ISSN : 0216-8175 EISSN : 2303 - 2499
MIMBAR
Jurnal Sosial dan Pembangunan
Publisher : UPT Publikasi Ilmiah Unisba
Jalan Taman Sari No. 20, Bandung, Jawa Barat, 40116, Indonesia.
Phone : (022) 4203368, 4205546 ext. 6737
Email : mimbar@unisba.ac.id
Website : https://ejournal.unisba.ac.id/index.php/mimbar/index

Internet and Farmers Well-being: Evidence from Indonesia

[1]Rusli Abdulah, [2]Dwi Rahmayani,
[3]Tuti Eka Asmarani, [4]RR. Retno Sugiharti

[1] INDEF – Institute for Development of Economics and Finance, Jakarta , [2]Deparment of Development Economics, Facuty of Economics, State of Semarang University, [3]Deparment of Development Economics, Facuty of Economics, Gunadarma University, [4]Deparment of Development Economics, Facuty of Economics, Tidar University
Correspondance author: retno.sugiharti@untidar.ac.id*

A r t i c l e

Article History
Received: 2024/ 3/ 12
Reviewed: 2024/ 9/ 16
Accepted: 2024/ 9 / 18
Published: 2024/12/ 27

DOI:
10.29313/mimbar.v40i2.2100

Volume : 40
No. : 2
Month : December
Year : 2024
Pages : 177-186

To cite this article (APA Style):

Rusli Abdulah, Dwi Rahmayani, Tuti Eka Asmarani, RR. Retno Sugiharti. (2024). The article title is sentence case style. Jurnal Mimbar. 40(2), 177-186. 10.29313/mimbar.v40i2.2100

A b s t r a c t

This study aims to investigate the impact of internet usage types on the welfare of farmer households, focusing specifically on the distinction between internet use for trade and non-trade activities. Using Ordinary Least Squares (OLS) regression analysis on data from the 2020 SUSENAS (National Socioeconomic Survey) household survey, the study examines farmer households where the head of the household has internet access. The analysis explores how different uses of the internet correlate with household well-being and economic outcomes. The findings indicate that farmer households with internet access exhibit significantly higher welfare levels compared to those without internet. Notably, farmer households using the internet for commercial purposes—such as selling and purchasing goods or services—enjoy a marked improvement in welfare compared to those who only use the internet for non-trade activities. Households that access the internet solely for activities like reading news, social media browsing, or exchanging emails tend to experience lower welfare levels relative to those engaging in trade-related online activities. This study highlights the importance of promoting digital trade literacy and enabling rural internet infrastructure to maximize the potential benefits of internet access in farming communities. By understanding how internet access types impact farmer welfare, policymakers can better support the digital transformation of rural areas, aiming to improve socioeconomic conditions through targeted interventions. This research underscores the transformative potential of internet access when harnessed for trade purposes, offering valuable insights for rural development strategies.

Keywords: Ordinary Least Square; Value Chain; Performance Internet.

Introduction

Amid the Covid-19 pandemic, there are several sectors with positive growth, namely the agriculture, ICT, and health sector. Those sectors can survive amid Covid-19 due to the public's need for these three sectors. The agricultural sector is required to provide food supply as a necessity. The information technology sector is needed because pandemics deter economic actors from interacting directly.

Face-to-face education is abolished, shopping visits are restricted, food stalls are only taken away, and many recreation areas are closed. This condition encourages the growth of the digital sector as a way out of the absence of direct interaction processes.

All activities that previously had to be carried out face-to-face suddenly changed. Offline learning has been switched to online learning. Mall visits were restricted, which was replaced by increased online shopping. Dine-in restaurants replaced with take-way and increased video-on-demand-based entertainment was a form of how human interaction began to shift to digital. The digital sector then becomes the foundation for other sectors affected by restrictions. Furthermore, the Health sector became focusing on providing a variety of nutrient needs during the pandemic. Medical devices for patients covid-19, the increasing demand for multivitamins is one of the reasons why the health sector remains stable in the middle of a pandemic.

