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Full Length Research Paper

Commercializing innovations from agricultural research in Northern Ghana and farmers' willingness to pay

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The study used contingent valuation to solicit monetary values from researchers and farmers on how much they were willing to sell and buy agricultural innovations from research respectively. A probit model was then employed to identify the determinants of researchers' willingness to sell innovations from research. Furthermore, a multivariate (MV) probit model was estimated to explain key determinants of farmers' willingness to pay (WTP) for such innovations (technologies). Multi-stage sampling methods were used to obtain data from 360 farmers and 51 research scientists for the study. Though majority of farmers were willing to pay for agricultural innovations, the amounts they were prepared to pay (average of GH¢6.00), were far less than what the researchers wanted them to pay (average of GH¢50.00). The probability of a researcher accepting payment for innovations from research was high for the following categories of researchers: younger researchers; researchers who were members of professional bodies; and researchers with a high number of publications. The following categories of farmers also had a higher probability of paying for research output: younger farmers; farmers with high level of formal education; native farmers; farmers who had contacts with extension staff; and farmers with high income from their previous farming and non-farming activities. Considering the wide disparity between researchers' WTA payment for innovations and farmers' WTP, commercialization of research is possible but cannot be run on full cost-recovery. Government should therefore set up a statutory fund dedicated to agricultural research as a way of subsidizing agricultural innovations.

Key words: Agricultural innovations, contingent valuation, multivariate probit model, willingness to pay, willingness to accept, probit model.

INTRODUCTION

Technology transfer and adoption have been identified as key to improving agricultural productivity, but funding of research and technology dissemination has also been a challenge to public research institutions and universities.

It is against this background that research commercialization is strongly advocated by policy makers. To policy makers, research commercialization would improve private sector's access to research results from public

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institutions, generate more funds for research and development, increase national competitiveness, optimize the return on public research funding and usage of innovations as well as help public research institutions overcome their budgetary constraints (Karlsson, 2004; Ali et al., 2008).

Ghana has therefore taken steps to operationalize research commercialization and to ensure that there is benefit not only to the end users of research products but also to researchers. This has led to the enactment of laws on Intellectual Property (IP) rights. These IP laws include the Patent Act, 2003 (Act, 657), the Copyright Act, 2005 (Act 690), Trade Marks Act, 2004, (Act 664), Industrial Designs Act, 2003 (Act 660) and Geographical Indications Act, 2003 (Act 659) (Constitution of the Republic of Ghana, 1996). Ghana is also a member of the World Intellectual Property Organization (WIPO). Additional laws have been enacted as part of efforts aimed at operationalizing commercialization of some research innovations, especially improved seed, which seems to be the focus of the Ghana government for now. Notable among them is the enactment of a new law called the Plants and Fertilizer Act 2010, (and a Plant Breeder's bill is currently before Ghana's Parliament awaiting to be passed into law). These policy regulations and laws are necessary but not sufficient condition for improving Ghana's agricultural productivity. For example, supply of good seed is not an end in itself. It is only part of a number of factors of crop management that contribute to farm productivity. While it is important to examine the seed supply side as the various laws and regulations seek to do, the demand side which is most critical is often overlooked (Tripp and Mensah-Bonsu, 2013). Also, what is often over looked is the demand for the other components of crop management necessary for farm productivity: soil fertility management, field crop protection and post-harvest techniques, in a research commercialization regime.

Presently, there is limited empirical research on the level of commercialization of innovations from agricultural research and the possible determinants of farmers' willingness to pay for the innovations. It is also not clear how much researchers will be willing to sell their innovations upon commercialization and how much farmers too will be willing to buy such innovations from researchers. Information on these is crucial in making an informed opinion on whether commercializing innovations from research is a viable and sustainable alternative to public funding of agricultural research in Ghana or not. This study sought to look at, *ex-ante*, researchers' willingness to accept payment for their research output and farmers' willingness to pay for these innovations.

LITERATURE REVIEW

Innovation is the creation of new, better or more effective processes, technology or ideas for the production of

goods and services. However, innovation in itself is not enough. It is useful when it is adopted and used by markets, governments and society (Bechdol, 2012). Technology is usually defined by economists as a stock of available techniques or a state of knowledge concerning a relationship between inputs and outputs (Colman and Young, 1989). Technology development creates opportunities, benefits and efficiency gains for farmers resulting in competitive utilization of factors of production (Gurel, 1998).

Rogers (1995) defined a technology as an instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome. A technology usually has two components, the hardware and the software aspects. The hardware aspect consists of the tool that embodies a material or physical object while the software component is the information-base for the tool. Rogers stated that the social embedding of the software component of a technology is usually less visible than its machinery or equipment and so technology is often understood in its hardware terms, especially agricultural technologies (Rogers, 1995). Perkmann et al. (2013) defined commercialization as intellectual property creation and academic entrepreneurship. Markmann et al. (2008) contended that commercialization is a key example for generating academic impact because it constitutes immediate, measurable market acceptance for outputs of academic research. Commercialization represents one important way for academic research to contribute to the economy and society (Salter and Martin, 2001).

Many factors have been hypothesized as having some influence on the commercialization of innovations from research in a number of studies. These factors are well explained and categorized into individual, organizational, socio-cultural, statutory and economic factors (Fakur, 2007; Radfar et al. 2009; Mohammadi et al., 2009; Nemati and Jamshidi, 2007; Bandaryan, 2009).

MATERIALS AND METHODS

Theoretical framework

The conceptual base for this study lies in the need for private participation in funding agricultural research through commercialization of innovations from research. Specifically, the need for agricultural research to move from "business-as-usual" to results-oriented and demand-driven academic discipline yielding financial rewards to scientists for their ingenuity and hard work as well as increased income to farmers through increased productivity as a result of adoption of innovations from research.

According to Holden and Shiferaw (2002) and Ulimwengu and Sanyal (2011), willingness to pay is modelled as a sacrifice of current income in order to sustain or increase agricultural productivity in the future.

Therefore, expenditure function is used to estimate WTP for improvement in the quality of a resource. The minimum expenditure level (e) required to achieve the initial utility level is given by an expenditure function as

$$e = e(p, EU_0, F_0) \tag{1}$$

where p is the vector of prices, EU_0 is the current expected utility level, and F_0 is the set of old agricultural services and farm characteristics. This means the amount of money a farmer spends in acquiring improved agricultural innovations is a function of prices, expected utility as well as agricultural services and farm characteristics. It follows that the willingness to pay in order to sustain current level of farm productivity is given by

$$WTP = e(p, EU_0, F_0) - e(p, EU_0, F_1) \tag{2}$$

Where WTP is the amount at which the household feels indifferent between the expected marginal utility under the old set of technologies and the discounted expected marginal utility of the change in future incomes as a result of the new set of agricultural technologies; F_1 is the new set of agricultural services and farm characteristics. Researchers' willingness to commercialize innovations can be analysed using willingness to accept (WTA) as proxy. WTA measures how much a respondent is willing to accept as compensation for a loss of a good or service. Contingent valuation tends to quantify the value consumers assign to products using a hypothetical purchasing situation in which they have to answer how much money they would be willing to pay for a given product, or if they would be willing to pay for a certain price premium (Carmona-Torres and Calatrava-Requena, 2006).

The probit model

The response variable, researchers' willingness to accept payment for agricultural technologies, is qualitative in nature. The appropriate model is a discrete choice model such as the probit model (Gujarati, 2004). Following Gujarati (2004), to motivate the probability model, the decision of the i^{th} researcher's willingness to accept payment for agricultural technology or not depends on an unobservable utility index I . This utility index is a latent variable which is determined by a number of explanatory variables. The index, I_i is expressed as

$$I_i = \beta_1 + \beta_2 X_i \tag{3}$$

In establishing the relation between the unobservable utility index and the actual decision making on willingness to accept payment, a threshold level of the utility index is assumed, say I_i^* .

$$\begin{aligned} \text{if } I_i > I_i^*, I &= 1 \\ \text{if } I_i \leq I_i^*, I &= 0 \end{aligned}$$

Given the assumption of normality, the probability that I_i^* is less than or equal to I_i can be computed from the standardized normal cumulative density function (CDF) as

$$P_i = P(Y = 1|X) = P(I_i^* \leq I_i) = P(Z_i \leq \beta_1 + \beta_2 X_i, \dots, \dots, \beta_n) = F(\beta_1 + \beta_2 X_i, \dots, \dots, \beta_n X_n) \tag{4}$$

where $P(Y = 1|X)$ means the probability that an event occurs given the values of the explanatory variables and where Z_i is the standardized normal value, i.e. $Z \sim N(0, \sigma^2)$. F is the standard normal CDF. Taking the inverse of the CDF gives

$$I_i = F^{-1}(I_i) = F^{-1}(P_i) = \beta_1 + \beta_2 X_i, \dots, \dots, \beta_n X_n \tag{5}$$

where F^{-1} is the inverse of the normal CDF. In the case of farmers' willingness to pay, running a separate estimation for determining willingness to pay for different

agricultural technologies is likely to yield biased estimates especially in a situation where the willingness to pay for one agricultural technology significantly correlates with the willingness to pay for other technologies (Ulimwengu and Sanyal, 2011). Therefore, in this study, while a probit model is used to determine the factors influencing researchers' willingness to accept payment, a multivariate probit model is used to estimate farmers' willingness to pay for different agricultural technologies. Following Capellari and Jenkins (2003), the multivariate probit is given as

$$y_{im}^* = \beta X_{im} + \varepsilon_{im}, m = 1, \dots, \dots, M \tag{6}$$

$y_{im} = 1$ if $y_{im}^* > 0$ and 0 otherwise, $\varepsilon_{im}, m = 1, \dots, \dots, M$ are error terms distributed as multivariate normal, each with a mean of zero, and variance-covariance matrix V , where V has values of 1 on the leading diagonal and correlations. Capellari and Jenkins (2003) noted that the model has a structure similar to that of a seemingly unrelated regression (SUR) model, except that the dependent variables are dichotomous. The Geweke-Hajivassiliou-Keane (GHK) smooth recursive conditioning simulator is used for estimating the multivariate probit model (Borsch-Supan and Hajivassiliou, 1993; Capellari and Jenkins, 2003).

