

ADAPTATION STRATEGIES OF SMALLHOLDER TOBACCO FARMERS IN BOJONEGORO IN RESPONSE TO CLIMATE VARIABILITY AND THE ECONOMIC CRISIS, 1996–2000

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Abstract

This study examines the adaptation strategies adopted by smallholder tobacco farmers in Bojonegoro in response to climate variability and the economic pressures of the 1997–1998 economic crisis during 1996–2000. It addresses the limited historical research on the interaction between climate variability and economic crises in shaping tobacco farming. Using a historical method with a socio-economic approach, the study applied heuristics, source criticism, interpretation, and historiography. Data were obtained from statistical archives of Statistics Indonesia (BPS), archives of the Indonesian Sweetener and Fiber Crops Research Institute (Balittas), and interviews with tobacco farmers in Bojonegoro. The findings show that the 1997 El Nino, the 1998–2000 La Nina phenomena, and rising production costs during the economic crisis created significant challenges for tobacco farming. Farmers responded by selecting productive land, adjusting cultivated areas, and diversifying crops according to seasonal conditions and economic constraints. These strategies reduced production risks and supported household livelihoods. The study concludes that the sustainability of tobacco farming in Bojonegoro was largely determined by farmers' adaptive capacity in responding to environmental and economic change.

Keywords: Tobacco farmers; Climate variability; Economic crisis; Adaptation strategies; Bojonegoro.

INTRODUCTION

Climate variability and economic instability pose significant challenges to smallholder agricultural systems in developing countries (Febriandika & Rahayu, 2021). Within the context of Indonesian agrarian history, climate variability and economic crises have repeatedly influenced agricultural production and the economic sustainability of smallholder households. Agricultural commodities that rely heavily on seasonal climatic conditions are particularly vulnerable to environmental uncertainty. In rural agricultural areas, changes in rainfall intensity and seasonal stability often affect farmland, agricultural productivity, and farmers' and farmers' economic resilience (Sudarma & As-syakur, 2018).

In Indonesia, tobacco farming is one of the most important commercial agricultural commodities for the national economy. During the New Order era, the government promoted tobacco farming as a potential source of foreign exchange through various intensification policies and agrarian partnership programs (Saputri, Harisudin, & Riptanti, 2023). One of the most influential policies was the implementation of the Core-Smallholder Plantation (PIR) scheme, which established cooperation between large companies and smallholder farmers in the production and marketing of plantation commodities (Nugrohandhini, 2018). This policy aimed to reduce structural disparities, increase productivity, and improve the incomes of smallholder farmers. In practice, large plantation companies act as the "core" by providing production facilities, technical guidance, supervision, and ensuring business sustainability. Meanwhile, smallholder farmers serve as "plasma" farmers who manage the land under the guidance of the core company (Fahamsyah,

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Hukum, Pola, & Inti, 2017). Over time, this model has also been applied to tobacco production in several major production regions in Indonesia, including Bojonegoro Regency.

Bojonegoro Regency is one of the major centers of Virginia tobacco production in East Java (Durroh, Masahid, & Fitriyani, 2024). The region's alluvial and grumosol soils, combined with its seasonal climate, make it well-suited for tobacco cultivation. Beyond its role as an agricultural commodity, tobacco constitutes an important source of rural livelihoods. The high economic value of tobacco compared to other crops encourages farmers to continue cultivating it despite the significantly higher production risks they face (Hayati & Maisaroh, 2019). Nevertheless, the development of smallholder tobacco farmers in Bojonegoro is highly dependent on environmental and economic dynamics. During the 1996-2000 period, the plantation sector faced two major pressures simultaneously: the 1997-1998 monetary crisis and the phenomenon of global climate anomalies. The economic crisis led to a depreciation of the rupiah exchange rate, causing production costs—such as those for fertilizers and pesticides—to rise (Calanda, Hidayah, & Aulia, 2025). Meanwhile, the El Niño and La Niña climate anomalies affected rainfall patterns, which in turn impacted the quality and quantity of tobacco (Wahyudi et al., 2024).

