

## Article

# Social Capital of Banjarese for Peatland Fire Mitigation: Combining of Local Wisdom and Environment

Deasy Arisanty <sup>1,\*</sup>, Ismi Rajiani <sup>2,\*</sup>, Mutiani Mutiani <sup>2</sup>, Karunia Puji Hastuti <sup>1</sup>, Ersis Warmansyah Abbas <sup>2</sup>, Dedi Rosadi <sup>3</sup> and Muhammad Muhaimin <sup>1</sup>

<sup>1</sup> Department of Geography Education, Lambung Mangkurat University, Banjarmasin 70123, Indonesia

<sup>2</sup> Department of Social Studies Education, Lambung Mangkurat University, Banjarmasin 70123, Indonesia; ersiswa@ulm.ac.id (E.W.A.)

<sup>3</sup> Department of Mathematics, Gadjah Mada University, Yogyakarta 55281, Indonesia; dedirosadi@ugm.ac.id

\* Correspondence: deasyarisanty@ulm.ac.id (D.A.); rajiani@ulm.ac.id (I.R.)

**Abstract:** Repeated fires cause peatlands to degrade. Fire management has been carried out, but fires continue to occur, especially during the dry season. Through social capital that exists in the community based on the local wisdom of the Banjar people in environmental management, it is hoped that peatland fires can be overcome in this area. This research aims to analyze the social capital of the Banjar people in mitigating land fires based on local wisdom and the environment. The sample in this study was 250 people who live in an area prone to fires on peatlands in Banjarbaru, South Kalimantan, Indonesia. There are three variables in this study, namely Trust (T), Network (N), and Norm (N). There are 33 Likert scale questions (1–4, strongly agree–strongly disagree). We also conducted interviews with 20 members of the Fire Care Community (MPA) to obtain information about the social capital of the Banjar community in mitigating land fires. The analysis used is Structural Equation Modeling (SEM). The study results show norms have the greatest influence on disaster mitigation of peatland fires compared to trust and social networks. Norms in the community in the form of values from peatlands, rules, norms, and sanctions regulate the community more to deal with the problem of peatland fires than trust and social networks

**Keywords:** social capital; mitigation; peatland fire; local wisdom; environment



**Citation:** Arisanty, D.; Rajiani, I.; Mutiani, M.; Hastuti, K.P.; Abbas, E.W.; Rosadi, D.; Muhaimin, M.

Social Capital of Banjarese for Peatland Fire Mitigation: Combining of Local Wisdom and Environment.

*World* **2023**, *4*, 745–757. <https://doi.org/10.3390/world4040047>

Academic Editor: Manfred Max Bergman

Received: 5 August 2023

Revised: 1 November 2023

Accepted: 8 November 2023

Published: 10 November 2023



**Copyright:** © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

Peatlands are natural ecosystems that contain stored biomass from biomass deposits originating from past tropical swamp vegetation that has not been decomposed. Burning peatlands consumes a huge amount of biomass and causes fires that are difficult to extinguish [1]. Peatland fires have an impact on the environment and people's livelihoods [2]. Peatland fires have released large amounts of thick smoke and greenhouse gases [3]. The negative impact of smoke and greenhouse gases from fires on peatlands is higher than fires on mineral lands [4]. Peatland degradation causes a loss of livelihoods and harms community welfare [5].

Peatland fires in Indonesia require serious handling because they recur every dry season and are difficult to extinguish. Handling land fires requires the role of a leader and the management of social capital that can synergize to provide solutions to the problems of forest and land fires [6]. Social capital is social unity or community resilience while simultaneously supporting the reduction of the risk of land fires. The community's unity makes dealing with land fires more effective. Community resilience to disasters supports and enables communities to survive in disaster-prone locations. The ability to adapt, government support, and community resilience make communities better prepared to deal with and overcome fires on peatlands.

Social capital is bound by one definition of size, the quality of relationships in communities, organizations, and society. Social capital is manifested as human resources as an

investment to obtain new resources for pragmatic interests in a community group [7]. The existence of social capital is not defined as material but as a social capital contained in a person. Social capital also sees the potential of groups in reciprocal relationships between individuals [8]. The social capital of a group determines the survival and functioning of a social group [9].

The involvement of local communities through various local wisdoms is critical in the conservation, rehabilitation, and effective use of peatlands [5]. Local communities have local wisdom values in managing disaster-prone environments [10]. The local wisdom of a community is an important capital in avoiding the degradation of peatlands. Various forms of local wisdom in the context of mitigating land fires include clearing land with strong customs, making ditches to avoid land fires, and anticipating peatland fires such as choosing plants that can adapt well to peatland ecosystems, as a form of structural and non-structural mitigation [11].

Peatland fires in the South Kalimantan region always recur during the dry season, especially in the Banjarbaru area. Fires in the Banjarbaru area have become a serious problem because of the existence of important objects such as the Syamsudin Noor International Airport. Flights are disrupted when a fire occurs in the area around the airport [12,13]. Forests and land fire in South Kalimantan in 2015 were 196,516.77 Ha while in 2019, they were 136,428.00 Ha. The restoration of land fires in the South Kalimantan region has been carried out from 2016 to present, with the establishment of the Peat Restoration Team for the Province of South Kalimantan. In addition, a fire care community (MPA) has been formed in the Banjarbaru area by the Regional Disaster Management Agency (BPBD) of South Kalimantan Province. The task of this community is monitoring land fires, coordinating the handling of land fires, and extinguishing fires when land fires occur. This community assists local governments in reducing the risk of land fires. Despite this, fires still occur in this area.