If y_j^i denote farmer I 's binary response outcome associated with each j type of agricultural technology, for $j = 1$ such that y_j^i is 1 if farmer I is willing to pay for agricultural technology j and 0 otherwise. Ulimwengu and Sanyal (2011) showed that the multivariate probit model can be specified as a linear combination of deterministic and stochastic component:

$$y_j^i = x' \beta_j + \varepsilon_j \tag{7}$$

Where $x = (1, x_1, \dots, \dots, x_p)$ is a vector of p covariates, which do not differ and $\beta_j = (\beta_{j0}, \beta_{jp})$ is corresponding vector of parameters to be estimated. The error term ε_j consists of those unobservable factors affecting the marginal probability of WTP for a type of j agricultural technology. They added that each ε_j is drawn from a J -variate normal distribution with zero conditional mean and variance normalized to unity (for parameter identification): $\varepsilon \sim N(0, \Sigma)$ with the variance covariance matrix given by:

$$\Sigma = \begin{bmatrix} 1 & P_{12} & \dots & \dots & P_{1j} \\ P_{21} & 1 & \dots & \dots & P_{2j} \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ P_{j1} & P_{j2} & \dots & \dots & 1 \end{bmatrix} \tag{8}$$

The off-diagonal elements in the covariate matrix P_{sj} represent the unobserved correlation between the stochastic component of the s^{th} and the j^{th} types of the agricultural technology (innovations).

Empirical specification of the probit model

Following the theoretical model explained earlier the empirical model to researchers' WTA payment for their innovations is as follows:

$$Y_i = \beta_0 + \beta_1 Age_i + \beta_2 Mem_i + \beta_3 Exp_i + \beta_4 No. Pub_i + \beta_5 Non. Pro. i + \beta_6 Dep. Sal_i + \beta_7 Nec. Pub_i + \varepsilon_i \tag{9}$$

Where Y_i = Researchers' WTA payment for his innovations; ε_i = Sample Error Term

The multivariate probit model for modelling the determinants of farmers' WTP for innovations from research is

$$Y_{ji}^* = \sum_{m=1}^{m=7} X_{mi} \beta_{mj} + \varepsilon_{ji} \tag{10}$$

Table 1. Definition of researchers' socio-economic variables.

Variable	Definition	Measurement	A Priori expectation
Age	Age of respondent	Age of a researcher, measured in years.	Positive
Mem	Membership to a professional body	Dummy; 1 if a researcher belonged to a professional body; 0 otherwise	Positive
Exp	Years of Experience	Number of years a respondent had been a researcher	Positive
No.Pub	Number of publications	Number of research published papers a respondent had	Positive
Non.Pro	Researchers' perception regarding the non-profit nature of extension delivery (technology transfer)	Dummy; 1 if a researcher perceived that the non-profit nature of extension delivery negatively affected research commercialization; 0 otherwise	Negative
Dep.Sal	Dependence on stated regular source of salary (Government subvention)	Dummy; 1 if regular source of salary will affect commercialization positively; 0 otherwise	Negative
Nec.Pub	Necessity to publish in order to be promoted	Dummy; 1 if a researcher agreed that the necessity to publish in order to be promoted could increase research commercialization; 0 otherwise	Positive/ Negative

where j is the type of agricultural technology, $X_m = X_1, X_2, X_3, X_4, X_5, X_6, X_7$ and X_8 are socio-economic factors influencing the dependent variable, farmers' WTP for innovations from research. $Y_j^* = Y_1^*, Y_2^*, \dots, Y_7^*$

denotes farmers' willingness to pay for improved seed, soil fertility improvement techniques, weed and pest control methods, safe use of agro-chemicals, crop disease identification and control measures, farm management and record keeping and post-harvest techniques, respectively. Also $\beta_m = \beta_1, \beta_2, \dots, \beta_8$ are parameters to be estimated and $\varepsilon_j = \varepsilon_1, \varepsilon_2, \dots, \varepsilon_{i8}$ are error terms attributed as multivariate normal. The descriptions of the variables as well as their *priori* expectations are indicated in Tables 1 and 2.

Study area, sampling procedure and data collection

The study was carried out in Northern Ghana, which comprises the Upper West, Upper East and Northern Regions. A total of six districts were randomly sampled for the study; two from each of the three northern regions of Ghana. Six communities were then selected from each district and ten farmers from each of the selected communities through simple random sampling technique. In total, three hundred and sixty farmers were interviewed with the use of semi structured questionnaires. Fifty one researchers were also randomly selected and interviewed from two purposively selected institutions: University for Development Studies (U.D.S.) and Savannah Agricultural Research Institute (SARI) based on their specialization in the following areas of agricultural technology: improved seed varieties (early maturing, high yielding, drought-resistant, striga-resistant, improved palatability), recommended seed and fertilizer rates, recommended planting distances, soil fertility management practices, pest and disease control, post-harvest techniques and improved soil and water conservation practices. Both institutions also have their mandates covering the three regions of northern Ghana. The main source of data for the study was primary, which was collected using semi-structured questionnaires. The questionnaires were administered to both farmers and researchers. Each questionnaire contained a

hypothetical market situation.

RESULTS AND DISCUSSIONS

Descriptive analysis of willingness to sell and pay for innovations from research

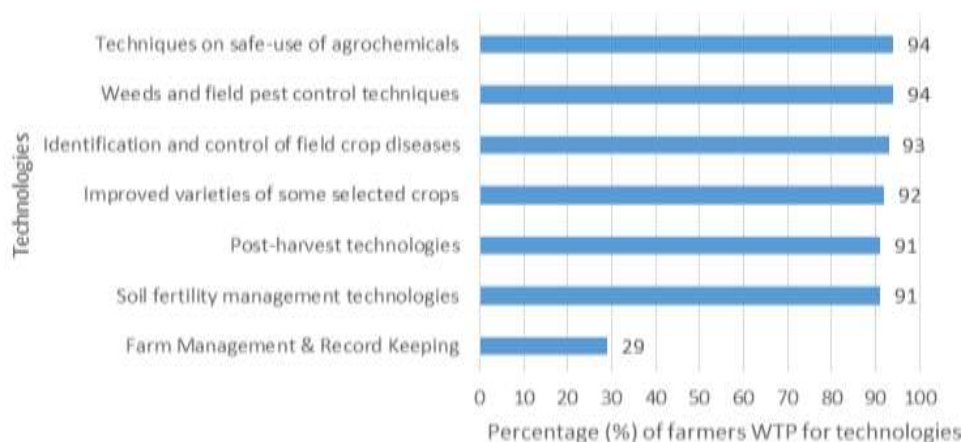
The main objective of this study was to assess researchers' willingness to sell innovations from research and farmers' willingness to pay for such innovations. The study revealed that 59% of researchers were willing to sell their innovations or provide extension service to farmers for a fee. The respondents who expressed their willingness to sell innovations from research gave various reasons for their answer. The highest percentage of respondents (43.3%) considered private participation as critical in sustaining funding for agricultural research.

Similarly, 26.7% thought that farmers would value research innovations more if they paid for it. About 16.7% of respondents saw service charges from the sale of innovations as a source of motivation and incentive to researchers, and the remaining 13.3% thought that research commercialization would improve access to research innovations and extension services. The forty one percent of respondents who said they were not willing to sell their innovations also gave their reasons. The highest percentage of respondents considered low income levels among farmers as a factor that would militate against research commercialization. Similarly, the least percentage of respondents not willing to sell saw research commercialization leading to low adoption of technologies.

Farmers were also willing to pay for innovations from

Table 2. Definition of Farmers' socio-economic variables.

Variable	Definition	Measurement	A Priori expectation
X ₁	Age of the farmer	Years	Positive
X ₂	Educational status	1 if a respondent had formal education; 0 otherwise	Positive
X ₃	Total farm income for the 2013 cropping season	Ghana Cedis (GH¢)	positive
X ₄	Total non-farm income for the 2013 cropping season	Ghana Cedis (GH¢)	Positive
X ₅	Nativity	1 if the respondent was a native of the community; 0 if settler farmer	Positive
X ₆	Free-rider	1 if a farmer who could obtain improved seed and knowledge on agricultural technologies free of charge from friends and relatives was also willing to pay; 0 if a farmer would not pay for innovations because he could free-ride	Negative
X ₇	Number of acres	Total area of land under cultivation owned by a respondent in acres.	Positive
X ₈	Extension contacts	Number	Positive

**Figure 1.** Percentage of farmers willing to pay for Innovations from Agricultural Research

research. On average, 83% of farmers were willing to pay for all the technologies proposed to them. Figure 1 shows that 94% of farmers were willing to pay for techniques on safe use of agro-chemicals as well as weeds and field pest control techniques. The technology that farmers were least willing to pay was on training on farm management and record keeping.

Researchers' willingness to accept payments and farmers' willingness to pay for improved technologies

Contingent valuation was used to solicit monetary values

from both researchers and farmers. The rationale behind a WTP study is that it indicates the monetary value that individuals attach to a good or service, which in turn predicts their likely contribution towards the maintenance of the said good or service (Boadu, 1993). Willingness to accept payment (willingness to sell) represents a compensation for the loss of a good or service. In this study, a researcher's willingness to accept payment represents the opportunity cost of extending a research innovation to a farmer.

Table 3 indicates the minimum amounts researchers were willing to accept (Min WTA) as payment for their innovations. From the results, extending innovations to

Table 3. Farmers' WTP and Researchers' WTA.

Technologies	Min WTP GH¢	Max WTP GH¢	Average WTP GH¢	MinWT A GH¢	Max WTA GH¢	Average WTA GH¢	Ratio WTP:WTA
Soil fertility management technologies	4.00	6.00	5.00	57.00	100.00	78.50	5:78.5
Weeds and field pest control techniques	4.00	6.00	5.00	53.00	100.00	76.50	5:76.5
Techniques on safe-use of agro-chemicals	4.00	6.00	5.00	53.00	100.00	76.50	5:76.5
Identification and control of field crop diseases	4.00	6.00	5.00	50.00	100.00	75.00	5:75
Post-harvest technologies	3.00	6.00	4.50	44.00	96.00	70.00	4.5:70
Farm Management and record keeping	4.00	6.00	5.00	43.00	85.00	64.00	5:64

The exchange rate at the time of survey was USD1.00= GH¢2.40.

farmers on record keeping and farm management was the least valued by researchers while that of soil fertility management had the highest value. Researchers were willing to accept GH¢43.00 and GH¢57.00, per farmer to provide a day's training on record keeping and farm management techniques as well as soil fertility management techniques, respectively. Below these stated amounts researchers were not willing to sell these techniques. Similarly, researchers would also not be charging more than GH¢85.00 and GH¢100.00 per farmer for these two innovations.

