

Between Professionalism and Amateurism in the Use of the Agricultural Training Videos: Lessons Learnt from Experimental Auctions in Benin

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Abstract

Agriculture training videos (ATV) facilitate the wider dissemination of agricultural technologies and encourage farmers to adapt the learnings to their conditions. However, producing quality video is expensive as well as challenging for notable number of agricultural extension organizations across many Africa countries. This paper compares farmers' willingness to pay (WTP) for two distinct video quality levels—a cheap, amateurish video and a costly, professionally produced video. Using stratified random sampling, 91 farmers were selected for the experimental auction sessions. These farmers were chosen from a database that was compiled by the Ministry of Agriculture developed in 2021, with a total population of 382 vegetable farmers. Data were analyzed using Student's t-test and Tobit model. 97% of farmers who attend the experimental auction sessions, agreed to pay for the ATV and results show a significant difference of 0.063 USD between the two videos, and in favor of professional video. Farmers' WTP for ATV is influenced by education, access to funding, images clarity, type of character in videos, understanding level of message and language spoken. Video quality is very important in the learning process in rural areas and support the promotion of professional videos. However, amateur videos can be used in agricultural training if financial support are not available for professional videos production.

Keywords: agricultural extension, agricultural training video, experimental auctions, willingness to pay, Benin Republic

1. Introduction

Agricultural training videos (ATV) are a useful and effective extension channel for reaching marginalized farmers and disseminating agricultural information (Van Mele, 2011). ATV facilitates the sharing of agricultural extension related information with large audiences by triggering farmers' innovation, ingenuity and imagination to adapt basic principles of improved technologies to local context (Bentley et al., 2022). Using ATV as extension tools, which are based on farmers' experiences and combine visual and verbal communication methods is suitable for knowledge development (Zoundji et al., 2018a; Goller et al, 2021). Several studies showed that when the ATV are made available to farmers at the right place, they find their own way to watch them, even if there is no electricity (Van Mele et al., 2016; Zoundji et al., 2016). The effectiveness of ATV in the process of producing and using technological, organizational and institutional innovations has been demonstrated by several studies (Zossou et al., 2017; Zoundji et al., 2018b; Bentley et al., 2022). Based on the "professional" videos created by audiovisual experts, these studies have demonstrated the benefits of ATVs by encouraging farmers to carry out their own basic research and adapt the technologies. However, the production of "professional" videos is quite costly (Songhai, 2015; Zoundji et al., 2016) and mostly dependent on development funding.

For instance, Benin, Mali, Egypt, Kenya, Uganda, and Malawi were among the countries where the Swiss Agency for Development and Cooperation's "Videos for Farmers" project assisted in the production and distribution of several ATVs (Bentley et al., 2014). Additionally, the International Maize and Wheat Improvement Centre and the Cereal Systems Initiative for South Asia were assisted by the United States Agency for International Development and the Bill and Melinda Gates Foundation to produce the "Save More, Grow More,

Earn More” video in Bangladesh (Bentley et al., 2015). The International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT) funded the creation of the production of the “Fighting Striga” videos in Mali (Zoundji et al., 2018b), while AfricaRice funded the development of the parboiling rice video in Benin (Zossou et al., 2012).

Given that only development organizations have invested in the “professional” videos, ensuring their sustainable production and wide distribution remains a challenge, particularly given the current global context of reduced development aid and financial assistance (IARAN and CaLP, 2019). Consequently, it could be a good idea to expand the scope of video production beyond financial aid or development aids and seek for the kinds of films whose production costs are reasonable and for which farmers would be happy to split the cost in order to ensure the long-term viability of using videos as an agricultural extension tool. This article’s goal is to determine if making an “amateur” video on the same subject may have the same effect on the farming community as a “professional” film while spending less on production. In order to achieve this, we examined the farmers’ willingness to pay (WTP) for three different types of ATV on the same topic. The first video referred to as the “reference video” was used as a benchmark for contrasting it with other kinds of videos. This video was created with a low budget cell phone, and as a result, it has extremely poor image clarity, sound quality, message content, and structure.

A second video, dubbed an “amateur video” had low production expenses since it was produced by an amateur cameraman who disregarded many “professional video”, requirements such as graphics, visual effects, and background music. The third video is referred to as a “professional video” or “high-quality video” meaning that it includes information from scientists and farmers’ backed up with pertinent, coherent and steady quality audio visuals effect that sequences of farmers at work (Van Mele, 2018).

