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The contribution of rural institutions to rural development: Study of smallholder farmer groups and NGOs in Uganda

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In this article, the results of the quantitative data analysis are presented. Through a case study, the contribution of NGOs and smallholder farmer groups as sample rural institutions is examined in addressing four main objectives of improving health, education, agriculture as well as improving industry. The study involved 87 respondents from 40 organizations (19 NGOs and 21 Smallholder farmer groups) from central region of Uganda. Questionnaires, focus group discussions, interview guide, key informants and literature review were used to collect data. The study results led to the consideration of rural development as a critical result of improvements in health, education, agriculture and rural industry in rural areas of Uganda. First, improving health by investing in increased awareness/ access to information sharing among communities, and policy development, program planning and service delivery fosters rural development, yet subsidizing health insurance and finance health services would affect rural development negatively. Secondly, improving education through appropriate geographical scope of the organization includes promoting information and technology dissemination for learning and access to various information; coordination of major sources of funding for education; policy on education for rural areas; conducting research and development and the total number of employees; thirdly, improving agriculture by investing in geographical scope of the organization includes offering basic and advanced training; promoting access to land and other factors of production on agriculture; mobilizing resources both financial and human resources; promoting access to agriculture information; conducting research and extension services; finally, improving Industry through investing in geographical scope of the organization includes supporting infrastructure development including financial facilities; supporting rural advocate for agro-based industry policies for industry promotion; conducting research and development programs; and considering the total employees.

Key words: Rural development, rural institutions, non-governmental organizations, NGOs, smallholder farmer groups.

INTRODUCTION

The formation of rural institutions is the first joint efforts by people (beneficiaries) towards self and rural development (Abegunde, 2009). This is in support of purely free market approaches to economic development which calls for more local decision-making and more locally based economic ventures. At the centre of this

approach is a strong community commitment to offer resources and information, overcome collective problems and improve the functioning of local labour markets. To Abegunde (2009), rural development thus involves the initiators, supporters and beneficiaries of any defined development effort. The theoretical literature and empirical findings from previous studies show that each individual rural community group by developing programs that transform communities through supporting self-reliance and underlining popular participation in their development activities impact positively on rural development (Lwanga-Ntale and Kimberly, 2003). Besides, this study also observes that there is broad appreciation of non-governmental organisations (NGOs) having an important role to play in supporting the rural poor to break out of their condition of poverty. For instance, NGOs' insistence on the empowerment of the poor as the key to their transformation provides groundwork for effective partnership (IFAD, 2008). However, as observed by Aheibwe (2013), rural development cannot take place simply as a result of empowerment of the poor through supporting self-reliance and underlining popular participation par se but by addressing the obstacles faced by the rural poor such as inappropriate policies, missing or uncompetitive markets, weak rural infrastructure, inadequate processing opportunities and financial services, among others.

Community groups such as smallholder farmer groups (SFGs) provide opportunities for people to participate at grassroots levels. For instance, Salami et al. (2010) argue that most community groups'activities occur in farming systems with the family being important in planning, decision making and implementation of the projects. Such groups also operate within a community level network of relations, the argument continues. To this aspects, Magingxa and Kamara (2003), Barham and Chitemi (2008), World Bank (2006) and Anriquez and Stamoulis (2007) add that expansion of smallholder farming through their organized groups stimulates faster rate of poverty reduction. In addition, smallholder farmer groups mediate in intra-community conflicts, build infrastructure, attract other development actors (such as donors, NGOs) into the community and therefore help many individuals to work more effectively and collectively (Resnick, 2004). It is in this regard that Jjuuku (2008) observes that smallholder farmer groups have taken on the role of rural developers in developing countries such as Uganda in education, health, industry and agriculture developments. In a catalytic development model, the emphasis is on mobilizing rural local talent and leveraging local resources and networks to find solutions to local issues, and ultimately foster development of communities through implementing plans for improvement of education, health, industry and agriculture as discussed above.

Health, education, agriculture and industry in rural Uganda

The 2014 Uganda Population and Housing Census (Uganda Bureau of Statistics, 2014) provides that Uganda's population is 34.9 million, an average annual growth rate of 3.03% and life expectancy of only 53.3 years. The primary causes of morbidity and mortality are malaria, acute respiratory tract infections, malnutrition and HIV/AIDS according to same source. About 50% of healthcare is delivered by the government of Uganda own facilities and the remaining 50% by the private sector providers (Ministry of Health, 2014). While, in theory, public healthcare provision is supposed to free; in reality, there are unofficial fees and patients are often asked to buy own drugs and surgical items privately. Other 'hidden' costs of healthcare to people living in rural areas of Uganda is the large distances patients travel to attend the nearest clinic as well as loss of income from time off work especially when receiving healthcare means queuing for long hours (Romathan, 2015). Pregnant women in many instances choose to deliver at home, unless a complication emerges. Major means of transport is by motorcycles (boda-boda), on the dirt roads, and when it rains the roads become impassable. Matsiko (2010) points out that unlike the large urban health centres, rural clinics have neither electricity nor running water, and in some cases solar powered electricity is used to run equipment for screening infectious diseases like malaria and TB. In rural areas of Uganda, access to healthcare services is always limited and many rural facilities are not equipped to handle transitional care or specialised follow up care after a life changing illness (Bateganya and Faku, 2010). Some of the strategies used to improve access to rural health include recruitment of students (to become health workers) from the affected communities, locating training programs within or in close proximity to community to be served.

