TAF

Journal of Administrative and Business Studies

JABS

2022, **8**(3): 36-50

PRIMARY RESEARCH

Understanding the interplay of environmental orientation, climate change beliefs, innovativeness, and attitudes in agricultural production

Hastirullah Fitrah, *

Faculty of Agriculture, Universitas Achmad Yani, Banjarmasin, Indonesia

Keywords

Environmental orientation
Farmer's beliefs in climate change
Innovativeness
Farmer's attitudes in agricultural production
Diffusion of innovation theory

Received: 21 February 2022
Accepted: 17 April 2022
Published: 16 August 2022

Abstract

Located in the southern region of the island of Borneo, the province of South Kalimantan in Indonesia is renowned for its abundance of natural resources and rich agricultural history. Offering a wide variety of agricultural goods and commodities that considerably boost the local and national economy, this region is crucial to the country's agriculture industry. This study examines the complex interactions between farmers in Indonesia's South Kalimantan Province that are farmers' environmental orientation, and have attitudes towards agricultural prodution. Beliefs on climate change are a mediating element and have a moderating influence on innovativeness. Based on the diffusion of innovation theory, this study clarifies the crucial processes that farmers' environmental orientation and farmers attitudes toward agriculture production. Only farmers in the South Kalimantan Province of Indonesia provided the data, which would limit the conclusions' wider applicability. Additionally, SmartPLS is used in the study to analyze the data, which provides insightful information but can benefit from additional validation using a variety of analytical techniques. This study, which included 355 farmers in all, offered insightful information about the complex interactions between variables affecting agricultural production. The results show that farmers' attitudes towards agricultural production are highly influenced by their environmental orientation, with ideas about climate change serving as a mediating factor in this relationship. Furthermore, innovativeness moderates the relationship between agricultural attitudes and opinions about climate change. These revelations highlight the practical importance of encouraging environmental consciousness among farmers and have theoretical implications for understanding the farmer's attitudes toward agriculture production. Notwithstanding its limitations, the results of this study provide theoretical and practical insights into the challenges of promoting environmentally conscious farming in a changing global environment.

INTRODUCTION

Technologies, inheritance, the environment, the ground, and field management techniques, along with related choices like fertilizer utilization, crop combination choice, cultivation, irrigation management, row spacing, planting date, and depth, the density of population, etc., are the global travelers of agricultural production and how it varies (Elahi, Khalid, & Zhang, 2022). Significantly, some of the genetics, agronomic, and resource utilization technical advancements have led to increases in agricultural productivity procedures. The agricultural industry saw significant mechanization in the 20th century, leading to the replacement of labor with technology, an improvement in land productivity, and the realization of economies of scale (Andati et al., 2022). Farming became less labor-intensive and more capital-intensive, allowing farmers to oversee greater fields and farms. The process known as the Green Revolution, which began in the middle of the 20th century, increased productivity by using pesticides that decreased crop losses, synthetic chemical fertilizers, and genetically

*corresponding author: Hastirullah Fitrah
†email: hastirullah@uvayabjm.ac.id

enhanced cultivars (Jung et al., 2021; Rezaei, Safa, & Ganjkhanloo, 2020). In many regions of the world, these advances encouraged the growth of larger and more consistently managed fields. However, in pursuing consistent practices and attaining economies of scale through mechanization, farmers forfeited their capacity to effectively manage both the time and geographical diversity of their farming areas (Elahi et al., 2022).

Urbanization and changes in land use can fragment agricultural land, which could have detrimental effects on ecosystem services, particularly agricultural productivity (Chen, Tian, Huang, Zhang, & Zhang, 2021; Qiao et al., 2022). According to Jung et al. (2021); Qiao et al. (2022), other detrimental effects of fragmentation include a notable rise in the cost of agricultural production and a decline in the technical and scale efficiency of agricultural production by Gao et al. (2019). Ongoing discussions, nevertheless, center on the advantages of fragmentation for farmers in various situations. The enhancement of agriculture's internal planting structure Du, Liu, and Fu (2021), the increased use of labor resources Ray et al. (2019), and a wider range of risks in connection with markets for agriculture, which raises farmers' income Finger, Swinton, El Benni, and Walter (2019) are the main manifestations of the positive effect. In this setting, assessing the overall impact of fragmentation and formulating ensuing land management policies now depend critically on characterizing the link between changes in landscape patterns and agricultural output.

Despite technological advancements and other considerations, climate and weather are major drivers or influences on agricultural production systems (Shahbaz et al., 2022). Research has indicated that changes in climate variables in recent times may have a significant impact on crop yield patterns. One of the most pressing issues facing the modern world is climate change, which has drastically changed or is currently changing the planet's ecosystems (Andati et al., 2022). Even if there has been a process that is ongoing on Earth, in the last 100 years or so, the rate of variation has higher manifolds. The artificial activities caused the 19th century, the average temperature increased by 0.9 °C, primarily as a result of greenhouse gas (GHG) emissions in the environment (Arora, 2019). Estimates indicate that this increase will likely be 1.5 °C or possibly even more by 2050 due to the rate of deforestation taking place, greenhouse gas emissions rising, and soil, water, Air, and bodies becoming contaminated. The unusual increase in temperature change has led to a rise in the frequency of droughts, cuisine, erratic precipitation patterns, heat waves, and more dramatic events occurring all throughout the world (Chen et al., 2021).

Farmers have different farming interests and lack a common sense of self (Cheema, Afsar, & Javed, 2020). According to Du et al. (2021), a farmer is often seen favorably if he employs sophisticated equipment and inorganic fertilizers and is concerned about the environment. Asia's green evaluation is the outcome of the past two decades of characterizing intensive agriculturalist techniques as environmentally friendly and productive (Fairbrother, Sevä, & Kulin, 2019). However, the world of today is very different from what it was thirty years ago. Currently, it is well-recognized that farmers who use a lot of environmentally friendly farming techniques are successful (Gao et al., 2019). It is generally acknowledged that farmers who have received greater knowledge about the environment are more likely to engage in sustainable farming production (Ahmad, Afzal, & Rauf, 2019; Yu & Huo, 2019). Furthermore, in many parts of the world, farmers' attitudes toward agricultural output are mostly determined by economic factors (Marr & Howley, 2019). Environmental orientations of farmers can have a significant impact on their intention to adopt generally, and especially on how they feel about agriculture output (Howe, Marlon, Mildenberger, & Shield, 2019).

The effects of climate change are widespread overall, but they are particularly evident in the agricultural industry right now, which is vital to global food production and economic growth. It is also important to keep in mind that by 2050, there will be 9.7 billion people on the planet, increasing the strain on agricultural lands to supply the rising need for food that is already being negatively impacted by climate change (Fairbrother et al., 2019; Hornsey & Fielding, 2020). Since agriculture and climate change are closely related, abrupt changes in the weather at such a fast rate have put world food security in jeopardy. Without a doubt, one of the most intricate environmental and sociological problems of our day is climate change (Obembe, Hendricks, & Tack, 2021; Qiao et al., 2022). Similarly, greater costs of production have been brought about by climate change, which is manifested in more unpredictable and incompatible precipitation patterns, severe flooding, regular droughts, higher incidences of insects and diseases, and irregular agricultural establishing periods (Gardezi & Arbuckle, 2020; Habib-ur Rahman et al., 2022; Hornsey & Fielding, 2020). These factors have a negative impact on farmer's attitudes toward agriculture production (Ahmad et al., 2019; Bramley & Ouzman, 2019; Massoro & Adewale, 2019).