Peatland fires cannot be resolved because there are three categories of disaster problems: technical problems, socio-economic problems, and law enforcement problems. These three problems must be handled simultaneously to produce solutions in disaster management [14]. Attempts have been made to solve technical problems through a peat restoration program by building canal blocks and drilled wells, while law enforcement has also been implemented in this area [13]. This research takes an approach to social capital in the community because the responsibility for handling fires is not only the responsibility of the government or volunteer groups that are members of the MPA but also the responsibility of society in general. Trust, social networks, and the norms that apply in the community can be a solution to handling land fires based on the local wisdom of the Banjar people in managing the peatland environment. The Banjar people who live in peatland areas have for generations understood peatlands very well, and there are local wisdom values that apply to the community. This study aims to analyze the social capital of the Banjar people in mitigating land fires based on local wisdom and the environment.

## 2. Literature Review

The environment binds humans to meet their daily needs. Humans continue to interact with components of the physical environment (animals and plants) and abiotic components (soil, rocks, water, etc.). In addition, humans are bound by interactions between social beings to develop values and norms in society [15]. The interactions carried out later give rise to cultural results in various forms, namely, tradition, language, technology, livelihoods, and elements of intrinsic value that bind people's behaviour in a group. The discussion of humans and the social environment is intended to establish that humans cannot live alone [16].

Humans are naturally social creatures. Humans have the needs, abilities, and habits to communicate and interact with other humans [17]. In them, there is always an urge to interact with other human beings. Based on these interactions, humans form groups based on similarity in location, interests, and gender [15]. Based on this, grouping in human life is

a need that must be met. Human group life can meet the needs of communication, security, order, justice, cooperation, and obtaining prosperity [7].

Social interaction as a social process which gives rise to closer and closer characteristics. In this article, the pattern of human interaction is devoted to the closer stages, which start from initiating, exploring (experimenting), increasing (intensifying), integrating, and bonding [9]. In social interaction, there is interaction between components of society. These events sometimes run smoothly and harmoniously. Social interactions that occur in humans give rise to various concepts, one of which is social capital.

To be able to work together the camp women in the community cannot be separated from the role of social capital that they have. The essence of social capital is social relations that are intertwined in the daily lives of citizens [9]. The essence of social capital lies in people's ability in an entity or group to work together to build a network to achieve common goals. This collaboration is characterized by a pattern of reciprocal and mutually beneficial interrelationships (reciprocity) and is built on trust supported by positive and strong social norms and values [18].

Social capital plays a critical role in the functioning and strengthening of modern life. It can be interpreted that social capital is an absolute requirement for human development, economic development, social, political, and democratic stability. There are three core concepts of existing social capital:

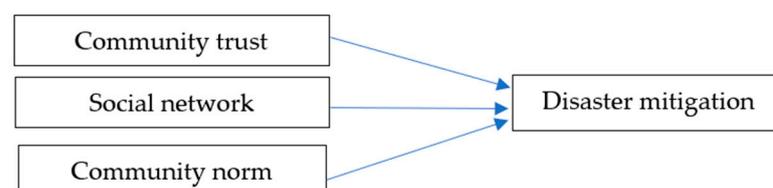
- a. Trust (honesty, fairness, egalitarianism, tolerance, and generosity)
- b. Social Networks (participation, reciprocity, solidarity, cooperation)
- c. Norm (shared values, norms and sanctions, rules) [18–20].

The core concept of social capital above is an element that should exist in the life of a social group, be it a community or society. The concept of social capital is a form of adhesive for order and meaning in social life. The concept of social capital has complexity, which can be formulated based on the point of view of the experts concerned [18]. Social capital is a resource in the form of a network that knows values, norms, and social structures; that have a spirit of cooperation, honesty/trust, and doing good; and that possess knowledge of attitudes, actions, and behaviours that have positive implications for productivity (output) and results (outcomes) [8].

Social capital is an important point in carrying out land fire mitigation. Traditional social collaboration, collective action, norms, and customs, as well as cultural values, are influential in the process of building traditional social capital and strengthening ties in socio-economic networks in the framework of disaster response and recovery systems [21]. Social capital can be used to reduce the impact of natural disasters and as strategy in disaster management [22].

The relationship between social capital, trust, norms, and links can provide valuable insights into how communities and societies function. Beliefs, norms, and networks vary across social, cultural, and economic contexts. Referring to the context of disaster mitigation, links constitute a significant investment as a social bond. The relationship between links and disaster mitigation is critical in reducing the impact of disasters and strengthening community resilience. Links can be used to increase community involvement in disaster mitigation initiatives. Involving communities in planning and implementation can increase awareness of disaster risks and improve preparedness.

Based on the description above, the theoretical framework of this study is as follows (Figure 1).

