, NPV and accuracy were calculated to be 74, 98, 97, 84 and 88%, respectively. Upon thorough microscopic analysis (examination >10 min), 8 more samples with very low oocyst density were found. However, these were missed by the kit and lower the sensitivity and NPV to 62 and 72%, respectively. No cross-reactivity was observed with any of helminthic or other protozoan parasites including Isospora and Cyclospora species. **Conclusion:** Based on the results described herein, the CoproStrip™ Cryptosporidium test could be used as an alternative to conventional microscopy especially where diagnosis of Cryptosporidium is limited due to time constraints, lack of experienced microscopists or unavailability of appropriate equipment/electricity. **Keywords:** Cryptosporidium, Evaluation, RDT
Bacterial isolate and antibacterial resistance pattern of ear infection among patients attending at Hawassa university referral Hospital, Hawassa, Ethiopia

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ABSTRACT
Background: Ear infection, is highly prevalent worldwide. In the old age, long standing Chronic Suppurative Ottitis Media can result in a severe conductive hearing loss with significant drawbacks in learning, communication and social adjustment. It’s associated with hearing impairment, death and severe disability due to central nervous system involvement mainly in developing countries. Objective: To determine the bacteriological profile and antibacterial resistance of ear infection from patients seen at Ear, Nose and Throat clinic of Hawassa University Referral Hospital. Method: A cross sectional study was conducted at clinic of Hawassa University Referral Hospital. Result: A total 117 study subjects were included in this study from June, 2013 to October, 2013. Among these, fifty seven (48.7%) were male and fifty three (45.3%) were children. Bacteria identified from positive ear swabs were: Staphylococcus aureus 24 (20.5%), Pseudomonas aeruginosa 17 (14.5%), Klebsiella species 10 (8.5%), Proteus species 7 (6.0%), Entrobacter species 4(3.4%), Escherchia coli 3 (2.6%), Citrobacter species 2(1.7%) and Providentia species 2 (1.7%). The overall sensitivity and resistance profile of antibacterial agents, Amikacin (90.0%) and Gentamycin (89.1) showed a high level of antibacterial effect on all identified bacterial species. On other hand, all isolates were highly resistant to ampcilin (87.5%), oxacillin (84.0%), ceftriaxone (82.8%), cephalotin (81.4%), and penicillin G (73.8%). Conclusion: Most of the isolates were resistant to commonly prescribed drugs in the area. However, Amikacin and Gentamycin are highly active against the isolated organisms whereas Ciprofloxacilin was moderately active. Therefore, culture and susceptibility test are vital for appropriate management of ear infections in the study area.
Key words: Antibiotic susceptibility pattern, Ear infection, Ethiopia
Prevalence and Factors Determining Psycho-Active Substance Use

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ABSTRACT

Background: The World Health Organization (WHO) and CDC report showed that psycho-active substance (PASU) use is among the leading causes of mortality and morbidity. Every year, millions of lives are lost due to use of PASU, which is probably more than HIV infection. PASU includes alcohol, Khat, cigarette, illicit drugs (Marijuana, Heroin, Cocaine & others) and Non-Medical use of prescription drugs (NPS). The majorities of the dead and diseased started PASU before and after joining university. Few study reports are available in this country involving undergraduate university students on use of Alcohol, Khat, Cigarette, illicit drugs. This study was conducted to determine the prevalence and factors determining use of PASU. Methods: A cross-sectional study using a self-administered WHO model core questionnaire was used. The study was conducted between June and July 2011. We employed multistage sampling method to select a total of 586 undergraduate students. The data were entered and analyzed using SPSS version 20 software program. Descriptive statistics were used for data summarization and presentation. A multivariate logistic regression analyses were used to assess the association of substance use with sociodemographic and behavioral characteristics. Results: Lifetime and annual prevalence rates for overall PASU were 53.6% and 45.7%, respectively. In 12 months period, 40.8% used Alcohol; 20.3% chewed Khat; 11.9% smoked cigarette; and 0.9% used Marijuana. No student reported for using NPS and other illicit drugs. The multiple logistic model showed that male gender, advancement in year of education, history of family substance use, having friends who uses PASU, advancement of maternal education, and living alone during school age were factors increasing the odds of alcohol use. Those with muslim religion had increased odds of chewing khat. Peer influence, gaining energy for study and avoiding stress were the three leading reasons for use of PASU. Alcohol users were experiencing quarrelling and fighting, property loss and damage, and unplanned and unprotected sex. Conclusion: The prevalence of PASU among study participants was high. Substance use prevention strategy and implementation should start while the students are in elementary and secondary school.

Keywords: Psychoactive substance, Prevalence, University students,
Factors Affecting Utilization of Antenatal Care among Pregnant Women in Borcha Wereda, SNNPR, Ethiopia

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ABSTRACT

**Background:** Consequences of pregnancy and childbirth are still the leading causes of maternal morbidity and mortality in developing countries. Antenatal care (ANC) use is one of the most effective intervention in reducing maternal mortality in the developing world. **Objective:** To assess the factors affecting the ANC uptakes in Borcha woreda. **Methods:** A cross-sectional community based survey was conducted from December 2012 to September/2013. Multistage cluster sampling technique was used to select 626 women. Data were collected through structured and pre-tested questionnaires. The data were entered and analyzed using SPSS version 20. **Results:** About 626 women with mean age (SD) of 27.8 (4.67) were included in the study. Eighty eight percent of income was generated by their husbands; only 4.2% of participants attended secondary and above level of education; and 90.4% of their partners were farmers. The educational status of the respondents and occupation of their partners have statistically significant association with ANC uptakes. Numbers of pregnancy, number of live birth, place of delivery and the profession of birth attendants were also associated with attendance of ANC. Women whose pregnancy were not planned but wanted by their partners, utilized the service 3.5 times more than their counterparts. Those who were informed the existence and advantage of ANC, utilized the service better. **Conclusion:** Community mobilization, empowering and intensive utilization of community health agents, HEWs and health professionals are recommended to enhance the utilization of ANC.

**Keywords:** Antenatal Care, Antenatal care utilization, Pregnancy women
Prevalence and Associated Factors with Sexual Violence among Female Students of Hawassa University, Ethiopia

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ABSTRACT

Background: Sexual violence is a pervasive problem in educational institutions, and can have a devastating impact on those affected. However, there is limited information on sexual violence in the context of higher education institutions in Ethiopia. This study, therefore, determined the prevalence, causes, and immediate consequences of sexual violence and its contributing factors among female students of Hawassa University. Methods: Institution based cross-sectional descriptive study was conducted from April to June 2013. A multistage sampling technique was used to identify total 336 female students registered as 2nd year or above. Data were collected using anonymous self-administered structured questionnaire. The data were analyzed by bivariate and multivariate logistic regression using SPSS 20.0 for windows. Results: The prevalence of completed rape since joining the university and in the past 12 months among female students of Hawassa University was reported to be 31.3% and 23%, respectively. Students who reported to have a boyfriend had five times increased risk (AOR = 5.07, 95% CI: 1.59-16.12) of experiencing completed rape than their counterparts. Single students had more than twofold increased risk of experiencing completed rape compared to their ever married students (AOR = 2.73, 95% CI, 4.81-12.92). Conclusion: This study showed a high prevalence of sexual violence against female students of Hawassa University. Interventions are, therefore, required by university authorities and other stakeholders, to create a safe learning environment for female students through primary prevention of sexual violence and rehabilitation programs for the victims.

Keywords: Sexual Violence; Female College Students; Hawassa University; Ethiopia.
Birth Preparedness and Complication Readiness among Women in Hawassa City, South Ethiopia

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ABSTRACT

**Background:** Birth preparedness and complication readiness is a crucial strategy in averting maternal morbidity and mortality. **Objective:** to assess status of BP/CR and to determine factors associated to practice of BP/CR among women who gave birth in the last 12 months preceding the survey in Hawassa city administration, Southern Ethiopia. **Method:** Community based quantitative cross-sectional study with a total of 553 study subjects was conducted. Subjects were selected using multi-stage sampling. Data were collected on Feb. 2014, using pre-tested questionnaire. The data entry and analysis were done using Epi info 7, and SPSS version 20 software, respectively. The BP/CR index was calculated using ten indicators which have been identified in a number of earlier studies. Women who identified emergency transport ahead of child birth, saved money, and had given their last birth at health institution were considered as well prepared for birth and complication. **Result:** Sixty seven (12.2%), 19.6 %, 14.7% and 11.6% women were knowledgeable on danger signs of: pregnancy, labour/childbirth, postpartum and newborn respectively, 65.3% of women identified place of delivery, 46.2% saved money, 13.1% identify blood donor, 46.2% identified emergency transportation and 72% of study population gave birth at health institution. Over all BP/CR index of the study population was 33.3. Out of the study subjects 35.8% of them were well prepared, BP/CR was higher among High school and above level educated women [AOR: 0.18,95CI(0.07-0.47)], a women who had better family income were well prepared as compared to the low income families [AOR: 0.19,95% CI (0.07-0.51)], women who had four or more ANC follow up in their last pregnancy were well prepared than those who had less visit [AOR: 0.18, 95%CI(0.11-0.31)] and women who had knowledge on at least two key obstetric/newborn danger signs were well prepared [AOR: 2.03, 95% CI(1.36-3.03)]. **Conclusion:** This study revealed low level of obstetric/newborn danger signs and low BP/CR index among women who delivered recently compared to the WHO standard. Being educated in high school and above level, family income, having four or more ANC follow up, and having knowledge at least two obstetric key danger signs were factors associated with improved BP/CR. **Keywords:** Recently delivered women, birth preparedness, complication readiness, BP/CR Index
ABSTRACT
The prevalence of gastrointestinal helminthes in dogs was investigated by faecal examination from 860 dogs employing direct smear, simple flotation and sedimentation techniques. A structured questionnaire was also completed by 476 owners to assess the public awareness of zoonotic helminthes transmitted by dogs. Of the 860 dogs examined 89.3% were found to be positive for one or more types of helminth eggs. The following helminthes, with their respective prevalence, were diagnosed: Strongyloides species (60.1%), Ancylostoma species (52.2%), Dipylidium species (40.6%), Toxocara species (23.3%), Echinococcus species (5.8%) and Trichuris species (4.9%). The prevalence of gastrointestinal helminthes were statistically significantly affected by age of dogs (P <0.001), sub-city (p <0.05) and confinement types of the dogs (p <0.001). Higher prevalence of gastrointestinal helminthes was recorded in younger dogs, less than one year of age. Free-roaming and semi-confined dogs were harboring significantly higher prevalence of helminthes (100%) than strictly confined dogs (62.6%, CI=56.5 - 68.7). The present study reported that 99.2% of dog owners were not aware of the zoonotic parasite transmitted by dogs, and 88.2% of them never used anthelmintics for treatment of their dogs. The high prevalence of gastrointestinal helminth parasites of dogs and lack of owners’ awareness in Hawassa indicates a potential risk to human health. Thus, attention by the veterinarians, municipality of the town and public health service to increase awareness of their potential threat to human health is desirable.

