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Livelihood strategies and diversification in western tip pastoral areas of Ethiopia

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Abstract

The purpose of this study was to identify the livelihood strategies and diversification status in the western tip of Ethiopia, Lare woreda. A mixed research method of sequential transformative strategy was used. Surveys and key informant interviews (KII) were sources of data. A survey of 133 sample households, and four KIIs were employed. Diversification status was measured by Simpson diversity index (SDI) using SPSS 20. The result showed that 33.8, 40.6 and 25.6% of the households were poor, less poor and better-off, respectively. More than half of the households (53.4%) pursued three activities as a means of income and food. Crop and animal production were practised by almost all of the sample households. The distribution of households with livelihood categories showed on-farm (10.5%), on-farm and non-farm (15.8%), on-farm and off-farm (12%) and on-farm, non-farm and off-farm (61.7%). The Simpson diversity index revealed that 15.04, 30.07 and 54.89% of the households were less, medium and high diversifiers, respectively. The mean diversification score of the households was 0.5775, and the diversification status was a lot better as compared to other study results within and outside Ethiopia.

Keywords: Livelihood strategies, Wealth diversification

Introduction

Livelihood strategies are the combination of activities that people choose to undertake in order to achieve their livelihood goals (UNCDF 2005). A livelihood comprises the capabilities, which comprised of assets (including both material and social resources) and activities used by a household for means of living (ACF International 2010).

The livelihood strategy would address both current and future causes of food insecurity through increasing consumption and investment while simultaneously protecting assets, the environment and vulnerability (Penney 2008). Long-term strategies must involve diversification away from rainfall-dependent livelihoods (Devereux2000).

Diversification is a dynamic process in which people combine activities to meet their various needs at different times (DFID 2009). Increased and diversified agricultural production and non-agricultural production would lead to sustainable improved food security (Penney 2008).

Protecting and promoting livelihoods requires a more holistic approach that addresses the causes of vulnerability to food insecurity as well as the consequences. In doing so, it needs to pay attention to what people are doing for themselves (World Food Program 2010).

The objectives of this study were to identify the livelihood strategies and to estimate the level of the diversification among households in Lare woreda, a western tip of Ethiopia.

Study area

Gambella is one of the nine regional states that constitute the Federal Democratic Republic of Ethiopia. It is located on the western tip of the country and has common borders with Sudan in the west, south and north; the regional state of the Southern Nations, Nationalities, and Peoples (SNNP) in the south and east and the regional state of Oromiya in the north and east. Gambella is lying between the Baro and Akobo rivers. It has an area of 25,802.01 km^2. In 2007, the regional state had a total population of 306,916. Its capital city is Gambella town (CSA 2008).

Nuer is one of the three zones of Gambella region. This zone is bordered by South Sudan on the south,

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west and north; by Majeneg Zone on the east and by Anuak Zone on the south to east.

This study was conducted in Lare woreda of Nuer Zone. It is found 89 km far from the regional capital Gambella city. According to DRMFSS (2014), the Woreda had a population of 32,241.

Based on the 2007 census, the Nuers are the majority group, representing 36.7% of the population of Gambella region of Ethiopia (CSA 2008). Gambella is found in tropical climate zone. The average annual temperature in Gambella is 27.6 °C. The average annual rainfall is 1,148 mm (Climate-Data.Org 2016).

Nuer are a large pastoralist people who live both in the current South Sudan and Ethiopia (Abbink 1997). Nuer groups occupy the central basin itself, extending eastwards along the Sobat and Baro rivers all the way into southwestern Ethiopia (Hutchinson 1962). Because of their settlement, they are highly exposed to flood. During rainy seasons, they become flooded and the people migrate to the highlands with their cattle until the riverbanks recede (Abraham 2002).

The Nuer people are largely livestock dependent and are mostly found in Akobo, Lare, Jikawo, Makuey, Wanthowa and parts of Itang woredas (Figure 1) (Abraham 2002; Gambella Regional State 2001; Samson 2013). Unlike pastoralists in the southern and eastern parts of Ethiopia, the Nuer does not possess goats, sheep or camels. They practise an oscillating form of movement of their herds related to the rise and fall of the flooding of the main rivers (Gambella Regional State 2001).