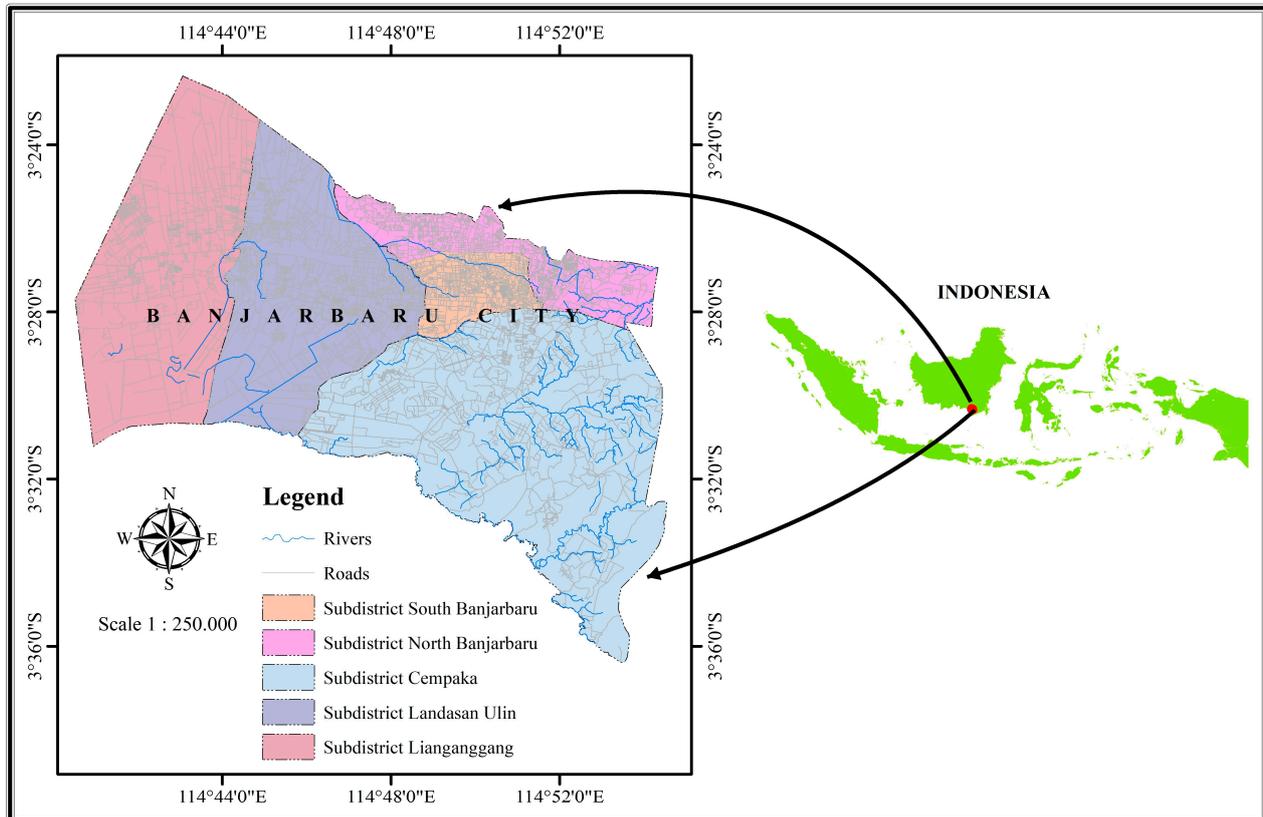


**Figure 1.** This study's theoretical framework.

### 3. Materials and Methods

#### 3.1. Research Locations

This study was conducted in Banjarbaru, South Kalimantan, Indonesia. Banjarbaru is located at 3025'40" S–3028' 37" S and 114041'22" E–114054'25" E. The area has peatlands that burn yearly, especially during the dry season [12,13,23]. A map of the study site is shown in Figure 2.



**Figure 2.** Map of the research location.

#### 3.2. Data Collection

The data were collected using questionnaires distributed to a total of 250 respondents. The respondents selected were people who live in villages whose areas are prone to fire, namely in Syamsudin Noor Village and Guntung Payung Village. They live on peatlands that are burnt every year, so that they are actively involved in disaster mitigation activities. The data collection was carried out from April 2023 to June 2023. The variables used to analyze social capital for peatland fire mitigation were Trust (T), Social Network (SN) Norm (N), and disaster mitigation (M). We asked 33 questions on the questionnaire. The 33 items employed a Likert scale (1–4, strongly disagree–strongly agree). The details of the questions based on variables and indicators are in Table 1.

We also conducted observations and interviews with the Guntung Payung Fire MPA and Syamsudin Noor MPA, with as many as 20 informants, to obtain data on the forms of social capital the community has implemented in mitigating land fires. All MPA administrators were used as informants in this research. The interview was conducted in June 2023. The interviews question consisted of: What is the role of MPA in preventing land fires? How does the MPA group participate in dealing with land fires? Do they work together to control land fires? What is the form of cooperation between MPA members and local government? How is solidarity between group members? We also used documents from the South Kalimantan Provincial Peat Restoration Team regarding mitigation efforts carried out by the community and local government to mitigate land fires.

