

Community Solidarity, Environmental Cleanliness, and Community Resilience in Climate Change Adaptation

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ABSTRACT

Climate change has become one of the most significant global challenges affecting environmental sustainability, public health, and community well-being, particularly in rural areas that depend heavily on collective action and local social institutions. Community-based adaptation strategies rooted in social solidarity and local wisdom have increasingly been recognized as important mechanisms for strengthening environmental resilience and sustainability. This study aims to analyze the role of community solidarity in maintaining environmental cleanliness as an effort to support climate change adaptation in Dusun Ngentak, Kemiri Village, Kebakkramat District, Karanganyar Regency, Central Java, Indonesia. This research employed a qualitative descriptive approach involving eleven informants, consisting of one neighborhood head, four members of the youth organization (*Karang Taruna*), and six community residents selected through purposive sampling. Data were collected through semi-structured interviews, participant observation, and documentation studies and analyzed using thematic analysis. The findings reveal that community solidarity is manifested through *gotong royong*, environmental maintenance activities, social assistance, collective celebrations, and communal gatherings. Social capital, including trust, reciprocity, cooperation, and social networks, plays an important role in strengthening environmental governance and community resilience. The study demonstrates that local wisdom and collective action remain effective mechanisms for supporting climate change adaptation and environmental sustainability in rural communities.

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1. Introduction

Climate change has been widely recognized as one of the most critical global challenges of the twenty-first century, influencing environmental systems as well as social and economic structures (Tamasiga et al., 2024; Wambura, 2024). Increasing global temperatures, shifting precipitation patterns, environmental degradation, biodiversity loss, and the growing frequency of extreme weather events have intensified the vulnerability of communities worldwide, particularly those in rural areas that depend heavily on natural resources (Mulligan et al., 2024). These conditions highlight the urgency of developing adaptive strategies that go beyond technological solutions and policy frameworks. Recent studies emphasize that effective climate change adaptation requires

community-based approaches that strengthen social cohesion and collective action (Tamasiga et al., 2024; Wambura, 2024). Consequently, understanding how communities mobilize social mechanisms to respond to environmental challenges has become an important focus in contemporary research.

One key concept in examining local adaptive capacity is community resilience. Community resilience refers to the ability of communities to anticipate, prepare for, respond to, adapt to, and recover from environmental, social, and economic disturbances while maintaining their essential structures and functions (Patel et al., 2017). Empirical studies indicate that communities with strong social networks, mutual trust, and active participation tend to demonstrate higher resilience in facing environmental risks and disaster. Furthermore, adaptation strategies rooted in collective action and social interaction have been shown to enhance environmental management and long-term sustainability (Gunawan, 2026). These findings suggest that resilience is not solely determined by physical infrastructure but is deeply embedded in social relationships and shared community values.

In Indonesia, one of the most prominent expressions of collective social capacity is the cultural practice of *gotong royong*. Historically, *gotong royong* has functioned as a social institution that promotes cooperation, mutual assistance, and collective responsibility among community members (Suwignyo, 2019). Beyond its functional role, it also strengthens social identity and cohesion within communities. Previous research demonstrates that *gotong royong* remains relevant in contemporary society as it contributes to social integration, conflict resolution, and community empowerment (Ramadhani & Melysia Yunita Heffy Saputri, 2023). In rural contexts, where traditional values are still strongly preserved, *gotong royong* continues to serve as a foundation for maintaining social solidarity and strengthening interpersonal relationships (Aulia & Gustiana, 2025).

Scholars have further conceptualized *gotong royong* as a form of social capital that supports community development and resilience. Social capital includes elements such as trust, networks, reciprocity, and shared norms that enable collective action (Lukiyanto & Wijayaningtyas, 2020). Empirical evidence shows that *gotong royong* functions as a strategic resource that enhances participation, strengthens cooperation, and reinforces social cohesion (Sumarmi et al., 2022). Additionally, both traditional and evolving forms of *gotong royong* continue to play a significant role in sustaining community solidarity and resilience (Faedlulloh et al., 2021). This indicates that social capital derived from cultural practices remains highly relevant in addressing contemporary environmental challenges (Azarinea & Wijayanti, 2026).

The relationship between social solidarity, environmental cleanliness, and climate adaptation has gained increasing attention in recent studies. Environmental cleanliness is not only a matter of public health but also reflects collective responsibility and community engagement. Research shows that social solidarity and collective action significantly contribute to environmental awareness and ecological sustainability (Sarfanudin et al., 2025). Similarly, *gotong royong* practices have been identified as effective mechanisms for encouraging community participation in environmental management (Rusmalinda & Kawijaya, 2025). Maintaining environmental cleanliness through collective efforts can therefore be understood as a practical form of community-based climate adaptation that supports sustainability and reduces environmental risks (Gunawan, 2026).

Despite the growing body of literature, several gaps remain. Existing studies tend to focus on disaster resilience, urban contexts, or conceptual discussions of social capital (Patel et al., 2017; Wambura, 2024). There is still limited empirical research that specifically examines how traditional social solidarity and *gotong royong* contribute to environmental cleanliness and climate adaptation in rural communities. Moreover, the role of local cultural values as adaptive mechanisms in the face of increasing environmental pressures has not been sufficiently explored. This gap highlights the need for context-specific studies that integrate social, cultural, and environmental perspectives (Nugraha et al., 2024).

Based on these considerations, this study aims to analyze the role of community solidarity in maintaining environmental cleanliness as an effort to adapt to climate change in Dusun Ngentak,

Kemiri Village, Kebakkramat District, Karanganyar Regency, Indonesia. The study focuses on identifying forms of social solidarity, examining the implementation of *gotong royong*, and analyzing how collective action contributes to strengthening community resilience. By addressing these issues, this research seeks to provide a clearer understanding of the importance of local wisdom and collective values in responding to urgent environmental challenges and advancing community-based climate adaptation.