Keywords: Helminth; Dogs; Prevalence; Owners’ awareness; Zoonoses; Hawassa
ABSTRACT

Vervet monkeys (Cercopithecus aethiops) are a member of the genus Chlorocebus which are native to Africa. Both the captive and free ranging vervets are affected by various parasitic diseases. The objective of the present study was to assess the occurrence of gastrointestinal parasites in free ranging vervet monkeys. Accordingly, a total of 140 free ranging vervet monkeys found in recreational areas of Hawassa City were examined for gastrointestinal parasitic infection from November 2013 to April 2014. For the identification of the gastrointestinal parasites, about 10-12 gm of the faecal dropping of feces was collected, preserved separately in clean and properly labeled containers containing formalin. The faecal samples were subjected to direct smear and floatation techniques for parasite detection of nematodes, cestodes and protozoa. Overall, out of 140 faecal samples examined 75% of the animals were found to harbor one or more gastrointestinal nematode parasites. The most frequently detected nematode parasite was Ancylostoma sp (32.9%). Parasite eggs suggestive of cestode parasites were found in 7.9% of the vervet monkeys. Cyst of coccidia (Eimeria sp and Isospora sp) was the most commonly detected protozoa parasites (27.1%). In 74.3% of the analyzed samples, two or more different species/genus of gastrointestinal parasites was detected. Correspondingly, 44.3% and 10.4% of the samples showed infection with two or more nematode and protozoa parasites, respectively. Future studies in the area should focus not only animals but also on the determination of the possible transmission of the parasites to humans which do have close interaction with the vervet monkeys.

Keywords: Cercopithecus aethiops; gastrointestinal parasites; Hawassa; recreational areas; Ethiopia
Survey of Bacterial and Parasitic Pathogens in Diarrheic and Non-Diarrheic Dairy Calves in and around Hawassa, Ethiopia

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ABSTRACT
The study was conducted from February 2013 to March 2014 in Hawassa, Shashemene, Wondo Genet and Yirgalem towns to assess bacterial and parasitic pathogens from diarrheic and non-diarrheic dairy calves. Fecal samples were collected from a total of 293 calves aged below 6 months for parasitological and bacteriological examination targeting selected pathogens. The feces of 140 calves were diarrheic (unformed) while 153 were formed (non-diarrheic). In all of the samples analyzed, Salmonella and Cryptosporidia were not detected. Moreover, it was not possible to characterize the E. coli isolates (n=100) whether they were pathogenic type or not due to the lack of serological reagents. Eimeria oocysts were detected from 61.8% (n=293) and strongyle type eggs from 34.9% (n=292) of the fecal samples. The prevalence of both parasites detected was significantly (p<0.05) associated with the duration the calf remains with the dam and age of calves. In this respect, calves which were separated from their dams early and calves older than 3 months (3-6 months) were more affected by both Eimeria and strongyle parasites. Calves infected with Eimeria had a higher chance of having unformed feces compared to uninfected calves (p<0.05). However, strongyle infection was not associated with fecal consistency (p>0.05). The mean count of Eimeria oocysts and strongyle type eggs were 2705.8 and 520.7 respectively. Calves with unformed feces had statistically significantly higher count of Eimeria oocysts and strongyle eggs compared to calf with formed feces (p<0.05). The study suggested that Eimeria infection might be an important cause of calf diarrhea in the study area. Therefore, control strategies to reduce calf diarrhea and associated negative repercussion in the study area should consider measures to control coccidiosis (Eimeria infection).

Keywords: Calf diarrhea; coccidia; Cryposporidium; Salmonella; Strongyle; Hawassa
ABSTRACT
This study was conducted from November 2011 to June 2012 and from April to May 2013 to estimate the prevalence of Salmonella prevalence in chickens and to assess the importance of fowl typhoid/pullorum diseased in Hawassa town and its surroundings. For estimation of the prevalence of Salmonella cloacal swab samples were collected from 536 apparently healthy chickens from Hawassa, Yirgalem, Wondo Genet, Dore Bafena and Arsi Negele. On the other hand, tissue samples from 42 sick and recently dead chickens, collected from Hawassa and Arsi Negele, were examined to assess possible involvement of Salmonella in morbidity and mortality of chickens. Isolation and identification of Salmonella was done according to standard bacteriological procedures. Six (1.1%) of the 536 cloacal swab samples collected from apparently healthy chickens were positive for Salmonella; all of the 6 isolates being motile salmonellae. A higher isolation rate of Salmonella (26.2%), however, was observed from sick and recently dead chickens (n=42). All of the isolates from tissue of sick/dead chickens were non-motile (S. Pullorum/Gallinarum) and recovered from chickens obtained from one farm namely Hawassa Poultry Breeding and Multiplication Center. The farm was in a state of an outbreak at the time and it was forced to temporarily halt its operation, after the entire flock was depopulated, in an attempt to stamping out the disease from its premises. The rate of isolation was 19.0% (n=8), 11.9% (n=5), 13.8% (n=4) and 4.8% (n=2) from spleen (n=42), liver (n=42), ovary (n=29) and ceca (n=42) samples respectively. The study revealed that fowl typhoid/pullorum disease may be very important poultry problems causing significant losses due to morbidity and mortality.

Keywords: Chickens, Hawassa, Isolation, Salmonella Gallinaurum/Pullorum
Urban and Peri-Urban Livestock Production in Hawassa, Southern Ethiopia: Environmental and Public Health Aspects

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ABSTRACT
The present study attempted to investigate peri-(urban) livestock production practices with respect to housing, watering and waste management practices and to assess the risks associated with environment as perceived by livestock keepers and non-keepers. A total of 130 livestock keeping households (65 from urban and 65 from peri-urban) and 130 non-keepers (65 from urban and 65 from peri-urban) were selected by snowball sampling method. Methodologically, a structured questionnaire was used to generate data on socio-economic characteristics of the respondents, housing, and other management practices, households’ perception about the benefits and negative impacts of livestock production in peri-(urban). The result showed that majority of the livestock keepers were male-headed and out of the total 130 urban and peri-urban livestock keepers, about 99.2%, 70%, 18.5%, 43.9% and 43.9% of them were kept dairy cattle, chicken, beef cattle, sheep and goat, respectively. The major positive aspect of livestock production in urban and peri urban perceived by the respondents were creation of employment opportunities and generation of additional income. The negative impacts of livestock production were less perceived by livestock keepers. The study revealed that most of the urban and peri-urban livestock keepers were managing manure and other animal related waste improperly. Therefore, the result of the present study reflected that there is a need to raise livestock keepers’ awareness of the importance of proper manure management (e.g. use of biogas technology) in view of efficient nutrient recycling and minimized risks for human and environmental health.

Keywords: Urban; peri-urban; livestock production; perception; constraints; waste management; environment; Hawassa
Microbiological Quality and Safety of Milk and Milk Products in Smallholder Dairy Production Chains of Hawassa Milkshed, Ethiopia: Implications for Public Health

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ABSTRACT
The present study aimed to assess the microbiological quality and safety of raw cow milk and natural fermented milk (ergo) produced and consumed in Hawassa and the surrounding towns. In the study a total of 63 samples (24 milk samples from vendors, 23 from smallholder dairy farms and 16 ergo samples) were collected and analyzed for microbiological quality/safety. Total bacterial and coliform counts were conducted and isolation of various bacteria which was also carried out. The result of the study showed that the mean total bacterial count of raw milks collected from smallholder dairy farms and vendors were 6.63 log$_{10}$ cfu/ml and 7.99 log$_{10}$ cfu/ml, respectively. The mean total coliform count of milk samples from dairy farms and vendors were 4.16 log$_{10}$cfu/ml and 7.09 log$_{10}$cfu/ml, respectively. Ergo had total bacterial and coliform count of 9.20 log$_{10}$cfu/ml and 7.56 log$_{10}$ cfu/ml, respectively. Comparing the bacterial count of milk samples collected from milk vendors and from smallholder dairy farms showed a statistically higher counts of total bacteria (t-test=2.59; p=0.007) and total coliforms in samples taken from vendors ((t-test=6.83; p<0.001). The most predominantly isolated bacteria were Staphylococcal species followed by Escherchia coli, Micrococcus species, Proteus species, Streptococcus species and Klebsiella species. The high level of total bacterial and coliform count and bacterial isolates in the present study indicates poor quality/safety with potential public health risk to consumers. Therefore, there is a need for the improved hygienic practices at production, transportation and selling points.

Keywords: Smallholder dairy; microbiological quality; milk; dairy products; Hawassa; Ethiopia
Major Gross Reproductive Tract Abnormalities in Female Sheep and Goats Slaughtered in and around Hawassa

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ABSTRACT
A cross-sectional study was conducted to assess gross reproductive tract abnormalities in ewe and doe from November 2013-April 2014. A total of 208 specimens of sheep reproductive tracts and 67 specimens of goats reproductive tracts were collected from ewe and doe slaughtered in Hotels and Restaurants of Hawassa City. The results of the investigation showed that a large number of slaughtered ewe (n=22; 10.6%) and doe (n=11; 16.4%) were pregnant. A total of 185 (88.9%) specimens had lesions in case of sheep and 53(79.1%) in case of goats. The predominant lesion of the ovaries both in sheep and goat was follicular cyst (57.2% in sheep and 59.7% in goats) and para-ovarian cyst (19.2% in sheep and 28.4% in goats). Other pathological lesions of the ovaries were ovarian hematoma, ovaro bursal adhesion, meso-ovarian tumor, luteal cyst, and in active ovary. Out of examined specimens, 24% in sheep and 16.4% in goats had uterine lesions. The most common uterine lesions were infections, presenting as metritis (19.7% in sheep) and (11.9% in goats) and pre-metritis.

Keywords: Reproductive abnormalities, genital tract, slaughter, ewe, doe, Hawassa.
ABSTRACT
This paper presents the result of the study on the current practice of solid waste management in Hawassa University. The major sources, methods of collection, storage, recycling options and transportation of solid wastes; and its management practice were identified by using Key Informant Interview and field observation. Additionally, the solid waste was segregated and categorized to their classes and the respective quantity was measured at each of the generation source. The major sources identified were offices, lounges, cafeterias, hotels, class rooms, dormitories, libraries, residential areas, hospital, clinics, dairy farms and maintenance offices. Papers and related wastes were not recycled rather burned. The results have shown that about 35,364.2 kg per week of food leftover (Sum of food leftover, onion peels, potato peels and cabbage peels) and more than 10,541.4 kg per week of the sum of paper, plastic, grass and leaves, medical waste, and some mixed waste was generated from the four campuses. The percentage of the moisture content and volatile organic matter content of the solid waste ranged between 69.514±0.8 - 86.923±4.564 and 85.1947±0.4880 - 97.1215±0.0191 respectively. From the total quantity of solid waste generated about 77.4% were organic that could be used either for compost production and biogas generation. Biogas generation was suggested as a better option which could be used as a source of heat for cooking that replaces the use of wood. Currently about 19.95 m³ wood per day were used for cooking which emits carbon dioxide and costs Et Birr 11,471.25 per day.