Romathan (2015) observes that agencies such as NGOs and sometimes in partnership with other agencies are complementing government effort in rural healthcare provision by developing ways to strengthen health care access in rural areas of Uganda. They provide relevant training to healthcare workers, and this is an important contribution as it enables healthcare workers to take on

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more demanding tasks and positions which may improve health in rural areas (Matsiko, 2010). In rural areas of Uganda also, attraction and retention of qualified and skilled health workers remain a daunting challenge (Marek et al., 2005). Notwithstanding, Uganda has chronically inadequate trained health personnel, poor equitable distribution of human resources, poor skills mix and ineffective use of available human resources which are worsened by the practice of non-professional task-shifting (Ministry of Health, 2014). There are disparities observed in the placement of health workers in urban and rural areas in Uganda (Ministry of Health, 2013). This is exacerbated by the poor access roads to health facilities, low salaries and lack of social amenities in rural areas (Ibid). There is no easy solution to these challenges and government and other health sector players such as private actors have begun programs to improve health care options in rural areas (Romathan, 2015). Many of these private actors are affiliated with religious organizations and funded by donors and foreign aid. About 60% of Ugandans depend on traditional medicine as a first treatment; witchdoctors offer herbal remedies for minor ailments and for more serious diseases they refer patients to medical practitioners.

The more economically developed a community is the better the health and wellbeing of its people (Glasby, and Lester, 2004). Cole and Neumayer (2006) affirm that poor health affects economic development especially through total factor productivity. With the concentration of poverty, low health status and high disease burden in rural areas, achieving rural development require improving rural health (Bage, 2004).

In the past decades, the government of Uganda has put in efforts to improve the functioning of the health sector through increasing public expenditure on health, re-energizing diseases control programs and re-orienting services to primary healthcare (Ministry of Health, 2014).

For the purpose of this study, the working definition for quality healthcare means a healthcare that improves health outcomes for all rural people, maximizes resources use, accessibility (timely, geographical and appropriate skills), and caters for gender needs. Strasser (2003) and Cole and Neumayer (2006) argue that many rural people the world over are caught in the poverty – ill health – low productivity downward spiral.

Education improvement

Peers (2015), basing his treatise on human capital theory, observes that education is a critical part of total factor productivity and Boser (2014) adds that education is an investment “like any other” that generates externalities. For example, individuals make individual choices concerning their education but these choices have a strong economic effect through the resulting increase in total factor of productivity.

Education in rural areas of Uganda faces a complex mix of lack of resources, unmotivated teachers, and the absence of legitimate support to resolve those strains (Okumu et al., 2008). This lack of or poor education is related to extreme poverty in rural areas of Uganda by reducing productivity and earning capacity as well as increasing vulnerability to extreme poverty (Grogan, 2006). The weakness of education services in rural Uganda are related to the fact that the country lacks trained people ready to live in rural areas, lacks resources and infrastructure to plan and deliver effective education services to rural population (Altinyelken, 2010). For instance ‘schools under trees’ are still common which among others affect access and quality of education. Curricula and textbooks in rural schools are often lacking or inadequate, with contents in many instances not particularly relevant to the needs of rural people. The introduction of universal primary (UPE) and secondary (USE) education in Uganda has led to increase in enrollment in schools but also put a significant stress on the limited rural education infrastructure thus having a consequential toll on quality (Vermeulen, 2013). Dyson and Kerr (2013) add that the quality of education in public schools especially in rural areas has not improved even with the introduction of the thematic curriculum in 2007 running through 2013. The margin for implementing the curriculum to fit rural learning is often too limited.

For this particular study, education improvement refers to promoting learning and achievement by providing leadership, guidance and support over a wide range of rural education programs that have direct impact on teaching and learning. This is the definition advanced by UNICEF (2000) as education includes learners who are healthy, well-nourished and ready to learn, safe, health and gender sensitive among others.

Agriculture improvement

The agriculture sector in Uganda employs over 80% of the work force nationally with over 95% rurally (Masaba, 2014). The sector consists of cash and food crops, livestock, forestry and fisheries activities and contributes 23.9% to the country’s GDP (ibid). From the poor households’ point of view, improving agriculture-based livelihoods means transforming agriculture by improving their capital assets which include natural, physical, financial, human and social assets. Uganda is attempting to accelerate agricultural growth by introducing technologies to enhance production which stimulates labour intensive industrialization, improves the terms of trade, and reduces pressure on food prices (Aheibwe, 2013). Ampaire et al. (2013) assert that in Uganda expansion of factors of production especially cultivatable land promotes agricultural production in addition to

considering research and development in new production technologies. The rationale for considering research and development is the belief that investment in research results in increases in the stock of knowledge, which in turn either facilitates the use of existing knowledge or generation of new technologies. This concurs with Rosegrant and Evenson (1992) who state that education, training and extension as well as technological advance improves quality or how inputs are combined, thus leading to productivity gains. According to Diao et al. (2006), agriculture plays a vital role in the overall economic growth of a country and increased agricultural yield leads to increases in total output. A decline in agricultural growth throws the poor into poverty and hunger, and those with the most rapidly growing agriculture sector generally face the most rapidly declining poverty and malnutrition incidences (World Bank, 2007).

Uganda agriculture is dominated by smallholder farmers in rural areas and therefore the sector faces several challenges including limited market and market access and poor infrastructure, high costs and limited access to improved inputs and production technologies. There is also lack of agricultural credit facilities and inadequate manpower especially extension services (ICEIDA, 2014)). Other challenges that inhibit progress include unreliable data due to lack of quality research, poor coordination of producers, global price increases and lack of ownership and control of land especially for women (who are the majority participants in the sector).

