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Farmers' Willingness to Pay for Agricultural Extension Service, A Case Study of Nubaria's Farmers, Egypt

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Aims: This study aimed to depict the current Extension Services (ES) in the new lands as perceived by farmers, also, identify farmers' Willing to Pay (WTP) for the ES.

Study Design: A descriptive design was implemented.

Place and Duration of Study: This study was carried out in Albustan district, Nubaria region in North West of the Delta of Egypt from July to December 2018.

Methodology: A convenient sample of 147 respondents were selected of a proportion of 20 % in three villages. The sampling frame included all farmers regardless of their cropping pattern or farm size including beneficiaries and graduate youths. An interview questionnaire was developed to cover 1) socioeconomic characteristics, 2) current ES, 3) farmers WTP for ES and their terms. Frequency, percentage, average, and range utilized for description purposes, while logistic regression was applied to outline the significant covariates of farmers' WTP.

Results: Findings denote a high level of homogeneity regarding the socioeconomic characteristics, horticulture is the most common pattern (82%). The majority of the respondents (81%) noted that they haven't access to a convenient public ES, and near to half (45%) demanded paid ES. They indicated a high level of trust in public providers e.g. universities (67%) and public extension (58%), nonetheless, they noted input suppliers (73%) and agriculture experts (66%) as the most

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frequent seeking providers. Respondents terms for paid ES was focused on four topics i.e. pricing policy, quality, accountability, and other services to be included with ES. With a preference for providing both knowledge and inputs (40%), fixed price (58%) in cash (56%). Logistic regression showed exposure to the extension activities is significantly associated with farmers' WTP, while late payment for inputs at the end of the season is significantly negative.

Conclusion: Farmers' WTP may contribute to outsourcing and improving ES.

Keywords: Outsourcing agriculture extension; willing to pay; pluralism; new lands; Egypt.

1. INTRODUCTION

Similar to other developing countries, agriculture extension in Egypt is performing under critical financial constraints. Cost-sharing is one of the various extension funding alternatives. Nonetheless, many reforms should be implemented in the traditional extension to ensure the acceptance and sustainability of such an alternative. To illustrate, the financial sustainability of the Agriculture Extension (ES) became the main concern of the professional extension staff [1]. Therefore, public agencies have to develop extension approaches that match the community financial resources. Including a range of providers in terms of methods, quality of service and cost. Still, the sustainability of each approach will depend on the portion of the domestic fund and the development of proper evaluation [2]. With this in mind, four issues need to be investigated a) source of funding, b) client targeting, c) cost recovery, and d) delivery channels. The government, farmers, or private non-profit organizations may pay for the ES. This depends on the economic characteristics of the extension information itself and the farm production pattern. Indeed, farmers may be willingly only for private goods or toll good [3].

Equally important, centralized ES should continue to ensure equity in service provision for stallholders [4], and maintain the function of public research and extension systems [5]. On the other hand, governments have to privatize certain services and/or partially charge farmers for such service [6], and terms of the cost-sharing scheme should be regarded. Cost-sharing may strengthen the voice of farmers, enhance accountability and outreach small scale farmers, and accordingly, improve farmers participation in the extension programs management and programs effectiveness [2,3,7]. Costs can be recovered also through the supply of inputs and services, therefore public-private partnerships with input suppliers may spur privatized advisory services [8], offer partial cost-

recovery mechanism and overcome the institutional inefficiencies related to the public extension [3].

Privatizing advisory services may be regarded as a means to shift the cost burden of ES to the farmers [9]. However, smallholders, in particular, confront ruthless conditions and almost produce for subsistence with modest margins to tolerate additional costs. Farmers add more investments in agriculture only if the anticipated returns neutralize the perceived threats and exceed returns of alternative investment opportunities [10]. Nonetheless, Willingness to Pay (WTP) for ES still a controversial issue e.g. the variant potential funding mechanisms and the combination of extension providers (private, public, universities, research centers, and NGOs). Farmers' WTP is determined by two factors 1) farmers' demand for agricultural ES 2) farmers' anticipation of returns from new information. Farmers' WTP is also assumed to be influenced by the farm scale and marketable surplus; the cost of the extension service; and the income resulted from adopting the extension information. To explain, small-scale and subsistence farmers produce low-price output, and so have limited incentive to pay for ES. Again, farmers perception of utility, relevance, and reasonable prices of ES is not enough to establish their WTP as they still think that extension should be a free service [11]. This situation demands the government to be involved and committed to supporting both public technology transfer efforts and private extension to maintain even access among variant farming scales to ES, chiefly, subsistence and small farmers. Also, increases the flow of information through integrating different existing subsystems of extension providers [12]. A government can also enhance this situation throw the following policies: demand aggregation, enhance credit facilities and promoting farmers' associations to enable small farmers to pay for ES [3], and finally, develop regulations to control over the contract relationship of ES provided by private actors [9].