Keywords: Hawassa University;, Solid Waste; Solid Waste Management
Utilization of Locally Available Feed Ingredients for Nile Tilapia Feed in Small-Scale Aquaculture Systems

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ABSTRACT
This research was conducted to evaluate the growth, feed utilization efficiency and survival rate of juvenile Oreochromis niloticus fed with six different types of experimental diets (control and test diets). The control diet (diet “A”) contained 40% Maiz: Sorghum (1:1 ratio), while, the test diets were contained 40% coffee husk/pulp (”B”), wheat bran (“C”), beer sludge (“D”), (potato scrap (“E”) and Jatropha Kernel Cake Meal: Wheat: Rice (“F”) (2:1:1 ratio). The rest 60% of each the test diet was considered as basal diet and constituted maize, sorghum, wheat, rice, soybean, bone meal and groundnut. After proper feed preparation, juvenile O. niloticus were collected from Lake Hawassa. One hundred eighteen fish having an average body weight of 3.27g was randomly distributed in 18 aquaria having 35x35x80m3 size. The fish were fed three times a day at the rate of 10% of their body weight for 10 weeks. The results revealed that there was significant difference (p<0.05) on the growth performance and feed utilization efficiency of juvenile O. niloticus that fed different types of experimental diets. The highest growth performance in terms of final body weight, weight gain and specific growth rate was observed on the fish fed on diet “A” followed by the fish fed on diet “F”. In other hand, the lowest growth performance was observed on fish feed on diet “B”. As conclusion, except diet “B” all the tested diets are potential fish feed. Moreover, inclusion of coffee husk in diets of juvenile O. niloticus could be possible if the proportion of coffee pulp reduced to less than 40%. However, further study should be done to evaluate the potential of those diets at later stage of the fish in different small-scale culture systems.

Keywords: Aquarium; locally available feed ingredients; Oreochromis niloticus; small-scale aquaculture systems
Physico-chemical and Bacteriological Analysis of Surface Water from Gidabo River during Release of Coffee Waste from Coffee Wet Mill Cooperatives, Southern Ethiopia

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ABSTRACT
Water samples were collected systematically from three sites of Gidabo River, Yirgalem town of Daleworeda, Southern Ethiopia. On a monthly basis at three different seasons (before, at the time of and after coffee processing plant operating period) to see the impacts of wastewater released from wet coffee processing plants on the water bodies. After sample collection, the levels of some water quality parameters were analysed according to the manual for standard methods for water and wastewater examination. The average values for these parameters varied among the three identified seasons (1st, 2nd and 3rd phases) and ranged for pH from 5.57±0.907 - 7.97±0.404, PO₄³⁻ (mg/l) 0.43±0.11 - 5.47±0.75, NO₃⁻ (mg/L) 3.23±0.829 - 10.76±1.773, TDS (mg/L) 22.97±2.437 - 54.57±10.01, conductivity (µS/cm) 37.47±3.524 - 77.73±15.98, TSS (mg/L) 9±2.645 - 27±9.165, turbidity (NTU) 29.93±8.889 - 74.7±13.141, DO (mg/L) 11.67±2.516 - 19±3.605, BOD (mg/L) 86.67±15.01 - 193.33±27.30, COD (mg/L) 179±33.51 - 361±89.59, TC (Cfu/100 ml) 64±9.165 - 84±11.135, F.C (Cfu/100 ml) 19.67±13.203 - 45.33±9.451 and NH₃ (mg/L)ND - 0.01±0.001. The results have shown that values for most of the parameters were above the maximum permissible limit given by the Environmental Protection Agency of Ethiopia and the level of pollution was generally higher during coffee processing season than the corresponding levels of the other season. This implies a potential risk for the population, the environment and the river itself and an administrative measure should be taken to improve the treatment efficiency of the plant before effluent discharge.

Keywords: Gidabo Rivers; physico-chemical; Water quality, pollution; Ethiopia
Microbiological Quality and Safety of Selected Ready-to-eat Street-Vended Cooked Foods in Hawassa, Ethiopia

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ABSTRACT
In developing countries like Ethiopia, street food plays a major role in the nutritional requirements of many people. However, the question of their quality and safety is still remained. The present study was carried out at Hawassa main street food vending sites from December 2013 to June 2014. The main objective of this study was to evaluate the quality and safety of selected street vended foods. Preliminary observation was carried out prior to sample collection, to assess hygienic practices, vending areas, facilities, ingredients and serving procedures. A total of 80 samples of ready-to–eat cooked foods comprising 20 each of ‘Fuol’, ‘Sambusa’, ‘Macaroni’ and ‘Pasta’ were collected using sterilized sampling bottles. They were examined for aerobic mesophilic (AMC) count, coliform count, Staphylococcus count, and Salmonella-Shigella count. The result of the study showed that the average AMC count ranged from $1.7 \times 10^5$ - $2.5 \times 10^5$ CFU/g; average coliform count ranged from $1.4 \times 10^3$- $4.6 \times 10^3$ CFU/g and average Staphylococcus count was ranged from $4 \times 10^2$ - $1.8 \times 10^3$ CFU/g across the food items. Salmonella-Shigella counts were only detected from few samples. Pearson correlation test revealed that both negative and positive correlations were observed among microbial counts across different food items. In the present study, it can be concluded that street foods are contaminated with AMC, Coliform and Staphylococcus with different degree of contamination. Thus Education or training of the food handlers/food vendors on food safety practices should be given by relevant bodies of the area.

Keywords: Food safety; hygienic practices; microbial contamination; ready-to-eat foods; street foods
Ethnomycological study of Wild Mushrooms in the Southern Part of Ethiopia

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(Department of Biology)

ABSTRACT
The aim of the present study was to assess the diversity and ethnomycological use of mushroom species in Wondogenet and Dale (Yirgalem) district of the Sidama zone of SNNPR. Information on the ethnomycological uses and folk classification of mushrooms were collected by the interview of 210 people in 2013 and 2014. There are several edible, non-edible and poisonous mushrooms species in the region, and more than 30 species were collected and identified. They are abundant during rainy season in forests, with termite moulds and fertile woody and virgin lands. The folk classification in the areas is based on the color, size, test, texture, shape, habitat and growing seasons of the year. The cultivation of Ganoderma lucidium using formulated media was also successful at laboratory scale, and it was possible to study the cultural characteristic of the specie for classification. The ethnobiological use of mushroom for other purpose than food is rarely known, and only 3 % of the interviewees used mushroom for medicinal purpose. The collection of edible mushroom is seasonal, and accompanied by other activities such as cattle rearing, wood collection, farming and water fetching. Mushrooms are consumed alone by roasting or as a soup, and with other foods such as Kocho and cabbage. The widely known edible mushroom species are Meine (Agaricus spp), Shoa, Kakshife and kake (Termitomyces spp). Though, economically beneficial mushroom species such as Ganoderma lucidum and Morchela escalunta were also identified, the tradition of marketing all mushroom types is not known. Bukibulaso, horoco and burkibure from Amanita spp and Glarina spp are known poisonous mushroom identified. The societies know several victims of poisonous mushroom, and they mainly use traditional medicine such as mocha (squeezed watery product from Ensete ventricum) and blood of goat to treat the victims. In conclusion the ethnomycological use of mushroom in the study area is not well known, and the resource is disappearing with the increasing loss of biodiversity and indigenous knowledge. Finally, this study suggests more ethnobiological studies and the need of raising awareness and training societies on uses, collection, production and processing of edible mushrooms.

Key words: Ethnomycology; folk classification; Mushroom, Sidama zone
Integrated Assessment of the Ecosystem Services of Lake Hawassa and their Sustainability to the Livelihood of Stakeholders

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ABSTRACT
Lake Hawassa forms spectacular freshwater ecosystem for Hawassa residents and tourist attractions. This study investigated the use and importance of Lake Hawassa by assessing ecosystem services through integrated environment assessment. Field survey, structured and semi structured questionnaires (both households and tourists), key informants interviews, and literature review were data sources. The Lakeside that boarder Hawassa City was the subject of study. The study identified six landscape units based on landscape character mapping using a series of biophysical and cultural factors. Among ecosystem services, four provisioning (fish food, freshwater supply, grass and animal fodder, and grazing land) and four cultural services (recreation, aesthetic, spiritual/cultural and scientific information) were identified. Provisioning services (material benefits/products), such as fish food, fresh water supply, and raw materials (grass for construction and fodder) were used by 81, 59, and 38% households, respectively. Among cultural services or non-material benefits, Lake Hawassa forms the most tourist attractions mostly for recreation (by 73% tourists, 41% local population) for beautiful landscapes and the presence of unique wildlife, fair proportion (22%) for scientific information (research and education). Moreover, at Gudumale lakeside Park, Amora Gedel, Sidama cultural and spiritual holiday “Fiche” has been celebrated annually. Overall, local stakeholders identified fishing and fish food, recreation and freshwater use as the most important ecosystem services showing that both material need and social well being play significant role. Most households (85%) believe that these ecosystem services would be sustainable. However, for example, the fishery sector, most studies revealed that the sustainability of fishery is affected and fish landing is beyond maximum sustainable yield. Nevertheless, Lake Hawassa continued to supply basic needs and tourism services. Consequently, the provisioning and cultural services need to be considered during development of any project and in conservation and protection interventions of the Lake.

Keywords: benefit; freshwater; Lake Hawassa; livelihood means
Effect of Clonal Variation on Quality of Kocho, Traditional Fermented Food from Enset (*Ensete ventricosum*)

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**ABSTRACT**

Enset (*Ensete ventricosum* Welw. Cheesman) is an important multipurpose crop serving for over millions of Ethiopian population living in the southern and southwestern parts of the country. Survey on indigenous knowledge of farmers on local system of selection and identification of enset varieties was carried out at three localities of Sidama zone namely: Chafee Jebesa (3 km east of Hawassa), Tulla and Abella 13 and 16 km respectively, (south of Hawassa) from November 2011 to July 2011. The main objective of the study was to evaluate the sensory characteristics and nutritional analysis of selected top ten enset varieties. Both an open – ended and semi-structured purposive questionnaires were used for the survey. The sensory characteristics such as appearance, odor, taste, sourness, dryness and texture of kocho sample prepared from each selected enset variety were evaluated using a sensory panel judges. Nutritional analysis of the selected varieties was also carried out using Official Methods of Analysis (AOAC). The results of nutritional analysis revealed that there was no significant difference among the selected varieties in terms of their moisture and ash content. The values of moisture content ranged from 59.90 to 63.30% while ash content was between 2.11 to 2.35%. However significant differences have been observed among the selected varieties in terms of their protein (2.93 to 3.51%), fat (0.43 to 1.25%), fiber (3.22 to 4.57%) and carbohydrate (49.21 to 64.15%) content. This could be attributed to varietal differences among the selected enset plants. In conclusion, varietal variation can affect proximate composition as well as sensory characteristics of the final product.