Simply put, the question of what NGOs and community groups is summarised in three activities of: implementers, catalysts and partners (Lewis, 2007). Through community groups, efforts of the people are combined with those of development actors (such as NGO, government) to improve socio-economic and cultural conditions of the communities (Akinola, 2008). Akinola further argues that community groups provide an avenue for people to organize themselves for planning action, define their common and individual needs and problems and offer solutions thus facilitating rural development. However, Mitlin et al. (2005) argue that NGOs may not necessarily have positive influences especially in situation where they get locked within unidirectional processes of change and in circumstances where they impose their own agenda and become self-interested actors at the expense of the people they are supporting. World Bank (2007) and IFAD (2010) argue that success in agricultural development necessitates a large number of investment and policy measures. These include improving farmer and agro-industrial access to markets, investments in infrastructure, information supply, rural education, regulation and policy.

The study here sought to establish whether improving agriculture by focusing/investing in the factors affecting agriculture (independent variables) influences rural development. The independent variable is: Agricultural improvement, which for the sake of this study means improvement in agricultural production and productivity to ensure food and income securities of the people.

Industry improvement

Rural industrialisation process in Uganda to be sustained requires a set of core resources and capabilities such as skilled manpower, technological innovation and enhanced knowledge capacity, as well as access to inexpensive finance, infrastructure and appropriate policies (Ainebyona, 2014). Uganda recognises that ability of micro, small and medium scale enterprises generate socio-economic benefits, value addition to local raw materials, job creation, income generation opportunities and promotion of entrepreneurship. Despite the above benefits that accrue from rural based industries, there are several limitations which include poor infrastructural facilities such as road andenergy (Ministry of Finance, Planning, and Economic Development, 2014a,b). For example, there is inadequate and unreliable power supply which affects efforts in rural agro-based industrial establishment. There are also weak capital base as well as consumer preference of imported goods over local goods. More of the rural entrepreneurs face financial constraints in setting up rural industries because of the non-supportive attitude of commercial financial institutions and banks (GoU-NDP, 2012). Besides, interest rates, collaterals and other requirement are stringent for rural entrepreneurs; such services are either limited or non-available by virtue of their location in rural areas of Uganda which are remote. Rural industries are mainly agricultural based and labour intensive, thus difficult to introduce sophisticated techniques and methods of production which are expensive and there is no technical know how to run them (Ainebyona, 2014).

In addition there are several other factors that are hampering the attainment of these goals and they among others include high population growth rate that creates diversion of investment into other services and stiff completion from foreign industries that produce similar agro-based goods which are cheaper (World Bank, 2011).

Ainebyona further asserts that rural industries like others need compliance with the various legal formalities such as licenses in order to operate. But rural entrepreneurs find it difficult to comply due to complexities of the legal provisions or illiteracy and ignorance. Other problems include poor quality standards, use of obsolete technology, machinery and equipment as well as poor communication and marketing information. Industries in rural setting can be divided into three categories namely small-scale cottage activities, medium-scale village enterprises, and large –scale rural industries. These industries in rural setting include units producing agricultural equipment and fertilizers that are in

substantial size, to very small scale animal husbandry units such as maintenance of one or two milk animals or half a dozen chicken that provide a secondary source of income.

There are several factors that can enhance industrial development for rural development.In light of the above in this study, industrial improvement means paying attention to the above challenges by focusing on strategic factors that promote industrial growth based on local resources. Here, the study sought to establish whether improving industry by focusing/investing in the factors affecting industry (independent variables) which in turn influences rural development. Improving industry means setting up rural based industries which make use of the producers of agriculture directly or indirectly. This is because rural based industries are regarded as essential for rural development in view of its large potential for growth and likely socio-economic impact on employment and income generation (Kar and Mishra, 2004). It also helps make use of raw materials directly supplied by the agricultural sector and facilitates the growth of industries which produce several inputs such as fertilizer, pesticides and agricultural implements that promote the productivity and expansion of agriculture. Industrial development for rural development has two components, namely location (geographical scope) and linkages with large industries as ancillaries (Nayak, 1996). Therefore, industrial development for rural development in Uganda covers all kinds of small and processing industries based on agriculture (Siggel and Semogerere, 2004).

This study sets out to analyze the critical factors influencing improvements in health, education, agriculture and industry in Uganda's rural areas with the aim of gaining insight into the possible contributions of rural institutions to Uganda's rural development. Given the above literature review, one would note that no single factor is likely to be successful in improving rural health, education, agriculture and rural industry in rural areas of Uganda but rather multiple factors are required at different levels.

DATA AND METHODOLOGY

A range of organizational level information on the characteristics of NGOs and SFGs was collected using various research tools. The data collection tools administered to leaders of the SFGs and staff of NGOs mainly included a structured questionnaires, focus group discussions, interview guide, key informants and literature review. A random sample of 40 NGOs and smallholder farmer groups (SFGs) were selected, stratified by location in the Central Region of Uganda for a period between 2002 and 2012 for which the data were available. The Central Region of Uganda was chosen based on their ease of logistics – transport and communication, and presence of NGOs and functional SFGs. With the help of two research assistants, functional SFGs in the Central Region were identified and weighed according to their partnership dealings with some NGOs.