Farmers' physical instrument deployment is frequently expensive and takes time. It might be difficult to keep them

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

on the field because they regularly get in the way of activities like cultivation, settling, spraying, and harvesting (Ahmed et al., 2021). Traditional agricultural data collection techniques are sensitive to bias and frequently fall short of capturing infield differences because of small sample sizes. Before any technology is implemented on farms, farmers must be aware of and accept its relative superiority (Bramley & Ouzman, 2019). The significance of people's views of the advantages of adopting technology was highlighted by Cheah, Thurasamy, Memon, Chuah, and Ting (2020) technology acceptance model. This model considered one of the key determinants of technology adoption to be the perceived utility of the technology. Recognizing an issue, searching for potential solutions, choosing to try adopting a solution, and ultimately choosing to try implementing the solution are common adoption steps (Elshaer & Sobaih, 2022). The stage of adoption and innovation identified by Farani, Mohammadi, Ghahremani, and Ataei (2021) the organization's innovativeness and the staff's approval and commencement of their procedures of adopting the innovation provided an alternate perspective.

The current study determines that understanding the interplay of environmental orientation, climate change beliefs, innovativeness, and attitudes in agricultural production and farmers belongs to South Kalimantan Province of Indonesia. The present study established its diffusion of innovation theory. The relative benefit of an invention, difficulty, compatibility, trial-ability, and detection all have an impact on the diffusion rate. A relative benefit is the extent to which an invention is regarded as superior to its forerunner (Shahbaz et al., 2022). In agriculture, innovation is the driving force behind advancement. Farmers who quickly adopt new methods, tools, and technology are typically more flexible and sensitive to shifting environmental circumstances. In addition to being a product of environmental orientation and views about climate change, innovativeness also influences attitudes towards agricultural production. The study's objectives include;

- To examine that farmer's environmental orientation has a significant impact on farmers' attitude toward agriculture production.
- To examine that farmers' belief in climate change has a mediating impact between farmers' environmental orientation and farmers' attitudes toward agriculture production.
- To explore that innovativeness has a moderating impact on farmers' belief in climate change and farmers' attitudes toward agriculture production.
- To examine that farmer's belief in climate change has an impact on farmer's attitudes toward agriculture production.

LITERATURE REVIEW

Diffusion of innovation theory

Rogers, Singhal, and Quinlan (2014) developed the Diffusion of Innovation Theory in 1962 to describe how novel concepts, goods, or technological advancements proliferate and become ingrained in a community or social structure. According to Vargo, Akaka, and Wieland (2020), inventions are adopted predictably and fall into one of five groups: innovators, early adopters, early majority, late majority, and laggards. First to adopt new concepts or technology are innovators, then prominent opinion leaders known as early adopters. Once they realise the benefits of innovations, the early and late majority adopt them; laggards, on the other hand, adopt innovations last since they are resistant to change. According to (Lin, Luo, & Luo, 2020), communication routes, social systems, time, and the characteristics of the innovation (such as relative advantage, compatibility, complexity, trial-ability, and observability) are some of the important variables that affect the diffusion process. Innovations are more likely to spread quickly if people believe they are easy to use, have apparent benefits, and fit in with current standards. This theory is a useful framework for comprehending social change and advancement since it has been widely applied in a variety of disciplines, including marketing, technology adoption, healthcare, and education, to understand and aid the adoption of new ideas and technologies (Benhabib, Perla, & Tonetti, 2021; Lin et al., 2020; Massoro & Adewale, 2019).

Innovative people are frequently more willing to experiment with environmentally benign and climate-resilient farming methods, such as organic or precision farming. Climate-smart agricultural production are also heavily influenced by farmers' views about agriculture production and their belief in climate change (Rogers et al., 2014; Shahbaz et al., 2022). Farmers who acknowledge the existence of climate change are more likely to adopt methods to lessen its effects, including water management practices or crop types resistant to drought. Furthermore, a positive outlook on agricultural production which might emphasise sustainability and long-term viability encourages the use of cutting-edge techniques that might raise crop resilience and output (Vargo et al., 2020). The diffusion of innovation theory provides important insights into the process of introducing and promoting the acceptance of agricultural technologies that are both environmentally sustainable and climate resilient. It does this by helping to define these inter-

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

related aspects within a structured framework (Shahbaz et al., 2022). Policymakers and agricultural experts can adjust their strategies and communication approaches to encourage the widespread adoption of production that benefits farmers and the environment, ultimately leading to a more resilient and sustainable agricultural sector, by understanding the traits and incentives of various farmer segments (Vargo et al., 2020; Walder et al., 2019).

Farmer's environmental orientation and farmers' attitude toward agriculture production

The concept of environmental orientation in agriculture is complex and encompasses social, economic, and ecological elements of farming (Farani et al., 2021). Sustainable and eco-friendly farming production is given priority by farmers who have a strong environmental orientation. They frequently have a long-term dedication to protecting natural resources and a sense of caring for the land. Research has indicated a connection between adopting eco-friendly practices such as organic farming, reducing pesticide use, and agroforestry and having a positive environmental outlook (Yu & Huo, 2019). Understanding farmers' approaches to sustainable agriculture and climate change adaptation techniques is based on this attitude. Farmers have different farming preferences and lack a common sense of self (Solekah, Handriana, & Usman, 2022). According to Gull, Saeed, Suleman, and Mushtaq (2022), a farmer is often seen favorably if he employs sophisticated equipment and inorganic fertilizers and is concerned about the environment. Asia's green revaluation is the outcome of the past two decades of characterizing intensive agriculturalist techniques as environmentally friendly and productive (Cheema et al., 2020). Currently, it is well-recognized that farmers who use a lot of environmentally friendly farming techniques are successful (Elshaer & Sobaih, 2022). It is generally acknowledged that farmers who have received greater environmental education are more likely to engage in conservation agriculture (D'Souza and Mishra, 2018). The investigation of how people act has made extensive use of the essential and intrinsic idea of attitude in social psychology ((Andati, Majiwa, Ngigi, Mbeche, & Ateka, 2022; Yu & Huo, 2019). Attitudes are employed to categorize anything as good or bad. It can be summed up as a measure of an individual's degree of approval or disapproval of a notion, idea, or perspective towards other people Ahmad et al. (2019). Attitudes are formed based on what a person believes to be true or untrue. A person's attitudes influence their behavior and are impacted by their values and behaviors. A farmer's decision-making process in agriculture enables the assessment and formation of positive or negative beliefs about agricultural production. Foundational theories on attitudes suggest that people's decisions can reveal their attitudes, even when measuring the process of belief development may not always be feasible (Howe et al., 2019; Solekah et al., 2022). Depending on their demands for output or the circumstances of their home, individual small-scale farmers have been seen to behave differently in practices (Fairbrother et al., 2019; Gull et al., 2022). Farani et al. (2021) examining attitudes regarding precision agriculture production found that confidence had a favorable impact on the adoption of new techniques. According to Elahi et al. (2022), farm size, attitudes toward utilizing precision agriculture technologies, and views of net advantages, all had an impact on how likely a farm was to use these technologies. Fairbrother et al. (2019) suggest that producers may not be primarily motivated to adopt precision agricultural technologies by financial gains. Nevertheless, the results do not imply that they apply to all technology.