**Key words:** Enset, Kocho, proximate analysis, sensory characteristics, varieties
Attitude and Skills of Farmers in Propagating and Conserving Indigenous Trees: The Case of Hawassa, Yirgalem, Wondo Genet and Yirba

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ABSTRACT
Assessment of attitude and skill of farmers in propagating and conserving indigenous trees was carried out in rural kebeles around Hawassa City (Hawassa Zuria), Yirgalem, Wondo Genet and Yirba towns of Sidema Zone, SNNPR of Ethiopia, from February, 2013 to January, 2014. By using random sampling method, 149 farmers (household leaders) of the four study sites were selected and interviewed. Lands owned and tree plantation practices of 46 randomly selected farmers from the aforementioned respondents were observed. Data about advices and supports that had been given to the farmers concerning tree plantation and care were collected from 16 Woreda/Sub-city Rural Development Experts through questionnaires. The results showed that mean land size owned by farmers around Yirgalem (1.34±0.86 ha) was significantly larger (p ≤ 0.05) than that of other study sites. Farmers around Wondo Genet owned the smallest land (0.3±0.14 ha) but their mean family size (8.8 ± 0.63) was the largest. Land size owned by the farmers was positively correlated (r=0.42) with their tree plantation. It was also found that 92% of trees on the land of farmers were exotic, and Eucalyptus spp. (79.6%), Cupressus spp (8.5%), C. africana (4.8%), Grevillea robusta (3.3%), and Millettia ferruginea (1.8%) were the five most dominant tree species. Majority of the farmers responded that exotic trees germinate and establish easier, grow faster and produce more income compared to indigenous ones. The farmers also argued that they want to plant indigenous trees for their economic, shade and other ecological values; however, they gave priority to exotic trees due to shortage of land and lack of advice for germination problems of some indigenous trees. Based on these findings, it is concluded that the most dominant tree species in the study areas were exotic; particularly, Eucalyptus spp. and Cupressus spp. Small land size and lack of advice for some indigenous tree nursery preparation were the two major factors that hindered tree plantation in the study areas. It is recommended that methods to integrate tree plantation to the farming system is required for sustainable plantation on the small lands owned by the farmers. Advanced methods obtained from research findings on indigenous tree propagation and plantation should be accessible to farmers.

Key words: Indigenous trees, land size, plantation, seedlings, tree preference
COLLEGE OF BUSINESS AND ECONOMICS

The Impact of Stress on Students’ Academic Performance at Hawassa University

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ABSTRACT
The study was designed to examine factors affecting stress level of students’ and their effect on academic performance at Hawassa University. The Major objectives of the study were to determine the stress level of the student, factors accountable for low and high stress level and to investigate the effect of stress on students’ academic performance. In order to achieve the above objectives the research was exclusively depend on primary data collected from 245 students of the four campuses of the university through questionnaire. Keeping in view the findings it was concluded that students were felt moderate level of stress and the relationship between stress and academic performance was negative. It was recommended that student should get counseling and guidance services and should be given tutorial classes above all.

Keywords: Academic Performance, Stress, Stressors, student
Measuring Service Quality and Students’ Satisfaction: A Case Study on Hawassa University

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ABSTRACT
This study is carried out to measure service quality and students’ satisfaction of the Hawassa University. The objectives of the study are to determine the extent of students’ expectation and students’ perceptions, the important parameters that determine service quality, see the relationship between service quality dimensions and students satisfaction and explore if the demographic characteristics significantly explain the variance in students satisfaction amongst students in Hawassa University. Cross-sectional design is used for the study and the researcher sampled these students by their campus. Both primary and secondary data sources are used to answer the research questions. The researcher carried out a quantitative research. It was seen that the extent of students’ perceptions lower than their expectation, service quality dimensions are positively correlated with students’ satisfaction and reliability is main factor that affected students’ satisfaction following with assurance, tangibility, responsiveness and empathy. Hence students are not satisfied the university service as a good deal. Therefore the university should work hard to improve its service quality level since its main goal is to serve students’.

Key Words: Service Quality, Service Quality Dimensions, Students’ Satisfaction
Assessment of Counter Productive Work Behaviours in Sidama Zone Revenue Authority

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ABSTRACT
Counterproductive work behaviour is volitional acts that harm or intend to harm organizations and their stakeholders. This paper aims to assess the counterproductive work behaviour and how the organization deals with them in the case of Sidama Zone Revenue Authority. In line with these, the researcher attempted to investigate the disciplinary procedures of the organization related with counterproductive work behaviour. To get the required data the researcher used questionnaires and interview. Finally, the researcher forwarded some recommendation based on the result and the problem identified.

Keywords: Attribution Errors, Counterproductive Work Behaviour, Sidama Zone Revenue Authority.
Determinants of Access to Formal Credit to Small Holder Farmers: The Case of Dale Woreda, Sidama Zone

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ABSTRACT
In Ethiopia, among other things, lack of access to institutional finance is very limited; the majority of the poor are forced to search financial services through informal channels. The study was sought to ascertain factors that affect smallholder farmer’s access to formal credit and informal credit sources in the study area. A two stage sampling method was employed to select four out of ten rural peasant associations and 150 farm households. Structured interview schedule was developed. Focus group discussion, group interview and field observations were held to generate qualitative data and descriptive statistics were used for analyzing quantitative data. The output from the study indicates that 64 (42.67 %) of the sampled farm households were formal credit users, whereas the remaining 86 (57.33 %) were non-users. It was also found out that credit access to female headed households is still limited. Farmers acknowledge group lending that solves the problem of collateral requirement by lending institutions, controls misuse of borrowed funds and minimizes the risk of default and they also recognize the provision of saving services by MFI, while strongly criticizing the isolation of very poor farmers from the group formation. Moreover, the smaller loan size, earlier saving requirement which was not convenient to the farmers, and repayment period by the MFI were among the critical problems. Age of the farm household head, Sex of the household, Literacy level of the household, Experience in credit use from the formal sources, Farm size in hectare, collateral or group formation were highly important in influencing access to formal credit use. Therefore, policy aimed to accelerate agricultural development in the area could be successful if these factors and problems are taken into consideration to access credit from the formal financial sources.

Key Words: Small Holder Farmers, Credit Access, Formal and Informal Financial Institutions,
Determinants of Performance of Micro and Small Enterprises: The case of Hawassa City

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ABSTRACT
This study examined determinants between male and female owned Micro and Small Enterprises operate in Hawassa city for the period 2013. The study employed Ordered Probit model for the dependent variable is measured on ordinary basis. The results from ordered probit regression indicates that As operation basis increases by one unit we have -.36606 percent less likely to be in lower category and 6.82e-08 more likely to be in higher status. As age of respondents increase by one unit (year), annual sales more likely to be in higher category by 9.39e-08 percent. The result provides hint on some important determinants of performance of micro and small enterprises. Therefore, it may have implication for policy maker, MSE agency and MSE owner.

Key Words: Performance, Annual Sales, Ordered Probit, MSE
A Co-Integration Analysis of Money Supply and Price in Ethiopia

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ABSTRACT
The objective of this study is to show the causality effect between money supply growth and Price level in Ethiopia using a cointegrated VAR model over the period 1974175 to 2012. The result of cointegration test, using Johansen Maximum likelihood approach, indicates the existence of long run relationship among the variables entered in both inflation and growth models. To explore the short-run direction of causality between MS and CPI, Granger Causality test has been applied and in order to investigate the existence of long-run relationship, co-integration analysis has been employed. The direction of causation between money and prices, the analyses suggests that the causation runs from money supply to prices, but price level does not causes money supply. Further, the co-integration analysis established that money supply and CPI were found to be co-integrated suggesting an existence of long-run relationship.

Keywords: Cointegration, Granger Causality, Money Supply, Price Level
Inflation and Economic Growth: Inflation Threshold Level Analysis for Ethiopia

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ABSTRACT
One of the main objectives of macroeconomic policy of the Ethiopia economy is to attain sustainable economic growth together with stable price level. However, in recent times the country has been experiencing an increasing price level and the situation has got wide range of concern regarding its effect on economic growth. Hence, the central focus of this study is to identify the nature of inflation-economic growth relationship of Ethiopia from 1974/75 to 2011/12, specifically by using the framework of VAR, vector error VECM, causality test and threshold level analysis using annual data covering the period from 1974/75 to 2009/10. All the variables are tested for unit roots using ADF test and the test result revealed the variables are stationary at their first difference. The result of cointegration test, using Johansen Maximum likelihood approach, indicates the existence of long run relationship among the variables entered in the models. The Granger Causality Test found the bidirectional causal relationship between inflation and economic growth. And the result also reveals the negative relationship between inflation and economic growth in Ethiopia both in the short and long run. The threshold model estimation recommends 9-10 percent threshold inflation level which is optimal for economic growth. Above this level inflation affects economic growth negatively. Therefore, controlling moderate inflation should be the main goal for policymakers in Ethiopia. Finally, though the study achieved the objectives mentioned lack of quarterly data on many important macroeconomic variables act as a limitation of the study.

Keywords: Economic Growth, Inflation VAR, Threshold level in Ethiopia
The Economic Contribution of Bamboo Production and Marketing: Case of Hula Woreda

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ABSTRACT
Despite becoming one of Ethiopia’s fast growing and most valuable forest, bamboo’s role in livelihoods and rural development is poorly understood. Hence, the general objective was to examine economic contributions of bamboo production and marketing for livelihoods of rural households. To attain this objective, both quantitative and qualitative data from 300 households were collected through structured questionnaires, focus group discussion and key informant interviews using multi-stage sampling technique in 4 Kebeles in Hula Woreda, SNNPR, and Ethiopia in 2012. Both descriptive statistical tools and binary logit regression model were used to analyze relationship between variables. Binary logit regression model was employed to find out the relationship between dependency level of households on bamboo for their livelihood and some selected socio-economic factors. According to the results, the area of land covered by bamboo has been decreasing from time to time and about 75 percent of respondents said that the area of land covered by bamboo has been decreasing. Bamboo culms and products marketing systems were informal. Bamboo producers simply display their products, mostly on road-sides, and interested buyers buy them. Information helps farmers to get better price to their product, to increase quality and quantity of the bamboo product. And only 7 percent farmers have full access for information on how to supply, where to sell and the level of demand for their bamboo products. This shows there was lack of adequate market information on the marketing of bamboo products they produce in this area. Therefore, the focus on the development of conservation and processing methods and appropriate production system and marketing can enhance the utilization of bamboo resources.