Finally, a total of 96 respondents were targeted but only 87 respondents from 40 organizations (19 NGOs and 21 Smallholder farmer organizations) in Central Region of Uganda that were in partnership were reached. This involved a random sample of 24 respondents from NGO officials, 63 respondents from SFG executive Committee members drawn after being visited. Questions addressed: Background information on sampled organizations such as their contacts, year of establishment, and number of staff by their gender, and employment status (permanent/temporary), scope, beneficiaries and source of funding, and the main objective of their organizations. Specifically, the study examined the contribution of rural institutions to Uganda's rural development, the case of smallholder farmer groups and NGOs in Central Region of Uganda. To achieve this goal, however, the study here employed STATA data manipulation software which involved coding of the responses of the above dependent variables as they were marked on the survey tool.

The probit model

In this work, a probit regression model was adopted to investigate the relationship between various potential factors (Tables 1) and the dependent variables (Improvements in health, education, agriculture and industry). All our study outcomes were binary whether improvement in health, education, agricultural production, and industry leads to rural development coded as a (1) or not coded as a (0).

Using data collected from a statistical sample of organizations (NGOs and SFGs) of Central Region of Uganda, the Probit regression model is used to model NGOs and SFGs characteristics, perceptions of their staff and their supported development sector (health, education, agriculture and industrial improvement) in the development of the rural economy. The relevance of the potential factors that influence the improvement in health, education, agriculture and industry and their relationship to rural development were captured through perceptions of study respondents. This was based on stochastic simulations by randomly selecting and interviewing a number of NGOs and SFGs staff.

The contribution of NGOs and SFGs to rural development is evaluated in the study, considering the dependent variables as the main objectives of rural development – health improvement, education improvement, agricultural improvement and industrial improvement which were corded as 1 for agreement (strongly agree and agree) and 0 for disagreement (strongly disagree and disagree). As in other works (Foltz and Change, 2002; Matshe and Yound, 2004), a priori functional relationship is assumed in this study, which implies an association as explained above and also coded 1 for agreement and zero for disagreement and a set of socio-economic explanatory variables specific to each of the main objectives.

Thus the first causal model for this study addresses the issue of the rural development status related to the nature of the main objectives as may be influenced by the objective determining statistically significant factors using a probit model (Greene, 2003). The probitmodel used to estimate the objectives - improvement in health; education; agriculture; and industry, is as follows:

$$Y_i = \alpha_1 + \beta_i \sum_{i=1}^{n} X_i + \varepsilon \quad (1)$$

Where Y_i is a vector of binary variables, such that $Y_i = 1$ if the i^{th} respondent is in agreement that a factor influences a particular main objective and 0 otherwise. X_i is a vector of explanatory

Table 1. The summary of Independent variables - factors affecting the main objectives.

Health improvement	Educational improvement	Agricultural improvement	Industrial improvement
Organization scope			Organization scope
Geographical scope	Geographical scope	Geographical scope	Geographical scope
Beneficiaries	Formal educational quality	Access to production factors	Smallholders and SMEs participation in markets
Health subsidies	Information and technology	resources mobilization for agricultural	Infrastructure development
Health practitioners' training	Major sources of funding	Networking in agriculture	Scaling up and replicating value chain innovations
Health information sharing	Capacity building of SFGs/NGOs	Agricultural policy	NRM and agro- based industries development
Personal education and self – management	Government Policy on education	Access to agricultural information	Rural advocates for agro-based industrial policies
Research and development	Research and development	Research and extension services	Research and development
Partnership Efforts			
Policy and service	Non-formal adult training	Training in agricultural	
Total employees' number	Total employees number	Total employees number	Total employees number

variables of the i^{th} respondent. It is assumed that X_i is independent of the zero mean random variable. In the specific case of this study the empirical model estimated is as follows:

$$Y_i = a_1 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \varepsilon \quad (2)$$

Where: Y_i is the dependent variable as explained above and the $X_1 s$ are the specific factors that where generated for each objective during the pilot study, verified through literature reviews and confirmed by running a simple probit model as in the process described in the section on choosing the independent explanatory variables and collinearity.

Independent variables are the values that can be altered in a specified model or equation (Arulmozhi and Nadarajan, 2003). Independent variables offer the "input" which is adjusted by the model to change the "output." A general empirical probit model was used as one of the preliminary criteria to choose variables to be incorporated in the econometric analysis. In the first instance, a probit model equation was calculated to establish the relationships between each of independent variables (factors that influence main objectives) with the dependent variable (main objectives) in the survey. Different sets of variables drawn from each part of the survey were considered in this preliminary procedure. Second, taking into account the cross-tabulation and the probit equation output, twelve (12) explanatory variables were selected for health improvement, 9 variables for education improvement, nine (9) for agriculture improvement and nine (9) for industrial improvement objectives. These variables were included in an empiricalprobit equation using a number of multiple explanatory variables to establish their behaviours conjointly in terms of estimating collinearity between the variables**.**

In this study, the "condition number" of the elements of the matrix included in the multi probit equation was used as criterion for assessing collinearity (Greene, 2003). The selected independent / explanatory variables for each main objective finally considered in this study in the general probit model are provided in Table 1. Four probit models were estimated one for each main objective based on the sample data.

The information set in Table 1 has a binary response (outcome, dependent) variable. There are several predictor variables listed under each main objective, which are all binary and taking two score 1 (one) or o (zero). Explanatory variables with a score 1, mean respondents stated that they agree that it has an influence (strong/ weak) on the particular main objective while those with score 0 means respondents stated that they disagree that these have influence on the particular main objective.