At the rainy season from June to November, the rivers, mainly Baro River, overflow their banks and flood wide expanses of the plains. By analyzing the level of the river, the Nuer evacuates with their livestock and settles at permanent villages on the highest land ('Lare') and grazes the livestock on these upland plains. In the month of November, they move back to riverside and settle in dry season camps ('Kurthuony') and spent from December to May (Gambella Regional State 2001).

The Nuer people are in long-term conflict with neighbour societies. Geographical set-up of the area, political conditions and socio-economic marginalization contribute for the conflicts of Gambella region and Nuer people (Mossa 2014). Generally, four important factors are responsible for the escalating ethnic conflict in Gambella region. These include control over scarce natural resources such as water and grazing land, the question of majority population in the region and what language should be taught in school and a general feeling or apprehension among Anyuaa that they are being dominated by the pastoralist Nuers who enter Anyuaa territory in search of grazing land and water (Abraham 2002).

Methods

Mixed research method sequential transformative strategy was used for this study. This method is characterized by collection and analysis of either quantitative or qualitative data first and the results integrated with the interpretation phase. In order to undertake this study, the researcher employed both quantitative and qualitative data which used survey and key informant interview (KII) as a tool of data collection. The study was conducted using household-based cross-sectional study design.

Data Collection

Survey and key informant interview were used as a source of data. Semi-structured questionnaire was developed for the survey. It was designed in a way to assess the livelihood strategies and food security situation. Data collectors used a random sampling technique to select the 133 sample households to be interviewed. Also, four key informant interviews were conducted among representatives of the kebeles.

Data Analysis

Among the various indices available, Simpson diversity index (SDI) was selected and used to measure livelihood diversification. SDI is simple, robust and widely applicable (Khatun and Roy 2012). The Simpson index of diversity was calculated as

$$\text{SDI} = 1 - \sum_{1}^{n} p_1^2$$

where P_i as the proportion of income coming from source i. The value of SDI ranges from 0 to 1.

The Simpson index of diversity is affected by the number of income sources and the proportion of income from each source (balance). The more uniformly distributed is the income from each source, the SDI approaches to 1 (Sahal and Baha 2010). The diversification status of the households was classified based on the rating given by Sahal and Baha (2010) low (0 to 0.38), medium (0.39 to 0.63) and high (above 0.63).

Results and discussion

Wealth status

The result of key informant interview (KII) had shown that it is very difficult to set criteria and to identify the wealth status of Nuer people. This is because of a very strong culture of cooperation and support among Nuer people. Thus, it seems everybody is within the same level of wealth status and evaluation of wealth needs careful analysis.