Key words: Bamboo, Binary Logit Model, Information, Livelihood, Marketing, Production
An Economic Inquiry into Commercialization of Small Holder Agriculture: The Case of Umbullo Watershed

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ABSTRACT
Agricultural commercialization refers to the process of increasing the proportion of agricultural production that is sold by farmers. Commercialization of agriculture as a characteristic of agricultural transformation is more than whether or not a cash crop is present to a certain extent in a production system. It can take many different forms by either occurring on the output side of production with increased marketed surplus or occur on the input side with increased use of purchased inputs. This study, however, is focused on the output side of marketed haricot bean by small holder farmers in Umbullo watershed. This study was conducted in order to identify factors influencing the market participation (commercialization) of haricot bean farmers in the study areas using both descriptive statistics and multivariate econometric analysis based on data obtained from 120 farming households which are interviewed by applying multistage sampling technique. The econometric result of the Tobit model indicated that, household size, total farm size, off-farm income, price of haricot bean, on-farm income, and credit availability are found to have been the determinants of the likelihood of Commercialization of haricot bean. Hence it is recommended that these results have tremendous implication for agricultural transformation program of Ethiopia.

Key words: Commercialization, Umbullo watershed, Tobit Regression
ABSTRACT
This paper attempts to analyze the determinants of Ethiopia's Sidama coffee exports in the international market over fourteen years for four years. In this regard, the tobit random effect model were developed to come up with the findings of the study. Accordingly, the result of the traditional gravity model shows that most of the exogenous variables have shown the already expected signs. However, only economic size of exporter nation, difference in per capita income and the resistance factor of distance have possessed a significant effect on in trade with Sidama coffee. Concentration of export in a limited number of countries is clearly seen from the structure of Ethiopian foreign trade. With regard to the direction of Ethiopia’s exports, Europe was a major trading partner accounting for almost all of its export including Sidama coffee. The identified determinants will provide a guideline for future move on exports in identifying those of importer nation's propensity and the proper quality of the goods must be maintained as well as the promotions must be increased as the Ethiopia’s exports largely depend on the foreign demand.

Keywords: Sidama, Coffee, Gravity, Tobit
Analysis of the Effects of Microfinance on Poverty Reduction in SNNPRS: Dale Woreda as a Case Study

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ABSTRACT
Micro finance is being practiced in developing countries as a tool to deliver financial services to the poor with the broad objective of attacking poverty. Most of the world’s poor do not have access for credit from formal financial institutions as it is considered too risky and too costly. Lack of finance is one of the major bottlenecks for economic development; as access to formal institutional credit is very limited. Thus, the government of Ethiopia brought micro finance institution into formal sector by issuing proclamation No. 40/1996 that empowered the National Bank of Ethiopia to issue licenses to supervise and regulate micro financing business in the country. Omo Micro Finance has been operational in SNNPRS region and has managed to reach more needy poor people who otherwise have no access to financial resources from banks. The evaluative research approach was used for this study involving both quantitative and qualitative studies, which aims in tracing the likely effects of microfinance in poverty reduction is by comparing the level of income, health and educational expenditures of beneficiaries before and after the loan. A two stage stratified sampling procedure was used to come up with representative sample towards the target population. The analyses reveal that micro finance credit services particularly that of Omo MFI has a positive impact on raising saving, income level and improving access to health care and educational services of the beneficiaries. Based on this finding it was concluded that micro finance credit services plays significant role in poverty reduction endeavor, and hence government and other responsible bodies should give due attention to the expansion of micro finance institutions in the context as well as devise mechanisms to increase loan size as the need arises.

Keywords: Microfinance, Poverty Reduction, the Poor, Targeting
Market Linkage and Information System around Wondogenet Woreda

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ABSTRACT
The principal intention of this study is to understand the market linkage and information system around Wondogenet Woreda. In the contemporary world, to stay in the competition arena, getting accurate, reliable, timely, relevant, and speedy information is not an option. However, it seemed impossible to the farmers of developing countries in general to the farmers around Wondogent Wereda in particular due to the asymmetric flow of information. In addition, the market linkage is still in its traditional format and at grass root level. This paper is done to identify the major problems that affect the market information system, to assess the possible ways to increase the market speculative and bargaining capacity power of farmers and to explore feasible Market Information System solutions. The study used primary and secondary data, a clustered sampling technique, qualitative and quantitative analysis, econometric modeling and value chain approach. The study identified value chain mechanism as a way to enhance their back and forth communication system rather than the unidirectional, selectively beneficiary traditional system. This system guarantees their consistent and continuous attachment with the other actors in the market. A model is developed to show how these farmers should interact with merchants and the union. One of the mechanisms to facilitate the value chain mechanism is using alternative market information system. After using the nine criteria on nine alternative information delivery systems, the result indicated that mobile Phone Short Messaging Service (SMS), Interactive Voice Response (IVR) Based System, have a high return in satisfying the criteria. However, since the majority of the farmers are illiterate, IVR is the best possible option. The fact is however, neither of these services is applied except the traditional Word of Mouth System and Market Information Point System. Among the recommended action points, Wondogenet Wereda Exchange and Union Bureau is expected to announce itself to the public, to strengthen interaction among the stake holders by facilitating smooth flow of information, build the capacity of farmers via continuous trainings and follow ups are some of them. Government is also expected to provide the necessary infrastructural facilities facilitate the transaction.

Keywords: Information System, Market Linkage, Value Chain
The Role Of Saving and Credit Cooperatives in Development: The Case of Hawassa City

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ABSTRACT
This research has been conducted with the objective to explore the role played by saving and credit cooperatives, in Hawassa city, in development. Survey has been conducted on selected cooperatives and members in 5 sub-cities of the city. Using descriptive analysis it has been shown that up to 2004 E.c more than 87 saving and credit cooperatives had been established with a total membership of 8,980 and generating more than 52 million birr capital. The maximum employment generated per cooperative reached 3 workers and a number of such opportunities were indirectly generated by members that took loan from the cooperative and invested. Some cooperatives are also participating in other investment projects like buying shares from private banks. If their constraints like training, supervision, auditing etc are met they can better play their role in the economy of the country.

Keywords: Saving, Credit, Cooperatives, Membership, Capital, Investment, Employment, and Committee.
Estimating Smallholder Farmers’ Willingness to Pay for Improved Water Harvesting Technology in SNNPR, Ethiopia: A Choice Experiment Approach

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ABSTRACT
Crop production fluctuates following rainfall patterns in countries that depend on rainfed agriculture heavily exposing and threatening the livelihood of the population. Rainwater harvesting can be considered an important intervention for managing scarce water resources and supplementing agriculture for communities subjected to erratic rainfall due to climatic variability. However, despite its proven uses for domestic, agricultural and environmental purposes, rainwater has not been fully utilized in Africa, Ethiopia is no exception. Typically, development projects in Ethiopia tend to subsidize household and community water pond construction to harvest and store water to be used in times of scarcity. These ponds are often constructed without proper technical knowledge and expertise, resulting in leakage and evaporation, and are furthermore often not maintained, ultimately resulting in their nonuse and abandonment. The main objective of the study was to estimate farm household’s willingness to pay for improved water harvesting technology employing a stated preference method of choice experiment by randomly selecting 300 farm households in Boricha, Ethiopia. The results based on descriptive statistics indicate that a significant number of the sample households are highly vulnerable to climatic variability and with no or little adaptive capacity. Moreover, there exist good social capital and social network that are very important in influencing technology adoption decision of the farm households, and also access to credit, input and output markets and information is fair. According to the result from mixed logit error components model, the farm households prefer the contract if provided by the regional government via facilitating credit services that enable farmers have private water ponds of their preference in terms of the pond attributes pond size, type of lining and covered top. Typically households are willing to pay birr 1022.58 per unit increase in pond size, other things remain constant. Regarding the lining of the pond, households are willing to pay birr 44.13 if the contract on offer includes a pond with plastic lining compared to cement lining. Finally, households’ marginal willingness to pay for a private pond with covered top is birr 223.54 relative to that without cover, ceteris paribus. Policy intervention in terms of technology adoption would be better when made with proper technical knowledge and expertise by engaging players at every level instead of a top down decision should the policy meet its target.

Keywords: Choice Experiment; Contract Design; Mixed Logit; Simulation; Water Harvesting

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ABSTRACT

It is evident that improving the existing drinking water supply services in developing countries depends critically on the available financial resources. The cost recovery rates of these services are generally low, while the demand for more reliable services is high and growing rapidly. This study examines household willingness to pay for improved drinking water supply services in urban area in Ethiopia, with particular reference to Yirgalem town in SNNPR, using a choice experiment approach. The design of the choice experiment enables to estimate the value of drinking water supply reliability and the water quality. The estimated values are crucial in policy appraisals pertaining to improved drinking water supply investment decisions. Although the respondents have significant income constraints, they are willing to pay for improved drinking water supply service above the present monthly water bill and those living in the poorest part of the town with the lowest service levels are ready even to pay more. In general, women value the improvement of water quality most.

Keywords: Drinking Water Supply, Choice Experiment, Improved Water Quality, Ethiopia, Water Supply Investment, Willingness To Pay.
The Role of Lake Hawassa in Improving the Livelihood of the People Engaged in Fishing and Related Activities, Southern Ethiopia

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(Department of Economics)

ABSTRACT
The aim of this study was to assess the role of Lake Hawassa in improving the livelihood of the people engaged in fishing and related activities. Specifically, the study aims to assess the role of Lake Hawassa in increasing employment, income and value of total assets and to identify factors that determine the income of those people. The study used primary data collected using a structured questionnaire. The methodology used comprises both descriptive and regression analysis. The findings of this study could be used in assessing the role of Lake Hawassa in improving the livelihood of people engaged in fishing and related activities. It was found that Lake Hawassa has contributed to the expansion of self-employment opportunities, increased income and value of total assets to the respondents. The observed increase in the number of newly created jobs enables the respondents to generate reliable income which has led to improvement in their livelihood. The regression result indicates that age of respondents, sex of respondents and years of schooling of respondents are important determinants of average monthly income of the respondents. The signs of the coefficients of the variables age and sex of respondents are positive and statistically significant while the sign of the variable respondents’ years of schooling is negative and statistically significant. This result suggests that years schooling of respondents negatively affects their average monthly income from these activities since individuals with more education can earn higher income by engaging in other types of activities. The contribution of Lake Hawassa in expanding employment opportunities, increasing income and value of total assets to the respondents implies that it is necessary to strengthen the development of fishing schemes to reduce unemployment which is decisive to poverty alleviation.