2. Research Method

2.1 Research Design

This study employed a qualitative descriptive approach to examine community solidarity in maintaining environmental cleanliness as an effort to adapt to climate change in Dusun Ngentak, Kemiri Village, Kebakkramat District, Karanganyar Regency, Central Java, Indonesia. A qualitative approach was selected because it enables researchers to explore social interactions, collective values, local knowledge, and community experiences regarding environmental management and climate adaptation within their natural social context. This approach also facilitates a deeper understanding of how social solidarity and *gotong royong* practices contribute to strengthening community resilience and environmental sustainability (Lukiyanto & Wijayaningtyas, 2020; Patel et al., 2017). The research was conducted from August 2025 to June 2026 through direct engagement with community members and local stakeholders.

2.2 Research Site and Participants

The study was conducted in Dusun Ngentak, Kemiri Village, Kebakkramat District, Karanganyar Regency, Central Java, Indonesia. The research site was selected purposively due to the community's strong social cohesion, active participation in collective activities, and the continued implementation of *gotong royong* practices in maintaining environmental cleanliness and social solidarity. Dusun Ngentak represents a rural community that preserves local cultural values and collective traditions, making it an appropriate setting for examining the relationship between social solidarity, environmental management, and community-based climate adaptation.

Informants were selected using a purposive sampling technique, which enabled the researchers to identify participants with sufficient knowledge, experience, and active involvement in social and environmental activities within the community. The participants consisted of community leaders, youth organization members (*Karang Taruna*), and local residents who regularly participated in collective activities related to environmental cleanliness, social solidarity, and community development. A total of eleven informants participated in this study, comprising one neighborhood head (*RT*), four members of the youth organization (*Karang Taruna*), and six community residents.

The sample size was guided by the principle of information power, which suggests that the more relevant and information-rich the participants are in relation to the study aim, the fewer participants are required (Malterud et al., 2015). This study addressed a narrowly defined research aim focusing on community solidarity, environmental cleanliness, and climate change adaptation within a single rural community. Participants were purposively selected because they possessed direct experience and active involvement in environmental management and collective community activities, resulting in a highly specific sample. Consequently, the eleven informants provided sufficient information power to generate rich and relevant data for addressing the research objectives.

Table 1. Characteristics of Research Informants

Code	Informant Category		Number	Main Role
R1	Neighborhood Head (RT)		1	Community leadership and coordination
K1–K4	Youth Organization	(<i>Karang Taruna</i>)	4	Social and environmental activities

W1– W6	Community Residents	6	Community participation and local practices
Total		11	

Although the participants were grouped into three main categories, the community resident group was intentionally selected to reflect variation in gender, age, and occupational background. The six residents included both men and women, including one elderly female participant, as well as individuals with different occupations such as farming, factory work, and private-sector employment. This variation enabled the study to capture diverse community experiences and perspectives regarding collective action, environmental cleanliness, and local climate adaptation while maintaining a focused sample of individuals directly involved in community life.

The participant selection focused on individuals who were directly engaged in collective environmental activities at the neighborhood level. Consequently, stakeholders such as village officials, religious leaders, environmental cadres, or waste management personnel were not included as separate participant categories because the study specifically sought to understand community-level practices and everyday collective experiences rather than institutional or administrative perspectives. This sampling strategy was considered appropriate for addressing the research objectives within the context of Dusun Ngentak.

The neighborhood head served as the key informant responsible for coordinating community activities and environmental management programs. Members of the youth organization represented the perspectives of younger generations who actively participated in social and environmental initiatives, while community residents provided insights into daily social interactions, collective practices, and local experiences related to environmental cleanliness and climate adaptation. The diversity of participants enabled the researchers to obtain comprehensive perspectives regarding the role of community solidarity in strengthening environmental sustainability and community resilience in Dusun Ngentak.

2.3 Data Collection

Data were collected through semi-structured interviews, participant observation, and documentation studies. Semi-structured interviews were conducted to explore participants' experiences, perceptions, and interpretations regarding community solidarity, *gotong royong*, environmental cleanliness, and climate adaptation practices. Participant observation was undertaken to directly observe community activities, social interactions, environmental maintenance practices, and collective actions within the village. Documentation studies were also conducted by collecting photographs, village activity records, and other supporting documents related to social and environmental activities.

The interview instruments were developed based on concepts of social capital, collective action, community resilience, and community-based climate adaptation (Faedlulloh et al., 2021; Patel et al., 2017; Suwignyo, 2019). The main indicators used in the interview process are presented in Table 2.

Table 2. Interview Indicators

Research Focus	Indicators	Informants
Community solidarity	Social relationships, cooperation, mutual assistance, social participation	R1, K1–K4, W1–W6
Gotong royong practices	Collective activities, community engagement, shared responsibility	R1, K1–K4, W1–W6
Environmental cleanliness	Environmental maintenance activities, environmental awareness, environmental benefits	R1, K1–K4, W1–W6

Climate adaptation	Community responses to environmental and climate changes	R1, W1–W6	K1–K4,
Community resilience	Collective capacity, sustainability, and social cohesion	R1, W1–W6	K1–K4,

Participant observation was conducted throughout the fieldwork period from August 2025 to June 2026 to complement the interview data. The observations focused on routine community service (*kerja bakti*), environmental cleaning activities, mosque cleaning, neighborhood meetings, preparations for Indonesia's Independence Day celebrations, and other collective activities related to environmental management and social solidarity. During the observation process, the researcher adopted the role of a participant observer, participating in community activities while observing patterns of social interaction, cooperation, community participation, and environmental maintenance practices. Observations were conducted regularly throughout the fieldwork period, with field notes recorded after each observation session to support data triangulation and thematic analysis.