Accordingly, key informant interviews conducted have come up with a lot similar criteria for wealth breakdown.
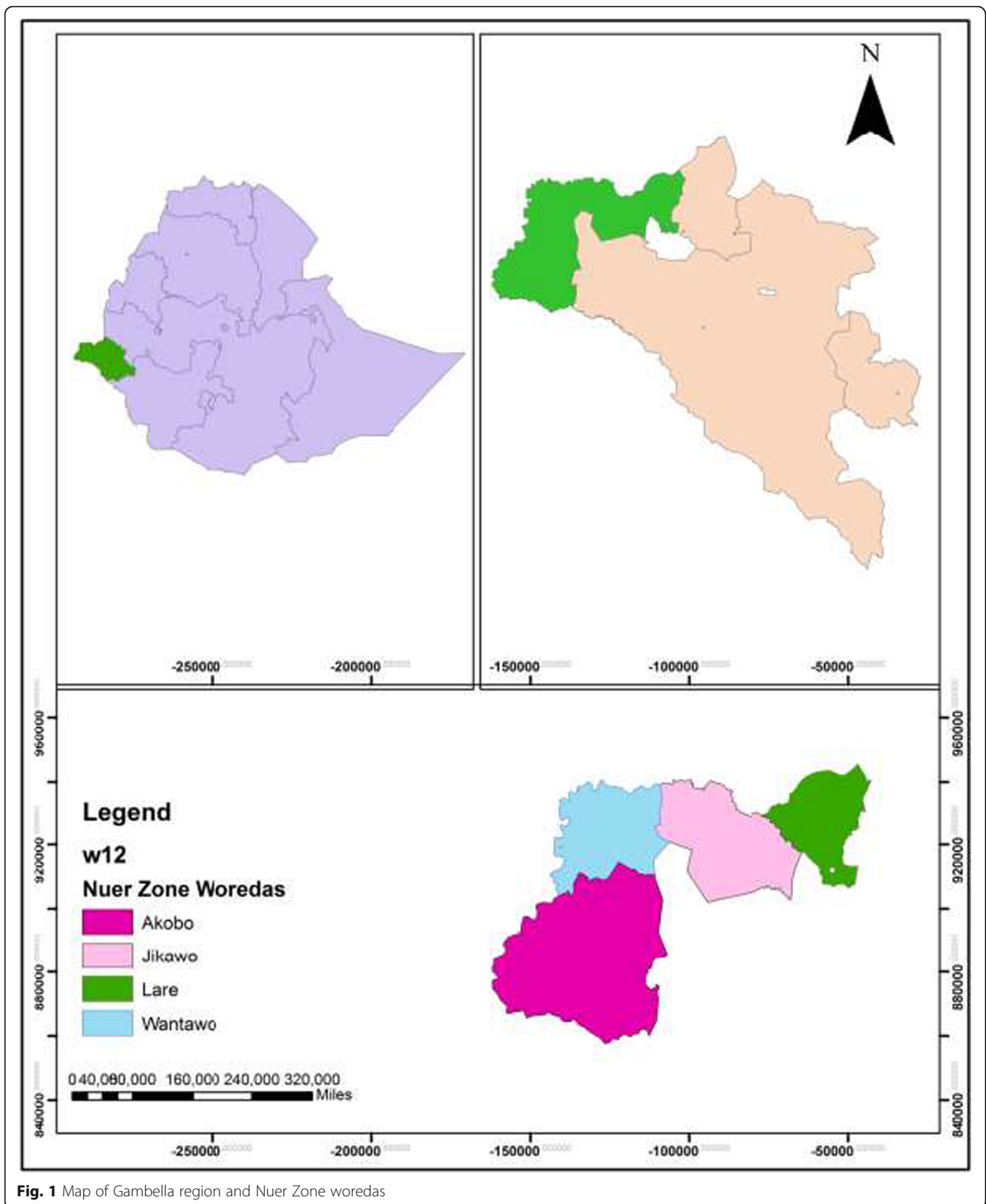
Fig. 1 Map of Gambella region and Nuer Zone woredas

The basic characteristics for the breakdown were cattle possession, crop production and participation in the cattle trade.

Households with a possession of 50 cattle or 100 sheep and goat and crop production of 15 quintals or an active participation in cattle trade were the criteria for better

off households. While a possession of 10 up to 50 cattle and a production of 10 up to 15 quintals was set for less poor/middle wealth status households. In addition, cattle less than 10 and a crop production of less than 10 quintals were requirements for poor wealth category.

Based on the criteria stated, the wealth classification was made by grouping the sample households into poor, less poor and better-off wealth groups. The poor group constitutes 45 households (33.8%). The less poor and better-off include 54 (40.6%) and 34 (25.6%) households, respectively.

Description of sample households

From the total sample respondent, 7.5% (10 households) were female headed and 92.5% (123 households) were male headed. The family size of sample households was found a minimum of 3 and a maximum of 12. The average family size of the sample households was 6.28 with a standard deviation of 1.69.

The ratio of persons in the dependent age groups to those of the working age groups provides a useful approximation to economic dependency burden. The minimum dependency ratio of the sample households was 0 while the maximum was found 4. The average dependency ratio of the sample household family members was 1.06 (*i.e.*, for each 100 people in the productive age group, there are about 106 young and old dependents to be supported).