The WTA offers in this study are significantly not different from the findings of Kolavalli et al. (2010) that the costs of extension service provided per farmer for the year 2006 were GH¢52.00 in the Brong-Ahafo region, GH¢64.00 in the Northern region and GH¢93.00 in the Western region of Ghana. Farmers' willingness to pay for soil fertility management techniques, field crop protection techniques, safe-use of agro-chemicals, post-harvest techniques and farm management and record keeping techniques were also valued. It is important to note that different types of crop technologies have both hardware and software components. An improved crop variety, as a type of hardware technology, cannot be fully exploited without having a complementary set of agronomic practices (Food and Agriculture Organization (FAO, 1997), hence assessing farmers' WTP for these technologies as well as the valuation of these technologies. Table 3 also shows the values farmers offered for these technologies.

Farmers were willing to pay as low as GH¢4.00 each for a day's training on soil fertility management and as high as GH¢6.00. They were not willing to pay for a day's training on soil fertility management above GH¢6.00.

Respondents were willing to pay as low as GH¢4.00 and as high as GH¢6.00 to receive training on ways of controlling weeds and insect pest on crop fields. Those willing to pay to receive training on safe use of agro-chemicals were prepared to pay as low as GH¢4.00 and as high as GH¢6.00, on average to receive the training (Table 3).

The last column of Table 3 highlights the significant wide gap between farmers' willingness to pay for agricultural innovations and researchers' willingness to accept payment for their innovations.

On average, farmers are willing to pay less than 7% of what researchers are willing to accept for the innovations extended to them. The divergence is as a result of farmers and researchers belonging to two diverging income groups. Researchers are wealthier than the farmers and so WTA will substantially differ from WTP (Hoffman and Spitzer, 1993). The study revealed that on average, the basic monthly salary for a researcher with first degree was GH¢1440.00 and that of a non-PhD was GH¢1750.00. PhD researchers had a mean basic monthly salary of GH¢2380.00. This is in sharp contrast to farmers' mean farm income of GH¢968.00.

This finding suggests that research commercialization is an area where subsidies will be required if it is to be successful. The subsidy could be in the form of continuous government subvention to research institutions.

Seed system and farmers' WTP for improved seed

Improved seed is about the most important technology to the farmer. From Table 4 farmers were willing to pay between GH¢2.00 and GH¢4.00 for improved seeds of

Table 4. Farmers' WTP for improved seed of some selected crops.

Crop	Prices offered for 1 Kg	
	Minimum (GH¢)	Maximum (GH¢)
Maize	2.00	4.00
Rice	2.00	3.00
Soya bean	3.00	4.00
Sorghum	1.00	3.00
Tomatoes	3.00	4.00

The exchange rate at the time of survey was USD1.00= GH¢2.40.

Table 5. Marginal effects of the factors influencing researchers' willingness to sell research innovations.

Explanatory variables	Marginal effects	STD. error
Age	-0.0184289	0.00766**
Membership to a professional body	0.4425909	0.17524**
Respondents' years of experience	0.0155304	0.03222
Number of publications of a researcher	0.0669063	0.03023**
Non-profit nature of extension delivery	-0.2900798	0.19142
Dependence on stated source of salary	0.1435752	0.18466
Necessity to publish in order to be promoted	0.0788004	0.17491

** represent significance level of 5%.

maize, rice and soya bean. At prices above GH¢4.00, farmers were not willing to pay for improved seed. Efforts at promoting the use of hybrid seeds among farmers might not be successful currently, considering the fact that the price of hybrid seed, for example, maize (Panar 53) was GH¢10.00 per 1Kg, far above the maximum stated WTP by the farmers. Efforts should rather be geared towards improving access to the Open Pollinated Varieties (OPVs) whose prices are within the farmers' stated willingness to pay values. Prices of the OPVs ranged from GH¢1.77 to GH¢2.66 for maize, rice, soya bean and sorghum for the 2014 cropping season, as reported by the Seed Producers Association of Ghana (SEEDPAG).

Determinants of researchers' willingness to sell innovations

One of the objectives of the study was to investigate the factors that influenced researchers' willingness to sell the following technologies: improved seed varieties, soil fertility improvement techniques, weed and pest control methods, safe use of agro-chemicals, field crop disease control, post-harvest techniques as well as farm management and record keeping. To do this a probit model was estimated. The significant factors were age, membership to a professional body and number of

publications.

The age of researchers had a significant negative influence on willingness to sell research innovations. The marginal effect indicates that an increase in age of a researcher by one year will result in a decrease of the probability of the researcher willing to sell his innovations by 2%. Younger researchers are more commercially oriented because they need to earn more money, besides their salaries in order to have a good start in life. Researchers' membership to a professional body had a positive influence on their willingness to sell their research technologies. Thus, researchers who belonged to professional bodies were more willing to commercialize innovations from research than those who did not belong to any professional body.

Membership to a professional body increases one's network, business orientation and social capital. The positive influence of membership to a professional body on their willingness to commercialize innovations from research was significant at 5%. It is expected that researchers who become members of professional bodies will lead to a higher probability of willingness to sell innovations by 44%. The number of publications by a researcher also had a positive influence on the willingness to commercialize. Thus, as the number of publications by a researcher increases, his willingness to sell research technologies also increases. This was significant at 5%. Furthermore, an increase in the number

Table 6. MV probit indicating factors influencing farmers' WTP for Innovations.

Explanatory Variables	Improved Seed	Soil fertility improvement techniques	Weeds and insect pest control methods	Safe use of agro-chemicals	Farm management and record keeping	Post-harvest techniques
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Age	-0.0222541 (0.0083612)***	-0.0285107 (0.0081633)***	-0.0294915 (0.0092794)***	-0.0487716 (0.0100546)***	-0.0061457 (0.0060389)	-0.0213486 (0.0076276)***
Educational status	0.8566023 (0.4063613)**	-0.0004373 (0.2269114)	-0.0898358 (0.2734372)	-0.4790022 (0.2654224)*	0.430929 (0.1556653)***	-0.144377 (0.2155912)
Nativity	0.8973799 (0.2481937)***	0.7725424 (0.2414772)**	0.8741929 (0.2820333)***	0.2542582 (0.313295)	-0.0029226 (0.2138322)	0.0818802 (0.2621454)
Free-rider	0.4872093 (0.2353743)**	0.4128067 (0.2207351)*	0.4746116 (0.2559607)*	0.4662275 (0.2736648)	0.3498178 (0.1878753)*	0.5004964 (0.2112851)**
Number of acres	0.0130904 (0.0227986)	0.0121588 (0.020583)	0.0471642 (0.0303452)	0.0633813 (0.0348181)*	-0.081843 (0.0134122)	0.0048097 (0.0175745)
Off-farm income	0.0130904 (0.0001053)	-0.0001431 (0.0000467)***	-0.0001078 (0.000062)*	9.89e-07 (0.0000751)	-0.000032 (0.0000453)	-0.0000106 (0.0000543)
Farm income	0.0001169 (0.0001506)	0.0000733 (0.0000963)	0.0005268 (0.0002579)**	0.0005268 (0.0002799)*	0.0000625 (0.0000699)	-0.000062 (0.0000686)
Number of contacts with an A.E.A.	0.0552829 (0.32997)*	-0.0308932 (0.0245868)	-0.047721 (0.0259496)*	-0.0610719 (0.0257548)**	0.0867617 (0.0174427)***	0.0043998 (0.0253028)

*, **, *** represent 10%, 5% and 1% levels of significance respectively. NB. Std. Errors are in parenthesis.

of publications by one will increase the probability of a researcher willing to sell innovations by 8% (Table 5).

Determinants of Farmers' WTP for Research Innovations

The results from the Multivariate Probit model (MV Probit) looked at farmers' willingness to pay for the following technologies: improved seed varieties, soil fertility improvement techniques, weed and pest control methods, safe use of agro-chemicals, field crop diseases control, post-harvest techniques and farm management and record keeping. The log likelihood and Wald chi-square values were -550 and 143.44, respectively. The Wald chi-square value was significant at 1%, suggesting that all the explanatory variables jointly determined the dependent variable. The endogeneity within the data set, as evidenced by the positive correlations between willingness to pay for the various technologies was corrected using Geweke-Hajivassiliou-Kean (GHK) smooth recursive conditioning simulator (Kankwamba et al.

2012).

Across all the technologies, age of the respondents had a significant negative influence on their willingness to pay for agricultural technologies. This means that as farmers grow older, the probability of their willingness to pay for agricultural innovations decreases. Possibly, older farmers would not like to go through the mental stress associated with learning agricultural technologies and may also be risk averse. Mwaura et al. (2010) found that increasing age of respondents was associated with reducing likelihood for their willingness to pay for agricultural innovations. To Kaliba et al. (1997), young people have relatively high disposable income, are less risk averse, exposed to a wide range of information channels and have the potential to be more educated.

Except for farmers' willingness to pay for crop diseases control and farm management and record keeping, the age variable was significant at 1% significant level for WTP for the other techniques. From Table 6, for every additional year above the mean, the probability to pay for improved seed, soil fertility improvement techniques, weed and pest control methods, safe-use of agro-

chemicals and post-harvest techniques decreases by 0.022541, 0.0285107, 0.0294915, 0.0487716 and 0.0213486, respectively, holding all other variables constant. The educational status of the farmer significantly and positively influenced his/ her WTP for improved seed and knowledge on farm management and record keeping at significance levels of 5% and 1% respectively. Educational status was however found to have a negative influence on farmers' WTP for safe-use of agro-chemicals techniques at significance level of 10%. Thus farmers who had at least basic education were less willing to pay for training on safe use of agro-chemicals. Farmers with formal education felt they could on their own understand issues regarding safe use of agro-chemicals and did not have to pay to receive additional information.

Nativity significantly and positively affected farmers' WTP for improved seed, soil fertility improvement techniques as well as field crop protection techniques. The nativity variable was significant at 1% for farmers' WTP for improved seed, soil fertility improvement techniques and field crop protection techniques. Thus farmers who were natives were more willing to pay for these innovations as against settler farmers.

The issue of free-rider is often considered as one of the possible limitations to commercializing innovations from agricultural research. In ascertaining the influence of free-riding on willingness to pay, respondents were asked whether they were still willing to pay for the proposed package of research technologies should they have free access to the same package from family members and friends. From the estimation, the free-rider variable had significant and a positive influence on farmers' WTP for improved seed, soil fertility improvement techniques, field crop protection, post-harvest techniques, farm management and record keeping techniques as well as techniques on safe use of agro-chemicals. This implies that issue of free-riding exists in the provision of agricultural services, just as any public good, but contrary to our *a priori* expectations it will increase farmers' WTP for agricultural innovations.