In order to attract the audience's or farmers’ attention and encourage learning, professional videos need to have high-quality audio and visuals, a strong narrative framework, and a relevant message (Salm et al., 2018; Vilppola et al., 2022). These kinds of videos were made using the zooming-in, zooming-out (ZIZO) technique, in which narrators and farmers explain cutting-edge technologies and the science behind them in simple easy to understand everyday language (Van Mele, 2006).

In order to capture the impact of the above three ATV on farmers’ preferences, experimental auctions is used to elicit the willingness to pay which is defined as the maximum price a customer would be willing to pay, under normal market conditions, to acquire a product or service (Robin et al., 2008). In the context of this study, the WTP is the amount derived from farmers' preferences for acquiring each type of ATV on different formats such as DVDs, mobile phones and public screenings. Several methods have been developed in marketing and economics to measure consumer WTP (Le Gall-Ely, 2009). This study used experimental economics, in particular the Vickrey auction, as it protects the measurement of WTP from hypothetical bias, the Warm Glow effect and strategic bias and limits measurement bias (Robin et al., 2008). The experimental method thus enables better control of the environment in which this measurement is carried out. In order to examine economic behaviors or phenomena in recognized, regulated, and repeatable situations, many authors (Robin 2017, Yildirim 2022) claim that experimental economics is first and foremost a research methodology that replicates a real economic environment.

2. Method

2.1 Study Area and Sampling

This study was conducted in the Municipalities of Kpomassè and Ouidah, located in the southern part of Benin and belong to the Guinea zone, which extends from the Atlantic coast and stretches between 1°45' and 2°24'E and 6°15'and 7°00'N to the west and 6°15' and 7°30'N to the east (Akoègninou et al., 2006). These municipalities are among the major tomato producing areas in Atlantic department of Benin (MAEP, 2020). According to same author, total production of tomato in 2012 was 244,742 tons, with 113,373 tons for the Atlantic department production, or 46.32% of total production. The municipalities of Kpomassè and Ouidah produced about 64% of the total production of tomato in the Atlantic department and were selected because the agricultural training videos used in this study are focused on the tomato conservation techniques. In addition, two villages from each municipality were selected. Villages of Kpodji and Houéyogbé of the municipality of Kpomassè and villages of Gbéhonou and Gakpé of the municipality of Ouidah were selected for this study because of their importance of tomato production.

Ninety-one vegetable producers were chosen from four selected villages for the experimental auction sessions using the stratified random sampling method and a simple random draw (Rondeux, 2021). This figure was selected since the experimental auction approach is expensive and the project has limited resources. These

producers were randomly chosen from a database that was compiled by the Ministry of Agriculture developed in 2021, with a total population of 382 vegetable producers.

2.2 Data Collection

Data on farmers' WTP were collected using the Vickrey (1961) auction sessions method. Each study village had one session. As a result, the reference video (benchmark), the "amateur" video, and the "professional" video were the three different kinds of videos that were used during the various sales sessions. Each sales session comprised five stages, as per Zossou's (2022) planned stages:

Stage 1. Introduction

This stage consisted of explaining the basic rules to be followed throughout the session in the farmers' local language. Farmers were also promised travel expenses worth 500 FCFA (0.8 USD). This pretext is often used in Africa to detach donations from their context of payment for services or gifts. It also slightly reduces the bias associated with participation fees (Lusk and Shogren, 2007).

Stage 2. Training with biscuits

Following Shogren et al (1994), biscuits were used to familiarize participants with the procedure. Each participant was given the benchmark "Glucose" biscuit and asked to give their WTP for two other types of biscuit, "Chic Choc" and "Rich". An actual sale of a randomly chosen biscuit was carried out. The training was followed by discussions and questions-answers to help participants understand the procedure.

Stage 3. Individual bids

We asked each participant if they would rather have the video on a mobile phone, DVD, or projection. Next, we asked them to select their favorite alternative video (amateur or professional) based on its comparison to the reference video they had received as a donation on the desired medium. If the individual chose the reference video, we asked the individuals if they would still prefer this video if the other two types of videos in comparison were at the same price. If they answer in the affirmative, we consider their WTP to be less than 0. If they answered negatively, then we consider their WTP is equal to 0. If the alternative video is chosen, we ask the individual to submit a price to be added to the price of the reference video (the price of the reference video for the DVD medium is 0.64 USD, 0.32 USD for the projection and 0.16 USD for the mobile phone) to have the preferred video on the chosen medium. The value provided is then considered as the individual's WTP. The total price is only obtained by adding the added value to the prices of the reference video according to each medium. Responses were recorded privately for each individual.

Stage 4. Surveys

We asked each participant to complete an independent questionnaire to gather precise information on their appreciation of the characteristics of the videos, as well as socio-economic information. This survey was carried out after all the auctions, to avoid revealing information about the aims of the study (Corrigan and Rousu, 2008).