Research on tobacco in Bojonegoro generally focuses on marketing aspects, farmer partnerships, and the development of the cigarette industry. For example, Nadiyah (2019) highlights the marketing system and marketing barriers for Virginia tobacco in Bojonegoro. Meanwhile, Prasetyo (2018), discusses the historical development of tobacco in Bojonegoro, specifically during the period from 1997-1995, which was marked by fluctuations in tobacco production influenced by climate and pests. Hapsari (2021) on the other hand, focused on the early history of tobacco plantations in Bojonegoro, which existed from the era of forced cultivation through the establishment of kretek cigarette factories in Bojonegoro. The research demonstrates the tobacco holds a significant position within the economic structure of Bojonegoro society.

Based on previous research, studies on tobacco in Bojonegoro are still dominated by the history of tobacco plantation development, marketing systems, and partnership relationships between farmers and cigarette companies. Furthermore, research examining the development of tobacco has generally been limited to the period prior to 1996. Consequently, there remains a gap in the literature regarding the impact of climate variability and the economic crisis on the development of tobacco plantations in Bojonegoro during the 1996-2000 period. The aspect of adaptation strategies employed by smallholder tobacco farmers in coping with climate variability and economic crises has also received little attention. Accordingly, this study seeks to address this research gap by analyzing the impact of climate variability and economic crises on tobacco development, as well as the forms of adaptation adopted by farmers to sustain their tobacco farming operations in Bojonegoro during 1996-2000.

Based on this research gap, an approach is needed that can explain how farmers respond to environmental and economic pressures; smallholder farmers generally focus not only on increasing profits but also on sustaining their household livelihoods. James C. Scott explains that farmers tend to apply the "safety first" principle to minimize the risk of economic failure when facing economic crises or environmental instability. These strategies are implemented through reducing production risks, crop diversification, and adjusting cropping patterns. This perspective is used to analyze the adaptation strategies of smallholder tobacco farmers in Bojonegoro in response to climate variability and the economic crisis during the period 1996-2000 (Scott, 1981).

RESEARCH METHOD

The present study employs a historical research method with a socio-economic approach. According to Haryanto, a socio-economic approach is appropriate because this study examines not only production trends but also farmers' social and economic responses to environmental transformation and economic crises (Haryanto, 2011).

Historical research involves the systematic examination and analysis of evidence from the past. According to Kuntowijoyo (Kuntowijoyo, 2003), the stages of historical research begin with

heuristics the process of collecting historical sources relevant to the research topic, whether primary or secondary sources. Primary sources were obtained from official statistical data from the Central Statistics Agency (BPS), such as "Bojonegoro Regency in Figures for 1996–2000," "Statistics on Producer Prices in the Indonesian Agricultural Sector for 1996–2000," archives from the Research Institute for Sugar and Fiber Crops (Balittas), and government policy documents related to tobacco. In addition, This article also utilized oral sources through interviews with smallholder tobacco farmers and the chairperson of a smallholder tobacco farmers group in Bojonegoro to obtain information regarding their experiences, adaptation strategies, and tobacco production conditions during the period of climate anomalies.

Source criticism was conducted to assess both the authenticity and credibility of historical evidence. External criticism was used to assess the authenticity and validity of the sources. Additionally, internal criticism was employed to evaluate the credibility of the source content and the consistency of information derived from archives, statistical data, and interview results. Data credibility was enhanced through a source triangulation technique by comparing statistical data, archival records, and informant statements to ensure an objective interpretation (Kuntowijoyo, 2003).

The interpretation phase involved analyzing the relationship between climate variability, the economic crisis, and the development of smallholder tobacco farmers in Bojonegoro. The analysis focuses on changes in land area, production volume, productivity, production prices, and farmers' adaptation strategies, based on data from the Bojonegoro Regency Central Statistics Agency (BPS) for the years 1996–2000, the Indonesian Agricultural Sector Producer Price Statistics, Balittas archives, and field interview results. The final stage was historiography, in which the findings were organized and presented chronologically in a scholarly narrative (Kuntowijoyo, 2003).