The free-rider variable was significant at significance levels of 5% for WTP for improved seed and post-harvest techniques, and 10% for WTP for soil fertility improvement techniques, weed and pest control methods and knowledge on safe use of agro-chemicals. For example, from Table 6, a farmer who had free advice from a friend on post-harvest techniques, his probability of willing to pay for innovations on post-harvest technology in future will increase by 0.50 or 50%. The number of acreages a farmer cultivated for the 2013 cropping season had no significant influence on WTP for all the technologies, except for safe use of agro-chemicals. Thus, farmers who had more area of land under cultivation were more willing to pay for training on safe use of agro-chemicals. This was at 10% significance level. The previous off-farm income was found to have a negative influence on farmers' WTP for both soil fertility improvement techniques and field crop protection techniques. The

previous farm income had a significant and positive effect on farmers' willingness to pay for weeds and pest control techniques as well as safe-use of agro-chemicals.

It was also important to determine whether the number of contacts (field visits) a respondent had with an Agricultural Extension Agent (A.E.A.) had any influence on willingness to pay for the technologies. The results suggests a positive influence on the respondent's WTP for farm management and record keeping techniques and improved seed at significance levels of 1% and 10% respectively. However, farmers who had more visits from A.E.As were found to be less willing to pay for weed and pest control methods and safe use of agro-chemicals. If the number of contacts a farmer had with an extension agent can be used as proxy for measuring prior access to agricultural services, then this finding supports that of Ulimwengu and Sanyal (2011) whose results suggest that prior access to agricultural services tends to reduce farmers' willingness to pay. The effects of the explanatory variables on farmers' WTP for innovations on crop diseases identification and control measures were not significant, hence not shown in Table 6. This is however shown in Appendix 1.

CONCLUSIONS AND RECOMMENDATIONS

The objective of this study was to investigate researchers' willing to sell their innovations as well as farmers willingness to pay for such research findings. Generally, farmers were willing to pay for innovations from research in the same way that a number of researchers were willing to sell their innovations. Farmers in the study attached the same value to all the technologies proposed to them. On the whole, farmers were willing to pay a mean of GH¢6.00 for the technologies. This means that farmers give equal importance to research innovations irrespective of whether it is a post-harvest technique or soil fertility management technique. Among the researchers, there were different valuations for the technologies. Soil fertility management technologies had the highest mean minimum WTA (GH¢57.00) and farm management and record keeping techniques was least valued (GH¢43.00). Government's subvention to research institutions should also be continued during research commercialization. This will serve as a subsidy for research commercialization.

The success of research commercialization will be dependent on improvement in both farm and non-farm incomes, increase in land area under cultivation and improvement in the educational status of farmers. Also, on the part of researchers, increase in the number of publications of researchers, encouraging the youth in academia to go into research and scientists becoming members of professional bodies would enhance research commercialization. In conclusion, research commercialization is possible but cannot be an alternative to public funding of research judging from the low WTP

valuations from farmers. Government can go ahead and implement the policy on research commercialization with two expectations; one is that the monetary returns would be low; and the other is that at least research commercialization would serve as another source of revenue for further research. The wide disparity between WTP and WTA means that commercialization of research could not be run on full cost-recovery. Government should therefore set up a statutory fund dedicated to agricultural research. Researchers should consider the issue of patenting their innovations very seriously, as it is one of the means through which they could get financial reward for their hard work and would be seen as being entrepreneurial. Also researchers should develop entrepreneurial and marketing skills. This is key to reducing the gap between WTA and WTP. Researchers should be encouraged to form and belong to professional bodies as it had a significant and positive influence on willingness to sell innovations from research. Research institutions should continue to use the number of publications of a researcher as requirement for promotions. These institutions could also consider whether a researcher has a patent right as additional requirement for promotions.

Conflicts of interest

The authors have not declared any conflict of interests.

REFERENCES

- Ali S, Ahmed M, Ali T, Islam D, Iqbal MZ (2008). Farmers' Willingness to Pay (WTP) for Advisory Services by Private Sector Extension: the case of Punjab. *Pak. J. Agric. Sci.* 4(3).
- Bandaryan R (2009). Marketing and Commercializing modern technologies: Processes, Key and Simplifying Factors of Success. *Dev. Technol.* 19:39-45
- Bechdol AE (2012). Food and Agriculture Innovation; 21st Century Opportunities for India. *BioCrossroads*. Available at <http://www.biocrossroads.com/wp-content/uploads/2014/09/Food-Agricultural> (Accessed on 1st December, 2014)
- Boadu FO (1993). Contingent Valuation for household water in rural Ghana. *J. Eco.*43(3):458-65.
- Borsch-Supan A, Hajivassiliou V (1993). Smooth unbiased multivariate probability simulators for maximum likelihood estimation of limited dependent variable models. *J. Eco.*58:347-368.
- Cappellari L, Jenkins SP (2003). Multivariate probit regression using simulated maximum likelihood. *Stata J.* 3(3):278-294.
- Carmona-Torres M, Calatrava-Requena J (2006). Bid design and its influence on the stated willingness to pay in a Contingent valuation study. Contributed paper for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006
- Colman D, Young T (1989). *Principles of Agricultural Economics: Markets and Prices in less developed Countries*. Cambridge University Press, Cambridge.
- Fakur B (2007). Preparing the Ground for the Development of Commercializing Research Results at Universities. *Rahyaft* 40:46-54.
- Gujarati DN (2004). *Essentials of Econometrics* 3rd Edition. McGraw-Hill International Edition.
- Gurel A (1998). A Study on the Factors Affecting the Behaviours of Sunflower Producers to Technology Innovations in Malkara District. *Trakya University Tekirdag Faculty of Agric.*, Publication No. 262, Res. No. 90, Tekirdag.
- Hoffman E, Spitzer ML (1993). Willingness to Pay vs. Willingness to Accept: Legal and Economic Implications, 71 WASH. U.L. Q.59. available at http://openscholarship.wustl.edu/law_lawreview/vol71/iss1/2 (Accessed on 10th April, 2015).
- Holden ST, Shiferaw B (2002). Poverty and Land Degradation: Peasant's Willingness to Pay to Sustain Land Productivity. In: Barrett CB, Place FM, Aboud AA (Eds) *Natural Resource Management Practices: Improving Sustainable Agricultural Production in Sub-Saharan Africa*, pp. 91-102. CABI Publishing: New York.
- Kaliba AR, Featherstone AM, Norman, DW (1997). A Stall-feeding management for improved cattle in semiarid central Tanzania: factors influencing adoption. *Agric. Econ.* 17:133-146
- Karlsson M (2004). Commercialization of Research Results in the United States: An Overview of Federal Academic Technology Transfer. Swedish Institute for Growth Policy Studies, Washington, DC. pp. 35-45
- Keane MP (1994). A computationally practical simulation estimator for panel data. *Econometrica* 62:95-116
- Kolavalli S, Birner R, Benin S, Horowitz L, Babu S, Asenso-Okyere K, Thompson NM, Poku J (2010). Institutional and Public Expenditure Review of Ghana's Ministry of Food and Agriculture. IFPRI Discussion Paper 01020.
- Markmann G, Siegel D, Wright M (2008). Research and technology commercialization. *J. Management Studies* 45: 1401-1423.
- Mohammadi M, Esmailzadeh H, Dehnavieh R (2009). Commercializing research: Challenges and Solutions. Tehran: The National Centre of Medical Researches.
- Mwaura F, Muwanika FR, Okoboi G (2010). Willingness to pay for extension services in Uganda among farmers involved in crop and animal husbandry. Contributed Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa, September 19-23, 2010.
- Nemati M, Jamshidi L (2007). Investigation of the Relationship and Effect of the Process of sharing Knowledge and Experience on the Development of Social Capital among of Technological Units and Development Centre in Shahidbeheshti University, Iran. Proceeding of the 1st National on Knowledge Management, Razi International Congress Centre, pp. 2-16.
- Perkmann M, Tartari V, Mckelvey M, Autio E, Broström A, D'Este P, Fini R, Geuna A, Grimaldi R, Hughes A, Krabel S, Kitson M, Llerena P, Lissoni F, Salter A, Sobrero M (2013). Academic engagement and commercialization: A review of the literature on university-industry relations. *Research Policy* 42:423-442.
- Radfar R, Khamseh A, Madani H (2009). Commercializing Technology as an Effective Factor on the Development of Technology and Economy. *Roshd*, 20:23-40.
- Rogers EM (1995). *Diffusion of Innovations*. New York: The Free Press.
- Salter AJ, Martin BR (2001). The Economic Benefits of Publicly Funded Basic Research: A Critical Review. *Research Policy* 30: 509-532.
- Tripp R, Mensah-Bonsu (2013). Ghana's Commercial Seed Sector: New Incentives or Continued Complacency? International Food Policy Research Institute (IFPRI). Working Paper 32.
- Ulimwengu J, Sanyal P (2011). Joint Estimation of Farmers' Stated Willingness to pay for Agricultural Services. IFPRI Discussion Paper 01070.

Appendix 1. Multivariate probit indicating factors influencing farmers' WTP for innovations.

