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A Pragmatic Comparison of Smallholder Farmers' Perceptions and Attitudes Towards Integration of Trees in Farmed Landscapes in North Eastern Ethiopia

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ABSTRACT

The study was conducted in north eastern Ethiopia to describe the status of woody plants integration in smallholders' farms and compare the smallholder farmers' perceptions and attitudes towards tree integration. Reconnaisance study was made between April and September, 2015 to collect preliminary information. Plant specimens were collected, identified and deposited at the Herbarium in Wollo University. Ethnobotanical data were collected using semi-structured interview schedule from 623 informants selected by multistage sampling. Free lists of common woody plants were drawn along their perceived uses. The data were anlyzed using SPSS version 20, R and Climatol. Significant differences between means were tested using indepenndent t-test and ANOVA. In total, 72 plant species belonging to 61 genera and 40 families were recorded with corresponding perceived uses. More mentions of plant species and uses with less significant mean differences ($P < 0.05$) were recorded in South Wollo Administrative Zone, Woina Dega and those with higher literacy levels. So does with males than females, rich wealth group and elder informants with no and significant differences respectively. The findings indicate the need for mainstreaming tree integration activities with emphasis on women, poor, illiterate and younger households, and prioritizing the Dega agroecological zone and administrative zones with higher moisture stress. Uncertainities have surfaced about building confidence on tree ownership rights and level of stakeholders' support for tree integration. Awareness creation, providing support mainly for specific groups, prioritizing agroecological and administrative zones, avoiding tenure insecurity would be crucial for sustainable tree integration.

Keywords: Attitude, farmed landscapes, perception, smallholder farmers, trees.

INTRODUCTION

Woody plants are cosmopolitan in distribution (Arnold & Dewees, 1997). Trees on-farm are important assets of agricultural biodiversity (Cromwell et al., 1999) many are multipurpose species providing a range of benefits (Nawir et al., 2007; Abiyu et al., 2015). Integration or reintegration of multipurpose tree species with crops prevent land degradation, enhances ecological restoration of farmlands, enhances soil fertility, increase farm productivity, offer aesthetic value, and sequester carbon (Jose, 2009; Zomer et al., 2009) harbour pollinators and provide timber and non-timber products, satisfy cultural and spiritual values noticeable in many rural societies (Adal, 2014) and stretches to capturing carbon and cutting the emissions of greenhouse gases (CRGE, 2011).

Extensification of crop cultivation through unfettered removal of trees from farmed landscapes gradually left crop fields devoid of trees, and denied farming communities of woody products. Observation of barren crop fields and increased realization of the values of trees on-farm gradually prompted a hidden campaign for the "trees on-farm agenda" that instigated reintegration of trees with crops in farmlands. Encouraging seedlings sprouting around living quarters, farm margins and inside crop fields was the right measure to recover trees lost from agricultural landscapes. This reverse integration of trees into managed landscapes including farmlands started when farmers began protecting seedlings of preferred species emerging spontaneously from the soil seed bank (Asfaw, 2001; Hillbrand, 2013).

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Previous woodlot plantation initiatives in the country focused on wood shortage problems of urban communities through planting the fast-growing eucalypts (MoA, 2004) ignoring the tree issue in the agricultural landscapes. Promotion of on-farm trees is gaining momentum through linkages with the Sustainable Development Goals (SDGs) and the country's second Growth and Transformation Plan (GTP II) (CRGE, 2011). Despite its endorsement in government strategic documents however, at grassroots level, tree reintegration is considered the responsibility of smallholder farmers and limited to a meager small-scale growing of few exotic trees around homesteads.

Farmers' poor tree integration practices in north eastern Ethiopia is reflected in declining woody plant dynamics in farmed landscapes, loss of useful local knowledge, replacement of indigenous tree species with exotics of unknown uses and management. The pursuit for tree integration on-farm requires a clear understanding of the households' needs that trees can satisfy, the priority species to satisfy these needs, as well as tree management practices and challenges that hinder planting trees and protection and sustained use of tree products. Tenure insecurity described in terms of fear of periodic division of farm plots (Rahmato, 2004) is purportedly triggering a diminishing interest of keeping trees in smallholders' farms.

