Research article

Community perceptions towards the impacts of ecotourism development in the central highlands of Ethiopia: the case of Lake Wanchi and its adjacent landscapes

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ABSTRACT

Scientific studies harmonizing biodiversity conservation, ecotourism development, and local livelihoods in areas of natural endowments have significant importance in the welfare of society. The objective of this study was to investigate the local community's perception of the impacts of the Wanchi Ecotourism Association (WETA) and test the relationship between these perceptions and some socio-demographic predictor variables. Data was collected using household surveys, focus group discussions, key informant interviews, field observations, and document analysis. Simple statistical analysis, such as descriptive statistics, cross-tabulations, multiple response sets, and chi-square tests were used to analyze the socio-demographic characteristics and opinions on ecotourism development. Multinomial logistic regression was used to analyze the local community's perceptions towards the impacts of ecotourism using socio-demographic variables as predictors of the community responsiveness. The non-quantifiable information was analyzed using qualitative descriptions. There was enough evidence for the high resident's support for ecotourism development and perceptions of its positive impacts, while there was limited community participation, less economic benefit, and inequitable sharing of the revenues generated from WETA. The examination in the distribution of observed and expected perception responses on the impacts of ecotourism showed statistically significant differences ($x^2 = 110.833$, df = 3, P = 0.000). The multinomial logistic regression revealed that the variables of educational level, duration of stay in the study landscape, ecotourism benefit, and place of residence from the ecotourism attraction center have a significant association with respondents' perception toward impacts of ecotourism. The study supported the social exchange theory, in that those who benefited from ecotourism viewed it as a development preference, and so are more likely to have positive attitudes concerning ecotourism.

1. Introduction

The term ecotourism developed in the late 1980s as a direct consequence of the world's recognition of sustainable development and global environmental practices (Diamantis, 1999). Since its inception, ecotourism has gained adequate attention in academic circles and policy-makers as it balances between conservation and development by creating synergistic relationships among natural landscapes, local residents, and the tourism industry (Zacarias and Loyola, 2017). It offers an opportunity to develop products that can contribute to socio-economic development, local livelihood improvement, and visitor experience while safeguarding local culture and maintaining the natural state of

biodiversity and ecosystem services (Christ et al., 2003; ECA, 2011; Admasu, 2020). Since ecotourism-based livelihoods are given opportunities to benefit directly from nature, they presumably have an incentive to stop external threats to biodiversity (Torquebiau and Taylor, 2009; Lapeyre, 2010; Mbaiwa and Stronza, 2010).

Empirical evidence shows that economic incentives from ecotourism have the potential to stimulate income diversification and risk management among households (Christ et al., 2003; Kiss, 2004; Lapeyre, 2010). Economic diversification, income-generation, and job security, in turn, assist the local communities to reduce the over-exploitation of nature's resources. The premise is that natural areas are the reason why tourists come to visit and that if the communities receive benefits from protecting

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those natural areas; their livelihood strategy will no longer depend on their exploitation of the local natural resource (Goodwin, 2002; Rechlin et al., 2008). It was stated that, even though, understandings of the key environmental concepts are limited, most local communities have positive attitudes towards ecotourism development (including interaction with eco-tourists) and biodiversity conservation (Makindi, 2016). Ecotourism is not, therefore, simply another niche market within the tourism industry; rather a way of life, a set of practices and principles that, if properly planned and effectively implemented will harmonize the triple objectives of tourism industry, namely, local livelihoods, biodiversity conservation and the travel industry (Christ et al., 2003; Honey, 2008; Makindi, 2016).

Despite its potential for providing and enhancing livelihood opportunities, ecotourism is not always the solution to conservation challenges and local development, especially in developing countries, like Ethiopia (ECA, 2011; SCBD, 2015; Admasu, 2020). It has been widely documented that tourism development does not only bring positive impacts but also has potentially negative impact on the environment and resident communities (Lankford and Howard, 1994; Ko and Stewart, 2002). Some scholars even label tourism as a "*double-edged sword*" that involves both positive and negative aspects for the host communities (Wang and Pfister, 2008). Similarly, the ecotourism industry may create downturns to the sustainability of the local environment and the living conditions of residents, unless it is properly planned, effectively implemented, and community-centered in terms of management, decision-making, and benefit-sharing mechanisms (ECA, 2011). There are many reported incidents where forms of ecotourism, which are not sufficiently community-focused, are harming the environment, and where local/indigenous communities are not receiving sufficient benefit from the projects (WWF, 2001). The implementation of most ecotourism projects has received much criticism, as they failed to provide benefits for local communities (Monteros, 2002; Krüger, 2005), and a significant lack of support for nature conservation (Mühlhäusler and Peace, 2001). There are also concerns regarding the direct benefits to local communities and potential negative impacts associated with eco/tourism including creation of a dependency syndrome on handouts among the local people, and erosion of indigenous cultural values through misconduct and bad influence (Makindi, 2016). In community-focused ecotourism, the community is taking care of its natural resources to gain income through operating an ecotourism enterprise and using that income to improve its livelihoods. The approach is to make livelihoods drive conservation rather than simply being compatible with it.

However, most ecotourism in developing countries, including Ethiopia, is characterized by haphazard planning, lack of environmental standards and monitoring, stark seasonality, and domination of tourism in the overall economy. Besides, although ecotourism-related research has been a research focus for the past few decades in Ethiopia, scientific studies with the aim of generating knowledge and evidence in ecotourism destinations are still largely lacking (ECA, 2011; Admasu, 2020). This has hindered the planning of the ecotourism sector for biodiversity conservation, environmental management, and socio-economic development of the local communities and the country at large (ECA, 2011). One of such data deficit ecotourism destinations in Ethiopia is Lake Wanchi and its adjacent landscapes, located at the central highlands of the country (Ketema, 2015a; Angessa, 2020).

The unique natural and cultural landscapes, historical features, and rich flora and fauna make Lake Wanchi and its surrounding landscapes among the most popular ecotourism destinations in Ethiopia. As a result, Wanchi Ecotourism Association (WETA), which is a local community-centered initiative, was established in 2002 with the objective of fostering the conservation of natural and cultural resources as well as supporting the livelihoods of local communities. According to the WETA's policy, 8% of the service providers' revenue and half of the entrance fee go directly to the community in a transparent way for the improvement of its services. Lake Wanchi and its adjacent landscape is one of the three nationally launched ecotourism projects "Gebeta

Lehager" in 2020 by the government of Ethiopia, which aims to develop three major natural landscapes (including Gorgora and Koisha sites) as part of sustainable landscape management, biodiversity conservation and livelihood improvement approach. Besides, the United Nations World Tourism Organization (UNWTO, 2021) initiative also designated Lake Wanchi and its adjacent landscapes as one of the best tourism villages of 2021 on December 2, 2021; by considering its role in safeguarding rural villages, along with their landscapes, natural and cultural diversity, and their local values and activities (https://www.unwto.org)news) unwto-announces-list).

A few pieces of research related to ecotourism development were conducted at Lake Wanchi and its surrounding landscapes (Ogato et al., 2014; Ketema, 2015a, 2015b). These studies indicated that contrary to Lake Wanchi's and the surrounding landscapes' greatest potential for community-based ecotourism development, there were hindrances that impede the sustainability of WETA. Hence, detailed assessment and evaluation on the implementation of WETA to identify its benefits and costs to the environment and local residents may help to minimize the negative environmental and socio-cultural footprint of WETA and enhance its contribution to ecological conservation, while realizing sustainable local development strategies.

