HARAMAYA UNIVERSITY

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Policy Briefs

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HARAMAYA UNIVERSITY
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POLICY BRIEF -1-1 | THEME | I
March 2019

Probiotic Lactobacillus Species Supplementation Improves Productive Traits of White Leghorn Chicken

Tarekegn Getachew, Estifanos Hawaz, Negassi Ameha, Teklemariam Guesh

Key messages

Supplementation of probiotics to layer chicken was found to improve daily feed intake capacity, egg weight, hen day egg production and egg qualities.

Introduction

Probiotics are live microbial food/feed supplements which beneficially affect the host animal by improving its intestinal balance that prevent from the growth of pathogenic bacteria. They also help the growth, multiplication and establishment of beneficial microflora in the intestinal environment. Probiotics supplementation into poultry diets improves feed intake and growth performance in poultry breeds, body weight, appetite, the immune system,feed conversion ratio, nitrogen and calcium retentions, egg production, egg size and egg quality in laying strains. Commonly used microorganisms as probiotics in animal feed are mainly bacteria strains belonging to Lactobacillusgenus. This study evaluates the effect of the probiotic Lactobacillus species supplementation on productive traits of White Leghorn chicken at Haramaya University poultry farm.

Approaches and results

A total of 30 raw cow milk samples were collectedusing sterile bottles from Haramaya University dairy farm to isolateLactic Acid Bacteria (LAB) using a selectivemedium. Morphological characteristics of LAB isolates were determined using Gram staining techniques. A total of 120 White Leghorn layers were used for the study in four treatments (T1-control without probiotic bacteria supplementation, T2-supplementation of Lactobacillus acidophilus in the diet, T3-supplementation of Lactobacillus plantarumin the diet, T4-supplementation of both Lactobacillus acidophilus and Lactobacillus plantarum in the ration).The feed ingredients used in the experiment were according to standard layers diet (basal diet) and probiotic bacteria were supplemented. The chickens were vaccinated for the common diseases, andthey were randomly distributed into the pens each having the capacity of 10 hens. The chickens were fed twice a day at 8:00 and 16:00 hours in a group. Each pen was provided/supplied with laying nests, feeders and watering point. A regular 16 hours light was provided throughout the experimental period of 84 days (12 weeks). The chickens were acclimatized for one week to the new feed treatment. Each treatment was replicated three times having 10 layers of each replicate. The probiotic bacteria used for the study were isolated, characterized and cultivated in the laboratory.The parameters employed in this experiment were feed intake (FI), hen day egg production (HDEP), egg weight and egg size. FI was calculated by subtracting the amount of feed refusal from the amount of feed offered/day. HDEP was calculated as the ratio of the number of eggs collected/day with the number of birds in the pen. Eggs collected during the experiment were categorized as jumbo (73 g), extra-large (63 g), large (56 g), medium (49 g), small (42 g) and pee wee (<42 g) based on their size.

Supplementation of probiotic lactobacillus species improved the FI, HDEP and egg weight. Higher FI, HDEP and egg weight was recorded at chicken supplemented the combination of the lactobacillus species (L. acidophilus and L. plantarum) compared to the control. The effects of probiotic L. acidophilus and L. plantarum on FI, HDEP, egg weight and egg size are presented in (Figure 1 and 2).This study demonstrated an increase in HDEP and average egg weight due to probiotic supplementation.

(Figure 1). About 75.42% of the respondents indicated that honey is sold to wholesaler. They complained that honey market chain is not well developed and the price is seasonal.

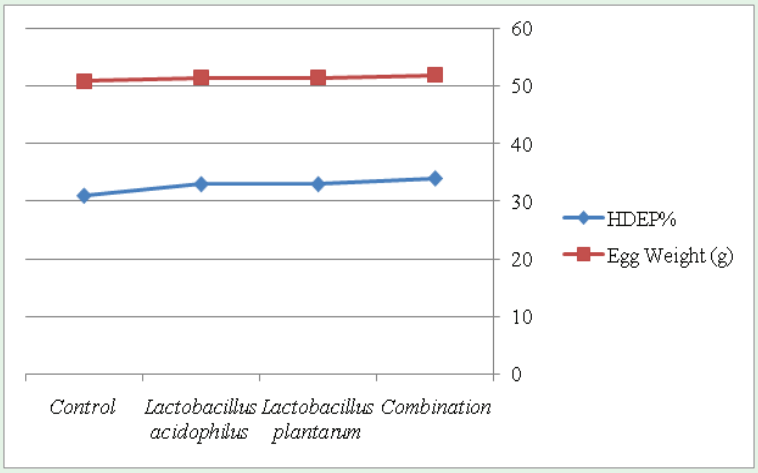

Figure 1. Effect of Lactobacillus acidophilus, Lactobacillus plantarum and their combination on hen day egg production (HDEP) and egg weight in White Leghorn hens.

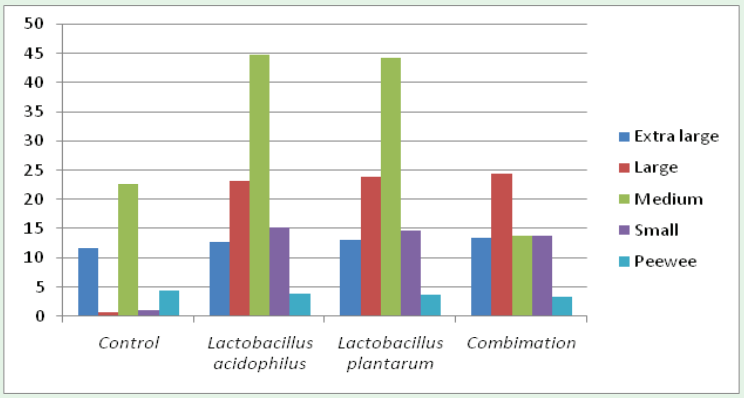

Figure 2. Effect of Lactobacillus acidophilus, Lactobacillus plantarum and their combination on egg mass in White Leghorn hens

Recommendations

- Promoting probiotics supplementation into layers' diet should be given attention to improve the production performance.
- A combination of probiotics (L. acidophilus and L. plantarum) supplement into layers' diet is recommended.

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POLICY BRIEF -1-2 | THEME | I
March 2019

In-Situ Rain Water Harvesting Techniques Significantly Improves Soil Moisture Conservation and Grain Yield of Maize

Amisalu Milkias,Teshale Tadesse, Habtamu Zeleke

Key Messages

Different alternative in-situ rainwater harvesting techniques increase soil moisture conservations and maize grain yield compared to the conventional flatbed planting. Tied-ridge in-situ rainwater harvesting techniques performed better than other techniques.