The average age of the sample household heads was 44.26 years, and the mean age of the household members was 21.25 years. Average age and education of the sample household heads were 44.26 and 1.8 years, respectively. The household members have scored the mean age of 21.25 years and mean education of 3.89 years.

The *t* test value indicated that wealth status has a statistically significant relationship with age of the head, the average age of the household members and average dependency ratio at less than 1% probability level. Also, it has shown a significant relationship with the average

education of household members at less than 10% probability level (Table 1).

Livelihood strategies of the households

The study area Lare woreda is found in the Gambella agro-pastoral (GAG) and Gambella mixed agriculture (GMA) livelihood zone which is located in the western part of the country (MoARD 2010). This agro-pastoral area is dependent on livestock and crop production as well as fishing. The major crops grown both for consumption and sale are maize and sorghum. Tobacco is also cultivated as a cash crop. Cattle, goats and sheep are the main livestock reared in this zone.

For both of the zones, livestock and crop production are the main livelihood strategies. The difference lies in the patterns of implementation. Agro-pastoral population moves from area to area in search of pasture while the mixed agriculture population leaves on a permanent settlement. According to the 2007 survey, the number of GAG-dependent population (23,666) was a lot higher than that of GMA (1,146) (MoARD 2010).

The key informant interview participants were asked to identify the best livelihood strategies. They have indicated the most important livelihood strategies with their order of importance as livestock production, crop production, fishery and trading.
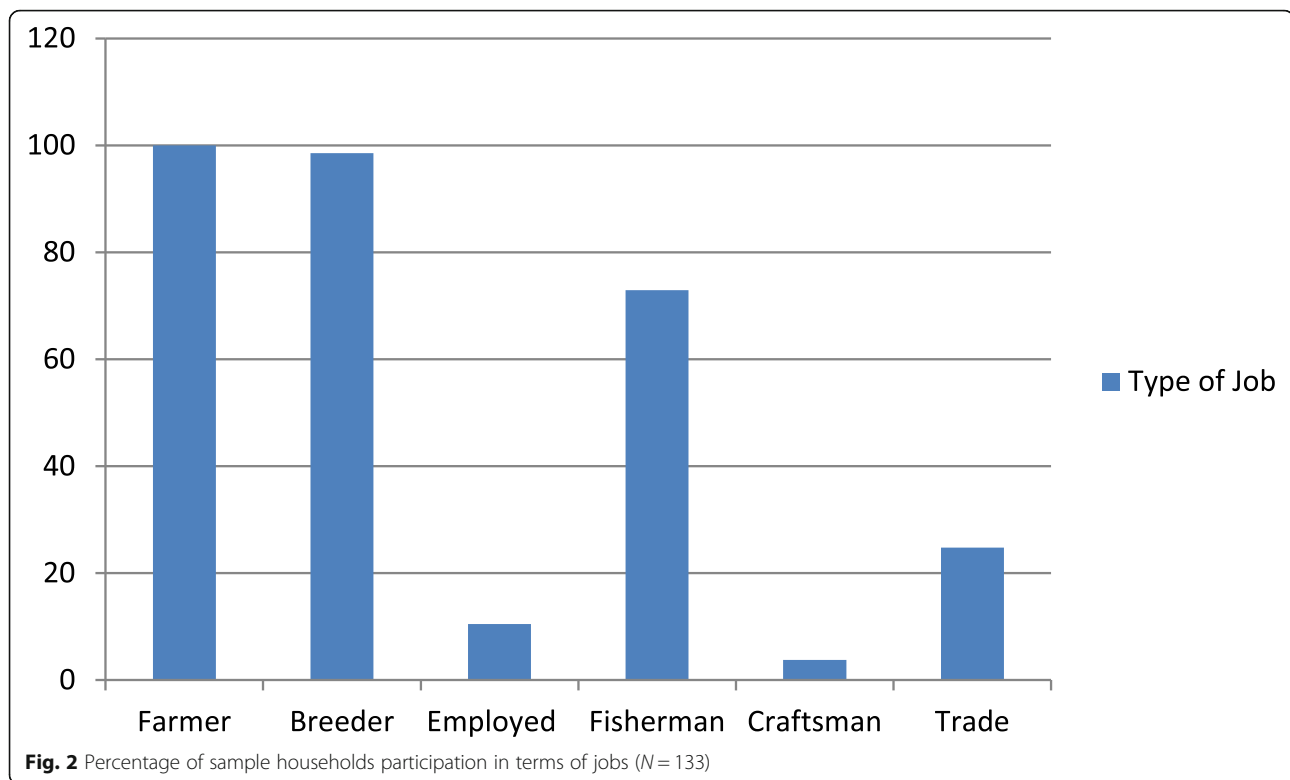
Livelihood strategies in terms of type of jobs

