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RESEARCH ARTICLE

Accelerating Sustainable Proklim in The Food Resilience and Green Economy

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Abstract. This study aimed to develop a model for accelerating the transition to green economy through the implementation of a climate village focused on food security. It introduced a children-friendly digital education program designed to enhance out-of-class learning on climate change mitigation and adaptation. This study also emphasized the integration of *Proklim* activities within designated areas to minimize the adverse effects of climate change. A survey method was conducted in Sukoharjo Regency with a sample of 160 respondents of *Proklim* activists. Primary data were collected using questionnaires, FGDs, and quantitative interviews, while secondary data were collected through documentation. The data were analyzed using geographic information systems, structural equation model PLS, vs code software, MySQL, construct, animate, and travel cost methods. The results showed that accelerating the transition to green economy through a food security-based climate village program involved a combination of adaptation, mitigation, and sustainability efforts. The adaptation measures focused on controlling drought, floods, and landslides, enhancing food security, and managing climate-related diseases. Meanwhile, mitigation efforts included effective waste management for both solid and liquid waste, adoption of renewable energy, conservation practices, energy efficiency, reduction of greenhouse gas emissions, agricultural innovation, and the preservation of vegetation cover. Sustainability was reinforced through the establishment of community groups, promotion of self-reliance, independent funding initiatives, gender-inclusive participation, capacity-building programs, external support, and the development of activities that generate social, economic, and environmental benefits. Digitalization in education is implemented through the *Proklim* digital platform, *KampungIklim.com*, which offers out-of-class learning resources on climate change mitigation and adaptation. *Proklim* activities serve as pilot sites for educational tourism, promoting sustainability by integrating economic value into existing initiatives, including the development of *Proklim*-based tourism villages.

1. Introduction

Climate change and environmental degradation are threats to well-being and future generations (Palinkas et al., 2020). To ensure sustainability in resource utilisation, it is important to commit the Government and other stakeholders, in order to realise green economy by implementing business practices based on a circular economy (Hartter et al., 2018; Sumter et al., 2021). After the 26th Conference of the Parties (COP26) of the United Nations Framework on Climate Change Conference in Glasgow, a number of agreed outcomes became homework for all countries to follow up. Indonesia is a country that plays an important role in efforts to save the earth from climate change (Blom et al., 2022; Wilson et al., 2020). In this context, climate change is a global environmental problem that can damage ecosystems and biodiversity, and the policies implemented by the government are very influential in mitigating the effects (Ge & Lin, 2021; Malhi et al., 2020).

Climate change led to alterations in temperature, rainfall patterns, and extreme weather events, all of which directly impacted agricultural productivity (Filho et al., 2022; Gill et al., 2023). These changes affected crop yields, growing seasons, and overall product quality. Moreover, increase in temperature caused heat stress on crops, and changes in rainfall patterns led to droughts or floods that damaged crops (Wang & Nakakubo, 2022). Changes in pest and disease patterns are associated with changing climatic conditions (Keegan et al., 2024). These factors can lead to reduced agricultural yields, which affect food resilience. Disruptions also caused by climate change extend to FSC logistics (Tomashuk, 2022). Extreme weather conditions can damage transport infrastructure, such as roads, bridges, and ports, leading to obstruction and disruption of goods movement. In this case, disruptions to transport networks can cause spoilage of perishable goods due to long transit times. Rising sea levels and changing weather patterns

affected shipping routes and port operations, which impacted the timely delivery of food products around the world (Osiakwan, 2017).

Climate change has an impact on increasing poverty, which is a major concern for the Indonesian government and the international community (Dharmasiri & Jayarathne, 2021). This change causes the economy to decline and makes women the most vulnerable, hence, social protection programs for women in Indonesia improved green economic welfare through social entrepreneurship programs (Nugroho et al., 2021). Practicing social entrepreneurship contributed to social transformation (Keegan et al., 2024; Osiakwan, 2017; Tomashuk, 2022). This transformed women who were considered weak and vulnerable to climate change into those who are strong in adapting to climate change (Mentes, 2023). The relationship between sustainable development and climate vulnerability risk is crucial for countries to formulate evidence-based policies (Rapsikevicius et al., 2021). Therefore, future social studies should balance business and social goals as a sustainable business model (Astadi et al., 2022; Bolger, 2021; Zandi & Lee, 2019).

Rising energy prices, especially fossil fuels, affect fertilizer and food prices. The three crises that have occurred in the last three decades, namely the monetary crisis in 1998, the global financial crisis in 2008, and the Covid-19 and geopolitical crises in 2021-2022 showed the strong relationship between energy and food, which added to the vulnerability of the global food system (Karoliina et al., 2023). Unlike the monetary crisis and the global financial crisis where recovery was gradual through monetary stimulus, the current crisis has its challenges (Androniceanu & Sabie, 2022; Zang et al., 2021). Moreover, the Covid-19 pandemic crisis had a strong impact on the real sector, and when the pandemic was coming to an end, everyone wanted to return to normal conditions immediately. As a result, a high increase in demand was created, causing disruption in the supply chain leading to price increase around the world, and triggered global inflation (Hao & Chen, 2023).