**Table 1.** List of questions based on variables and indicators.

Variable	Indicator	A List of Questions
Trust (T)	Honesty	<ul style="list-style-type: none"> <li>Honesty in managing peatlands according to their designation can prevent peatland fires.</li> <li>Peatlands that are managed properly will produce sustainable peatlands.</li> <li>Communities provide opportunities for information disclosure on peatland management.</li> </ul>
	Fairness	<ul style="list-style-type: none"> <li>Fires on peatlands during the dry season are normal but must be prevented so they do not spread.</li> <li>Understanding the characteristics of peatlands and the causes of fires is very understandable for people who live there.</li> </ul>
	Attitude	<ul style="list-style-type: none"> <li>Fires on peatlands that recur during the dry season must be dealt with quickly by the community.</li> <li>Community concern is significant in preventing fires on peatlands.</li> </ul>
	Tolerance	<ul style="list-style-type: none"> <li>Communities need to respect peatlands to prevent damage and fires on peatlands.</li> </ul>
	Generosity	<ul style="list-style-type: none"> <li>Peatlands are a gift for the community that must be maintained and managed as well as possible.</li> <li>Communities must continue to protect peatlands so they are not damaged and burnt.</li> </ul>
Social Networks (SN)	Participation	<ul style="list-style-type: none"> <li>Community participation in mitigating land fires is urgently needed, starting from before the fire, during the fire, and after the fire occurs.</li> <li>Community active participation is beneficial in reducing fires that occur on peatlands.</li> <li>Community participation can be in the form of assistance in personnel, funds, and infrastructure in mitigating peatland fires.</li> </ul>
	Reciprocity	<ul style="list-style-type: none"> <li>Donations in the form of personnel, funds and infrastructure from the community are beneficial in mitigating land fires.</li> <li>Mutual assistance in mitigating land fires can alleviate obstacles and limitations when fires occur.</li> <li>The role of the community in mitigating land fires can help local governments (BPBD).</li> </ul>
	Solidarity	<ul style="list-style-type: none"> <li>The fires did not spread widely because of the high level of community solidarity in preventing peatland fires.</li> <li>Helping each other mitigate land fires is an absolute thing the community must do.</li> </ul>
	Cooperation	<ul style="list-style-type: none"> <li>Monitoring together when a land fire occurs is an effort to mitigate land fires.</li> <li>The community and local government need to cooperate to prevent land fires.</li> </ul>
Normal (N)	Shared values	<ul style="list-style-type: none"> <li>Peatland has a significant value for the community, so it needs to be protected from fire.</li> <li>Many people depend on managing peatlands for their livelihood, so sustainability is critical.</li> </ul>
	Norm	<ul style="list-style-type: none"> <li>The community feels that burning land is unnecessary and violates community norms.</li> </ul>
	Penalty	<ul style="list-style-type: none"> <li>Legal sanctions must be enforced so that land fires do not occur again.</li> </ul>
	Rule	<ul style="list-style-type: none"> <li>Rules for preparing land for agriculture without burning are applied to prevent land fires.</li> <li>Regulations regarding fire prevention need to exist and be implemented from the village level down to the provincial level.</li> </ul>

Table 1. Cont.

Variable	Indicator	A List of Questions
Peatland Mitigation (M)	Structural mitigation	<ul style="list-style-type: none"> <li>• Fire prevention facilities need to be prepared as a form of mitigation of peatland fires.</li> <li>• Drilling wells and canal blocking is a structural mitigation to prevent land fires.</li> <li>• Utilization of technology needs to be applied to monitor land fires.</li> </ul>
	Non-structural mitigation	<ul style="list-style-type: none"> <li>• Regulations prohibiting land burning are a form of non-structural mitigation.</li> <li>• Regulations regarding the sustainable management of peatlands are a form of non-structural mitigation.</li> <li>• Forms of local community wisdom, such as the value of trust and cooperation, are forms of non-structural mitigation.</li> <li>• Norm values and social networks accelerate non-structural mitigation.</li> </ul>

### 3.3. Data Analysis

The data were analyzed using Structural Equation Modeling (SEM). Factors loading was used to assess discriminant validity, where only items with factors that outperformed 0.50 would remain in the model [24]. The hypotheses in this study are:

1. Banjar community trust (T) has a positive influence in mitigating land fires (M)
2. Banjar Community Social Network (SN) has a positive influence in mitigating land fires (M)
3. Norms that apply in the Banjar Community (N) have a positive influence in mitigating land fires (M)

We used SEM to carry out modeling related to social capital and disaster mitigation. We used SEM to see the relationship between social capital variables such as trust, social networks, and norms and land fire mitigation. Through SEM modeling, variables that have a significant relationship could also be identified.

We used data triangulation to check the validation and validity of the data. Triangulation was carried out through cross-checks on observation data, interviews, and documents. Data analysis consisted of data reduction, data display, and data verification.

## 4. Results

### 4.1. Banjar Community Trust in Land Fire Mitigation

Peatlands that are well-managed will produce sustainable peatlands. The Banjar people believe that properly managing peatlands and following the allotment of these peatlands will prevent fires on the land. The problem of fires on peatlands is difficult to overcome; for one, it is caused by inappropriate land use and land that needs to be addressed to turn into shrubs. Many peatlands are then converted into agricultural land by using deep ditches so that the land is drained and dry. When dry and less productive, the land is overgrown with shrubs and left abandoned. This triggers widespread land fires. Therefore, the community seeks to utilize peat land according to its designation; for example, shallow peat can be planted with vegetables, and they also consider the width and depth of the drainage canals on the land to prevent land degradation. Unfortunately, managed peat is safer against fire, but a lot of peat needs to be addressed, which causes the land to continue to experience fires.

Fires are a natural thing that happen on peatlands, especially during the dry season, because the land is dry. Even though it is natural, the community thinks fires on peatlands must be addressed so they do not spread. The community will protect their land because it is their livelihood source. Land owned by farmers tends to be more monitored from fire than abandoned land, so that fire risks can occur on unproductive land.

The ability to recognize nature and the ability to use technology are important things that must be possessed by people who live in peatland areas that are prone to fire. Communities on peatlands are very aware of when fires will occur on their land, so they try to reduce the risks of land fires, including through the ability to recognize signs of the dry season, the ability to access information and technology for monitoring land fires, and the ability to use tools to put out fires.

Community concern is critical to success in overcoming repeated peatland fires. Communities can move quickly when a fire occurs so it does not spread and can help each other to put out the fire. The community also prepares agricultural land without burning. They use natural fertilizers from decomposed shrubs and artificial fertilizers. For them, peatland is a gift that must be preserved for the next generation. This attitude indicates that there is still hope for sustainable peatlands in the future. Even though it is still limited to their land, in the future, it is hoped that less productive land can also be managed into productive land for the sustainability of peatlands.

