

Analysis of Farmers' Perceptions on Privatisation of Irrigation Supply in the Nandom District of Upper West Region, Ghana

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ABSTRACT

Water is an important and non-substitutable input in agricultural production. Its adequacy and quality supply is a necessity for sustainable production. However, it is increasingly getting scarce due to poor rainfall and inefficiency in use of available water. To improve the reliability of agricultural water supply, there are arguments to the effect that water needs to be privatised and treated as an economic good with an efficient price scheme. But what farmers, in reality, think about this idea of privatising irrigation is vital as they are the ultimate beneficiaries. This study therefore assessed the perception of farmers towards privatising irrigation supply using cross-sectional data collected from 240 randomly sampled farmers from different households in four communities in the Nandom District. With descriptive statistics involving simple frequencies and measure of association, perceptions of farmers were analysed. The study revealed that farmers generally perceived privatisation will ensure wider provision of irrigation schemes in remote locations, make operators respond better to farmers' needs as well as ensure service sustainability. Farmers, however, were concerned about affordability of irrigated water to the resource poor farmers when it is privatised. They were of the view that, priority might be put on profit maximisation at the expense of social welfare in a market oriented irrigation system. The study therefore recommends that the Government of Ghana, under the 'One-village One-dam' flagship initiative should encourage and regulate private investment in the supply of irrigation to ensure affordable and sustainable supply of the services to interested farmers.

Keywords: Irrigation, Privatisation, 'One-village one-dam', Perception, Poor rainfall.

INTRODUCTION

Agriculture in the Nandom District is basically rain-fed with a mean rainfall recorded by three meteorological stations in the region over 25 years being 989 mm, ranging from 700-1200 mm in the region (Blench, 2006). The district is drought-prone and even during the best rainfall seasons, crop yields are very low owing to the erratic nature of the rain (Blench, 2007). This serves as a disincentive to the younger generation and discourages them from going into farming, thus leading to labour migration to the cities for non-existent jobs. These potential youthful backbones of agriculture waste away in the city slums because the occurrence of erratic rainfall has created uncertainty in agricultural production and emphasized the need for infrastructural development to cater for irrigation.

Irrigation development has been recognised globally as an important means of overcoming climate uncertainty with regards to agricultural production (MoFA, 2012). The gradual expansion of irrigation in Northern Ghana has generally increased dry-season farming leading to increased production of crops such as tomatoes, onions and rice with associated profitable gains for producers (Blench, 2006). Irrigation is a vital component of human capital in an agrarian community because investment in irrigation has direct effects on productivity, food and income security and indirect effect on migration of agricultural labour to urban centers. Consequently, investment in irrigation can propel economic growth and reduce poverty and inequality, and curb labour migration from most rural communities.

Under conditions of frequent drought, irrigation development offers promise of greater security and predictability under which farmers are better able to plan their cropping patterns as it stabilises the supply of water for production (Kurukulasuriya and Mendelsohn, 2006; IFPRI, 2007). Irrigation has a positive effect on crop yield (Tiwari, 1998). Better crop yield per acre has been reported under irrigated cultivation in Pakistan (Shah, 2008) and Ghana (Yilma *et al.*, 2005). Irrigation also allows for the cultivation of land that would have been impossible under rainfed agricultural conditions. Under state sponsored irrigation system, desert countries (Libya, Morocco, Egypt and Sudan) have been able to put land which otherwise will have been less useful under cultivation. This increases the amount of productive global land. Farmers have opportunity to cultivate crops multiple times on the same field within a single year under irrigated agriculture and this helps to increase employment because it offers year-round production opportunity. Irrigation removes seasonal unemployment, reduces poverty, and ensures food security (Tiwari, 1998) by stabilising food prices both in rural and urban markets (Lipton *et al.*, 2003).