To make the food system more resilient, several strategic measures can be implemented (Santeramo, 2022)(Martin et al., 2019)(Balogun et al., 2020)(Tomashuk, 2022). Rather than sporadic efforts, a systematic approach to increasing food productivity is essential. This includes strengthening production intensification, providing consistent and high-quality support to farmers in adopting sustainable modern agricultural practices, and restoring ecosystems. Additionally, expanding arable land through the use of marginal areas, such as swamplands, ex-mining sites, tidal lands, and high-salinity areas can be achieved through innovative technological advancements.

It is important to maintain price stability by building a resilient food reserve and logistics system. Bulog, as a food reserve management agency, can adopt partially dynamic stock instruments to enhance efficiency. This includes optimizing warehouse receipt systems and commodity futures trading markets, as well as establishing a unified real-time data and information system for stock management. The 2022 National Rice Reserve Survey (SCBN) conducted by the Ministry of Agriculture in collaboration with BPS can provide information on rice reserves nationally, both in households (producers and consumers) and non-households (millers, rice traders, Bulog, Horeka, processing industries). This data can serve as a baseline for building more complete big data that contains not only information on rice reserves but also production, consumption, and prices in each region in an integrated manner. Furthermore, the integration of big data will help reduce information asymmetry regarding prices, demand, and the availability of rice and other essential staple foods. By leveraging real-time data, fluctuations in food prices can be monitored more effectively, enabling the design of timely mitigation measures, such as determining the necessity for imports in order to maintain price stability.

Strengthening the national food industry can be achieved through various measures, such as providing fiscal and non-fiscal incentives to support local food production beyond rice and wheat. Encouraging businesses to incorporate a higher ratio of local food content in wheat imports can promote import substitution. Additionally, reducing reliance on imported foodstuffs through innovation and diversification into locally sourced alternatives is essential. Improving efficiency in the food system requires better governance, particularly in managing the archipelagic country's food network. Developing a logistics system tailored to the archipelago, establishing strategic food reserves, and minimizing Food Loss and Waste (FLW) throughout the supply chain are key priorities. Furthermore, promoting behavioral shifts in food consumption can further support long-term sustainability. Enhancing local food diversification and security involves fostering innovations that utilize local commodities, strengthening community-based food systems, and supporting farmers. This includes initiatives to revitalize farmer organizations, provide agricultural insurance for disaster-prone areas, and ensure long-term production sustainability.

The inputs of regulations, guidelines, human resources, and budget are not measured quantitatively, but will be visible in the process qualitatively. An interesting finding is that this study did not consider the entrepreneurial spirit of the beneficiaries (Rivera et al., 2020). This is very important as some beneficiaries choose to become workers. All locations of the social entrepreneurship program apply digital marketing, but the most prominent is in Bantul District because it has developed a platform for digital marketing but still needs further development. In the era of advances in information and communication technology, the seller's relationship with the market is changing. In this regard, information technology and digital tools influence marketing, which enhances the relationship with consumers (Choi et al., 2020; Kovilage, 2021).

The Indonesian government is committed to following up on the results of COP26 by implementing climate change mitigation and adaptation activities to meet emission reduction targets (Luo et al., 2019; Obergassel et al., 2021). Indonesia achieves this through the climate village program (*Proklim*) which includes 20 thousand villages in 2024. The location of the climate village program in Central Java Province until 2022 is 630 locations. Out of this number, only 5 locations received the Minister of Environment and Forestry award in the category of *Proklim Lestari*. Meanwhile, out of the 5 locations, only 1 is located in Sukoharjo Regency, namely Ngadirejo Village, Kartasura District, Sukoharjo Regency. The lack of locations that have obtained the *Proklim Lestari* category, especially in Sukoharjo Regency and Central Java Province, is a challenge in realizing green economy based on edu-tourism by accelerating the application of digitalization (Adminweb, 2021; Ariyaningsih & Shaw, 2023).

Various strategies for strengthening *Proklim* in Central Java have been implemented in the form of regulations, namely Article 70 of the Law of the Republic of Indonesia Number 32 of

2009 concerning Environmental Protection and Management. It emphasizes that nature preservation by creating a friendly climate for the survival of humans is a shared responsibility. Every individual has a role to play in environmental protection and management. *Proklim* is a regional flagship program in the 2018-2023 RPJMD, Central Java Governor Regulation No. 51 of 2019 concerning the Climate Village Program in Central Java. It is Governor Decree No. 660.1/21/2021 concerning the Development Team of the Climate Village Program in Central Java.

Green economy is the result of various efforts and strategies implemented by the Government to have sustainable economic growth while preventing environmental damage. The focus of green economy development should be in line with environmental development goals such as climate change, control of biodiversity damage and environmental pollution, as well as the use of new and renewable energy. Green economy in various countries is a dynamic process of transformation towards low-carbon development, increasing resource efficiency and population welfare with the use of technology and innovation that creates new jobs while reducing environmental risks (Frone & Frone, 2017).

