

WILLINGNESS TO PAY FOR ONLINE AGRICULTURE ENTERPRISE LEARNING AND SOFT SKILLS: TOWARDS SUSTAINABLE AGRICULTURE, FOOD SECURITY AND WEALTH CREATION IN AFRICA AND NIGERIA

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Abstract

This study explores the willingness to pay (WTP) for online agriculture enterprise learning and soft skills development among farmers in Africa, with a specific focus on Nigeria. The research assessed the financial readiness of farmers to invest in online learning platforms that offer training in agriculture-related enterprise management and essential soft skills. By analysing factors influencing WTP, this study provides insights into how online learning can contribute to sustainable agriculture, food security, and economic development. Result indicates a significant willingness to invest in online training, driven by perceived benefits in productivity and income generation. The findings underscore the potential of online education as a tool for enhancing agricultural practices and promoting economic growth in Africa.

Keywords: Enterprise learning, soft skills, sustainable agriculture, wealth creation

Introduction

Agriculture remains a cornerstone of the African economy, contributing significantly to employment, food security, and economic growth. Between January and March 2021, the agricultural sector in Nigeria contributed to 22.35 percent of the total Gross Domestic Product (Statista, 2022). Over 70 percent (Nations Encyclopaedia, 2024) of Nigerians engage in the agriculture sector mainly at a subsistence level. Thus, agriculture is vital for the livelihoods of millions of people. However, the sector faces numerous challenges, including outdated practices, limited access to modern technology, and a lack of soft skills essential for successful enterprise management (FAO, 2024).

Despite several government initiatives and programmes implemented to address the situation including the Agriculture Promotion Policy (APP), Nigeria–Africa Trade and Investment Promotion Programme, Presidential Economic Diversification Initiative, Economic and Export Promotion Incentives and the Zero Reject Initiative, Reducing Emission from Deforestation and Forest Degradation (REDD+); Nigeria Erosion and Watershed Management Project (NEWMAP); Action Against Desertification (AAD) Programme, among others; these challenges have stifled agricultural productivity (FAO, 2024). Besides, affecting the sector’s contribution to the country’s GDP as well as via increased food imports partly due to; population rise and declining levels of food sufficiency. For instance, between 2016 and 2019 (Oyaniran, 2020) Nigeria’s cumulative agricultural imports stood at N3.35 trillion, four times higher than the agricultural export of N803 billion within the same period.

As digital technologies advance, the potential of online learning to address knowledge gaps and improve soft skills is substantial. Online learning platforms present a promising solution to these challenges especially in Africa, where agricultural practices are crucial for economic stability and food security. By providing access to education

and training remotely, these platforms can enhance agricultural productivity and sustainability (AgrifoodSA, 2023).

Besides, agriculture, the digital transformation of education via online platforms offers new opportunities for skill development in various sectors, including agriculture. Further, in Nigeria and across Africa, traditional agricultural training methods are often inadequate in addressing the evolving needs of farmers (African Development Bank, 2023; FAO, 2020; FAO, 2022; Obreque, 2022). Understanding farmers' financial readiness to invest in such educational online learning and resources is critical for designing effective interventions that promote sustainable agriculture and wealth creation.

In addition, the lack of access to modern educational resources and soft skills training hampers agricultural productivity and economic development (Hinings, Gegenhuber & Greenwood, 2018; Lowder, Skoet & Raney, 2016; Mabaya & Porciello, 2022). While online learning presents a viable solution, there is limited understanding of farmers' willingness to invest in such resources. This study bridged this gap by assessing WTP and identifying factors influencing it.

Online learning in agriculture

Agriculture is the backbone of human civilisation. Not only has agriculture allowed humanity to evolve and thrive, it has also supported greatly the global economy. The agricultural industry provides food, fibre, and even raw materials utilised in other industries – enhancing flourish of society. At its optimum, agriculture needs to continue to evolve to further support society, farmers and industrial needs (AgrifoodSA, 2023).

The emergence of online learning is transforming consistency of education via taught skills. At the agri-industrial level, consistency of education cannot be over-emphasized and is critical to optimised productivity of current farmers and future farmers alike given the possibilities to learn; methods and techniques required for successful

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agriculture enterprise. As a valuable tool for agricultural education, the emergence of online learning-capacities to offer flexibility and accessibility to agriculture-farmer-studies is essential to; improve agricultural practices by providing access to up-to-date information and training (Miller, 2017). For instance, online courses on crop management, pest control, and sustainable farming techniques can enhance farmers' knowledge and skills (Bowers, 2020).