H1: A farmer's environmental orientation has a significant impact on farmers' attitudes toward agriculture production.

Mediating role of farmer's belief in climate change

One of the biggest threats to the long-term survival of life on Earth is climate change. An important factor in the deterioration of the environment is warming temperatures (Arora, 2019). The use of fossil fuels increases greenhouse gas emissions into the atmosphere, which in turn raises the average temperature worldwide and pollutes the air Ray et al. (2019). Beliefs about climate change have a greater role in fostering transformative change (Yoder et al., 2019). Obembe et al. (2021) investigated farmers' perceptions of weather-related challenges as a possible predictor of adaptation over the previous ten years, but they left it out of their final analysis, showing its relative worthlessness. Hornsey and Fielding (2020) found a relationship between farmers' perceptions of climate change and their level of risk management and preparedness for climate-related events based on a survey of 148 Australian farms. Gardezi and Arbuckle (2020) suggested how two Australian farmer adaptation models were affected by their ideas about climate change, he discovered evidence of it. They started by looking into the assertions made by farmers that they could adapt by employing a risk management approach (which includes techniques like succession planning, financial improvement, diversification, risk management, and farm plan development) (Fairbrother et al., 2019). Using a second model, they then examined farmers' intentions to engage in adaptive actions (strategies including interest in carbon cred-

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

its, utilization of new technologies, and adoption of sustainable land management practices) ((Azadi, Yazdanpanah, & Mahmoudi, 2019; Habib-ur Rahman et al., 2022). Despite discovering proof farmers were less inclined to implement risk management strategies when they saw tangible signs of climate change. Farmers were less inclined to use risk management strategies after seeing tangible signs of climate change. Numerous studies have demonstrated significant and advantageous connections between views about climate change and behavioral adjustments (Fairbrother et al., 2019; Howe et al., 2019; Qiao et al., 2022) . There is not much research that examines how causal reasoning systematically influences policy decisions, as noted by Habib-ur Rahman et al. (2022). The purpose of this study is to ascertain whether farmers' intentions to use conservative agricultural methods and their belief in climate change are related. An additional crucial prerequisite for raising agricultural yields and quality is climate-smart agriculture. Agriculture and climate change are closely linked V (Fairbrother et al., 2019; Gardezi & Arbuckle, 2020). The rapid climate changes will have a significant impact on the productivity of agro-ecosystems. Therefore, researchers must get ready for the difficulties that lie ahead to mitigate the effects of climate change and guarantee food security for all living things, including people Ray et al. (2019). Climate change has forced economies to react by establishing new inventions to make agriculture more sustainable, especially in emerging and vulnerable countries. According to (Howe et al., 2019), agricultural advances stand a strong chance of lessening the effects of climate change, enhancing food security, and increasing farmer income. Farmer's attitude toward agriculture production are significantly impacted negatively by climate change (Khanpae, Karami, Maleksaeidi, & Keshavarz, 2020).

H2: A farmer's belief in climate change has a mediating impact between the farmer's environmental orientation and the farmer's attitude toward agriculture production.

Moderating role of innovativeness

In the field of agriculture, innovation is defined as farmers' inclination to adopt new tools, technology, and procedures. Innovation is a key factor in agricultural development and adaptability (Walder et al., 2019). Farmers with high levels of innovation are more willing to try out new techniques and are more equipped to deal with environmental issues. Research has indicated that farmers with a creative mindset are more inclined to implement climate-smart farming production, like precision farming, intelligent irrigation systems, and enhanced approaches to managing pests (Massoro & Adewale, 2019; Shahbaz et al., 2022). Many times, a person's propensity to innovate is the result of a confluence of circumstances, such as educational background, exposure to novel concepts, and resource availability. It is challenging to implement innovation at the organizational or systemic level (Lin et al., 2020). When organizational decision-makers do not believe that changes are necessary, it is more difficult to bring about changes in standard practices (Massoro & Adewale, 2019). Despite the similarities to individual adoption, Lin et al. (2020) argue that people in organizations may find it difficult to comprehend, assess, or choose appropriate innovations to address particular problems, or that organizational factors (such as hierarchy, culture, and values) often complicate the decision of which innovation to adopt. These factors are not always present when addressing problems at the individual level. According to Massoro and Adewale (2019), social network perceptions about innovations have a significant influence on how people accept new concepts. Additionally, Walder et al. (2019) discovered that an individual's social network significantly influences how quickly they adopt new ideas. According to (Shahbaz et al., 2022), perceived risks and opportunities being unbalanced, incompatibility with day-to-day operations, incompatibility with independent business systems, uncertainty surrounding infrastructure development, lack of information technology expertise, and costs are the six main barriers that prevent SMEs from implementing innovations. According to Rezaei et al. (2020), an entrepreneur's mindset significantly influences the emergence and diffusion of innovation. The idea that innovativeness is a moderator implies that it has the power to either amplify or attenuate the association between two variables, in this example, the attitudes of farmers towards agricultural productivity and their opinions about climate change. Farmers with innovative tendencies may be less susceptible to the negative effects of climate change ideas on their attitudes and more resilient in the face of climatic obstacles. Novel approaches could operate as a buffer, helping farmers cope with climate change and keep a positive outlook on farming even in the face of hardship. Jung et al. (2021), which suggested that the interaction of innovativeness in the context of farmers' perceptions about climate change and attitudes towards agriculture, provides empirical support for this theory. The results showed that compared to less inventive counterparts, innovative farmers who strongly believed in climate change had more positive attitudes and a stronger readiness to invest in climate-resilient practises (Benhabib et al., 2021) . This implies that the association between attitudes towards agriculture and

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

views about climate change is reinforced in a significant way by innovativeness. Nevertheless, other investigations have also shown how intricate these interactions are. Gardezi and Arbuckle (2020) discovered that the moderating influence of innovativeness might change based on the particular agricultural technologies and practises that are taken into account. It suggests that the moderating role of innovativeness might vary depending on the situation and calls for more research with diverse crops and agricultural environments (Andati et al., 2022). An essentially unambiguously stated economic motive appears to be one of the most significant incentives for increasing farmers' inventive activities, even though numerous research approach farmers' innovativeness from a variety of angles. However, Elahi et al. (2022) contend, "Researchers expect our newly introduced and significantly changed products from the farmers' regard to their self-realization and well-being, not from their striving for higher revenues."

H3: Innovativeness has a moderating impact on farmers' belief in climate change and farmer's attitudes toward agriculture production.