Explanatory Variables	Improved seed	Soil fertility improvement techniques	Weeds and insect pest control methods	Safe use of agro-chemicals	Crop diseases identification and control measures	Farm management and record keeping	Post-harvest techniques
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Age	-0.0222541 (0.0083612)***	-0.0285107 (0.0081633)***	-0.0294915 (0.0092794)***	-0.0487716 (0.0100546)***	-0.003401 (0.0085466)	-0.0061457 (0.0060389)	-0.0213486 (0.007623)***
Educational status	0.8566023 (0.4063613)**	-0.0004373 (0.2269114)	-0.0898358 (0.2734372)	-0.4790022 (0.2654224)*	-0.0351378 (0.2238314)	0.430929 (0.1556653)***	-0.144377 (0.2155912)
Nativity	0.8973799 (0.2481937)***	0.7725424 (0.2414772)**	0.8741929 (0.2820333)***	0.2542582 (0.313295)	-0.4626531 (0.342405)	-0.0029226 (0.2138322)	0.0818802 (0.2621454)
Free-rider	0.4872093 (0.2353743)**	0.4128067 (0.2207351)*	0.4746116 (0.2559607)*	0.4662275 (0.2736648)	0.2228686 (0.2347527)	0.3498178 (0.1878753)*	0.5004964 (0.211285)**
Number of acres	0.0130904 (0.0227986)	0.0121588 (0.020583)	0.0471642 (0.0303452)	0.0633813 (0.0348181)*	0.0264265 (0.0225748)	-0.081843 (0.0134122)	0.0048097 (0.0175745)
Off-Farm income	0.0130904 (0.0001053)	-0.0001431 (0.0000467)***	-0.0001078 (0.000062)*	9.89e-07 (0.0000751)	-0.0000177 (0.0000666)	-0.000032 (0.0000453)	-0.0000106 (0.0000543)
Farm income	0.0001169 (0.0001506)	0.0000733 (0.0000963)	0.0005268 (0.0002579)**	0.0005268 (0.0002799)*	0.0000717 (0.0001585)	0.0000625 (0.0000699)	-0.000062 (0.0000686)
Contacts with an A.E.A.	0.0552829 (0.32997)*	-0.0308932 (0.0245868)	-0.047721 (0.0259496)*	-0.0610719 (0.0257548)**	-0.0208771 (0.0251704)	0.0867617 (0.0174427)***	0.0043998 (0.0253028)

*, **, *** represent 10%, 5% and 1% levels of significance respectively. NB: Std. Errors are in parenthesis. (Multivariate Probit (SML, # draws = 30 Number of observations = 360; Log Likelihood = -550.02745; Wald chi-square = 143.44; Prob > chi-square (0.000).

Full Length Research Paper

Corporate social responsibility in Cameroon: The Hydro Electricity Sector University of Hertfordshire, United Kingdom

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Corporate social responsibility concept is relatively new in Cameroon. That is why a majority of the large companies do not have either CSR policies in place or a team that deals with corporate social responsibility issues. Very few companies have been identified in Cameroon as having CSR policies in place. One of these companies is ENEO which is the hydro-electrical company in Cameroon. This paper examines and evaluates ENEO's CSR policies and activities in the local communities surrounding two of its reservoir dams which are the Mape and Bamendjing dams. The paper explores the problems of the people living in the local communities, the expectations they have towards ENEO, what CSR policies ENEO has in place and how it affects the people in these two local communities. The data for this article were collected by conducting interviews with forty participants that live in villages that surround the Mape and Bamendjing dams. The finding from this study indicates that ENEO CSR practices have not been efficient and very limited in these areas. Considering these two areas alone, ENEO could be described as not practicing any CSR activities. The expectation that the local inhabitants have on ENEO is very high in terms of sustainable development. However, the limited or none existence of CSR activities in these areas does not affect the profitability of the company because ENEO has monopoly in the market in Cameroon.

Key words: Corporate social responsibility, Cameroon, Dams, ENEO Hydroelectricity Company.

INTRODUCTION

Cameroon has been highlighted (Rampersad and Skinner, 2014) as one of the countries in Africa in which large businesses promote the practice of CSR primarily through philanthropic projects in health, education and poverty reduction. Several sector businesses are involved in development initiatives to create employment and generate sources of income. Most large businesses such as ENEO, MTN, SGBC etc. have taken discretionary

measures to improve the living conditions of the local population. Increasingly, the employees, consumers and the local communities are expecting a lot from businesses operating in the country and local areas. Corporate social responsibility (CSR) existed in Cameroon since the colonial period, although it was not recognised as CSR. Company policies were geared towards their workers which in turn benefited the people living around the

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operating areas of these companies. For example, the Cameroon Development Corporation (CDC) was created in the German colonial period, and now they are the second highest employer in Cameroon after the government, with a network of hospitals, recreational facilities and educational facilities which the local communities benefit from. The influx of foreign investors to Cameroon since the 1990s as a result of the privatisation of many Cameroon's parastatals saw some companies exercising CSR as a corporate benevolence. The companies turn to support particular initiative or programmes that the company felt passionate about which the local communities benefit from in return. Most companies in Cameroon do not have written CSR policies. However, ENEO has been highlighted as one of the top ten companies in Cameroon with good CSR policy.

Definition of corporate social responsibility

There is no universally accepted definition of CSR. The World Business Council for Sustainable Development, 2009 defines CSR as "the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve their quality of life." The European Union Commission (2002) defined CSR as "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis." This implies that companies need to invest more in the life of the community and environment in which they carry out business. Jenkins (2009) describes CSR as the activities that contribute to sustainable development such as the integration of economics, social and environmental management policies and strategies. Mc Williams and Siegel (2001) considers CSR as a set of actions addressed to the social welfare beyond the interest of the company's interest and what the company is required by law to do. Ollong (2014) defined CSR as the relationship between business and society, where the role of business is purported to go beyond the provision of goods and services.

ENEO company and its CSR policies

ENEO is the company responsible for hydro electricity production in Cameroon, 56% of which is owned by Act is (a British private equity firm) and 44% by the Cameroon government. Cameroon has the second highest hydro-electricity potential in Africa after the D.R. Congo with an estimated capacity of 12,000MW. Hydro-electric power is the main source of electrical energy production in Cameroon. However, only 5% of its potential is being exploited and 721MW has been developed. ENEO has

installed capacity of 921.34MW including diesel, hydro and heavy fuel with hydro representing about 69%. Its capacity comprises of 33 generation plants. About 88% of electricity is accessible to the urban areas and the rest in the rural area; however some areas are not served at all. ENEO serve about 970,000 Cameroonian customers, 70% of whom live in Douala and Yaounde. It employs about 3700 people and working with over 600 contractor companies.

It has three main hydro power plants which are Songloulou, Edea and Lagdo. In order to ensure constant supply of electricity, reservoir dams were built to back up the Songloulou and the Edea dams which is where the electricity generation takes place. The Mape dam constructed in 1987 is located 76 km from the town of Fouban on the Mapé River and is designed to create a 3.2 billion cubic meter reservoir to increase the regulated flow of the Sanaga River during the dry season, raising it to 850 m³/s so that operation of the Edea and Songloulou plants is optimized. The main earth dam has a maximum height of 35 m, is 1521 m long, and 5.5 m wide on the crest. The volume of the dam's embankment is 3.5 million cubic meter.¹ The Bamendjing dam constructed in 1975 on the Nun River has a capacity of 2 billion cubic meter and has a length and width of 32km and 27km respectively. Water from the Mape and Bamendjing dam takes approximately six hours to reach Songloulou hydroelectric scheme and a further 12 h for water released from Songloulou to reach Edea hydroelectric scheme. The main purpose of the reservoirs was not only to maintain river flows but also to cover forecast in electricity demands. Therefore the people of these local communities (surrounding Bamendjing and Mape dams) expect the activities of ENEO to improve on their living standards and sustainable development in general.

The company's activities have a significant impact on the economic and social development of the country. Its aim is to improve the welfare of the people it serves and communities around its business operations based on the approach of its core values which are: Customer satisfaction, conducting business with integrity, respect for their employees and stakeholder and cohesion in all business operations. ENEO being the only electricity supplier nationwide operates in remote and rural areas characterised by low income communities, majority of whose inhabitants are unemployed. These communities have extremely high social and economic expectations on what the company should do to improve their living conditions. Consequently ENEO's corporate social responsibility (CSR) policies and practices are crucial to the people that live around its operating areas.

ENEO CSR practices have involved development and implementation of corporate social investment projects such as programs on Water, sanitation and hygiene (WASH) and public safety educational awareness campaigns in schools and communities around ENEO's hydroelectric generation plants. Key areas that ENEO's

CSR policies and practices have covered include health, environment and education.

Public Safety Awareness Campaign involves the use of face-to-face educational interactive discussion in schools and communities trained by Public Safety ambassadors to reduce the number of electrical related incidents and fatalities. They also create safety clubs in big cities (Douala and Yaoundé) and diffusion of safety messages in the local dialects/languages. It is logical that ENEO has based most its awareness activities in Douala and Yaoundé because there are the two main cities that consume most of the electricity in Cameroon. However, other cities are potentially at risk of electrical incidents and thus require sensitisation. It is important that ENEO should not concentrate its activities in some cities and ignore others because everybody using electricity needs to be aware of its potential dangers.

ENEO uses the WASH policy to ensure that the people get clean water and understand the dangers of drinking dirty water. In 2014 the company distributed basic WASH kits to some sixteen schools and four health centres in localities situated around ENEO's two major hydro electricity generation plants in Edea and Songloulou. Over 15,000 people were sensitized on water borne diseases preventive methods and portable water treatment. Clean drinking water is necessary to prevent the spread and infection of water borne diseases.ⁱⁱ However, ENEO needs to extent its activities of WASH to all the localities surrounded by dams which includes, Mbakua, Bamendjing and Mape dams.

ENEO has been undertaking aquatic treatment/control of the Black fly population along the Sanaga River which is the major cause of river blindness in neighbouring communities. Much is still expected of ENEO to extend treatment and sensitisation to the local communities. ENEO has been getting into partnerships with the Ministry of health, some private companies located around the Sanaga basin, local NGOs as well as the German Corporation to provide better help facilities to the local communities.

LITERATURE REVIEW

CSR policies and practices have been proven to be influenced by company size (Nasif AL-Shubiri et al., 2012), profitability (Sangle, 2010), corporate governance structure (Mohd and Nazli, 2007), company industry (Mohd and Nazli, 2007), and company's rules and policies (Iman, 2000). Factors such as characteristics of employees and personal attributes (Keinert, 2008), traditional beliefs and customs (Ahmad, 2006), managerial attitude to protect the environment (Sangle, 2010) drive CSR practices in companies. While CSR has become an established concept in some countries like the UK, USA, etc. with many academics researching on its impact on the society and the environment, very

limited studies have been conducted in Cameroon.