However, public irrigation schemes in Ghana are insignificant in terms of making any meaningful contribution to agricultural production, particularly in the Upper West Region. The total irrigated area spans some 22 public irrigation schemes, but only 712 ha were developed in isolated places in Upper West region (Namara *et al.*, 2011). This is far too small to make any considerable impact in a region that has over 60 % of its economically active people in agricultural production. Besides, although the classical reasoning for most public enterprises is to avert private monopolies under sound economies of scale (Lee, Matsumura and Sato, 2017), public supply of water service globally, has failed to achieve equitable and efficient distribution of the resource but created a management system that is terribly centralized; opaque to water users; and characterised by waste, inequity, theft, favoritism, corruption, conflicts and “free-riding” in user communities (Trawick, 2003). The Nandom District is endowed with productive land and untapped water resources, but only insignificant acreages are under informal irrigation. Public irrigation in the district is unavailable. Challenges to expansion and improvement of productivity include high capital cost in

irrigation development, limited private sector investment due to lack of incentives, poor management (MoFA, 2007), land tenure insecurity, lack of access to appropriate low-cost drilling technologies, lack of decision support for precise siting of wells, inefficiencies in the output markets, and the absence of explicit government support services (Namara *et al.*, 2011).

Ghana’s unsuccessful experience with public irrigation, makes valid the argument for irrigation privatisation as it is perceived to improve operation and maintenance of irrigation schemes (Namara *et al.*, 2011). Besides, governments of developing countries are financially constrained and faced with poor credit worthiness but private firms often have greater access to credit (Latifi, 2013). Though, privatisation has been criticised on grounds of deception for profit; pursuing profit motive to the detriment of societal good; increased economic divisions by restricting access from poor and on social welfare grounds (Light, 2001), there are evidence under varying conditions that privatisation may improve welfare (Anderson *et al.*, 1997; Matsumura *et al.*, 2009; Cato and Matsumura, 2012). In this direction, Ghana’s irrigation policy has opened up the investment space for intensified and diversified irrigated crop production. The policy aims at achieving accelerated and sustained irrigation development. Specifically, policy thrust A and D involves responding to new demands for irrigated production through a mix of well-coordinated public and private initiatives and extending cost-effective, demand-driven irrigation services to both the public and private irrigators (MoFA, 2011).

Globally, privatisation has been proclaimed as one of the most influential developments in economic policy over the past three decades and is being replicated under all economic ideologies - from capitalist to communist states (Hawkins, 2010) largely due to consensual perception that public sector is highly inefficient, corrupt, and too slow in extending service access (Budds and McGranahan, 2003). Other arguments backing the privatisation option include improvement in quality of service delivery (Latifi, 2013; Hawkins, 2010) due to competition from private actors, production of cheaper goods, and improved access to goods and services by means of business expansion (Gerber *et al.*, 2004).

The concept of privatisation in Ghana dates back to the days of Economic Recovery and Structural Adjustment

Programmes. The Ghanaian experience suggests that public services are not sufficient to support the entire farming community but privatisation of agricultural services cannot fully substitute for public service system. Privatisation efforts of late, are thus geared towards complementing public services where private agencies supply services at areas that the public sector is unable to meet the demand for such services. Under this circumstance, private irrigation supplier will provide irrigation schemes in Nandom District.

Unlike other extension services where it is argued that delivery of service by private service might not be compatible with socio-economic and political situation (Uddin and Qijie, 2013) usually based on public good argument, irrigation service is excludable and exhaustive, thus farmers who wish to have secure production have to be under the scheme. Economic and bureaucratic wise, privatisation of water services has strong appeal for two reasons: (1) water can be priced and (2) people will be incentivised to pay for and use it more efficiently (Trawick, 2003). This makes privatisation of irrigation a possibility.

Ghana's irrigation policy aims at bringing in private sector with the objective of improving cost recovery, expanding scheme sizes and coverage. If the policy gains ground, irrigation service providers will implement cost recovery strategies through proper and realistic water pricing. In this context, it is important to analyse farmers' perceptions with respect to privatising irrigation supply services.