Willingness to pay in agriculture evaluate beneficiaries' demand and proposed cost for potential extension services that may be provided by a profit-based extension agent. Contingent valuation methods are repeatedly used in WTP studies [13]. In fact, farmers' WTP for a particular ES is a function of knowledge, attitude, and intention. To illustrate, socioeconomic characteristics such as age, gender, and income contribute to form farmers' WTP, since it shapes their knowledge and attitude. While market circumstances such as accessibility and prices define their purchase behavior and ultimately farmers' WTP [14]. The academic literature on Ulimwengu and Sanyal (2011) suggested determinants of farmers' WTP for ES as follows: per-unit cost, farm size, education, nonfarm income, family size, and the awareness level of agricultural technology increase the propensity of farmers' WTP for ES, while, cash payment decrease farmers' WTP. Nevertheless, farmer's age was found to have a double effect as the longer experience has a positive effect, while young farmers may be more likely to invest in agricultural technologies [15].

1.1 The agriculture Sector in Egypt

Egypt faces a critical situation with scarce land and water resources together with high population growth. To deepen the challenge, the majority of the Egyptian farmers (90%) are smallholders with a land property of fewer than two hectares. Not only microscale farm, but also fragility, desertification, climate change, and poor performance of governmental institution are common problems among smallholders [16].

To respond to such circumstances, the agricultural strategy was planned to maintain the fertile soil to avoid further infringement, together with, expanding reclaimed areas. Naturally, the newly reclaimed lands assumed to apply modern irrigation systems and convenient farm management practices for water scarcity conditions. In general, the agriculture pattern in Egypt tends to be more desert oriented, utilizing virgin lands and modern irrigation and production techniques to produce high-value products [17]. However, land reclamation is a comprehensive process regards both technical development and sustainability, it also includes economic, social, cultural, legal, environmental and administrative activities [18]. Therefore, farmers in the newly reclaimed lands need more and highly specialized ES e.g. irrigation and fertilization, soil leveling and preparation, crop selection and

rotation [19]. Considering, the depending on the public sector as the main services provider which resulted in heavy financial and administrative burden. And so, more budget should be allocated to the agricultural research centers and the advisory system. Instead, the actual budget has been decreased [17], likewise, the extension activities at the village level, in particular, sustainability-relevant assistance e.g. organic farming, herbs and medicinal plants [20].

1.2 Agricultural Extension and Advisory Services

Public Extension (PE) in Egypt is comprised of a mosaic of institutions in the fields of research, extension, education, and rural development. These institutions are belonging to the Ministry of Agriculture and Land Reclamation (MALR), the Ministry of Water Resources and Irrigation (MWRI), or public universities and national research centers [21]. MALR includes complex institutional structure. However, for the most parts, MALR institutions are inadequate to establish sustainable agricultural and rural development. Moreover, research institutions are almost centralized [22]. The Central Administration for Extension and Environment CAEE is the principal provider of agriculture ES as a public sector. Besides CAEE, MALR has two research bodies i.e. The Agriculture Research Center (ARC) and Desert Research Center (DRC). Both bodies include special institutes, regional research stations, and central laboratories [19]. CAEE was perceived as inefficient and poorly linked to research centers. Also, hiring procedures got frozen starting from 1984. Resulting in, a serious decrease of village level workers from 3,274 in 2011 to around 800 in 2014 [23]. Increase the age average of extension staff as to 50 % of them were more than 50 years old [24]. Moreover, extension staff has to engage in both administrative and advisory work. Similar to CAEE, research centers lack sufficient fund to carry out the relevant activities. The regression of CAEE in providing the advisory services left the room open for private providers. However, services provided by private advisors remained limited to product-specific information. Private firms are compensating public investment in research and development [19,21].