#### *4.2. Banjar Community Social Network in Mitigating Land Fires*

Various volunteer groups were formed to deal with land fires. These volunteer groups include people who care about fire and people who care about disasters. This organization was initiated by the local government and by community groups in fire-prone areas [25]. This group was mobilized to mitigate land fires, starting from before the fire occurred, during the fire, and after the fire occurred. The assistance provided by this group was primarily in the form of personnel assistance for monitoring fire hotspots and for extinguishing fires. The local government trained them to put out fires, so this group of volunteers helped the local government deal with peatland fires.

Community groups carry out monitoring to monitor areas prone to land fires. The information is then disseminated to the general public and local governments. Community groups also sometimes carry out monitoring together with the local government. Community groups and the local government have also prepared drilled wells, canal blocks, and ditches to prevent fires. Water sources from drilled wells can be used when fires occur, although some drilled wells run dry when fires occur in peatland areas. Communities and local governments are trying to protect peatlands from fires because peatlands have a significant value.

The weakness in this social network is the low level of coordination between stakeholders involved in extinguishing activities. Even though there are groups of volunteers and government agencies that specifically deal with land fires when fires spread, each stakeholder tends to work separately [12]. In addition, the number of personnel from both community groups and the local government is still limited, which causes a risk of spreading to peatland areas. There is also not much extinguishing equipment, so it is difficult to extinguish fires when fires spread. In addition, water sources are also limited because drilled wells in several locations cannot be used, which causes the need for other water sources. Other government agencies outside disaster management manage some water sources. Therefore, the community and local government related to disaster management need to coordinate with various parties to deal with land fires. Good coordination is the key to managing land fires, but this has yet to be implemented optimally.

#### *4.3. Norms Applicable in the Banjar Community in Mitigating Land Fires*

Many people depend on peatlands for their lives, causing peatlands to be preserved. Peatlands are a part of the life of the Banjar people. Since ancient times, the Banjar people have developed a traditional planting system without burning to prevent land fires. The *tapulikampar* system is a tradition of the Banjar people that involves preparing land without burning. This system is a form of local wisdom of the Banjar people in managing swamps and peat swamps to prevent land fires. In this system, organic matter is obtained from the decomposition of dead swamp plants and then spread throughout the land [26,27]. In this system, land burning is no longer needed to increase fertility because people think that

burning land will cause the land to become degraded and violate the norms that apply in society. Burning also does not permanently make the land fertile because the residue from burning is carried away by water and lost from the peat soil [28].

According to the community, the perpetrators of land burning should be given social and legal sanctions. Perpetrators of land burning are ostracized by society as a form of social sanction, and they even have to pay a fine. Meanwhile, legal sanctions include imprisonment. However, there are no regulations that provide social sanctions in society. Meanwhile, legal sanctions have been implemented in Indonesia. Communities can also inform the local government or police if there is an act of burning land in their area. Usually, the perpetrators of arson will be subject to prison terms because there are already clear regulations governing forest and land burning violations, including peatlands. It is appropriate that regulations regarding forest and land fires must be implemented from the village level to the national level to prevent fires from spreading to fire-prone areas.

#### 4.4. The Social Capital Model of the Banjar Community in Mitigating Land Fires

The Banjar community's social capital model in mitigating land fires is seen from various aspects, including trust, social networks, and norms that apply in society. There are around 38 questions regarding social capital and land fire mitigation to explore social capital in land fire mitigation. The loading factor value is quite high, with a value of  $>0.5$  and Cronbach's Alpha  $> 0.7$ . In Table 2, a summary of the measurement model is presented.

The social capital model for mitigating peatland fires in the Banjar community is shown in Figure 3.

**Table 2.** Summary of the measurement model.

Construct	Items	Loading Factor	Cronbach's Alpha
Trust (T)	T1	0.755	0.844
	T2	0.734	
	T3	0.617	
	T4	0.600	
	T5	0.674	
	T6	0.583	
	T7	0.629	
	T8	0.710	
	T9	0.538	
	T10	0.606	
Social Networks (SN)	SN1	0.707	0.858
	SN2	0.695	
	SN3	0.673	
	SN4	0.620	
	SN5	0.730	
	SN6	0.669	
	SN7	0.719	
	SN8	0.631	
	SN9	0.549	
	SN10	0.591	

Table 2. Cont.

Construct	Items	Loading Factor	Cronbach's Alpha
Normal (N)	N1	0.539	0.745
	N2	0.528	
	N3	0.695	
	N4	0.660	
	N5	0.754	
	N6	0.783	
Mitigation (M)	M1	0.641	0.772
	M2	0.562	
	M3	0.744	
	M4	0.815	
	M5	0.667	
	M6	0.648	
	M7	0.641	