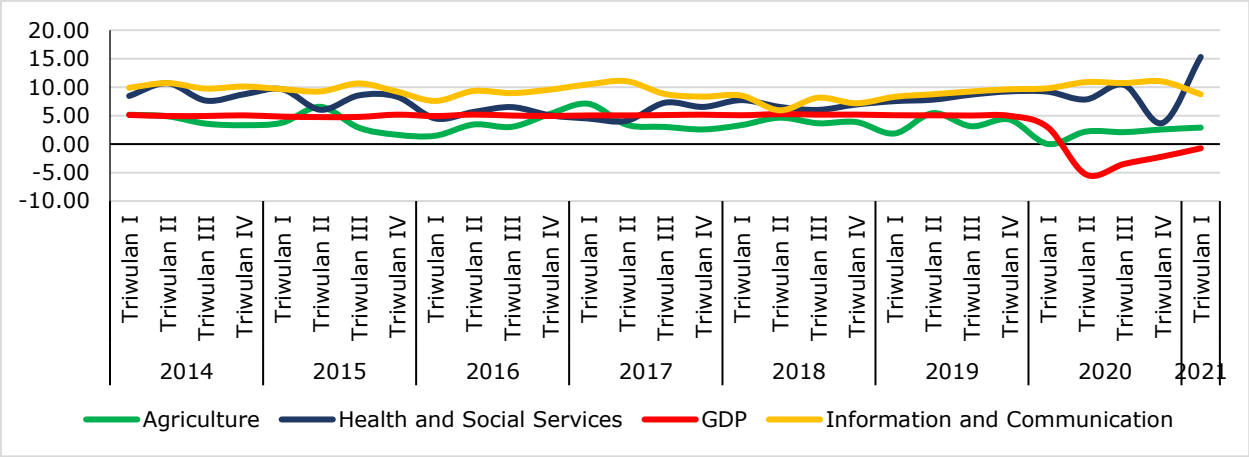

Figure 1. Economic Growth and Several Sectors (%)

In general, the pandemic has impacted the decline in economic performance in almost all sectors, especially health, agriculture, and information and communication. The economic growth sunk to (5.32) in quarter II of 2020, three months after the pandemic Covid-19 hit Indonesia (Figure 1). During the pandemic, increasing public demand for technology service products and health services is expected regarding the restrictions on activities and soaring Covid-19 diseases.

Figure 1 informs that the Information and Communication sector recorded positive growth. Before the pandemic, the growth of the Information and Communication sector seemed to fluctuate. In 2019, the Information and Communication sector recorded positive stable growth with an average growth of 8,977 percent in a year. The growth increased to 10,597 percent in 2020. The same pattern happened to the growth of the Health and Social Services sector, which increased quite significantly in 2020, with an average growth of 11,487 percent.

An interesting thing happened in the agricultural sector. Figure 1 confirms that the agricultural sector recorded extraordinary growth. With an average growth of 3.68 percent (2019), this value is the highest growth value in the agricultural sector in the last three years. In the second quarter of 2019, the agriculture sector continued its positive trend and grew by 5.43% year on year (YoY). The number was recorded as the highest growth point in 2019 and 2020. Although the growth of the agricultural sector in 2020 is not as high as in 2019, from the first quarter of 2019 to the fourth quarter of the agricultural sector, growth increased steadily. It increased again to 2.9 percent in the first quarter of 2021.

It cannot be denied that Covid-19 accelerates digital transformation. Cloud Industry Forum (2020) reveals that the Covid-19 pandemic has forced most organizations (83%) to change their IT strategy somehow. Four in ten businesses (41%) concede that their remote working solutions are not as secure as the office, highlighting security concerns. Also, 55 percent of respondents have increased their cloud adoption as a direct result of Covid-19. The last, remote working has brought many positives, with 56% highlighting flexible working and 41% enjoying increased use of cloud-based collaboration apps.

The acceleration could bring benefits for the farmer. It cannot be denied that although the agricultural sector continued to grow during the Covid period, this sector experienced the highest poverty rate compared to other industries. As the primary location for the agricultural sector, villages contribute to a higher poverty rate than urban areas. In Nurjati (2021), it is stated that the agricultural sector's dependence on nature is the main factor in high poverty in rural areas. Apart from that, it is also supported by human capital factors, which are still low. Therefore, digital acceleration is expected

DOI: https://doi.org/10.29313/mimbar.v40i2.2100

to support the agricultural sector. Schroeder et al., (2021) explain that the digital agriculture revolution holds a promise to build an agriculture and food system. The transformation also leads to more efficient, environmentally sustainable, and equitable, one that can help deliver Sustainable Development Goals. Unlike past technological revolutions in agriculture, which began on farms, the current revolution is being sparked at multiple points along the agrifood value chain.