1.3 Significance of the Study

This study may contribute to enhance decision makers understanding of farmers' acceptance of

paid extension services, including price, how to pay, when to pay. etc. It also provides an outline of farmers projections and terms for the paid services.

1.4 Problem Statement

To maintain responsive and effective advisory services, the public extension should find alternative resources. Farmers sharing of the extension costs is one of the outsourcing alternatives. Also, other advisory providers may contribute to meet a particular service based on commercial principles. Additionally, there is room open for different actors to deliver collaborative ES that integrates principles of both commercial and public goods. However, farmers may evaluate the returns against the costs, and/or they can't pay for the services. This study tends to investigate farmers willing to pay, as well as, forms of extension they are willing to pay for.

1.5 Objectives of the Study

The objectives of this study are:

- 1) To explore the conditions of the extension services in the new lands.
- 2) To identify farmers willing to pay for the extension services.
- 3) To Identify factors influencing farmers WTP for public extension services.

2. METHODOLOGY

2.1 The Study Area and Sampling

Nubaria region is located in North West of the Delta 47 km south of Alexandria (see Fig. 1). The total area of the region is around 5670 km² [25]. Nubaria was selected for this study as a mega-project, that was established during 80th in Egypt. It includes variant categories of farmers i.e. graduate youths, beneficiaries, disadvantaged farmers from reforms of the land-tenants low, and pension militant persons. Equally important farm size ranges from 2 to a few hundreds of hectares. Conditions are suitable for a wide range of crops. The region comprises six districts (Moraqabah) as follow: Bangar Al-Sukkar, Al-Hammam, West Nubaria, Taiba, Al-Entelak, and Al-Bustan. Each Moragabah is comprised of a few small villages of about 200 and 800 farmers per each. One of

those villages considered the administration village [26].

With referring to the official expertise in the public extension of Nubaria, the major categories demanding for the extension service were selected on two stages. First, Albustan district was selected as it comprises both Graduate Youths (GY) and Beneficiaries. Second, three villages were selected i.e. Tawfeeq Al-hakeem, Abdel-Mouneem Riyad, and Al-Sharawee. These villages include both GY and beneficiaries.

Given, 1) the allocation terms induced a high level of homogeneity among the study subjects, 2) the wide area of farmlands, and 3) the poor transportations, a convenience sample of 20 % of a total of 147 respondents was determined. The sample was representative with respect to farm title (GY/beneficiaries) for each village. Eighty-two GY were selected from the three villages and 65 beneficiaries from only Tawfeeq Al-hakeem and Al-Sharawee as shown in Table 1. Eligibility criteria required subjects to have a parcel and house in the concerned village and practicing the agriculture regularly.

Hancock, Mueller et al (2010) concluded that the sample size in logistic regression should be larger than might be expected for standard linear regression. The sample size should regard the model complexity in a particular population. For instance, the response probability rate (success/failure) within the population, the type of covariates (continuous, categorical, or dichotomous), and the expected number of observations per covariate. Some sources recommended sample size to not be less than 10 ($p + 1$), where p is the number of covariates in the model [27,28]. Some others suggest only 5-9 events in particular circumstances, and 10–16 events under other sample frame circumstances [29]. Respecting time and budget limitations, the sample size was limited to 147 respondents. The relevant variables to farmers' WTP were identified with respect to [30] "Framework reflecting consumer behavior towards food products" with the adaptation to extension services.

Model specification followed Hosmer and Lemeshow's (2013) including building the initial model, refining the set of covariates, and determining the final form of the logistic regression model. First: An initial bivariate analysis was performed to evaluate the