From the above procedure, the section below presents results of the Probit regression coefficients interpretations of the main objectives (Improved, Health, Education, Agriculture and Industry) and their respective independent variables. The above general probit model can be fitted to data by the method of maximum likelihood. To test hypothesis and confidence intervals the study follows the general procedures for statistical inferences in maximum-likelihood estimation; for example, for each coefficient, test of the hypothesis.

RESULTS AND DISCUSSION

The study sought to establish whether improving health has any linkage with rural development by investing in the factors (independent variables) affecting health improvement (main objective). In other words, whether there are factors that can be invested led to improved health and hence foster rural development.

Table 2 presents the probit regressions results for the selected factors expected to affect health, education, agriculture and industry improvements from the base model which includes only a basic set of explanatory variables. In column 1under health improvement, you can see that health subsidies, health information sharing and policy and services are the only variables that significantly influence health change. Health subsidies have a negative

Table 2. Probit regression results of the dependent variables: health, education, agriculture and industry improvements.

Independent variables	Health improvement	Education improvement	Agriculture improvement	Industry improvement
Organisation Launch Year	-1.073			
	(-1.57)			
Organisation Scope	-0.053			0.359
	(-0.18)			(1.50)
Geographical Scope	0.260	-2.036	1.668	-0.964
	(0.57)	(-2.77)***	(3.78)***	(-2.41)**
Employees Number	-0.005	0.031	-0.016	0.023
	(-0.34)	(1.86)*	(-1.32)	(1.83)*
Research & Development	0.483	-1.885		0.190
	(0.87)	(-2.19)**		(0.49)
Beneficiaries	-0.249			
	(-0.51)			
Health Subsidies	-0.709			
	(-1.740)**			
Health Workers Training	0.112			
	(0.29)			
Health information Sharing	1.109			
	(2.56)***			
Personal Education and Self-Management	0.009			
	(0.020)			
Policy and service	1.416			
	(2.93)***			
Partnership Efforts	0.375			
	(0.63)			
Non formal Education Training		0.908		
		(1.66)		
Formal Education Quality		0.175		
		(0.220)		
Information & Technology		1.255		
		(2.08)**		
Major Funding Sources		2.899		
		(3.67)***		
Capacity Building		1.176		
		(1.50)		
Government Policy		2.052		
		(2.54)***		
Training in Agriculture			-0.913	
			(-1.77)*	
Access to fob			-0.850	
			(-2.44)**	
Rs Mobilize for Agriculture			0.820	
			(2.19)	
Network in Agriculture			0.452	
			(1.170)	
Agriculture Policy			-0.371	
			(-1.07)	
Access to Agriculture Information			-1.149	

Table 2. Contd

			(-2.52)***	
Research & Extension Services			-1.333	
			(-2.46)**	
SMEs in Marketing				-0.346
				(-0.860)
Infrastructure development				-0.251
				(-0.620)
Scaling/value chain Innovation				-0.539
				(-1.160)
NRM & Agro Industry management				0.008
				(0.020)
Rural Policies				0.743
				(2.12)**
Constant	0.872	1.107	2.571	0.849
	(0.660)	(0.680)	(2.660)	(0.980)
Chi-*squared*	40.20	73.87	29.28	17.63
Prob Chi-*squared*	0.0001	0.000	0.0006	0.0397
Pseudo R-*squared*	0.3823	0.6801	0.2647	0.1697
Log-likelihood	-32.482	-17.369	-40.669	-43.155
Number of observations	77	77	84	77

Note: Z-statistics are in parenthesis. *** signifies significance at least 1 percent level, **signifies at least 5 percent significance level and * signifies significance at least 10 percent level.

effect and are significant at the 10% level which is unexpected while health information sharing and, policy development, programme planning and service delivery has strong positive influences which we would expect. All other variables are not significant.

Table 2 shows that geographical scope of the organization, employees' number, research and development, information and technology, funding sources and government policy all influence education improvement effort. Geographical scope and research and development seem to have a negative effect on education improvement but the others have positive effects. The result for R&D is unexpected but all other effects are as expected.

For factors affecting agricultural development, geographical location of the organization operation, training in agriculture, access to fob, resource mobilization, access to agriculture information and research and extension services have significant effects on efforts to improve agriculture in rural areas of central Uganda.

All the mentioned factors seem to have negative effects on this objective except for geographical scope and resource mobilization activities. Our results on the factors that are likely to affect industry development reveal interesting findings. We can see that the factors which are significant in affecting industry improvement include geographical scope of the organization, employees' number, and rural policy. None of those findings are surprising at all.

In Table 3 we look at the marginal effects of each of the factors. We hypothesize that they influence the four major objectives of rural development efforts.

Health improvement and rural development

The marginal effect on health improvement of health insurance subsidization and health service financing has a negative effect with a coefficient of -0.709, which is significant at the 5 percent level. This suggests that a 1 standard error increase in healthcare subsidization decreases health improvement by 0.709 points. This is an unexpected finding. The result may seem astonishing in that it contradicts the findings of Trujillo et al. (2005) who in their research on the impact of subsiding health insurance for the poor suggest that subsidizing health insurance programs is often used to provide basic healthcare to the poor and uninsured citizens. This is confirmed in the popular literature by Panopoulus and Velez (2002), and Bailey (2013) who claim that health insurance coverage significantly increases medical care utilization through availability of health care professionals in leading effective improvement efforts, enhancing clinical outcomes and reducing costs for access. The result perhaps may be explained by the fact that

Table 3. Marginal effects of the independent variables in the probit regressions.