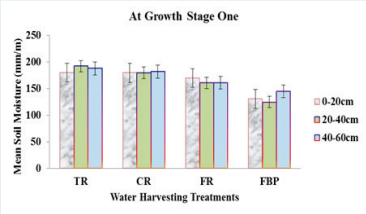
Introduction

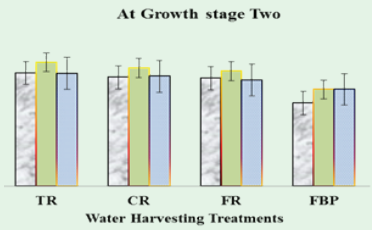
Rainfedagricultureis the dominant crop production system and has generallybeenassociatedtolow crop yieldandhighon-farmwaterlosses.In-situ rain water harvesting techniques such as tied ridge (TR), furrow ridge (FR) and contour ridge (CR) are effective practices particularly in lands with slopes less than 3-4%. Eastern lowlands of Ethiopia are vulnerable to soil moisture stress and there have been notable droughts in this part of the country time and again. This study was carried out in Fedis , EastHararghe, Ethiopia with the objective of determining the effect of in-situ rainwater harvesting structures on soil moisture conservation and grain yield of maize.

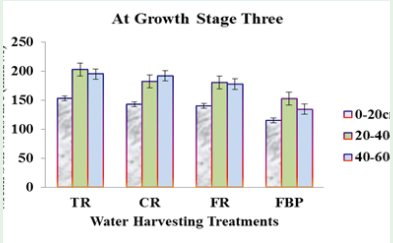
Approaches and Results

Field experiments were conducted for two consecutive years (2015-2017) at Fedis Research Station of Haramaya University.The treatments considered were CR,TR andFR taking flatbed planting (FBP) as a control.The improved maize variety Melkasa-4 was used as a test crop on all of the two consecutive trials where planting was made at the main cropping seasonatthe end of May. The crop was planted on a plot size of 5m x 4.5m (22.5m2) in rows of six per plot at a spacing of 75 by 30 cm.The soilmoisturecontent data was collected from three depths (0-20cm, 20-40cm and 40-60cm)atthree periods(viz.early, mid and late vegetative growth stages)duringgrowingseason.

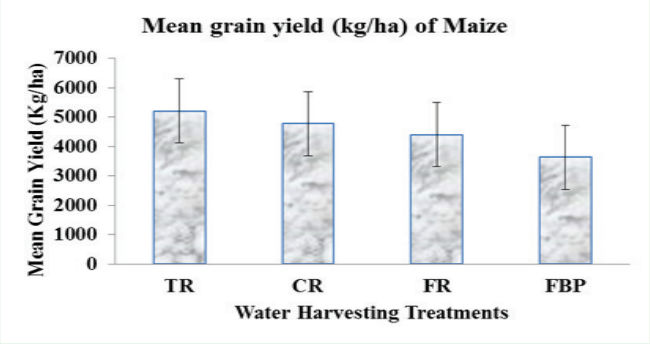
Averaged over the three stages in both years, the TR, CR and FR treatments increased soil moisture storage by 134.59,128.57, and 121.87%, respectively, compared to FBP. In all the three stages, tied-ridge performed best in terms of soil moisture conservation. This might be due to the effect of tied-ridge on retaining more water at plant root zone.







In terms of grain yield, TR CRand FR resulted in 143.14%, 131.47% and121.16% improvement respectively,compared to FBP.This might be due to the fact that the water harvesting structures store rainwater in-situ, enhancing infiltration, which provide a reservoir of water to the crop at depth with heavy textured soils (sandy clay), rises by capillarity during dry spells and ensure the crop benefits. Among the in-situ rainwater harvesting treatments, TR treatment revealed better performance than CR and FR.



Recommendations

- Promoting tied-ridge, contour ridge and furrow ridge rainwater harvesting techniques to improve soil moisture and maize grain yield should be among the major responsibilities of Ministry of Agriculture (MoA) and other concerned stakeholders. Among the three in-situ rain water harvesting techniques, tied-ridge should be promotedin moisture stress areas.

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POLICY BRIEF -2-1 | THEME | II
March 2019

Tuberculosis Patients are Physically Challenged and Socially Isolated in eastern Ethiopia

Aklilu Abrham Roba, Tamirat Tesfaye Dasa, FitsumWeldegebreal, Abyot Asfaw, Habtamu Mitiku, Zelalem Teklemariam, Mahantash Naganuri, BahubaliJinnappa Geddugol, Firehiwot Mesfin, Hilina Befikadu, Eden Tesfaye

Key message

Physical and emotional roles were quality of life (QoL) domains predominantly reduced in tuberculosis patients and such roles were worse for multi-drug resistant tuberculosis (MDR-TB) patients. Social isolation and stigma were all-embracing problems that the MDR-TB patients experienced compared to the non MDR-TB patients.

Introduction

Tuberculosis (TB) is one of the leading causes of infectious disease that resulted in 10.4 million infections and 1.7 million deaths in 2016. Patients infected with TB especially MDR-TB suffer from social isolation, stigma, lack of support and economic constraints. These in turn, affect quality of life of the patients. MDR-TB is on rise and becoming a serious public health problem in Ethiopia. This study was conducted to assess QoL of MDR-TB and non MDR-TB patients using health survey questionnaire in health facilities of eastern Ethiopia.

Approaches and Results

The study was conducted in eight hospitals (Jugal, HiwotFana, Karamara, DilChora, Sabian, Haramaya, Deder and Chiro) and three health centres (Number One, Legahare and Amir Nur) in eastern Ethiopia. Data were collected from 400 patients (100 MDR-TB patients and 300 non-MDR-TB patients) using a structured questionnaire. The patients'QoL was measured using physical (i.e., physical function, physical role, bodily pain and general health) and mental health (i.e., vitality, social functioning, emotional role and mental health) domains. In-depth interviews were also carried out with MDR- and non-MDR-TB patients regarding their physical, mental, social and economic challenges.

The majority of MDR-TB patients were of primary education level, single by marital status and students compared to non-MDR-TB patients (Table 1).