RESULT AND DISCUSSION

General Condition of Tobacco Plantations in Bojonegoro

Bojonegoro has ideal natural conditions for growing Virginia tobacco. Agricultural practices in Bojonegoro Regency follow a seasonal planting pattern, with rice planted during the rainy season and tobacco during the dry season (BPS, 1996).

No.	Crop Type	Quantity
1	Coconut	8.248
2	Jatropha	2.757
3	Cashew	272
5	Tobacco	
	Virginia	16.030
	Jawa	690
6	Sackcloth	96
8	Sugarcane	1.190
9	Turmeric	89
10	Kencur	14
11	Galangal	37

Table 1.1 Plantation Crops in Bojonegoro
Source: BPS, Bojonegoro in Figures 1996

The data indicate that tobacco is the most widely cultivated cash crop among the people of Bojonegoro Regency, with the largest cultivated area compared to other types of cash crops. Tobacco cultivation in Bojonegoro has been practiced since the Dutch colonial era. A Dutch newspaper from the colonial period mentioned;

"Bodjonegoro, 25 November (Aneta) De British American Tobacco Company heeft besloten haar bedrijf op Madoera stop te zetten en haar werkzaamheden te concentreren op

Kadong Anom, afdeeling Bodjonegoro, waar een etablissement zal worden opgericht, en de aanplant van Virginiatabak strerk zal wonder uitgebreid" ("Stopzetting," 1929).

The foreign company British American Tobacco Company (BAT) decided to centralize its tobacco production activities in Bojonegoro and cease its operations in Madura. The company established a new business facility and began significantly expanding tobacco cultivation in Bojonegoro. To support the development of tobacco plantations in Bojonegoro, the Dutch colonial government established a tobacco research center located in Sumberrejo, Bojonegoro. This center served as a service hub for farmers by providing extension services (Prasetio, 2018).



Figure 1.1 Extension on the cultivation and marketing of Virginia Tobacco in Tambakrejo Subdistrict, Bojonegoro Regency, 18 May 1989 Source: Balittas Archives

As shown in Figure 1.1, an extension session was held in Tambakrejo Subdistrict to provide information on the cultivation and marketing of Virginia tobacco (Balittas, 1989). Initially, these plantations supplied raw materials to PT British American Tobacco Company (BAT), but as tobacco cultivation in Bojonegoro expanded, farmers also established partnerships with other cigarette manufacturers such as PT Gudang Garam Tbk., PT Djarum Super, and PT HM Sampoerna (Nadiyah, 2019).

In carrying out their partnerships, tobacco companies or factories use a "core-plasma" model. Under this model, the company provides production facilities, technical assistance, and storage for the harvest, while partner farmers are responsible for meeting the company's needs (Nugrohandhini, 2018). According to an interview with Mr. Kasir (60 years old), a tobacco farmer in Bakalan Village Tambakrejo Subdistrict, Bojonegoro Regency, conducted on May 4, 2026, in the cultivation of tobacco, farmers receive initial capital from the company in the form of seeds, pesticides, and plastic for seedling beds. This reflects a mutually beneficial relationship that creates economic interdependence between both parties. For farmers, the provision of initial capital (seeds, fertilizer, pesticides) can serve as a solution for those facing capital constraints. Meanwhile, companies are able to secure a supply of raw materials that meet their industry standards (Nugrohandhini, 2018).

This partnership model provides farmers with price certainty and access to production inputs, thereby reducing the uncertainty associated with marketing their harvest. The marketing process for Virginia tobacco is also less complicated than marketing through middlemen (Nadiyah, 2019).

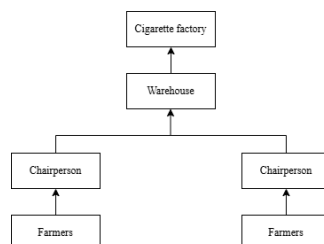


Figure 1.2 Flowchart of the Virginia tobacco marketing process
Source: Nadiyah (2019, p. 4)

Based on this diagram, the marketing flow for Virginia tobacco carried out by partner farmers is as follows: shredded tobacco that is ready for market is collected by the head of each

farmer group. Then, once collected, the farmer group leader delivers the shredded tobacco to the warehouse for quality assessment and price determination. The price depends on the quality of the tobacco leaves themselves; the higher the quality, the higher the price offered. Afterward, the tobacco is immediately shipped to the cigarette factory (Nadiyah, 2019).