Raising efforts stretching from careful identification of the core causes of the disappearance of trees from smallholders' farms to developing mechanisms of tree reintegration with farmers' active participation helps bring trees back to the agricultural landscape (Hachoofwe, 2008**;** Tefera et al., 2014; Ruelle, 2014). Identifying smallholder farmers' perceptions of and attitudes towards trees integration as well as the status, needs for and contributions of different sociological strata; age, gender, education, wealth status to the tree integration endeavour allows generating useful recommendations about tree integration in smallholders' farms. This study was conducted in the agricultural landscapes of north eastern Ethiopia from this perspective. The research questions the perceived uses of different species, differences in the level of tree integration between different sociological variables and agroecological zones and, also examines emerging trends associated with legal issues and stakeholders' support for local tree reintegration initiatives in smallholders' farms.

MATERIALS AND METHODS

Description of the study area:

North eastern Ethiopia is located within the geographical coordinates of 10^0 10'-13^0 50'N and $38^0$30'-$40^0$30'E (Fig. 1). It covers four

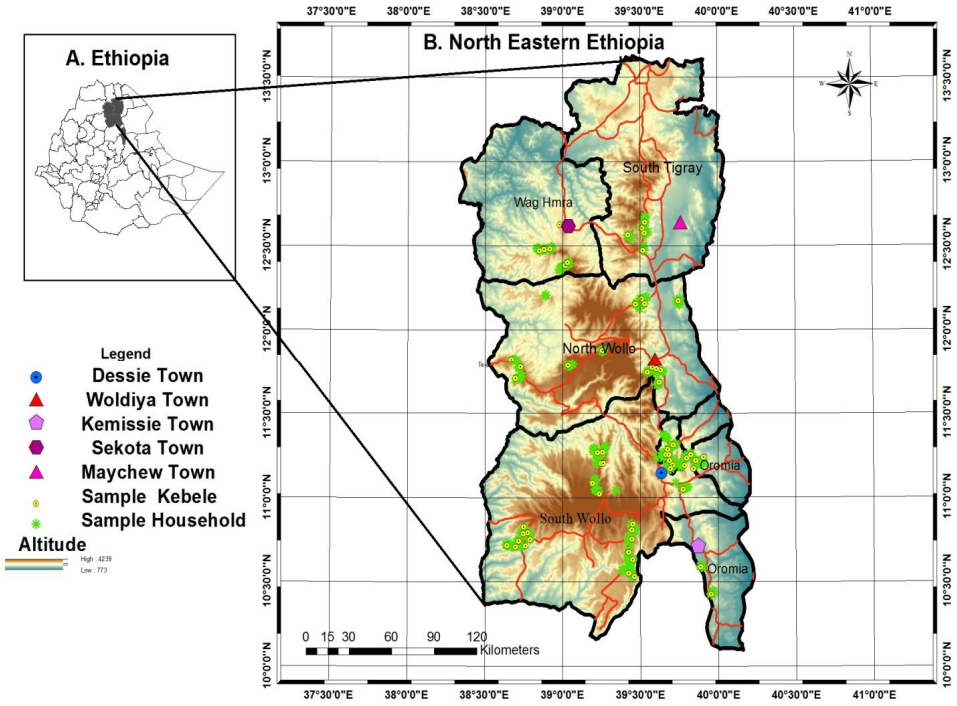

Fig. 1: Map of the study area showing sampling sites

administration zones including South Wollo, North Wollo, Wag Hmra and the administrative zone belonging to the Oromo Nationality Zone in the Amhara National Region, and the adjacent South Tigray administration zone. Its total land area as calculated using data from EthioGIS is about 54, 401.28 sq.km and roughly extends from the altitudinal range of 774- 4239 m.a.s.l.

The area is found at the interface of four cultural groups: Amhara, Agew, Oromo and Argoba. Settled in the area as far back as 2450 Years Before Present (Hurni, 1985), their ancestors have caused widespread deforestation while practicing early agriculture (Zewde, 1998) that the current patches of few natural high forests, pockets of marginal lands and mature trees dotted in sacred sites and farmlands is reminiscent of the vegetation (Friis, 1986; Tamrat, 1994). Paradoxically, the study area offers the biggest trees so far recorded in Ethiopia (Adal, 2014). The types of remnant vegetation of the Wollo Upland floristic region that encompass the present study are mainly Afroalpine, subAfroalpine, dry evergreen Afromontane forest and grassland whilst the lower altitudes are covered with *Acacia-Commiphora* woodlands (Demissew, 1998).