2.4 Data Analysis

The collected data were analyzed using thematic analysis, which enables researchers to identify, categorize, and interpret patterns and meanings emerging from qualitative data (Patel et al., 2017; Maulana, 2023). The analysis process consisted of several stages, including data reduction, data coding, categorization, interpretation, and conclusion drawing. The identified themes were subsequently analyzed through the perspectives of social capital and community participation to understand how community solidarity supports the maintenance of surrounding environmental cleanliness and contributes to community-based climate change adaptation practices.

To ensure the credibility and trustworthiness of the findings, this study employed source triangulation, method triangulation, and member checking procedures. Source triangulation was conducted by comparing information obtained from neighborhood leaders, youth organizations, and community residents. Method triangulation involved comparing findings from interviews, observations, and documentation studies, while member checking was performed by confirming the accuracy and interpretation of the findings with selected informants. These procedures were implemented to enhance the validity, reliability, and rigor of the research findings (Patel et al., 2017; Zhao, 2025).

3. Results and Discussion

3.1 Community Solidarity Practices in Maintaining Environmental Cleanliness

Interview findings reveal that community solidarity continues to play a central role in shaping social relationships and collective environmental practices in Dusun Ngentak, Kemiri Village. Based on interviews with the neighborhood head (R1), members of the youth organization (Karang Taruna) (K1–K4), and community residents (W1–W6), solidarity is reflected through mutual assistance, cooperation, and active participation in various community activities. Rather than functioning merely as a traditional cultural value, gotong royong has become an expression of social citizenship and communal identity that continues to influence everyday community life (Suwignyo, 2019). In Dusun Ngentak, these values are sustained through routine interactions involving residents from different generations, allowing solidarity to remain relevant in maintaining harmonious social relationships and encouraging shared responsibility for environmental cleanliness. The continuity of these practices demonstrates that solidarity is not only preserved as a cultural tradition but also serves as a guiding principle for organizing collective community life (Ramadhani & Saputri, 2023).

The interview data further demonstrate that community solidarity has been maintained across generations and continues to be regarded as a cultural inheritance within the village. According to

the neighborhood head, the values of togetherness established by previous generations remain firmly embedded in contemporary community life because they are consistently practiced through collective participation.

“Solidarity has existed since the time of our ancestors and continues to survive because we maintain togetherness. We embrace all generations, from young people to older adults, with the common goal of maintaining solidarity and environmental cleanliness in Dusun Ngentak.” (R1)

The statement illustrates that solidarity is perceived not as a temporary response to particular circumstances but as a long-standing social norm that shapes interactions among community members. The transmission of these values from older to younger generations reinforces mutual responsibility and strengthens community commitment to preserving shared social values (Aulia & Gustiana, 2025). Consequently, solidarity continues to be reproduced through everyday community interactions rather than being confined to ceremonial or occasional social activities.

Participants also explained that solidarity is manifested through a wide range of collective activities involving different social groups and generations. These activities include environmental maintenance, religious gatherings, social assistance, community meetings, and collective celebrations. Although each activity serves a different purpose, all of them encourage frequent interaction, cooperation, and shared responsibility among residents, creating opportunities for individuals to contribute to the welfare of the wider community (Sumarmi et al., 2022). As a result, solidarity is continuously reinforced through everyday practices that strengthen interpersonal relationships and collective commitment rather than through symbolic expressions alone. The interview findings therefore suggest that gotong royong functions not only as a cultural tradition but also as a practical mechanism through which community members maintain social cohesion and organize collective action in their daily lives.

The practical implementation of solidarity is particularly evident in routine environmental management activities carried out by residents of Dusun Ngentak. The neighborhood head explained that community service (*kerja bakti*) is organized regularly and involves youth groups, adults, and elderly residents in maintaining public facilities and environmental cleanliness.

“We routinely conduct community service activities, clean public spaces, maintain the mosque, clean roads, remove weeds, and organize environmental cleaning activities together. These activities strengthen solidarity among all community members.” (R1)

Similar views were expressed by members of the youth organization and community residents, who emphasized that collective environmental activities not only improve the physical condition of the village but also strengthen relationships among residents through regular cooperation.

“We work together with the neighborhood head, community members, and families to maintain environmental cleanliness. Through these activities, we strengthen our relationships and create a better environment.” (K2)

“Working together makes our environment cleaner and creates stronger relationships among neighbors because we help each other.” (W1)

These interview findings indicate that environmental management serves a dual function within the community. Besides maintaining the cleanliness of public spaces, routine collective activities provide opportunities for residents to strengthen interpersonal trust, cultivate shared responsibility, and reinforce the tradition of mutual cooperation. To provide a clearer overview of the various forms of solidarity identified throughout the interviews, these collective practices are synthesized and presented in Table 3.