Also, livelihood strategies were identified in terms of jobs. Six different types of jobs were implemented by households. Farming and breeding were the primary jobs for almost all of sample households.

The fishery was the third most existent job with 72.9% of engagement by sample households. Lare woreda is adjacent to the Baro River which is very rich in fish resource. This creates a good opportunity for them to practise fishing as a source of food and income. In addition, trading, employment and craftsman were practised in the percentage of 24.8, 10.5 and 3.8, respectively (Figure 2).

Table 1 Demographic characteristics of sample households (N = 133)

Variable	Wealth status			Total average	t value
	Poor (N = 45)	Less poor (N = 54)	Better-off (N = 34)		
Age of the head	45.27	40.23	49.32	44.26	2.674***
Average age of the HH members	20.52	19.76	24.58	21.25	3.384***
Adult equivalent	4.95	4.92	5.16	4.99	0.973
Educational level of head	1.33	2.43	1.41	1.8	−0.636
Average education of HH members	3.71	3.54	4.73	3.89	1.852*
Household size	6.29	6.31	6.21	6.28	−0.287
Dependency ratio	1.18	1.19	0.72	1.06	−3.11***

***,*Significant at less than 1 and 10% probability level respectively

Fig. 2 Percentage of sample households participation in terms of jobs ($N = 133$)

The other expression of livelihood strategies was in terms of the number of jobs practised by the household members. The minimum number of jobs practised was two and the maximum was five. More than half of the households covering 53.4% pursued three jobs as a means of income and food. And only 4.5% practise five jobs.

Income share of livelihood strategies

Income gained from livestock production, trade of animals and crops and crop production were the three major income sources for the households. They covered 45.02, 14.29 and 12.72% of the total household's income, respectively. The mean annual income of households was 10876.33 Birr, and the mean annual income gained from the sale of animals and their products was 4896.31 Birr (Table 2).

One interesting experience found from the FGDs conducted was the unique type of *Iquib*. Iquib is a traditional saving mechanism implemented by people of Ethiopia in terms of cash or different commodity items. The women of the study area have Iquib of milk production. They gather their production and gave to one member of the women, and she took the milk to the nearby city or regional capital to sell and get income for the household.

The livelihood strategies of the households can be categorized under livelihood categories. These categories

on-farm, off-farm and non-farm livelihood strategies were practised by households with different proportion.

Strategies included in on-farm livelihood categories were crop production and livestock production. Off-farm strategies included agricultural activities employed out of the farmland of the households like forest products and fishery. In addition, activities of employment, trade of animals and crop, trade of food and drink, sell of handcraft products, income from carpentry, remittance and gift were taken as non-farm.

From the total sample households, only 14 (10.5%) have practised off-farm livelihood strategies only. The other 21 (15.8%) households employed a combination of on-farm and non-farm livelihood strategies. In addition, 16 (12%) of households depend on both on-farm and off-farm livelihood strategies. Finally, most of the sample households based on the combination of on-farm, off-farm and non-farm. Around 82 (61.7%) relied on the outcome of these three livelihood strategies.