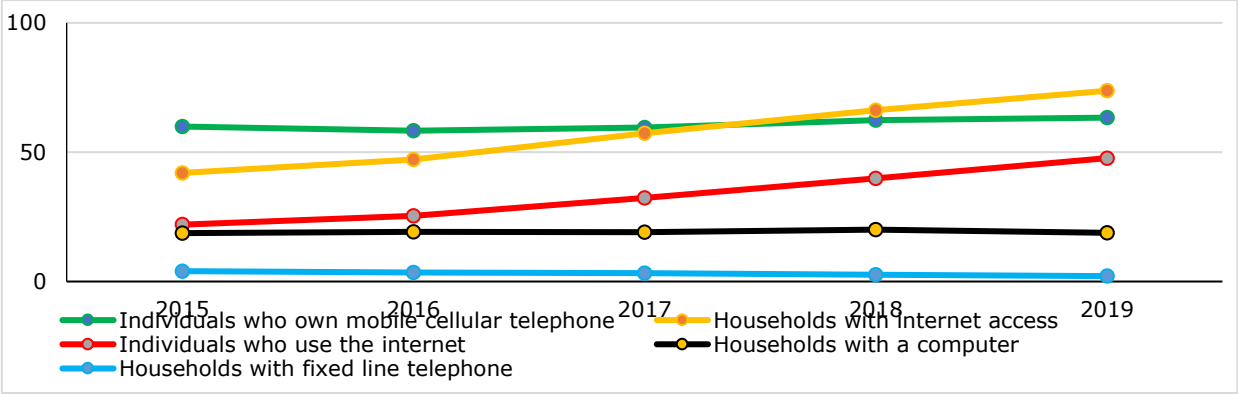

Figure 2. The Development of Technology and Communication Indicator in Indonesia

In today's digitalization era, various information can be accessed easily and quickly, even with only a communication tool (smartphone) connected to the internet network. Therefore, it is not surprising that internet users in Indonesia are increasing every year. Based on the Central Bureau of Statistics (BPS) data, the population/individuals who use the internet increased rapidly from 39.90% in 2018 to 47.69% in 2019. The increase in internet usage also occurred in households from 66.22% in 2018 to 73.75% in 2019.

The rapid development of ICT in Indonesia indicates that most Indonesians have used internet access, including farm households. One of the primary benefits of the internet for farmers is the enhanced access to information and communication. The internet has enabled farmers to connect with broader economic networks, allowing them to access up-to-date market prices, weather forecasts, and agronomic advice. This increased access to information has the potential to improve decision-making, optimize resource allocation, and ultimately enhance agricultural productivity and profitability. The utilization of the internet will cut the long chain rule network because farmers can directly access the market for their agricultural products. Furthermore, social media and online communities provide farmers with platforms to share knowledge, collaborate, and support one another, fostering innovation and collective problem-solving. (Darshan & Meena, 2017).

Research on the benefits of ICT in the agricultural sector has been conducted in several countries, including Indonesia. Manida & Nedumaran (2020) surveyed the impact of the internet on agricultural sector development through Corporate Social Responsibility (CSR) to 120 farmers in India. As a result, E-Communication in agribusiness can directly expand the structure of E-Farming. It can improve the quality of life of farmers. Nie et al. (2020) researched the relationship between smartphone use and subjective well-being in 493 rural households in China. Using Ordinary Least Square (OLS) results from a positive relationship between smartphone use and subjective well-being. This means that smartphones can increase subjective well-being by increasing the income of farmers in the countryside. In Indonesia, Feryanto & Rosiana (2021) researched mobile phones for marketing and their impact on farmers' welfare.

Digital transformation can be referred to as the process of combining IT modernization, an agile approach, and new ways of working and thinking using digital, social, mobile, and emerging technologies (Clouds Industry Forum, 2020). It involves a change in leadership, the encouragement of innovation and new business models, the digitization of assets, and increased use of technology to improve the experience of your organization's employees, customers, suppliers, partners, and stakeholders.

There are several works of literature that contain the results of research related to the impact of the internet, one of the digital transformation instruments, on the welfare of farmers and the welfare of the public in general. Jin et al. (2020) state that shows that e-commerce and Rural E-Commerce Service Centers (RESC) can effectively improve the SWB (Social Well Being) of rural residents because of the services provided by RESCs, which have been verified in some areas. Also, RESC has opened the market of agricultural products and consumption channels and brought much convenience to the farmers in Tonglu, which may improve their SWB. With the development of rural e-commerce in China, farmers in more areas are expected to benefit from RESC shortly.

Mwombe et al., (2014) and Agbongiarhuoyi et al., (2020) inform that internet and mobile phones could increase farm income and household income by 20.1% and 15.47%, respectively .Furthermore, the rapid growth of mobile phone links to farmers, reduction of transaction cost and use as electronic money transfer channel is increasingly becoming important. Using ICT as a source of agricultural information improves banana productivity and market efficiency, resulting in increased farm income for smallholder farmers.

Another study conducted by Nie et al., (2021) reveals an association between smartphone use (SU) and increases in life satisfaction and happiness that remains even after we adjust for possible endogeneity. The analysis also indicates that SU intensity is associated with lower subjective well-being (SWB) measures, especially when it exceeds 3 h per day.

Some research informs the utilization of the internet or ICT will increase farmer welfare indirectly. Gitonga & S. M. Mukoya, (2016) write social interactions between neighboring farmers, contacts with extension agents, and the use of ICTs are essential in the adoption of agroforestry practices. Integrated agroforestry systems are increasing on farms in the form of boundary marking, home gardens, woodlots, pasturelands, and alley cropping. Furthermore, the adoption of agroforestry practices can be strengthened by promoting regular farmers-to-farmers dialogue and noting that farmers are the prime agents of change in their respective communities.