Stage 5. Closing

We randomly selected one type of video and one type of medium (DVD or Mobile phone) that has been sold. This was deducted from the entry fee of the winner who bought at the second-best price.

2.3 Data Analysis

Once the WTP had been determined, the WTP amounts were compared using Student's t-test. A one-factor ANOVA test at 5% was then carried out to determine whether there was a significant difference between WTP depending on the type of support. The factors influencing these amounts were then identified using a Tobit model. In general, the Tobit model is written as:

$$Y_i^* = X_i\theta + \varepsilon_i$$

Where Y_i^* is a latent variable used to approximate the maximum value that individual i is willing to pay. θ is a vector of model parameters to be estimated, X_i is a vector of explanatory variables and ε_i is an error term independently and identically distributed according to a normal distribution with zero mean and constant variance σ^2 .

Let Y_i be the actual amount that individual i is willing to pay:

$$Y_i = \begin{cases} Y_i^* & \text{si } Y_i^* > 0 \\ 0 & \text{si } Y_i^* \leq 0 \end{cases}$$

Tobit model is used to estimate the parameters θ and σ^2 from observations of Y_i and X_i .

3. Results and Discussion

3.1 Socio-economic Characteristics of Participants in Experimental Auction Sessions

Tomato farming is the main activity that occupies both men and women of all age groups. The average age of respondents was 43, with 20 years' farming experience, including 11 years in tomato farming. In terms of education, 38% of respondents were uneducated and 62% educated. All the respondents had farming either as their main activity (94%) or as a secondary activity (6%). This finding is similar to the study of Shaw et al (2019), who showed that agriculture employs more than 50% of the population in sub-Saharan Africa. However, to improve their incomes, respondents engage in other activities such as livestock rearing, fishing, processing, and trading. Tomato production accounts for an average 53% of annual household income. It is important to note that only 44% of respondents belong to a farmer group (Table 1). This low percentage could be explained by the scarcity of support projects in these areas.

Table 1. Respondents sociodemographic characteristics (n=91)

Variables	Definition	Mean (std. Dev.)
Age	Age in years	43.15 (11.76)
Education	1= Not instructed; 2= No formal schooling; 3= Primary school, 4= Secondary school; 5= University level	2.47 (1.27)
Main activity	1= agriculture ; 0= non agriculture activity	0.94 (0.23)
Experience in farming (year)	Years of farming experience	20.31 (10.29)
Experience in tomato growing (year)	Years of experience in tomato growing	10.98 (6.01)
Share of annual income	1=10%, 2=20%, 3=30%, 4=40%, 5=50%, 6=60%, 7=70%, 8=80%, 9=90%	53.24 (21.37)
Association membership	1= yes ; 0= no	0.44 (0.50)

3.2 Willingness to Pay for the Agricultural Learning Videos

Among farmers who attend the experimental auction sessions, 97% agreed to pay for the agricultural training videos. This result shows the interest that farmers have in agricultural training videos. This is in line with the results of Zoundji et al. (2016; 2018b), who highlighted that farmers were willing to pay for the ATV and use it for the knowledge development in vegetable farming. It also supports Okry et al. (2014)'s study, which found that farmers were prepared to spend money on learning new skills. The calculation of the average WTP did not take into account the zeros (number of non-consenters) and this explains the non-zero minimum values. It should also be noted that these values are the amounts to be added to the prices of the reference video. Table 2 summarizes the descriptive statistics for WTP for each medium and video. It shows that the respondents (34%) who chose the DVD medium agreed to pay an average of 232 FCFA (0.385 USD) for the "amateur" video and 317 FCFA (0.526 USD) for the "professional" video. Those (40%) who chose video screenings agreed to pay an average of 187 FCFA for amateur videos and 198 FCFA (0.328 USD) for professional videos. The respondents (26%) who chose to have the various videos on their mobile phones agreed to pay an average of 183 FCFA for the "amateur" video and 214 FCFA (0.355 USD) for the "professional" video. We found no significant difference between the average WTP for the "amateur" video, whatever the medium ($p=0.34$). For the average WTP for professional video, there is a significant difference ($p=0.005$) between offers for DVD and the other two medium (projection and mobile phone). We can therefore conclude that farmers in the study areas prefer to have videos on DVD. These results confirm those of Zoundji et al (2016) who observed that most farmers agreed to pay 2,000 FCFA (3.516 USD) for a DVD, which was made within the professional standard video production.