Independent variables	Health improvement	Education improvement	Agriculture improvement	Industry improvement
Organisation Launch Year	-1.073			
	(-1.57)			
Organisation Scope	-0.053			0.359
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Beneficiaries	-0.249			
	(-0.51)			
Health Subsidies	-0.709			
	(-1.740)**			
Health Workers Training	0.112			
	(0.29)			
Health information Sharing	1.109			
	(2.56)***			
Personal Education and Self-Management	0.009			
	(0.020)			
Policy and service	1.416			
	(2.93)***			
Partnership Efforts	0.375			
	(0.63)			
Non formal Education Training		0.908		
		(1.66)		
Formal Education Quality		0.175		
		(0.220)		
Information & Technology		1.255		
		(2.08)**		
Major Funding Sources		2.899		
		(3.67)***		
Capacity Building		1.176		
		(1.50)		
Government Policy		2.052		
		(2.54)***		
Training in Agriculture			-0.913	
			(-1.77)*	
Access to fob			-0.850	
			(-2.44)**	
Rs Mobilize for Agriculture			0.820	
			(2.19)**	
Network in Agriculture			0.452	
			(1.170)	
Agriculture Policy			-0.371	
			(-1.07)	
Access to Agriculture Information			-1.149	

Table 3. Cont'd

			(-2.52)***	
Research & Extension Services			-1.333	
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				(-1.160)
NRM & Agro Industry				0.008
				(0.020)
Rural Policies				0.743
				(2.12)**
Constant	0.872	1.107	2.571	0.849
	(0.660)	(0.680)	(2.660)	(0.980)
Chi-Squared	40.20	73.87	29.28	17.63
Prob Chi-squared	0.0001	0.000	0.0006	0.0397
Pseudo R-squared	0.3823	0.6801	0.2647	0.1697
Log-likelihood	-32.482	-17.369	-40.669	-43.155
Number of observations	77	77	84	77

Note: Z-Statistics are in parenthesis. *** signifies significance at least 1 percent level, **signifies at least 5 percent significance level and * signifies significance at least at 10 percent level.

subsidizing health insurance is likely to be negative as health insurance premiums rise and out-of-pocket medical expenses increase. This is so because households in Uganda are major financing sources of their healthcare, and thus for poor rural households, subsidizing health insurance imposes higher healthcare costs. Subsidies also provide limited choice to the patients; besides not being sustainable it is also associated with low quality services. This is because the assistance flows from government to services providers rather than direct to the poor patients. This is consistent with Catro-Leal et al. (2000) who claim that the supply side of subsidy creates no incentives for services providers to provide good services or offer patients anything beyond the bare essentials in terms of comfort and privacy. Therefore instead it increases the tax burden and creates a trade-off scenario – diversion of resources from being invested into rural development to meeting the subsidy requirement.

The result in Table 3 on the effect of health information sharing shows that increased awareness or improved access to and sharing of information on health by NGOs and SFGs has a positive coefficient of 1.109 which is strongly significant at 1% level. This means that a 1 standard error increase in access to healthcare information increases the chance of improved rural health by 1.1 points. This is expected and is consistent with findings by Green et al. (2009) who noted that availability of accurate, timely and analysed information improves the quality of people's health, healthcare system, delivery of care, understanding and management of overall health systems. The result probably is informed by the fact that in Uganda access to information and its sharing also has much to offer in managing healthcare costs and improving the quality of care (Musoke, 2012). This finding is also consistent with findings by Kolodner et al. (2008), who maintain that addressing bottlenecks to increased awareness or improved access to and sharing of information on health trends also holds great potential for strengthening rural health care and healthcare delivery gaps in urban areas of developing countries.

Finally, the estimated coefficient of promoting policy development, programme planning and service delivery also has positive coefficient of 1.416 and has statistically significant effect on health improvement at 1% level. This means that a 1 standard error increase in this policy raises the possibility of health improvement by about 1.4 points. This result is not surprising as it is supported by among others Baggot (2012) which in a study on policy success and public health in England demonstrates that health policy development, program planning and service delivery contributes to achieving intermediate health outcomes (quality, efficiency, utilization, access, learning, and sustainability) of improved health status and risk

protection at the health system level. In addition, Dixon et al. (2011)add that effective health program planning and service delivery is crucial for directing and assessing the impact of health program or project to the local community, their effectiveness and identifying opportunities

Education improvement and rural development

In the education improvement regression, we can see that geographical scope, research and development, information and technology, employees' number, funding sources and government policy are the factors which affect the achievement of this objective significantly. All the above factors have a positive influence on education with exception of geographical scope and R&D. The marginal effect has coefficient of -2.036 on geographical scope and is significant at 1 percent level**.** The result negates the argument by Ssemawala (2011) that the larger the geographical scope of an organization the greater the impact of its operations is because it activates participation of rural people and cultural development, increasing critical abilities for rural people to diagnose their needs, assert their rights and take greater control of the decisions affecting their lives, providing employment and income opportunities. On the contrary, this result is not surprising considering the fact that the larger the geographical area of operation of an organisation, the thinner it spreads out its intervention, thus the less effective it is likely to be.

R&D also has a negative effect on education development and the effect is significantly different from zero at the 5 percent level. This is an unexpected finding with Field (2011) who argues that investing in research and development related to education helps to avoid running into the risk of basing education on dogma, theory, ideology, convenience and prejudice. The results perhaps may be explained by the fact that funding, conducting research and development programs may lead to diversion of both financial resources and man power that could have been allocated to direct education funding and this negative effect could be short-term. Also possibly the priority for rural people in Uganda may not be research and development but providing good quality education. On the other hand, one could argue that the type of R&D carried out in the rural areas of the country should be appropriate, something which needs further investigation.