Four of five customary schemes of agroecological zones of Ethiopia except the 'Bereha' (Desert) occur in the study area as classified based on ambient heat intensity and moisture regimes (NEERP, 1989; Hurni, 1998). A bimodal rainfall characterizes the rainfall distribution in the study area with a big rainy season locally known as 'Kiremt' and a small rainy season known as 'Belg'; though the latter is sometimes of an erratic and highly variable nature considering current rainfall regimes (Fig. 2).

The population was estimated at 12852841 individuals in 1199737 households (CSA, 2008). The smallholder farming communities live off combining traditional rain-fed crop cultivation and animal husbandry including honey production and other livelihood means. The cultivable flat lands and degraded hillsides dominantly produce grains mainly cereal crops. Livestock rearing and traditional apiculture are parts of the mixed agricultural system. Traditional weaving, pottery, carpentry, artisanship, trading, labour and remittances are means of supplementary income for some households.

Sampling design

Multistage sampling technique was used to select study sites and informants. Five administration zones and two agroecological zones were selected by purposive sampling. Sixty-four of 653 study 'kebeles' or Peasant Associations (PAs) from 12 of 45 districts were selected by simple random sampling through referring to 2 of 3 agroecological zones namely cool to sub-humid (Dega) and cold to cold-humid (Woina Dega) kebeles (localities) from each district. The sample determination was performed using following formula

$$n = \frac{\left(\frac{\alpha}{2}\right)^2 pq}{d^2}$$

which was applied to the 1199737 households (CSA, 2008) living in the five administrative zones, where n, sample size; Z, the value on the abscissa of the normal curve that cuts off an area α at the tails and found in statistical tables; p is the estimated proportion of an attribute that is present in the population, and q is 1-p; d, allowable error = 0.04 to select 623 informants. Proportionate sampling was used to select 144 informants from the Dega and 479 from the Woina Dega agroecological zones respectively. As the administration zones were not of equal size, the calculated sample size was distributed to the five administrative zones by proportional allocation as

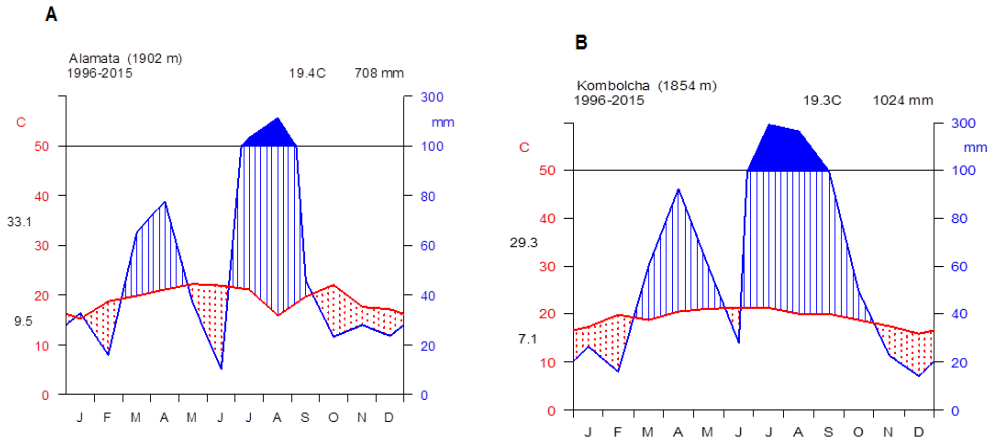

Fig. 2: Climate diagram at two rural towns in the study area (Data source: NMSA, 2015)

given by following formula

$$n_h = \frac{n \times N_h}{N}$$

where n = the total number of sample households, N_h = total number of households in the administration zone, N= the total number of households in the overall study area. To check for differences between informants' responses along differences of sociological variables, stratified random sampling technique was used to select informants in each 'kebele' against age, gender, wealth-group and other selected categories. Wealth group class intervals were determined following the government practices that categorize local farmers into 3 wealth classes as rich, medium and low income farmers.