MATERIALS AND METHODS

Data for the Study

The data used for the study were obtained from a household survey of four rural communities in the Nandom District; a district with 95 % rural inhabitants and that has 80 % of the economy depending on largely rainfed agriculture (NDCB, 2014). In addition to the household interviews, key informant interviews and focus group discussions were held with selected stakeholders. The data was collected in April 2015. Household survey was conducted with a questionnaire, checklist was developed for Focus Group Discussions (FGD) and an Interview Guide for Key Informant Interviews (KII). A

random sampling technique was used in the survey to sample the households.

The households survey gathered information on household demographic variables and their perceptions on privatising irrigation in Ghana. Also, information was sought on how much they will be ready to pay if irrigation services were provided in their community by private suppliers. In total, 240 households were sampled for the survey using multi-stage sampling techniques as follows: In the first stage, four small-scale dry-season gardening communities in the Nandom District (Kokoligu, Brutu, Ketuo and Pufien) were selected based on the prevalence of the activity.

In the second stage, simple random sampling was used to select a representative sample of 118 farmers engaged in dry-season gardening in the selected communities based on proportional representation.

In the third stage, simple random sampling was used to select 122 farmers not engaged in dry-season gardening in the selected communities using proportional representation.

In each community, two focus group discussions and two key informant interviews were conducted. In measuring farmers' perception, a likert-type scale was used to quantify responses and obtain shades of perception on an ordinal scale. Likert response alternatives enjoy wide usage among Extension professionals (Boone and Boone, 2012). Choices ranged from 1 = Strongly Disagree to 5 = Strongly Agree, with value increasing by one unit from the most negative to most positive as suggested by Simon and Goes (2013). Farmers' agreement rank to sets of statement depicting their views were recorded based on five points scale (1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly Agree).

Data Analysis

The five-point Likert-type scale data and farmer socio-economics were subjected to descriptive analysis, namely, computation of frequencies, means and standard deviations. The analysis on the Likert-type data helped to deduce group perception. Chi square analysis was employed to establish whether perceptions differed across respondent characteristics. Information from key informant interviews and focus group discussions were transcribed and reported.

RESULTS AND DISCUSSIONS

Farmers' Demographic and Socio-Economic Characteristics

Descriptive statistics estimated from the sample of 240 farmers are presented in Table 1. Out of the 240 farmers surveyed, 58.75 % were males. The unequal distribution of the sex orientation was because fewer females were engaged in dry season gardening specifically and agriculture as a whole (GSS, 2012). Besides, proportionally fewer females cultivate their own fields; most women support their husbands, brothers or sons in production. Females generally undertake household chores and non-farm economic activities carried out in the house such as 'pito' brewery. The mean age of respondents is 43.5 years, with young farmers constituting only 27.1 % of the total sample. This was expected since most of the youth were in school.

On the average, farmers had 3 years of formal education but as many as 48.3 % never had any formal education. This looked bad when compared to the regional average

of the population (age 15 and above years) that have never had any formal education placed at 28.5 % (GSS, 2012). This poor formal education record is characteristic of rural areas in developing countries. The household comprised an average of 7 individuals, 3 of whom are dependents. This represents a larger household size compared to the national average household size of 4.4 (GSS, 2012).

Also, on the average, a farmer cultivates 5.6 acres with about 51.7 % cultivating less than 5 acres. The district can therefore be considered as largely a small-scale production area. The results further indicate that on the average a farmer has 23.6 years of experience in farming. The mean income a farmer earns is GHS 959 per annum with 40.7 % earning less than GHS 500. About 55 % had access to credit from formal financial institutions, money lenders, revolving fund ('susu') and relatives or friends in the 2014 production year. 48.3 % of the farmers belonged to farmer-based organisations (FBOs) and 59.7 % had contact with extension officers.