Zhu et al., (2020) reveal that both ICT adoption and high individual income are significantly associated with higher levels of happiness and life satisfaction, but are significantly associated with lower levels of stress and loneliness. Further analysis reveals that there exists a positive interaction effect between farmers' decision to adopt ICTs and their income. Hong & Chang, (2020) empirically assessed the association between internet use and the objective and subjective well-being of forestry farm households in rural China. Using a survey of forestry farm households in Fujian Province of China. Compared with non-internet users, internet-user households have 28% higher household income and 10% higher life satisfaction, ceteris paribus. Furthermore, the increase in household income is driven partly by using the internet for collecting information on either forest prices or production technology. From the perspective of benefit-cost analysis, this paper finds that for every Chinese dollar spent on internet use, farm households' income increases by approximately 11 Chinese dollars.

Maulida and Subejo, (2020) aimed to explore coastal farmers' characteristics in aspects like age, educational level, farming experiences, and monthly income and uncover their access to productive capital. The data came from a survey carried out using a questionnaire-based field interview, which adopted and used a simple random sampling method to select 60 respondents. The result of this research showed that the average age of coastal farmers is 43.2 years. In the majority, farmers went to school for 10-12 years or graduated from high school. Besides, 86.53% of the farmers had more than 10-year experience, which indicated that farming in coastal areas was profitable. The average monthly income of coastal farmers was 6 million rupiahs during peak season. The most profitable crop, Chilli, contributed as the primary source of income, mostly when the selling price was high. Access to land, livestock, transportation (motorbike), extension services, internet, and informal institution were considered high and remarkably high. In contrast, access to four-wheeled transportation, credit, and formal institution (farmers' group) was medium and low.

Asa & Uwem, (2017) ascertained the agricultural purposes mobile phones are used for by farmers in Itu Local Government Area of Akwa Ibom State, Nigeria. Data were obtained from 150 farmers using a multi-stage sampling procedure and analyzed using descriptive statistics. The majority of the respondents (98.7%) had access to mobile phones in the study area, and the majority (90.5%) owned mobile phones. The primary agricultural uses of mobile phones by farmers in the study area were getting information from fellow farmers, marketing produces, accessing inputs for farming, getting agricultural information from radio and the internet, and accessing extension services. Asa and Uwem (2020) recommend that agricultural extension agencies in Akwa Ibom State focus their attention on these identified agricultural uses of mobile phones to ensure increasing the effectiveness of their extension efforts. Furthermore, research conducted by Pratiwi, et al (2023) has emphasized the importance of digital literacy being implemented from an early age with assistance and direction from adults.

However, the adoption and utilization of internet-based technologies by farmers are not without their challenges. Constraints such as limited digital literacy, inadequate infrastructure, and accessibility issues can hinder the full realization of the internet's potential benefits. Some of previous research conclude that the impact of the internet on farmer's well-being is multifaceted and complex. While the internet has provided numerous opportunities for enhancing agricultural productivity, profitability, and overall well-being, the successful integration of these technologies requires

 DOI: https://doi.org/10.29313/mimbar.v40i2.2100

addressing the existing challenges and ensuring equitable access for all farmers. (Deichmann et al., 2016; Darshan & Meena, 2017; Khan et al., 2022; Zhang & Fan, 2023).

Research Method

This study uses OLS regression methodology using SUSENAS March 2020. The use of the March 2020 Susenas was carried out with the aim of avoiding shock from the Covid 19 pandemic. The data samples used in this study is farmer household. The model that used in this study is stated below:

$$lnexpend = \beta_0 + \beta_1 lnage + \beta_2\, lnfam + \beta_3\, marstat + \beta_4\, gender + \beta_5\, use_{hp} + \beta_6\, have_{hp} + \beta_7\, home_{own} + \beta_8\, rev_{kks} + \beta_9\, have_{pkh} + \beta_{10}\, jamkes + \beta_{11}\, purpos_{internet} + \beta_{12}\, sector + \beta_{13}\, educlev + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where is:

lnexpend	=	natural logarithm of farmer household expenditure
lnage	=	natural logarithm of the life of the head of a farmer's household
lnfam	=	natural logarithm of the number of members of the farmer's household
marstat	=	married status of the head of a farmer's household, where1 = married, 0= unmarried
gender	=	gender of the head of a farmer's household, where 1 = male, 0 = female
use_hp	=	description of the head of the farmer's household in using a mobile phone, where 1= not using, 0 = not using
have_hp	=	description of the head of the farmer's household whether to have a mobile phone, where 1= has a mobile phone, 0 = does not have a mobile phone
home_own	=	farmer's household information on the type of home ownership, where 1= own, 0= rent
rev_kks	=	description of the farmer's household whether to accept the prosperous family card (KKS), where 1= receive, 0= do not accept
have_pkh	=	description of the farmer's household whether it has ever received PKH (Program Keluarga Harapan: Indonesian government program to provide conditional social assistance to Poor Families), where 1=received, 0= does not accept
jamkes	=	description of the farmer's household whether to have health insurance, where 1 = have health insurance, 0 = do not have
purpose_internet	=	description of the head of the farmer's household in using the internet
sector	=	sub-sector of agriculture type of work of the head of the farmer's household
educlev	=	the level of education of the head of the farmer's household. There are 5, categories namely 1= not in school, 2=elementary school, 3=junior high school, 4=high school, 5= university