Further, Davis (2019) posits that, soft skills-capacities including; communication, problem-solving, and management, in online learning are, critical for successful agricultural enterprises. Directly, the need for these soft skills in agriculture is important. Following, these soft skills complement technical knowledge, leading to better decision-making and business outcomes. Consequently, aiding farmers improve on enterprise management and increase profitability.

Benefits of agricultural education

Since prior experience or knowledge may not guarantee very successful farming-craft, consistent agricultural education remains essential to learn the intricacies of this craft. From multiple consistent agricultural education benefits of; overwhelming weather conditions-knowing to soil quality and; taught financial planning necessary for, enterprise growth; agricultural education goes a long way to solidifying technical and skill capacity (Vial, 2019; Usha, Anand & Chandrakanth, 2021; Mhlanga & Ndhlovu, 2021a; Mhlanga & Ndhlovu, 2021b; Mhlanga, 2023; Mhlanga, 2022; Mhlanga, 2021).

Obviously, there is a lot that goes into farming and agriculture. Consequently, whether its online learning or in person-leaning towards; gaining knowledge or, performing research to; remain knowledgeable in the field for years to come is; vital for farmers or would be farmers. On the other hand, the lot of agricultural generational knowledge has yet to be determined certain, as agricultural best practice. Thus, best practices within the industry evolves. In farming, some of these evolving best

practices include such areas of; integrated pest management, soil conservation, water management that require, farmer-informed decisions going, forward (AgrifoodSA, 2023, FAO, 2022; FAO, 2020; African Development Bank, 2023).

Again, while farming and agriculture is an age-old practice that allowed humanity to evolve, it is also a field that is consistently developing in great leaps and bounds. Technology has become an integral part of agriculture and the ability to produce large quantities of agricultural produce and products (AgrifoodSA, 2023; Oyaniran, 2020). Agricultural education thus must, expose learners to the latest cum newest and best technologies within the industry, allowing farmers to more easily achieve success.

In addition, farming has changed in terms of scale and technologies utilised. Further, also, agriculture is an industry constantly experiencing change due to climate change, market fluctuations, policy changes, and more (African Development Bank, 2023; AgrifoodSA, 2023). Following, ready agricultural education is more than needed to empower farmers with knowledge and skill-sets to adapt to circumstances as they change – keeping them ahead of the curve whilst preventing large loss experiences due to these changes (Kropp, 2015). Online learning and willingness to pay is a crucial factor in determining the adoption of ‘ready agricultural education’ via online learning platforms. Such studies as this on WTP for agricultural training highlights farmers' willingness to invest in education and influence-factors especially; perceived benefits, cost, and the quality of the learning experience. In Nigeria, where access to education and resources is limited, understanding WTP can guide the development of targeted online learning solutions.

Theoretical Framework

The study is grounded in the Theory of Planned Behavior (Ajzen, 1991). The Theory of Planned Behaviour posits that individual behaviour is

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influenced by attitudes, subjective norms, and perceived behavioural control. In the context of WTP for online learning, the theory helps explain how farmers' attitudes towards online education, perceived benefits, and financial constraints affect their willingness to invest in online enterprise and soft-skill learning.

Materials and Methods

The study was conducted in 2 states of south-east Nigeria. Rural and semi-urban areas where agriculture is a primary livelihood was selected in Ebonyi and Enugu state. Both states represent a wider farming community with diverse range of agricultural practices and socio-economic conditions (Ndukwe & Nwuzor, 2021; Mbanasor *et al.*, 2024). Primary data was collected through a structured questionnaire administered to a sample of 500 farmers. The questionnaire included questions on demographics, perceived benefits of online learning, and WTP for various online educational resources.

The data was analyzed using descriptive and inferential statistics of econometric methods. The willingness to pay was estimated using contingent valuation techniques and regressed as coded in Python, while factors influencing WTP were identified through regression analysis.

Result and discussion

Table 1: WTP regression model summary

Dep. Variable	WTP
R-squared	0.835
Adj. R-squared	0.802
F-statistic	278.7
Prob (F-statistic)	6.62e-190
Log-Likelihood	-3003.9

From table 2, WTP for training on converting agricultural waste into valuable products (waste-to-wealth), which can enhance sustainability

and income increased by N5308.21. This is the position of Bowers (2020) emphasizing that WTP for online agriculture enterprise learning and soft skills must provide understanding to; convert waste materials into valuable resources, contributing to both environmental protection and economic development. Effective waste management can significantly reduce the impact of flooding (NEMA, 2013), help to manage waste efficiently, prevent blockages in drainage systems (NEMA, 2022; NEMA, 2013), create jobs and generate income (NEMA, 2022), which aligns with the concept of WTP.