Table1: Common mental illnesses among adults living in Harari Region (March, 2016)

Variables		Number of MDR-TB (%)	Number of non-MDR-TB (%)
Residence	Urban	67 (67)	213 (71)
	Rural	33 (33)	87 (29)
Marital status	Married	43 (43)	172 (57.3)
	Single	52 (52)	93 (31)
	Separated/Widowed	5 (5)	35 (11.7)
Educational status	No formal education	26 (26)	75 (25)
	Primary education	47 (47)	96 (32)
	Secondary & above	27 (27)	129 (43)
Occupations	Employee	12 (12)	44 (14.7)
	Merchant	25 (25)	105 (35)
	Student	27 (27)	42 (14)
	Farmer	36 (36)	109 (36.3)
Family size	1-2	15 (15)	75 (25)
	3 –5	49 (49)	154 (51.3)
	More than 5	36 (36)	71 (23.7)
HIV status	HIV positive	14 (14)	41 (13.7)
	HIV negative	86 (86)	259 (86.3)

Table 2: Comparison of the QoL domains between MDR- and non MDR-TB patients

Physical or mental aspect	Average value for MDR-TB patients	Average value for non MDR-TB patients	Mean difference (95% CI)	P-value
Physical function	65	64.65	0.35(-5.75 - 6.45)	0.91
Physical role	30	35.58	-5.58 (-15.30-4.14)	0.29
Bodily pain	61.70	67.71	-6.01 (-12.3 – 0.23)	0.05
General health	77.40	72.11	**5.29 (1.88 – 9.71)**	**0.02***
Vitality	59.70	55.93	3.67 (-0.51 – 8.04)	0.08
Social functioning	69.60	72.2	-2.3 (-8.50 – 3.28)	0.38
Emotional role	34.33	39.8	-5.47 (-15.59 – 4.7)	0.29
Mental health	63.14	65.11	-1.97 (-6.10 – 2.17)	0.35
Overall QoL	57.61	59.13	-1.52 (-6.25 – 3.20)	0.52

Policy Recommendations

- Health facilities, media and all other stakeholders should educate the community, households and students about TB (specifically MDR-TB), its treatment, prevention and therapeutic approaches to regain the role function such patients havelost.
- Multi-sectoral collaboration of stakeholders working on health, education, gender and social institutions should be made to reduce social isolation and stigma in order to optimize such QoL domains of MDR-TB patients.

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POLICY BRIEF -2-2 | THEME | II
March 2019

Blood pressure cuffs and stethoscopes as potential sources of bacterial infections in hospitals

FitsumWeldegebreal,Desalegn Admassu, Dereje Meaza, Mulatu Asfaw

Key message

Healthcare workers frequently neglect to disinfect blood pressure (BP) cuffs and stethoscopes. Often, outbreaks of hospital-acquired infections have been linked to these devices. The dominant isolates identified from specimens of such devices were Staphylococcus aureus, Coagulase negative Staphylococcus (CoNS) and Klebsiella pneumoniae.

Introduction

Hospital-acquired infection is a major but often neglected public health problem. It has long been recognized as crucial factor affecting the quality and outcomes of healthcare. Acquisition of such infection can prolong duration of hospitalization, increases costs of healthcare, and poses economic burden to the patient and to the health system. Patients in developing countries were reported to have up to 20 times greater risk of contracting hospital-acquired infections compared to those in developed countries. Healthcare workers often overlook healthcare tools such as stethoscopes and sphygmomanometers as sources of infection. This study tried to assess BP cuff and stethoscope in the transmission of hospital-acquired infections.

Approaches and results

A structured questionnaire was used to collect data on the perception of 212 healthcare workers in Jugal and HiwotFana Specialized University hospitals on the need for disinfection of BP cuff and stethoscope. Swab specimens from 187 stethoscopes and 25 BP cuff were also collected as culture samples to investigate bacterial strains and their antibacterial susceptibility.

The contamination rate associated with the devices was 53.8% (54% for Stethoscopes and 52% for Sphygmomanometers). A total of 137 bacterial strains were isolated with frequent strains attributable to Staphylococcus aureus (35%), Coagulase negative Staphylococcus (CoNS) (16.8%) andKlebsiella pneumoniae (12.4%) (Table 1).

Table 2: Antimicrobial susceptibility profiles of bacterial isolates from stethoscope or BP cuff in Jugal and HiwotFana Specialized University hospitals

Bacterial isolates	SIR	Susceptibility profile of isolates to antimicrobial agents (%)								
		AMX	CIP	CTX	E	FOX	NOR	SXT	TTC	VAN
Staphylococcus aureus	S	27(56.2)	33(68.8)	27(56.2)	31(64.6)	27(56.2)	42(87.5)	27(56.2)	36(75)	9(18.7)
	R	19(39.6)	15(31.2)	16(33.3)	9(18.7)	20(41.7)	4(8.3)	16(33.3)	11(22.9)	33(68.8)
	I	2(4.2)	---	5(10.5)	8(16.7)	1(2.1)	2(4.2)	5(10.5)	1(2.1)	6(12.5)
CoNS	S	13(56.5)	19(82.6)	13(56.5)	15(65.2)	18(78.3)	18(78.3)	12(52.1)	14(60.9)	13(56.5)
	R	8(34.8)	4(17.4)	7(30.4)	3(13.1)	4(17.4)	4(17.4)	8(34.8)	5(21.7)	7(30.4)
	I	2(8.7)	---	3(13.1)	5(21.7)	1(4.3)	1(4.3)	3(13.1)	4(17.4)	3(13.1)
Klebsiella pneumoniae	S	10(58.8)	14(82.3)	9(52.98)	10(58.8)	15(88.2)	13(76.5)	7(41.1)	11(64.7)	12(70.6)
	R	5(29.4)	2(11.8)	8(47.1)	5(29.4)	2(11.8)	3(17.6)	8(47.1)	5(29.4)	4(23.5)
	I	2(11.8)	1(5.9)	---	2(11.8)	---	1(5.9)	2(11.8)	1(5.9)	1(5.9)
Bacillus species	S	10(83.3)	11(90.7)	5(41.7)	8(66.7)	7(58.3)	11(91.7)	9(75.1)	7(58.3)	9(75.1)
	R	2(16.7)	---	5(41.7)	---4(33.3)	5(41.7)	1(8.3)	3(24.9)	4(33.3)	3(24.9)
	I	---	1(8.3)	2(16.7		---	---	---	1(8.3)	---
Escherichia coli	S	7(70)	7(70)	7(70)	7(70)	9(90)	10(100)	7(70)	8(80)	7(70)
	R	2(20)	3(30)	3(30)	3(30)	1(10)	---	3(30)	2(20)	3(30)
	I	1(10)	---	---	---	---	---	---	---	---
Pseudomonas aeruginosa	S	---	8(80)	0(0)	7(70)	6(60)	10(100)	3(30)	2(20)	4(40)
	R	10(100)	1(10)	10(100)	2(20)	4(40)	---	7(70)	7(70)	6(60)
	I	---	1(10)	---	1(10)	---	---	---	1(10)	---
Proteus species	S	7(77.8)	5(55.6)	6(66.7)	8(88.9)	7(77.8)	8(88.9)	7(77.8)	---	4(44.4)
	R	1(11.1)	3(33.3)	3(33.3)	---1(11.1)	2(22.2)	1(11.1)	1(11.1)	7(77.8)	5(55.6)
	I	1(11.1)	1(11.1)	---		---	---	1(11.1)	2(22.2)	---
Salmonella species	S	7(87.5)	8(100)	7(87.5)	4(50)	7(87.5)	7(87.5)	4(50)	5(62.5)	5(62.5)
	R	---	---	1(11.5)	2(25)	1(11.5)	1(11.5)	1(11.5)	2(25)	2(25)
	I	1 (11.5)	---	---	2(25)	---	---	3 (38.5)	1(11.5)	1(11.5)