Data collection

Names and uses of tree species growing in smallholders' farms were collected from free listing exercises following Martin (1995), Alexiades (1996), Cotton (1996) and Cunningham (2001). The question asked was "Would you please list trees growing in your farm plot with their uses drawn locally?" Pre-prepared semi-structured interview guide transcribed to vernacular language of the study population was used for collecting data from informants on plants and associated uses of the plants. Pictures of trees and tree stands occurring in farm plots were taken using an Olympus Master 2 camera. Focus group discussion was made with selected informants. All plant voucher specimens were collected, pressed, dried, identified and authenticated by reconfirming at the National Herbarium, ETH, Addis Ababa University and deposited at Wollo University.

Data analysis

Field dataset collected from informants was presented in quantitative terms using appropriate descriptive and inferential statistics and, text analysis was made for qualitative data. Data entry and simple arithmetic calculations were conducted using Excel 2007 and SPSS version 20. Independent sample t-test and ANOVA were carried out to detect significant differences among different means. Appropriate statistical tests at α = 0.05 level were applied to check significant mean differences in the integration of trees in farmed landscapes along differences of different sociological variables.

RESULTS

Cognitive domain:

Smallholder farmers' cognitive domain with respect to different sociological variables and agroecological zones were drawn from informants' expression of interest in growing trees in their farm plots and their local knowledge of woody plants. Overall, among the participants of the study, 520 (83.5%) replied "yes" and 103 (16.5%) "no" to the question "Do you like to have trees in your farms". Inventory of woody species spotted in smallholders' farms revealed that 278 (44.6%) of 623 informants had no trees while 345 (55.4%) have retained one or more tree species. This proportion correspond with the data collected through visual observation of the presence of trees on-farm. The proportion of smallholder farmers with a positive attitude to growing trees in own formats was relatively appreciably higher than those who were not clearly and unambiguously positive. Also, the result indicated more proportion of males, medium wealth categories and illiterate informants and those in the middle age category than the other categories interested in growing trees in own farms (Table 1).

Species composition:

In total, 72 woody plant species representing 61 genera and 40 families were recorded in the study. In terms of habit, 49 (68%) were trees and 23 (32%) shrubs. Of total, 15 (20.8%) species belong to the family Fabaceae, 5 species to Rosaceae, 4 species each to Anacardiaceae and Euphorbiaceae, 3 species each to Myrtaceae and Rutaceae, 2 species each to Boraginaceae, Celastraceae, Cuppresaceae, Loganiaceae, and 31 families were represented by single species. The family Fabaceae was the dominant taxon group accounting for 15 of 72 (20.8%) woody plant species recovered in this study. Based on the provenance and management status of the species 12 species were exotic; 10 cultivated and 50 species encouraged.

Informant mentions of woody plants and their uses:

One to six types of perceived uses of each plant species were recorded (Fig. 3). Construction, cash and fertilizer were cross-cutting perceived uses that woody species in smallholder farms accrue to smallholder farmers. Eighteen species were not cited for any use; 21 species were cited for a single use; 16 species for a couple of uses; 10 species for 3 types of uses where as 5 species were cited for 4 and, 2 species for 5 and 6 perceived uses each. More plant species and corresponding uses were cited by informants living in South Wollo Administrative Zone, by males than females, higher income group, those living in Woina Dega agroecological zones and those found at higher literacy level (Table 2).

Influence of sociological variables on local perception and attitude:

Two hundred eight (33.4%) informants supported the presence of gender distinction while 415 (66.6%) gave no support for the assertion.

Table 1: Smallholder farmers' interests in growing trees in their farms

Variable	Overall	Informants' response	
		Yes (%)	No (%)
Total	623	520 (83.5)	103 (16.5)
Gender			
Male	434	361 (57.9)	73 (11.7)
Female	189	159 (25.5)	30 (4.8)
Wealth Class			
Rich	185	155 (24.9)	30 (4.8)
Middle	236	192 (30.8)	44 (7.4)
Poor	202	173 (27.8)	29 (4.7)
Agroecology			
Dega	144	118 (18.9)	26 (4.2)
Woina dega	479	402 (64.5)	77 (12.4)
Education			
Illiterate	341	271 (43.5)	70 (11.2)
Read & Write	120	111 (17.8)	9 (1.4)
PFC	99	85 (13.6)	14 (2.2)
PSC	43	33 (5.3)	10 (1.6)
SS	20	20 (3.2)	0 (0)
Age			
20-40	147	121 (19.4)	26 (4.2)
41-60	296	253 (40.6)	43 (6.9)
61-80	171	138 (22.2)	33 (5.3)
Above 81	9	8 (1.3)	1 (0.2)