The result shows that promoting information and technology dissemination for learning has a positive marginal effect with a coefficient of 1.255, which is statistically significant at the 5% level. This result is expected and it is supported by other studies including Menou and Niang (1991), and Kamba (2009) who claim that promoting the role of information for learning through establishment of innovative community information channels strengthens and empowers the rural people to be among global players in the knowledge –based economy.

The results also show that good coordination of major sources of funding for education has a significant positive effect on education improvement in the rural areas. The estimated probit marginal effect has a coefficient of 2.899 which is statistically significant at 1% level. This result would be consistent with a priori expectation. The finding is consistent with Okidi and Mugambe (2002) who agree but argue that for the development of rural communities one of the major challenges is about how to coordinate major sources of funding for achieving the greatest impact.

Government policy on education for rural areas is found to have a profound positive effect with a marginal effect of 2.052, which is significant at 1 percent level. This result is also expected since one would expect the introduction of universal primary and secondary education to affect rural development positively. Galdeano-Gomez et al. (2011) support this finding by arguing that the exogenous approach to rural development efforts is stimulated from the outside and in this case by the central government through the formulation of policy for rural education. Perhaps, the explanation behind the finding is based on the fact that Uganda is an agrarian economy dominated by smallholder farmers, where it is acceptable that farmers with basic education are more likely to adopt new technology and become more productive.

The number of employees working for the organization also has positive effect on education achievement in the rural areas of the country and this effect is significant at 10 percent level with a coefficient of 0.031. The positive coefficient means that an increase in the total number of employees will consequently lead to an increase in the level of education improvement. This result confirms the conclusions by Coultas and Lewin (2002) who contend that teachers prefer to teach in urban areas. This results in rural school to have empty posts which reduce total number of employees to foster education improvement; even when they are filled, rural education facilities have fewer qualified and experienced teachers. In the same vein, Towse et al. (2002) suggest that the problem of staffing in rural education facilities is often considered as a problem of employees' numbers.

Agriculture improvement and rural development

The coefficients for geographical scope and resource mobilization for agriculture are positive but statistically significant at 1 and 5 percent levels, respectively. The results however, for training in agriculture, access to production factors or inputs, access to information and research and extension services have negative effects on agricultural improvement. Geographical scope has a

marginal coefficient of 1.668 with a Z-statistics of 3.78. This result suggests that the NGOs and SFGs in Uganda are undertaking their operations in reasonably manageable geographical areas and thereby are likely to be efficient in providing the required services to the community; and hence they end up positively affecting rather than promoting agriculture improvement. One could argue that geographical spread may not be a problem to improvement of agriculture because of strong informal network effects and linkages among rural farmers.

The result is surprising because it contradicts the argument by Vandenbosch et al. (2005), who note that providing agricultural education and training provides a range of educational activities for achieving human resources development for rural development. This is backed up by Naluwairo and Tabaro (2006) who contend that agricultural education and training creates niches for farming and smallholder rural enterprises. The results perhaps may be explained by the fact that basic and advanced training in agronomical practices only without the essential inputs such as fertiliser, equipment, and improved seed among other may not improve agriculture to cause rural development. For example, Lukwago (2010) argues those technologies, access to cattle for manure, access to agricultural inputs such as fertilizer, access to labour and agricultural equipment are very essential for agricultural improvement in Uganda. Besides, within the rural setting of Uganda, there are inadequate mechanisms to coordinate the several agencies involved in agricultural education and training (EPRC, 2011). In fact, the institutions are often isolated from extension and research services, thus curricula rarely adjust to the emerging issues (e.g. farmers' participation in research and from rural communities themselves).

The estimated marginal coefficient on mobilizing resources (human and financial) for agricultural development was positive (0.820) and statistically significant at 5% level. The finding fits with Khalil et al (2008) who maintain that agriculture requires both human and financial resources to facilitate the transfer of knowledge from research centres to the farmers. The finding, therefore, indicates that mobilizing resources through SFG and NGOs for agricultural development is essential for enhancing agriculture, which in turn is a major source of food, income, employment, foreign exchange and tax revenue that are critical for rural development. As Echeverria and Beintema (2009) contend that since agriculture connects with food security, poverty reduction and maintenance of the natural resource base, it requires better appreciation in terms of the skills, knowledge and funding rations in budget.

The analysis of the effect of promoting access to land and other factors of production on agricultural improvement in the country reveals a significant negative effect with a marginal coefficient of -0.850 and a Z-statistics of -2.44. According to Cotula et al. (2006), rural poverty is strongly associated to poor access to land either in the form of landlessness or other factors. Cotula et al. further assert that increasing access to land for the poor can bring about direct benefits such as poverty reduction, not least by contributing directly to increase household food security. Although this finding is puzzling, it might make sense if one considers that to the respondents from Central Uganda, land is in abundance to the extent that their poverty is not in any way attributed to poor access to land but to other structural and cultural factors such as remoteness of rural areas, poor infrastructure (poor roads, absence of vehicles), poor market linkages, lack of access to financial services, changing weather patterns(drought, floods), which in all have an impact on water, natural resources, agricultural production and rural livelihoods.