Farmer's belief in climate change and farmer's attitude toward agriculture production

Numerous studies have examined the perspectives of small-scale farmers about agricultural advances Arora (2019), the experiences of farmers differ among developing nations. Chen et al. (2021); Habib-ur Rahman et al. (2022) investigated the factors influencing the adoption of no-till conservation agriculture using a cross-sectional study. The study's conclusions showed a positive correlation between farmers' positive attitudes. Access to extension services can help farmers improve their attitudes toward their agricultural production when they are reluctant to adopt new procedures due to a lack of knowledge or sufficient training (Jung et al., 2021; Khanpae et al., 2020). However, this argument depends on the socio-cultural milieu in which it operates, which in turn creates the prevailing belief system within a particular social context. Concerns about maximizing profits as well as attitudes and values may have an impact on farmers' strategic reactions to external change Ray et al. (2019); Tamsah and Yusriadi (2022). Farmers gain from their significance to their communities, families, and the land and water. Because attitudes and views of new practices vary among sociocultural contexts and practises, regional studies are crucial to understanding local populations. A vast array of cognitive and affective elements that affect farming decision-making and behaviour are included in attitudes in agriculture (Obembe et al., 2021). Farmers' perspectives on climate change and environmental sustainability are crucial in determining how they conduct their farming. Crop rotation, integrated pest management, and soil conservation are practises that are linked to positive attitudes toward sustainability. The farmer's general attitude towards change and risk has a significant impact on their willingness to devote time and resources to climate-resilient farming production (Jung et al., 2021). Growing evidence points to farmers' perceptions of climate change as a major factor influencing their adaptive actions in the face of climate-related difficulties. Farmers are more likely to implement adaptation practices if they acknowledge and embrace the fact of climate change (Howe et al., 2019; Ray et al., 2019). This understanding alters their perspectives on agricultural production and increases their openness to methods and techniques that are climate resilient. However, the strength of this link might not be the same for all farmers, and in understanding the specifics of these relationships, the role of innovation as a moderator becomes clear (Qiao et al., 2022; Rezaei et al., 2020). This relationship has been the subject of numerous studies, which have shown how important it is for farmers' perceptions and actions in the agricultural industry to be shaped by their ideas about climate change. Ethiopian farmers who believed in climate change were more likely to have proactive attitudes, stressing the adoption of climate-resilient practices and a willingness to invest in adaptive measures, according to (Massoro & Adewale, 2019). Marr and Howley (2019) found that farmers in Australia who accepted that climate change was happening were more likely to use sustainable farming methods and were open to climate adaptation strategies. This illustrates the impact of these beliefs on a favourable attitude towards sustainable agriculture. (Obembe et al., 2021) confirmed this association by showing that farmers who acknowledged the existence of climate change were more likely to adopt soil and water conservation measures, boosting their total agricultural resilience.

H4: Farmer's belief in climate change has an impact on farmer's attitude toward agriculture production.

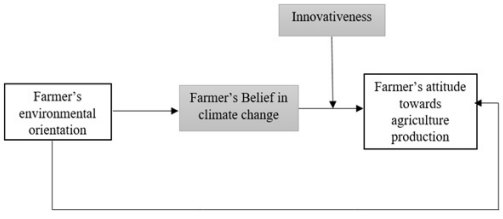

FIGURE 1. Conceptual framework

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

METHODOLOGY

This research is regarding the farmer's attitude toward agriculture due to the role of the farmer's environmental orientation. The farmer's belief in climate is the mediating variable and innovativeness is the moderating variable. The research approach for this study is quantitative and descriptive based on hypothesis testing. The time horizon is cross-sectional, where the one-time response was recorded by collecting the primary data. The targeted population was farmers belonging to the South Kalimantan province of Indonesia. To collect the data from the farmers, a survey approach was selected and a questionnaire was used as an instrument to gather the data. In terms of the number of respondents, a total of 400 questionnaires were distributed and 355 were received as filled properly and as completed. The instrument was an adapted questionnaire, where all the items against variables were adapted from different sources. The population was unknown as it was hard to reach and collect the exact number of respondents, which is why the non-probability sampling technique was used, and under this technique; the convenience sampling method was used. Only the available respondents were approached and requested to fill out the instrument. After gathering the data, for analysis purposes, SMART PLS was used as a tool to perform all the statistical tests. As per the requirements of the model to test the hypotheses all the tests were performed in a specified sequence to get the results for interpretation and drawing the conclusion.

This study was based on a research framework where all the variables were defined according to their role and nature. To measure the role of each variable in this study, the approach that was used to measure was based on primary data. For that instance, the survey approach was used and a questionnaire was the method to collect the data from the farmers. The instrument was an adapted questionnaire and items were adapted from different sources against each variable. The instrument was based on three parts, where the first part contains the information regarding the study. It was mentioned in starting of the instrument why we are collecting the data what the purpose of the study and how it will be beneficial for the farmers. It was also ensured to the respondents that the data, which will be collected from them, would not be shared with anyone and would just be used for this research work. The second part of the instrument was all about demographical information, where questions were asked regarding gender, age, education, land ownership, terrain, years of experience, and income. To respond to each demographical question, close-ended options were given in terms of range and specified options so that they could easily provide personal information. The last part of the instrument was all about the items, which were adapted from different sources. To measure the role of a farmer's environmental orientation as an independent variable, 3 items were adapted from Yu and Huo (2019), and the mediating variable; the farmer's belief in climate change was measured by using the scale of 3 items scale developed by Azadi et al. (2019). Innovativeness as a moderating variable was measured by using the 3-item scale of Walder et al. (2019). The dependent variable farmer's attitude towards agriculture was measured by using the 8-item scale of Munoz, Coleman, Hemsworth, Campbell, and Doyle (2019). All the items were based on 5 5-point Likert scale where 5 was the highest option which shows the respondent was strongly agree and 1 indicated the lowest option towards strongly disagree. This study was conducted in Indonesia and for that instance one of the provinces of the country was selected and it was South Kalimantan. This study is regarding the farmers, which is why the targeted population was the farmers belonging to the south Kalimantan province of Indonesia. The number of respondents was 355 and these were the result of distributing the 400 questionnaires. The respondents rate was almost 89 percent and it was more than the significant to conduct the analysis.

RESULTS

The present study indicates that understanding the interplay of environmental orientation, climate change beliefs, innovativeness, and attitudes in agricultural production and farmers belongs to South Kalimantan Province of Indonesia and diffusion of innovation theory involved.

Demographics

Based on an initial review of respondent data, SmartPLS3 was used to evaluate the structural and measurement models. Table 1 displays the demographic information and descriptive statistics of the sample for the current study (N=355). The relationship between farmer's environmental orientation, farmers' attitudes toward agriculture production, and farmers' belief in climate change as mediator and innovativeness as moderator was investigated among farmers belonging to South Kalimantan Province of Indonesia. The analysis of the model showed managers' age, gender, education, land ownership, terrain, year of experience, and income.