Table 1: Bacterial profiles isolated from stethoscopes and BP cuffs used in Jugal and HiwotFana Specialized University Hospitals

Profiles of isolates	Frequency (%)
Contamination rate of stethoscopes and/or BP cuffs	114 (53.8)
BP cuffs	101 (52)
Stethoscope	13 (54)
Bacterial strains identified	137 (100)
Staphylococcus aureus	48 (35.0)
Coagulase Negative Streptococcus	23 (16.8)
Klebsiella. pneumoniae	17 (12.4)
Bacillus species	12 (8.8)
Pseudomonas aeruginosa	10 (7.3)
Proteus species	9 (6.6)
Escherichia coli	10 (7.3)
Salmonella species	8 (5.8)

Recommendations

- The hospital administrative bodies should work to create awareness about the need for periodic disinfection of stethoscopes and BP cuffs.
- Healthcare professionals should strictly follow the healthcare practice standards in handling medical devices.
- Healthcare policy makers should devise strategies to contain antibacterial resistance.
- The drug supply chain management system should enable to periodically monitor susceptibility profile of the common pathogenic bacteria.

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POLICY BRIEF -3-1 | THEME | III
March 2019

Selected Fruit and Vegetable Cultivars Found Suitable for Processing and Standardization of Novel Value-Added Products

K. Vasanthakumar, Fikreyohannes Gedamu, Tewodros Bezu, NeelaiahBabu, BosenaTegegne, Desta Dugassa

Key message

- Among the tested banana varieties 'Williams-1' variety banana jam clearly indicated a superior status based on its edible pulp (%), TSS (oBrix) and overall acceptability.
- The avocado variety 'Hass' cheese was found to be far superior in terms of TSS, acidity level, color, flavor and texture indicating its potential to utilize for commercial purpose cheese development.
- The tomato variety 'Melka Salsa' was found quite suitable for ketchup manufacturing as measured by its TSS, color, acidity and acceptability while the potato Bubu variety was highly suited for chips making using the sunflower oil.

Introduction

Ethiopia is blessed with high production of fruits, viz, banana, avocado, mango and among the vegetable crops/tubers, production of tomato, potato, onion, garlic etc.are high. Currently a good majority of fruit and vegetable growers of Ethiopia are getting low price for their produce and they are increasingly at the mercy of the middlemen engaged in marketing. Improved on-farm processing activities for developing value added products in fruits and vegetables,not only save the post-harvest losses but also earn premium price for their produce. Hence, investigations were undertaken on evaluating selected varieties of important fruits of eastern Ethiopia, viz, banana and avocado, vegetables, viz, potato and tomato and also standardization of procedures for value-addition and product development.

Approaches and Results

A study on processing for product development of banana, avocado, tomato and potato was conducted in the laboratory of Horticultural Crops, School of Plant Sciences, Haramaya University, Ethiopia. Evaluation of banana and avocado varieties for processing and value addition: Four table varieties of banana namely: Dwarf Cavendish, Robusta, Grand Naine, Williams -1 and Williams-2 were procured from Melkasa Agricultural Research Centre and from local markets which were subjected to experimentation on value addition studies to developbanana jam and banana puree. The four avocado varieties used for experiments were Hass, Pinkerton, Fuerte andNabal.

The five tomato varieties utilized in this experiment were MelkaShola, Melka Salsa, Chali, Cochoro and Anna F-1. Standardization experiments were conducted to develop tomato ketchup, tomato sauce and tomato juice. The three potato varieties utilized to process potato chips were Gabissa, Chiro and Bubu. Three vegetable oils were used to process the chips: palm , sun flower and sesame oils.

The quality of processed fruit/ vegetable product is of paramount importance as far as consumer acceptance is concerned and as per food laws and standards. Besides, the quality of all processed products wasevaluated. A panel of judges (consisting of three expert members) was engaged for scoring the processed products for different characters immediately after manufacturing and after a shelf life of 3 months and six months.

Banana:Overall, acceptability of the processed banana jam as evidenced by sensory evaluations conducted on a 10-point scale revealed rather high quality and acceptability of William-1 (8.25) closely followed by Robusta (7.88). Characterization of the physico-chemical parameters of banana fruits of four varieties and the manufactured jams clearly indicated a superior status for variety Williams-1 as regards [Please check. A bit awkward] edible pulp (%), TSS (oBrix) and overall acceptability of jams.

Avocado: The processed and developed avocado cheese (spread)showed high TSS (Total Soluble Solids) in variety Hass (72.3) and fairly low in varietyNabal (65.1). A high value for TSS and low value for acidity depict superiority of avocado spread prepared from variety Hass. The color, flavor and texture of prepared avocado cheese were best in variety Hass, medium in varieties Pinkerton and Fuerte. Experimental results of the present study clearly point out that Hass variety of avocado can be utilized commercially for developing avocado cheese.

Tomato: TSS of ketchup,from Melka Salsa variety recorded maximum value (33.6). Acidity of ketchup was high in Chali (10.9) and fairly low in Melka Salsa (8.8). Color index of processed ketchup depicted maximum in Melka Salsa (4.7) followed byMelka Shola (4.5) and minimum color for Chali (3.8). Overall, acceptability of freshly processed ketchup and after storage for 100 days indicated highest acceptability

of Melka Salsa (9.6 and 9.5respectively) and followed by Melka Shola (9.2 and 9.0 respectively). Hence, the tomato variety Melka Salsa was found quite suitable for ketchup manufacturing.

Potato: Experiments on three cultivars of potato (Gabissa, Chiro, Bubu) and three oils (refined palm , sunflower and sesame oils) conclusively indicatedfar superior performance of variety Bubu followed by Gabissa.The performance of Chiro variety was found to be poor. Among the three oils tested sunflower oil proved to be the best option for chips making followed by refined palm oil. Rancidity of potato chips (studied as optional) after storage period of three months was minimum when sunflower oil was used.

made up of compostable matter.

