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Research Article

Subsistence Agriculture and its Effect on Smallholder Farmers' Socioeconomic Status in South Kivu Province, Democratic Republic of Congo

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Abstract

The aim of the paper was to investigate the effects of subsistence agriculture on smallholder farmer's socio-economic status in the Eastern Democratic Republic of Congo. The study was conducted in the South Kivu province's rural area by means of a self-administered questionnaire survey. A sample of 389 households was drawn from the research area which was chosen owing to the diversification with regard to geographical position. The findings revealed that subsistence agriculture in South Kivu province affect negatively the education level of household head ($\beta = 0.205$, $p = 0.001$), education level of wife ($\beta = 0.109$, $p = 0.041$) and the income status within the households of smallholder farmers ($\beta = 0.280$, $p < 0.000$). The results from the study highlighted the need for the government of DRC to adapt education policies on the local realities and to improve agricultural extension services in rural areas.

Keywords: Subsistence agriculture; Socio-economic status; South Kivu Province; Democratic Republic of Congo

1. Introduction

Subsistence agriculture plays a critical role in livelihoods of smallholder farmers in the Democratic Republic of Congo [1]. Shifting cultivation is reputed as the main activity in losing forest cover, by a repeated pattern of agriculture over periods [2]. Agricultural sector of the Democratic Republic of Congo is characterized by mostly small-sized farms which co-exist with some levels of intensive farming systems [3]. However, it is also reported the practice of irrigation of a single crop alongside the use of household wastes to fertilize fields near homes in intensive farming [4].

Literature shows two major forms of Subsistence Agriculture, namely Primitive Subsistence Agriculture and Intensive Subsistence Agriculture. Primitive subsistence agriculture includes shifting cultivation (slash-and-burn), and pastoral nomadic farming [5]. In shifting cultivation, farmers typically cultivate a piece of land and abandon it when soil fertility declines [6]. A considerable fallow period follows thereafter [7]. This traditional agricultural practice is one of the most important land-use systems in tropical areas [8]. Shifting cultivation is considered to be a highly appropriate farming system in upland areas where population density is low because in these circumstances fallow periods are long enough to allow the recovery of soil nutrients and vegetation [9]. Shifting cultivation gives practitioner farmers a higher quality of life than other common forms of land use, such as wet rice cultivation, because the returns per unit of land labour are much higher [10].

Also, it is informed that the pastoral nomadic agriculture is still prevailing in societies currently [11], and it is noted the seasonal movement of herders in search of water and fresh vegetation [12]. It is reported movement of some nomadic herders commonly known as the ‘Mbororos’ in several central African countries, Democratic Republic of Congo include [13].

Intensive Subsistence Agriculture, the other subsistence agricultural practice is a type of agriculture in which the farmers maximize food production in relatively small fields [14, 15]. Farmers practice double and continuous cropping with no fallowing thus ensuring that no land is wasted; and use minimal amounts of fertilizers, usually manure, and occasionally sub-optimal amounts of inorganic fertilizers to increase crop productivity [16]. Also, it is indicated that livestock is usually allowed to graze on land that is not suitable for crops [17].

Discussing the impacts of intensive subsistence agriculture, authors enumerated among others the loss of biodiversity, the reduced water catchment areas, soil nutrient depletion, and infertility, increased crop diseases and pests, and increased rural-urban migration [18, 19]. The authors revealed also challenges: low yields and high rate of crop failure, poor delivery of extension services, poor/lack of infrastructure, land storage and poor land tenure system, poor government policies, HIV/AIDS pandemic [18].

The paper examined the form of agricultural practice currently used by smallholder farmers as well as in the area where the average of population density is between (36) and (117) inhabitants per kilometre square, like Fizi, Kalehe, Shabunda and Mwenga territories than in the mountains and lakeside areas where the average of population density is high and

between (277) and (767) inhabitants per kilometre square, as Uvira, Kabare, Walungu, and Idjwi territories. External factors inhibiting the improvement of subsistence agriculture practice were also determined. On the other hand, Socioeconomic status as an economic and social which combined total measure of a person's work experience and an individual's or family's economic and social position about others [20] interested the paper. The socioeconomic status is typically assessed in three variables: income, education and occupation, while it is broken into three levels (high, middle, and low) to describe the three places a family or an individual may fall into [21].

Income refers to wages, salaries, profits, rents, and any flow of earnings received. Income can also come in the form of unemployment or worker's compensation, social security, pensions, interests or dividends, royalties, trusts, alimony, or other governmental, public, or family financial assistance [22]. Education plays a major role in skillsets for acquiring jobs. The highest degrees, professional and doctoral degrees, make the highest weekly earnings while those without a high school diploma earn less [23]. Higher levels of education are associated with better economic and psychological outcomes [24].