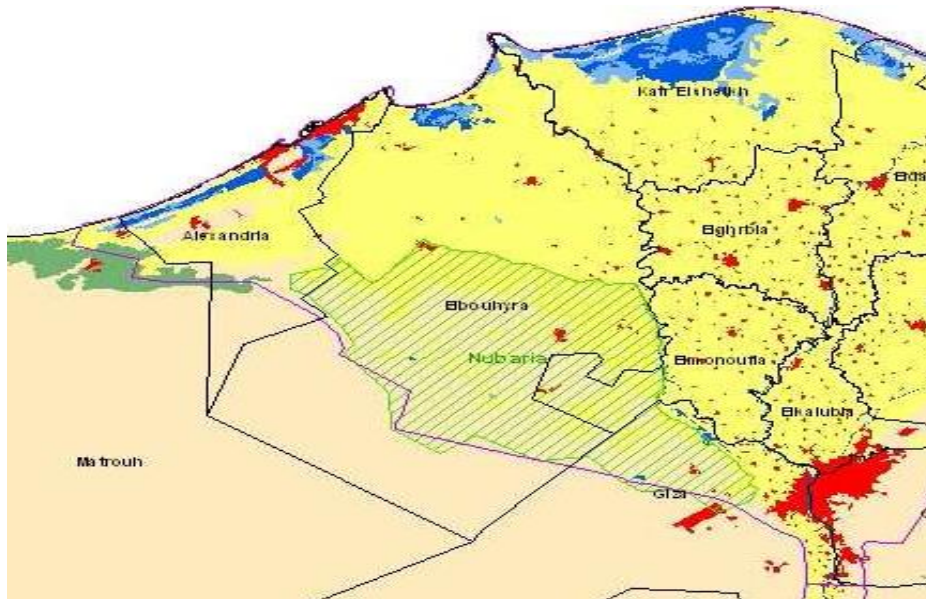


Fig. 1. Map of Nubaria region

Source: Abu-Hadid et al. (2010)

Table 1. Total farm holders and interviewees in the selected villages

Village	Sample size		Total farm holders		Total
	Youth	Beneficiaries	Youth	Beneficiaries	
Tawfeeq Al-hakeem	14	24	70	118	188
Abdel-Mouneem Riyad	58	—	288	—	288
Al-Sharawee	10	41	49	206	255
Total	82	65	407	324	731

Source: Non-published data MALER, Sector of Land Reclamation, Al-Bustan District, 2005.

relationship of each individual covariate using the contingency table with categorical variables and univariate logistic regression with continuous variables. All farmers' socioeconomic variables and characteristics of current extension services were included in this stage. Second: only the covariates that have a bivariate association with farmers' WTP at significance $p < 0.25$ were selected as candidates for the multivariate logistic regression model. Including, land title, exposure to extension activities, crops area, late payment for inputs, current access to extension service education, practicing agriculture before, and animal production per head. Third: The contribution of each predictor to the multivariate model was evaluated using the Wald stepwise test [27,31]. IBM SPSS package V. 21 was employed for data analysis.

2.2 Tools of Data Collection

An interview questionnaire was designed and pretested to achieve the study

objectives. It included three sets of questions as follows:

2.2.1 Farmers' socioeconomic variables

Education was measured by the number of farmers' education years; origin was given scores of 2 and 1 for rural and urban responses respectively; Residence was given scores of 2 and 1 for permanently and sometimes responses respectively; and practicing agriculture in advance was given scores of 2 and 1 for yes and no responses respectively; Experience in Nubaria was measured by the number of years since holding the parcel; irrigation system was given scores of 3, 2, and 1 for drip, sprinkler, and both responses respectively; animal production: measured by number of large animals. Also, economic characteristics were coded as follows: farm size, horticultural, vegetables, and cropping areas: measured by farm area by feddans (one feddan= 4200 m²). Both having a loan and late payment of inputs prices at the end of the

season were given scores of 2 and 1 for yes and no responses respectively; other income resources were given scores of 3, 2, and 1 for the enterprise, job, and no responses respectively; and finally income satisfaction was given scores of 3, 2, and 1 for satisfied, moderate, and unsatisfied responses respectively.

2.2.2 Farmers' perception regarding current extension services

The past exposure for public ES was given scores of 3, 2, and 1 for more than three times, from 1 to 3 times, and never responses respectively; Current access to convenient ES was given scores of 2 and 1 for yes and no responses respectively; Times-paid for service was given scores of 3, 2, and 1 for many times, one time, and never responses respectively. While the remained variables, i.e. extension source that has been paid for service; forms of paid for service; fee for service were an open-ended question. Farmers responses were identified, listed, and classified.

Additionally, Farmer had provided a list of 13 extension providers and was asked to give a score from 1 to 5 with regard to three criteria 1) how frequently they are seeking for ES, 2) how they describe the access, and 3) how far they trust this provider as a source of information. Inexistent extension providers assumed to get zero scores. Farmers responses cover only the actual services they have received during the last three years to avoid the recent retrogradation in public ES. The score of each criterion was given the numbers 5, 4, 3, 2, 1 for the following responses highly satisfied, satisfied, moderate, poorly satisfied, and very poor satisfied respectively. The satisfaction level was estimated according to the formula.

$$Percentage = \frac{score - N + n}{n} * 100/5$$

Where (N) is sample size and (n) is the number of respondents who mentioned such extension providers.