The average particle size distribution of the compostable organic matters is 42.76% (greater than 50mm), 53.2% (between 10-50 mm) and 4.04% (less than 10 mm). It was observed that the largest proportion of compostable organic wastes are found in particle size range of 10-50 mm (Figure 2). Generally, the organic fraction of the University municipal solid wastes is suitable for composting process.

Policy Recommendations

1. Commercial table varieties of banana like Williams-1, Robusta and Dwarf Cavendish are ideal for manufacturing banana jams on a large scale.
2. Utilization of avocado varieties like Hass, Pinkerton and Fuerte for developing products such as avocado cheese and avocado chocolate deserve special attention. Owing to the fact that avocado and its products possess high nutritional/ anti-oxidant values, more attention should be given toavocado processing for achieving nutritional security of the nation.
3. Melka Salsa, Melka Shola and Cochoro tomato varieties are recommended for large scale growersto develop local tomato ketchup industriesand to reduce the huge amount of imports of tomato ketchup from abroad with foreign currency.
4. Bubu and Gabissa potatovarieties should be adopted by potato growers on a large scale to promote development of high grade potato chips for augmenting marketing on domestic scale / imports.
5. On-farm processing of choice varieties of banana, avocado, tomato and potato need to be popularized in Ethiopia. Training programs have to be conducted periodically to attract unemployed youth and entrepreneurs to this lucrativeagro-processing business.

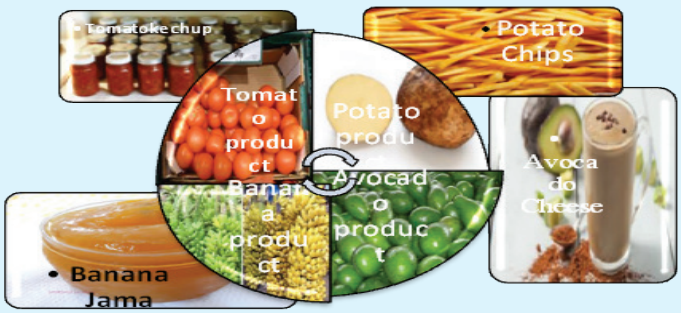

Fig 1. Pictures for respective products for fruits and vegetables

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1. Animal Production and Health
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POLICY BRIEF -4-1 | THEME | IV

March 2019

Harar and Dire Dawa Cities have Best Experiences in Accommodating Cultural Diversities and Promoting peaceful co-existence

Desta Roba and Imana Beyene

Key Message

Peoples in eastern Ethiopia, particularly in Harar and Dire Dawa,with diverse culturalbackgroundshave maintained harmonious relations and peaceful co-existence with each other. Peoples to people's interaction is a model for the others to emulate and their pre-1991 experiences are a very good example to the rest of other cities in the country.

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Introduction

Issues of ethnic relations are of paramount importance to our understanding of the past heritages of peoples, their accumulated experiences, knowledge, wisdom and harmonious relation passedthrough their indigenous institutions. Since its conception as a modern state, Ethiopia is comprised of a multi-ethnic, multilingual and multi-cultural society upon whom the assimilation policy had been tried out through force and violence.

In order to bring a genuine national integration without risking one's culture and identity, it is imperative for leaders and policy makers to consider the lived experiences of the rich and accumulated wisdom of the Ethiopian people.

The peoples in the cities of Harar and Dire Dawa stood against the state sponsored policies of assimilation and creation of a centralized state that did not recognize cultural diversities. Harar and Dire Dawa have served as centers where people make extensive economic transactions. The cities have also served as centerswhere peoples from diverse backgrounds share cultures to each other. This study is an attempt to understand these complex interactions and people's capacity in building peace that could be of crucial importance to the nation-building project often ignored by the elites.

Approach and Results

The research focuses on examining the nature and patterns of the consensual ethnic relations in Harar and Dire Dawa cities since the conquest of Harar in 1887 up to 1991. Relevant data were collected dominantly through interview with informants, documentary analysis by consulting relevant literature and to some extent the use of archives.

The settlement of diverse ethnic groups of Ethiopians and foreign nationals in Harar and Diré Dawa cities widened the scope of people's understanding to appreciate the unavoidable differences to live in a mutually collaborative social environment. Besides, joint celebration of the Christian and Muslim holidays and shrines, forming common associations and commensality, intergroup marriages and multilingualism resulted in robust social interactions among people of the two cities. Moreover, this study tries to sift out the role of trade including contraband trade and chat ceremony in promoting instantaneous communication, socialization and collaborative spirit among the inhabitants of the two cities in many walks of lives.

The study provides a vivid example of how differences along ethnic, religious, cultural and linguistic lines could not be a source for ethnic conflict. Multicultural environments have significant influences on the people's ways of life, and these had been realized through upholding their differences and adopting each other's culture, values and norms without risking their own. The study has a far-reaching implication to our current problem in fostering intercultural communications among diverse ethnic groups

Recommendations

- Policy makers of the country should consider the lived experiences of the rich and accumulated wisdom of Harar and Dire Dawa cities to scale it out further to other cities in the country.
- Governmental and non-governmental organizations working in peace and conflict resolution should incorporate the best experiences of the two cities to address issues related to "national integration" by recognizing their differences.
- Peoples to people's interaction should be encouraged in other cities in the country by taking the examples of the two cities in their pre-1991 experiences.

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POLICY BRIEF -5-1 | THEME | V
March 2019

Impact of Cooperatives on Productivity, Marketable Surplus, Income and Saving: The Case of Haramaya Farmers' Cooperative Union

Henock Semaw, Abdurahman Aliyi, Saleamlak Walellign and Anketse Birhanu

Key Message

Sustainability and outreach performance analysis of Saving and Credit Cooperatives (SACCOs) showed that cooperatives are sustainable and accessible institutions for the poor and unbanked section of the society. However, they provide a very small loan to its members. Hence, it is necessary to promote cooperatives and encourage self-help institutions to improve their lending power.

Introduction

Finance is among the most important means for socio-economic development and alleviating poverty. The majority of the economically active populations are excluded from mainstream financial services in most developing countries due to the presence of high transaction cost per borrower, lack of sufficient collateral to secure loan, information opacity, higher risk of default and low rate of cost recovery. As a result, micro finance institutions such as SACCOs have emerged to bridge the gap as alternative remedytargeting the poor through innovative approaches, which include group lending, progressive lending, regular repayment schedules, and collateral substitutes. Therefore, SACCOs need to be financially sustainable and accessible to effectively serve the poor. Hence, this study examined the sustainability and outreach performance of SACCOs inEastern Ethiopia.

Approach and Results

Using bothdescriptive and causal research design, 46 SACCOs that have been operating at least for three years with audited financial reports were selected. The study used only secondary data sources such as membership register file, audited financial statement of the SACCOs for the year 2016 and report of the Dire Dawa City Administration and East Hararghe zone cooperatives promotion offices.