Furthermore, understanding the knowledge and perceptions of the residents of ecotourism destinations towards ecotourism is crucial for the success of ecotourism development and environmental management of the destination areas (Vodouhê et al., 2010; Holladay and Ormsby, 2011). It also helps policy and decision-makers to develop and implement a plan that would incorporate the concerns of the residents and realize sustainable biodiversity conservation and environmentally friendly livelihood strategies (Harun et al., 2018). Closely associated with community attitude is the social exchange theory that has been widely accepted as an appropriate hypothetical framework by researchers to explain community perception toward the impact of tourism development (Wang et al., 2006). From tourism perspectives, social exchange theory suggests that residents' attitude toward tourism and their subsequent level of support for its development will be influenced by their expectations in terms of the benefits or costs incurred in return for the services they offer (Ap, 1992; Andereck et al., 2005). In other words, tourism effects were viewed positively when the exchange of resources is high for the host community in either the adjusted or disturbed exchange relation, whereas tourism effects were viewed negatively if the exchange of resources is low (Ap, 1992). Most perception studies focus on investigating the differences in communities' attitudes according to their socio-economic and demographic attributes (Wang et al., 2006). Therefore, the objectives of this study were to: (1) assess the local community's understanding and attitude on ecotourism development and its impacts (both positive and negative) in the Lake Wanchi and adjacent landscape; (2) evaluate the involvement of the communities and their benefits from WETA, and (3) analyze the major socio-demographic characteristics that could have a significant effect on community perceptions towards the impacts of ecotourism development.

2. Study area and methods

2.1. Study area

The study was conducted in Wanchi district, Oromia, Ethiopia with special reference to Lake Wanchi and its adjacent landscapes. Lake Wanchi is located in the central highlands of the country at about 155 km to the southwest of Addis Ababa (8° 45' – 8° 49' N and 37° 50' - 37° 55' E). It is found in the Hero Wanchi rural Kebele (the lowest administrative unit) and is bordered by 12 other adjacent Kebeles (Figure 1). Lake Wanchi is a picturesque crater lake formed as a result of volcanic eruptions (Abebe et al., 1998). According to Degefu et al. (2014), the lake has a surface area of about 560 ha and mean and maximum depths of 28 m and 107 m, respectively. The landscape is a highland area characterized by mountain hills, steep slopes, gorges, and valleys. The altitude ranges
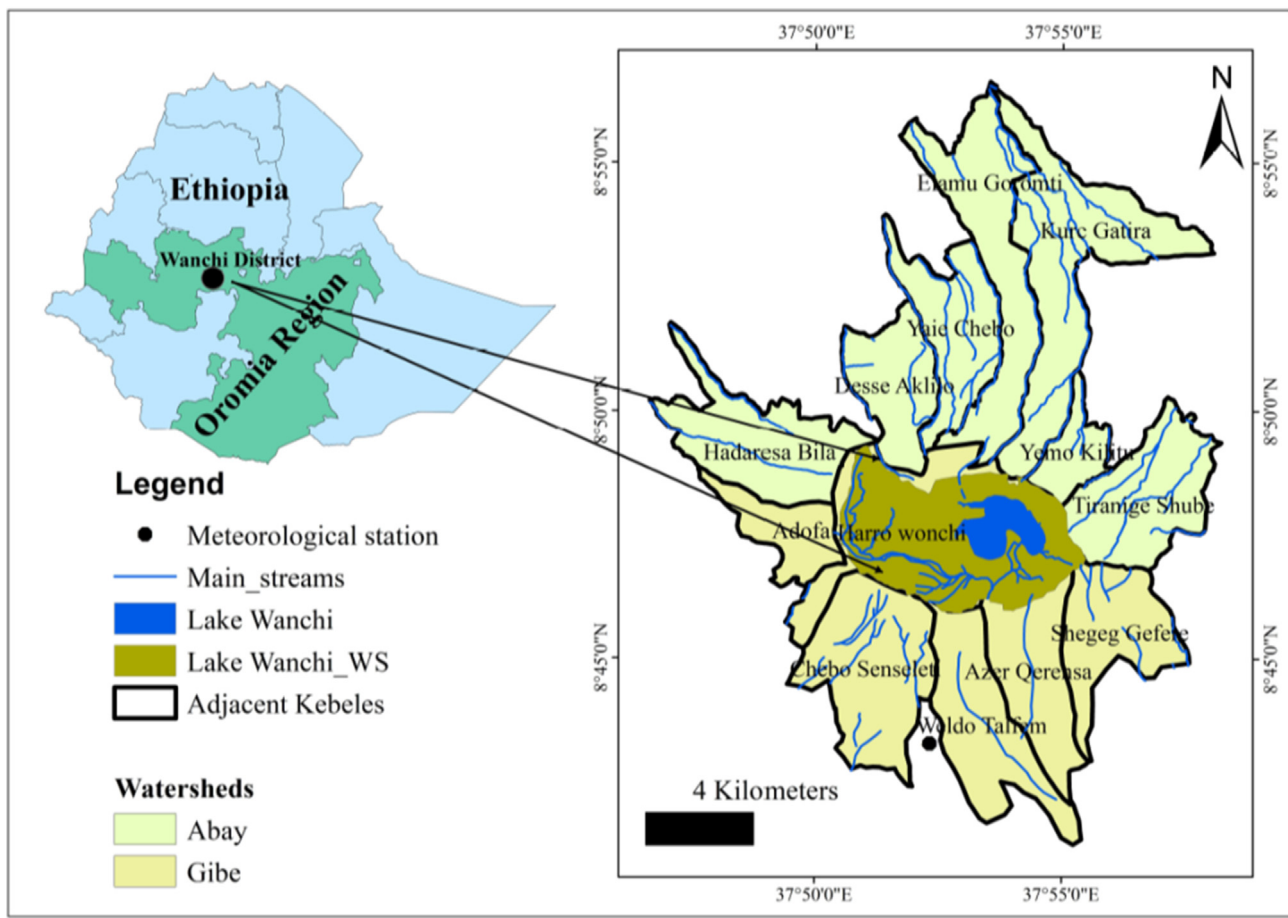
Figure 1. Map of the study area.

from 2810 – 3385 m above sea level. The average annual temperature is 17.8 °C with a maximum of 23.4 °C and a minimum of 12.2 °C, whereas the mean annual rainfall is 1402 mm with peck rainfall in July and August (Angessa, 2020). Unimodal type of rainfall with longer rainy periods extending from June to September is the characteristic of the landscape. According to the international slope classifications standards of WOCAT (2007), the slope of the area ranges from flat (0–3%) at the lake water surface to very steeply sloped terrain (>60%) near the ridges.

Lake Wanchi and its adjacent landscapes are among the most exciting ecotourism destinations in Ethiopia, featuring spectacular natural landscapes (mountains, valleys, waterfalls and Lake Wanchi itself with its islands and peninsulas). The natural vegetation; mineral waters and hot springs; ancient churches and monasteries; and the eye-catching huts with *Enset* (*Ensete ventricosum*) dominated home gardens make Lake Wanchi and its adjacent landscapes one of the most ecotourism potential destinations. The lake provides an attractive landscape scenery, nature and culture with its ability of ecosystem in accepting managed level of visitors, and cultural landscapes being shaped. Owing to the topographic attractiveness of the landscape, most tourists call Lake Wanchi and its adjacent landscape as *"The Switzerland of Africa"*, while others call it as "*The hidden Garden of Eden*" (Angessa, 2020).

Sub-afro-alpine vegetation dominated by *Erica* species is the characteristic vegetation type of the study landscape. However, there are also indigenous plant species such as *Hagenia abyssinica, Hypericum revolutum, Protea gaguedi, Rosa abyssinica, Lobelia gibberroa, Solanecio gigas, Rumex nervosus* and *Rubus* species (Angessa et al., 2020) that have tourism importance, especially during their flowering seasons. *Colobus guereza, Tragelaphus sylvaticus, Sylvicapra grimmia, Anubis baboon*, Common jackal, and Common hyena are the commonly observed wild mammals. *Gyps africanus, Milvus aegyptius, Tauraco leucotis,* and the endemic bird to the

Ethiopian highlands Wattled ibis *(Bostrychia carunculata)* are some of the bird species that are common to the area (Ketema, 2015b).