Green economy is characterized by a considerable increase in investment in sectors of the economy, creating and strengthening the Earth's natural capital or contributing to reducing ecological deficiencies and environmental threats. These sectors include renewable energy, low emission transportation, energy efficient buildings, clean technology, improved waste management, sustainable agriculture and forest management, as well as sustainable fishing (Hamdouch & Depret, 2012).

There is no social aspect that has been able to turn the economy green. However, developed social aspects have a much higher rate of introduction of green technologies and constant monitoring of compliance with established standards. Nevertheless, there are enough social policies to enhance the implementation of green economy, some of which are not purely economic. In a market economy, where income is the main factor of profitability, the state needs to set the key to introducing sustainable development (Yeshchenko et al., 2019). The key tools to stimulate green economy include equalizing the competitive environment (Dabyltayeva & Rakhymzhan, 2019; Saeed, 2019).

Encouraging social engagement and population-driven initiatives to support the ecosystem can increase demand for goods produced with environmentally friendly technologies. Ensuring transparency in data related to production technologies and the economic impact of industries on the environment is essential. Additionally, addressing market monopolies and fostering fair competition should prioritize the preservation of social and ecological balance, supported by strategic information policies. Promoting open competition and leveraging grant programs can further increase the growth of green and circular economies, ensuring sustainable development while maintaining environmental integrity (D'Amato et al., 2019).

Resilience is associated with the ability of a system to maintain its structure and function (Béné, 2020; Chebet et al., 2020). Theoretical constructs of resilience aid understanding of the dynamics and functioning of various types of social-ecological systems, including food systems (Rojas-Downing et al., 2017; Smith et al., 2020). Resilience is manifested as cyclical and continuous adaptation, as well as learning induced by change and disturbance (Altieri et al., 2015; Manyise & Dentoni, 2021). The three key capacities of resilience include robustness, which refers to a system s ability to resist and withstand external changes without significant disruption. Adaptability is the capacity to adjust operations and functions in response to changing conditions. Transformability involves the ability to fundamentally restructure and modify internal processes to effectively respond to long-term changes (Campbell et al., 2022).

Adaptability and transformation are innate characteristics of resilience (Balogun et al., 2020; Godde et al., 2021). When faced with adversity, a resilient system will meet its general objectives and predetermined goals with effective adaptation and transformation. Adaptability is the extent to which an individual or society can influence and make adjustments when faced with shocks or disturbances (Arnell, 2022). Transformability, on the other hand, is the ability of a system to make robust system changes, either by choice or due to disturbances (Dwivedi et al., 2022; Fleetwood, 2020).

Food systems include all elements, including environment, people, inputs, processes, infrastructure, and institutions, as well as activities related to the production, processing, distribution, consumption preparation, and management of food waste. It also includes the outputs of these activities, namely economic and environmental outcomes (El Bilali et al., 2019; Lalander et al., 2020). The concept of resilience is emerging in various fields as a term that describes the process or state of surviving stress and recovering after a disruption. The term appears in the study of ecosystems, social infrastructures that intersect with the environment, objects and systems in the physical sciences, and individual psychological development in the behavioral sciences(Campbell et al., 2022).

Resilience has recently experienced increased attention across disciplinary boundaries, and clarity on its application can increase utility in a range of disciplines such as economics, environment, and agriculture. Conceptually, resilience offers a framework for thinking about agriculture, urban planning, environmental engineering, disaster relief coordination, community organization, and a host of other areas in addressing contemporary threats to system stability. This is due to the pervasive, repetitive, and often widespread nature of shocks (Jalles, 2024).

Based on the above description, this study aimed to create a model for accelerating the realization of green economy by implementing a climate village program based on food resilience. It created children's version of digitalization education to provide knowledge through out-of-class learning about mitigation and adaptation activities of current and future climate change impacts. In addition, this study formed an integrated area of pro-climate activities to minimize the negative impacts of climate change.

2. Methods

This study used a survey method in Sukoharjo Regency with a sample of *Proklim* activists totaling 160 respondents. The population was 248 from 62 *Proklims* categorized as *Proklim Pratama*, *Proklim Madya*, *Proklim Utama* and *Proklim Lestari*. The sample was 160 respondents, including 32 *Proklim Pratama*; 72 *Proklim madya*; 48 *Proklim utama* and 8 *Proklim lestari*. Furthermore, the purposive random sampling technique was used with consideration that has the potential to be upgraded to a higher level based on data from the Sukoharjo District Environment Office. *Proklim* variables

were measured from adaptation, mitigation, and sustainability support programs using a Likert scale of 1 to 5, with 1 being the lowest and 5 being the highest. In this study, green economy was measured by programs and strategies related to the maintenance of an environmentally friendly environment using a Likert scale of 1 to 5. The food resilience variable is a process that associates a set of adaptive capacities with a positive trajectory of functioning and adaptation following a food disruption with values from 1 to 5. Primary data were obtained using questionnaires, FGDs and in-depth interviews quantitatively, while secondary data were collected through documentation. In addition, the analysis technique used geographic information system and structural equation model (SEM) PLS, vscode software, MySQL, construct, animate, gdevelop, and travel cost method.