Table 1: Demographic Characteristics of Farmers

Characteristic	Mean (Std Deviation)	Characteristic	Mean (Std Deviation)
Gender	0.59 (0.493)	Farm Size	5.56 (5.037)
Age	43.34 (12.256)	On-farm Income	968.31 (1322.210)
Education	3.77 (4.426)	Credit access	0.54 (0.500)
Household size	7.43 (2.658)	Extension access	0.59 (0.493)
Farming Experience	23.41 (13.104)	Group membership	0.49 (0.501)

Perception of Privatisation of Irrigation Service Delivery

Farmers' knowledge and perception about privatisation could generally enable them pay or not pay for private irrigation service. Farmers' knowledge of privatisation could have an influence on their perception about privatisation of irrigation service and thus, likelihood of accepting to bear the cost that comes from privatising irrigation.

Out of the 240 farmers interviewed, 69.9 % perceived that the benefits of privatisation will out-weigh its cost while 65.4 % perceived there is the need for private sector participation in the provision of irrigation services. In line with the views held by Gerber, Hall and Hines Jr. (2004) and Latifi (2013), about 72 % (61.7 %

strongly agree and 10 % agree) of the farmers perceived that privatization will ensure wider provision of scheme to farmers in remote location. Gerber, Hall and Hines Jr. (2004) thought that private ventures in their self-interest, would not only improve access to goods and services but also expand their business to areas of demand. This leads them to virgin areas where the potential to capture new customers are high. Latifi (2013) on his part argued that private service providers are concerned with customer quantum and thus expand access to increase the customer base in order to increase customer size and profit.

Less than half (30.0 % strongly agreed and 12.5 % agreed) of the respondents perceived that privatisation will lead to lower prices. The cost saving effect of privatisation is prominently held in literature where it is believed that privatising services brings about competition leading to lower service price (Gerber, Hall and Hines Jr., 2004). To complement the finding of that privatisation can make irrigation service delivery cheaper, participants in a focus group discussion at Kokoligu were of the opinion that privatisation is not bad as it can make goods cheaper. They cited the telephone network industry where competition resulting from privatisation led to the decline of SIM card prices and cheaper call cost. Drawing lessons from privatisation in the telephone industry, they were of the view that private supply of irrigation will lead to cheaper irrigation service delivery. They however, expressed the hope that irrigation suppliers will be the main buyers of their products so as to solve the problem of poor pricing of farm produce.

Farmers however, share in the perception that privatisation of irrigation will ensure that operators respond better to the needs of farmers (service quality) with 68.3 % strongly agreeing and 15.3 % agreeing with the statement. This is in line with the argument put forward by Latifi (2013) that quality service delivery and privatisation are positively related. However, criticism to this is that private companies, in their incentive to maximise profits, may turn to cost cutting short cuts (**Pettinger**, 2017) which in the long run hamper the quality of service delivery.

Also, 74.2 % of the farmers surveyed perceived that privatisation of irrigation will lead to service sustainability. This makes economic sense because the complete cost of service is paid for by the customers, hence providers can completely offset the cost of operation and maintenance as well as make some profit to sustain the running of the irrigation scheme. On sustainability of the scheme key informant had this to say: *“Irrigation will help us get rich. I am happy that there is such an idea. Paying for irrigation will not be a problem. After all we spend money to make money. It will even be a motivation for the suppliers to give us water any time we want it since we pay for the supply.*

The suppliers will be able to continue providing service to us (Female Key Informant, Kokoligu community)”.

Similarly, a farmer put forward this all-encompassing explanation. He said: *“When irrigation service is given to private companies to sell to us, we in communities without state sponsored irrigation scheme will also get access to the service through the private providers. Because they are going to charge based on the full cost of the service, the quality of the service we will receive will be better compared to the public supplier and the supplier will have a good reason to keep delivering the service to us (Male Key Informant, Kokoligu community)”.*

In terms of affordability, about 57 % of the respondents perceived that privatisation of irrigation will make the service unaffordable. Based on the willingness to pay (WTP) responses, this makes intuitive sense since as much as 30 per cent of the respondents indicated they will either not be able to pay or will be unwilling to pay a hypothetical price of GHS 30 per acre per year.