Table 3. Forms of Community Solidarity in Dusun Ngentak

Community Activity	Participants	Purpose
Community service (<i>kerja bakti</i>)	RT, youth, residents	Environmental cleanliness

Mosque cleaning	Youth and residents	Public hygiene
Visiting sick residents	Community members	Social solidarity
Community meetings	RT and residents	Social cohesion
Independence Day celebrations	Entire community	Collective identity

Following the interview findings summarized in Table 3, it is evident that community solidarity in Dusun Ngentak is expressed through diverse forms of collective participation that extend beyond routine environmental maintenance. Environmental cleaning activities, religious gatherings, social assistance, community meetings, and local celebrations collectively create opportunities for residents to interact, cooperate, and strengthen interpersonal relationships. Rather than functioning as isolated community events, these activities have become embedded in everyday social life, allowing solidarity to be continuously reinforced through repeated collective experiences. This pattern suggests that community solidarity is sustained not only by shared cultural values but also by regular participation in activities that encourage mutual responsibility and cooperation (Sarfanudin et al., 2025). The diversity of these activities demonstrates that maintaining environmental cleanliness is closely connected with broader social interactions that foster a strong sense of belonging among community members.

The interview findings further reveal that the sustainability of these collective activities depends on the active involvement of multiple community actors who perform complementary roles during implementation. The neighborhood head coordinates community programs and mobilizes residents, while members of the youth organization (Karang Taruna) facilitate participation among younger generations and assist in organizing collective activities. Adult residents contribute through direct participation in environmental maintenance and social events, whereas women frequently support community initiatives by preparing communal meals, coordinating neighborhood gatherings, and encouraging household participation. The collaboration among these groups illustrates that solidarity is maintained through shared responsibilities rather than individual contributions alone. Such collaboration enables community activities to be organized efficiently while strengthening communication and cooperation among residents (Lukiyanto & Wijayaningtyas, 2020).

The active participation of these different community groups can be observed directly during routine environmental management activities conducted in Dusun Ngentak. Residents from various age groups work together to clean public spaces, maintain village facilities, and support one another throughout the implementation of collective activities. These interactions demonstrate that environmental management is not only a technical effort to improve physical conditions but also an important social process that reinforces cooperation and strengthens relationships among community members. The implementation of these collaborative activities is illustrated in Figure 2.



Figure 1. Community Service Activities in Dusun Ngentak

As illustrated in Figure 1, environmental management activities involve broad participation from community members regardless of age or social background. The photograph reflects how residents collectively share responsibilities during *kerja bakti*, creating opportunities for frequent interaction and cooperation while working toward common environmental objectives. This shared participation strengthens interpersonal relationships and cultivates a collective sense of ownership over the surrounding environment. Consequently, environmental maintenance becomes a medium through which social cohesion is continuously reinforced rather than merely a routine effort to preserve physical cleanliness. These findings support previous research suggesting that active community participation in collective activities strengthens social cohesion and reinforces collaborative relationships that sustain community life (Faedlulloh et al., 2021).

The interview findings further suggest that the relationships established through routine environmental management activities extend beyond the immediate objective of maintaining surrounding environmental cleanliness. Repeated participation in *kerja bakti* creates regular opportunities for residents to communicate, exchange experiences, and strengthen interpersonal trust, allowing cooperation to become an integral part of everyday community life. As these interactions become increasingly frequent, solidarity is reinforced not only during environmental activities but also through broader social engagement that connects individuals across different generations and social groups. This pattern indicates that environmental management serves as an important entry point for strengthening community relationships, which are subsequently maintained through various social, religious, and cultural activities (Ramadhani & Melysia Yunita Heffy Saputri, 2023).

Beyond routine environmental management activities, the interview findings indicate that community solidarity is further strengthened through various social and cultural gatherings that encourage regular interaction among residents. Participants explained that annual Independence Day celebrations, religious gatherings (*pengajian*), neighborhood meetings, and visits to community members experiencing illness or bereavement provide important opportunities to maintain communication and reinforce interpersonal relationships. These activities enable residents to interact in informal settings, exchange information, and strengthen their sense of belonging to the community. Consequently, solidarity is nurtured not only through collaborative work but also through shared social experiences that sustain mutual care and community cohesion (Suwignyo, 2019). This finding suggests that the continuity of solidarity depends on maintaining regular social interactions alongside collective environmental activities. The atmosphere of these community gatherings and their contribution to strengthening social relationships are illustrated in Figure 2.



Figure 2. Community Solidarity During Independence Day Celebration

As presented in Figure 2, community gatherings provide a social space where residents from different generations can interact, communicate, and reinforce interpersonal relationships beyond the context of environmental management. These activities strengthen social bonds by encouraging mutual trust, reciprocal support, and a shared sense of belonging within the village. Rather than functioning solely as ceremonial occasions, community celebrations contribute to maintaining social cohesion by creating continuous opportunities for residents to participate in collective community life. The findings therefore demonstrate that community solidarity in Dusun Ngentak is sustained through the integration of environmental, social, religious, and cultural activities that collectively reinforce cooperation and shared responsibility among residents (Faedlulloh et al., 2021). This strong foundation of solidarity provides the social basis for the development of broader community collaboration, which is further discussed in the following section on the role of social capital in strengthening collective environmental management. This strong foundation of solidarity provides the social basis for the development of broader community collaboration, which is further discussed in the following section on the role of social capital in strengthening collective environmental management.

3.2 Social Capital and Community Participation in Environmental Management

Building upon the community solidarity practices discussed in the previous section, the interview findings demonstrate that these collective values have evolved into broader forms of social capital that support environmental management in Dusun Ngentak. Participants consistently described trust, cooperation, social networks, and active participation as interconnected social resources that enable residents to organize environmental activities collectively. Rather than perceiving environmental cleanliness as an individual obligation, community members regard it as a shared responsibility that can only be maintained through continuous collaboration among residents. This finding indicates that the effectiveness of environmental management depends not only on physical activities but also on the quality of social relationships that facilitate cooperation and collective action (Lukiyanto & Wijayaningtyas, 2020). In this context, social capital functions as a community resource that strengthens collective participation while preserving the values of solidarity established through everyday social interactions (Azarinea & Wijayanti, 2026).