Comparison of means showed that male households grow relatively more trees than female households do, but no significant mean difference (P>0.05). Gender distinction in growing trees on own farms was ascribed to many different reasons including work burden 33 (15.9%), low female income 23 (11.1%), difficult job for females 21 (9.2%), sociological classification that culturally 'restricts' females' engagements to indoor works 13 (6.3%), job unfamiliar with females 7 (3.7%), perception as duty of the masculine 7 (7%) and a combination of multiple reasons 96 (46.2%).

Four hundred sixty (73.8%) of 623 informants gave support for the presence of distinction between different wealth groups while 163 (26.2%) have no support for the presence of wealth class distinction regarding growing trees on own farms. The wealthier smallholder households retained relatively more trees on their farms with significant mean difference (F =1.13, P > 0.05). Better awareness and access to agricultural extension services draw more consensus but a combination of assumed factors dominated claiming close to 60% of the cases (Table 3). Farm plot size is not related or least related to wealth category.

Elder household heads integrated more trees along with possessing relatively more plant use knowledge than the younger with significant difference (F =0.206, P > 0.05). With increasing literacy level, there was a corresponding increase in the mean number of trees integrated into farms with less significant difference (F = 3.899, P< 0.05). Comparison of means showed that smallholder farmers grow relatively more trees on their farms in the Woina Dega agroecological zone than in the Dega with less significant difference (P<0.05) and it is as so with administrative zones, though the difference is not significant (F = 8.54, P<0.05).

Perception of legal protection and stakeholders' support:

Five hundred sixty-seven (91%) informants expressed the need for effective legal mechanism that safeguards individuals' tree ownership rights while 56 (9%) did not consider this any important. Five hundred thirteen (82.3%) informants agreed that the latter guarantees their tree use rights while 110 (17.7%) said they do not currently know whether government regulations duly respect smallholder farmers' sovereign right of tree ownership although they say they are currently enjoying the right of use of tree products, they are growing in their farm plots with the benefit of doubt of the emerging land certification.