The main variable that use to to capture internet usage are use_hp , have_hp and purpose_internet.

Results & Discussion

The farmer households used in this study amounted to 127,673 farm households listed in SUSENAS data in March 2020. The farming households are divided into 6 sub-sectors of farming, namely (i) rice and crops farming, (ii) horticulture, (iii) plantations, (iv) fisheries, (v)farms, and (vi) forestry and other agriculture. The focus of the discussion in this paper is the impact of internet use on the welfare of farm households.

Furthermore, variable internet usage by farmer households (purpose_internet)is categorized into 5 categories namely 1=does not access the internet, 2=access the internet for non-trade activities such as to get information or news, send and receive emails, for learning activities, 3=access the internet for the purchase of goods or services, 4=use the internet for the sale of goods or services and 5=internet use for the sale and purchase of goods and services. Table 1 below informs a statistical description of the data used in this study.

Table 1
Statistic Descriptive of Household Farmers

Variabel	Obs	Mean	Std. Dev.	Min	Max
lnexpend	127673	14.851	0.578	12.324	18.401
lnage	127673	3.873	0.272	2.565	4.575
lnfam	127673	1.234	0.494	0	3.258
marstat	127673	2.122	0.372	1	3

Variabel	Obs	Mean	Std. Dev.	Min	Max
gender	127673	0.894	0.307	0	1
use hp	127673	0.695	0.46	0	1
have hp	127673	0.556	0.497	0	1
home own	127673	0.904	0.294	0	1
rev kks	127673	0.165	0.372	0	1
have pkh	127673	0.115	0.318	0	1
jamkes	127673	0.721	0.448	0	1
purpose internet	127673	1.175	0.432	1	5
sector	127673	2.317	1.347	1	6
educlev	127673	2.210	1.118	1	5

Source: SUSENAS in March Edition Year of 2020 processed by authors, 2021

After cleaning the data, the final observations from Susenas for March 2020 were 127673 observations. From Table 1 it can be seen that the numerical variables used are lnexpend, lnage and lnfam, while the rest are categorical variables. Next, in Table 2, the results of OLS regression processing in this study are displayed.

Table 2
Regression Output

lnexpend	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
lnage	0.162	0.006	26.81	0.000	0.150	0.173	***
lnfam	0.511	0.003	166.81	0.000	0.505	0.517	***
marstat	0.028	0.005	5.39	0.000	0.018	0.038	***
gender	0.154	0.006	25.10	0.000	0.142	0.166	***
use_hp	0.070	0.004	16.85	0.000	0.062	0.078	***
have_hp	0.098	0.004	25.20	0.000	0.091	0.106	***
home_own	0.026	0.004	5.88	0.000	0.017	0.035	***
rev_kks	-0.079	0.006	-12.90	0.000	-0.091	-0.067	***
have_pkh	-0.062	0.007	-9.00	0.000	-0.075	-0.048	***
jamkes	0.084	0.003	27.66	0.000	0.078	0.090	***
1b.purpose_internet	0.000	0.000	0.00	0.000	0.000	0.000	
2.purpose_internet	0.187	0.004	44.27	0.000	0.179	0.195	***
3.purpose_internet	0.480	0.023	21.08	0.000	0.435	0.524	***
4.purpose_internet	0.316	0.035	9.05	0.000	0.247	0.384	***
5.purpose_internet	0.508	0.039	13.09	0.000	0.432	0.584	***
1b.sector	0.000	0.000	0.00	0.000	0.000	0.000	
2.sector	0.071	0.006	12.58	0.000	0.060	0.082	***
3.sector	0.105	0.003	34.08	0.000	0.099	0.111	***
4.sector	0.146	0.005	30.20	0.000	0.137	0.156	***
5.sector	-0.008	0.008	-1.12	0.263	-0.023	0.006	
6.sector	0.055	0.009	6.01	0.000	0.037	0.073	***
1b.educlev	0.000	0.000	0.00	0.000	0.000	0.000	
2.educlev	0.026	0.003	7.73	0.000	0.019	0.033	***
3.educlev	0.064	0.005	14.19	0.000	0.055	0.073	***
4.educlev	0.119	0.004	26.69	0.000	0.110	0.127	***
5.educlev	0.268	0.011	24.66	0.000	0.247	0.289	***
Constant	13.1	0.028	471.51	0.000	13.046	13.155	***

Mean dependent var	14.851	SD dependent var	0.578
R-squared	0.314	Number of obs	127673.000
F-test	2195.805	Prob > F	0.000
Akaike crit. (AIC)	174112.750	Bayesian crit. (BIC)	174346.923

*Note: *** p<.01, ** p<.05, * p<.1*

The challenge in data processing with big data is the existence of object heterogeneity. Without the need for formal testing, the use of 127673 observations would encourage the model to violate the homoscedasticity assumption. To overcome this, the regression was corrected using robust standard error (Table 3).