Structured online agriculture enterprise learning and soft skill-services should include waste-to-wealth learning. Organic waste can be converted into biogas through anaerobic digestion. This not only reduces the volume of waste but also provides a renewable energy source. Biogas projects in Nigeria, such as those by the Nigerian Biogas Programme (Olugasa, Odesola & Oyewola, 2014; Akinbomi, Brandberg, Sanni and Taherzadeh, 2014), illustrate the potential for waste-to-energy solutions to support climate sustainability while addressing waste management issues.

Utilizing recycled materials in structured-farm unit construction can reduce the demand for virgin resources and decrease environmental impact. Projects that convert plastic waste into building materials offer a dual benefit: reducing waste in landfills and providing affordable construction materials. An example is the plastic waste-to-blocks initiative (Greening Afrika, 2023), which has shown promise in providing sustainable farm-building solutions.

Composting organic waste turns it into valuable fertilizer, which can improve soil quality and enhance agricultural productivity. This practice can help mitigate the impacts of flooding on agriculture by improving soil retention and reducing runoff. Organizations like the International Institute of Tropical Agriculture (IITA) have promoted composting initiatives in Nigeria to support sustainable agriculture and climate resilience (Chew, Chia, Yen, Nomanbhay, Ho & Show, 2019)

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Emphasizing the need for Structured Climate Change Economics and Adapting to Climate Change, particularly WTP for real-time, digital alerts and forecasts that help individuals prepare for weather changes increased by N5308.21. A significant gap in Nigeria's climate and climate change services is the absence of framework and services that explicitly address the specifics of weather alerts or provide detailed directives on how to manage such sub-location climate forecasts. The critical role of this cannot be over-emphasized particularly given incessant flooding that persist in the country (Maclean, 2022). Again, as climate crisis and flood incidence continue, both life expectancy and economic health would decrease. Following, relief materials – bountiful or minimal – would be incomparable to the pains. Worrisome too, there is a notable absence of explicit legal obligations or comprehensive frameworks addressing the displacement of individuals and the protection of displaced individuals, particularly women, from arbitrary displacement due to natural hazards a – critical issue in Nigeria (Olufemi, 2018; Johnson, 2013).

Accordingly, climate-smart agriculture inherent apparently via Adapting to Climate Change compared to digital flood forecasts and early warning systems and improved drainage systems to reduce flooding of previous programs (IPCC, 2021; Ejiogu-Okereke, 2021; Okunola, 2020; Miller, 2017; Koudelova, 2020; Bateman, 2006) play a critical role in evading, the losses, pains from incessant flood and other environmental hazards that relief materials may only minimize. Consequently, through; appropriate and adequate; ecological conservation; disturbance ecology that deals with the causes and consequences of both natural and anthropogenic disturbances; restoration and succession measures; as well as, legal-ecology actions and, continued enlightenment, implementation and advocacy both for improved Adapting to Climate Change and Structured Climate Change Economics learning-services, going-forward is, essential.

Table 2: WTP regression results

Variable	Coef.	Std. err.	 t 	P> t 	[0.025	0.975]
Constant	312.5373	71.664	5.902	0.000	282.088	563.786
Waste-to-Wealth Strategies	5308.21	6.298	12.837	0.000	9322.3	68467
Structured Climate Change Economics	5308.21	6.298	12.837	0.000	9322.3	68467
Adapting to Climate Change	5308.21	6.298	12.837	0.000	9322.3	68467
Market Fluctuations	7164.5	34.069	8.622	0.000	30071.4	226796
Policy Changes	7164.5	10.123	52.901	0.000	51559.6	555385

WTP for Market Fluctuations and WTP for Policy Changes-learning services of online agriculture enterprise learning and soft skills stood at about N7164.5. This may be consistent with perceived effectiveness of such learning-service/training in improving agricultural productivity and operational efficiency (Ready, 2010) – impacting income generation. Again, perceived impact of the training on increasing income and economic stability (Davis, 2019).