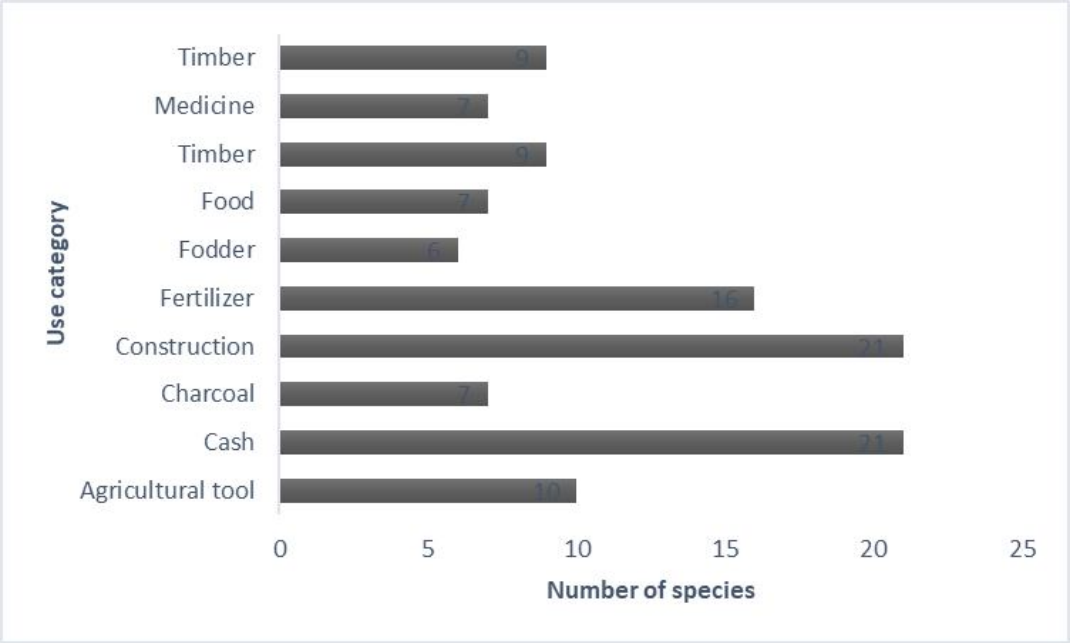

Fig. 3: Number of woody species against use categories

Judgment of actual stakeholders' support for tree integration activities in smallholders' farms discovered that 397 (63.7%) informants have not so far encountered any on-going stakeholder effort dedicated for the mainstreaming of trees in smallholders' farms while 226 (36.3%) approved the preoccupation of local government agencies in mainstreaming on-farm trees for improved agricultural productivity and natural resource management. The latter substantiate their assertion with their observation of going efforts of local government offices. Twenty-three (10%) informants justify the presence of local stakeholders' support for tree integration stemming from their observation of seedlings distributed from community nurseries for planting, 143 (63.2%) recalling awareness raising education given to local farmers, 6 (2.2%) recognizing local government's follow up and assessment, and 54 (23.8%) assert a combination of multiple justifications.

DISCUSSION

Cognitive domain:

Presence of considerable number of smallholders' farms devoid of trees reflect the scenario surfaced in the agricultural landscape in north eastern Ethiopia while smallholders are cognizant of the value of retaining on-farm trees for improved agricultural productivity and biodiversity conservation. Decreasing trend in indigenous tree integration on farms alluded to by informants is a phenomenon reported by Hachoofwe (2008) based on a study made in Tigray. The same trend prevails as reports (Negash & Achalu, 2008) demonstrated for southern Ethiopia and in the northwest (Tefera et al., 2014; Ruelle, 2014; Abiyu et al., 2015).

The list of uses mentioned by informants in the current study as compared with those reported in many other studies elsewhere (Gerique, 2006; Jose, 2009; Tabuti, 2012) and in Ethiopia (Hachoofwe, 2008; Adal, 2014; Tefera et al., 2014) evidently reveal a high degree of correspondence. This implies that the cognitive domain for on-farm woody plant species are more or less universal in rural communities of different parts of Ethiopia and elsewhere due to dependence on plants for their livelihood world-wide.

Informant mentions of woody plants and their uses:

Variation in the number of use citations of plants can be viewed in relation to the different level of plant use knowledge owned by informants, tree species scarcity and impacts of sociological variables, age and gender in the main. The fact that informants have not attributed any use type to some of the woody plants relates to variation in local knowledge and perception of informants about plant uses, and magnitude of local cultural significance of plants established in the area. Multipurpose plants, providing a range of benefits have been typically reported in rural areas of developing countries (Nawir et al., 2007; Abiyu et al., 2015; Cromwell et al., 1999). In earlier studies, it was shown that many of indigenous species have been recorded as multipurpose woody plants used as food, medicine and a variety of purposes to the respective communities (Adal, 2014; Lulekal, 2014). Many species that are among those

frequently reported to be the common multipurpose woody components of the agricultural landscapes in highland Ethiopia (Negash & Achalu, 2008; Hachoofwe, 2008; Tefera et al., 2014; Ruelle, 2014) were recorded in this study and includes *Acacia abyssinica, Acacia etbaica, Acacia nilotica, Cordia, africana, Ekebergia capensis, Hagenia abyssinica, Olea europaea* subsp. *cuspidata* and *Ziziphus spina-christi.*

The relatively heavy load of leguminous species (about 21%), known as fertilizer trees underlines the importance of woody species not only for economic and other utility purposes but also on account of the remedy that they offer to the degraded landscapes with an added value as fodder/browse species for cattle, goats and camel. Significant yield increases of maize and sorghum have been reported for the Sahel region, West Africa, Malawi and other countries when intercropped with fertilizer and woody species (ICRAF, 2013).