2.2.3 Willing to pay for extension services

Farmers WTP for ES was given scores of 2 and 1 for yes and no responses respectively; Afterwards, Farmers were asked to point out their terms for paid services in an open-ended

question. Farmers' responses were identified, listed, and classified.

Then, farmers were asked about the forms of ES as paid services as follows a) only information; information and inputs; and information, inputs, and marketing with scores of 1, 2, 3 respectively, b) Individual farmer, group farmers, or farmers' cooperation level with scores of 1, 2, 3 respectively, c) season long or on call with scores of 1, 2 respectively, d) pay in cash or in kind with scores of 1,2 respectively, and e) fixed price or percentage of the productivity with scores of 1,2 respectively.

3. RESULTS AND DISCUSSION

3.1 Farmers' Socioeconomic Characteristics

Findings in Table 2 show that only one-fourth of the respondents have high education, close to half of them have spent 7-12 official educational years (43.5%). The majority of respondents are above 50 years old (65%), raised in rural areas (83.6%), practiced agriculture before (76.9%), and have permanent residence in the village (87%). These findings may attribute to the allocation criteria which was applied at the beginning of the project. In the same manner, more than half of the respondents have more than 20 years of experience in Nubaria, farm size of 5 feddans (74.8 %). All respondents have modern irrigation systems, two-thirds of them have drip irrigation. Almost three-fourths of respondents cultivate horticulture. Only 10% of respondents who grow livestock of the amount of 1 to 5 heads.

With regard to the financial status, table 3 reveals near to one-third of respondents who have a bank loan (28.6%). Also, thirty percent have other income resources, half of them have a job and the other half have enterprises. Close to half of the respondents can't pay cash with the order for their inputs.

3.2 Current Extension Services

3.2.1 Traits of current extension services as perceived by farmers

Table 4 depicts the current ES provided to the respondents. Close to half of the subjects have exposed to more than 3 extension events. Four-fifths of them indicated that they have no access to ES nowadays, this may attribute to the tragic

shift in resources allocated to PE. Almost half of them have already paid many times for ES. Private engineers, input supplier, and researcher from ARC and DRC were the main paid resources of a percentage of 17.7, 12.9, and 4.8 % respectively. The provided paid services was mainly through field visits or the farmer visit inputs supply store of a percentage of 19.7 and 8.8 respectively. Farmers also may get verbal advice from input suppliers or agent of input firms. Similarly, in the veterinary, the farmer describes the disorder to the doctor or brings his

animals to the veterinary clinic (veterinary medicine store) himself and charge only for the medications. Nonetheless, sometimes the case demands farm visit, and in this case farmer charge for both farm visit and medications. However, they are committed to buying their inputs from the same source of information. Therefore, from about 28.2 % of the respondents who declared that they had fee-for-service, 21.1% regard the fee as an intangible volume. The fee for a farm visit ranges from 50 to 150 EL, however, 100 EL is the most common fee.

Table 2. Socioeconomic characteristics of the study subjects (n=147)

Characteristics	Average	Range	Frequency	Percentage
Age	52.2	<40	22	15
		41-50	29	20
		51<	96	65
Education	11.8	<6	43	29.3
		7-12	64	43.5
		>13	40	27.2
Family size	5.3	<4	42	28.5
		5-6	85	57.8
		>6	20	13.6
Origin		Rural	123	83.6
		Urban	24	16.3
Residence		Sometimes	19	12.9
		Permanently	128	87.0
Practicing agriculture before		No	34	23.1
		Yes	113	76.9
Farm title		Beneficiary	65	44.2
		Youth	82	55.8
Irrigation system		Drip	100	68.0
		Sprinkle	39	26.5
		Both	8	5.4
Experience in Nubaria	21	<10	22	15.0
		11-20	44	29.9
		>20	81	55.1
Farm size	5.8	<5	12	8.2
		5	110	74.8
		>5	25	17.0
Horticulture area	4.1	No	26	17.7
		Less than 5	85	57.8
		>5	36	24.5
Vegetable area	0.9	No	120	81.6
		1- 5	27	18.4
		>5	00	00.0
Crop area	0.8	No	106	72.1
		Less than 5	34	23.1
		>5	6	4.1
Animal production per head	0.4	No	123	83.7
		Less than 5	15	10.2
		>5	10	6.8