This could be justified based on the fact that CSR is not an established concept amongst businesses in Cameroon. A survey conducted by Institut RSE Afrique in 2014ⁱⁱⁱ, found out that most of the businesses in Cameroon have no sustainable or CSR division, and a large number of the business are unaware of what is expected of them in terms of CSR practices, e.g. the ISO 26000 international guidance on social responsibility. Baxter (2015) further pointed out in another study on CSR practices in Chinese businesses in Cameroon that CSR practices have not developed amongst the businesses in Cameroon due to unsolved problem that goes back years, such as unpaid salaries, bonuses, etc. Akwaowo and Swanson (2015) in their study of CSR in Cameroon concluded that the increase number of foreign direct investment in Cameroon did not lead to a higher level of corporate responsibility and poverty reduction in the regions where the businesses were operating. On the contrary they found out that there was an increase in the poor standard of living among the citizens due to low involvement in corporate responsibility. Demuijnck and Ngnodjom (2013) examined the responsibilities of SME in Cameroon in comparison with CSR practices in companies in Europe. Alemagi et al. (2006) found that although industries along the Cameroon coast adopted the environmental management systems they were still faced with a lot of hurdles as to fully make the use of the system environmentally beneficial. Tita (2011) considered the coordination of corporate social responsibility in sub-Saharan Africa with particular reference to transnational corporations in Cameroon and found out that there was less use of socialisation and little evidence of centralisation with transnational corporations CSR practices in Cameroon. Ndjanyaou (2015) and Sotamenou (2014) examined whether the SMEs in Cameroon and their managers CSR practices were backed up with public entities, business associations and civil society engagement. Ollong (2014) examined CSR practices of three companies in Cameroon (MTN, Guinness Cameroon and BAT) such as health projects, employment rate, payment of better levels of wages to the employees that was more than what the government and domestic companies offered their employees and concluded that the companies were impacting positively on the government and society in which they conducted businesses. These studies represent some of the few studies done by academics on CSR Cameroon. However, no study has specifically considered ENEO CSR policies and its effect on the local communities surrounding the Bamendjing and Mape reservoir dams.

METHODOLOGY

Ten companies were identified in Cameroon as having the best CSR policies which include: MTN, Orange, SABC, Camrail, ENEO, Hysacam, Cimencam, Sodecton, Camtel and Guinness Cameroun.

Table 1. Number of participants and occupation.

Occupation	Number of participants
Public officers	5
School teachers	3
Local chiefs	3
Fishermen	8
Local traders	7
ENEО workers	6
Farmers	5
Unemployed natives	3

Table 2. Age group of the participants.

Age group	Number of participants
<25 years	1
25-35 years	6
36-45 years	18
46-55 years	6
56-65 years	4
66+	5

ENEО was specifically chosen for this study because its activities have greater impact on the society (particularly those people living around the dams) than the rest of the nine companies. Out of the three reservoir dams operated by ENEО, two were chosen for the study being the Mape and the Bamendjing dams. Several villages (about eleven) surround these dams but six villages were visited from which the data for this study were collected. Only six villages were included in this study due to accessibility problems to the other villages. The roads were treacherous and consequently five villages were not included in the study. Information about the six participated villages is confidential because it was a condition for which the participants agreed to participate in the study. The research was based on face-to-face interviews with forty local people living in the villages around the Mape and Bamendjing dam. These forty participants include fishermen, workers of ENEО company, public officers, traders, local chiefs, unemployed natives and farmers. Twenty in-depth face-to-face interviews were conducted in the localities around the Mape dam and twenty interviews were conducted in the localities around the Bamendjing dam (Tables 1-3). The forty participants for the interviews were selected using a snow-balling approach whereby people recommended others for the interview. The data were collected on anonymous basis with full consent of the participants. The interviews were based on unstructured question and digitally recorded, transcribed by the researcher and analysed. The grounded theory approach was used to analyse the data.

RESULTS AND DISCUSSION

Socio-economic development

Studies (McNally et al. 2009; Brown et al., 2008) have indicated that dams are important in the socio-economic development and poverty alleviation of many local

communities and countries in general. The existence of the Mape dam and the Bemendjing dam has improved on the standard of living of the people in that community and the development of the communities. The ENEО workers who are working in Mape and Bemendjing are paid better than any other company in the locality. This then translate into worker better managing their household financial circumstances and increasing on their standards of living.

In addition to the wages, all the workers have electricity in their houses, good clean water supply, free hospital treatment etc. This supports the studies by past academics (Manatunge et al. 2008) to the fact that dams play a key role in the economic development of the local communities, serving a variety of purposes including electricity generation, poverty reduction, social and cultural values etc.

“One of the major advantages that I have working with ENEО is that they provide me with clean drinking water as oppose to the rest of the villagers that depend on wells. Also, they pay my hospital bills and that of my family if we are ill. This could have cost me a lot of me if I had to pay the bills myself because we constantly get malaria and other water borne diseases that are so common in this area. We also have electricity which is a gain for working for ENEО a hydro electricity generation company.” Worker with ENEО

All these benefits that the workers have as being part of ENEО turns to attract many people to the area seeking for jobs and hoping that the company advertises more vacancies. These opportunity created by the dams is key toward poverty reduction in the area and the country as a whole. The workers also turn to build houses for themselves or houses for people to rent which goes towards the development of the local community. Business people from other areas are also attracted to the locality to sell their good which also contributes the development of the local community.

The existence of the dams also forms a touristic site for the Mape and Bamendjing locality. Schleiss and Boes (2011: 754) document that the construction of dams has special aesthetic attractions for tourist. Tourist visit the dams to admire the natural scenery, cultural and human-made attractive features, traditional ways of fishing techniques which is by the use of hooks, traditional fish traps, baskets etc. The wide view of the dams and the natural habitation around the dams attracts many visitors annually to the dams. Consequently, local hotels and other facilities have been set up around the area by the local people to provide the tourist with some basic needs and in return get money for their services.

“I have increasingly seen a lot of people coming to me and asking me the way to the dam, and some asking me about hotels and restaurants. Over the past three years that I started doing business here, and located very close

Table 3. Descriptive results.

Key aspects identified	Statistics of participant's view
Socio-economic development	80% of the participants agreed that the presence of the dam has brought some socio-economic development in the area.
Health	95% of the participants were of the opinion that the people living in these areas are more at risk of being ill than people in other localities of the country. The same percentage of participants agreed that they have very limited health facilities to manage their health problems
Education	60% of the participants were of the opinion that the educational level of the people living in the area has not seen any significant improvement since the existence of the dams.
Good drinking water	82% of the participants were concerned about the quality of water that the people in the area drink. Furthermore, they were of the opinion that dirty water is the major cause of the ill issues in these areas
Electricity	62% of the participants confirmed that because of these dams they can have access to electricity. However, they were unhappy with the fact that they still experience constant power cut and pay electricity bills at the same rate as the rest of the people in the country.
Fishing	97% of the participants were of the opinion that fishing has become the main source of income for the people living around these dams
Public security	80% of the participants were of the opinion that the public security of the local villages surrounding the dams has gone from what they described as 'bad to worst'. They express the need for ways of enforcing public order.
Transportation	98% of the participants express their concern on the nature of roads that they have. They were of the opinion that ENEO is expected to help improve on the roads.
General Expectation	In general more than 70% of the participants clearly express the fact that they have high expectations from ENEO to help them in the sustainable development of their local communities.

to the dam, I have seen and helped hundreds of people who are not from this area, and are not Cameroonians with information and directions about/to the dam. I am happy when they come to ask me because they often buy a lot from me especially water and biscuits." Local trader

Furthermore, the local people bring artefacts and other items to sale which they know that tourists will like to buy. These have consequently attracted more business people to the dam areas and also develop the areas. However, as suggested by Scudder (2012:116) the involvement of the local communities has been ignored in the planning of the reserve and tourism. In support of Scudder's view, the local communities surrounding the Mape and Bamendjing dams are expecting ENEO to collaborate with them and make the area more attractive such as building company hotels and restaurants, create good communication network which can enable the law enforcement officers to function efficiently.

It is therefore key that for ENEO to succeed in its CSR policies or have CSR policies that will be regarded by the people as reasonable, ENEO involve the local communities in its strategy to building and executing an effect CSR activities.

Health

Large dams have been criticized for the influence it has on health through water changes and food insecurity (Lerer and Scubber, 1999). Good health is the greatest need that every human being has. Apart from the fact that people get ill for different reasons, the people that live close to large water bodies such as dams are at greater risk of different types of health hazards such as malaria, schistosomiasis (bilharzia), onchocerciasis, and dracunculiasis (Ripert and Raccurt, 1987). Research (Tetteh et al. 2004) has demonstrated that in general, people who live closer to the dams always have a poor health status as compared to those that live further away from the dams. Research (Lautze et al., 2007) has proven that the risk of having malaria among the people living where there are dams is greater. This is because dams convert fast flowing streams and rivers to stagnant water that favours the breeding of mosquito which is responsible for the transmission of malaria. Therefore, large water exacerbates malaria transmission in malaria endemic places. Cameroon is considered a high risk country for contracting malaria and some malaria parasites are resistant to some drugs in the market like

chloroquine. Malaria statistics in Cameroon in 2013 showed that out of 100 people consulting in any health facility, 40-50 were consulting because of malaria and out of 10 children dying, four were caused by malaria (Kindzeka, 2013). Therefore the presence of the Mape and Bamendjing dam increases the risk of the inhabitants of that area in contracting malaria. With the presence of a dam, flooding is common upstream from the dam. During flooding water covers a vast area of land and when the water recedes, little ponds are left within the flooded area which serves as nurseries for mosquitoes. There is no hospital near any of the villages' studies, only small health centres that do not have all the facilities. Consequently, most of the sick people would have to move to other areas where there are hospitals to be treated or offer the treatment that this deemed adequate. ENEO is expected to have as its key CSR policy the prevention and treatment plans for malaria concentrated in these local communities that surround the dams.

"The rate at which people have malaria here is very high. It is the most common illness here. It has killed a lot of people as well especially those who are unable to effort treatment. The mosquitoes that transmit the malaria parasite are everywhere. The government sometimes provides with mosquito tents as a preventive measure, but it is difficult not to have malaria. What we need in this area is good hospital and subsidised medication, so that people will not continue to die from malaria." Unemployed native

Apart from the government distributing mosquito tents to the everyone because malaria in pandemic in Cameroon, ENEO is expected to join forces with the government and make the distribution of malaria tents to the people in these localities at least twice a year because they are at greater risk of malaria living close to the dams.

Another illness that is common amongst people living by large water bodies is Onchocerciasis. In the West Region of Cameroon 2011, statistics showed that there was 68.7% prevalence of onchocerciasis in adults and 29.2% in children (Katarbarwa et al., 2013). Bamendjing dam is situated in the West Region of Cameroon and this statistics could be due to the dam situated in that area. Onchocerciasis is a parasitic infection that causes skin and eye inflammation and can lead to blindness (a condition called river blindness). The symptoms are skin itches and blindness itself. The parasite is transmitted to humans by the black fly, which breeds in fast-flowing rivers. Black flies breed in fast flowing water and dams provides a favourable breeding ground for black flies. Onchocerciasis is controlled by a drug called Metizan distributed by WHO in Cameroon. However, this drug can only be effective if an infected person takes it for fifteen years which is the life span of the parasite (Filou, 2012). Most infected people starts taking the drug and when the itches stop they stop taking the medication. This results

in the parasite developing from a micro stage that was being controlled by Metizan to a macro stage which currently does not have a control drug. ENEO is expected to build in this health factor into its CRS policies and activities. Currently, there seem to be no activity geared towards this illness in the villages where the study was carried out.