Keywords: Fishing and Related Activities, Improving Livelihood, People, and Role of Lake Hawassa.
The Impact of Inflation on Living Standard of Households in Hawassa City

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ABSTRACT
In the modern globalization era, inflation crosses borders and affects both developing and developed countries. The most serious costs of persistent inflation is that it destroys the confidence that society can solve its problems and creates fear that their social contracts is falling apart. The food inflation index is currently over 12% and has shown no sign of coming down. The prices of essential food items are astronomical as compared to the prices earlier years. While the pinch is felt by every household, the poorest sections are understandably the worst affected. To understand the impact on the poorest households, the survey conducted across 240 households from five different sub-cities of Hawassa. While the average monthly expenditure has increased but more importantly, food expenditure as a percentage of monthly household expenditure has gone up dramatically. The prices paid by the households for essential food items have increased across the spectrum and this increase in prices has naturally resulted in a change in consumption habits. The burgeoning food budget has invariably led households to cut costs in other areas such as healthcare and transportation and consumption of individual food items also shows a significant reduction. In addition to women workload increase, households have also been forced to adopt other coping strategies such as using up savings, pawning or selling valuables, or taking a loan to finance their monthly cash requirements.

Key Words: Inflation, living standard, Consumption and Price.
Determinants and Behavior of Rural Household Saving: A Case of Dale Woreda, Sidama Zone

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ABSTRACT
The study aims at investigating the determinants of households’ saving in Dale district Sidama Zone. Data of 150 respondents are drawn through field survey in 2012/13 by adopting multistage random sampling technique. Questions are asked directly from head of household about their education level, family size, age, amount of savings per year in birr, assets, income etc. Sample contains information about rural households. Ordinary Least Square method is used for estimation. OLS analysis presents determinants of households’ saving in Dale district. It is concluded that, total dependency rate, total income of household and family size significantly raise household savings. Education of household head, sex, household landholdings, marital status, and livestock size of the households reduce saving level of households. This study also supports existence of Life cycle hypothesis. Future research must be conducted which takes into account nonmonetary saving of rural households.

Keywords: Life Cycle Hypothesis; Savings; Dale; saving account
Assessment on the Application of Cooperative Principles by Cooperative Members in Wondo Genet Woreda, Sidam Zone, SNNPR

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ABSTRACT
The present study was undertaken to assess the practice of principles of cooperation by primary cooperative members in Wondo Genet Woreda. Both primary and secondary sources of data were perused for the study. On the basis of proportionate to size, 180 members were selected by adopting stratified sampling procedure. Simple statistical tools such as percentages and tables were used for descriptive analysis of the primary data and multiple linear regression analysis was used. Results of multiple linear regression show that age, education, social participation, duration of membership, services availed from cooperatives, participation in cooperative management, membership with other cooperatives and cooperative education and training have a consistently positive effect on the practice of principles of cooperation among members. To conclude members of cooperatives in the study area were found to be practicing the principles of cooperation during their association with their cooperatives.

Key words: Principles, Practice, Cooperation, Assessment
The Role of Entrepreneurship in Poverty Reduction: The Case of Hawassa Small Scale Industry, Sidama Zone, SNNPRS

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ABSTRACT
Entrepreneurship is a means to enhance the living standards of peoples since it play a pivotal role for poverty reduction. Based on this theoretical hypothesis this research was conducted to assess the potential role of entrepreneurs in poverty reduction and to identify the factors that affect entrepreneurs towards its success in Hawassa city Sidama zone, Ethiopia. The research employed both qualitative and quantitative research methods. Simple random sampling method was employed to select 125 respondents. The data were collected through semi structured interview. The data were processed using descriptive statistics with the help of SPSS 17 version. In addition, qualitative data were also collected using FGDs, and key informant interviews. The qualitative data were analyzed using content analysis. The research revealed that Entrepreneurs have a positive contribution for poverty reductions since they generate income, employment opportunity, change the saving habit, access of getting credit, empower women, change the living standard, create asset, financial support to get health services and education, access of getting training, and market opportunities. The major challenges faced by the entrepreneurs towards its success were lack of business management skill and labour, poor infrastructure, negative perception of the peoples towards their product, access to capital and bureaucracy, lack of adequate credit, group lending system, Unreliable supply of raw materials, inputs, power, finance and labour, unfavorable market situations, Complex taxation rules, regulations and procedures framed by the government. In order to solve the above problems entrepreneurs should create collaboration with different stake holders in order to get financial and non financial support, continuous education and training on basic business skill, request service from government about lending policy and tax issues, forging vertical and horizontal collaborations with financial institutions, diversify the nature of product, creating workshop, symposium to create awareness for the product.

Key words: Entrepreneurs, Poverty
Assessment of Social Capital in Women Self-Help Groups and its Impact on Members in Hawassa Town, SNNPRS

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ABSTRACT
Social capital is the network of people with different agencies results in effective utilization of resources. Urbanization in Ethiopia leads to increases in urban poverty, inequality and unemployment among women. Self Help Group (SHG) is the alternative mechanism to solve such problems. Though such evidences are noticed in different parts of world, solid evidence is lacking in Hawassa town due to dearth of studies. Hence the objective of this paper is assessing the level of social capital in women SHGs and its impact on members in Hawassa city. The study is based on descriptive design and multi stage random sampling procedure was adopted to select the sub-cities, SHGs and members. Primary data was collected through pre-tested interview schedule. Simple tools like Mean, Standard Deviation, Chi-square Test, and Correlation were used to analyze the data. Multiple Linear Regression analysis was carried out to find the relative importance of various factors influencing the level of social capital. The results indicate that 25.45%, 32.72% and 41.82% of the respondents possessed high, medium and low level of social capital respectively. Entrepreneurial ability, decision making power, self confidence, extensive network has also been increased among women due to the participation in SHGs. Regression result shows that Age of the members, Social participation, Occupation, Duration of membership, Attendance in SHGs, Number of internal loans availed, Linkage with external agencies, and Participation in community activities are found to be statistically significant indicating the importance in strengthening the social capital. Different activities engaged and promoted bears testimony for livelihood options. To conclude, facilitating coordinated action, trust, norms and networks can improve the efficiency of the community based organizations more democratic and active.

Key words: Social Capital, Self Help Groups, Urban Women, Livelihood, Poverty
The Impact of Human Resource Management Practices on Staff Turnover: 
The Case of Hawassa University Main Campus

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ABSTRACT
This study attempts to analyze the role of Human Resource Management Practices on Employees Turnover in Hawassa University. Primary Data was collected from staff members (both academic and administrative) of the university using questionnaire. The objective of the study was to assess the impact of Human Resource Management Practices on Employees Turnover. The study evaluated six Human Resources Management Practices (Job Analysis, Recruitment and Selection, Training and Development, Performance Appraisal, Compensation and Benefits) and their likely impact on employee’s intention to leave the University. Means and standard deviations for all the variables were calculated in order to get an idea about the direction of the respondents’ perceptions. The result indicated that Job Information received during recruitment, clarity of job objectives, and feedback on performance appraisal were rated low. Most employees indicated that they do not receive the feedback on their weakness and strength of their performance. The study also shows that respondents are not satisfied with the existing benefit package of the university

Key words: Human Resource Management Practices, Intention to leave
ABSTRACT
This paper attempts to look at the financial impact of Sidama microfinance Institution (SMFI) on its clients’. In order to achieve this end the study assesses the interventions impact on its clients and the financial performance of the institutions while serving the poor. Quantitative and qualitative data were collected from the institution and its clients to test the following variables: creation of Employment, income generation, asset formation, and financial sustainability of MF program. Furthermore, in order to examine the financial performance of the institution while serving the poorest 5-year financial statement of SMFI is analyzed. The study finds that the services of SMFI are benefiting its clients; there is a significant difference between new and veteran clients in terms of income and asset formation and the difference is attributed to MF participation. In addition, the study reveals that SMFI is financially and operationally self-sufficient.

Key Words: Microfinance, Intervention, Financial Impact, Financial Self-Sufficiency
Determinants of the success of Coffee Cooperatives (The Case of selected coffee cooperatives in Dale woreda, Sidama zone, SNNPR, Ethiopia)

Bantyergu Engida and Habib Bariso
(Department of Cooperatives)

ABSTRACT

Any improvement in the agriculture is a means of stimulating economic development at national and regional level. Failure to develop the agricultural marketing system is likely to go against most efforts to increase agricultural production and productivity. There are little studies, so far, done to investigate the determinants of success of coffee farmer’s cooperatives in the context of Ethiopia. The study assessed business performance of the sample cooperatives; analyzed the level of participation of members; identified factors affecting the success/well functioning of the sample cooperatives. The study was conducted in Dale woreda of Sidama zone. Sample 140 members from three sample coops were selected for the study purposes. Both primary and secondary were used. FGDs, KII and semi structured interview were used to collect data. The result revealed that Boa Badagalo, Waycho, and Shoye Cooperatives made an average of 19.1, 52.5 and 10 percent of ROA respectively in the last five years. On average Boa Badagalo achieved 75 percent, Waycho 78 percent and Shoye achieved 70 percent of their plan in collection of coffee from the farmers. The five year average shows, except for Waycho, the percentage of allowed loan is 2/3 of the request. The participation index shows the overall level of participation of members in the cooperatives affairs is below the average that is 50%. The top 5 Major the factors determining the success/well functioning of the cooperatives in their order of importance are: Lack of adequate credit service; Competition from private investors; Members economic and democratic participation; Embezzlement in the cooperative; Inadequate working capital.

Key words: Cooperatives, Participation, Performance, Success
COLLEGE OF SOCIAL SCIENCES AND HUMANITIES

Analysis of Communication and Documentation of Information Related to Rural Development in SNNPR: with a Focus on Dale and Hawassa Zuria Woredas

Medhin Marcho
(School of Languages and Communication Studies)

ABSTRACT
This study is aimed at investigating if actors in the rural development sector pay proper attention to practices of communicating and documenting innovative insights in scope of rural development to promote extension practices. It also attempts to identify the factors that cause inefficient communication and documentation practices in the sector. The study was conducted in Dalle and Hawassa Zuria woredas in Sidama zone in 2013/14. The main objective of this study is to explore and describe communication and documentation practices of some undertakings in the scope of rural development interventions to promote effectiveness of interventions through effective communication process and documentation facility. To achieve its objectives the study employed two research tools. Firstly, reactions of development practitioners to some points pertaining to the investigation were surveyed with a help of research questionnaire. Secondly, supervisors of these practitioners and an expert from a nongovernmental actor were interviewed to compile further information and to crosscheck the data generated from development actors directly involved in field activities. The summary of the data obtained through both angles mentioned above primarily indicated that the level of attention paid to practices of communication and documentation in the rural development sector in the two woredas is low.