Table 3. Financial characteristics (n=147)

Characteristics	Range	Frequency	Percentage
Having loan	No	105	71.4
	Yes	42	28.6
Other income resources	No	103	70.0
	Job	22	15.0
	Enterprise	22	15.0
Late payment of inputs at the end of the season	No	81	55.1
	Yes	66	44.9
Income satisfaction	Insufficient	25	17.0
	Moderate	73	49.6
	Satisfied	49	33.3

Table 4. Current extension services (n=147)

Characteristics	Range	Frequency	Percentage
Past exposure for public extension services	Never	32	21.8
	1-3	43	29.3
	>4	72	49.0
Current access to convenient ex services	No	120	81.6
	Yes	27	18.4
Times paid for service	Never	81	55.1
	One time	14	9.5
	Many times	52	35.4
Extension source that has been paid for service	No	81	55.1
	Private Eng.	26	17.7
	R	7	4.8
	V	5	3.4
	AIF	9	6.1
	IS	19	12.9
Forms of paid for service	No	81	55.1
	Field visit	29	19.7
	VISS	13	8.8
	AIF Field Visit	3	2.0
	VFS	5	3.4
	Phone call	16	10.9
Fee for service	No	81	55.1
	Intangible	32	21.8
	50	34	23.1
	100	22	15.0
	150	6	4.1

IS input supplier, VISS Visit Inputs Supply Store, AIF Agent of Inputs Firm, V Veterinarian, VFS Veterinarian Farm Visit, R Researcher from ARC and DRC.

3.2.2 Extension providers in terms of frequency seeking, access, and trust

Farmers were asked to classify the variant extension providers according to three indicators i.e. frequency seeking, access, and trust. Table 5 shows the most important extension providers from farmers' point of view as follows: input suppliers, an agriculture expert, family members, exhibitions, research centers, public extension, universities of a number of recipients of 59, 43, 34, 32, 29, 28, 21 farmers respectively. It worth

to mention that the first two actors are profit based actors either direct or indirect, while the last two actors are non-profit actors. Which may be explained in the light of the limited services provided by the public extension. Findings also, reveal kind of homogeneity among the three indicators for each actor except trust which is about to double of both seeking frequency and access to universities, public extension, local community organizations, research centers. While trust is less than frequency seeking and access for input suppliers and family members.

Table 5. Current extension providers in terms of frequency seeking, access, and trust (n=147)

Extension providers		No	Seeking		Access		Trust	
			Score	%	Score	%	Score	%
1	Public extension	28	167	34.3	162	30.7	201	58.6
2	Agriculture expert	43	247	66.5	265	74.9	272	78.1
3	Local community dev. org.	10	145	16.0	149	24.0	157	40.0
4	Farmers' cooperation	16	167	45.0	152	26.3	172	51.3
5	Universities	21	152	24.8	149	21.9	206	76.2
6	Research centers	29	163	31.0	145	18.6	212	64.8
7	Input suppliers	59	306	73.9	322	79.3	201	38.3
8	The agent of inputs firms	9	145	15.6	149	24.4	157	42.2
9	Contract (sugar beet)	13	147	20.0	149	23.1	164	46.2
10	Research centers and SOs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	SOs and Public Extension	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Agricultural exhibitions	32	181	41.3	164	30.6	216	63.1
13	Family members and neighbors	34	221	63.6	218	61.8	189	44.7

Such findings indicate that farmers still trust public actors instead of poor services, also the opportunities still available to develop such providers.