Another study by Kamga et al. (2011) indicated that onchocerciasis can be treated by the strict and continues use of the relevant medication. In order to achieve this aim, there is a great need for health information on the issue, sensitisation, mobilisation and advocacy is key in creating awareness. ENEO could involve the local communities to build up CSR policies that can achieve this aim.

The local communities that surround the Mape and Bamendjing dams are expecting ENEO to sensitize these people more often and build information centres in these communities to make them aware of this type of illness and the importance of taking the Metizan that WHO Cameroon is giving out each year. Furthermore, ENEO should work with WHO Cameroon more prior to the distribution of the medication to make sure that people are aware. Furthermore, ENEO should work with existing health centres in the areas to care for people that develop an allergic reaction to Metizan. This is because the allergic reaction of some of the people to the medication is serving as a deterrent to others from taking the medication. If ENEO could work with the WHO and the local health centres to provide medical assistance to people who suffer side effect from Metizan or are allergic to Metizan, they will reassure the local community on the importance of taking the medication.

"I remember we were told by the government to take the medication. I took my wife and five children to the community centre where they were distributing the medicine. We were not allowed to bring it home and made us take the medicine right there in their presence. When I returned home, less than eight hours later, my wife's fingers, face and legs were swollen and we were so scared. Unfortunately, I had no money to take her to the hospital. We all stayed with her at home in fear and hoping that she got better. Friends came and saw her, and eventually get got well again after three days. Since then no one in my immediate and extended family takes that medication again." Farmer

Schistosomiasis, (bilharzia) is a parasitic disease which can cause serious damage to internal organs, and may even undermine growth and cognitive development in children. When the urinary system of adults is infected it may increases their chances of developing bladder cancer.^{iv} Symptoms of the disease includes blood in urine, fever etc. Schistosomiasis can be easily treated when diagnosed by the use of a drug called praziquantel. Past academic studies (Saotoing et al. 2011; Sama et al.,

2007) suggest that schistosomiasis is common in Cameroon which implies that it would even be worst amongst the people living close to the dams. Just like the other diseases discussed earlier, ENEO is expected to incorporate necessary policies and activities in its CSR plan in collaboration with the local communities that will help the people to prevent the disease.

Most of the people living in these local communities have a belief that anyone that has cancer will die. This is technically true because most of the people diagnosed with cancer could not afford the money for treatment and chemotherapy. As a result most of the people believe that any form of cancer that they may have will lead to death. Consequently, people suffering from schistosomiasis are scared to go to the hospital for treatment forgetting that they are creating opportunities for it to develop to cancer of the bladder. Therefore, ENEO needs to do more sensitisation and educate the local people on all of these diseases so that they can seek medical attention as soon as possible when they notice any symptoms.

ENEO pays for the hospital bills of its workers that contract any of these diseases. However, the multitude of people living in the area would have to pay their hospital bills when ill. What the local community is expecting of ENEO is not only to provide them with enough sensitisation on the dangers of living around the dam, but also to liaise with the private health service that exist in the area.

"We are happy that the dam is located here, but health wise we wish it was not. I know that ENEO pays the hospital bills of its workers because my cousin works there, but we expect a lot more from ENEO because we feel like the most important thing in our lives which is good health has been taken away and left us vulnerable."
Village chief

Hundreds of people living around the area feel that the ENEO company is not doing anything to help the indigenous people because rather than concentrating their CSR activities around the area where the dams are, they are concentrating their activities in big cities like Douala and Bamenda that are not close to the dam and do not face the consequences of the dam.

Furthermore, the local people expect ENEO to understand the implications on drinking contaminated water and provide the entire community surrounding the dam area with good clean pipe borne water. However, the people expressed their frustration that ENEO only provided water to the town where the dam is situated and completely ignored the surrounding villages. This has consequently resulted into increase in death rate because some of the local people do not recognise the symptoms, while others do and simple do not have the money to go to the hospital.

The local community are expecting ENEO to build hospitals or collaborate with hospitals that are around the

dam areas to provide good quality health for the people. The provision of the health facilities will also create employment opportunities for the people living around the area. The great importance of hospital facilities is due to increase risk of illnesses that the people living around the dams face because of being close to large water bodies such as malaria.

Education

The local communities surrounding the Mape and Bamendjing dams expect ENEO to contribute to the education standards of the people. Cameroon has about 67% literacy rate indicating that about 33% are out of education and the need to encourage pupils to acquire education. They expect at least primary schools and secondary schools to be built in these areas with the collaboration of ENEO and the local communities. ENEO can do this by liaising with the government or the local people to build the schools. The schools will provide employment opportunities to the people those communities and also educate the children about the effect of living around large water bodies in general (and dams in particular). At school children will be taught amongst other things about the importance of drinking good clean water as a means of preventing some of the health issues associated with drinking dirty water in general (and dam water in particular).

"We were expecting that by now we will have good primary and secondary schools in this area in which our children can have their education. I am sad that there are no good schools in this area and in some areas that I know like...there are no school at all. We desperately need schools through which our children can be taught many things including the dangers of living in places like this one. Most of the people here are un-educated and cannot read or write. Even ENEO places some important information most of the people will be unable to read. But if there were schools, the children can read and tell the parents, or the teachers can emphasise on the information for pupils to tell their parents."
Village chief

Good drinking water

Having good quality of drinking water around dams is difficult except procedure is taken to purify the water (Pottinger 2009). Some of the villages surrounding the Bamendjing dam have access to pipe borne water but the villages surrounding Mape dam are almost hopeless.

Most of the people in the villages surrounding Mape dam use well water. ENEO CRS policy of WASH is expected to be put more into practice in these areas. However, ENEO seem to be implementing its WASH policy in the big cities that are not close to the dams as

the local villagers that are so close to the dam. Even though ENEO could be seen as having an essential CSR policy that if put to proper use will help the people, this policy is very limited in its effectiveness because the policy is not put into practice in areas that most need it.

"We get our water from the well which I dug up myself two years ago. The water does not look very clean but we think it is better than the dam water. When it rains too much and there is flooding, our well gets filled up to the brim. We know then that it is not clean, but we try to boil the water before drinking because we cannot afford to buy refined water." Fisherman

Well water is clean with reference to where the well is located. Water obtained from a well constructed in and around water bodies from the dam are hardly clean. This is because the dam water seeps into the well making them not clean for human consumption. In addition to this, when the water levels rise so much flooding occurs filling the wells directly with dirty water from the dam. Based on the living standards on the people of this locality, pit toilets are commonly used. Flooding causes water to mix with faecal material from these pit toilets and subsequently released into the environment and the wells (Adekunle 2009). ENEO is expected to collaborate with the local community to ensure that everyone living close to the dams has pipe borne water that is treated to prevent diseases.

Electricity

The primary aim for the construction of the dams is to generate electricity. It is therefore expected that ENEO should aim at providing the villages close to the dams with access to reliable electrical supply. Furthermore, the ENEO company is making billions from the sales of electricity and the people expect that ENEO's top CSR policy should be to provide the local villages with electricity. The construction of the Mape dam and Bamendjing dam were to serve as reservoirs to back up the Songloulou and Edea hydroelectric plants. Most of the urban areas surrounding the dams are still without electricity and those that have electricity constantly experience power cuts. Most of the villages surrounding the Bamendjing dam have access to electricity than the villages surrounding the Mape dam. Some of the villages around the Mape dam that have electricity are within the 15km from the location of the dam, and the villages beyond are without electricity. However, the effect of the dam (in terms of health for example) is felt by the people living far beyond 15km from the dams.

"It is rather unbelievable that we do not have access to electricity even though we live less than 5kms away from a dam that is used as a reservoir for a hydroelectricity

plant. When the dam was constructed, we thought that the very first advantage would be access to electricity but no. The dam is causing us too much trouble and it would be the least thing for ENEO to grant use access to electricity and even free in return for all the troubles we are going through because of the dam." Village chief

Fishing

The dams create a good source of fishing and consequently attract a lot of people from different areas who fish for commercial purposes and for pleasure (Marmulla, 2001). The construction of the dams constituted a new dawn for the fishermen around the locality. Over 10,000 fishermen from diverse nationalities comb the dams to harvest fish for the thousands of buyers from the other parts of Cameroon as well as from neighbouring countries like Nigeria.^v The Mape dam for example, attracts many people to the area including citizens of other countries such as Nigeria and Ghana. However, the local people are complaining that there is no appropriate fishing regulation in place and therefore people from Ghana and Nigeria are not practicing subsistent fishing. However, the fishing sector in Cameroon is under-developed (Belhabib and Pauly 2015) and ENEO is expected to encourage fishing and safety at sea which it has failed to do in these two dams.

"Fishing is the greatest thing that we enjoy from the dam being located in this place. However, we are in a big competition with Nigerians and Ghanaians who come with fast fishing boats and fine nets which allow them to catch even the small fish. We try to catch only the big fish to make sure that the fish's life cycle continues and we can continue to fish all the time. We want ENEO and the government [Ministry of Fisheries] to control the sizes of fishing in this place. Our greatest fear is that if the fish is not there then most of us in this place will be left empty handed with nothing to live on." Fisherman

The people living around the dams turn to depend mostly on fishing. They try to practice subsistent fishing to make sure that they continue to have fish which will support their living. However, because there is no effective fishing regulation in place others like the Ghanaian and Nigerians turn to fish even the small fish (Business in Cameroon 2013). The Ghanaians and the Nigerian use very fine nets with very little holes to fish. Once these nets are cast into the water, it catches even the tiny fish which could have been left to mature and continue the life cycle of the fish. The local community fish with local nets and hooks avoiding the little fish to grow because they know that their living depends on it. ENEO is therefore, expected to make efficient fishing regulations in collaboration with the Ministry of Livestock, Fisheries and Animal Industries in Cameroon to ensure that the fishing

rules are respected by all fishermen.

Public security

The influx of people to the dam areas has resulted in a high level of illegal acts such as rape, drug deals, widespread of sexually transmitted illnesses, unwanted pregnancies, abortions, robbery, prostitution, etc. The local community feel less safe than they were before the construction of the dams. The local people have expressed their concerns that the fishermen, especially those from other countries who come to fish turn to get involved in illegal drug dealing, rape and as a result a wide spread of sexually transmitted diseases.