Occupational status reflects the educational attainment required to obtain the job and income levels that vary with different jobs and within ranks of occupations [25]. The occupational status shows achievement in the skills required for the job. Occupational status measures social position by describing job characteristics, decision-making ability and control, and psychological demands on the job [25]. Hence, another objective of this paper was to show socio-economic status of smallholder farmers in Democratic Republic of Congo's south Kivu province.

2. Methodology

2.1 Study areas

The survey was conducted in 2019 and involved questionnaires with farmers in fourteen sites in the South Kivu province,eastern Democratic Republic of Congo. These sites were: Mboko and Nundu (Fizi); Chasi (Idjwi); Mudaka, Mudusa and Kavumu (Kabare); Bunyakiri (Kalehe); Mwenga-centre (Mwenga); Shabunda-centre and Nzovu (Shabunda); Sange (Uvira); Walungu-centre, Burhale and Kanyola (Walungu) in the eight territories. Only, 303 out of 389 questionnaires were fully completed and returned making 77.8% which is acceptable, because, if more than 75% of the data that must be answered by the respondents is not there, then the questionnaire should be eliminated from further analysis [26].

The questionnaire was self-administered to farmers. The literature review was focused on subsistence agriculture as defined using four construct, namely primitive agriculture; nomadic herding; shifting cultivation, and intensive subsistence agriculture. The questionnaire covered farmers' agricultural practices and socio-economic status that could be affected by subsistence agriculture practices.

2.2 Data analysis

The data obtained from questionnaires were analysed using SPSS 20.0 software program. Items measuring subsistence agriculture practice were scaled five levels: Very High, High, Average, Low, and Very Low. Items measuring socio-economic status were scaled in frequency and three levels for income status:

High, Middle, and Low. For each of the four subsistence agriculture practices, and the three components of socio-economic status, the results are presented at univariate, bivariate, and multivariate levels, and the pertinent hypothesis derived was tested using Pearson Correlation Moment to determine the relationship between the independent variable (Subsistence Agriculture) on the dependent variable (Socio-economic status).

3. Results and Discussions

The paper described the subsistence agricultural practice among farmers in South Kivu province as shown in (Table 1).

Subsistence Agricultural Practice	Mean	Std. Deviation	Interpretation
Primitive agriculture Sub-Mean	2,58	1,49	Low
Nomadic herding Sub-Mean	1,66	1,01	Very Low
Shifting cultivation Sub-Mean	2,79	1,32	Moderate
Intensive Subsistence Sub-Mean	2,15	1,69	Low
Pooled Mean	2,3	1,28	Low
(Scale: 4.20-5.00 Very High, 3.40-4.19 High, 2.60-3.39 Average, 1.80-2.59 Low, 1.00-1.79 Very Low)			

Table 1: Descriptive statistics on subsistence agricultural practice among farmers.

Table 1 indicates low levels of primitive agriculture practice amongst the smallholder farmers in South Kivu within DRC (Mean = 2.58, SD= 1.49). This finding is in line with one earlier established where farmers undertaking to slash and burn as a primitive agricultural practice [18].

The study results are also comparable to those earlier found which reported the use of rudimentary tools like the slashes in clearing nearby shrubs and trees for agriculture in a non-shifting arrangement [5].

Table 1 show very low levels of demonstration of nomadic herding amongst the farmers in South Kivu, eastern Democratic Republic of Congo (DRC) (Mean = 1.66, SD = 1.01).

This study result is quite similar to one earlier found that the representation of pastoral communities is limited or non-existent [27]. The very-low levels of nomadic herding could be attributed to the fact that herders in the DRC are generally found in areas formerly and currently occupied by people who are not familiar with the rearing of large livestock.

The findings in Table 1 indicates moderate levels of demonstration of shifting agriculture practices amongst the farmers in South Kivu, eastern

Democratic Republic of Congo (Mean = 2.79, SD = 1.22). The results confirm that shifting cultivation as a collective exercise much as weeding activity was undertaken by family members, most other agricultural operations such as slaughter, burning, fencing, sowing, harvesting and postponing crops were all group activities undertaken with clan members or members of the entire village [28]. It is also confirmed that the continued loss of tree cover was as a result of shifting cultivation within the DRC [29].

The overall moderate levels of shifting agriculture illustrate the need for the DRC's government to re-think and make known the likely future constraints that farmers are likely to face arising from the currently increasing societal population.

Results presented in Table 1 indicates low levels of demonstration of intensive subsistence agricultural practice amongst the farmers in South Kivu, eastern Democratic Republic of Congo (Mean = 2.15, SD = 1.39). As per the results in Table 1, the standard deviation greater than 0.60 observed in each type of subsistence agriculture, indicates that there is not homogeneity of this practice among small farmers, considering the definition of each type of subsistence agriculture.

The socioeconomic characteristics variables considered in this paper included the sex of household head, education level of household head, education level of wife, and income status.