3. Results and Discussions

Results

The results of the *Proklim* distribution map in Sukoharjo Regency in realizing food resilience and green economy are as follows:

Figure 1 shows that *Proklim* in Sukoharjo Regency had 90 *Proklim* locations until 2024, of which 62 have received national level awards and 28 are awaiting verification by the Ministry of Environment and Forestry (KLHK). The 62 locations with details of *Proklim Pratama* certificate were 15 (24.19%), *Proklim Madya* certificate were 33 (53.22%), *Proklim Utama* certificate were 10 (16.13%), *Proklim Utama* trophy were 2 (3.23%) and *Proklim Lestari* trophy were 2 locations (3.23%). Figure 1 shows that in Sukoharjo Regency, Central Java Province, the most locations that have received awards at the national level were the Intermediate *Proklim* certificate followed by the Primary *Proklim* certificate, the Main *Proklim* certificate, the Main *Proklim* trophy, and the *Proklim Lestari* trophy. The results of statistical analysis in this study are as follows:

Table 1. shows that all statement items in each variable have a p value < α = 0.05, indicating that all statement items in the climate change variable, namely food resilience and green economy are valid. The results of the reliability test in the study are as follows:

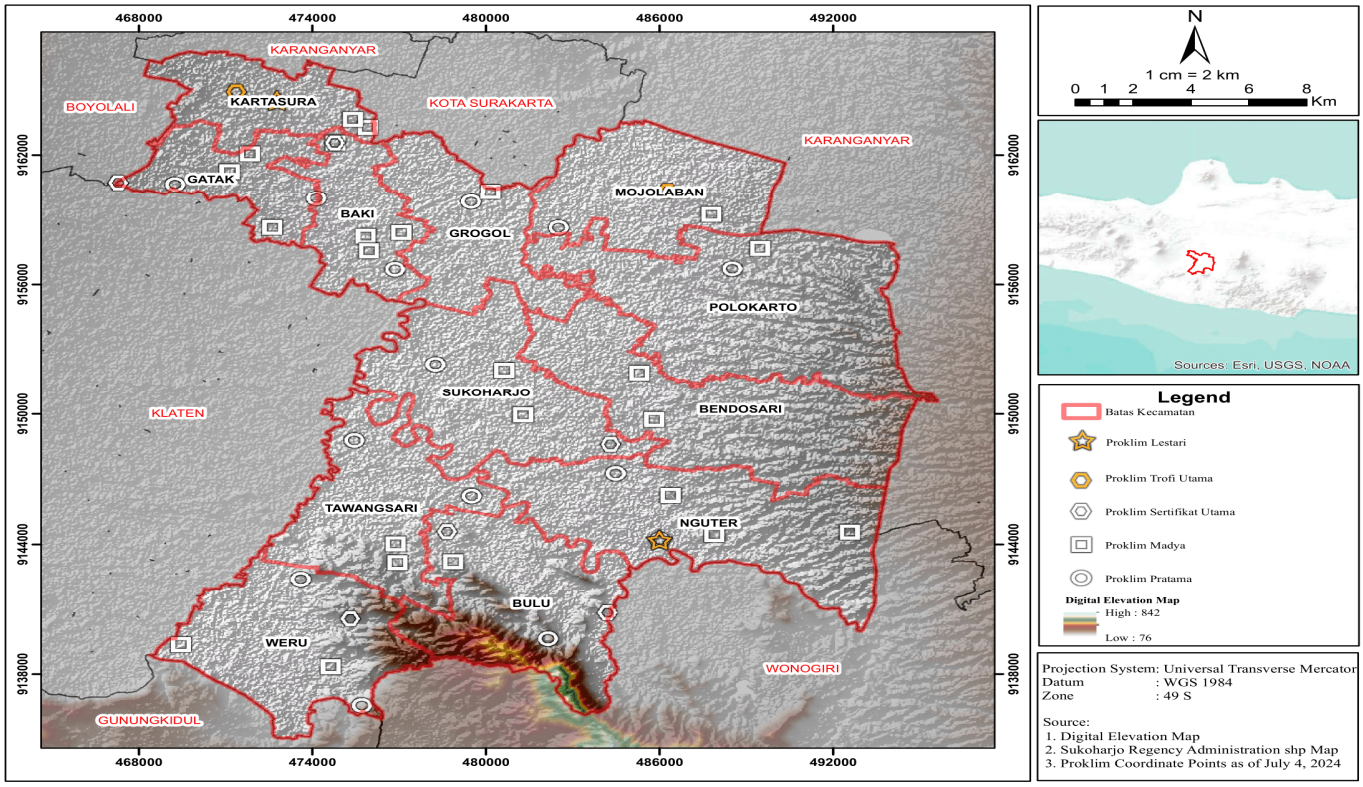

Figure 1. Distribution of *Proklim* in Sukoharjo Regency (Digital Elevation Map source: Esri, USGS, NOAA)