3.3 Famers' Willing to Pay for Paid Extension Services

3.3.1 Famers' terms of paid extension services

Farmers were asked about their terms for paid-services. Farmers' responses were listed and classified into four groups as follows: pricing policy, quality traits, accountability, and other services to be included with ES as shown in Table 6. Regarding pricing policy, close to half of the respondents suggest a fixed cost for each service. Also, but less frequent, farmers are demanding for affordable or co-financed services and the availability to pay at the end of the season. Concerning the service quality, more than half of the respondents pointed out the importance of the local-based experience of the extension personnel and close to half see that extension personnel should be available at the village level. Besides, close to one-third demanded ES be contemporary with the farming processes, and close to one-fourth indicated that services should be problem-solving. With respect to the accountability, farmers are demanding for impartial and objective extension staff, chiefly with regard to the input suppliers, also punctual schedule. Equally important, they suggest accountability from a third-party such as research centers or university institutions. Finally, farmers provided a number of services to be integrated with ES as follows: affordable and guaranteed

inputs, marketing, water management, nematode treatment, and soil analysis and fertilization.

3.3.2 Farmers' projections of paid extension services

Table 7 displays farmers' preference regarding forms of paid ES. Out of 147 respondents, 29 are refusing the paid services of a proportion of 19.7 %. With regard to services types, respondents prefer first the services that include providing them with both knowledge and inputs of about 40.1 %, to ensure inputs' credibility and validity. Farmers prefer second an integrated service includes providing them with knowledge, inputs, and marketing (25.2%). Considering the grouping level, farmers preference of client-provider relationship in descending order were as follows: farmers' association, farmers' group, or individual of a proportion of 38.1, 25.2, and 17 % respectively. These results may reflect farmers demanding to decline the costs of the services and find an official relationship with the service providers to preserve their rights. Findings show also approximately double proportion for the following options: season-long vs on call only, cash vs in-kind, fixed fee for feddan vs proportion of productivity.

3.3.3 Suggested fee for different agricultural patterns from farmers' point of view

Farmers were asked about the convenience fee for ES at different scenarios as follows: farm visit for once, biweekly visit for one-month, biweekly visit for one season, and monthly visit for one year. Table 8 shows the mainstream of the respondents' suggestions. Crops pattern

recorded less estimation of the fee comparing to other patterns at average from 50 to 75 EL. While the same record was 50 to 100 and 75 to 100 for vegetables and horticulture patterns.

Nevertheless, such average for one farm visit make it poorly attractive for expertise, research, and university staff to contribute as a provider for ES, and so for-profit sector.

Table 6. Farmers' terms of paid extension services (n=147)

Famers terms of paid-services	Freq.	%
1. Pricing policy		
1.1 Fixed price for each service	67	45.6
1.2 Affordable or Co-financed extension services	21	14.3
1.3 Late payment at the end of the season should be available	18	12.2
2. Quality traits		
2.1 Extension staff should be qualified and expert in the region	83	56.5
2.2 The extension should be accessible at the village level	70	47.6
2.3 Extension activities should fit farming processes in time across the season	42	28.6
2.4 Problem-solving	33	22.4
2.5 Provide realistic solutions that fit new lands circumstances	20	13.6
2.6 Extension services should be integrated	18	12.2
2.7 Provide farmers with printed material	17	11.6
2.8 Extension staff should avoid routine performance	15	10.2
2.9 Reduction in productivity or quality is not accepted	10	6.8
3. Transparency and accountability		
3.1 The extension should be impartial and objective regarding different input suppliers	80	54.4
3.2 Punctuality	47	32.0
3.3 Accountability from third-party/reference organization	40	27.2
3.4 Continuous and follow-up	32	21.8
3.5 The extension should be contract-based services	26	17.7
4. Other services to be included with the extension services		
4.1 Provide guaranteed inputs	66	44.9
4.2 Affordable inputs	55	37.4
4.3 Marketing	49	33.3
4.4 Irrigation water management	42	28.6
4.5 Nematode treatment	36	24.5
4.6 Soil analysis and fertilization recommendations	28	19.0

Table 7. Farmers' projections of paid extension services (n=147)

Forms	Options	Frequency	Percentage
Willing to pay	Yes	118	80.3
	No	29	19.7
Services types	Knowledge only	22	15.0
	Knowledge and inputs	59	40.1
	Knowledge, inputs, and marketing	37	25.2
Grouping	Individual	25	17.0
	Farmers group	37	25.2
	Farms association	56	38.1
Frequency	Season-long	81	55.1
	On call only	37	25.2
Payment type	Cash	83	56.5
	In-kind	35	23.8
Payment method	Fixed fee for an area unit	86	58.5
	Proportion of productivity	32	21.8

Table 8. Proposed fee ranges from farmers point of view (n=147)