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

TABLE 1. Demographic profile

Demography	Description	No. of Responses	%
Gender	Male	235	66
	Female	120	34
Age	Less than 30 Years	110	31
	30-50	145	41
	Above 50 Years	100	28
Education	No education	80	23
	Primary education	110	31
	Secondary education	90	25
	College	75	21
Land Ownership	Small farmers	135	38
	Middle farmers	90	25
	Large farmers	130	37
Terrain	Very steep	110	31
	Moderate	145	41
	Flat	100	28
Years of Experience	Less than 4 Years	120	34
	5-8 Years	135	38
	More than 9 years	100	28
Income	Less than 50,000	120	34
	60,000-80,000	145	41
	More than 1 lac	90	25

Measurement model

First, the factor loadings, validity, and reliability of the data collected from 355 farmers in Indonesia's South Kalimantan Province were evaluated using PLS-SEM. A measurement model, sometimes referred to as a confirmatory factor analysis (CFA) model, is a statistical method used in quantitative research to evaluate an observational variable or indicator set's measurement qualities. The measurement model examines the interrelationships between the latent constructs that support the observable variables (Purwanto, Asbari, & Santoso, 2021). A measurement model, sometimes referred to as a confirmatory factor analysis (CFA) model, is a statistical method used in quantitative research to evaluate an observational variable or indicator set's measurement qualities. To validate the measurement tools used in a study, it is frequently utilized in the social sciences, psychology, and market research (Cheah et al., 2020). Internal consistency dependability is commonly measured using two methods: composite reliability and Cronbach's alpha. They are frequently used in the field of psychometrics to assess the validity of scales and questionnaires. Their approaches to calculation and interpretation are slightly different, but share the same objectives. The Construct Reliability and Validity results are shown in Table 2.

TABLE 2. Construct reliability and validity

Constructs/Items	CA	Rho-A	CR	AVE
Farmer's Belief in Climate Change	0.755	0.757	0.86	0.671
Farmer's attitude towards agriculture production	0.888	0.893	0.911	0.564
Farmer's environmental orientation	0.719	0.727	0.842	0.642
Innovativeness	0.815	0.828	0.89	0.73

Note: CR=composite reliability; AVE=average variance extracted; CA= Cronbach's Alpha

Discriminant validity is a fundamental concept in statistical methods and research, particularly in the context of structural route analysis. It assesses the extent to which a measurement tool, such as a scale or questionnaire, can effectively distinguish between various theoretical constructs or components that should be distinct from each

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

other (Purwanto et al., 2021). In other words, it examines whether the latent constructs associated with observed variables in a measurement model are more strongly correlated with their intended constructs than with other constructs in the model, confirming the sincerity and reliability of the measurement. One useful tool for assessing discriminant validity is the Heterotrait-Monotrait (HTMT) ratio, which helps confirm that variables that should not be theoretically related to each other are indeed distinct. In the analysis, when HTMT scores are below 1, it reinforces the evidence of discriminant validity, indicating that the measurements are effectively distinguishing between the intended constructs (Purwanto et al., 2021). This statistical approach is a valuable tool in research, as it assures that the measurement instruments are reliable and that the underlying constructs are appropriately distinct, as demonstrated in Table 3. Discriminant validity is essential for robust and credible research, ensuring that the observed relationships between variables align with theoretical expectations.

TABLE 3. Discriminant validity

	FCC	FAGP	FEO	INNO
Farmer's Belief in Climate Change	0.819			
Farmer's attitude towards agriculture production	0.696	0.751		
Farmer's environmental orientation	0.651	0.672	0.801	
Innovativeness	-0.447	-0.658	-0.497	0.854

The R-squared (R2) statistic, as discussed by Purwanto et al. (2021), serves as an important measure in regression analysis. It quantifies the proportion of variance in the dependent variable that can be accounted for by the independent variables in the model. This statistic is frequently employed to assess the goodness of fit of a regression model and to evaluate how effectively the independent variables can predict outcomes. In a regression analysis, the dependent variable is predicted using one or more independent variables, and R-squared showcases the degree to which these independent factors can explain the variability observed in the dependent variable. R-squared values range between 0 and 1, where 0 signifies that the independent variables have no explanatory power regarding the dependent variable, and 1 indicates that they completely account for the variance in the dependent variable. Specifically, in the context of this study, the R-squared value for farmers' belief in climate change was 0.423, indicating that the independent variables considered in this analysis explain 42.3% of the variability in farmers' belief in climate change. Similarly, the R-squared value for farmers' attitudes toward agriculture production was 0.666, demonstrating that the independent variables account for 66.6% of the variability observed in farmers' attitudes toward agriculture production. These R-squared values provide insights into the predictive power of the independent variables about these specific aspects of the study.

TABLE 4. Assessment of R square

	R Square
Farmer's Belief in Climate Change	0.423
Farmer's attitude towards agriculture production	0.666

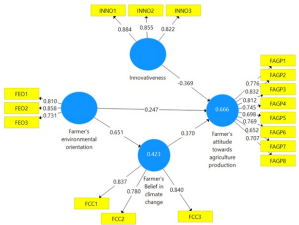

FIGURE 2. Assessment of Algorithm

Structural equation model

To establish the support for the hypothesized relationships, the PLS-SEM bootstrapping approach was employed to statistically determine the coefficients within the structural model. Structural equation modeling (SEM) is a powerful statistical methodology used to analyze intricate connections between independent and dependent variables. It ef-

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

fectively assesses both measurement and structural models, integrating elements of path analysis, regression analysis, and factor analysis (Purwanto et al., 2021). In particular, direct analysis, a method employed within structural equation modeling (SEM), delves into the direct relationships between variables as outlined in the theoretical model. It focuses on the immediate influence of independent variables on dependent variables, without considering mediating or indirect effects through intermediary factors. The results of this analysis reveal significant and positive relationships between several key factors. Notably, there is a meaningful and positive connection (β = 0.242, t = 3.569, p = 0.000) between farmers' environmental orientation and their attitude toward agriculture production. Similarly, the relationship between farmers' belief in climate change and their attitude toward agriculture production is also significant and positive (β = 0.429, t = 6.057, p = 0.000). Consequently, all the hypotheses put forth in the study have been validated.

TABLE 5. Direct relationship

	Original Sample	T Statistics	P Values	Decision
Farmer's environmental orientation -> Farmer's attitude towards agriculture production	0.242	3.569	0	Supported
Farmer's Belief in climate change -> Farmer's attitude towards agriculture production	0.429	6.057	0	Supported

A mediating effect, often referred to as an indirect influence, comes into play when a mediator or intermediary variable steps in to affect or mediate the relationship between an independent variable and a dependent variable (Purwanto et al., 2021). In simpler terms, the mediating variable serves to clarify how or why the independent variable influences the dependent variable, shedding light on the underlying mechanisms of this influence (Hair Jr et al., 2021). The results presented in Table 6 demonstrate the significance of farmers' belief in climate change as a mediating variable. They reveal a substantial association (β = 0.279, t = 5.569, p = 0.000) between farmers' environmental orientation and their attitude toward agriculture production, thereby supporting the hypothesis that this mediating variable plays a meaningful role in explaining the relationship. In essence, this confirms the hypothesis as accepted, highlighting the mediating impact of farmers' belief in climate change in the context of this relationship.