2.2. Methods

2.2.1. Data collection and sampling techniques

This study employed information from socio-economic data collected through household surveys (HHS) supplemented with focus group discussions (FGDs); key informant interviews (KIIs), direct field observations, and document analysis. Prior to the actual data collection, a detailed reconnaissance survey was conducted to obtain baseline information on population, faunal and vegetation distribution, topography, accessibility, climate, and infrastructures about the study landscape. In addition, identification of subjects and possible sampling sites for the questionnaire administration; determination of sample size for the HHS; a decision of the required number of FGDs and KIIs were made during the reconnaissance survey. A pilot survey was also conducted by randomly selecting 12 respondents who were not included in the main sample group to assess the validity of the research instruments (Hamito, 2001). This enabled us to evaluate and modify those questions, in which the respondents encountered difficulty to respond. The HHS enumerators were recruited and trained on the objective of the research, on how to fill the questionnaire, how to approach sensitive questions, such as illegal resource utilization, and on those questions considered as taboos by the local community. The questionnaire was interpreted into the local language (Afan Oromo), and the enumerators were monitored and evaluated by the researchers during the data collection process. Data collection instruments were evaluated for ethical considerations and approved by the research ethical review board of the college of agriculture and veterinary sciences of Ambo University.

Data for socio-economic characteristics, ecotourism knowledge, and community perceptions towards the impacts of WETA on the environment, economy, and socio-cultural aspects of the local community was collected using HHS. The sample size was determined using the standard formula by (Yamane, 1967) stated in Eq. (1) below. Sample households were selected randomly from a list of registered total resident households obtained from the Hero Wanchi Kebele Office. Similarly, sample respondents were selected randomly from those selected sample households, so as to give each person or family in the households an equal chance of being selected for the sample survey. The fieldwork was carried out between October and December 2019, based on a simple random sampling of 240 households. The purpose of the survey was clarified for respondents before raising any questions of interest to gain his/her confidence and interest. A semi-structured questionnaire containing both open-ended and fixed response questions was used to collect data through on-site surveys by questioning the respondents in face-to-face style interviews. The questionnaire was administered randomly to the survey respondents. Finally, the household's survey result was cross-checked with the information obtained from the FGDs and KIIs, field observations, and other pertinent secondary sources to capture the consistency in the responses.

$$n = \frac{N}{1 + N(e)^2} \tag{1}$$

where, n is the sample for the households, N is total number of households of Hero Wanchi Kebele and e is the level of precision. The level of precision is a guarantee for the representativeness of a sample from the selected population. The accepted level of precision for representative samples usually ranges from 1 to 10% (Limaei et al., 2014). The commonly used 5% level of precision was used for this research.

Purposive sampling was used for selecting focus group discussants. Participants were selected based on their home distance from the center of the ecotourism site, their influence in the society, their knowledge of ecotourism and ecotourism-related activities, their age, and duration of stay in the study landscape. Ten pre-designed open-ended questions were used for FGDs. Four FGDs consisting of 6, 7, 7, and 8 individuals, respectively, were conducted. Participants were invited to discuss issues according to their convenience. Most often, community leaders were approached in advance, and development agents of the respective Kebeles were communicated to organize and create conducive environment for the discussion. Similarly, a purposive sampling technique was

employed for the selection of key informants to include knowledgeable individuals from different social groups including elders, community leaders, village chiefs, WETA managers and experts, tour guides, and experts from the district culture and tourism office. The main focus points of the interviews included the demographic and socio-economic conditions of the people, ecotourism resources and activities; the perception of the local communities on the ecotourism development; the positive and negative impacts of WETA with respect to the environment, local economy, and socio-cultural aspects of the local community; the major challenges and opportunities in the development of ecotourism; and strategies on the future sustainable management of Lake Wanchi and its adjacent landscapes.

In addition, against the social exchange theory background, described earlier, the major socio-demographic characteristics that were believed to affect the respondent's understanding of the impacts of ecotourism development were considered for multinomial logistic regression analysis (Table 1).

2.2.2. Data analysis

All the data collected were summarized and carefully coded to perform the appropriate statistical computations, after which it was subjected to a two-stage analysis. In the first stage, statements dealing with respondent's socio-demographic characteristics and the knowledge and awareness related to ecotourism were analyzed using simple statistical analysis, such as descriptive statistics, cross-tabulations, multiple response sets, and the non-parametric chi-square tests. Descriptive statistics and cross-tabulations were carried out to produce frequency counts and percentages based on tables and graphical presentations (Field, 2000). Chi-square test was used to determine the degree of associations between the dependent and independent variables, and to estimate how closely an observed distribution matches an expected distribution. In the second stage, multinomial logistic regression was used to analyze the local community's perceptions towards the impacts of ecotourism development using socio-demographic variables affecting the respondent's understandings. The data collected through FGD, KII, and field observation (non-quantifiable information) was analyzed and interpreted using narrations, context analysis, and qualitative descriptions.

2.2.2.1. Multinomial logistic regression analysis. Prior to the multinomial logistic regression analysis, the distributions in the observed and expected responses among the respondents perception on the impacts of

Table 1. Socio-demographic factors affecting respondent's perception and their theoretical assumptions.

Variables	Scale	Levels/categories	Research hypothesis/Theoretical assumptions
Gender	Nominal	1 = Female 2 = male	Female respondents will be less likely to report the positive impacts of ecotourism development as compared to their male counterparts.
Educational status	Ordinal	1 = Primary level 2 = Secondary level 3 = Tertiary level 4 = No formal education	Respondents with a higher education level are more likely to report the positive impacts of ecotourism than those with a lower education level/with no formal education.
Occupation	Nominal	1 = Tour-guide 2 = Merchant 3 = Employer 4 = Student 5 = Farmer	There might be perception differences in reporting the impacts of ecotourism based on the respondent's occupation.
Duration of stay	Ordinal	1 = < 10 years 2 = 10–20 years 3 = 20–30 years 4 = Since birth	Respondents with longer duration of stay in the study area may have more supportive attitude towards ecotourism development than those with a shorter duration of stay.
Ecotourism benefit	Nominal	1 = Yes 2 = No	Respondents receiving economic benefits from ecotourism are more likely to report the positive impacts of ecotourism than those not receiving economic benefits.
Ecotourism distance (km)	Numeric	Ranging from 0.5km to 9km	Home distance from the ecotourism attraction center may influence respondents' perception towards the impacts of ecotourism development.

ecotourism were checked using the nonparametric chi-square test, and showed statistically significant differences. Multinomial logistic regression was performed as a follow-up to the chi-square test to analyze the local community's perception towards the impacts of ecotourism using socio-demographic factors as predictors of the community responsiveness. The traditional 0.05 criterion of statistical significance was employed for all tests. The entire model assumptions were checked, and found that no any of the assumptions have been violated. Then, the correlations among the model predictors (independent variables) were checked for multicollinearity using Spearman's rank correlation coefficients, and those predictors with a correlation coefficient above the conventionally accepted value of 0.4 cut-off level (Schober et al., 2018) were removed (for instance age and membership status). The goodness-of-fit and the model-fitting information statistics were assessed, in order to check whether the model reasonably approximates the behavior of the data. The Goodness of fit was explored and in no case this test found significant, implying that the model fits the data well. The model fitting information table also confirmed that the addition of the predictors to a model that contained only the intercept significantly improved the fit between the model and the data, that is, the final model is outperforming the null model. In a final step, the entire independent variables (without interactions) were fitted to the model using the custom/stepwise–main effects with backward elimination, thus filtering out the statistically not significant independent variables (at $P < 0.05$). All the statistical analysis was performed using IBM SPSS statistics version 23.

3. Results

### 3.1. Socio-demographic profile of the sample households

Male households constituted the largest proportion (84.2%), while females constituted 15.8% of the survey respondents. The gender bias was the expected result in the Ethiopian household heads condition, where the socio-cultural practices take for granted male heads of households as responsible actors than female counterparts. In terms of the age profile of the survey households, relatively larger proportions (45.4%) were included between the age categories of 31–45 years. Nearly proportional numbers of respondents, 23%, and 30%, were included between the age categories of 15–30 and 46–65, respectively,

whereas, very few of the respondents (1.7%) were older than 65 years. Gender-wise comparison of the age category indicated that relatively more proportions of males were represented in the 31–45 age category, whereas females are more represented in the 46–65 age category (Figure 2a).