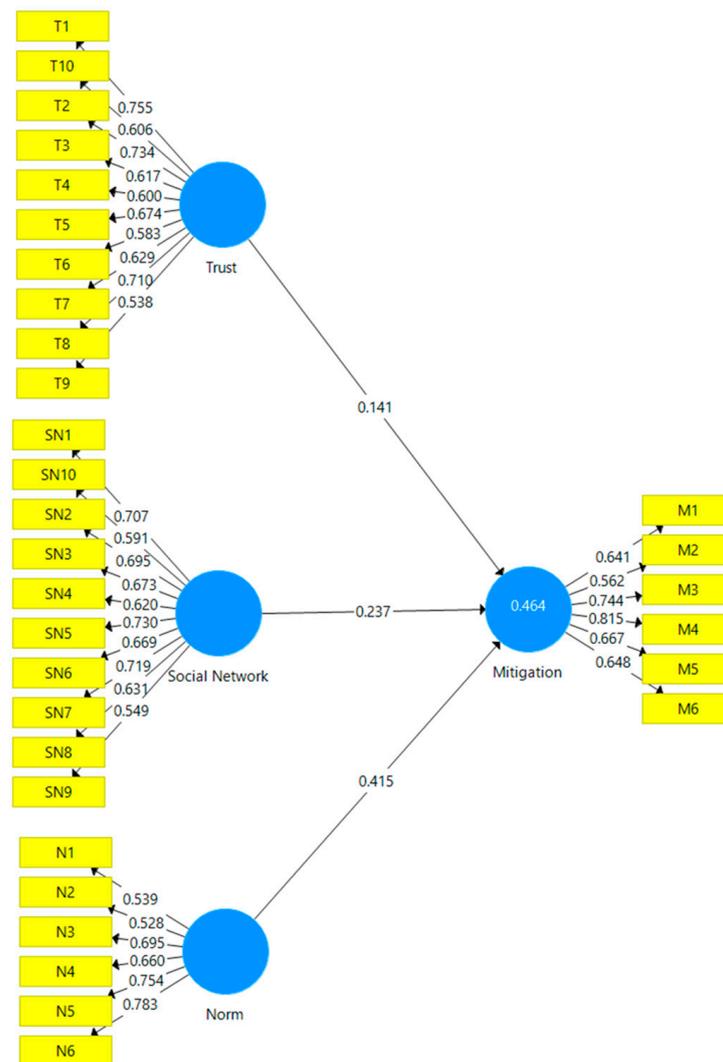


Figure 3. Social capital model in peatland fire mitigation (Source: data processing with SEM).

The correlation value between social capital and land fire mitigation ranges from 0.5 to 0.6. The highest correlation value is between norms and land fire mitigation compared to other correlation values, namely 0.627. It indicates that the relationship between norms and land fire mitigation is closer than the relationship between other social capital variables (Table 3).

**Table 3.** Correlation between social capital on land fire mitigation.

Variable	Mitigation
Trusts	0.546
Social network	0.533
norm	0.627

The  $p$ -value is  $<0.05$ , which indicates that the influence between the norm variable and land fire mitigation, and the social network with land fires is significant, while trust in land fire mitigation is not significant. The influence of norms on mitigating peatland fires is greater than the influence of other aspects of social capital on mitigating peatland fires. It shows that values, norms, rules, and sanctions significantly influence efforts to mitigate peatland fires compared to other aspects (Table 4).

**Table 4.** The model summary.

	Original Sample (O)	Sample Means (M)	Standard Deviation (STDEV)	T Statistics (10/STDEV1)	$p$ Values	Conclusion
Trust -> Mitigation	0.141	0.145	0.080	1767	0.078	Not Significant
Social Network -> Mitigation	0.237	0.241	0.056	4226	0.000	Significant
Norm -> Mitigation	0.415	0.415	0.071	5843	0.000	Significant

## 5. Discussion

Land fires that occur in peatland areas, which are always recurring, are a difficult problem to overcome. Through the social capital that applies to the Banjar community, it is hoped that these problems will be overcome. The Banjar community has norms that apply in society in the form of local wisdom values, norms, rules, and sanctions in managing peatlands so that it is more effective in managing peatlands compared to other aspects. The local wisdom of the people in Indonesia has been proven to have a significant role in disaster management in Indonesia. Local wisdom can be in the form of empirical experience from the community and the prohibitions that apply in society [29]. The Banjar people also have experience in managing peatlands for agriculture and how to make the land sustainable. Those who live on peatlands are very familiar with the peatlands themselves and can sustainably use peatlands, such as using the *tapulikampar* system to increase soil fertility [26,27]. Land preparation without burning is a norm in the Banjar community. This effort is carried out in the context of sustainable peatland management for the future.

Other variables such as trust and social networks also play a role in mitigating land fires, although they do not have a big influence on norms. The community believes that preserving the land is essential for sustainable wetlands. Social networks also play a role in land mitigation. Collaboration between community groups means that fire problems can be overcome, although implementation cannot yet be carried out optimally. In general, social capital plays a large role in mitigating land fires in the research area and although peatland fires still occur, social capital can reduce the possibility of the impact of peatland fires becoming more widespread.

Social capital has also led to a high degree of collective action, shown by the active participation of all parties in one group by their respective functions. There was a commitment from each individual to be open to one another, to trust one another, and to give authority to everyone to play their role according to their responsibilities. In this study, the representation of norms is rules and sanctions. In a society, norms in the form of rules and sanctions in managing peatlands are an important component of social capital to prevent peatland fires. Rules and sanctions are made to prevent fires from occurring in an area, including in the Kalimantan region. In Indonesia, forest and land-burning perpetrators can be given criminal penalties and fines for burning forests and land. Many actors play a role in burning land, so sanctions are an important key in overcoming land fires, even though the main actors of burning are difficult to identify and are not touched by the law [30]. The existence of rules and sanctions helps to restrain destructive behaviour towards peatlands [31].