Table 1. Validity Test
Outer loading

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
X1 <- X	0.702	0.700	0.060	11.643***	0.000
X10 <- X	0.656	0.658	0.058	11.386***	0.000
X11 <- X	0.704	0.702	0.058	12.164***	0.000
X12 <- X	0.605	0.604	0.058	10.478***	0.000
X13 <- X	0.697	0.700	0.055	12.702***	0.000

X2 <- X	0.731	0.731	0.039	18.770***	0.000
X3 <- X	0.679	0.673	0.062	10.975***	0.000
X4 <- X	0.566	0.561	0.080	7.051***	0.000
X5 <- X	0.701	0.697	0.054	12.883***	0.000
X6 <- X	0.694	0.687	0.059	11.663***	0.000
X7 <- X	0.712	0.709	0.051	13.858***	0.000
X8 <- X	0.691	0.689	0,050	13.789***	0.000
X9 <- X	0.707	0.707	0.043	16.270***	0.000
Y1 <- Y	0.274	0.266	0.123	2.231**	0.026
Y10 <- Y	0.763	0.755	0.057	13.300***	0.000
Y2 <- Y	0.281	0.276	0.126	2.229**	0.026
Y3 <- Y	0.254	0.249	0.120	2.119**	0.035
Y4 <- Y	0.763	0.755	0.057	13.300***	0.000
Y5 <- Y	0.672	0.663	0.051	13.155***	0.000
Y6 <- Y	0.580	0.572	0.070	8.315***	0.000
Y7 <- Y	0.569	0.559	0.079	7.216***	0.000
Y8 <- Y	0.620	0.617	0.069	8.943***	0.000
Y9 <- Y	0.479	0.472	0.093	5.170***	0.000
Z1 <- Z	0.677	0.675	0.060	11.236***	0.000
Z2 <- Z	0.755	0.756	0.037	20.486***	0.000
Z3 <- Z	0.722	0.717	0.055	13.233***	0.000
Z4 <- Z	0.573	0.567	0.081	7.028***	0.000
Z5 <- Z	0.714	0.709	0.053	13.516***	0.000
Z6 <- Z	0.688	0.681	0.062	11.152***	0.000
Z7 <- Z	0.757	0.754	0.046	16.537***	0.000
Z8 <- Z	0.748	0.746	0.044	16.849***	0.000
Z9 <- Z	0.758	0.758	0.037	20.283***	0.000

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 2. Reliability Test Results

Cronbach's alpha

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
X	0,904	0,902	0,017	54,531***	0,000
Y	0,743	0,739	0,035	20,988***	0,000
Z	0,877	0,874	0,023	38,427***	0,000

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 2. shows that the results of the reliability test have a Cronbach value for each climate change variable (X) of 0.904, food resilience (Z) of 0.743, and green economy (Y) of 0.877 greater than 0.7, hence all the variables are reliable.

a. Research Model Testing

Model testing in this study are:

Figure 2. shows that the direct effect of climate change (X) on green economy (Y) was 6.966 with a significance value of 0.000 < α = 0.05. These results showed that climate change affected green economy. The effect of climate change (X) on food resilience (Z) was 196.393 with a significance value of 0.000 < α = 0.05. This showed that climate change affected food resilience. Also, the effect of food resilience (Z) on green economy (Y) was 4.580 with a significance value of 0.000 < α = 0.05. The results indicated that food resilience affected green economy, and the coefficient of determination (R2) in this study was 0.281. Green economy variable was influenced by climate change and food resilience by 28.1%, while the remaining 71.9% was influenced by other variables outside the study model such as government policy and law enforcement.

Table 3 path analysis results (X -> Z -> Y) showed that the food resilience variable mediated the effect of climate change on green economy. The negative impacts of climate change can be minimized by increasing food resilience. The total effect of climate change and food resilience on green economy can be seen in the figure below:

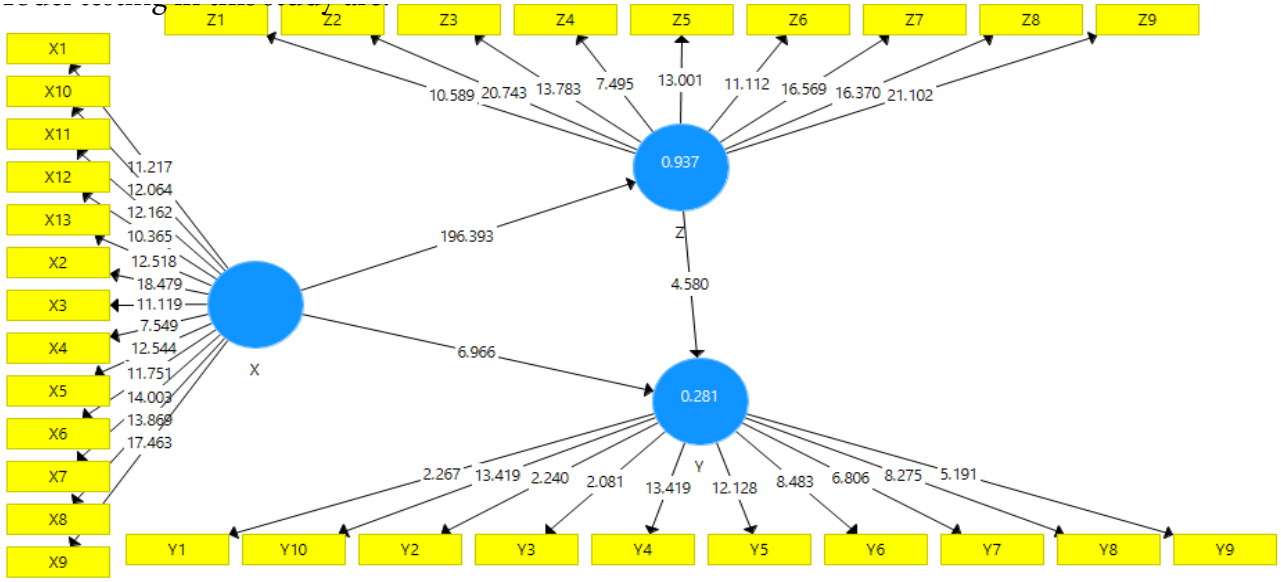

Figure 2. Green Economy Model Based on Food Resilience

Table 3. Path Analysis Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
X -> Y	1,693	1,747	0,247	6,842***	0,000
X -> Z	0,968	0,968	0,005	191,135***	0,000
Z -> Y	-1,322	-1,364	0,288	4,593***	0,000
X -> Z -> Y	-1,280	-1,321	0,280	4,573***	0,000

* p < 0.10, ** p < 0.05, *** p < 0.01

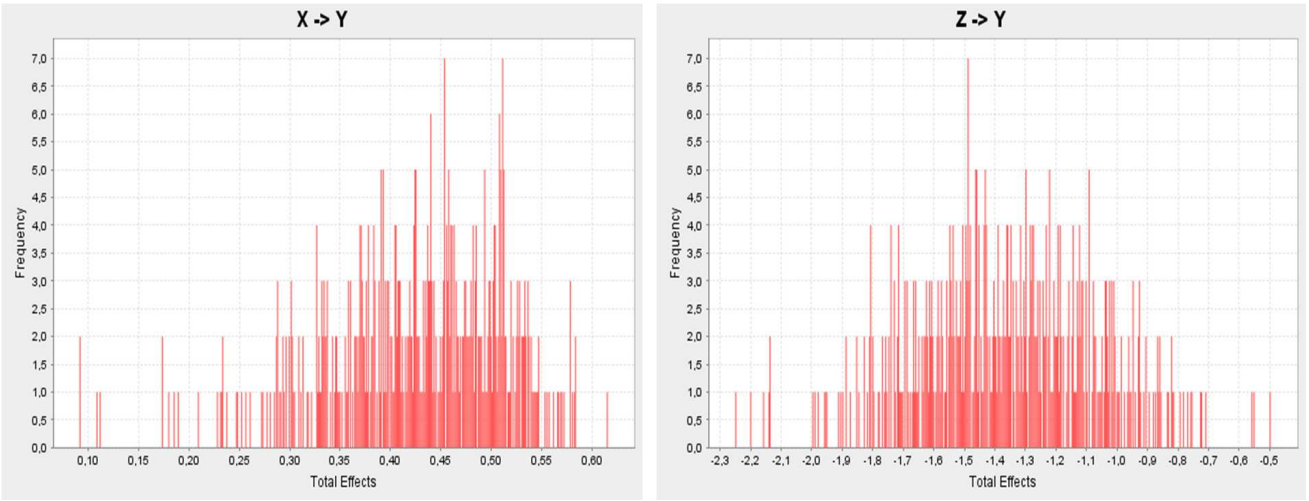

Figure 3. Total Effect of Climate Change and Food Resilience on Green Economy

Figure 3 shows the effect of climate change on green economy, with a sample mean of 0.426, a standard deviation of 0.086, a T statistic of 4.801, and a significance level of 0.000. These results showed that climate change had a significant impact on green economy. Similarly, the effect of food resilience on green economy was reflected by a sample mean of -1.364, a standard deviation of 0.288, a T statistic of 4.593, and a significance level of 0.000. This indicated a negative influence, implying that without strong commitment from all stakeholders and a holistic, sustainable approach, food resilience efforts may hinder rather than support the realization of green economy.

The results of *Proklim* digitalization in delivering a children-friendly digital education initiative are shown in the flowchart below. This initiative enhances knowledge through out-of-class learning, focusing on mitigation and adaptation strategies to address both current and future climate change impacts.