Contrary to the rural Ethiopian situations, where people with non-formal education are greater in proportion, in the Lake Wanchi and its adjacent landscape a greater percentage (61.3%) of the respondents attained primary education (grade 1–8 level); whereas, only 23% of the respondents reported no formal education. The educational achievements of 14.6% of respondents ranged from grade 9 to grade 12 (secondary education). A very small proportion of the household heads (0.8%) had attended tertiary education, which is above grade 12, including some college and university level of formal education. As is common in most parts of Ethiopia, compared to the female respondent's males constituted the larger proportions in both the primary and secondary levels of education, while females constituted greater proportion of the respondents who have no formal education (Figure 2b). Unexpectedly, the proportion of female respondents who attained a tertiary level of education was slightly greater than that of male respondents (Figure 2b).

Given the focus of the survey was on household heads, the majority of respondents (84.6%) were married households, which is consistent with the survey expectations. Low proportions of the respondents reported that they were either single (12%), widowed (2.9%), and divorced (0.4%). A large percentage (85%) of the respondents were farmers by occupation, followed by students, which constituted 6.3% of the sample households, while traders, employers, and tour guides together constituted 8.7% of the respondents (Table 2).

Information on the respondent's duration of stay in the study area might indicate the level of knowledge and understandings about the socio-economic undertakings in the study landscape. In line with this, the majority of the household heads (60.4%) have lived in the study landscape since birth. A further 8.8% and 10.8% of the survey respondents reported that they have lived in the study area for the last 20–30 and 10–20 years, respectively. Only 20% of the survey respondents reported as they have lived less than 10 years in the study landscape. Those respondents who were not lived in the study area since birth were asked to justify the reasons why they came to settle in the current study landscape. Of these respondents, a greater proportion (72.6%) came to the study
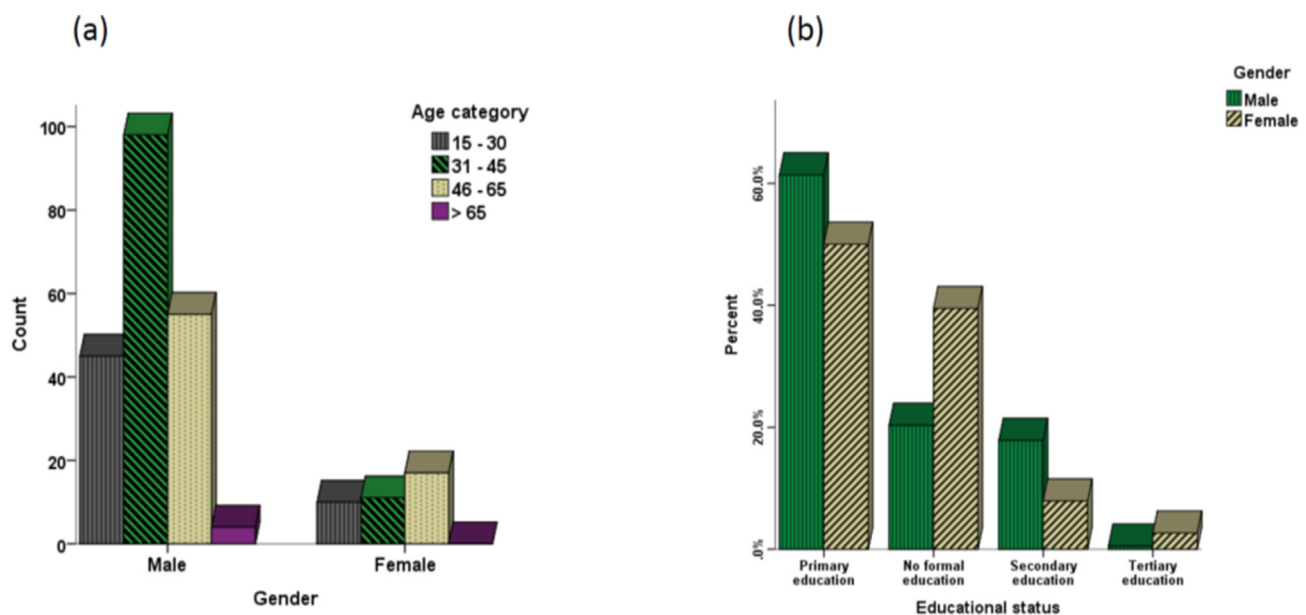
Figure 2. Respondents (a) Gender by age category, (b) Educational status by gender. Note: Educational status: Non-formal = no formal education, Primary = 1–8 grade level, Secondary = 9–12 grade level, Tertiary = above grade 12.

Table 2. Demographic and socio-economic characteristics of the sample households (N = 240).

Variables	Responses	N	percent
Marital status	Single	29	12.1%
	Married	203	84.6%
	Divorced	1	0.4%
	Widowed	7	2.9%
Occupation	Farmer	204	85.0%
	Trader	13	5.4%
	Employer	7	2.9%
	Student	15	6.3%
	Tour-guide	1	0.4%
Major Livelihoods[a]	Crop production	218	63.4%
	Livestock rearing	85	24.7%
	Beekeeping	6	1.7%
	Monthly salary	5	1.5%
	Handcraft	3	0.9%
	Ecotourism	16	4.7%
	Petty trade	11	3.2%
Duration of stay in the study area	Since birth	145	60.4%
	20–30 years	21	8.8%
	10–20 years	26	10.8%
	<10 years	48	20.0%
If not since birth reason for coming	Marriage case	10	10.5%
	Get access to land	69	72.6%
	Attracted by WETA and Hero Wanchi town	16	16.8%
Do you have farmland	Yes	168	70%
	No	72	30%
Farmland condition in the past 10 years	Increased	2	1.2%
	Decreased	37	22.0%
	No change	129	76.8%
Farmland enough to support your households?	Yes	0	0.0%
	No	168	100.0%

[a] Dichotomy group tabulated at value 1.

landscape to get access to land, while 16.8% of them were reported as they were attracted by the establishment of WETA and Hero Wanchi rural town in the past two decades. Relatively a lower proportion of the respondent (10.8%) claimed that they came to the study landscape due to marriage cases.

Most of the surveyed households (88.1%) were engaged in agricultural activities including crop production and livestock rearing as their main source of livelihoods followed by ecotourism that constituted 4.7% of the livelihoods of the sample households. The remaining sample households depended on beekeeping (1.7%), employment (1.5%), handcraft (0.9%), and petty trading (3.2%) for their survival. The majority of the survey households (70.0%) reported that they have their own farmland, where, the landholding size varied from 0.5 ha to 3.5 ha with an average of 1.4 ha per household. On the other hand, the household survey result indicated that there is a larger family size that ranged from 1 - 17 individuals with a mean of seven persons per household. Hence, all of the respondents who own farmland argued that the landholding size is not sufficient enough to sustain their family members. In terms of the conditions of landholding size, approximately three fourth (76.8%) of those respondents who have their own farmland reported that there was no change in the landholding size in the past 10 years, while nearly one-third (22%), and small (1.2%) reported a decrease and an increase in the landholding size, respectively. Table 2 shows the key demographic and socio-economic characteristics of the surveyed households.

3.2. Local community's knowledge and perceptions on ecotourism development

The local community's knowledge on eco/tourism and essential resources and their perception towards the impacts (positive or negative) of WETA were analyzed using the opinion of sample households. Results from the 240 HHS analysis indicated that the local community in Lake Wanchi and its adjacent landscapes were well aware of tourism and its impacts on landscape and local livelihoods. The majority of the respondents (80.4%) know what tourism means. Tourism understood and described as visiting and enjoying attractive and beautiful landscapes nearly by one-sixths of the respondents (14%); both natural and man-made places that attract people by one-fourth of the respondents (25%); natural and cultural resources that serve as a source of income by 43.3%, and any recreational activity enjoyed by the people roughly by one-tenth (11.9%) of the respondents. Almost all of the respondents (97.1%) remarked on the appropriateness of the establishment of ecotourism that encompasses sustainability at Lake Wanchi and its adjacent landscapes. However, relatively a smaller proportion of respondents (32.1%) reported that they are benefiting from the ongoing ecotourism and related activities. Of the respondents who reported they are benefiting, 29% of them stated - collective benefits such as infrastructure and facilities that put into consideration the conservation of natural habitats, and 24% of them reported – exemption from land tenure taxes, which they wish to compensate society by conserving natural resources. The rest reported employment opportunities, percent share from the cash revenue WETA generates, biodiversity conservation, and income generation from the different ecotourism services (Table 3). The majority of respondents (73.3%) reported that they were not a member of WETA, whereas, 90% of them expressed their willingness to join the WETA as members.