Among the various dimensions of social capital identified during the interviews, interpersonal trust emerged as the primary foundation supporting collective environmental management. The neighborhood head explained that community members willingly participate in environmental programs because they trust one another and share a common understanding that environmental cleanliness is a collective responsibility.

“The participation of community members is very good because everyone understands that maintaining environmental cleanliness is our shared responsibility. When people trust each other and work together, environmental problems can be solved collectively.” (R1)

This statement suggests that trust extends beyond personal relationships and becomes a social mechanism that encourages residents to cooperate in addressing common environmental concerns. Shared trust creates confidence that every individual will contribute to collective activities, thereby strengthening community commitment to environmental management. The importance of interpersonal trust as a foundation for collective action has also been emphasized in previous studies, which argue that trust facilitates cooperation and strengthens the capacity of communities to organize collective initiatives (Lukiyanto & Wijayaningtyas, 2020).

The perspectives of community residents further reinforce the significance of trust in encouraging active participation. Participants explained that mutual trust motivates residents to support one another because they recognize that environmental cleanliness generates shared benefits for the entire community.

“We trust each other and help one another because we understand that maintaining environmental cleanliness benefits everyone. If we work together, the environment becomes cleaner and our relationships become stronger.” (W2)

The interview findings indicate that trust encourages residents not only to participate in environmental activities but also to sustain long-term cooperation through reciprocal relationships and mutual responsibility. As residents repeatedly work together, interpersonal trust becomes increasingly embedded in everyday community life, allowing collective participation to be maintained over time. This reciprocal relationship between trust and participation demonstrates that social capital is continuously strengthened through repeated social interactions rather than emerging solely from formal community programs.

Beyond interpersonal trust, the interviews reveal that social networks also play an essential role in supporting community participation and coordinating environmental management activities. Participants explained that environmental programs are organized through collaboration among neighborhood leaders, youth organizations (Karang Taruna), women's groups, and local residents, who maintain communication through regular meetings, social gatherings, and informal interactions. These communication channels enable information to be shared efficiently, encourage broader participation, and facilitate collective decision-making during environmental activities. Consequently, social networks function not merely as channels of communication but also as mechanisms that connect different community groups and strengthen collective coordination in environmental management (Sumarmi et al., 2022). The practical role of these social networks in mobilizing community participation is further illustrated through the experiences shared by members of the youth organization in the following discussion.

Members of the youth organization further explained that effective communication among community members plays a crucial role in sustaining environmental management activities. They emphasized that environmental programs are coordinated through continuous communication between neighborhood leaders, youth organizations, and local residents, ensuring that collective activities can be implemented efficiently.

"We always coordinate with the neighborhood head, community members, and other groups to ensure that everyone participates in environmental activities. Communication and togetherness are very important for maintaining solidarity." (K1)

A similar perspective was expressed by another member of the youth organization, who highlighted the importance of involving all residents regardless of age or social background.

"We try to involve all community members, regardless of age or social background, because environmental cleanliness can only be achieved through collective participation." (K3)

These interview findings demonstrate that communication functions as an important mechanism through which social networks are transformed into collective participation. Continuous interaction among community members facilitates coordination, strengthens mutual understanding, and encourages broader involvement in environmental activities. As communication becomes embedded in routine community interactions, participation is sustained not only through formal organizational structures but also through informal social relationships that reinforce collective responsibility (Sumarmi et al., 2022).

The interview findings further indicate that collective participation represents the most visible manifestation of social capital within the community. Trust and social networks encourage residents to become actively involved in environmental cleaning, public facility maintenance, waste management, and various community activities. Repeated participation in these collective programs strengthens cooperation among residents while simultaneously reinforcing interpersonal trust and reciprocal relationships. This reciprocal process demonstrates that social capital is continuously reproduced through everyday community practices rather than functioning as a static social resource. Consequently, participation serves not only as an outcome of strong social capital but also as a mechanism through which social capital is maintained and strengthened over time (Paramita et al., 2023). To provide a clearer overview of the dimensions of social capital identified throughout the interviews, these findings are synthesized in Table 4.

Table 4. Elements of Social Capital in Dusun Ngentak

Dimension	Findings
Trust	High
Participation	Active
Cooperation	Strong
Social Networks	Extensive
Collective Action	Sustainable

Following the findings presented in Table 4, it is evident that trust, participation, cooperation, social networks, and collective action function as interconnected dimensions rather than independent components of social capital. Trust encourages residents to cooperate, social networks facilitate communication, communication promotes participation, and sustained participation reinforces collective action in environmental management. The interaction among these dimensions enables environmental activities to be implemented consistently while strengthening collective responsibility among community members. Therefore, the effectiveness of environmental management in Dusun Ngentak depends not only on individual willingness to participate but also on the integration of these social resources into everyday community life (Nugraha et al., 2024).

The practical implementation of these dimensions is particularly evident through the active involvement of youth organizations in environmental management activities. Members of Karang Taruna explained that environmental maintenance programs, including road maintenance, environmental cleaning, and community service (*kerja bakti*), are viewed not merely as routine activities but as opportunities to strengthen cooperation and collective responsibility among residents.

“Maintaining the environment is similar to taking care of ourselves because environmental cleanliness creates comfort, health, and happiness for everyone. Therefore, we actively participate in environmental activities.” (K2)

Another participant further emphasized that active participation in environmental programs reflects a shared commitment to preserving both the environment and community values for future generations.

“We work together because we want future generations to inherit a clean environment and strong solidarity within our community.” (K4)

These statements indicate that youth participation extends beyond physical involvement in environmental activities. Their contribution also reinforces intergenerational collaboration, encourages the transmission of collective values, and strengthens community commitment to environmental management. The active participation of youth organizations in implementing environmental management activities is illustrated in Figure 3.