Social networks have a significant influence on land fire mitigation. Coordination of cooperation and synergy is needed between disaster management actors [14]. Community participation and cooperation have been implemented to prevent land fires. Community participation has been carried out quite well by those joining the volunteer group. Collaboration has also been carried out between community groups and local governments. Many components play a role in handling land fires; it is just that coordination and synergy between groups still need to be improved. Coordination and synergy between components that play a role in managing peatland fire disasters are still deficient, which can cause peatland fire problems to continue [23]. The existence of sectoral egos causes social networks to not work properly, so the problem of land fires still needs to be solved.

The effect of trust in mitigating peatland fires has no significant effect on mitigating land fires. Even though the community thinks peatland is a source of livelihood for the community that needs preservation, peatland fires still occur. A well-managed grassland can become an economic resource for the community and a sustainable livelihood [32–34]. The tendency is that people pay less attention to lands that are less productive and overgrown with shrubs. As a result, the land still burns, especially in the dry season.

Based on these findings, the implication is that social capital is still an important factor in mitigating land fires in the study area. Even though peatland fires still occur, the presence of social capital can help reduce the potential for fires to become bigger and more widespread. This suggests that developing and strengthening social capital within communities can be a valuable strategy for increasing the resilience of peatland ecosystems and minimizing the impact of land fires in the future. In addition, the results of this research emphasize the need for continued efforts to increase trust and collaboration between community groups and local governments to optimize land fire mitigation strategies.

## 6. Conclusions

Community norms play a more significant role in addressing peatland fires compared to trust and social networks. These norms, encompassing values, rules, and sanctions, are the most effective means of mitigating land fires within the study area. While social networks also exert some influence, there remains room for improvement, particularly in enhancing the collaboration between community groups and local governments. Trust levels are relatively low, highlighting the need to address people's concerns regarding peatlands. Although individuals acknowledge the importance of peatlands for sustaining life, they prioritize their land, despite the potential for increased productivity in many peatland areas. On the whole, social capital has a positive impact on fire mitigation efforts. Social capital represents the collective strength within the community to combat peatland fires. Leveraging this social capital and harnessing the power of societal forces can effectively reduce the widespread impact of peatland fires. Recognizing the positive influence of social capital on fire mitigation suggests that making use of existing social networks and community resources can be a successful strategy. By building upon the

strengths and capacities of local communities, we can enhance the overall resilience of peatland ecosystems.

**Author Contributions:** Conceptualization, D.A., I.R., M.M. (Mutiani Mutiani) and K.P.H.; methodology, D.A. and E.W.A.; validation, I.R., K.P.H., D.R. and M.M. (Muhammad Muhaimin); formal analysis, I.R., K.P.H. and M.M. (Mutiani Mutiani); investigation, D.A.; resources, D.A.; data curation, K.P.H., I.R. and M.M. (Muhammad Muhaimin); writing—original draft preparation, D.A., I.R. and E.W.A.; writing—review and editing, I.R., E.W.A., D.R. and M.M. (Mutiani Mutiani); visualization, D.A. and I.R.; supervision, D.A.; project administration, K.P.H.; funding acquisition, D.A., I.R. and D.R. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research is supported by the Ministry of Education, Culture, Research, and Technology of Indonesia (Grant number: 026/E5/PG.02.00.PL/2023).

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Data are contained within the article.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