About 70 percent (30.4 % strongly agree and 40.0 % agree) of the respondents perceived privatisation has the potential to promote unequal access resulting in exclusion of poorer farmers in the long run. These distributional consequences of privatisation have been documented in the works of Light (2001) and Gerber, Hall and Hines Jr. (2004). Gerber, Hall and Hines Jr. (2004) asserted that in poorer economies, privatisation will reduce access for low income groups as it serves the interests of those who have the ability and will to pay. This will naturally be the case among smallholders with low income. Farmers may be willing to pay but the price tag by private operators may be so high that only the rich and credit worthy will be able to access their services. The following observation by a key informant further revealed the potential of private delivery of service to exclude the poor: *“Privatisation of irrigation will help us to farm under good water supply but it is going to cost us so much because they are going to charge for the use of the water. We poor farmers will be left out from enjoying the benefit it comes with. I think the government should help” (Key Informant, Puffien community)”.*

Another key informant expressed his sentiments on the distributional consequences of irrigation privatisation follows: *“I anticipate that we will pay higher than those under the public irrigation schemes. This will scare away poor farmers from producing under the irrigation scheme. It is therefore going to make the rich farmers richer and the poor farmers cannot pay. I think it will push the poor farmers out of dry season farming and promote poverty among the poor since only the rich will reap the benefits of irrigation and they (poor) will not”* (Key Informant, Kokoligu community). ”.

Fifty five percent of the respondents (37.1 % strongly agreed and 17.9% agreed) perceived that private irrigation service providers may focus on profit at the expense of social welfare benefits. This is possible because, the state’s welfare focus may be on grain production to attain food security but this goal will not ensure making enough income to pay for services rendered by private service providers. Private irrigation providers will therefore offer scheme site to farmers producing exportable high-value crops with potential to pay for services instead of honouring the national food

security goal. Under this circumstance, the private provider places profit objective over social welfare benefits. Members of a FGD in Kokoligu community were of the opinion that to forestall a situation where profit will be the ultimate motive of private service providers, government should provide the irrigation instead of the private institutions. They indicated further that where government cannot provide irrigation service, they will still have access to the land that will be used by private irrigation suppliers which they can manage under rainfed agriculture. They stated that private irrigation supply will be a good idea but their challenges in respect to such services will be lack of money to pay and lack of ready market for their farm produce.

Regarding the feasibility and ease of payment for the private irrigation initiative, 72.6 % (53.8 % strongly agreed and 18.8 % agreed) perceived it was a feasible initiative while 39.6 % (17.1 % strongly agreed and 22.5 % agreed) perceived they can easily pay for the initiative when a hypothetical price of thirty Ghana cedis (GHS 30) was proposed for irrigation water and service charge per acre per year.

Perception Statement	Response Frequency						Mean	Std. Dev.
	SA	A	U	D	SD			
Privatization will ensure wider provision of scheme to farmers in remote location	148	24	37	20	11		4.16	1.224
Privatization will result in lower cost to farmers	72	30	34	46	58		3.05	1.578
Privatization will ensure operators respond better to farmers needs	164	36	21	16	3		4.43	0.987
Privatization will lead to service sustainability	155	23	32	24	6		4.24	1.163
Privatization will make service unaffordable	13	124	29	43	31		3.19	1.183
Privatization will promote unequal access to service, excluding the poorer farmers in the long run	73	96	23	46	2		3.80	1.098
Private irrigation providers may focus on profit without considering social welfare	89	43	11	41	56		3.28	1.642
In general, the benefits of privatization of irrigation will outweighs the disadvantages	151	16	8	40	25		3.95	1.508
There is the need for private sector participation in the provision of irrigation services	137	20	18	38	27		3.84	1.509
The private irrigation initiative is a feasible initiative	129	45	11	51	4		4.02	1.261
I will easily pay the fee for the private irrigation	41	54	8	92	45		2.81	1.419

SA - Strongly Agree, A -Agree, U - Undecided, D - Disagree and SD - Strongly Disagree. Sample size =

240

Measures of Association between Farmers Socio-Characteristics and Perception

To establish any significant difference between the expected frequencies and the observed frequencies across categories of farmers' characteristics and their perception, a chi square analysis was carried out as presented in Table 3.