The result contradicts Aina (2007), who asserts that information and knowledge are very crucial in agricultural improvement/development of any community and where they are not or are poorly disseminated, agricultural improvement becomes highly impeded. Aina (2007) further explains that lack of access to basic agricultural knowledge and information by rural smallholder farmers may be forcing them to stick to their old traditional methods of farming systems and animal husbandry practices that result in poor crop and livestock productivity. Perhaps the explanation behind this result rests with the challenges rural smallholder farmers face in accessing information for agricultural development and the resultant effect of this has still been poor agricultural yields. These include the lack of access to agricultural information by rural farmers in Uganda as a result of certain constraints such as general illiteracy and remoteness and accessibility of rural areas.

The probit model results also indicate that conducting agricultural research and extension services has negative effect with a marginal coefficient of -1.334, which is statistically significant at the 5% level with a z-statistics of -2.46. Okori (2011) argues that reducing poverty rates in Uganda requires the empowerment of smallholder farmers to adapt to new technologies, add value and access market which can all be informed properly by conducting successful agricultural research and effectively delivering extension services. To London and Powell (1996) in Kumba, (2003) research and extension promulgates development as it provides opportunities for agricultural professionals to make expert contributions in identifying lessons for best practices, development of appropriate agricultural technologies and improve their dissemination among farmers for adoption. The explanation of these results may be based on the fact that smallholder farmers and NGOs in the short-run do not see critical relevance of the research and extension services since they are long–term processes and returns

on investment may take at least 10 to 15 years to realize (Kumba, 2003). Also, research and extension require considerable investment of capital and operational costs which is a constraint in rural Uganda. Besides, possibly research and extension services to operate successfully requires government commitment and the linkage between research and extension must be well articulated and operationalized – for instance the information and technology generated by research should be able to reach the greatest number of smallholder farmers (as users) if the extension system is to achieve its goal, and of course time and feedback to research and ability to research systems.

Industrial improvement and rural development

Firstly with respect to improvement of rural industry, our findings reveal that geographical scope of the organization has a negative influence and this influence is significant. Besides, the results also show that employees' numbers and rural policies also affect rural industry improvement but positively and significantly. For geographical scope, the result is plausible because the bigger the area of operation of the NGO and NGOs the less effective they would be especially as you can also see from the results that employees' number is positively correlated with industry improvement. This is contrary to Kenell (1999) and Osei (2010) who claim that those industries located in rural areas such as cottage ones have the advantages of needing low capital and they use local resources which are readily available.

Public rural policy has a positive and significant effect on industry improvement in rural Uganda; it has a marginal coefficient of 0.743 and a z-statistics of 2.12. This means that an increase in support for rural advocates for agro-based industry policies will consequently lead to an increase in the level of industry improvement. This result is expected and supports findings for example by Sunder and Srinivasan (2009) that emphasize that agro-industrial policy aimed at value addition to agricultural production could be achieved by introduction of modem technology into food processing chain through developing facilities for storage, transport and processing. This literature is in line with that of Aryeetey (2007), and Olayiwola and Adeleye (2005) who maintain that policy influence for agro-based industries also increases participation of entrepreneurs and farmers in food processing and related sectors, creating new employment opportunities and increasing incomes for the rural people.

Another key finding of this study is that total employees of the organizations in question have a significant effect on industry improvement in the rural areas. The result shows that increasing total employees of the NGOs and SFGs has a positive coefficient of 0.023 which is statistically significant at the 10 % level. This result may be explained by the fact that in Uganda, like elsewhere in developing countries rural industries are labour intensive and require large numbers of personnel especially causal workers who are readily affordable and accessible in rural areas. This is supported by Bryden and Bollman (2000) who reason that rural setting are found to have plenty of excess supply of unskilled labour that can be easily employed as causal workers.

Conclusion

The study found out that the linkage between improving health and rural development is influenced negatively by health insurance subsidization and health services financing. For reasons of being unsustainable, associated with low quality services, creation of a tax burden and the fact that the supply side of subsidy creates no incentives for services providers to provide good services. In this case investing in improved access to and sharing of information not targeted to perquisite infrastructure may not lead to rural development in Uganda. Equally, promoting policy development, programme planning and service delivery has positive effect on health improvement in rural Uganda. For reason of promoting participatory engages members of the rural communities and other stakeholders to be given an opportunity to contribute to the designing of the health plan.

The geographical scope of the organization negatively affects education improvement in rural Uganda. This is because the larger the geographical area of operation of an organisation, the less effective it is likely to be. Promoting information and technology dissemination for learning on the other hand positively influences education improvement for reasons that access to various information services has become more difficult due to illiteracy and distance from information sources. Besides, coordination of major sources of funding for education influences education improvement positively.

Offering basic and advanced training has a negative effect on agricultural improvement among the Ugandan rural farmers. This is because basic and advanced training in agronomical practices only without the essential inputs such as fertiliser, equipment, and improved seed among other may not improve agriculture to cause rural development. On the other hand, mobilizing resources (human and financial) for agricultural development has positive effect on agricultural improvement in rural Uganda. This is because the poor view groups as providers of means to working together in self-help groups, and through which they can be in a position to tap external benefits such as resources (financial, human and physical).

Geographical scope of the organization regarding the reach of the NGOs/SFGshas a significant effect on industrial improvement. These findings support advocate

for agro-based industry policies for industry has a positive effect on industry improvement in the rural areas. This is because famers as smallholders and small enterprises in Uganda need support in terms of finance, infrastructure and skills development.

Conflict of Interests

The authors have not declared any conflict of interests.

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