**Figure 3.** Youth Participation in Environmental Maintenance Activities

As illustrated in Figure 3, youth organizations play an active role in supporting environmental management through their direct involvement in community service activities, environmental cleaning, and the maintenance of public facilities. The participation of younger generations reflects the successful transmission of collective values across generations while strengthening cooperation among different community groups. Beyond contributing labor, youth organizations also facilitate communication, encourage broader community participation, and help sustain collective environmental initiatives through continuous collaboration. These findings demonstrate that active youth engagement represents an important manifestation of social capital because it connects trust, cooperation, and participation within everyday community practices (Faedlulloh et al., 2021). Despite the strong social cohesion observed in Dusun Ngentak, participants acknowledged that collective environmental management occasionally encounters challenges, particularly communication barriers, scheduling conflicts, and weather conditions that may delay community activities.

“Sometimes there are misunderstandings or communication problems between different groups, which can delay environmental activities. However, we always try to solve these problems through discussion and cooperation.” (K1)

Similarly, community residents explained that environmental conditions associated with seasonal changes sometimes influence the implementation of collective activities.

“Weather conditions sometimes affect our activities, but we always try to maintain solidarity and continue working together.” (W3)

Rather than weakening community participation, these challenges are generally addressed through discussion, coordination, and mutual cooperation, allowing environmental activities to continue despite temporary obstacles. This finding suggests that strong social capital enables community members to maintain communication and collective problem-solving when environmental or organizational difficulties arise (Wambura, 2024).

Overall, the findings demonstrate that social capital in Dusun Ngentak develops through the interaction of interpersonal trust, social networks, cooperation, and collective participation. These interconnected dimensions enable residents to coordinate environmental management activities effectively while strengthening shared responsibility for maintaining environmental quality. Rather than functioning as separate social elements, trust encourages cooperation, social networks facilitate communication, and continuous participation reinforces collective action in everyday community life. The integration of these dimensions allows environmental management to be implemented collaboratively and sustained through repeated social interaction. Accordingly, social capital provides an essential social foundation that supports collaborative environmental management and prepares the community to respond collectively to environmental challenges. The contribution of these social resources to community resilience and climate change adaptation is examined in the following section.

3.3 Community Resilience and Climate Change Adaptation

Building upon the findings presented in the previous sections, this study further demonstrates that community solidarity and social capital provide an important foundation for strengthening community resilience in responding to environmental and climate-related changes. Social cohesion and social capital have been recognized as important factors in enhancing climate resilience and supporting collective environmental action (Tamasiga et al., 2024). Rather than emerging solely as cultural values, solidarity and collective participation have become practical mechanisms through which community members collectively respond to environmental challenges. The findings indicate that climate-related changes have not weakened social cohesion; instead, they have encouraged residents to strengthen collective awareness, environmental responsibility, and collaborative action. Strong social networks and community participation also enhance local adaptive capacity by facilitating collective responses to environmental change (Wambura, 2024).

The interviews revealed that residents of Dusun Ngentak have experienced noticeable changes in local weather patterns over recent years. Participants consistently described increasingly unpredictable weather conditions, characterized by hotter temperatures, irregular rainfall, and seasonal variability. According to the neighborhood head (R1), these climatic changes have affected both environmental conditions and the daily livelihoods of local residents. Farmers, who constitute a large proportion of the community, frequently experience disruptions in drying harvested rice during periods of unexpected rainfall, while factory workers encounter transportation difficulties during heavy rain. Rather than perceiving these climatic changes as isolated environmental events, community members increasingly recognize them as shared challenges requiring collective awareness and coordinated responses.

The growing awareness of climate-related challenges has gradually transformed the way community members perceive environmental management. According to the neighborhood head, compared with previous years, residents have become more conscious of maintaining environmental cleanliness because they recognize that changing weather conditions increase environmental risks if waste management and drainage systems are neglected. One participant explained:

"Weather conditions continue to change, sometimes becoming very hot and sometimes very rainy. These changes encourage the community to become more concerned about the environment. People now realize that maintaining environmental cleanliness requires cooperation and shared responsibility. Compared with previous years, residents are much more aware of changing weather conditions and are increasingly motivated to work together to keep the environment clean and safe." (R1)

This increased environmental awareness was also reflected in the responses of community residents. Several participants explained that environmental changes had encouraged greater public participation in maintaining environmental cleanliness and preventing environmental problems. One resident noted that, in previous years, blocked drainage channels, accumulated waste, and standing water were relatively common; however, stronger collective awareness has significantly improved environmental conditions within the village. As another participant stated:

"Compared with the past, people are now more aware of the importance of protecting the environment. Previously, we sometimes experienced blocked drainage channels, accumulated waste, and standing water. Today, the community is much more concerned about maintaining cleanliness because we understand that changing weather conditions require us to be more prepared and work together." (W1)

These findings suggest that climate-related changes have not only increased public awareness of environmental issues but have also stimulated behavioural changes that strengthen collective environmental responsibility. Consistent with Gunawan (2026), local adaptation strategies are often shaped through shared experiences, community participation, and continuous social interaction, enabling communities to develop collective responses to emerging environmental challenges.