The results indicated thatthe mean value of financial self-sufficiency of SACCOs was 165% which indicates that they are financially sustainable. Similarly, the mean value of average loan size shows that SACCOs extend an average of birr 6804.05 to a single borrower, which showed a very small loan provided to its members. Moreover, the mean value of their operational efficiency is 648% indicating cooperatives are operationally efficient. Further, it showed that SACCOs operating income is six times of the amount required to cover their operational costs like salaries, supplies, and other administrative and contingency costs. Generally, the study found that SACCOs in Eastern Ethiopia are financially sustainable and their outreach performance is at moderate level.

Recommendations

- Demand for loan, deposit mobilization and new potential entrants must be increased by providing loans for members who can invest in a productive manner.

- Extending small loan increases operational costs. Therefore, SACCOs should increase the average loan balance which can improve the operational self-sufficiency of SACCOs.

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POLICY BRIEF -5-2 | THEME | V
March 2019

Maintaining social values and networks and capacitating local authorities reduce poverty

Abadi TeferiAlemaw, Megersa Debela Daksa

Key Message

Less security of land ownership and lack of trust and transparency on local authorities were found to be among the major institutional determinants of poverty. Maintaining-social values and networks, capacitating local authorities and enhancing poverty coping mechanisms are necessary to reduce poverty.

Introduction

Poverty is the most serious challenge facing the people, governments and development practitioners; in developing countries, especially in Sub-Saharan Africa (SSA) including Ethiopia. Poverty is not merely characterized by the traditional demographic and socio-economic determinants but also by the institutional characteristics of the people.A paradigm shift in investigating the determinants of poverty in terms of the institutional characteristics of households is needed. Therefore, this study examined the institutional determinants of poverty along with the demographic and socio-economic factors and the coping mechanisms in east Hararghe zone, Ethiopia.

Approach and Results

The study mainly usedstructured interview scheduleto collect data from a total of 400 households from three rural kebele administrations of Haramaya District . A household is defined poor when household daily per calorie consumption is below the poverty line (expenditure is insufficient to meet the food and other basic needs of all household members). In this study, the poverty line in terms of daily kilocalorie per adult is estimated to be 2200 kilocalorie per day per adult equivalent. The data were analyzed using descriptive statistics.

Results indicated that 44 percent of the households were poor. Less security of land ownership, lack of trust on the local or municipal authorities, lack of transparency from local authorities and corruption were found to be institutional determinants of poverty (Table 1).

Table 1 Institutional challenges of poverty reduction

Items	Non-poor (n=223) Yes (%)	Poor (n=177) Yes (%)
Feel secured on the current land ownership	28.7	36.2
Perceive family members, relatives, and communities are helpful	48.0	51.4
Trust in the local or municipal authorities	48.9	51.4
Perceive local authorities are accountable	46.6	49.2
Perceive local authorities are transparent	43.0	46.9
Perceive local authorities encourage participation	43.0	48.0
Local authorities demand bribe	18.8	16.9
Ever received welfare or public assistance	29.6	20.9
Availability of development bank	27.4	43.5
Availability of Micro Finance Institutions	20.6	20.3
Availability of NGOs	5.8	2.8
Availability of Ethiopian Commodity Exchange Branches	3.1	1.7

Table 2 Poverty coping mechanisms of the households

	Coping mechanisms	Poverty Status of the Household (%)		
		Non-poor	Poor	Total
1.	**Self-insure**			
	Own Funds, Saving	11.2	5.1	8.5
	Calling in Debts	1.8	1.1	1.5
	Re-Sowing	4.0	0.0	2.25
	Selling Livestock	1.3	0.6	1
	Selling Assets and eating less	4.9	1.7	3.50
	Spend Less on Clothing	0.4	0.0	0.25
	Spend Less on School	1.3	0.0	0.75
	Defer Expenses	0.4	5.1	2.5
	Additional Job	0.4	2.3	1.25
	Combinations of More Than One	74.0	84.2	78.5
2.	**Community-based**			
	Livestock Sharing	2	0	0.02
	Sharecropping	1	2	0.04
	Donations from Relatives, Friends and Private Persons	13	11	0.30
	Borrowing with interest from community organizations	2	0	0.02
	Borrowing without interest from relatives, friends or others	7	7	17.28
	Combinations of More Than One	16	20	44.44
3.	**External help**			
	Work for Productive Safety Net Program	3	1	0.01
	Emergency Food Aid	1	1	0.03
	Assistance from Farmers Cooperatives	0	1	0.01
	Assistance from Government	2	0	0.03
	Assistance from NGOs	0	1	0.01
	Combinations of More Than One	51	6	85.07

Recommendations

Maintainingsocial values and networks should be promotedto increase productivity and thereby reduce poverty.

Enhancingthe available coping mechanismsis necessary to reduce poverty.

The government should consider capacitating local authorities to be accountable and transparent.

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POLICY BRIEF -6-1 | THEME | VI
March 2019

Extracts of Selected Plant Materials Showed Goodanti-bacterial and anti-fungal Properties on Some Medically and Agriculturally Important Pathogens

Ameha Kebede, Manikandan M., and YirgashewaAsferie

Key Message

The stem and leaf extracts of Vernonia amygdalina(Grawa),Calotropis procera(Tobiaw),Rhamnusprinioides(Gesho), Justicia schimperiana(Sensel)andRutachalepensis(Tena adam)are more effective against E. coli, P. aeruginosa, S. aureus, C. jejuni, A. niger, A. flavus, C. albicans and S. boulardiithan the root extracts.

Introduction

Mankind has been successfully using plants and plant products for centuries as effective therapeutic tools for fighting diseases and various other health hazards. Plants have the major advantage of still being used as the most effective and cheaper alternative sources of drugs. Traditional medicines including the herbal medicines are still in use at least for primary health care in some domains of the society in almost every country. In developing countries about 70-95% of patients still depend on natural medicines primarily derived from plants. In Ethiopia, 70% of human and 90% of livestock population depend on traditional medicine. Furthermore, the increasing emergence of drug-resistant pathogens has drawn the attention of the pharmaceutical and scientific communities towards studies on the potential antimicrobial activities of plant-derived substances which are being used in traditional medicine in different countries. Plant derived antimicrobials are probably more active against drug-resistant microbial pathogens because they are targeting sites other than those used by micro-organism-derived antibiotics. As a result, scientists are continuously trying to search for newer compounds having antimicrobial properties from the plant species. This study, the potential of crude extracts obtained from selected plant species of Haramaya University and Dire-Dawa to serve as antibacterial and antifungal agents was evaluated.