Besides, financial constraints and budget allocation. Following, the maximum amount farmers are willing to pay for online training services, both per course and annually (Carson, 2001) may follow, prioritization of spending on online education relative to other agricultural investments (Mitchell & Carson, 1989) given, there critical importance in improving access to technology. Further, maximum willingness to pay online agriculture enterprise learning and soft skills may be influenced by internet access. Thus, availability and quality of internet access, which affects the feasibility of participating in online training may be an important consideration for WTP (Warren, 2018). Also, priority of spending given technology literacy relative to online agriculture enterprise learning and soft skills influence WTP. Hence, farmers' familiarity with using digital tools and platforms for learning is importantly influence WTP for online agriculture enterprise learning and

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soft skills especially climate resilience initiatives (Okunola, 2020; Ejiogu-Okereke, 2021; Ajzen, 1991). In addition, the result on WTP for learning how to manage risks associated with market price fluctuations, including strategies for price hedging, climate resilience initiatives, investments in climate adaptation and mitigation projects and market analysis are consistent with previous report of Carson (2001), Okunola (2020), Ejiogu-Okereke (2021).

Table 3: Socio-economic factors associated with WTP

Variable	Coef.	Std. err.	t	P> t	[0.025	0.975]
Income	0.000121	0.000	0.592	0.554	0.000	0.000
Age	0.000012	0.1435	0.215	0.888	2.163	2.660
Gender	0.2360	1.4245	0.395	0.693	3.840	5.772
Education level	4.0344	3.6034	0.603	0.547	12.928	6.859

From the table 3, WTP for online agriculture enterprise learning and soft skills increased by 0.001% with such socio-demographic variables like age. Obviously, age can influence WTP due to different wealth concerns and financial capabilities (Loomis & Ekstrand, 1998). WTP increased by 0.0121% given income. Farmers' income levels impact their ability and willingness to pay for training and taught-learning. Following, higher income levels often correlate with a greater ability and willingness to pay for online agriculture enterprise learning and soft skills (Hanemann, 1984).

WTP increased with increasing years of formal education attainment. This is in consistent with the position of Falk (2008) but may be linked to; behavioural trust and credibility especially trust in service providers and quality perceived of farmers. Thus, given increasing need for learning, government or private entities responsible for providing the services and perception of individuals on value of online agriculture enterprise learning and soft skills, WTP is influenced (Harrison, 2002; Marlowe, 2004). Also, knowledge of successful implementation level or otherwise of previous learning in comparisons to similar contexts or

regions influence WTP (Smith., 2003). Further, socioeconomic and behavioural structures particularly increased produce demand and/or behavioural intentions to demand for more produce influence WTP. Also, ease in agricultural online platforms/initiatives and likelihood of student-paced-learning practices influence WTP for online agriculture enterprise learning and soft skills (Warren, 2018; Ajzen, 1991).

WTP increased for the male gender relative to females. Gender can impact learning preferences and financial willingness (Sullivan & Huber, 2020). Further, perceived effectiveness of online agriculture enterprise learning and soft skills particularly, effectiveness in flood risk reduction and effectiveness in wealth improvement, market fluctuations, policy changes vis-à-vis gender influence WTP. Thus, in previous studies (Ready, 2010; Cameron & James, 1987) vis-à-vis perception of how effective specific learning services are in improving climate change resilience and adaptation either to flood risk, change due to climate change, market fluctuations, policy changes and perception of how well such learning services contribute to overall wealth-base and environmental quality, WTP was impacted relative to gender.

Conclusion

The study highlights a significant willingness to pay for online agriculture enterprise learning and soft skills among Nigerian farmers. The findings indicate that online learning platforms can address critical gaps in agricultural knowledge and skills, contributing to sustainable agricultural practices, improved food security, and economic growth. The results suggest that online learning can play a crucial role in promoting sustainable agriculture by equipping farmers with up-to-date knowledge and skills. Enhanced enterprise management and soft skills can lead to better decision-making, improved productivity, and increased food security.

Recommendation and implications for sustainable agriculture, food security, and wealth creation

Sustainable Agriculture

Online learning can significantly contribute to sustainable agricultural practices by providing farmers with the latest knowledge and techniques. This can lead to more efficient resource use, better soil management, and reduced environmental impact. Via improving agricultural productivity and management skills, online learning can enhance food security. Farmers equipped with better skills are more likely to produce higher yields and manage resources effectively. Consequently, investing in online learning can lead to increased income and economic development for farmers. Enhanced enterprise management and soft skills can improve business outcomes, leading to greater wealth creation in rural communities. In lieu, the following recommendations follow:

1. Develop affordable online learning platforms: To cater to the financial capacities of farmers, it is recommended that government and agricultural investors cum enthusiasts should create affordable online courses with flexible payment options.
2. Tailor content to local needs: Online learning modules should be customized to address local agricultural practices and challenges.
3. Enhance accessibility: Efforts should be made to improve internet access in rural areas to facilitate online learning.
4. Promote awareness: Increase awareness about the benefits of online education among farmers to encourage participation.

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