Influence of sociological variables on local perception and attitude:

The level of cognitive domain of household heads regarding trees integration in the agricultural landscape varied with sociological variables. Being a male or a female has influenced trees integration efforts. This gender desparity with regards to on-farm tree integration can be ascribed mainly to work burden, low income, engagement in indoor activties of females and sociological ideosyncracy developed about women in the society. The finding is in agreement with Adal (2014) assumption of the impact of a patriarchal society that encourages males to manage outdoor activities as a factor determining the gender-based knowledge difference. Difficulties including equal number of females and male informants for the study and the prevailing cultural disapproval of females working in the field and not generously appearing in public may have influenced the finding. It is always the case in rural communities to find more male-

Table 2: Average number of mentions of plant species and plant uses

Category	Number of informants	Average number plant mentions	Average number of mentions of plant uses
Adm. Zone			
North Wollo	146	1.63	2.63
South Wollo	351	2.20	3.20
Oromo	20	1.85	2.85
South Tigray	48	0.23	1.23
Wag Hmra	58	1.03	2.03
Gender			
Male	434	1.72	2.72
Female	189	1.36	2.36
Wealth class			
Rich	185	1.79	2.79
Middle	236	1.59	2.59
Poor	202	1.49	2.49
Agro-ecology			
Dega	144	1.17	2.17
Woina dega	479	1.74	2.74
Age			
20-40	145	1.65	2.65
41-60	300	1.60	2.60
61-80	170	1.57	2.57
Above 81	8	2.13	3.13
Education			
Illiterate	341	1.38	2.38
Read &Write	120	1.58	2.58
PFC	99	2.00	3.00
PSC	43	2.21	3.21
SS	20	2.50	3.50

Table 3: Suppositions for better tree integration performance of rich households

Assumption	Number of informants	
	Number	Percentage
Better awareness	100	17.7
Better access to extension services	21	4.6
More demands for fodder/browsing	18	3.9
Extra-large plot size	15	3.3
Sufficient labour force	13	2.8
Subleasing farm plots	11	2.4
Economic drive	8	1.7
Combination of assumptions	274	59.6

headed households than female-headed ones.

Wealth class appears to have significant influence on smallholder farmers' attitude towards growing trees on own farm arising from disparity of access to resources and technologies between the rich and the poor as it is always the case that the rich have better proximity to resources including information communication and access to agricultural extension services than lower income farmers. Elder smallholder farmers' retention of relatively more woody plants in their farms can be attributed to rich experience and deeper environmental knowledge possessed over the younger farmers. This agrees with the general fact regarding age-wise distribution of indigenous botanical and ecological knowledge among rural farming communities that the knowledge increases with age. This needs to be focused at in future selection and expansion of woody plants on farmed landscapes where participation of knowledgeable elders becomes critical. Rijal (2008) noted that elderly people have more knowledge on local plant uses than younger people.

Corresponding increase in mean number of trees integrated into smallholders' farms along increasing literacy level supports that education has a positive impact through its link with awareness raising. Literacy level enables individual farmers' to easily capture relevant information disseminated through the mass media and during local fora considering tree integration as an agendum. This clues on the need for launching appropriate packages for mainstreaming environmental education and functional literacy programs for local smallholder farmers.

Mean differences with agroecological zones is reflective of the impact of the latter on smallholders' perception of and attitude towards trees in farmed landscapes indirectly through determining the distribution of plant species. Diversity and distribution of tree species varied with agroecological zones due to gradients of complex environmental factors that limit tree growth. The gradients of administrative zones can be accounted to the evident gradient of moisture stress caused by lower precipitation and higher temperature decreasing in the order: South Wollo, Oromo, North Wollo, Wag Hmra. However, whether the difference among the administrative zones is due to better legacy of agrobiodiversity, or the quality of governance or variation in agrobiodiversity conservation practices of different cultural groups inhabiting each administrative zone requires further investigation.

Perception of legal and stakeholders' support:

The study revealed that current legal atmosphere does not hamper tree integration drive since the emerging land certification has lessened the doubt of ownership right over trees in smallholders' farms. The current land holding certification has been spoken out to be a guarantee for smallholder farmers' tree use right. But considerable number of informants are still doubtful about it, questioning its relationship with ownership right speculating the occurrence of inevitable periodic redistribution of farms in the future that may displace them from their current land holding. This scepticism of farmers is in line with Rahmato (2004) suggestion of redressing the issue for making the future brighter for the more sceptical farmers.