SES status	**Frequency (%) N=303**		**SES status**	**Frequency (%) N=303**	
Sex of household head			**Education level of Household' Wives**		
Male	278	92	No education	42	14
Female	25	8	Primary level	97	32
			Secondary level	155	51
Education level of the household Head			3 years post-secondary	8	3
No education	14	5	Other specify	1	0
Primary level	57	19			
Secondary level	171	56	**Income status**		
3 years post-secondary	51	17	Low	267	88
5 years post-secondary	8	3	Middle	32	11
Degree	1	0	High	4	1
Other specify	1	0			

Source: Primary data, (2019).

Table 2: Socio-economic characteristics of the smallholder farmers in South Kivu Province.

As shown in Table 2, a total of 303 farmers responded to the study. Most of the household heads who participated were male 278 (92%) who studied up to the secondary level of education 171 (56%), and most of the wives who participated had attained the same level of education 155 (51%). On the other hand, 8 % of households were headed by females. This proportion of female households reveals an average already observed (7-12%) by previous studies in the South Kivu province [30, 31]. In African setting, a typical home is headed by a man. The only scenario when females take up this responsibility is when the husband dies. In this case, a woman becomes a widow or after separation/divorce and in some other circumstance in a situation where the man is regarded as an absent husband.

The foregoing result on education level is quite different from one earlier established in which 54% of respondents had reached primary education level, 24% had no formal education yet only 20% had secondary or higher education [32]. On the other hand, evidence shows that there is increased number of school enrolment in Democratic Republic of Congo where the education system developed at all levels between 1986/87 and 2001/02, as shown by the increase in the number of schools, students and teachers [33].

Given the focus of this paper, the income status was based on agricultural activities only and excludes any off-farm income. The study findings show that the minority of smallholder farmers 4(1%) are at a high-income level, which means 700 to 800 US $/year (1.120.000 to 1.200.000 Congolese francs); 32 smallholder farmers (11%) were in a middle-income level that means 500 to 600 US $/year (800.000 to 960.000 Congolese francs), and the majority of the respondent farmers are characterized by a low-income status 267(88%) it means 250 to 400 US $/year (400.000 to 640.000 Congolese francs).

The study finding regarding income status of subsistence agriculture practitioners is therefore similar than that earlier found, which informed that most rural people working in subsistence agriculture lives with 1 US $/day or less [34].

Variables	**Coefficient**	**S.E.**	**Sig.**	**95% C. I**	
				Lower	**Upper**
Education Level of Household head					
VS Subsistence Agriculture	.205	.064	**0.001****	.079	.331
Education Level of wife					
VS Subsistence Agriculture	.109	.054	**0.041****	.004	.215
Income status					
VS Subsistence Agriculture	.280	.061	**0.000****	.161	.399
Family Support					
VS Subsistence Agriculture	.085	.046	0.062	-.004	.175

**Significant at the 5% level.

Table 3: Effect of Subsistence Agriculture on Farmers' Socioeconomic Status in South Kivu.

The overall objective of this paper was to examine the effects of subsistence agriculture practice on smallholder farmers' socioeconomic status in the study area. After collecting, analysing, and presenting results on subsistence agriculture practice and socioeconomic status of farmers in South Kivu, the Pearson's Correlation Moment was done to show the variables of socioeconomic status which were influenced by the practice of subsistence agriculture (Table 3).

The study results in Table 3 shows subsistence agriculture practice having a statistically significant positive effect on the education level of household head ($\beta = 0.205$, $p = 0.001$); education level of the wife ($\beta = 0.109$, $p = 0.041$), and income status ($\beta = 0.280$, $p < 0.000$) among smallholder farmers in South Kivu province in DRC. This discrepancy in the result could be attributed to the fact that subsistence agricultural practices are borne of low productivity not adequate to propel supportive livelihoods. In the same vein, authors stated that agricultural modernization is much more effective in reducing poverty among the poorest groups [35, 36].

The study results goes to the direction of some academicians and policymakers who have a negative view of subsistence agriculture (traditional agricultural practices) because it is characterized by low use of external inputs and low productivity, and thus is synonymous with backwardness and inefficiency and holds back economic growth and performance. Subsistence agriculture involves traditional agricultural knowledge and practices.

Additionally, the study results highlight the presence of uncertainties and incapability among smallholder farmers and Agricultural Extension Service. The future of smallholder farmers in South Kivu, eastern DRC need Capabilities, Fairness and Equity enhancement through human, social, physical, financial and natural capitals investment.

4. Conclusion

Overall, although the DRC' Government has repeatedly developed policies and strategies to modernize the agricultural sector with the ultimate goal of ensuring sustainable increases in agricultural productivity, the results of the study have revealed that the majority of the Congolese population in South Kivu lives from subsistence agriculture practice in these four aspects, namely, primitive farming, nomadic herding, shifting cultivation and intensive subsistence farming, albeit in varying degrees.

Under these conditions smallholder farmers faced several socio-economic constraints which lead to vicious cycle of poverty.

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