When asked about the presence of conflicts of interest over the use of natural resources in Lake Wanchi and its adjacent landscapes, a slightly higher proportion of the respondents (37.1%) reported the presence of

Table 3. Respondents knowledge and perception of WETA's development (N = 240 unless otherwise stated).

Inquiry	Replies	N	percent
Do you know what tourism means?	Yes	193	80.4%
	No	47	19.6%
Does ecotourism appropriate for Lake Wanchi?	Yes	233	97.1%
	No	7	2.9%
Do you get benefit from ecotourism activities?	Yes	77	32.1%
	No	163	67.9%
Are you a member of WETA?	Yes	64	26.7%
	No	176	73.3%
Do you need to be a member of WETA? (n = 176)	Yes	158	90.0%
	No	18	10.0%
Ecotourism benefits[a] (n = 163)	Employment opportunities	9	3.6%
	Collective benefits	73	28.9%
	Revenue sharing	5	2.0%
	Biodiversity conservation	47	18.6%
	land tenure tax exemption	61	24.1%
	Service-income	58	22.9%
Conflict over the use of resources	Yes	89	37.1%
	No	80	33.3%
	I have no idea	71	29.6%
Conflict resolution mechanisms[a]	local traditional system	102	65.0%
	legal or court system	42	26.8%
	ecotourism code of conduct	13	8.3%

[a] Dichotomy group tabulated at value 1.

conflicts of interests, whereas, somewhat proportional percentage of the respondents, i.e., 33.3% and 29.6% reported the absence of any sort of conflicts, and as if they have no idea over such matters, respectively. The majority of respondents (65.0%) stated the local traditional system or *"jaarssummaa"* as a remedy to disputes in the society about sharing natural resources of the watershed, while nearly one-fourth (26.8%) stated that they prefer to use the legal system of conflict resolution, and smaller proportions (8.3%) stated WETA's tourism code of conduct can serve as the conflict management system in the study landscape.

Regarding the impacts of WETA on the local environment, economy, and socio-cultural aspects of the local community, over half of the respondents reported that WETA has both positive and negative impacts, while one-fourths of them reported as if they have no idea about its impacts. Only small proportions of the respondents (6.25%) reported the negative impacts of WETA on the study landscape and its resident community (Figure 3).

3.3. Perception of local communities on the development of WETA and its impacts

Prior to multinomial logistic regression analysis, the examination in the distribution of observed and expected perception responses of the respondents on the impacts of WETA was estimated to check whether they have significant differences or not and showed a statistically significant difference ($x^2 = 110.833$, df = 3, P = 0.000). This chi-square test result leads to the further exploration of whether respondent's perception significantly differed based on the socio-demographic characteristics of the respondents (such as gender, education level, occupation, duration of stay, receiving a benefit or not from ecotourism, and place of residence). Hence, a multinomial logistic regression was performed to model the relationship between the respondent's socio-demographic characteristics and perception towards the impacts of WETA's development (Table 4). The Goodness-of-fit table showed the consistency of the data with the model assumptions (Pearson $x^2 = 310.932$, df = 342, P = 0.885). The model

Table 4. Case processing summary for the multinomial logistic regression.

Variables		N	Marginal Percentage
Respondents perception on the impacts of ecotourism	Positive impact	40	16.7%
	Negative impact	15	6.3%
	Both positive and negative impact	125	52.1%
	I have no idea	60	25.0%
Gender	Female	38	15.8%
	Male	202	84.2%
Educational status	Primary education	143	59.6%
	Secondary education	39	16.3%
	Tertiary education	2	0.8%
	No formal education	56	23.3%
Occupation	Tour-guide	1	0.4%
	Trader	13	5.4%
	Employer	7	2.9%
	Student	15	6.3%
	Farmer	204	85.0%
Duration of stay	Less than 10 years	48	20.0%
	For the last 10–20 years	26	10.8%
	For the last 20–30 years	21	8.8%
	Since birth	145	60.4%
Benefit from ecotourism	Yes	77	32.1%
	No	163	67.9%
Valid		240	100.0%
Missing		0	
Total		240	
Subpopulation		123[a]	

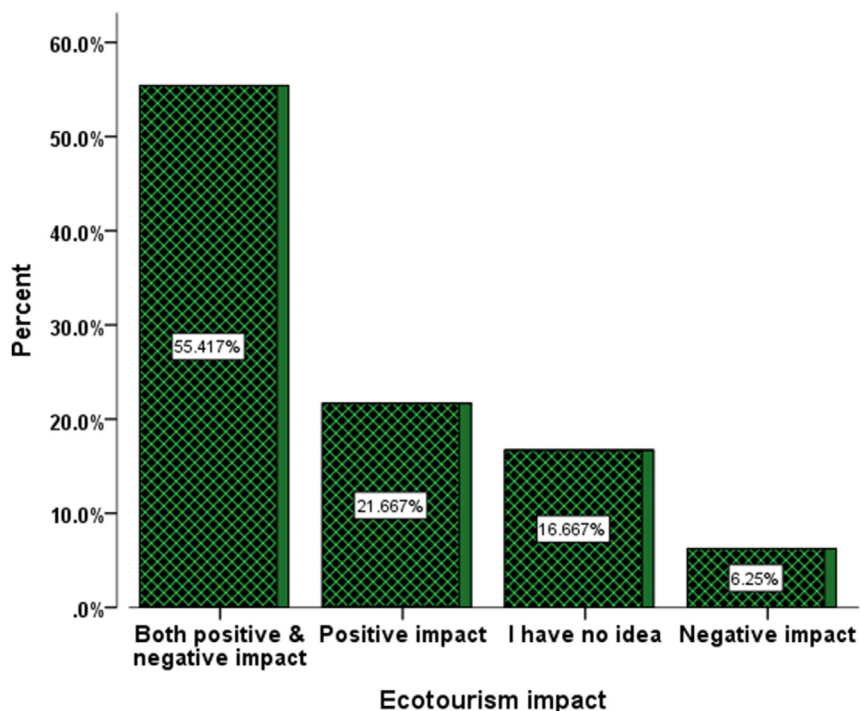[a] The dependent variable has only one value observed in 93 (75.6%) subpopulations.

Figure 3. Respondents perception on the impacts of ecotourism at Lake Wanchi and its surrounding landscapes.

Table 5. Multinomial logistic regression Likelihood Ratio Tests of statistically significant independent variables.

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	385.298	479.276	331.298[a]	.000	0	.
Educational status	418.171	480.823	382.171	50.873	9	.000
Duration of stay	384.025	446.676	348.025	16.726	9	.053
Ecotourism benefit	395.184	478.719	347.184	15.886	3	.001
Ecotourism distance	388.618	472.153	340.618	9.319	3	.025

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

[a] This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

fitting information table also confirmed that the full model statistically significantly predicted the dependent variables better than the null model (with no variables added), Pearson x^2 (24, N = 240) = 93.638, Nagelkerke R^2 = 0.358, p < 0 .001.

Moreover, from the Likelihood Ratio Tests (which shows the overall statistically significant independent variables), statistically significant unique contributions were made by educational status, ecotourism benefit, distance to the center of ecotourism, and partially by the duration of stay in the study area (Table 5). This implies that the removal of these four independent variables from the model would significantly reduce the fit of the model to the data. However, gender and occupation were the variables that do not significantly predict respondents' perception of the impacts of WETA.

3.3.1. The classification table for the multinomial logistic regression

The classification table shows the practical results of using the multinomial logistic regression model (Table 6). For each case, the predicted response category is chosen by selecting the category with the highest model-predicted probability. Of the cases used to create the model 25 of the 60 respondents (41.7%) who "have no idea" about the impacts of ecotourism development were classified correctly. In particular, the model did extremely well at identifying those respondents who reported "both the positive and negative" impacts of ecotourism

Table 6. Classification table of the perception of local communities on the impacts of WETA.