As mentioned in the previous discussion that this paper focuses on the influence of internet access on the welfare of farm households. The welfare variables here are projected with the variable

DOI: https://doi.org/10.29313/mimbar.v40i2.2100

expenditure of total farm households. Furthermore, based on the results of data processing (robust regression in Table 3), information is obtained in general that significant dependent variables are influenced by all predictor variables except in sub-sector 5 variables i.e. farms. The coefficient is not significant at alpha levels of 1% or 10%. This shows that the statistical sector of the farmer's household sub-sector of livestock does not have a significant difference in welfare with the households of farmers sub-sector 1 namely rice farming households and crops. The demographics of the head of the farmer's household affect the welfare of the farmer's household. The older the head of the household and the more the number of family members, the more welfare farmers are increasing. Related to the number of family members, in the farmer's household, the more family members, the more labor availability that can be done to cultivate the land. This makes sense amid the increasingly expensive daily labor wages of the agricultural sector, especially the agricultural sector of food crops.

Then, farmer households that use and or have mobile phones, and have a home with their home status have higher welfare compared to households that do not have both. Related to social security, farmer households that have independent health insurance, have high welfare compared to farmer households that do not have independent health insurance. On the other hand, households who receive a prosperous family card and become recipients of PKH have lower welfare compared to farm households that do not receive the Government's social programs.

The education of the head of the household has a relationship with the welfare of the farm household. The higher the education, the higher the difference in welfare with the farmer's household whose head of the family does not finish school or does not attend school. Furthermore, farmer households that have access to the internet have significant welfare differences from farm households that do not have internet access. This can be seen from the p-value of the variable purpose_internet category 1 (does not have internet access) with 4 other categories.

More specifically, farmer households that have internet access, not for trade activities (group 2), have a greater level of household expenditure 0.18 units than farm households that do not have internet access (group 1_. Then, farm households that use it for purchasing goods/services (group 3) have a greater level of household expenditure 0.47 units than farm households that do not have internet access (group 1). Households with the highest difference in expenditure are farm households that use the internet for goods/services sales activities (group 4) with a larger expenditure of 0.507 units of expenditure from farm households that do not have internet access (group 1) . For farm households that use the internet for goods or services sales activities (group 5), household expenditures are greater by 0.31 units than farm households that do not have internet access (group 1). Of all the groups, the group that benefits from income from internet use is group 5, which is the group that use internet for the sale and purchase of goods and services.

For the farming households group, group 2-horticulture, group 3-plantations, group 4-fisheries, and group 6-forestry and other agriculture significantly has different income with group 1 rice and crops farming. From the coeffiecient, we can conclude that grup 2, grup 3 group4 and group 6 have higher income that group 1. Only group 5- fisheries that has no differnt in income compare to group 1- rice and crops farming.

Table 3
Regression Output : Comparion in using Robust S

Variabel	**(1) lnexpend**	**(2) Lnexpend (Robust)**
lnage	0.162***	0.162***
	(0.00559)	(0.00603)
lnfam	0.511***	0.511***
	(0.00295)	(0.00306)
marstat	0.0277***	0.0277***
	(0.00490)	(0.00513)
gender	0.154***	0.154***
	(0.00592)	(0.00614)
use_hp	0.0702***	0.0702**
	(0.00429)	(0.00417)
have_hp	0.0983***	0.0983**
	(0.00411)	(0.00390)
home_own	0.0260***	0.0260**
	(0.00471)	(0.00442)
rev_kks	-0.0792***	-0.0792***
	(0.00617)	(0.00614)