Figure 4. shows the results in the form of a *Proklim* digital platform named kampungiklim.com which is a digital

educational tool for every activity of adaptation, mitigation and sustainability activities. The flow of this *Proklim* digital platform includes users visiting the site then logging in/ registering into the system. For users who have not registered, they can register by filling in their name and email and then enter the system. Users who have entered the system can choose what menu to select first, either adaptation, mitigation or institutional. Users who have selected the menu above will enter the menu data category options, where each menu has various categories, in which users can select sub-categories. The users can also see *Proklim* data that have been registered in this *Proklim* system, which includes *Proklim* Logo, *Proklim* Main Photo, *Proklim* Brief Profile, *Proklim* Gallery (Photo & Youtube Video URL), Map Location (GPS). Also, integrated areas of *Proklim* activities to minimize the negative impacts of climate change are carried out to see the educational potential of *Proklim* activities. The results of this study are as follows:

The results in Table 4 showed that the travel cost variable was negative, which means there was an inverse relationship with the level of visits per 1,000 population per year. This was in accordance with demand theory, with the coefficient value of travel costs having a significant effect on the level of visits per 1,000 population per year as evidenced by the probability value of 0.056 < α = 0.10.

The education variable had an insignificant effect on the level of visits per 1,000 population per year. This can be seen from the probability value of 0.905> α = 0.05. The result indicated that the increase in education cannot increase the level of visits per 1,000 population per year.

The income variable had a positive and significant effect on the level of visits per 1,000 population per year, which can be seen from the probability value of 0.004 < α = 0.05. This result showed that the increase in income can increase the level of visits per 1,000 population per year.

The distance variable had a negative and significant effect on the level of visits per 1,000 population per year, which can be seen from the probability value of 0.011 < α = 0.05. This result showed that the greater the distance, the lower the visitation rate per 1,000 population per year.

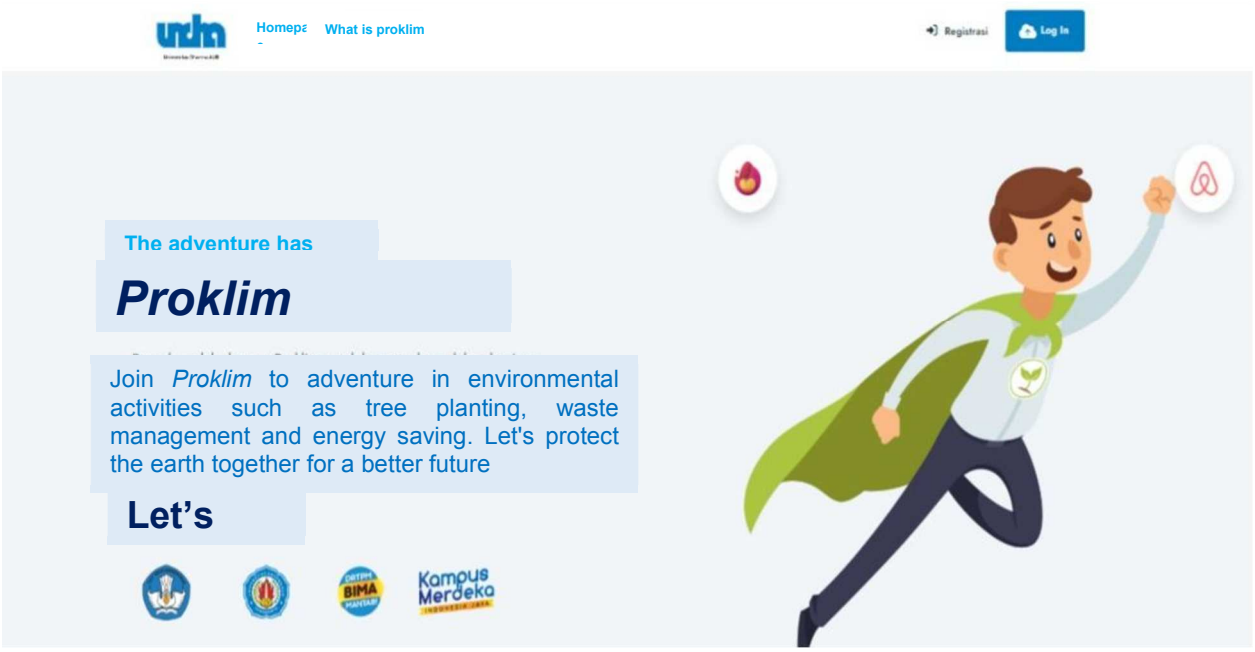

Figure 4. Proklim Digital Platform

Table 4. Regression Results for Determining Visit Rates Per 1,000 Population Per Year

Variable		Koefisien	t count	Sig	Description
Constant			27.841	.001	Significant
Cost of travel	Visit Level	-.428	-4.041	.056*	Significant
Education	Visit Level	.010	.135	.905	Not significant
Revenue	Visit Level	.571	16.770	.004***	Highly Significant
Distance	Visit Level	-.682	-9.503	.011**	Significant
Age	Visit Level	.720	13.782	.005***	Highly Significant

F_{hitung} = 279.707
Sig F = 0,004
R Square = 0,995

Source: processed survey data, 2024

Notes:

* = Significant at the error rate 10%

** = Significant at the error rate 5%

*** = Significant at the error rate 1%

The age variable had a positive and significant effect on the level of visits per 1,000 population per year, which can be seen from the probability value of $0.005 < \alpha = 0.01$. This result showed that an increase in age can increase the level of visits per 1,000 population per year.