Crop production

Crop production is the major livelihood strategy in the study area, and it was practised by all of the sample households. The key informant interview results showed that the primary crop types cultivated in the area were maize, sorghum and tobacco in descending order of importance. The type of production was traditional, and they use sticks and small equipment to prepare their

Table 2 Income of the household from different sources in *Birr* (N = 133)

Income source	Wealth status			Mean income of household
	Poor (N = 45)	Less poor (N = 54)	Better-off (N = 34)	
Sell of crop and agricultural product	801.78	1,573.52	1,852.94	1,383.83
Sell of animal's product	508	1,240.37	1,517.94	1,063.53
Sell of cow, sheep, goat and hen	2,530.44	4,246.48	4,899.41	3,832.78
Employment/salary, in the form of daily or monthly	330.44	505.06	176.47	361.98
Trade of animals and crop	1,703.78	738.89	2,650.59	1,554.06
Trade of food and drink	638.44	872.22	1,252.94	890.45
Handicraft products	14.44	0	10.29	7.52
Carpentry	3.33	1.85	33.82	10.53
Service delivery	15.33	8.33	12.35	11.73
Fishery	636.67	980.93	794.62	816.82
Forest products	381.22	567.59	608.85	515.08
Remittance and gift	570.33	354.63	356.18	428.01
Total mean income	8,134.22	11,108.41	14,166.41	10,876.33

1USD = 23.09 Birr

agricultural land. The households reported a mean agricultural land possession of 1.98 ha, and they had cultivated on 1.55 ha of it. The mean crop production stock of the households was 815 kg, but more than half of this production (510.75 kg) was from one crop type, maize.

The amount of crop production stock was a lot less as compared to an average productive capacity of a certain agricultural land and the results found from different studies done by various scholars (Table 3). Arega et al. (2013) reported a mean crop production of 10,300 kg from 0.88 ha of land.

Livestock production

Livestock is a lot related to the life of the Nuer people. The nature of their settlement area is favourable for livestock production. The FGD results showed that livestock outputs take the major part of daily food basket of the people. Selling of livestock and their products (like milk and egg) was the major source of income for the households. In addition, livestock especially cattle have a great role in determining wealth status and social interactions of the community. For instance, cattle were used as a gift in times of marriage.

Table 4 shows the sample households possessed a mean livestock of 30.92 tropical livestock units (TLU). The poor, medium and rich households possess 14.02, 29.41 and 55.7 TLU of mean livestock.

Even though most of the study area population categorized under Gambella agro-pastoral (GAG) livelihood zone, the crop and livestock production characteristics of the study area fall under the pastoral and horticultural societies. Pastoral societies are those whose livelihood is

Table 3 Crop production of households by wealth group in kilogramme (N = 133)

Crop type	Wealth status			Production of HH per crop	Total production
	Poor	Less poor	Better-off		
Sorghum	129.56	125.37	129.12	127.74	16,990
Maize	482.89	532.41	513.24	510.75	67,930
Potato	27.73	34.67	45.44	35.08	4,665
Onion	25.87	24.41	28.47	25.94	3,450
Vegetables	34.67	110.20	51.24	69.57	9,253
Dry pepper	4.49	2.37	4.47	3.62	482
Tobacco	16.16	16.70	14.62	15.98	2,126
Beans	20.78	23.19	25.47	22.95	3,053
Total	743.24	871.17	813.82	813.23	108,209
Agricultural land cultivated	1.47	1.51	1.71	1.55	
t test	1.721**				

**Significant at less than 5% probability level

Table 4 Livestock possession of the households (*N* = 133)

Livestock	Wealth status			Mean livestock type per household	Total livestock
	Poor	Less Poor	Better-off		
Cow	7.98	16.67	36.47	18.79	2,499
Ox	1.47	3.48	5.38	3.29	437
Heifer and bull	1.84	5.50	8.09	4.92	655
Weaned calf	2.53	4.09	6.24	4.11	547
Calf	2.20	3.06	7.15	3.81	507
Donkey (adult)	0.00	0.00	0.12	0.03	4
Donkey (young)	0.00	0.09	0.03	0.05	6
Sheep and goat (adult)	8.91	15.96	19.88	14.58	1,939
Sheep and goat (young)	8.47	11.83	16.35	11.85	1,576
Hen	8.80	15.20	16.29	13.32	1,771
Mean TLU	14.02	29.41	55.70	30.92	
t test	9.832***				