Production pattern	Farm visit		Monthly *		Seasonally*		Annually**	
	From	To	From	To	From	To	From	To
Crops	50	75	50	100	400	500	500	1000
Vegetables	50	100	100	150	400	600	500	1200
Horticulture	75	100	100	150	-	-	1000	2500
Animal production	100	150	100	150	-	-	500	1000

* Biweekly visit, ** monthly visit

Table 9. The logistic regression coefficients, Wald test, and odds ratios for each covariate

Explanatory variables	B	SE	Wald	P value	Exp (B)
Land title beneficiary/youth	- 4.796	1.385	11.992	.001	0.160
Exposure to extension activities	1.226	0.318	14.918	.000	3.409
Crops area	0.228	0.116	3.861	.05	1.256
Late payment for inputs at the end of the season	0.991	0.505	3.856	.05	2.693
Current access to extension service	-1.483	0.528	7.902	.005	0.227
Constant	0.158	0.512	0.095	.758	1.171

3.3.4 Covariates contribute to explain farmers' willingness to pay for the extension services

Logistic regression analysis findings in Table 9 show five statistically significant covariates. That is, the odds ratio indicates that beneficiaries are six times more likely than GY concerning WTP for the ES. Similarly, farmers that pay for the inputs at the end of the season are 2.6 times more likely than who pay directly. Also, one unit increase in the past exposure to the extension activities increases the odds of WTP for the ES by 3.4 times. And, one unit increase in the crops area increases the odds of WTP for the ES by 1.2 times.

$\text{Log (p/1-p)} = 0.158 - 4.796 \text{ land title} + 1.226 \text{ exposure to the extension activities} + 0.991 \text{ late payment for the inputs} - 1.483 \text{ current access to extension service}.$

The overall model goodness of fit Hosmer and Lemeshow ($X^2 = 17.458$, $df = 8$, $N = 147$, $p = 0.026$) indicates the covariates are significantly predicting outcome variable; farmers' WTP for ES. While pseudo r^2 was estimated at 23.6 % and 36.7 % for Cox & Snell, and Nagelkerke tests respectively. Such findings point out the impact of both farmers' background and financial resources on their WTP for ES. As the beneficiaries are almost less educated and have limited financial resources together with living in extending families. It worth to mention that GY had been allocated their parcels first, while the extension activities were at the peak. A few years afterward, beneficiaries had allocated their

parcels after notable regression in the extension activities. Therefore, GY is more candidate to shift their farms from traditional cropping pattern to permanent horticulture than beneficiaries (Dr. Mohamed Wageeh EL-Sawy, former director of agriculture and statistical issues, Albustan Muraqabah, GY Lands Development Project). Horticulture generates better income and accordingly better access to paid ES. To conclude, both GY who had received intensive extension activities and the beneficiaries who have limited financial resources are WTP for ES.

4. CONCLUSION AND RECOMMENDATIONS

According to the findings of this study, we can conclude that horticulture is the mainstream agriculture pattern among the respondents, most of them have experience of more than 10 years of experience in Nubaria. Three-fourths of the respondents have a moderate or high level of income satisfaction. Most of the respondents indicated a high level of exposure to ES in the past, while currently, they don't receive convenient ES. A notable number of them have demanded paid ES. Private engineer and input suppliers are the main providers of the paid services, and this may explain that one-fives of respondents recorded intangible fee. However, among a list of 13 theoretical extension providers, respondents gave more attention to the integration of variant providers, chiefly, the public-private partnerships. The suggested terms of respondents for paid ES included four subsets of terms i.e. pricing policy, quality traits,

transparency and accountability, and other services to be included with ES. Nonetheless, the suggested fee ranged from 50 to 100 EL which may be regarded as not attractive for the private sector. The logistic model pointed out the covariates relevant to the economic resources and the past exposure for ES as main covariates contributed to explaining the outcome variable farmers' WTP for ES.

From the previous explanation this study recommends the following:

- The poor proposed fees should motivate decision makers to develop alternative cost recovery payments that attract the for-profit extension providers as well as, encourage farmers to benefit from group economics of farmers associations.
- The legislative system should be developed according to the pluralistic concepts, in particular, eligibility to provide ES, accountability, and pricing.
- More attention should be given to IS in terms of capacity building and integrity.
- As respondents noted both input supply and marketing as essential services, any future revision for ES should be flexible to integrate such services according to farmers demands.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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