Observed	Predicted				
	Positive impact	Negative impact	Both negative and Positive impact	I have no idea	Percent Correct
Positive impact	**6**	0	34	0	15.0%
Negative impact	0	**1**	9	5	6.7%
Both positive and negative impact	5	0	**109**	11	87.2%
I have no idea	0	0	35	**25**	41.7%
Overall Percentage	4.6%	0.4%	77.9%	17.1%	58.8%

Note: Cells in the diagonal and bold are correct predictions of the model, while cells off the diagonal (not bold) are in correct predictions.

development by classifying 87.2% correctly. The correct predictions were less frequent (15.0%) for those respondents who reported the "positive impacts" of ecotourism development. However, the model showed poor performance in classifying the respondents who reported the "negative impacts" of ecotourism (6.7%). Taking into account only the null model, one would correctly predict 25.0% of the cases, while using the logistic model to make such predictions resulted in 58.8% correct prediction, i.e., the model gets 33.8% more, as compared to the modal category.

3.3.2. The parameter estimates

The parameter estimates table was computed to present the estimated multinomial logistic regression coefficients of the model. As there were four levels of the dependent variable for this study there are three sets of logistic regression model coefficients (three logits) for each independent variable in the parameter estimates table, one for each comparison to the reference category (Table 7). The model treated the responses to the impacts of WETA, "I have no idea" as the reference category. The first set of coefficients are found in the "positive impacts" row (representing the comparison that WETA has positive impacts category to the reference category, I have no idea). The second set of coefficients is found in the "negative impacts" row (representing the comparison that WETA has negative impacts category to the reference category). The third set of coefficients is found in the "both negative and positive impacts" row (this time representing the comparison that WETA has both positive and negative impacts category to the reference category).

Because the parameter estimates are relative to the reference category, the standard interpretation of the multinomial logit is that for a unit change in the independent variable, the logit of outcome relative to the reference category is expected to change by its respective parameter estimate (which is in log-odds units), given the other variables in the model are held constant. Parameters with significant negative coefficients decrease the likelihood of that response category with respect to the reference category, and parameters with positive coefficients increase the likelihood of that response category with respect to the reference category. Since the coefficient does not have a simple interpretation, the exponentiated values of the coefficients or the odds ratio (Table 7) are normally considered for interpreting multinomial logistic regression results.

The odds ratio of a coefficient indicates how the risk of the outcome falling in the comparison group compared to the risk of the outcome falling in the reference group changes with the variable in question. An odds ratio >1 indicates that the risk of the outcome falling in the comparison group relative to the risk of the outcome falling in the referent group increases as the variable increases (i.e., the comparison outcome is more likely). An odds ratio <1 indicates that the risk of the outcome falling in the comparison group relative to the risk of the outcome falling in the referent group decreases as the variable increases (i.e., the reference category outcome is more likely).

3.3.2.1. Positive impacts relative to the reference category (I have no idea). Statistically significant logistic regression coefficients were observed for the respondent's educational status, duration of stay in the study area, and whether they get a benefit from WETA or not (Table 7). The educational status specifically represents the primary level of education (p < 0.001), and secondary level of education (p < 0.001). The multinomial logit for primary education was 4.073 and that of secondary education was 4.267 units higher for those respondents who reported the "positive impacts" of ecotourism relative to those who "have no idea" about the impacts of ecotourism. Given the other variables in the model are held constant, a one-level increase in the educational status of the respondents, the odds ratio (relative risk) of being reporting the "positive impacts" of WETA would be 58.7 and 71.3 times more likely, for respondents with primary education, and secondary education, respectively, as compared to those who "have no idea" about the impacts of WETA. Therefore, at the 0.05 alpha levels,

Table 7. Parameter estimates of the multinomial logistic regression model.

Community Perception toward the impacts of ecotourism[a]	B	Std. Error	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)	
							Lower Bound	Upper Bound
Positive impacts								
Intercept	-3.959	1.378	8.250	1	.004			
[Education = primary]	4.073	1.102	13.653	1	.000	58.704	6.769	509.122
[Education = secondary]	4.267	1.211	12.418	1	.000	71.339	6.646	765.812
[Education = tertiary]	3.931	.000	.	1	.	50.975	50.975	50.975
[Educational = no formal]	0[b]	.	.	0	.	.	.	.
[Duration of stay = < 10 years]	.169	.666	.064	1	.800	1.184	.321	4.363
[Duration of stay = 10–20 years]	.284	.837	.115	1	.735	1.328	.257	6.853
[Duration of stay = 20–30 years]	2.041	.848	5.791	1	.016	7.696	1.460	40.555
[Duration of stay = since birth]	0[b]	.	.	0	.	.	.	.
[Tourism benefit = yes]	2.094	.593	12.451	1	.000	8.116	2.537	25.968
[Tourism benefit = no]	0[b]	.	.	0	.	.	.	.
Distance from ecotourism	-.124	.134	.849	1	.357	.883	.679	1.150
Negative impact								
Intercept	.025	1.067	.001	1	.981			
[Education = primary]	.537	.652	.677	1	.410	1.711	.476	6.142
[Education = secondary]	-16.75	3015.87	.000	1	.996	5.298E-8	.000	.[c]
[Education = tertiary]	.012	.000	.	1	.	1.012	1.012	1.012
[Educational = no formal]	0[b]	.	.	0	.	.	.	.
[Duration of stay = < 10 years]	1.126	.789	2.033	1	.154	3.082	.656	14.483
[Duration of stay = 10–20 years]	-16.73	3935.48	.000	1	.997	5.444E-8	.000	.[c]
[Duration of stay = 20–30 years]	1.440	.896	2.586	1	.108	4.222	.730	24.424
[Duration of stay = since birth]	0[b]	.	.	0	.	.	.	.
[Tourism benefit = yes]	.073	.791	.009	1	.926	1.076	.228	5.065
[Tourism benefit = no]	0[b]	.	.	0	.	.	.	.
Distance from ecotourism	-.292	.156	3.513	1	.061	.747	.551	1.013
Both positive and negative impacts								
Intercept	.580	.711	.666	1	.415			
[Education = primary]	1.775	.421	17.823	1	.000	5.902	2.588	13.456
[Education = secondary]	2.038	.601	11.494	1	.001	7.674	2.363	24.925
[Education = tertiary]	19.071	6105.77	.000	1	.998	191610792.3	.000	.[c]
[Educational = no formal]	0[b]	.	.	0	.	.	.	.
[Duration of stay = < 10 years]	.383	.487	.618	1	.432	1.467	.565	3.811
[Duration of stay = 10–20 years]	.586	.571	1.051	1	.305	1.796	.586	5.505
[Duration of stay = 20–30 years]	.362	.734	.243	1	.622	1.436	.341	6.052
[Duration of stay = since birth]	0[b]	.	.	0	.	.	.	.
[Tourism benefit = yes]	1.204	.476	6.402	1	.011	3.333	1.312	8.467
[Tourism benefit = no]	0[b]	.	.	0	.	.	.	.
Distance from ecotourism	-.265	.102	6.799	1	.009	.767	.628	.936

[a] The reference category is: I have no idea.

[b] This parameter is set to zero because it is redundant.

[c] Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

the null hypothesis was rejected and concluded that at least one of the regression coefficient has been found to be statistically different from zero for the educational status of the respondents with respect to the "positive impacts" of the ecotourism category relative to the reference category, when the other variables in the model are held constant.

Although the addition of the duration of stay in the study area did only partially significantly improved the model compared to the null model, the logistic regression coefficient for the duration of stay in the study area was statistically significant (p < 0.05) representing those respondents who have to reside for 20–30 years being quite knowledgeable (Table 7). The multinomial logit for the 20–30 years duration of stay in the study area is 2.04 units higher for those respondents reported the "positive impacts" of WETA relative to those who "have no idea" about the impacts of WETA. When the other variables in the model are held constant, the odds ratio for a one year increase for the 20–30 years duration of stay in the study area would be expected to increase by a

factor of 7.70 for those respondents reported the "positive impacts" of WETA relative to those who reported "I have no idea" about the impacts of WETA. Given the 0.05 alpha level, the null hypothesis was rejected and concluded that at least one of the regression coefficient has been found to be statistically different from zero for the respondent's duration of stay in the study area with respect to the "positive impacts" of WETA category, relative to the "I have no idea" category, given that the other variables in the model are held constant.