The increased environmental awareness has been translated into various forms of collective action that constitute the community's practical response to environmental and climate-related challenges. Interview findings indicate that residents do not merely recognize changing weather conditions but actively organize collective activities to minimize potential environmental risks. Routine community service (*kerja bakti*), drainage cleaning, waste management, grass cutting, and environmental monitoring have become regular activities involving the neighborhood association, youth organization (*Karang Taruna*), and local residents. These activities are coordinated collectively through community meetings and digital communication platforms, particularly WhatsApp groups, enabling residents to respond quickly whenever environmental problems arise. Rather than being occasional voluntary activities, these collective actions have become an integral part of the community's strategy for maintaining environmental quality amid increasingly unpredictable weather conditions.

According to the neighborhood head, collective environmental management is considered essential because environmental problems become more difficult to address when community participation declines. Whenever environmental issues such as accumulated waste, stagnant water, or blocked drainage channels are identified, residents immediately coordinate collective action involving multiple community groups. As explained by the neighborhood head:

“When environmental problems occur, such as accumulated waste or blocked drainage, we immediately coordinate with community members through the neighborhood association, youth organization, and WhatsApp groups to organize collective work. We believe that maintaining environmental cleanliness together helps prevent environmental problems and keeps the village safe despite changing weather conditions.” (R1)

Similarly, members of the youth organization explained that changing weather conditions have encouraged them to become more active in mobilizing community participation. Routine environmental cleaning activities are now conducted more consistently because residents recognize that unpredictable rainfall and hotter weather require greater preparedness than in previous years.

“Changing weather conditions have encouraged us to become more active in inviting residents to participate in community service. Every Sunday we organize environmental cleaning activities, including cleaning drainage channels, cutting grass, and collecting waste, because we realize that maintaining a clean environment is increasingly important as the weather becomes more unpredictable.” (K1)

These collective activities represent locally developed adaptation practices that enable the community to reduce environmental risks while simultaneously strengthening social cooperation. Participants consistently explained that maintaining environmental cleanliness helps prevent blocked drainage systems, standing water, mosquito breeding sites, and waste accumulation, all of which are considered potential environmental hazards during periods of heavy rainfall and fluctuating weather conditions. Consequently, environmental management is perceived not merely as a sanitation activity but as a preventive strategy that improves community preparedness and reduces vulnerability to environmental disturbances. This finding supports Gunawan (2026), who argues that local adaptation strategies emerge through shared experiences, continuous social interaction, and active community participation in responding to environmental challenges.

Based on the interview findings, community-based adaptation practices in Dusun Ngentak can be identified through several routine environmental management activities that collectively strengthen local adaptive capacity. These practices include drainage maintenance during periods of heavy rainfall, routine environmental cleaning during hot weather, collective waste management, mosquito prevention through the elimination of stagnant water, and strengthened community participation in responding to seasonal variability. Rather than relying primarily on technological interventions, the community addresses climate-related challenges through locally organized collective action supported by mutual cooperation and environmental awareness. The identified adaptation practices are summarized in Table 5, which illustrates the relationship between observed environmental changes, collective community responses, and their contribution to local adaptation outcomes.

Table 5. Community-Based Climate Adaptation Practices in Dusun Ngentak

Environmental Change	Community Response	Adaptation Outcome
Heavy rainfall	Community members regularly clean drainage channels and maintain the surrounding environment to prevent water blockage	Reduced risk of flooding and other environmental hazards
Hot weather	Community members increase environmental cleaning activities to reduce	Improved environmental hygiene and neighborhood

	unpleasant odors, maintain sanitation, and create a healthier living environment during prolonged heat	comfort
Waste accumulation	Collective waste collection and proper waste disposal through community cooperation	Better sanitation and cleaner public spaces
Mosquito and disease threats	Elimination of stagnant water and regular environmental monitoring to prevent mosquito breeding	Reduced risk of mosquito-borne diseases and improved public health
Seasonal variability	Community members strengthen mutual cooperation, participate in collective environmental activities, and coordinate adaptation efforts	Enhanced collective preparedness and adaptive capacity to respond to environmental and climate-related changes

As presented in Table 5, community-based adaptation in Dusun Ngentak is characterized by the close interaction between environmental changes, collective participation, and environmental management practices. The findings demonstrate that each environmental challenge is addressed through specific forms of collective action developed from local experiences and shared responsibility. For instance, periods of heavy rainfall encourage residents to conduct routine drainage cleaning to reduce water accumulation and minimize flood risks, while prolonged hot weather prompts community members to increase environmental cleaning activities to maintain sanitation, reduce unpleasant odors, and create a healthier living environment. Likewise, waste accumulation and mosquito breeding are addressed through collective waste management, the elimination of stagnant water, and regular environmental monitoring. Furthermore, seasonal variability encourages residents to strengthen mutual cooperation, participate in collective environmental activities, and coordinate local adaptation efforts, thereby enhancing the community's collective preparedness and adaptive capacity to respond to environmental and climate-related changes. These findings suggest that adaptation within the community is not implemented through technological interventions alone but is largely achieved through locally organized social cooperation and collective environmental stewardship, consistent with the argument that community resilience is fundamentally shaped by collective capacities, social cohesion, and active community participation (Patel et al., 2017).

The interview findings further indicate that the effectiveness of these adaptation practices depends not only on the implementation of environmental activities but also on the continuous interaction among community members during their implementation. Routine activities such as drainage cleaning, waste management, and environmental monitoring provide opportunities for residents to communicate, coordinate responsibilities, and exchange local knowledge regarding changing environmental conditions. Through these repeated interactions, community members develop stronger mutual trust, shared environmental awareness, and a collective understanding of how environmental problems should be addressed. Consequently, adaptation becomes embedded in everyday community practices rather than functioning as a series of isolated responses to environmental disturbances. This process demonstrates that continuous collective participation strengthens the community's adaptive capacity by reinforcing cooperation, improving coordination, and enhancing the ability of residents to organize collective responses to environmental challenges (Gunawan, 2026).