Keywords: Communication, Documentation, Innovative Insights, Innovative practices, Rural Development
ABSTRACT
The growing need for institutional effectiveness and efficiency in meeting institutionally set objectives cannot be seen independent of information management and strategic communication. As a result, information management and strategic communication practices have become quite relevant to improve the effectiveness and efficiency of institutions. To find out the information management and strategic communication situation in the region, data was collected from primary and secondary sources and relevant literature was reviewed. Then, the data was classified using sex, age, qualification and experience, and also analyzed using frequency, percentage, mean value, standard deviation, T-test and correlation analysis. Based on the analysis, it is found out that the information management and strategic communication practice is less effective due to its intuitional placement where the section is mostly ignored. Besides, it is found out that most of the challenges and problems related to BPR implementation for institutional change, though it has been better performed in Hadiya more than the rest two zones, it is are quite related to the marginalization of information management and communication practices along with the inadequacy of finance and office equipments, and poor office situations like in the case of Gedeo zone. There is a strong correlation among the zones in information exchange level and challenges of BPR implementation. There is, indeed, more than 65% success story in reducing process time, and more than 50% in reducing cost and about 50% success in proper use of resources and creating accountability in Hadiya zone though much more is expected. Sidama and Gedeo zones seem to have by far low successes in BPR implementation.
The Attitudes and Perceptions of School Community towards Mother Tongue Based Classroom Instruction: *The Case of Sidama Zone*

Mebratu Mulatu Bachore  
(School of Languages and Communication Studies)

**ABSTRACT**
The main objective of the study is to assess the attitudes and perceptions of school community towards mother tongue based classroom instruction. The study was conducted in Sidama zone, particularly in three Woredas which one school was drawn from each. The approach employed to carry out the study was mixed one: quantitative and qualitative approach. The tools which were used to collect data are questionnaires and interview. The questionnaire was administered to the teachers and the students, and the interview was to the school parents in the target area. There were 70 students, 6 parents and 11 teachers who were taken by using cluster and random sampling. The results of the study showed that most parents and almost half of the sample students have negative attitude and perception towards using mother tongue as a medium of instruction. But, the teachers’ attitude and perception can be rated as good. Moreover, the study revealed that there are challenges like shortages of reference materials and text books to be used in Sidama language; students might have problems in their future since the language is being used in their local environment only, and the students are experiencing serious writing problems in the texts they produce in the Sidama language.
The Perceptions and Attitudes of University Students towards Group Work and its Implications in Learning in Higher Institutions: Focusing on Selected Ethiopian Universities

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ABSTRACT
This paper tried to discuss an investigation of students’ attitudes and perceptions of group work in higher institutions and the implications these perceptions and attitudes have in learning in higher institutions. To do so, the following key terms were considered. In this study, the researcher clearly identified the research problem to be assessed and the objectives to be achieved. The target populations were also determined. Then he cogently revised the related review literature and organized the scholars’ view point based on the action plan set. He also integrated the reading he has made with the research problem and objectives, and then contextualized it. Moreover, the researcher collected data through questionnaires that helped him disclose student’s feelings and thinking about group work. He used the Likert scale method of measuring attitude and perception where the respondents indicated their attitudes and perceptions by saying ‘yes’ or ‘no’. Apart from this focused classroom discussions were employed to uncover students’ feelings concerning the importance and effect of group work towards their learning. Then the researcher analyzed the nature of group work, the possible variables that may speed up or delay group or collaborative work in learning. He drew on data from students of two universities addressing the factors that speed up group work and factors that hinder it’. The research results drawn from the questionnaire, and focused group discussion were cogently discussed and interpreted. Finally, the research result implications, confusions and misconception were clearly stated in the conclusion.

Keywords: Attitudes, Perceptions, Group work, Awareness, Instructor/s, Focused discussion, Needs assessment, Impact, Likert scale, Implications, Misconceptions, Confusions
Assessment of Factors Affecting Promotion of Gender Equality in Education in Schools of Technology Villages of Hawassa University

Dawit Legesse
(School of Education and Training)

ABSTRACT
This study aimed at investigating factors affecting gender equality in education by looking into feeling of stakeholders towards gender equality in education, factors affecting gender equality in education, measures taken so far by stakeholders and future action that needs to be taken to promote gender equality in education. To achieve the objectives of the study, qualitative approach has been employed and data has been collected from 30 students, 20 teachers 6 Unit leaders and 6 principals of three primary and three secondary schools located in Boricha, Wondogenet and Hegereselam woredas; Gender Unit of SNNPR Education Bureau (REB), and gender offices of the selected woredas. Interviews, focus group discussion and observation have been employed to collect data from the participants and the research sites. The results indicated that participants have a general feeling that females perform less than their male counterparts; home related factors, teacher interactions and culture and school environment are factors affecting female students’ participation in education. It was found that there were attempts made at school level to mitigate problems lowering participation of female students in education through tutorials and other affirmative actions though these seem to be less significant in solving the challenges girls are facing in those particular schools. It was suggested that the school management and education offices should work in collaboration with gender units of the woredas as home and culture related factors need coordinated efforts to minimize their effect as they need working with families and the larger society. Moreover, schools and education offices should give training to teachers by involving educators on appropriate interaction strategies for teachers in their classrooms.

Key words: Females Participation, Gender Equality, Home Related Factors, School Environment, Teacher Interactions
Implementation of the School Improvement Program in Selected Schools of Technology Villages of Hawassa University

Dawit Legesse
(School of Education and Training)

ABSTRACT
The major objective of this study was to explore the implementation of the School Improvement Program (SIP) in primary schools of Boricha, Wondogenet and Dale woredas. The study investigated the process of SIP implementation, challenges faced while implementing it, benefits accrued and actions to be taken to advance SIP implementation. The study employed qualitative approach and made use of purposeful sampling. Thus, from six primary schools 4 principals, 24 teachers, 60 students, 4PTA members, and 3 supervisors, and 3 education office heads and 2 REB officials were participants of the study. To obtain the data interviews, focus group discussion and observation were employed. The data indicated that SIP implementation is in progress through preparation of plans, employing active learning methods, making the school environment conducive, implementing continuous assessment, involving parents and organizing different clubs. However, these attempts have been mitigated by lack of positive attitude on the part of some teachers, lack of incentives and recognition strategies, low-level of parental involvement and low suitability of environments of some schools. Hence, increasing parents participation, introducing proper incentive and recognition mechanisms for outstanding teachers, giving training on continuous assessment and active learning and creating collaborative environment are suggested as solutions. Finally the study implied that education officers, school management, teachers, parents and students should work in collaboration as there is much to be done to achieve SIP targets.

Keywords: School improvement, School environment, Leadership, Continuous assessment
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Keywords: School improvement, School environment, Leadership, Continuous assessment
Psycho-Educational Factors That Affect First Year Female Students' Academic Achievement: The Case of Ethiopian University

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\textbf{ABSTRACT}
This study focused on determining the psycho-educational factors that affect female students academic achievement in Ethiopian University. Three research questions and three objectives were formulated to guide the study. Three hundred fifty (generic and readmitted) female students for survey study were selected through simple random sampling techniques from all Hawassa university campuses and 20 key informants (staff and students) were selected purposively for interview. Data were collected through interview and questionnaire. Mean and graphs were the statistical tools used for the analysis. The study reveals that two psychological factors are found to be the dominant problem from the investigation. They are lack of self confidence and worry about having to leave the institution due to academic failure. Similarly, three educational factors are found as the major obstacle for female academic success in the university. These are: lack of attention during lecture time, poor previous academic preparation/experience in secondary schools and problem of taking notes during lecture hours. It was recommended that successful study skills training should be arranged, a learning center as an academic development center should be established to utilise both the academic staff and senior students, Orientation should go beyond showing their dormitory and the provision of good and organized counseling service by the professionals.
An Assessment on Factors Affect Saving Culture: The Case of Dale District in Sidama Zone, SNNPRS in Ethiopia

Amalo Soga
(School of Behavioral Sciences)

ABSTRACT
This study assesses overall socio-economic and cultural factors that affect saving culture of cash crops producer households in Dale Woreda. It focused on the coffee producers. Primary data was collected through household survey, focus group discussion and in-depth interview with key informants. Secondary data was collected from written documents. The total annual income of households and other related data were collected from 144 informants through survey method and additional qualitative data were collected from 30 informants. Descriptive statistics and qualitative description were used to present and discuss the findings. The results of this study show that the average income of the households who were included in survey was 16,562.5 Ethiopia birr. Total saved money during the crop harvesting season is too low; only 2.48% money was saved but it shows that people have experience of saving. Major factors that down saving culture are increase of cost of consumption, social and production like fertilizer and seed, inflation, climate change causes low produce, absences of prioritizing experience and resource management problem, international coffee price volatility, increase of debt habit and expectation of availability of money in cash crops harvesting season.

Keywords: Saving culture, Household, Cash crop.
The Need, Practice and Challenges of Guidance and Counseling Services in Selected Sidama Zone Secondary Schools of SNNPRS Ethiopia

Adane Wako
(School of Behavioral Sciences)

ABSTRACT
The general objective of this study was to assess the need, process of practice and challenges of guidance and counseling services in selected secondary schools at Sidama Zone of SNNPRS, Ethiopia. The study used survey design and 258 student, 3 school counselors and 4 school directors were participated in the study. Descriptive statistics like percentages, mean, range, and Standard deviation were used as data analysis techniques for close ended items. Open ended items were narrated qualitatively. The result indicated that there is high counselor student ratio in the study areas. Students have favorable perception about school counseling programs and characteristics of their school counselors. However, students face different psychosocial problems that need the help of school counselors. The main problems are low students self concept, lack of proper study skills, time management problem, lack of assertiveness among female students in their teaching learning process, and different problems students with special Needs face. Majority of students are not utilizing counseling services. The major reasons are lack of awareness about the service in their school, and weak link between school counselors and school community. Counseling services in schools are not being implemented due to different problems. These problems are related with pre-service training, administrative problems, lack of proper guideline and manual, and counselors’ personal problems. Recommendations for different stakeholders on ways of improving school guidance and counseling services were forwarded.