Climate Variability as a Challenge in Tobacco Farming, 1996–2000

The development of smallholder tobacco farmers in Bojonegoro during the 1996–2000 period experienced fluctuations characterized by increases or decreases in cultivated area, production volume, and productivity levels. These changes were influenced by the 1997 El Niño and 1998–2000 La Niña climate anomalies, which were reflected in changes in the number of rainy days and annual rainfall in Bojonegoro (BPS, 1996, 1997, 1998, 1999, 2000a).

Table 1.2 Tobacco area, production, and productivity, 1996–2000

Year	Area (ha)	Production (metric tons)	Productivity (kg/ha)
1996	16.030	11.430	713
1997	14.888	11.441	768
1998	4.692	4.694	598
1999	11.666	10.081	598
2000	12.854	9.531	799

Source: BPS, Bojonegoro Regency in Figures 1996–2000

Fluctuations in tobacco cultivation area, production, and productivity during the 1996–2000 period indicate that tobacco farming is highly sensitive to changes in climatic conditions. The most drastic decline occurred in 1998 when the cultivated area dropped to 4,694 ha due to increased rainfall during the La Niña phenomenon. This reduction in cultivated area not only lowered productivity but also affected Farmers' confidence in the success of tobacco farming. High rainfall during the dry season increased the risk of leaf damage and failure of the drying process, leading some farmers to reduce or even temporarily halt tobacco cultivation. These conditions demonstrate that risk perception is a key factor in determining farmers' production decisions (BPS, 1998).

Table 1.3 demonstrates that average rainfall increased from 97 mm in 1997 to 203 mm in 1998 (BPS, 1996, 1997, 1998, 1999, 2000a)

Year	Rainy days	Average rainfall
1996	84	90
1997	63	97
1998	110	203
1999	98	182
2000	106	179

Table 1.3 Number of rainy days and average rainfall

Source: BPS: Bojonegoro Regency in Figures 1996–2000

The decrease in the number of rainy days in 1997 indicates the impact of the El Niño phenomenon on the agricultural system in Bojonegoro. Reduced rainfall intensity exposed farmers to a higher risk of drought, prompting some farmers to reduce their cultivated land area as a means of adapting to production risks. Farmers tended to cultivate on land considered more productive or closer to water sources. However, prolonged dry conditions improved tobacco leaf quality because lower moisture levels accelerated leaf ripening and drying, thereby enhancing overall leaf quality and productivity. The improvement in leaf quality led to an increase in leaf weight and harvest productivity, so that the reduction in cultivated area could be offset by improvements in quality and production efficiency (Wahyudi et al., 2024).

These findings align with the results of an interview with Mr. Siyar (50 years old), a tobacco farmer from Bakalan Village, Tambakrejo Subdistrict, Bojonegoro Regency conducted on May 7, 2026, who explained that the dry season produces higher-quality tobacco leaves compared to the

rainy season. These findings suggest that a reduction in cultivated area due to the El Niño phenomenon is not always accompanied by a decrease in production volume. Factors such as leaf quality play a significant role in determining the productivity of tobacco farming in Bojonegoro.

In contrast, from 1998 to 2000, the La Niña phenomenon caused a "wet drought" that is, high rainfall during a period that should have been dry (BPS, 1998, 1999, 2000a). These conditions adversely affected tobacco plants, as high rainfall can affect leaf quality, trigger plant diseases, and even potentially cause the death of tobacco plants, leading to a reduction in cultivated area and tobacco production as an adaptive measure to minimize the risk of losses and crop failure. This is given that tobacco is a crop that is sensitive to climate variability, particularly during the growth and leaf-drying phases (Herlina, Azizah, & Putra Pradiga, 2020).