Perception about privatisation ensuring wider provision of irrigation schemes to farmers in remote location differed across dry season gardening, age and access to extension. The implications are that farmers who practiced dry season gardening differed significantly in their perception on privatization's ability to ensure wider provision of irrigation to farmers in remote locations from that of their non-dry season gardeners. This is expected because those practicing dry season gardening will have more knowledge and experience regarding irrigation and thus perceive it differently. Also, farmers who have access to extension service will like to have knowledge about irrigation and the benefits of private sector participation, hence they significantly hold different perception on privatisation's ability to ensure wider provision of irrigation to farmers in remote locations from that of their counterparts without access to extension services. Regarding age, the results show that younger farmers (the youth 20 - 34 years) and adults (above 35 years) significantly differed in their perception on privatisation's ability to ensure wider provision of irrigation to farmers in remote locations.

Perception about privatisation ensuring lower service cost differed across farm size and access to extension service. Because farmers with access to extension service are predicted to have knowledge about irrigation and the benefits of private sector participation, they are likely to hold different perception on privatization's ability to ensure lower service cost from that of their counterparts without access to extension. On farm size, the results indicate that smallholder farmers (less than 5 acres or 2 hectares) and their larger farm (above 5 acres or 2 hectares) counterparts will perceive privatization's ability to ensure lower service cost differently.

Perception about privatisation ensuring operators respond better to farmers needs differed across farming experience and access to extension. This

indicates that more experienced farmers (more than 20 years in farming) and their less experienced counterparts (less than 20 years in farming) significantly differed in their perception regarding private entities' response to farmer's needs. So, do farmers with access to extension service and those without. Farmers with access to extension service and those without also differed in their perception about privatisation leading to service sustainability. Perception about privatisation making service unaffordable differed across age and farming experience while the discriminatory effect of privatisation against the poor differed across dry season gardening and farming experience. On whether private irrigation providers may focus on profit as against society's welfare, perceptions differed across dry season gardeners and non-dry season farmers, farm size (smallholder farmers and large-scale farmers) and income groups (farming household who live on less than US\$2 per day and their high income earning counterparts who lived on more than US\$2).

Regarding the benefits of privatisation of irrigation outweighing its disadvantages, perceptions differed only between age groups, extension access and information (those farmers who had some basic information about privatization and those without). Similarly, on the need for private sector participation in the provision of irrigation services, perceptions differed across income groups and extension access. On the feasibility of private irrigation initiative, differences in perceptions were based on age, credit access and information access. Thus, younger farmers, (the youth 20-34 years) with access to credit and informed farmers differed significantly in their perception from adult farmers (above 35 years) without access to credit and uninformed farmers. Whereas ease of fee paying for private irrigation differed across dry season farming, farming experience, income groups, credit and information access.

Table 3: Chi Square Test of Association between Farmers' Characteristics and Perceptions

Perception Statement	Dry Season Farming	Age	Sex	HH Size	Farming Experience	Farm Size	Income	Credit Access	Extension Access	Group Membership	Information
Privatization will ensure wider provision of scheme to farmers in remote location	8.767*	9.623*	0.114	6.113	7.792	3.515	2.251	2.110	24.558***	1.910	3.564
Privatization will result in lower cost to farmers	6.518	3.232	1.694	3.254	2.738	8.950*	1.969	6.348	11.296	7.188	4.379
Privatization will ensure operators respond better to farmers needs	5.592	5.591	2.254	2.649	14.134**	7.297	2.901	6.176	17.525**	0.993	4.4880
Privatization will lead to service sustainability	2.774	4.147	1.719	2.371	4.116	3.956	3.788	4.196	12.435*	4.461	2.665
Privatization will make service unaffordable	3.810	8.698*	5.922	4.151	15.894**	2.555	0.936	1.990	1.820	2.705	4.758
Privatization will promote unequal access to service, excluding the poorer farmers in the long run	9.235*	7.460	7.372	2.962	9.273*	3.398	0.856	7.186	0.276	3.163	5.656
Private irrigation providers may focus on profit without considering social welfare	16.439**	7.594	3.486	1.554	2.161	7.818*	8.567*	2.945	5.897	5.861	4.722
In general, the benefits of privatization of irrigation will outweighs the disadvantages	4.534	9.985*	4.546	4.285	5.240	2.059	3.560	4.483	8.928*	3.960	16.305**
There is the need for private sector participation in the provision of irrigation services	0.433	4.490	2.074	4.797	3.050	1.873	13.991**	4.110	10.222*	7.628	4.176
The private irrigation initiative is a feasible initiative	3.434	8.954*	2.060	5.114	4.879	1.417	7.129	11.952*	7.029	6.358	8.459*
I will easily pay the fee for the private irrigation	69.277***	7.339	2.283	3.205	10.048*	4.011	22.259**	53.609**	2.600	6.877	10.718*