Keywords: Guidance and counseling, Need, Counselor, School administrative, Preparatory and Secondary schools
Analysis of Factors Affecting the Adoption of Sustainable Management of Municipal Solid Waste in Hawassa City, Southern Ethiopia

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ABSTRACT
This study was conducted on Hawassa city, southern Ethiopia from 01 September 2013 to August 2014. The general objective of this study was to investigate factors affecting the adoption of sustainable management of municipal solid waste in Hawassa. For this study three kebeles were selected using simple random sampling technique and 234 sample households were chosen. Both primary and secondary data sources were used. Questionnaires, interviews, field measurement and observations were employed to collect primary data. Both qualitative and quantitative techniques were used for data analysis. The study showed that there are nine solid waste categories in Hawassa. These solid waste types were food, plastic and rubber, paper and cardboard, textiles and leather, ash and dust, metals, glass wastes, yard waste and miscellaneous. The major components of the household solid waste were food wastes, with average weight of 103.1 kg and volume 315.97 liters. The average amount of household solid waste generated in Hawassa town is about 0.2 kg/day per capita. The results of the sample survey suggested that the amounts of solid waste generated by the higher, medium, and lower income households of Hawassa are 0.85kg, 1.9kg and 4.3kg per capita per day respectively. The study indicated that the number of solid waste containers in the city is inadequate. Containers are not distributed in the city in such a way that the beneficiary’s optimum travel distance is secured. The provision and distribution of containers in the city was not considered the number of population per sub city and sub cities area/size. Organizing the informal sector and promoting microenterprises are an effective way of extending affordable services for the successful adoption of MSWM. The increase of the service demands combined with the shortage of resource for the municipality of Hawassa is putting tension on the existing MSWM systems.

Key Words: Barriers, Municipal Solid Waste Management, Success factors
ABSTRACT
This study was carried out to evaluate the risk of soil erosion and Evaporation in Lake Hawassa watershed. The research applied the Revised Universal Soil Loss Equation (RUSLE), remote sensing, geographical information system (GIS), and Surface Energy Balance Algorithm for Land (SEBAL) to the mapping of soil erosion risk and Lake Evaporation in the catchment. Soil map and soil survey data were used to develop the soil erodibility factor (K), and a digital elevation model image was used to generate the topographic factor (LS). The cover-management factor (C) was developed based on vegetation, shade, and soil fraction images derived from spectral mixture analysis of a Landsat ETM+ image. Meteorological data’s like rainfall, temperature, humidity, cloud cover, etc were also applied to estimate the actual rate of evaporation from the lake. The result revealed that a soil erosion risk map with five classes (very low, low, medium, medium-high, and high) was produced based on the simplified RUSLE within the GIS environment, as very severe, severe, moderate, low, and very low, and ranged from 0.49 to125 t/ha/yr. However, the mean annual soil loss estimated for the study area was put at 5.35 t/ha/yr. Moreover, the sensitivity analysis of the RUSLE model to the input variables revealed that, this model was highly sensitive to slope gradient and cover but less sensitive to slope length, and rainfall erosivity. In addition to the RUSLE parameter, Aerial pattern of actual annual evaporation can be assessed by SEBAL remote sensing techniques using restricted input data like solar radiation. Finally, the SEBAL analysis showed that lake shore has higher evaporation rate than the center of the lake. This is because the area contains silts which are received from the high elevated areas of the catchment through erosional processes.
ABSTRACT
This study analyzes the role and factors of Bajaj taxi transport in Hawassa city administration. Results were shown Bajaj taxi transport role in terms of drivers and passengers’ side. Bajaj taxi as any other intermediate public transport system is playing an important role by giving door to door short distance journey of majorities of the city inhabitants particularly low income group of the society. It is also improves the life of large number of young people by making use of as employment opportunities. It also helps as a substitute of other type of urban public transport. On the drivers’ side as they satisfy different parameters of the qualities of their life they have some compliant on traffic flow control system and tariff fixing mechanisms, and they are also dissatisfy on their own expense and saving behavior. On the passengers’ side as they have higher satisfaction most of the public transport system measuring parameters, they have also some kind of inconvenience on crime and theft control mechanisms, and safety and security

Keywords: Bajaj taxi, Modal shift, Intermediate Public Transport
ABSTRACT
Effectiveness of consumer protection in a market economy is highly determined by the quality of the enforcement framework of competition and consumer protection law and institutions entrusted to enforce it. Despite the current efforts of Ethiopia to bring about an effective consumer protection, the country has been experiencing various consumer abuses. The study argues that these abuses to be attributable, among others things, to problems in the enforcement framework for the consumer protection. Hence, the basic objective of the study is to assess the challenges of the enforcement design for consumer protection in Ethiopia in general and Hawassa city in particular. In conducting the study, general principle pertaining to effective enforcement framework for consumer protection and experiences of some purposively selected courtiers based on their successes and relevance to Ethiopia have been used. In addition, in-depth interview, legislative and case analysis have been used as data gathering instruments. Accordingly the study has found that, failure of the current enforcement framework to recognize representation of major stakeholders in the consumer protection authority, less emphasis given to competition promotion, failure to decentralize the consumer protection affairs, and failure to provide for the administrative appeal system in the consumer protection authority are found to be the major shortfalls of the enforcement framework of the consumer protection law of the country. While lack of extensive pre-intervention study, failure to give priority to areas of greater consumer risks and failure to take measures against anti-competitive practices of traders and business organizations are found to be the major practical failures of the enforcing institutions which have actually resulted in present consumer crisis in Ethiopia in general and Hawassa City in particular. Finally, the study suggests possible solutions which may serve as inputs for stakeholders to re-design the enforcement framework for consumer protection in Ethiopia so as to bring about effective consumer protection regime to the country.

Keywords: Consumer Protection; Enforcement Framework, Institutional Framework, Legal Framework
Human Rights Approach to Combating Corruption in Ethiopia: The Case of SNNPR'S’ Ethics and Anticorruption Commission

Filata Gigiso Boroje
(School of Law)

ABSTRACT

Even though it has been so long since Ethiopia took gigantic steps against corruption, its prevalence necessitates reconsideration of the corruption problem. Experiences of successful countries show that appropriateness of anticorruption approach determines country’s anticorruption efforts. This research, therefore, assesses effectiveness of present anticorruption approaches of the region in light of newly developed human rights approach to determine and find out as to whether adopting human rights approach would upgrade the region’s effort to combat corruption. Results of this research involving 233 purposively selected participants from twenty seven institutions show that absence of institutional independence and decentralization are among the pitfalls of the present approaches obscuring the anti-corruption commission’s efforts to control corruption. This writer argues that a human rights approach would provide effective remedies which are not available within the current approaches.

Key words: Human Rights Approach, Anti-Corruption Commission, Corruption Combating, Corruption, Human Rights, Human Rights Violation SNNPRS
The Federal-State Intergovernmental Relationship in Ethiopia: Institutional Framework and Its Implication on State Autonomy

Nigussie Afesha
(School of Law)

ABSTRACT
Intergovernmental cooperation is both an inevitable and desirable feature of federal political system in installing the culture of negotiation and checking the centralization, and thereby enhancing the bargaining power of the states. Establishment of permanent forums of intergovernmental bond has crucial roles in negotiation, non-hierarchical exchange of information as well as facilitation of cooperation between the institutions of the two levels of governments. With this assumption, in Ethiopia, virtually all ministries have their own family of intergovernmental mechanisms, and they have developed their own practices of cooperation and collaboration between the federal and regional government. This research explores the experiences of the house of federation, three federal ministers and two regional bureaus to provide examples of intergovernmental processes and mechanism. It argues that the shortage of an independent institution that is in charge of consolidating IGR has led to lack of regularity and continuity of the interactions. With this reality, the article contends that establishing an appropriate legal framework is essential to the maximization of the value of intergovernmental relationship in Ethiopia. Despite some sections of the constitution that suggest a relationship of equality, in Ethiopia is a much more top down federalist system than the other cases here. Unconstructive cultures of superior subordinate interaction freeze a spirit of partnership. The federal government has wide powers to outmaneuver regional plans, and to intervene in regional administration. Regional governments have not developed a strong sense of themselves to act as independent political actors. It appears that many intergovernmental meetings involve the center enlisting the regional states in central government priorities.
ABSTRACT
With increasing access to information and communication technologies such as the Internet, Ethiopia is recently taking responsive legislative measures. One such legislative measure is enactment of cybercrime rules as part of the Criminal Code of 2004. These rules penalize three items of computer crimes namely hacking, dissemination of malware and denial of service attacks. The cybercrime rules are however slightly outdated due to changes that have occurred in the field of cybercrime since the enactment of the Code. The surge of new varieties of cybercrimes previously uncovered under the Code and the need to legislate tailored evidentiary and procedural rules for investigation and prosecution of cybercrimes have recently prompted the Ethiopian government to draft a modern and comprehensive cybercrime legislation. Whilst modern and fairly comprehensive, the draft law still needs further work in light of other major legislative developments at regional and national levels on cybercrimes. This article closely examines major developments in cybercrime law and practice in Ethiopia since the enactment of the first set of cybercrime rules and proffers recommendations towards a unified cybercrime regime.

Key words: Computer Crime, Cybercrime, Criminal Code, Draft Computer Crime Law, Cybersecurity, Ethiopia
The Role of Productive Safety Net Program on The Conservation Practices of the Farmers in Hula Woreda of Sidama Zone, SNNPR

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ABSTRACT
Hula is one of the woredas in Sidama zone of SNNPR, which is the most densely populated high land area of the region. The livelihood of the population in the woreda is mainly dependent on subsistence crop farming activities and there is high soil erosion and environmental degradation problem in the area. The Safety net program has been launched in this woreda in 2005 to ensure food security of the peasants as well as to alleviate the environmental degradation problems. Therefore, this study was aimed to assess the conservation practices of the farmers and the role of the safety net program on supporting their conservation practices. The study was designed in a way that information to be gathered both from primary and secondary sources. Primary data was collected using structured questionnaire and in depth interview from sample household respondents, community leaders, extension workers and woreda level agricultural experts. The secondary data was gathered from various published and unpublished sources. From the total 31 rural kebeles of the woreda, 3 kebeles are safety-net kebeles which are supported by the program since 2005. From these three safety-net kebeles 2 kebeles and from the remaining 27 non-safety-net program kebeles, 2 kebeles were selected through simple random sampling technique. The survey included a total of 422 sample households from these 4 sample kebeles. Both qualitative and quantitative methods of analysis were applied in the analysis. The quantitative analysis has been mainly applied the binary-logistic regression model and the descriptive statistics methods. The finding of the study indicates that all households are users of biological conservation measure where as in the case of physical conservation measures about 30% of them are non-users. According to the findings of this study, age, gender, educational status, land holding size, land tenure security, off farm income, safety net program beneficence, are among the determinant factors which are affecting the decisions of the farmers to apply the physical conservation practices (PCP) on their farm lands. The safety net program has positive contribution regarding the conservation practices of the farmers. However, there are also various management and resource utilization problems which can negatively affect the successes of the program in the study area. Accordingly, continues awareness creation over the goal of the safety net program to the farmers as well as creating of suitable working systems through participatory, transparency and accountability is required to overcome the problems.
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