The reduction in cultivated land during 1997–1998 indicates that farmers adopted subsistence strategies to mitigate the risk of losses resulting from climate uncertainty. From James C. Scott's perspective, these actions reflect smallholder farmers' efforts to maintain household economic stability. Farmers prioritize long-term economic security and are not interested in the possibility of short-term profits, even if such profits carry the risk of economic ruin. For smallholder tobacco farmers, crop failure can threaten the economic sustainability of their households; thus, reducing the area of cultivated land serves as a strategy to maintain family income stability (Scott, 1981).

Climate variability also has broader economic implications because tobacco is a commercial commodity that is highly dependent on the quality of the harvest. Unlike food crops, where part of the yield can be used for household consumption, the economic value of tobacco is largely determined by the quality of the leaves produced. Even slight changes in weather conditions can affect leaf quality, which ultimately determines the selling price received by farmers. Thus, climate risk in tobacco farming is not only related to the possibility of reduced production but is also directly linked to the potential for a decline in farmers' household income. Consequently, climate variability became a factor shaping farmers' economic decisions while also determining the sustainability of smallholder tobacco farming during the 1996–2000 period.

From a socio-economic historical perspective, farmers' decisions to reduce or expand their cultivated land reflect an economic rationality in coping with environmental instability. Furthermore, climate variability also influences land management patterns and agricultural production relationships in rural areas. Seasonal instability causes farms to be more selective in making production decisions, as crop failures can have a direct impact on the economic sustainability of their households.

The 1997–1998 Economic Crisis as a Challenge for Tobacco Farming

The impact of climate variability on smallholder tobacco farmers during the 1996–2000 period cannot be understood in isolation from the prevailing economic conditions. While the El Niño and La Niña phenomena did affect the area under cultivation, production, and the quality of tobacco, the pressures faced by farmers intensified when these events coincided with the 1997–1998 economic crisis. At a time when farmers were facing the risk of crop failure due to unpredictable rainfall, they also had to contend with rising prices for fertilizers, pesticides, and various other production inputs (Irawan, 2006).

The economic crisis of 1997–1998 affected the economic conditions of smallholder tobacco farmers in Bojonegoro, particularly through rising agricultural production costs. This crisis was marked by a sharp depreciation of the rupiah against the U.S. dollar. The exchange rate, which in 1996 was still around Rp 2,300 per U.S. dollar, rose sharply to over Rp 10,000 per U.S. dollar in 1998. This situation resulted in a significant increase in the prices of agricultural inputs such as fertilizers and pesticides (BPS, 1999; Calanda et al., 2025).

Year	Commodity		
	TPS Fertilizer (1kg)	Urea Fertilizer (1 kg)	Pesticide (1 L)
1996	767	542	13.315
1997	857	610	15.106
1998	1.000	700	24.315
1999	1.638	1.129	32.300
2000	1.590	1.069	-

Table 1.4 Prices of Production Inputs
Source: BPS, Bojonegoro Regency in Figures 1999–2000

Based on Table 1.3, the prices of fertilizers and pesticides paid by farmers have increased. The rise in production input costs highlights the agricultural sector's high dependence on national economic stability. The economic crisis has increasingly limited farmers' ability to meet production needs, particularly for tobacco, a commodity that requires high maintenance costs (Calanda et al., 2025; Maa'rif, Sueadi, Glorino, & Pandin, 2025)

Government budget austerity measures have resulted in the partial withdrawal of subsidies for fertilizers and pesticides in the local market of Bojonegoro. Overall fertilizer procurement has also declined by 7.85% since 1997 (BPS, 1997).

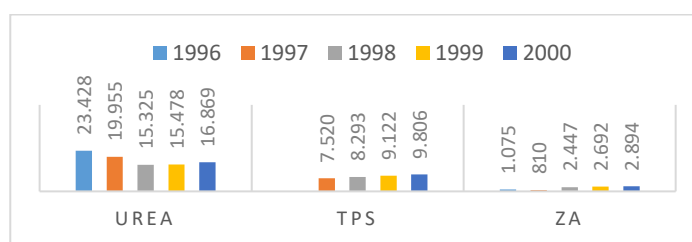


Figure 1.3 Data on fertilizer procurement, 1996–2000
Source: BPS, Bojonegoro Regency in Figures, 1996–2000