Variabel	(1) lnexpend	(2) Lnexpend (Robust)
have_pkh	-0.0617***	-0.0617***
	(0.00715)	(0.00685)
jamkes	0.0843***	0.0843***
	(0.00306)	(0.00305)
2.purpose_internet	0.187***	0.187***
	(0.00420)	(0.00422)
3.purpose_internet	0.480***	0.480***
	(0.0195)	(0.0228)
4.purpose_internet	0.316***	0.316***
	(0.0314)	(0.0349)
5.purpose_internet	0.508***	0.508***
	(0.0319)	(0.0388)
2.sector	0.0707***	0.0707**
	(0.00541)	(0.00562)
3.sector	0.105***	0.105***
	(0.00316)	(0.00308)
4.sector	0.146***	0.146***
	(0.00491)	(0.00484)
5.sector	-0.00841	-0.00841
	(0.00680)	(0.00752)
6.sector	0.0549***	0.0549**
	(0.00892)	(0.00914)
2.educlev	0.0260***	0.0260**
	(0.00335)	(0.00336)
3.educlev	0.0643***	0.0643**
	(0.00461)	(0.00453)
4.educlev	0.119***	0.119***
	(0.00443)	(0.00445)
5.educlev	0.268***	0.268***
	(0.00967)	(0.0109)
Constant	13.10***	13.10***
	(0.0256)	(0.0278)
Observations	**127,673**	**127,673**
R-squared	**0.314**	**0.314**

*Note: *** p<.01, ** p<.05, * p<.1*

Furthermore, based on the regression results, a scatter plot is drawn for the visualization of the results. The images presented are only scattered plot images with variables of internet use purposes that are the focus of this paper. Based on figure 3 above, it can be seen that farm households who use the internet to purchase and sell goods and or services at once (code 5) have the highest average household expenditure compared to other farming households.

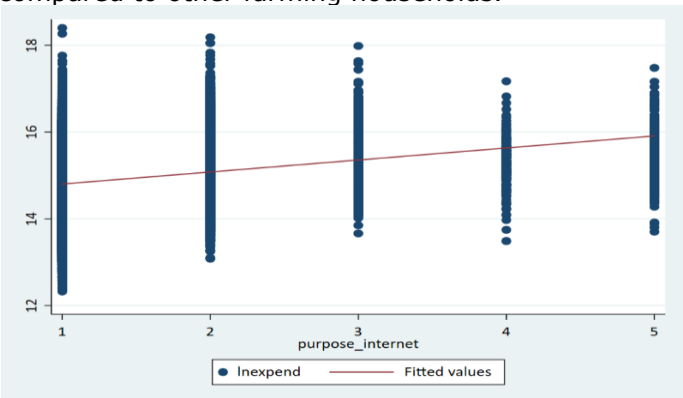

Figure 3. Scatter Plot of Household Expenditure with the Purpose of Internet Use by the Head of the Household

DOI: https://doi.org/10.29313/mimbar.v40i2.2100

The findings of this study confirm that internet access has a significant impact on the expenditure patterns of farming households. In line with previous research, this relationship can occur through increased exposure to information, media influence, ease of online shopping, and increased living standards (Aker and Mbiti, (2010), Splielman., et al (2021))

Based on the findings that internet access, digital literacy, and certain socioeconomic characteristics are strongly associated with higher welfare levels among farmer. Government can make movement such as Expand Rural Digital Infrastructure to Increase internet access and connectivity in rural areas. The Government can develop public-private partnerships to build affordable, high-speed internet networks in rural farming communities. This could involve subsidized internet services, community-based Wi-Fi hubs, or low-cost internet packages tailored to rural income levels. Governments should incentivize internet service providers (ISPs) to reach underserved rural areas. To improve the quality of farmers' resources, the government can adopt policies such as: Support Education and Skill Development for Farming Communities. To Improve welfare by enhancing education levels in farming communities, government can make an investment in education programs that are accessible to rural farming families. This could include vocational training in modern agricultural practices, financial literacy, and technology use. Additionally, scholarships or financial incentives for farmers' children to complete secondary and tertiary education can contribute to intergenerational welfare improvements.

Conclusions

Farmer households that have internet access have higher welfare compared to farm households that do not have access to the internet. Among the purposes of internet use, households that use the internet to purchase and sell goods or services at the same time have the highest welfare among farm households of internet users. Then, farm households that use and or have mobile phones, and have a home with their home status have higher welfare compared to households that do not have both. In addition to internet access, the older the head of the farm household and the more members of the farming family, the more welfare farmers are increasing.

Related to social security, farmer households that have independent health insurance, have high welfare compared to farmer households that do not have independent health insurance. In contrast, households receiving Government social assistance have lower welfare. Furthermore, the education of the head of the household has a relationship with the welfare of the farm household. The higher the education, the higher the difference in welfare with the farmer's household whose head of the family does not finish school or does not attend school.

References

A., A. U., & A., U. C. (2017). Utilization of Mobile Phones for Agricultural Purposes by Farmers in Itu Area, Nigeria. European Scientific Journal, ESJ, 13(19), 395. https://doi.org/10.19044/esj.2017.v13n19p395

Agbongiarhuoyi, A. E., Thomas, K. A., Uwagboe, E. O., & Famuyiwa, B. S. (2020). Utilization of Icts in Accessing Cocoa Beans Market Information By Cross River State Farmers. 20(3), 45–51.

Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. Journal of Economic Perspectives, 24(3), 207-232.

Darshan, N. P., & Meena, B. S. (2017). Constraints in Using Internet and Social Media as Perceived by Farmers in Karnal District of Haryana, India. In International Journal of Current Microbiology and Applied Sciences (Vol. 6, Issue 10, p. 1465). Excellent Publishers. https://doi.org/10.20546/ijcmas.2017.610.173

Deichmann, U., Goyal, A., & Mishra, D. K. (2016). Will digital technologies transform agriculture in developing countries? In Agricultural Economics (Vol. 47, p. 21). Wiley. https://doi.org/10.1111/agec.12300

Feryanto, & Rosiana, N. (2021). Penggunaan Telepon Seluler Untuk Pemasaran Serta Dampaknya Terhadap Kesejahteraan Petani. Agrisep, 20(1), 25–40. https://doi.org/10.31186/jagrisep.20.1.25-40

Forum, C. I. (2020). Adapt, Innovate, Advance! Digital Transformation in the COVID era.

Gitonga, S., & S. M. Mukoya, W. (2016). An Evaluation of the Influence of Information Sources on Adoption of Agroforestry Practices in Kajiado Central Sub-County, Kenya. Universal Journal of Agricultural Research, 4(3), 71–77. https://doi.org/10.13189/UJAR.2016.040302

Hong, Y.-Z., & Chang, H.-H. (2020). Does digitalization affect the objective and subjective wellbeing of forestry farm households? Empirical evidence in Fujian Province of China. Forest Policy and Economics, 118, 102236. https://doi.org/https://doi.org/10.1016/j.forpol.2020.102236

Jin, H., Li, L., Qian, X., & Zengd, Y. (2020). Can rural e-commerce service centers improve farmers' subject well-being? A new practice of 'internet plus rural public services' from China. International Food and Agribusiness Management Review, 23(5), 681–695. https://doi.org/10.22434/ifamr2019.0217

Khan, N., Ray, R. L., Kassem, H. S., & Zhang, S. (2022). Mobile Internet Technology Adoption for Sustainable Agriculture: Evidence from Wheat Farmers. In Applied Sciences (Vol. 12, Issue 10, p. 4902). Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/app12104902

Manida, M., & Nedumaran, G. (2020). Impact of E-Communication on Agriculture Development Through CSR in Agri-Farmer in Rajapalayam Taluk. SSRN Electronic Journal, XI (106), 106–114. https://doi.org/10.2139/ssrn.3551988

Mwombe, S. O. L., Mugivane, F. I., Adolwa, I. S., & Nderitu, J. H. (2014). Evaluation of Information and Communication Technology Utilization by Small Holder Banana Farmers in Gatanga District, Kenya. The Journal of Agricultural Education and Extension, 20(2), 247–261. https://doi.org/10.1080/1389224X.2013.788454

NURJATI, Eka. (2021). The Socioeconomic Determinants of Poverty Dynamics in Indonesia. MIMBAR : Jurnal Sosial dan Pembangunan, [S.l.], p. 345-354, dec. 2021. ISSN 2303-2499. doi:https://doi.org/10.29313/mimbar.v37i2.8024.

Nie, P., Ma, W., & Sousa-Poza, A. (2021). The relationship between smartphone use and subjective well-being in rural China. Electronic Commerce Research, 21(4), 983–1009. https://doi.org/10.1007/s10660-020-09397-1

Pratiwi, R. E., Rohandi, M. M. A., Permana, R. M. T., & Meirani, N. (2023). Enhancing Digital Literacy Through Instructional Videos and Social Media Engagement. MIMBAR: Jurnal Sosial dan Pembangunan, 251-257. https://doi.org/10.29313/mimbar.v39i2.2983

Schroeder, K., Lampietti, J., & Elabed, G. (2021). What's Cooking: Digital Transformation of the Agrifood System. In What's Cooking: Digital Transformation of the Agrifood System. World Bank. https://doi.org/10.1596/978-1-4648-1657-4

Spielman, D., Lecoutere, E., Makhija, S., & Van Campenhout, B. (2021). Information and communications technology (ICT) and agricultural extension in developing countries. Annual Review of Resource Economics, 13(1), 177-201

Zhang, X., & Fan, D. (2023). Can agricultural digital transformation help farmers increase income? An empirical study based on thousands of farmers in Hubei Province. In Environment Development and Sustainability (Vol. 26, Issue 6, p. 14405). Springer Science+Business Media. https://doi.org/10.1007/s10668-023-03200-5

Zhu, Z., Ma, W., & Leng, C. (2020). ICT Adoption, Individual Income and Psychological Health of Rural Farmers in China. Applied Research in Quality-of-Life 2020, 1–21. https://doi.org/10.1007/S11482-020-09879-2

 DOI: https://doi.org/10.29313/mimbar.v40i2.2100