Approach and Results

The study mainly usedstructured interview scheduleto collect data from a total of 400 households from three rural kebele administrations of Haramaya District . A household is defined poor when household daily per calorie consumption is below the poverty line (expenditure is insufficient to meet the food and other basic needs of all household members). In this study, the poverty line in terms of daily kilocalorie per adult is estimated to be 2200 kilocalorie per day per adult equivalent. The data were analyzed using descriptive statistics.

Results indicated that 44 percent of the households were poor. Less security of land ownership, lack of trust on the local or municipal authorities, lack of transparency from local authorities and corruption were found to be institutional determinants of poverty (Table 1).

Table 1: Antibacterial and antifungal activities of crude extracts of the leaf of J.schimperianaat 60mg/ml concentration against eight test organisms (mean ± SD, n=3)

Test Organism	Zone of Inhibition (mm) of different solvent extracts								Zone of inhibition (mm) in 0.1mg/ml (Control)
	Ethanol Extract		Methanol Extract		Hexane Extract		Water Extract		
	Leaf	Stem	Leaf	Stem	Leaf	Stem	Leaf	Stem	
Escherichia coli	19	13	13	13	0	11	0	0	15
Pseudomonas aeruginosa	0	14	0	13	0	10	4	0	18
Staphylococcus aureus	16	18	15	18	8	11	12	12	15
Campylobacter jejuni	24	19	20	15	11	0	0	0	18
Aspergillus niger	0	5	14	0	6	0	0	5	12
Aspergillus flavus	15	11	15	0	11	0	8	5	20
Candida albicans	10	14	0	9	0	5	9	8	15
Saccharomyces boulardii	0	0	0	0	12	0	0	5	14

Table 2: Antibacterial and antifungal activities of crude leaf and stem extracts of Calotropisproceraat 60mg/ml concentration against eight test organisms (mean ± SD, n=3)

Test Organism	Zone of Inhibition (mm) of different solvent extracts								Zone of inhibition (mm) in 0.1mg/ml (Control)
	Ethanol Extract		Methanol Extract		Hexane Extract		Water Extract		
	Leaf	Stem	Leaf	Stem	Leaf	Stem	Leaf	Stem	
E. coli	17	23	17	19	16	16	13	13	15
P. aeruginosa	22	22	18	14	18	24	9	11	18
S. aurous	19	25	14	21	13	21	13	14	15
C. jejuni	16	13	14	14	0	8	11	12	18
A. niger	14	10	11	13	0	0	9	11	12
A. flavus	12	16	12	14	0	0	0	0	20
C. albicans	12	9	7	8	0	0	0	0	15
S. boulardii	16	11	11	10	0	11	0	0	14

Table 3: Antibacterial and antifungal activities of crude leaf and stem extracts of V. amygdalinaat 60mg/ml concentration against eight test organisms (mean ± SD, n=3)

Test Organism	Relative Zone of Inhibition (%) of different solvent extracts								Zone of inhibition (mm) in 0.1mg/ml
	Ethanol Extract		Methanol Extract		Hexane Extract		Water Extract		
	Leaf	Stem	Leaf	Stem	Leaf	Stem	Leaf	Stem	
E. coli	16	24	15	20	12	15	8	9	15
P.aeruginosa	17	10	16	11	12	13	4	9	18
S. aureus	18	24	18	22	16	22	16	10	15
C. jejuni	16	16	14	18	7	11	12	10	18
A. niger	11	14	13	13	11	10	15	8	12
A. flavus	15	16	15	14	13	12	12	7	20
C. albicans	11	12	9	13	10	8	13	9	15
S. boulardii	11	12	8	12	11	9	12	10	14

Zone of inhibition for antifungal activities of crude extracts ranged from 0 - 16mm. The highest antifungal activity was recorded for the ethanolic root extract of R. prinioides against A. flavus (Table 1-5).This study has shown that the stem and leaf extracts of Vernonia amygdalina (Grawa),Calotropis procera(Tobiaw),Rhamnusprinioides(Gesho), Justicia schimperiana(Sensel)andRutachalepensis(Tena adam)are more effective against the tested bacteria and fungi than the root extracts.

Table 4: Antibacterial and antifungal activities of crude leaf and stem extracts of Rutachalepensis at 60mg/ml concentration against eight test organisms (mean ± SD, n=3)

Test Organism	Relative Zone of Inhibition of different solvent extracts (%)								Zone of inhibition (mm) in 0.1mg/ml (Control)
	Ethanol Extract		Methanol Extract		Hexane Extract		Water Extract		
	Leaf	Stem	Leaf	Stem	Leaf	Stem	Leaf	Stem	
E. coli	13	9	10	7	0	7	12	4	15
P.aeruginosa	8	9	10	9	0	11	0	8	18
S. aureus	14	20	16	14	8	10	12	14	15
C. jejuni	9	9	12	6	0	13	0	0	18
A. niger	9	7	9	10	0	8	8	7	12
A. flavus	8	14	10	9	0	8	0	0	20
C. albicans	8	10	0	11	0	0	12	0	15
S. boulardii	8	10	4	9	8	0	13	0	14

Table 5: Antibacterial and antifungal activities of crude leaf and stem extracts of Rhamnusprinioidesat 60mg/ml concentration against eight test organisms (mean ± SD, n=3)

Test Organism	Relative Zone of Inhibition (%) of different solvent extracts								Zone of inhibition (mm) in 0.1mg/ml (Control)
	Ethanol Extract		Methanol Extract		Hexane Extract		Water Extract		
	Leaf	Stem	Leaf	Stem	Leaf	Stem	Leaf	Stem	
E. coli	9	8	6	6	8	0	8	0	15
P.aeruginosa	0	7	0	10	0	0	5	0	18
S. aureus	10	11	9	10	7	10	8	4	15
C. jejuni	14	8	11	8	8	0	8	0	18
A. niger	7	0	10	0	0	0	0	8	12
A. flavius	0	6	0	8	0	0	0	0	20
C. albicans	11	0	0	0	0	0	6	0	15
S. boulardii	8	8	6	8	9	0	7	0	14

Recommendations

- It is recommended that stem and leaf extracts of Vernonia amygdalina (Grawa),Calotropis procera(Tobiaw),Rhamnusprinioides(Gesho), Justicia schimperiana(Sensel)andRutachalepensis(Tenadam)be considered as source of drugs for better antimicrobial activities against the test pathogens.
- Further identification and characterization of the medicinal properties of the extracts should be done for the purpose of developing new, more effective, and safe antimicrobial drugs that do not promote drug resistance in pathogens.