Rising production input costs and reduced fertilizer availability have had a negative impact on farmers. Fertilization aims to improve soil fertility by supplying essential nutrients for plant growth, thereby enhancing crop productivity (Soemarah, Supriyadi, & Suprapti, 2020). These conditions place significant economic pressure on smallholder tobacco farmers because tobacco cultivation requires relatively high production costs compared to other crops (Maa'rif et al., 2025). As a result, farmers' ability to meet the nutritional needs of their tobacco plants has diminished, which affected both the quality and quantity of tobacco, leading to a decline in production volume and productivity (Ngawit, Supeno, Jihadi, & Azhari, 2024).

Nevertheless, the rise in production input costs does not entirely influence farmers' decisions regarding tobacco cultivation. For smallholder tobacco farmers, the economic crisis also has a positive impact since tobacco selling prices continue to rise.

Year	Average price (Rp/100 Kg)
1996	405.280,32
1997	409.632,23
1998	429.457,80
1999	715.174,77
2000	1.298.998,24

Figure 1.4 Average tobacco prices in East Java
Source: BPS, Statistics on Producer Prices in the Agricultural Sector in Indonesia 1996–2000

Table 1.4 shows that the average producer price of tobacco in East Java experienced a significant increase (BPS, 2000b). This encouraged farmers to maintain and even increase their

tobacco production. Market information and the economic value of tobacco were factors influencing smallholder tobacco farmers' decisions to continue cultivating tobacco despite price fluctuations.

This finding aligns with the results of an interview with Mr. Mustakim (64 years old), a farmer and chairman of the smallholder tobacco farmers group in Tambakrejo Village, Tambakrejo Subdistrict, Bojonegoro Regency, conducted on May 4, 2026, who explained that farmers will continue to choose tobacco given that it has a much higher economic value compared to other crops. The high potential for profit from tobacco sales leads farmers to continue cultivating this crop despite facing production risks due to climate change and high production input costs. This finding demonstrates that farmers' decisions to continue cultivating tobacco were primarily driven by household economic considerations. These findings suggest that farmers were not only striving to survive but also choosing the crop they considered most capable of ensuring their households' economic sustainability. These findings contribute to the literature on agrarian history by demonstrating that farmers' production decisions were shaped not only by market incentives but also by strategies aimed at sustaining household livelihoods. Furthermore, the rise in tobacco prices also influenced farmers' willingness to expand their cultivated land again in 1999–2000 after a drastic decline in 1998. This demonstrates that farmers' production decisions are influenced by a combination of climatic conditions and market economic opportunities.

The interaction between climate variability and the economic crisis illustrates that smallholder tobacco farmers faced dual pressures arising from both environmental uncertainty and rising production costs. When heavy rainfall during La Niña periods led to a decline in tobacco quality, farmers lacked the flexibility to increase their use of fertilizers or pesticides because agricultural input prices were rising significantly due to the economic crisis. Conversely, when a dry season caused by El Niño resulted in better tobacco quality, the profits farmers earned had to be used to cover rising production costs. These conditions demonstrate that the success or failure of farming is not determined solely by natural conditions but also by farmers' economic ability to access production inputs.

From the perspective of agricultural political economy, the position of smallholder tobacco farmers in Bojonegoro reveals a dependence on market structures and partner companies. Although the partnership model provides access to seeds, fertilizers, and marketing guarantees, farmers remain in a vulnerable position because their ability to control both input prices and selling prices is relatively limited. During economic crises, farmers have no influence over increases in fertilizer and pesticide prices, which follow national market mechanisms. Therefore, farmers' ability to survive is determined not only by their cultivation skills but also by their position within the broader plantation economic structure. This situation demonstrates that the impact of climate change on farmers is often exacerbated by unequal access to agricultural economic resources (Bernstein, 2010).

Smallholder Tobacco Farmers Adaptation Strategies, 1996–2000

Climate variability caused by the El Niño and La Niña phenomena led to instability in tobacco production, while the 1997–1998 economic crisis resulted in rising agricultural production costs. These conditions prompted smallholder tobacco farmers to adopt various adaptation strategies to ensure the economic sustainability of their farming operations.