Beyond reducing immediate environmental risks, these collective adaptation practices also contribute to strengthening community resilience. Participants consistently explained that regular participation in environmental management activities improves communication, reinforces mutual trust, and enables residents to respond more effectively to future environmental challenges. In this context, community participation functions not only as a mechanism for solving environmental

problems but also as a process through which collective capacity is continuously strengthened. Consequently, resilience emerges from repeated experiences of cooperation, shared responsibility, and coordinated action rather than from individual initiatives alone. This finding directly addresses the relationship between strengthened community participation and increased community resilience, demonstrating that active participation enhances the community's capacity to anticipate, respond to, and recover from environmental disturbances.

Participants further emphasized that solidarity remains the primary factor sustaining these adaptation efforts. One youth organization member explained:

"If we lose our solidarity and stop working together, environmental problems will become much more difficult to solve. Solidarity is what keeps our community strong and enables us to respond together whenever environmental problems occur." (K4)

Similarly, another resident highlighted the importance of collective responsibility:

"Environmental cleanliness is everyone's responsibility. Working individually is not enough because maintaining a healthy environment requires cooperation from the entire community." (W3)

These findings reinforce the argument of Patel et al. (2017) that resilience is strengthened when communities possess strong collective capacities and sustained social participation in addressing shared environmental challenges.

The interview findings further indicate that the sustainability of community-based adaptation is supported not only by routine environmental activities but also by continuous social interaction among community members. Participants explained that informal gatherings, religious activities, communal meals, and neighborhood meetings provide opportunities to strengthen interpersonal relationships, build mutual trust, and maintain collective identity. These social interactions facilitate communication and coordination, making it easier for residents to organize collective responses whenever environmental challenges arise. As one participant explained:

"Activities such as gathering together and eating together strengthen our relationships and remind us that we belong to the same community." (W5)

Another participant similarly stated:

"When we gather together, we strengthen solidarity, build trust, and maintain our togetherness. This makes it easier for us to help one another whenever problems arise." (W6)

These findings support Maulana & Wardah (2023), who emphasizes that social capital and social cohesion are essential foundations for strengthening community resilience because they foster trust, reciprocity, and long-term collective commitment. The relationships among social interaction, trust, collective participation, and community resilience are illustrated in Figure 4.



Figure 4. Social Bonding Through Collective Gathering

Figure 4. illustrates that community resilience in Dusun Ngentak develops through a continuous process beginning with social interaction and the strengthening of interpersonal trust. These social relationships encourage greater community participation in collective environmental activities, which subsequently reinforce collaborative environmental management and community-based adaptation practices. Rather than functioning as isolated social activities, communal gatherings and everyday interactions strengthen the social networks that enable residents to coordinate collective action efficiently during environmental challenges (Patel et al., 2017). Consequently, environmental cleanliness extends beyond maintaining the physical condition of the surrounding environment and contributes to broader environmental sustainability by reducing environmental risks, supporting public health, and enhancing the community's long-term adaptive capacity (Gunawan, 2026; Maulana & Wardah, 2023).

Overall, the findings demonstrate that community solidarity, social capital, and collective participation constitute interconnected social resources that support community-based climate adaptation in Dusun Ngentak. The study reveals a sequential process in which climate-related changes increase environmental awareness, encourage collective participation, strengthen environmental management practices, and ultimately enhance community resilience (Tamasiga et al., 2024; Wambura, 2024). Unlike adaptation approaches that depend primarily on technological solutions, the adaptation strategies observed in Dusun Ngentak are largely grounded in local wisdom, mutual cooperation (*gotong royong*), and sustained community participation. These findings further demonstrate that traditional social values continue to function as practical mechanisms for strengthening environmental sustainability and building resilient rural communities in the face of contemporary climate change.

4. Conclusion

This study demonstrates that community solidarity in Dusun Ngentak remains an important social resource that supports collaborative environmental management through everyday collective practices. The findings reveal that solidarity is maintained through *gotong royong*, environmental cleaning activities, mosque maintenance, social assistance, religious gatherings, and community celebrations, which strengthen interpersonal relationships and foster shared responsibility among residents. These repeated interactions gradually develop into social capital characterized by interpersonal trust, social networks, cooperation, and active community participation. Together, these interconnected social resources enable residents to organize environmental management collectively, coordinate community initiatives, and respond collaboratively to environmental challenges. The findings further suggest that strong social capital provides an important social foundation that supports community-based climate change adaptation and contributes to strengthening community resilience.

This study contributes to the existing literature by explaining the sequential relationship between community solidarity, social capital, collaborative environmental management, and community-based climate change adaptation within the context of a rural Indonesian community. Rather than treating these concepts as separate social phenomena, the findings demonstrate how everyday collective practices reinforce social capital, which subsequently supports collaborative environmental governance and adaptive community responses to environmental change. This perspective extends previous studies by highlighting the dynamic process through which traditional social values are transformed into practical social resources that strengthen collective environmental action.

The findings also have important practical implications for environmental governance and rural community development. Strengthening community solidarity and preserving local traditions of *gotong royong* should be regarded not only as efforts to maintain cultural heritage but also as strategies for promoting community participation, collaborative environmental management, and locally driven climate adaptation initiatives. Village governments, community organizations, and other local stakeholders may therefore consider integrating community-based participation and local social capital into environmental management programs to enhance their long-term

sustainability. Future research is encouraged to examine these relationships in different geographical and socio-cultural settings while incorporating additional dimensions of adaptive capacity, environmental governance, and community resilience to provide a broader understanding of community-based responses to environmental and climate-related challenges.

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