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HARAMAYA UNIVERSITY
Office of the Research Affairs

POLICY BRIEF -6-2 | THEME | VI
March 2019

Traditional Medicinal Plants against Human and Livestock Ailments in East Hararegie, Ethiopia

Negussie Bussa, Anteneh Belayneh, Biressaw Serda, Berihanu Motbaynor, and Tsegu Kiros

Key Message

This study identified 151 traditional medicinal plant speciesalong with the natural ecosystems and associated indigenous knowledge in Harar city and the surrounding areas, Ethiopia.

Among these, the top ten priority medicinal plants (Table 1) including Cyphostemmaadenocaule(Harmaladi/Or), Zanthoxylumusambarense(Geda/Or), Hydnoraabyssinica(Shifa'aweyn/H), and Senecio lyratus(Bal-kutal/H), etc. are highly threatened as per emic perspective; indigenous knowledge is also deteriorating and urged the local authorities'immediate attention for inventory and conservation priority.

Attention should be given to understand the serious health effect of dose; optimal doses for plant extracts in the traditional remedial preparation should be given attention.

Introduction

In Ethiopia, up to 80% of the population is combating diseases by using traditional medicinal plants through traditional practices due to the cultural acceptability of healers and local pharmacopeias as well as the relatively low cost of traditional medicine. The current environmental degradation coupled with climate change and population pressure poses severe challenges on traditional medicinal plants and associated indigenous knowledge. This mega project was designed to study the traditional medicinal plants and associated indigenous knowledge of eastern Ethiopia in a comprehensive manner to safeguard from extinction.

Approach and Results

Participants fullyendorsed the research by giving oral approval . Semi-structured interviews were carried out with 72 informants and group discussions were administered in the local language(Afan-oromo). Basic facts about local name(s) were collected and traditional descriptions of the medicinal plant species used for ailment treatments, specific types of ailment treated or controlled in these categories, parts used, conditions and methods of preparation (Table 2), routes of remedial administration, and major drawbacks of medicinal plants,and practical observation while the traditional healers prepare remedies and treat the patients.

A total of 151 traditional medicinal plant species in 128 genera and 84 families were used for the treatments of various human and livestock ailments. Remedial preparations consisting of 162 formulations were used for the treatment of 67 different ailments listed under the twelve major categories. Preparation of pastes from fresh parts accounted for 19.5% followed by pulverization of respective parts for internal application (17.6%) and concoction (12.8%). Crushing of fresh parts for topical application accounted for (12.1%) (Table 2). Eight different plant parts were used for 50 remedial preparations, of which leaves, stems, and the fruits and roots each accounted for 42.4%, 19.2%, 7.8%, respectively. These preparations were used to treating five major categories of health problems i.e. Cancer, Tumor, and Inflammations; Gastro-intestinal problems; heart problems; Kidney problems; and toothache (Table 3). Among these, five major health problems, namely Cancer, Tumor, and Inflammations ailments were found to have the highest ICF value of 0.91. A total of 39 plant species belonging to 38 genera and 29 families, which wereused to treatingcancer, tumor, and inflammatory ailments were identified and documented among the traditional healers (key informants) and randomly selected informants of Harari and Oromo communities. The highest Frequency of Citation (FC)

Table 1. Plant species with the highest frequency of citation based on overall effectiveness to treat the corresponding human ailments

No.	Plant species	Disease(s) treated	FC(%) of TH	FC(%) of RI
1	Cyphostemmaadenocaule	External body swelling	71.3	41.1
2	Zanthoxylumusambarense	Swelling of joints	64.6	40.0
3	Plumbago zeylanica	External body swelling	64.2	38.4
4	Hydnoraabyssinica	External body swelling	62.2	38.0
5	Cissampelosmucronata	External body swelling	51.6	30.4
6	Senecio lyratus	Abdomenal disorder	51.4	35.6
7	Echinopskebericho	Tonsillitis	50.4	38.6
8	Zanthoxylumchalybeum	Mild under skin swelling	42.4	22.0
9	Pimpinella ahmarensis	External body swelling	42.0	22.6
10	Canarinaabyssinica	Leg swelling	36.4	18.8

Table 2. Methods of remedial formulations of the traditional medicinal plants by the users and traditional healers and number of their preparations

Methods of remedial formulation types	Number of preparations	Percentage
Paste from fresh parts	29	19.5
Pulverized	26	17.6
Concoctions	19	12.8
Crushed	18	12.1
Powdered	17	11.5
Hot infusion	11	7.4
Concoctions and filtrate	9	6.1
Decoctions	6	4.1
Dried for smoke bath	4	2.7
Cooked parts eaten	4	2.7
Fresh parts eaten raw	3	2.0
Warmth	2	1.3

Analysis of Informant Consensus Factor (ICF) showed that the values ranged between 0.45 - 0.91. Major health problem like Cancer, Tumor, and Inflammations has ICF value of 0.91 while Toothache resulted the lower ICF value of 0.45 (Table 3).

Table 3. Top five disease categories identified based on Informant Consensus Factor (ICF)

No.	Top priority human ailments	Number of species used	ICF
1	Cancer, Tumor, and Inflammations	39	0.91
2	Gastro-intestinal problems: Parasites, Diarrhea, Stomach disorder, gastritis	31	0.82
3	Heart problem	23	0.71
4	Kidney problems: infections, urine retentions,	14	0.55
5	Toothache	11	0.45

Table 4. The Fidelity Level (FL) of top five species used to treat cancer, tumor, and inflammatory ailments with above 50% FC

No.	Plant species	Disease(s) treated	Np	Nt	FL(%)
1	*Zanthoxylumusambarense*	Swelling of joints	38	57	66.67
2	*Hydnorajohannis*	External body swelling	40		63.49
		Internal cancer	23	63	36.51
3	*Cissampelosmucronata*	External body swelling	22	35	62.86
4	*Cyphostemmaadenocaule*	External body swelling	41		54.67
		Suppurating wounds	23	75	30.67
5	*Plumbago zeylanica*	External body swelling	35		46.67
		Bone cancer	22		29.33
		Internal cancer	18	75	24.00

FC = Frequency of Citation; Np = the number of informants who independently suggested the use of a plant species for a particular use (single use mentioned); Nt = the total number of informants who mentioned the same plant for any other uses (total use mentioned).

Recommendations

- The local government (Harari Region)should make a timely conservation intervation and give urgency and attention to those top priority and highly claimed traditional medicinal plant species to safeguard them from extinction which, from emic perspective, has been reported to be a serious threat to natural resources.
- The thirty-nine traditional medicinal plant species in 38 genera and 29 families, which were reported to have been used for cancer, tumour, and body inflammation treatments should be considered for further scientific research.
- Further studies on purification, isolation and structural elucidation of bioactive compounds be made prior to drug formulation from the identified potentially useful plants.

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