TABLE 6. Mediating effect

	Original Sample (O)	T Statistics	P Values	Decision
Farmer's environmental orientation -> Farmer's Belief in climate change -> Farmer's attitude towards agriculture production	0.279	5.569	0	Supported

According to Legate et al. (2023), a moderator variable comes into play typically, when there is an inconsistent or weak connection between independent and dependent variables. Various methods exist to assess moderating effects, including the three-phase hegemonic regression approach, which requires the manual generation of interaction terms through feature conversion and calculation (Purwanto et al., 2021). The information presented in the table below provides empirical support for this concept. Table 7 underscores the significance of the moderating role of innovativeness in the context of the relationship between farmers' belief in climate change and their attitude toward agriculture production. Interestingly, the results indicate a significant and negative impact (β = -0.401, t = 0.038, p = 10.453), confirming the hypothesis that this moderation effect holds. In essence, the presence of innovativeness as a moderator has a discernible influence on the relationship between farmers' belief in climate change and their attitude toward agriculture production, thus validating the hypothesis.

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

TABLE 7. Moderating Effect

	B-value	(STDEV)	T-value	P value
Moderating Effect 1 -> Farmer's attitude towards agriculture production	0.096	0.032	3.036	0.003

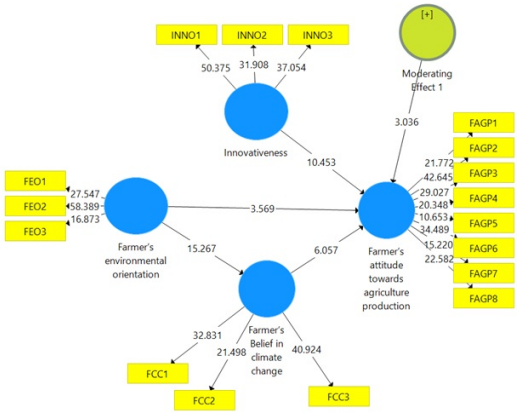

FIGURE 3. Assessment of bootstrapping

While the slopes of the correlations are influenced by the moderation effect, the slopes in Graph 1 exhibit significance across low, moderate, and high levels of findings (Purwanto et al., 2021). To put it differently, when farmers' belief in climate change is low, so is innovativeness, and this corresponds with their attitude toward agriculture production. Conversely, when farmers' belief in climate change is high, innovativeness also tends to be high, aligning with their positive attitude toward agriculture production. The graph illustrates that the relationship between high levels of farmers' belief in climate change and their attitude toward agriculture production benefits significantly from the presence of innovativeness. In other words, innovativeness plays a vital role in enhancing the connection between high levels of farmers' belief in climate change and their positive attitude toward agriculture production, as depicted in the graph.

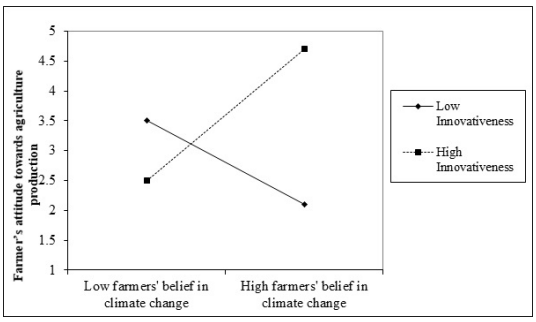

FIGURE 4. Moderation Graph

DISCUSSION

The current study demonstrates the importance of comprehending the interactions between environmental orientation, farmers' beliefs in climate change, innovativeness, and attitudes in agricultural production among farmers in Indonesia's South Kalimantan Province, as well as the diffusion of innovation theory. Farmers from Indonesia's South Kalimantan Province were asked to participate in an investigation on the relationship between their environmental orientation, their attitude towards agricultural output, their belief in climate change as a mediator, and their innovativeness as a moderator. Based on the results of the research, we need to further strengthen environmental orientation for farmers on a large scale if we want to increase their intentions and beliefs about climate change. This is especially important in developing nations where farmers receive little attention. The body of existing work (Gardezi & Arbuckle, 2020; Khanpae et al., 2020; Munoz et al., 2019) also supports these results. All hypotheses were accepted.

Farmers' attitudes toward agriculture output may assist such educational initiatives to encourage farmers, given the fiscal and financial limitations that developing countries already face (Khanpae et al., 2020). Government initiatives to increase public awareness of the degradation of soil have been successful in reaching this group. The farmers who participated in the conversation understood the issue well. It demonstrates how knowledgeable farmers are when they are concerned about soil erosion across the nation. Promoting alternative methods and increasing awareness is particularly crucial when it comes to the use of chemicals in agriculture. In their responses, the farmers who participated in the poll indicated that they were somewhat concerned about chemicals used in agriculture. The results of this study are corroborated by previous research demonstrating the impact of farmer feedback and resources on their innovativeness and beliefs regarding climate change (Rezaei et al., 2020; Vargo et al., 2020). The findings suggest that innovativeness has a moderating effect on farmers' attitudes toward agricultural productivity and their belief in climate change. This demonstrates how farmers were willing to take a chance while implementing crop management and soil protection techniques, but not when it came to protecting their crops and water-gathering technologies. Climate change is expected to have a positive effect on farmers' attitudes towards agriculture production because of modi-

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

fications to overall climatic conditions and extreme conditions like frost and flooding, particularly in the study area where agriculture production is greatly influenced by climate change. (Ray et al., 2019; Shahbaz et al., 2022), which emphasise the significance of economics in farming decisions, are further supported by this study. Farmers are proud of their products and irritated by the meager compensation they receive for their labor. They depend on an economic system outside of their control. Long-term production is another major worry for farmers.

According to Rezaei et al. (2020), a farmer's perspective on agriculture productivity is greatly influenced by their environmental orientation. This emphasizes how important it is for a person's environmental ideals, consciousness, and concerns to influence how they farm. Eco-friendly practices are more likely to be used by farmers who place a high priority on environmental sustainability, which can enhance agriculture's overall sustainability. Additionally, the study indicates that a farmer's perspective on agriculture productivity and environmental orientation is mediated by their belief in climate change. According to Ray et al. (2019), farmers who care about the environment are more likely to think that climate change is real, and that idea in turn affects how they feel about farming. Put another way, farmers who are concerned about the environment may see the value of sustainable farming production as increased when they acknowledge the impact of climate change and its relationship to agricultural production (Walder et al., 2019). Furthermore, the research highlights the correlation between a farmer's perception of climate change and their outlook on agricultural output. This implies that farmers' perspectives on agricultural production can be influenced only by their opinions about climate change. In order to meet the problems given by a changing climate, farmers who accept the facts of climate change may be more likely to include adaptation and mitigation tactics in their farming production.