Land Selection

One strategy employed is land selection, or the reduction of cultivated land due to unstable seasonal conditions. This step is taken as a strategy by farmers to minimize losses. Regions adapt to changing climate conditions by adjusting the amount of land allocated to each crop (Juliá & Duchin, 2013). Land selection involves choosing suitable land to improve both the quality and quantity of the crop's yield. Land management that is not adapted to the land's characteristics and conditions can hinder the crop cultivation process and increase the risk of crop failure.

Based on an interview with Mr. Mustakim (64 years old), a tobacco farmer and chairman of the smallholder tobacco farmers group in Tambakrejo Village, Tambakrejo Subdistrict, Bojonegoro Regency-conducted on May 7, 2026, he explained that farmers tend to reduce the area planted with tobacco when seasonal conditions are unstable. This indicates that farmers are able to adapt to climate uncertainty to minimize the risk of losses.

According to James C. Scott, this action reflects the "safety first" principle, that is, small farmers' efforts to minimize the risk of loss rather than pursue maximum profit. The strategy of adjusting the area under cultivation is employed to maintain economic stability amid unstable environmental conditions (Scott, 1981).

Crop Diversification

In addition to land selection, farmers also implement crop diversification strategies. When climatic conditions are unfavorable for tobacco cultivation, some farmers will switch their land to other crops (Mahato, 2021). This observation is consistent with the interview findings with Mr. Kasir (60 years old), a tobacco farmer from Bakalan Village, Tambakrejo Subdistrict, conducted on May 4, 2026, who stated that when climatic conditions do not permit tobacco cultivation, farmers will switch their land to corn and rice. Crop selection is adjusted according to prevailing seasonal conditions.

Although farmers demonstrate the ability to adapt, this flexibility does not fully reflect freedom in determining their actions. The adaptation strategies they employ are still heavily influenced by household economic demands and limited capital. The need to cover daily living expenses, children's education, and various social obligations leaves farmers with limited room to take risks or implement new strategies that require greater financial investment (Zuraida, 2023). Consequently, the forms of adaptation they adopt tend to be oriented toward sustaining their livelihoods rather than driving transformative change.

CONCLUSION

The research demonstrates that climate variability and the economic crisis had a significant impact on the development of smallholder tobacco farmers in Bojonegoro from 1996 to 2000. In 1997, the El Niño phenomenon caused an extreme dry season, leading to a reduction in cultivated land area. However, these dry conditions actually supported improved tobacco quality and productivity, as tobacco plants require low rainfall intensity during their growth phase and leaf drying period. Conversely, the La Niña phenomenon occurred from 1998 to 2000, bringing increased rainfall that led to a reduction in cultivated land area and production volume. The 1997–1998 economic crisis also affected farmers' economic conditions through rising prices of production inputs. Nevertheless, higher tobacco selling prices enabled farmers to continue tobacco cultivation, as it was considered more profitable than other commodities. In the face of pressures from climate change and economic conditions, farmers implemented adaptation strategies such as land selection and crop diversification. These strategies demonstrate that smallholder tobacco farmers were able to adapt to maintain the economic sustainability of their households amid climate instability and economic crises.

This study contributes to the literature on socio-economic agrarian history by demonstrating that the sustainability of tobacco farming depended not only on production factors but also on farmers' adaptive capacity in responding to climate variability and economic pressures. This study also highlights the relevance of James C. Scott's "moral economy" perspective in explaining farmers' adaptation strategies to ensure the survival of smallholder tobacco farmers during times of crisis. Despite these contributions, this study has several limitations, particularly regarding the oral sources, which were largely obtained from informants recalling events from more than two decades ago, raising the possibility of memory bias. Additionally, the limited availability of statistical data at the district level prevents a detailed depiction of regional variations in conditions. Future studies should expand the study's time frame to include the post-reform era and to integrate an agrarian political economy approach to analyze the impact of agricultural policies,

partnership relationships with the tobacco industry, and changes in market structure on the economic sustainability of smallholder tobacco farmers.

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