***Significant at less than 1% probability level

based on pasturing of animals, such as cattle, camels, sheep and goats. Horticultural societies are those whose economy is based on cultivating plants by the use of simple tools, such as digging sticks, hoes and axes. The key informant interview outcome revealed that animals have no role in crop production practices. Using of animal power for farming and related activities is a defining characteristic of the agricultural societies. However, due to cultural beliefs of the Nuer people, no livestock power is used for such purpose. There were some collaborative efforts by agriculture and rural development office with the help of non-governmental organizations to initiate the use of cattle for agriculture (Figure 3). But these efforts were fruitless due to the strict and change resistance culture of the society.

Livelihood diversification

Simpson diversity index (SDI) was used for estimation of livelihood diversification. SDI considers both the number of income sources and the proportion of income gained from the sources. An outcome of zero shows the complete specialization, and the level of diversification increases as SDI close to one. This means the income of the households does not depend on a single livelihood source. There are some income-generating livelihood strategies, and the proportion of income gained from these sources is not influenced by a single livelihood strategy.

The result showed that majority of the households 54.89% were high diversifiers. The income of these households was gained from various sources with even (equal) distribution. The percentage of less and medium diversifiers were 15.04 and 30.07, respectively. The percentage of high diversifiers found in this study was a lot higher than households of West Bengal which was 21.74% found by the study of Sahal and Baha (2010).

Aduogna (2012) had also got 69% of less diversifiers in pastoral areas of southern Ethiopia.

The reason for having a bigger number of high diversifiers in the study area could be due to the availability of assets for various livelihood strategies. The area is suitable for crop, livestock and fishery production. Also, the better existence of employment opportunities and remittance contributed to the high diversified result of households.

SDI was also computed for wealth groups. The mean SDI score of the poor was 0.5552, while the less poor and better-off had a score of 0.5682 and 0.6218, respectively. The average diversification score of the total households was found 0.5775 with a standard deviation of 0.202. The range of the SDI score was from 0 to 0.819. Even though the diversification of livelihood strategies increased from poor to better-off wealth status groups, the level of diversification did not show a statistically significant relationship with wealth groups (Table 5). These could be due to some possible reasons. The poor diversify their livelihood in order to skip their poverty and food security problem. On the other hand, the less poor and better-off households diversify their livelihood to sustain and increase their wealth.