Table 2. Descriptive statistics of willingness to pay for agricultural learning videos

Parameters	WTP for amateur videos			WTP professional videos		
	DVD	Projection	Mobile phone	DVD	Projection	Mobile phone
Number of farmers	32	33	23	30	35	23
Minimum price (FCFA)	50	50	50	50	25	50
Maximum price (FCFA)	600	500	600	800	500	600
Mean price (FCFA)	232.5**	187.12**	182.95**	317.5**	197.72**	213.63**
Standard deviation	157.99	119.26	142.55	194.7	119.95	138.47

Note: Reference price of video on DVD is 400 FCFA, 200 FCFA for the projection and 100 FCFA for the mobile phone; Fixed exchange rate: 1 USD = 603 FCFA;

** denote significant differences at the 5% level based on ANOVA test.

3.3 Quality of Videos Assessment

Farmers' perceptions of the different videos were gathered based on certain characteristics of the videos, namely the quality of the images, the length, the type of character used, the language spoken and the level of understanding of the message. Table 3 shows that most respondents (62%) found "very good" the image quality of professional videos, unlike amateur videos, where around 51% of respondents found "good" the quality of image. As for the length of the videos, 53% of respondents considered this characteristic to be 'long' for the professional video and 'average' for the amateur video. Concerning the type of character in the videos, 67% of respondents considered this to be 'very satisfactory' for professional videos, unlike amateur videos, where 57% considered the type of character to be 'satisfactory'. The spoken language in the videos remains a key factor in the farmers' appreciation of the videos. This characteristic (language) is judged to be "understandable" by most of the respondents for both amateur and professional videos. According to the respondents, the level of understanding of the message conveyed is higher for professional video (72%) than for amateur video. Thus, both amateur and professional videos are of interest to farmers. Each farmer focuses on the characteristic that seems most important to them, which explains the different levels of appreciation from one characteristic to another and from one video to another.

Table 3. Quality videos assessment by farmers (n= 91)

Characteristics of videos		Videos assessment by farmers (%)	
		Amateur video	Professional video
Quality of images	Very good	47.25	62.64
	Good	36.26	51.65
	Poor	1.1	1.1
Video duration	Long	14.29	52.75
	Medium	81.32	47.25
	Short	4.39	0
Type of character	Very satisfied	40.66	67.03
	Satisfied	57.14	32.97
	Not satisfied	2.2	0
	Very understandable	48.35	39.56
Language	Understandable	49.45	57.14
	Not understandable	2.2	3.3
Level of understanding	Good	43.96	72.53
	Fair	53.84	25.27
	Poor	2.2	2.2

3.4 Comparative Analysis of Willingness to Pay for Amateur and Professional Videos

Using Student's t-test, this study compared the average WTP offers for amateur and professional videos. The results of this test show a significant difference ($p=0.0048$) between the two videos if we take the WTP amounts as a whole, i.e. ignoring the WTP per medium. This difference is 38 FCFA (0.063 USD). However, the results note that there is no significant difference between the offers depending on the medium. This study can therefore conclude that video medium (DVD, projection, mobile phone) does not influence farmers' interest in a particular type of video. Thus, "amateur" videos interest farmers in the same way as "professional" videos.

Table 4. Comparison of average WTP for the two videos, by medium

Parameter	DVD		Projection		Mobile phone		Together (DVD, Proj. & Mobile phone)	
	Amateur	Professional	Amateur	Professional	Amateur	Professional	Amateur	Professional
Mean	232.5	317.5	187.12	197.72	182.95	213.63	202.01	240.51
Std. Dev.	157.99	194.66	119.26	119.95	142.55	153.47	138.47	165.49
Mean difference	85		10.60		30.68		38.50	
Probability (diff Moy=0)	0.1202		0.6689		0.5088		0.0048**	

** significant at the 5% level

3.5 Determinants Affecting Willingness-to-pay Amounts

The factors influencing the amount of consent to pay for the purchase of agricultural training videos were examined using the Tobit model. This revealed the socio-economic factors and factors relating to the videos that have a significant influence on the amount of WTP by the respondents. Analysis of the Table 5 reveals that WTP is influenced by factors such as: level of education, access to funding, clarity of images, type of character in the videos, level of understanding of the message contained in the videos and language spoken. Thus, when the farmer is literate (educated), he is more willing to give a higher amount for the videos. This is in line with Sodinou et al. (2015) and Otieno (2020) who argue that education level enhances farmers' ability to efficiently allocate resources or input for more knowledge on the sustainable farming and forest management in Benin. This is also confirmed in Burkina Faso through the results of Sigué et al. (2019), who showed that the level of education is one of the determinants of the amount of WTP for farmers using the "microdose" technology. The level of education therefore has a considerable effect on the farmers' WTP.