Theoretical and practical implications

The results of this research study point to certain policy implications. Governmental initiatives are required to motivate farmers to participate in providing technical assistance for the implementation of conservation agriculture production. The government must set up training sessions and educational initiatives for this reason. This could support farmers in implementing climate change-related initiatives for their extension services, credit availability, and education. To evaluate a farmer's commitment to implementing conservation agriculture, which may assist in boosting farm output, it is essential to comprehend their views regarding climate change, their acceptance of it, and their capacity for adaptation. Pakistan is proactively implementing policies to guarantee its ability to adapt to the evolving climate. Plans for agricultural adaptation should take into account both national and local initiatives in addition to the changes that farmers are making on their properties. Increased agricultural land area, decreased subdivision of land, reduced contamination of the soil, and increased agricultural productivity are the goals of these policies (Song and Pijanowski, 2014; Du et al., 2018). In the context of industrial and improved agriculture in Indonesia's main grain production bases in South Kalimantan Province, modern land consolidation projects can typically achieve the goals of fewer scattered plots, regulated plot shapes, and increased large-scale farm sizes.

These results advance our theoretical knowledge of the variables affecting agricultural behavior. By highlighting the complex relationships between environmental orientations, attitudes about climate change, and innovativeness within the framework of the diffusion of innovation theory, they add to the body of research in this field. Based on this foundation, researchers can further explore the subtleties of these relationships and their ramifications in various agricultural situations. In South Kalimantan Province, these conclusions have important practical ramifications for environmental advocates, agricultural practitioners, and policymakers. With this information, policymakers can create focused initiatives that support sustainable farming methods. These could include campaigns to raise public awareness of climate change and farmer's attitudes toward farming production. Furthermore, promoting cooperation across stakeholders including governmental organizations, farming associations, and non-governmental organizations can help farmers access resources and best production. Through the utilization of these discoveries, the province of South Kalimantan can progress its farming industry while concurrently tackling environmental and climate-related issues, ultimately cultivating a more resilient and sustainable farming environment.

Limitations and recommendations

While this study provides valuable insights into the interplay of environmental orientation, farmers' beliefs in climate change, innovativeness, and attitudes towards agricultural production in Indonesia's South Kalimantan Province within the diffusion of innovation theory, it is important to acknowledge certain limitations that open doors for future research endeavors. One notable limitation is that this research primarily focuses on examining farmers' at-

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

titudes regarding climate change and its impact on agricultural production, without directly assessing the actual adoption rates of sustainable farming production. To address this gap, future research could delve into the practical implementation of these attitudes by farmers and investigate the factors influencing their decision to adopt or resist such production. Furthermore, this study suggests the need for longitudinal investigations into the decision-making behaviors of farmers and the array of factors that may influence their attitudes toward agricultural production over time. Longitudinal studies can provide valuable insights into the dynamics of agricultural production, environmental consciousness, and climate change beliefs among farmers, allowing for a more comprehensive understanding of how these factors evolve and interact over extended periods. Additionally, research endeavors could explore the influence of external factors, such as government policies, market dynamics, and climate variability, on farmers' evolving attitudes and behaviors related to agricultural production. By addressing these limitations and pursuing future research along these lines, we can enhance our understanding of sustainable agriculture in the context of evolving environmental and climatic challenges.

Furthermore, the data used in this study was gathered solely from farmers in the South Kalimantan Province of Indonesia. Future studies should take into account cross-regional or cross-cultural studies that look at how these associations develop in different agricultural contexts to improve the application of these findings. Studies that draw comparisons between various nations or areas help clarify whether these connections are context-specific or universal. Furthermore, future research could go deeper into the mechanisms and elements impacting the dissemination process, even though the attitude toward agriculture production is examined in this study using the diffusion of innovation theory. To encourage attitude toward farming production, policymakers and practitioners might benefit from looking into the function of extension services, government regulations, and peer networks in the context of South Kalimantan Province or other agricultural regions.

Conclusion

This study emphasizes how important environmental orientation, farmers' attitudes, innovativeness, and ideas about climate change are to agricultural productivity. It is clear that larger farms, with access to more sophisticated technologies, are frequently in a better position to investigate and implement new technologies Andati et al. (2022). However, it is crucial to take note of the claim made by Benhabib et al. (2021) that larger farms can put short-term profit ahead of long-term investments. Consequently, the study emphasizes how a farmer's attitude towards agricultural productivity is greatly influenced by their environmental orientation. It is urged that future studies look into these processes more empirically. This study also emphasizes the need for prudence when creating tools to gauge farmers' perceptions of agricultural output. To guarantee a thorough evaluation of these views in subsequent research, researchers should take great care in developing legitimate and trustworthy instruments. It will be feasible to contribute to this body of knowledge as more study is done by incorporating more participants with various backgrounds and viewpoints. Given the myriad and serious environmental effects of contemporary agriculture, farmers who farm sustainably must maintain their level of output and inspire other farmers' attitudes toward agricultural production. By recognizing the pivotal role of environmental orientation, climate change beliefs, and innovativeness, stakeholders can work together to create a more sustainable and environmentally conscious agricultural landscape. This study provides a valuable step towards more informed and effective approaches in the pursuit of sustainable agriculture in this region and beyond.

REFERENCES

Ahmad, D., Afzal, M., & Rauf, A. (2019). Analysis of wheat farmers' risk perceptions and attitudes: evidence from punjab, pakistan. *Natural Hazards*, *95*(3), 845-861.

Ahmed, N., Li, C., Khan, A., Qalati, S. A., Naz, S., & Rana, F. (2021). Purchase intention toward organic food among young consumers using theory of planned behavior: role of environmental concerns and environmental awareness. *Journal of Environmental Planning and Management*, *64*(5), 796-822.

Andati, P., Majiwa, E., Ngigi, M., Mbeche, R., & Ateka, J. (2022). Determinants of adoption of climate smart agricultural technologies among potato farmers in kenya: Does entrepreneurial orientation play a role? *Sustainable Technology and Entrepreneurship*, *1*(2), 100017.

Arora, N. K. (2019). Impact of climate change on agriculture production and its sustainable solutions. *Environmental Sustainability*, *2*(2), 95-96.

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

Azadi, Y., Yazdanpanah, M., & Mahmoudi, H. (2019). Understanding smallholder farmers' adaptation behaviors through climate change beliefs, risk perception, trust, and psychological distance: Evidence from wheat growers in iran. *Journal of environmental management*, *250*, 109456.

Benhabib, J., Perla, J., & Tonetti, C. (2021). Reconciling models of diffusion and innovation: A theory of the productivity distribution and technology frontier. *Econometrica*, *89*(5), 2261-2301.

Bramley, R., & Ouzman, J. (2019). Farmer attitudes to the use of sensors and automation in fertilizer decision-making: Nitrogen fertilization in the australian grains sector. *Precision agriculture*, *20*, 157-175.

Cheah, J.-H., Thurasamy, R., Memon, M. A., Chuah, F., & Ting, H. (2020). Multigroup analysis using smartpls: Step-by-step guidelines for business research. *Asian Journal of Business Research*, *10*(3), I-XIX.

Cheema, S., Afsar, B., & Javed, F. (2020). Employees' corporate social responsibility perceptions and organizational citizenship behaviors for the environment: The mediating roles of organizational identification and environmental orientation fit. *Corporate Social Responsibility and Environmental Management*, *27*(1), 9-21.