The estimated logistic regression coefficients of ecotourism benefit are also highly significant (p < 0.001) representing those respondents who are benefiting from WETA. The multinomial logit for the respondents who reported the benefit from WETA was nearly doubled (2.1 units higher) to report the "positive impacts" of WETA relative to those who "have no idea" about the impacts of WETA, given the other variables in the model are held constant. A one-unit increase in a benefit for those respondents who reported the benefit from the ecotourism development,

the relative risk of being reporting the "positive impacts" of WETA would be 8.12 times more likely as compared to those who "have no idea" about the impacts of WETA. In general, given the 0.05 alpha level and the other variables in the model are held constant, the null hypothesis was rejected and concluded that at least one of the regression coefficient has been found to be statistically different from zero for ecotourism benefit with respect to the "positive impacts" of ecotourism category relative to the "I have no idea" category.

3.3.2.2. Both positive and negative impacts relative to the reference category. Statistically significant logistic regression coefficients were detected for the respondent's educational status, ecotourism benefit, and home distance from the center of WETA. The educational status precisely represents the primary level of education ($p < 0.001$), and secondary level of education ($p < 0.01$). The multinomial logit for primary education and secondary education was 1.78 and 2.04 units higher, respectively, for those respondents who reported "both the positive and negative" impacts of WETA relative to those who "have no idea" about the impacts of WETA. Given the other variables in the model are held constant, the odds ratio (relative risk) for a one-level increase for primary education and secondary education would be expected to increase by a factor of 5.9 and 7.67, respectively, for respondents to report "both the positive and negative impacts" of WETA relative to report "I have no idea" about the impacts of WETA. Given the 0.05 alpha level, the null hypothesis was rejected and concluded that at least one of the regression coefficient has been found to be statistically different from zero for the educational status of the respondents with respect to "both the positive and negative" impacts of the WETA category relative to the "I have no idea" category, given that the other variables in the model are held constant.

When the other variables in the model are held constant, the estimated logistic regression coefficients of ecotourism benefit representing those respondents who are getting benefit from WETA was statistically significant ($p < 0.05$). The multinomial logit for the respondents who reported the benefit from WETA was 1.2 units higher for reporting "both the positive and negative" impacts of WETA relative to those respondents who "have no idea" about the impacts of ecotourism. Given the other variables in the model are held constant, the odds ratio for one unit of increase in benefit for those respondents who reported they are getting benefit from WETA would be expected to increase by a factor of 3.33 to report "both the positive and negative" impacts of WETA relative to those who "have no idea" about the impacts of WETA. Generally, at the 0.05 alpha level, the null hypothesis was rejected and concluded that at least one of the regression coefficient has been found to be statistically different from zero for ecotourism benefit with respect to "both the positive and negative" impacts of the WETA category, relative to the "I have no idea" category, given that the other variables in the model are held constant.

Similarly, the estimated logistic regression coefficients of ecotourism distance were statistically significant ($p < 0.01$) representing respondents' home distance from the center of WETA attraction. The multinomial logit for the respondent's home distance from the center of WETA was 0.265 units lower for those respondents who reported "both the positive and negative" impacts of WETA relative to those who "have no idea" about the impacts of WETA. Stated differently, respondents who are residing near to WETA attraction center are more likely to report "both the positive and negative impacts" of ecotourism as compared to those who "have no idea" about the impacts of WETA. When the other variables in the model are held constant, a 0.5 km increase in home distance of the respondents, the relative risk of being reporting "both the positive and negative" impacts of WETA would be 0.77 times less likely compared to those respondents who "have no idea" about the impacts of WETA. Given the 0.05 alpha level, the null hypothesis was rejected and concluded that at least one of the regression coefficient has been found to be statistically different from zero for the respondents home distance from the center of WETA attraction with respect to the "both positive and

negative" impacts of ecotourism category, relative to "I have no idea category", given that the other variables in the model are held constant. However, no statistically significant logistic regression coefficients were reported toward the "negative impacts" of WETA with respect to the "I have no idea" about the impact of WETA.

4. Discussion

Ecotourism schemes planned and implemented according to the principles of ecological sustainability, community participation, economic and socio-cultural security of the host community will have a net positive contribution to the well-being of the society while satisfying the needs and aspirations of the eco-tourists (Christ et al., 2003). The promotion of such a socio-culturally and environmentally sound ecotourism, especially in areas of significant natural endowments like that of Lake Wanchi and its adjacent landscapes, offers many opportunities in biodiversity conservation while realizing sustainable local development strategies. However, many obstacles prevent the local communities and other relevant ecotourism stakeholders from actually attaining such practical ecotourism development schemes. We investigated the local community's perception toward the impacts of the Wanchi ecotourism Association (WETA) at the biologically diverse, ecologically fragile, and socio-politically marginalized landscape in the central highlands of Ethiopia. Generally, there were evidences for the high resident's support for ecotourism, while there was less community participation and benefit from the undergoing ecotourism development. These findings and their implications for landscape management, biodiversity conservation, and local livelihood improvements were discussed in relation to other studies elsewhere.

The local communities in Lake Wanchi and its surrounding landscapes were well aware of the "*pros and cons*" of ecotourism development and were highly supportive of the establishment of WETA, where, they express their positive attitude to support the undergoing ecotourism activities at the study landscape (see Table 3). Nevertheless, the study indicated that a smaller proportion of the residents were involved and economically benefited from the revenues generated and services provided by WETA. The focus group discussants and key informants remarked that these differences in ecotourism benefit formed two different community groups, that is, the economically, socially, and politically marginalized (those who were alienated from the ecotourism development) and the empowered (those who benefited from the ecotourism developments). Similarly, a study by Goodwin (2002) in different National Parks also specified that even though ecotourism presents additional income and employment opportunities, rural populations remain largely marginalized from ecotourism-related developments. For instance, 99% of the revenues generated from ecotourism in Komodo national park (Indonesia) goes to the nearby town residents, and not to those residents living within the park who were the most underprivileged by restrictions of resource use within the park and who lack the resources and opportunity to develop ecotourism facilities because of park restrictions (Goodwin, 2002). Furthermore, Kiss (2004) specified that usually ecotourism projects generate modest cash benefits, and these are frequently grabbed by a relatively small proportion of the community.

This study also showed that the majority of the residents of Lake Wanchi and its adjacent landscapes were not members of WETA, yet, a larger proportion of the community showed their willingness to join WETA. This could be justified by the fact that the landholding size in the study landscape is not sufficient to support the livelihood of the households (Table 2). Besides, due to the steep slope and highly fragile nature of the landscape, some rural livelihood activities such as agriculture are not suitable for the landscape. Thus, the desire to become a member of WETA could be what is expected from such rural communities with relatively disadvantaged backgrounds to secure their family livelihoods. Likewise, Goodwin (2002) stated that tourists are affluent customers with cash to expend; it would be amazing if large numbers of people in

marginalized rural communities were not interested in finding a means of securing some of their disposable income.

Biodiversity conservation, employment opportunities, income generation from ecotourism activities, exemption of land tenure taxes, and collective benefits such as infrastructure improvements and public facilities were some of the limited benefits provided by WETA to the local residents. Studies also indicated that ecotourism offers many opportunities such as employment, job-creation, income-generation, and alternative means of livelihoods to those that may result in the destruction or overuse of natural resources (IUCN, 2012; Eshetu, 2014). Therefore, helping communities earn income from ecotourism projects provides both an incentive for conservation and an economic alternative to destructive activities (Kiss, 2004). Regarding the collective benefits, some scholars who studied residents perception toward tourism impacts also reported the resident's supportive attitude toward the contribution of tourism for improvements in a set of community infrastructure and public facilities (Andereck and Vogt, 2000; Andereck et al., 2005; Wang and Pfister, 2008). The findings of this study also indicated that there was a conflict of interests over the use of natural resources among the different stakeholders in Lake Wanchi and its adjacent landscapes. The focus group discussants stated that the conflicts are mainly of between WETA and non-WETA members, between WETA and investors, between the Orthodox Church and WETA, and between Orthodox Church and investors". The key informants also added that there are also conflicts of interest among the WETA members over the arrangements of the ecotourism service delivery system. This result was consistent with the knowledge that tourism induces conflict in the host community (Jafari, 2001). Previous studies in the study landscape also reported the presence of conflicts of interest among the different stakeholders over the use of natural resources (Ogato et al., 2014; Ketema, 2015a; Angessa et al., 2019). Conflicts of interest over the use of natural resource in the local context refers any sort of disputes over the use of local natural resources, particularly of the use of communal properties such as land (for grazing and cultivation), forests (for timber and fuel wood collection), and spring water (for drinking purpose).