Conclusions and recommendations

Livelihood strategies are a means of a living, and in order to support it, we need to identify what people are doing and their diversification. The study was aimed to identify the livelihood strategies and their level of diversification in western tip of Ethiopia. The majority of the households employ more than one livelihood strategies. Only on-farm livelihood strategies practised by few households, and majority of
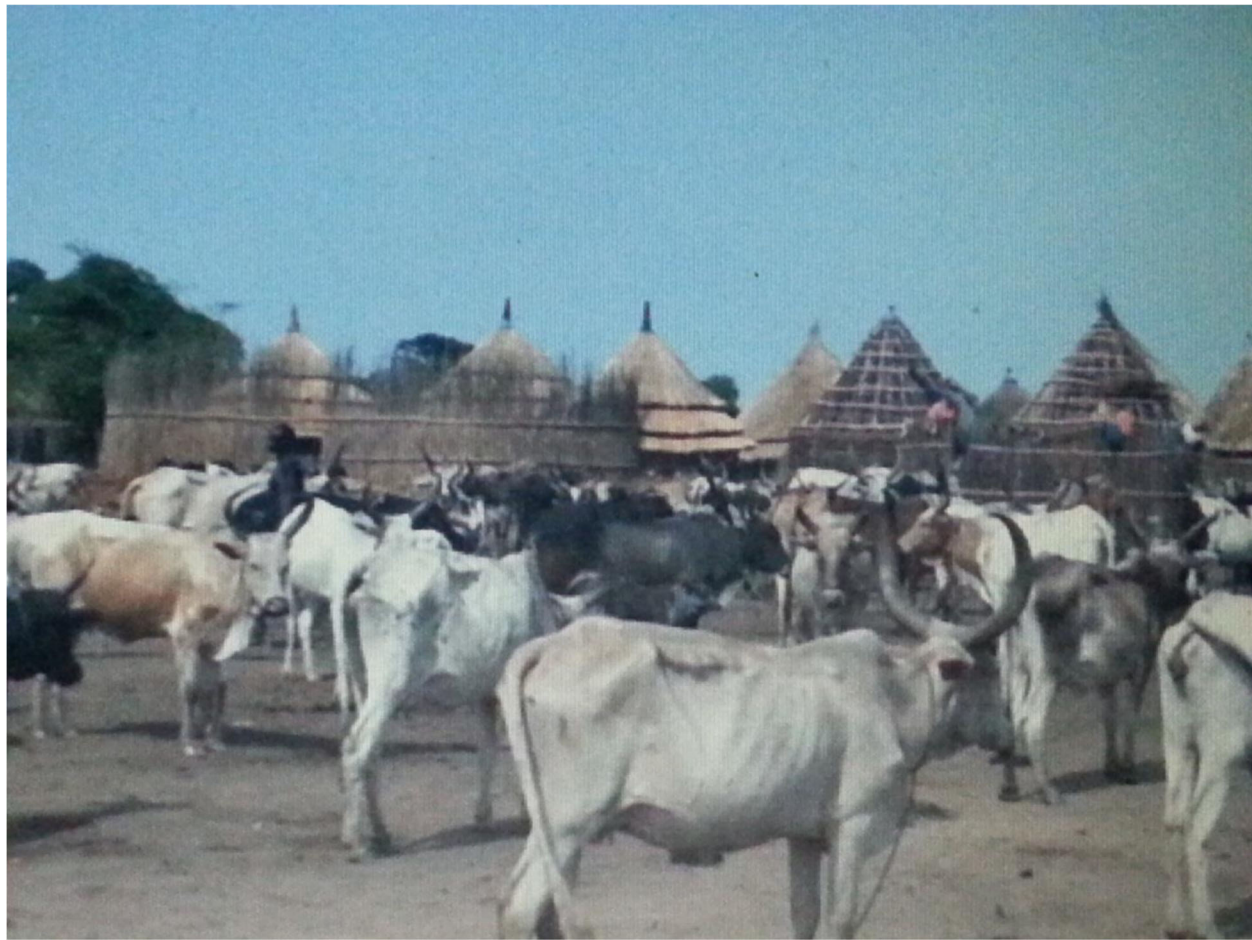
Fig. 3 Cattle of Nuer people

them use on-farm combined with off-farm and non-farm livelihood strategies. Livestock production, crop production, fishery and trading are the most viable livelihood strategies. Livestock production and crop production were practised almost by all of the households. But the type of farming and livestock practice is traditional and the output is low. Therefore, the extension works targeting on the improvement of farming mechanisms and livestock production and their outputs should be implemented. Also, more than half of the households are high diversifiers. Diversification result was a lot better, and it was achieved due to the existence of various assets to support livelihood strategies. Finally, around one third of the households live under poverty status. Thus, poverty reduction measures should be implemented.

Table 5 Distribution of households with livelihood diversification (N = 133)

Livelihood diversification (SDI)	Wealth status						Total	
	Poor		Less poor		Better-off			
	No.	%	No.	%	No.	%	No.	%
Less diversified (0 to 0.38)	9	20	9	16.7	2	5.9	20	15.04
Medium diversified (0.39 to 0.63)	13	28.9	14	25.9	13	38.2	40	30.07
Highly diversified (above 0.63)	23	51.1	31	57.4	19	55.9	73	54.89
Total	45	100	54	100	34	100	133	100
Mean	0.5552		0.5682		0.6218		0.5775	
t test	−0.291							

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