Chen, J., Tian, H., Huang, J., Zhang, J., & Zhang, F. (2021). Climate-driven yield variability for winter wheat in henan province, north china and its relation to large-scale atmospheric circulation indices. *International Journal of Plant Production*, *15*, 79-91.

Du, S., Liu, J., & Fu, Z. (2021). The impact of village rules and formal environmental regulations on farmers' cleaner production behavior: New evidence from china. *International Journal of Environmental Research and Public Health*, *18*(14), 7311.

Elahi, E., Khalid, Z., & Zhang, Z. (2022). Understanding farmers' intention and willingness to install renewable energy technology: A solution to reduce the environmental emissions of agriculture. *Applied Energy*, *309*, 118459.

Elshaer, I. A., & Sobaih, A. E. E. (2022). I think i can, i think i can: Effects of entrepreneurship orientation on entrepreneurship intention of saudi agriculture and food sciences graduates. *Agriculture*, *12*(9), 1454.

Fairbrother, M., Sevä, I. J., & Kulin, J. (2019). Political trust and the relationship between climate change beliefs and support for fossil fuel taxes: Evidence from a survey of 23 european countries. *Global Environmental Change*, *59*, 102003.

Farani, A. Y., Mohammadi, Y., Ghahremani, F., & Ataei, P. (2021). How can iranian farmers' attitudes toward environmental conservation be influenced? *Global Ecology and Conservation*, *31*, e01870.

Finger, R., Swinton, S. M., El Benni, N., & Walter, A. (2019). Precision farming at the nexus of agricultural production and the environment. *Annual Review of Resource Economics*, *11*, 313-335.

Gao, H., Yan, C., Liu, Q., Ding, W., Chen, B., & Li, Z. (2019). Effects of plastic mulching and plastic residue on agricultural production: A meta-analysis. *Science of the Total Environment*, *651*, 484-492.

Gardezi, M., & Arbuckle, J. G. (2020). Techno-optimism and farmers' attitudes toward climate change adaptation. *Environment and Behavior*, *52*(1), 82-105.

Gull, A. A., Saeed, A., Suleman, M. T., & Mushtaq, R. (2022). Revisiting the association between environmental performance and financial performance: Does the level of environmental orientation matter? *Corporate Social Responsibility and Environmental Management*, *29*(5), 1647-1662.

Habib-ur Rahman, M., Ahmad, A., Raza, A., Hasnain, M. U., Alharby, H. F., Alzahrani, Y. M., ... others (2022). Impact of climate change on agricultural production; issues, challenges, and opportunities in asia. *Frontiers in Plant Science*, *13*, 925548.

Hornsey, M. J., & Fielding, K. S. (2020). Understanding (and reducing) inaction on climate change. *Social Issues and Policy Review*, *14*(1), 3-35.

Howe, P. D., Marlon, J. R., Mildenberger, M., & Shield, B. S. (2019). How will climate change shape climate opinion? *Environmental Research Letters*, *14*(11), 113001.

Jung, J., Maeda, M., Chang, A., Bhandari, M., Ashapure, A., & Landivar-Bowles, J. (2021). The potential of remote sensing and artificial intelligence as tools to improve the resilience of agriculture production systems. *Current Opinion in Biotechnology*, *70*, 15-22.

Khanpae, M., Karami, E., Maleksaeidi, H., & Keshavarz, M. (2020). Farmers' attitude towards using treated wastewater for irrigation: The question of sustainability. *Journal of cleaner production*, *243*, 118541.

Lin, J., Luo, Z., & Luo, X. (2020). Understanding the roles of institutional pressures and organizational innovativeness in contextualized transformation toward e-business: Evidence from agricultural firms. *International Journal of Information Management*, *51*, 102025.

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4

Marr, E. J., & Howley, P. (2019). The accidental environmentalists: Factors affecting farmers' adoption of pro-environmental activities in england and ontario. *Journal of Rural Studies*, *68*, 100-111.

Massoro, Z. Z., & Adewale, N. T. (2019). Influence of attitude, subjective norms and personal innovativeness on intention to use open access journals: a case of agricultural research institutes. *Library Philosophy and Practice*, 1-13.

Munoz, C. A., Coleman, G. J., Hemsworth, P. H., Campbell, A. J., & Doyle, R. E. (2019). Positive attitudes, positive outcomes: The relationship between farmer attitudes, management behaviour and sheep welfare. *PLoS One*, *14*(7), e0220455.

Obembe, O. S., Hendricks, N. P., & Tack, J. (2021). Decreased wheat production in the usa from climate change driven by yield losses rather than crop abandonment. *Plos one*, *16*(6), e0252067.

Purwanto, A., Asbari, M., & Santoso, T. I. (2021). Analisis data penelitian marketing: Perbandingan hasil antara amos, smartpls, warppls, dan spss untuk jumlah sampel besar. *Journal of Industrial Engineering & Management Research*, *2*(4), 216-227.

Qiao, L., Wang, X., Smith, P., Fan, J., Lu, Y., Emmett, B., … others (2022). Soil quality both increases crop production and improves resilience to climate change. *Nature Climate Change*, *12*(6), 574-580.

Ray, D. K., West, P. C., Clark, M., Gerber, J. S., Prishchepov, A. V., & Chatterjee, S. (2019). Climate change has likely already affected global food production. *PloS one*, *14*(5), e0217148.

Rezaei, R., Safa, L., & Ganjkhanloo, M. M. (2020). Understanding farmers' ecological conservation behavior regarding the use of integrated pest management-an application of the technology acceptance model. *Global Ecology and Conservation*, *22*, e00941.

Rogers, E. M., Singhal, A., & Quinlan, M. M. (2014). Diffusion of innovations. In *An integrated approach to communication theory and research* (p. 432-448). Routledge.

Shahbaz, P., Abbas, A., Batool, Z., Alotaibi, B. A., Nayak, R. K., et al. (2022). Adoption of climate smart agricultural practices through women involvement in decision making process: Exploring the role of empowerment and innovativeness. *Agriculture*, *12*(8), 1161.

Solekah, N. A., Handriana, T., & Usman, I. (2022). Millennials' deals with plastic: The effect of natural environmental orientation, environmental knowledge, and environmental concern on willingness to reduce plastic waste. *Journal of Consumer Sciences*, *7*(2), 115-133.

Tamsah, H., & Yusriadi, Y. (2022). Quality of agricultural extension on productivity of farmers: Human capital perspective. *Uncertain Supply Chain Management*, *10*(2), 625-636.

Vargo, S. L., Akaka, M. A., & Wieland, H. (2020). Rethinking the process of diffusion in innovation: A service-ecosystems and institutional perspective. *Journal of business research*, *116*, 526-534.

Walder, P., Sinabell, F., Unterlass, F., Niedermayr, A., Fulgeanu, D., Kapfer, M., … Kantelhardt, J. (2019). Exploring the relationship between farmers' innovativeness and their values and aims. *Sustainability*, *11*(20), 5571.

Yu, Y., & Huo, B. (2019). The impact of environmental orientation on supplier green management and financial performance: The moderating role of relational capital. *Journal of cleaner production*, *211*, 628-639.

ISSN: 2414-309X
DOI:https://doi.org/10.20474/jabs-8.3.4