“This place has slowly become a fertile place for illegal activities such as crack cocaine, rape, prostitution and a lot of other illegal activities. I think that most of these illegal activities are as a result of the consumption of the crack cocaine by the fishermen. There seems to be no immigration control or that there are weak, but they freely trade in crack cocaine and when they take it, they just rape girls at random and no one seems to say anything about it.” Fisherman

Some of these rape cases result in unwanted pregnancies and abortion by girls who do not want to keep the pregnancies. Furthermore, due to the influx of people to the dam areas for fishing, commercial and other reasons, there has also been an increase case of prostitutions in the area. The rape and prostitution turn to increase on the rate of spread of sexually transmitted diseases in the area, which could also increase dead rates in the area. ENEO can contribute towards public safety through sensitisation in schools and talks around the community on sexually transmitted diseases. Furthermore, ENEO should work with the government to create/increase police post in these areas to maintain law and order. It would be important for ENEO to encourage communication and coordination with the people of these societies. Some of these villages do not have telephone network and therefore are unable to communicate to others or the police if a crime is being committed. If ENEO could work together with some of the telephone providers and encourage them to extend their services to these areas, there will be increased communications in the society and some of the crimes can be prevented or perpetrators of such crimes punished.

Transportation

Most of the urban areas in Cameroon are faced with the problem of bad roads. The bad roads are causing car accidents leading to the loss of lives. Bad roads also encourages high way robbery because cars are unable to

run fast, and in some places, passengers need to get off the car or bus/coach and walk a few meters or kilometres on foot. High way robbers then target such places and rob passengers of all their money and belongings. Passengers who try to resist sometimes lost their lives as well. The people find it pointless to call the law enforcement officers because they will be unable to get to the scene of the crime to help the passengers for the same reason of bad roads.

“Over the years we have received reports of robbery and sometimes dead caused by robbers on our road. Almost all of the time information reaches us when the robbers are already gone or a dead body has been found by the roadside. It is difficult to help our people because the roads are not good and it takes us a long time as well to get to the scene of the incident.” Police officer

The local community around the Mape and Bamendjing dam expects ENEO to help with the maintenance of roads that leads from the dam through the villages to big cities. If the roads are constantly maintained, then it will reduce cases of highway robbery and dead and injuries caused by car accidents. Furthermore, the fishermen need good roads to be able to transport the fish to the market.

Conclusion

CSR practices are core practices that could help the local communities and the country as a whole to develop both financially and otherwise. However, the concept of having CSR policies and practices by companies in Cameroon is still relatively new. However, ENEO has been identified as one of the companies in Cameroon that has CSR policies and is involved in activities and projects to help the local communities and the country as a whole to alleviate poverty. However, this paper argues that ENEO CSR policies are targeted towards urban areas that do not desperately need the measures as much as the societies where their dams are located. Most of the people especially in the local society surrounding the Mape dams do not have pipe borne water to avoid drinking contaminated water; schools to educate the community on the effect of the dams; law enforcement officers to guarantee security for the people; no good roads to ensure safe transportation etc. There is a need for ENEO to move its CSR activities to these areas that are most needed which are the local communities around the dams.

The complaints and negative feedback about ENEO from these people is unable to impact on the competition of ENEO business because ENEO has monopoly over the electricity sector in Cameroon. However, the concerns that these people have raised requires immediate reaction not only from ENEO company but also a reaction from

other sectors of the government (such as the Ministry of Health, Ministry of Fisheries, Transportation sector etc.) and the government as a whole. This article form the basis for further studies to carried out on the activities of ENEO company and its CSR policies around these locality. This article did not cover environmental aspects which is another important aspect of CSR. Furthermore, this paper only considered the communities that surround the Mape and the Bamendjing dam, a more extensive research could be conducted which will include the local communities surrounding all the dams in Cameroon to properly evaluate their position and ENEO CSR policies and practices.

Conflict of Interests

The authors have not declared any conflict of interests.

REFERENCES

- Adekunle A (2009). "Effects of industrial effluent on quality of well water within Asa dam industrial estate, Ilorin Nigeria" *Nat. Sci.* 7(1):1545-0740.
- Akwaowo E, Swanson A (2015). "Nigeria, Ghana and Cameroon: Foreign Direct Investment, Corporate Social Responsibility, and poverty alleviation" 2015 Spring Global Conference on Business and Finance (GCBF), San Jose, Costa Rica.
- Alemagi D, Oben P, Ertel J (2006). "Implementing Environmental Management Systems in Industries along the Atlantic Coast of Cameroon: Drivers, Benefits and Barriers" *Corporate Social Responsibility and Environmental Management* 13(4):221-236.
- Baxter J (2015). 'Cameroon: a case study of Chinese Corporate Social Responsibility' *Forest News*, 23rd June 2015.
- Belhabib D, Pauly D (2015). "Reconstructing fisheries catches for Cameroon between 1950 and 2010" *Fisheries Centre, The University of British Columbia, Working Paper Series* 2015-04.
- Demuijnck G, Ngnodjom H (2013). "Responsibility and Informal CSR in Formal Cameroonian SMEs" *J. Bus. Ethics* 112(4):653-665.
- Filou E (2012). "River blindness: from disease control to elimination" *The Guardian*, Monday 17 December, <http://www.theguardian.com/global-development-professionals-network/2012/dec/17/river-blindness-disease-africa>
- Kamga H, Nsagha D, Assob J, Njunda A, Fon P, Njem P (2011). "Prevalence of concocerciasis in the Fundong Health District, Cameroon after 6 years of continuous community-directed treatment with ivermectin" *Pan African Med. J.* 10(34):580-592.
- Katarbarwa M, Eyambe A, Nwane P, Enyong P, Kamgno J, Kuete T, Yaya S, Aboutou R, Mukenge L, Kafando C, Siaka C, Mkpouwoueiko S, Ngangue D, Biholong B, Andze G (2013). "Fifteen years of annual mass treatment of onchocerciasis with Ivermectin have not interrupted transmission in the West Region of Cameroon" *J. Parasitol. Res.* <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3652197/>
- Kindzeka M (2013). "Malaria re-emerges in Cameroon" *Voice of America*, October 8th 2013 <http://www.voanews.com/content/malaria-re-emerges-in-cameroon/1765098.html>.
- Lautze J, McCartney M, Kirshen P, Olana D, Jayasinghe G, Speilman A (2007). "Effect of a large dam on malaria risk: the Koka reservoir in Ethiopia" *Tropical Medicine & International Health* 12(8):982-989.
- Lerer L, Scubber T (1999). "Health impacts of large dams" *Environ. Impact Assess. Rev.* 19(2):113-123.
- Long K (2014) *The Role of Multinational Corporations in Community development Initiatives in Cameroon, Technology Applications for Enterprises and Academic Innovation IGI*, 2014).
- Manatunge J, Priyadarshana T, Nakayama M (2008) "Environmental and social impacts of reservoir: issues and mitigation" *Ocean Quatic Ecosyst.* 1(1):212-255.
- Marmulla G (2001). *Dams, fish and fisheries: opportunities, challenges and conflict resolution*, issue 419 (Food and Agriculture Org. 2001)
- Mc Williams A, Siegel D (2001). "Corporate Social Responsibility: A Theory of the firm perspective" *Acad. Manage. Rev.* 26(1):117-127.
- Ndjanyou L (2015). "Perception of corporate social responsibility by chief executive officers of Cameroonian small and medium size enterprises" *Afr. J. Bus. Manage.* 7(18):671-679.
- Ollong KA (2014). *The Role of Multinational Corporations in Community Development Initiatives in Cameroon*. In: E. Ariwa (Ed.), *Green Technology Applications for Enterprise and Academic Innovation*, Hershey, NY, pp. 87-101.
- Pottinger L (2009). "How dams affect water supply" *World Rivers Review* December 2009 <https://www.internationalrivers.org/resources/how-dams-affect-water-supply-1727>.
- Rampersad R, Skinner C (2014). "Examining the practice of Corporate Social Responsibility in Sub-Saharan Africa" *Corporate Ownership Control* 12(1):722-732.
- Ripert CL, Raccurt CP (1987). "The impact of small dams on parasitic diseases in Cameroon" *Parasitology Today* 3(9):287-289.
- Sama M, Oyono E, Ratard R (2007). "High risk behaviours and schistosomiasis infection in Kumba, South West Province, Cameroon" *Int. J. Environ. Res. Public Health* 4(2):101-105.
- Saotoing P, Njan V, Tchuenguem F, and Messi J (2011). "Epidemiological Survey of schistosomiasis due to schistosoma haemetobium in some primary schools in the town of Maroua, Far North Region Cameroon" *Int. J. Trop. Med.* 6(2):19-24.
- Schleiss A, Boes R (2011). *Dams and reservoirs under changing challenges* (CRC Press, 2011).
- Scudder T (2012). *The future of large dams: dealing with social, environmental, institutional and political costs* (Earthscan).
- Sotamenou J (2014). "Corporate Social Responsibility Amount Small and Medium Size Enterprises in Cameroon" *J. Entrepreneurship. Innov. Manage.* 3(2):1-19.
- Tetteh K, Frempong E, and Awuah E (2004). "An analysis of the environmental health impact of the Barekese Dam in Kumasi, Ghana" *J. Environ. Manage.* 72(3):189-194.
- Tita J (2011). "The Coordination of corporate social responsibility in sub-Saharan Africa: The case of transnational corporations in Cameroon" *PhD Thesis, University of Florida*.
- WHO. (2015). "Dracunculiasis (guinea-worm disease)" *WHO Fact sheet N°359*, <http://www.who.int/mediacentre/factsheets/fs359/en/>.

Endnotes

ⁱ <http://www.salini-impregilo.com/en/projects/completed/dams-hydroelectric-plants/mape-river-dam.html> accessed on the 7th of November 2015

ⁱⁱ Water borne disease will be explained in detail below.

ⁱⁱⁱ Thierry Tene, 'CSR gets the cold shoulder from most Cameroon companies' 21st February 2014, <http://www.businessincameroon.com/business/2102-4669-csr-gets-the-cold-shoulder-from-most-cameroon-companies>

^{iv} Centre for Disease Control and prevention (2012) <http://www.cdc.gov/parasites/schistosomiasis/disease.html>

^v Cameroon: FCFA 530 Million For Bankim Fishermen (2013) http://www.stopillegalfishing.com/news_article.php?ID=824 accessed on the 7th of November 2015



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