The Proclamation number 542/2007 (GOE, 2007) passed to provide for the development, conservation and utilization of forests supports the integration of trees into farmed landscapes. However, at the grassroots level, proper implementation of the proclamation does not look encouraging as none of the informants knew about the presence of any strong binding legal mechanism regulating tree interaction in own farms and this evidence can be invoked to justify the farmers' feeling of insecurity about tree ownership rights. Farmers are unable to realize issues of legal

protection of individual's on-farm trees ownership rights where there is inadequate information communication from relevant bodies. Lack of emphasis on tree integration in local development plans also disable the latter to give the necessary advice to smallholder farmers. This gap in legal and stakeholders issue may perhaps continue as a disincentive hindering smallholder farmers' interests of purposive integration of trees in their farms in the face of the current government policy that assumes the land as the states' property held for the public interest (GOE, 1995, Article 40: 3-4).

Although few informants clued on the existence of some supportive initiatives/stakeholder mechanisms for local tree integration activities, the majority of informants did not approve the existence of any. In addition, the governments' endeavor for mainstreaming on-farm trees was not appreciated. This finding spells out that the matter has not been given the kind of attention it deserves in this era of climate change tribulation.

Addressing the tree integration interests of smallholder farmers in several ways including through adopting proven agroforestry practices is imperative. Backing up smallholder farmers' activities with incentives, introducing innovative practices such as the carbon trade and green water can encourage smallholder farmers' efforts of on-farm tree integration. Strengthening the green water credit concept which smallholder farmers can implement is practiced in other countries (Flaskets and Chi lima, 2013; Jose, 2009) and being recently introduced in the region. Smallholder farmers in north eastern Ethiopia are seeking partners in tree integration although some farmers deviated from this assumption because of skepticism of development packages trickling down benefits at the farmers' gate. Providing inputs including seedlings and agricultural tools to farmers would strengthen the tree planting drive on the agroscape (Hachoofwe, 2008; Tefera et al., 2014; Ruelle, 2014) along investigating and removing other constraints of on-farm tree planting in the study area.

In conclusion, comparison of smallholder farmers' perception in north eastern Ethiopia indicated positive attitude for trees integration in individual farms. Empty farms inform the lack of keeping an eye on tree reintegration in the agricultural landscape and absence of strong local support mechanism. Members of the Fabaceae have preponderance perhaps from farmers' recognition of the agroforestry value of this class of plants in increasing soil fertility. Informants free listed quite fewer numbers of direct uses of plants providing for humans among several potential uses of these plants, the uses cited being mainly gastronomic and other consumptive uses of plants. Non consumptive uses including aesthetic values and ecosystem services were not mentioned probably because of lack of due recognition for the indirect uses of plants. This assumption can warrant support for the informants' not assigning any use or have assigned very few uses for some of the woody species while these plants are seen growing in their farms and these services are provided though were not recognized by the informants. `

Identification of differences in perception and attitude among different sociological groups with regards to tree integration helps to develop mechanisms of support for specific groups with emphasis to female, low income, illiterate and younger households, and prioritizing the Dega agroecological zone where trees are disappearing from most smallholders' farms and the administrative zones characterized by relatively higher moisture stress.

Smallholder farmers have been preoccupied by ambiguities and inconsistencies of the meaning of "tree use rights and tree ownership rights". The legal tone of 'right to use a resource' may not be as good as the 'right to own a resource', particularly when it comes to the 'right to a natural resource' in which the state overrides the right to the resource. Ownership is the expression of something belonging to somebody, hence since land is a natural resource belonging to the state, the smallholder farmer may be evicted from the land upon subsequent land redistribution scheme by the time the state wants to redistribute land to smallholder farmers or lease land to investors. Article 40:3 of the constitution of the FDRE provides for protection against eviction from land possession, but in reality, it is hardly implemented.

Stakeholder partnership on tree reintegration in smallholders' farms in north eastern Ethiopia is incredibly non-existent. This occurred while farmers are seeking support from an NGO rolling the evergreen agriculture bandwagon. In addition, local government offices endeavor has not yet received appreciation at the grassroots level. Hence, concerns of tree integration into smallholders' farms in the study area have so far been a least area of concern for stakeholders in development, if not an optional activity set aside for the discretion of smallholder farmers. This is despite its endorsement in the government's strategic documents. From recommendation point of view, devising mechanisms of awareness creation, support with emphasis on specific groups, removal of legal bottlenecks, hailing political activism considering the problems of tree integration in smallholders' farms is recommended.

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