With regard to ecotourism impacts, the findings indicated that the local residents were conscious of ecotourism development and recognized both the positive and negative impacts of WETA on the local environment, economy, and socio-cultural aspects of the local community (see Figure 3). Amazingly, a similar result was reported by Andereck et al. (2005) in his study on residents' perceptions of community tourism impacts in Arizona, USA. The economic and environmental benefits gained from WETA could be the reasons for the local community to develop a positive perception towards WETA's impacts (see also Almeida et al., 2015). In addition to the historical and cultural features and natural landscape experiences, there are additional products that can be sold by the local people supporting them to get cash income for family subsistence and diversify their livelihoods (Goodwin, 2002). The slight negative impacts perceived by the residents may be associated with the conflicts of interest among the communities and socio-cultural aspects that are affecting the traditions and social associations of the resident communities. Likewise, a study by (Doğan, 1989) identified that tourism development has negative impacts on the socio-cultural aspects of the local community such as habits, daily routines, social lives, community relationships, beliefs, and values. The key informants also added that there are considerable changes in land ownership taking place in Lake Wanchi landscape, with non-local land grabbers buying lakeshore wetlands for tourism lodges that raise the price of land and other consumable goods in the locality (see also Saveriades, 2000). However, the residents of Lake Wanchi and its surrounding landscapes prefer to support ecotourism, putting its benefits ahead of its costs (see also Almeida et al., 2015). Here, it was stated that the local resident's attitude towards tourism development may not be determined only by supposed benefits and costs but also influenced by several moderating factors (Lankford, 1994).

The study findings indicated that residents' perceptions towards the impacts of WETA were significantly differed based on the socio-demographic characteristics. The hypothesis that residents with a higher educational level may be more supportive of ecotourism development and are more likely to report the positive impacts of ecotourism than those with a lower education level was highly confirmed. The findings indicated that respondents with a higher educational level were more motivated and supportive of WETA. This could be attributed to the fact that individuals with higher educational levels have more opportunities to learn and understand the potential advantages and disadvantages of ecotourism that can accrue to a community, than those respondents with lower/no formal education. This positive correlation of high educational level with the support for WETA was consistent with studies elsewhere (Teye et al., 2002; Andriotis and Vaughan, 2003; Bi-xia and Zhen-mian, 2017). Generally, it was confirmed that as the educational level of the respondents increases, it is expected that respondents are more likely to develop a positive attitude towards ecotourism development.

The hypothesis that respondent's home distance from the center of ecotourism attraction may influence residents' perception towards the impacts of ecotourism development was partially supported by this study result. Respondents who live relatively at a closer distance to WETA's attraction center were more conscious about the impacts of ecotourism in that they perceive "both the positive and negative" impacts of WETA than those who live relatively at a further distance from the attraction center. Their closeness to the center of WETA usually predisposes them to economically dependent on ecotourism and, hence, they develop more positive attitudes towards WETA. At the same time, they are also more exposed to the negative influences of WETA that drive them to perceive ecotourism negatively. More generally, as the resident's home distance from the center of WETA's attraction increases, it is expected that residents have less or no idea about the impacts of WETA. This result is consistent with an earlier study, which stated residents residing farther from the center of the tourism zone, were less concerned about the impacts of tourism development (Haley et al., 2005).

Partial confirmation was obtained regarding the hypothesis of the resident duration of stay in the study landscape. Statistically significant logistic regression coefficients for the duration of stay in the study area were observed for the "positive impacts" of the WETA category relative to the "reference category" for those respondents who resided for 20–30 years. More generally, as the respondent's duration of stay in the study landscape increases, it is an indication that respondents are more likely to support the existence of WETA. Likewise, a study by Davis et al. (1988) indicated that long-term residents showed a more supportive attitude toward tourism development than those newly settled in the community. The hypothesis that residents receiving economic benefits from ecotourism development will have a more supportive attitude toward ecotourism development and are more likely to report the positive impacts of ecotourism development than those receiving no economic benefits from the ecotourism venture was largely confirmed. The findings specified that those respondents who benefited from WETA were more inclined to support WETA than those who were not benefited. Similarly, a study by Wang et al. (2006) found that personal benefit was found to be closely and positively related to residents' attitudes toward tourism development and tourism impacts. In general, it can be remarked that in the study area as the respondent's economic benefits increase from the ecotourism development undertakings, it is expected that they are more likely to develop a positive attitude towards WETA and become less concerned with the negative impacts of WETA.

5. Conclusion and recommendations

Ecotourism development that is not properly planned, effectively implemented, and community-centered in terms of management, decision-making, and benefit-sharing mechanisms, may create downturns to the sustainability of the local environment and to the living conditions of local residents. Studies of local resident's perception of the impacts of ecotourism are useful in setting up strategies that seek to minimize the

negative environmental and socio-cultural footprints of ecotourism and enhance its positive contribution. It offers also many opportunities in ecological conservation, and landscape maintenance while realizing sustainable local development strategies. Indeed, this study investigated the local community's perception toward ecotourism impacts at Lake Wanchi and its adjacent landscapes, central highlands of Ethiopia. In the study area, there were enough evidence to conclude there was a positive relationship between supports for ecotourism development and perceptions of its positive impacts by the local community. Nonetheless, it was detected that there was limited community participation, less economic benefit, and inequitable sharing of the revenues generated from the ecotourism development in the study area. However, in order for ecotourism to be sustainable and contribute to maintaining the landscape and improving local livelihoods more of the economic benefits of ecotourism should be allocated to the local people by empowering them to benefit from the income generated and economic diversification.

A systematic analysis of the perception of local residents on ecotourism impacts using socio-demographic factors as predictors of their perception may help planners, policy, and local decision-makers to identify real concerns and requirements of individuals in order for appropriate policies and decisions to take place. In this study, multinomial logistic regression was used to assess whether community perceptions and attitudes towards ecotourism development impacts significantly differed based on the socio-demographic characteristics of the respondents. Here, the variables of educational level, duration of stay in the study landscape, ecotourism benefit (whether receiving a benefit or not from WETA), and place of residence from WETA attraction center have a significant association with respondents' perception toward the impacts of WETA development. Moreover, the study was consistent with the social exchange theory in that those who received benefits from WETA viewed ecotourism as a development preference, and so are more likely to have positive attitudes concerning ecotourism.

To ensure the success of WETA and maintain the Lake Wanchi and its adjacent landscapes to play an important role in keeping the conditions of the natural and cultural landscape, conservation of biodiversity, and improving of local livelihoods, while fulfilling the requirements of ecotourism, the study suggest the following considerations: (1) improving the participation of the local communities and allow better access to ecotourism resources. (2) Resolving the conflicts of interest of the different stakeholders, and establishing strong and cooperative partnerships among the different stakeholders and decision-makers involved in the ecotourism development. (3) Scaling up of WETA to a more sustainable form of ecotourism so as to enhance community livelihoods and ecological resilience. (4) Regional or local decision-makers must use evidence-based decisions and devise appropriate policies, strategies, and investments that could balance the land-use trade-offs between environmental conservation and satisfying immediate human needs.

5.1. Limitations of this research

In selecting sample households our target population was not the total population, rather the total households in the study area. Because of the absence of complete information on the total population and resource constraints, we decided our target population to be the total households of the study area. This has implications on the validity, to be specific external validity or generalizability of our results, i.e., the findings from the survey may not be generalized with confidence to the population of interest.

Declarations

Author contribution statement

Abebe Tufa Angessa: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Brook Lemma and Kumelachew Yeshitela: Conceived and designed the experiments.

Mahammed Endrias: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data.

Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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