, ** and * respectively represent significance at 10 %, 5 % and 1 %*

Payment for Private Irrigation Service Delivery

With regards to paying for private irrigation service delivery, a hypothetical charge of thirty Ghana cedi (GHS 30) for an acre of irrigated field per year was proposed and about 63 % of the respondents were willing to pay to enjoy irrigation service delivery. Regarding maximum acceptable cost farmers will be willing to pay, about 38 % of the respondents were willing to pay GHS 35 and beyond for an acre of irrigated field for a year.

Table 4: Farmers' Willingness to Pay for Irrigation Water and Price per Acre per Annum

Variables	Frequency	Percentage
Willingness to Pay (WTP)		
Yes (1)	223	92.9
No (0)	17	7.1
<i>Total</i>	<i>240</i>	<i>100.0</i>
WTP at GHS 30		
Yes (1)	151	67.7(62.9)
No (0)	72	32.3 (37.1)
<i>Total</i>	<i>223</i>	<i>100.0</i>
Maximum WTP (Minimum=5; Maximum=500)	Mean=35.03 (US\$9.20); Std. Dev=43.062;	
<15	32	14.3 (13.3)
15 -30	101	45.3 (42.1)
>30	90	40.4 (37.5)
<i>Total</i>	<i>223</i>	<i>100.0</i>

Percentages in brackets are relative to the population sampled; exchange rate 1 US\$ = 3.8 GHS

Conclusion

The results of the study revealed that farmers in the Nandom District perceived privatisation of irrigation service delivery to be good as it would be a positive tool to promote irrigation access, ensure customer responsive irrigation service delivery and sustainability in irrigation supply. However, privatisation is seen as a means of excluding resource poor farmers from irrigation as affordability of privatised irrigation is of concern. Also, the idea that priority might be put on profit maximisation at the expense of social welfare in a market oriented irrigation system was an issue of concern to farmers. Dry season farming, income, credit access, extension access among others, are key to these views held by farmers. In line with the positive views, over half of the respondents are likely to pay for private irrigation, which is expected to help them cope with reducing rainfall situation, if it is delivered at GHS 75 (US\$ 20) per hectare per annum. The potential for private investors to set up private irrigation supply or for government to take advantage of public private partnerships is bright as there is a body of farmers ready to pay for the service.

An important policy implication, however, is that the Government of Ghana, through its "one-village one-dam" programme and in line with Ghana's irrigation policy, can take a step further to liaise with private entities to actualize implementation of an efficient irrigation system based on public-private-partnership (PPP). PPP will be ideal as it will help protect the interest of smallholders in farming communities in terms of land security, social welfare goals from private corporation's potentially "predatory power and self-interest". This can take the form of government-developed private-run system, where dams and irrigation infrastructure are financed and owned by the state and contracted out to private institutions to manage. The reasoning is that land is fixed and the poor in farming communities should not lose access to land due to their inability to pay. When infrastructure is provided by the state, communities can hold government accountable over the land and thus have a window to negotiate for the poor. This therefore solves the distributional consequences and social welfare challenges posed by privatisation.

The study therefore recommends the implementation of a government-developed private-managed irrigation service delivery in the study communities and Nandom District as a whole.

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