The results also show that respondent access to microfinance services has a positive influence on the amount of WTP. Thus, access to microfinance services is essential and constitutes a significant factor to agricultural activities. Therefore, more the farmers have access to a source of finance, more they are willing to give a higher amount for the acquisition of agricultural videos. Our results are in line with those of Ayedun et al (2017) who showed in Northern Nigeria that maize and groundnut farmers' access to credit positively influenced their willingness to pay for organic products for aflatoxin control. Regarding to the intrinsic factors of videos, the study shows that, except for the length of the videos, factors such as the quality of the images, the type of character, the level of understanding of the message and the language spoken in the videos have a significant and positive influence on the respondents WTP. As a result, the perception that the quality of the images is good increases farmers' WTP. Thus, farmers accepted to pay 107 FCFA (0.177 USD) for a marginal unit of image quality of the videos. The "farmer to farmer video" technique lowers the technical complexity of best practices so that farmers can increase their WTP by observing farmers from similar socioeconomic backgrounds performing the tasks they are being educated to perform. This clarifies the beneficial impact the character type has had on the farmers' WTP amount. This promotes the buying of videos. Farmer WTP is also influenced by understanding the message presented in the videos portray.

When producers have a high level of understanding of the technology, they are more willing to increase their amount. This was highlighted by Jimmy et al (2016) who showed that the positive effect of perception, facilitated the understanding and use of soybean processing technology in Benin by women after watching ATV. Understanding the message contained in the videos is an important factor in the farmers' decision making to acquire a training video. The study revealed that the language spoken in the video has an influential factor. This confirms the generally accepted idea that producers learn and are more interested when the video is in their own language. This result is in line with the study of Zoundji et al. (2018a), who showed that agricultural training videos in the vernacular represent an enormous potential for farmers to increase the rate of dissemination of agricultural innovations. Bentley et al (2013), postulates that dissemination can be negatively influenced when viewing is done without understanding the language. It is therefore obvious that not understanding the language of the video makes it difficult to grasp the content of the message and therefore discourages the desire to purchase the video.

Table 5. Determinants of WTP using Tobit regression model

Variable	Coefficients	Bootstrap standard deviation	P>z
Intrinsic factors of the videos			
Quality of images	106.68	21.763	0.000***
Type of character	27.16	13.717	0.048**
Message understanding	44.92	19.799	0.023**
Duration (length of the videos)	4.51	13.604	0.740
Language spoken in the videos	26.85	8.614	0,002***
socioeconomic factors of the farmers			
Gender	-28.25	23.612	0.231
Age (year)	0.00	0.892	1.000
Education (year)	25.54	5.108	0.000***
Experience in farming (year)	0.04	0.871	0.964
Association membership	11.19	13.504	0.407
Access to micro finance service	44.86	10.397	0.000***
_CONS	-125.64	38.161	0.001
LR chi-deux	404.94		
Prob > chi-deux	0.000***		
Log likelihood	466.20		

*** significant at the 1% level; ** significant at the 5% level

4. Conclusion

Videos for agricultural training are a great resource for farmers learning about new agricultural technologies these days. This study used Vickrey's experimental auction method to compare farmers' willingness to pay (WTP) in order to evaluate their capacity to distinguish between amateur and professional video quality. Given that farmers are interested in both "amateur" and "professional" videos, the study found no significant difference in the WTP amounts between them. The factors that define the WTP and have a significant impact on the farmers' decision-making process are the degree of education, availability of finance services, characteristics of characters, image quality, language used in the video, and comprehension level. The study also showed that most farmers accepted to pay around 0.177 USD for a marginal unit of video image quality. These amounts are respectively 0.045 USD, 0.075 USD and 0.028 USD for a marginal unit of satisfaction linked to the type of character, the level of understanding of the message and the language spoken in the videos. These results show that video quality is very important in the learning process in rural areas and support the promotion of professional videos. However, because extension and agricultural advisory organizations lack the funding necessary to create high-quality or "professional" movies, it's possible that they will instead make use of "amateur" recordings, which have a big influence on how widely and quickly agricultural advances are adopted. With less development aids and financial help available in around the world today, amateur videos which are significantly less expensive to make than professional videos are an appropriate option.

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Authors contributions

Dr. Zoundji and Dr. Zossou were responsible for study design and revising. M. Awanvoeke was responsible for data collection. Dr. Zoundji and Dr. Zossou drafted the manuscript with input from M. Awanvoeke and Prof. Vodouhe revised it. All authors read and approved the final manuscript.

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Data sharing statement

No additional data are available.

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