Discussions

The Relationship of Climate Change to Green Economy

Climate change has led to increased actions to implement green economy, which is a major concern of the Indonesian government and the international community. Climate change causes the community's economy to decline. Therefore, programs related to improving welfare through the application of the economy should be continuously implemented. This will increase the active involvement of communities and other stakeholders to strengthen adaptation capacity, mitigate the impacts of climate change, reduce greenhouse gas emissions, as well as provide recognition for climate change adaptation and mitigation efforts that have been implemented to improve welfare at the local level according to regional conditions. Adaptation action efforts can be implemented in several ways. Controlling drought, floods, and landslides involves strategies such as rainwater harvesting, infiltration systems, spring protection, water conservation, flood control infrastructure, adaptive design, and terracing. Enhancing food security can be achieved through improved cropping patterns, irrigation systems, agricultural models to prevent crop failure, food availability strategies, food diversity initiatives, and urban farming. Also, climate-related disease control includes vector management, community-based total sanitation, promoting clean and healthy living behaviors, and addressing health impacts associated with climate change. Mitigation efforts can be implemented through various strategies. Waste management includes handling solid and liquid waste through proper disposal, recycling, and innovative waste utilization with economic benefits. The use of renewable energy, conservation, and energy efficiency can be promoted by integrating new renewable energy sources and optimizing energy-saving practices. Low-emission agricultural practices involve adopting low-GHG emission cultivation methods, promoting healthy farming techniques, and fostering agricultural innovation. Enhancing and maintaining vegetation cover can be achieved through afforestation, conservation efforts, and innovative planting programs. To support sustainability institutionally, several measures can be taken. These include fostering responsible community groups, promoting self-sufficiency through independent funding and gender-inclusive participation, strengthening community capacity, leveraging external support, and developing initiatives that generate social, economic, and environmental benefits. This activity involves all components of the community including the Women Farmers Group; *PKK*, *Karang Taruna* and other stakeholders.

This study is in line with previous findings that climate change adaptation and mitigation activities positively contributed to improving the welfare of green economy through social entrepreneurship programs (Ahmed et al., 2023; Luyten et al., 2023; Naydenov, 2018). Social entrepreneurship for women can increase economic growth, which will have an impact on welfare. In this context, welfare includes an increase in income, quality, quantity, and equality (Bombiak, 2019).

1) Relationship of Climate Change to Green Economy through Food Resilience

Food systems successfully cope with shocks through resilience or resistance. The results showed resistance as an element of resilience, with resilient communities coping with the negative impacts of climate change, which improved recovery time (Sarkodie et al., 2020). Meanwhile, successful responses to negative systemic shocks require recovery, mitigation, and adaptation. Many of the negative effects of climate change on food systems are long-term factors that require adaptation to new conditions. In this case, adaptation involves the adoption of new procedures and technologies as embodied in climate-smart agriculture approaches that contribute to the implementation of green economy (Kristoffersen et al., 2021). This perspective relates closely with the concepts of mitigation and adaptation capacity in advancing green economy through food resilience. Mitigation, adaptation, and sustainability play crucial roles in responding to shocks, directly influencing food resilience in the pursuit of a sustainable green economy. Achieving this requires active participation from all stakeholders, ensuring that mitigation, adaptation, and sustainability efforts are integrated with environmental considerations. Therefore, the actions should meet present needs without compromising the ability of future generations (Foschi et al., 2020).

4. Conclusion

In conclusion, accelerating the realization of green economy by implementing a climate village program based on food resilience can be achieved with adaptation action efforts in the form of controlling drought, floods and landslides, increasing food security and controlling climate-related diseases. Mitigation efforts can be implemented by managing solid and liquid waste, using new renewable energy, conserving and saving energy, cultivating low greenhouse gas emissions, healthy agriculture and agricultural innovation, as well as increasing and maintaining vegetation cover. Also, sustainability efforts can be driven by community groups taking responsibility for implementation. Key aspects include fostering community self-reliance, securing independent funding, ensuring gender-inclusive participation, enhancing community capacity, leveraging external support, and developing initiatives that generate social, economic, and environmental benefits.

Digitalization education in the form of *Proklim* digital platform with the name kampungiklim.com can provide more information through out-of-class learning about mitigation activities and adaptation to climate change impacts. The *Proklim* digital platform can also help *Proklim* display all existing activities in accordance with adaptation, mitigation and sustainability efforts. In addition, *Proklim* activities can be used as an edu tourism pilot site that provides added value in a sustainable manner because every existing activity can provide economic value including the *Proklim*-based tourism village.

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