- Santoso, E.W.; Riza, H.; Kristijono, A.; Melati, D.N.; Prawiradisastra, F. Machine Learning Application in Response to Disaster Risk Reduction of Forest and Peatland Fire: Impact-Based Learning of DRR for Forest, Land Fire and Peat Smouldering. *Maj. Ilm. Pengkaj. Ind.* **2020**, *14*, 183–196. [\[CrossRef\]](#)
- Rozaki, Z.; Nopembereni, E.D.; Rahayu, L.; Rahmawati, N.; Murhidayah, M.L.; Rejeki, T.M.; Ariffin, A.S.; Azizah, S.N.; Tjale, M.M. Farmers' Lives and Adaptation Strategies toward the Forest and Peatland Fires in Indonesia: Evidence from Central and South Kalimantan, Indonesia. *Biodiversitas J. Biol. Divers.* **2022**, *23*, 2379–2388. [\[CrossRef\]](#)
- Usup, A.; Hayasaka, H. Peatland Fire Weather Conditions in Central Kalimantan, Indonesia. *Fire* **2023**, *6*, 182. [\[CrossRef\]](#)
- Akbar, A.; Adriani, S.; Priyanto, E. The Potential for Peatland Villages to Prevent Fire: Case Study of Tumbang Nusa Village Central Kalimantan. *IOP Conf. Ser. Earth Environ. Sci.* **2021**, *758*, 012017. [\[CrossRef\]](#)
- Rengasamy, N.; Parish, F. Sustainable Peatland Management Focusing on Community-Based Peatland Rehabilitation in Malaysia. In *Tropical Peatland Eco-Management*; Springer: Singapore, 2021; pp. 651–662. [\[CrossRef\]](#)
- Wahid, M.; Baidawi, A. Leadership and Social Capital in Handling Forest and Land Fires in Muaro Jambi Regency. *Mimb. J. Penelit. Sos. Dan Polit.* **2022**, *11*, 25–37.
- Mutiani, M.; Supriatna, N.; Abbas, E.W.; Wiyanarti, E.; Jumriani, J. Kampung Hijau: Bonding and Bridging Social Capital in Developing Sustainable Local Tourism. *Komunitas Int. J. Indones. Soc. Cult.* **2022**, *14*, 218–224. [\[CrossRef\]](#)
- Muringani, J.; Fitjar, R.D.; Rodríguez-Pose, A. Social Capital and Economic Growth in the Regions of Europe. *Environ. Plan. A Econ. Space* **2021**, *53*, 1412–1434. [\[CrossRef\]](#)
- Yami, S.; M'Chirgui, Z.; Spano, C.; Gontier, O.B. Reinventing Science and Technology Entrepreneurship Education: The Role of Human and Social Capitals. *Technol. Forecast. Soc. Chang.* **2021**, *164*, 120044. [\[CrossRef\]](#)
- Arisanty, D.; Putro, H.P.N.; Anis, M.Z.A.; Hastuti, K.P.; Abbas, E.W.; Aristin, N.F. Community and Government Preparedness to Reduce the Risk of Land Fires on Peatlands. *IOP Conf. Ser. Earth Environ. Sci.* **2023**, *1190*, 012019. [\[CrossRef\]](#)
- Jalil, A.; Sulistyani, A. Lukun Villager's Local Wisdom on Managing Fire Disaster Impact in Kepulauan Meranti Regency of Riau Province. *Int. J. Adv. Sci. Technol.* **2020**, *29*, 2622–2631.
- Arisanty, D.; Muhaimin, M.; Rosadi, D.; Saputra, A.N.; Hastuti, K.P.; Rajiani, I. Spatiotemporal Patterns of Burned Areas Based on the Geographic Information System for Fire Risk Monitoring. *Int. J. For. Res.* **2021**, *2021*, 2784474. [\[CrossRef\]](#)
- Arisanty, D.; Rajiani, I.; Hastuti, K.P.; Putro, H.P.N.; Abbas, E.W. Peatland Fire Mitigation: Indigenous People's Way in Surviving Economic and Ecological Sustainability. *Disaster Adv.* **2022**, *15*, 1–7. [\[CrossRef\]](#)
- Al Kautsar, P.H.; Mulyono, N.B. Ecosystem-Based Disaster Risk Reduction Concept for Forest and Land Fire Disaster. *Int. J. Emerg. Serv.* **2021**, *10*, 289–314. [\[CrossRef\]](#)
- Liu, W.; Gerber, E.; Jung, S.; Agrawal, A. The Role of Human and Social Capital in Earthquake Recovery in Nepal. *Nat. Sustain.* **2022**, *5*, 167–173. [\[CrossRef\]](#)
- Dahiyat, S.E.; Khasawneh, S.M.; Bontis, N.; Al-Dahiyat, M. Intellectual Capital Stocks and Flows: Examining the Mediating Roles of Social Capital and Knowledge Transfer. *VINE J. Inf. Knowl. Manag. Syst.* **2023**, *53*, 11–42. [\[CrossRef\]](#)
- Ray, C.; Nyberg, A.J.; Maltarich, M.A. Human Capital Resources Emergence Theory: The Role of Social Capital. *Acad. Manag. Rev.* **2023**, *48*, 313–335. [\[CrossRef\]](#)
- Zhang, H.; Han, R.; Wang, L.; Lin, R. Social Capital in China: A Systematic Literature Review. *Asian Bus. Manag.* **2021**, *20*, 32–77. [\[CrossRef\]](#)

19. Waring, S.M.; Robinson, K.S. Developing Critical and Historical Thinking Skills in Middle Grades Social Studies. *Middle Sch. J.* **2010**, *42*, 22–28. [[CrossRef](#)]
20. Halpern, D. *Social Capital*; Polity: Cambridge, UK, 2005.
21. Karunarathne, A.Y.; Lee, G. Traditional Social Capital and Socioeconomic Networks in Response to Flood Disaster: A Case Study of Rural Areas in Sri Lanka. *Int. J. Disaster Risk Reduct.* **2019**, *41*, 101279. [[CrossRef](#)]
22. Rustinsyah, R.; Prasetyo, R.A.; Adib, M. Social Capital for Flood Disaster Management: Case Study of Flooding in a Village of Bengawan Solo Riverbank, Tuban, East Java Province. *Int. J. Disaster Risk Reduct.* **2021**, *52*, 101963. [[CrossRef](#)]
23. Arisanty, D.; Putro, H.P.N.; Hastuti, K.P.; Rosadi, D.; Rajiani, I.; Muhaimin, M. Integrating Governments Bodies in Peatland Environmental Management to Eliminate the Sectoral Egos. *Procedia Environ. Sci. Eng. Manag.* **2021**, *4*, 783–792.
24. Hair, J.F., Jr.; Matthews, L.M.; Matthews, R.L.; Sarstedt, M. PLS-SEM or CB-SEM: Updated Guidelines on Which Method to Use. *Int. J. Multivar. Data Anal.* **2017**, *1*, 107–123. [[CrossRef](#)]
25. Arisanty, D.; Hastuti, K.P.; Putro, H.P.N. Disaster-Resilient Villages: Strengthening Community Capacity in Flood Disasters Managing in Wetland Areas. *Disaster Adv.* **2023**, *16*, 1–7. [[CrossRef](#)]
26. Hastuti, K.P.; Arisanty, D.; Rahman, A.M.; Angriani, P. Indigenous Knowledge Values of Bahuma as a Preservation of the National Culture of Indonesia. *IOP Conf. Ser. Earth Environ. Sci.* **2022**, *1089*, 012061. [[CrossRef](#)]
27. Hastuti, K.P.; Arisanty, D.; Rajiani, I. Preserving the Sustainability of Natural Resources and Agro-Ecosystems in Tidal Swamp Land through Local Wisdom in Indonesia. *J. Sustain. Sci. Manag.* **2022**, *17*, 77–97. [[CrossRef](#)]
28. Arisanty, D.; Jędrasiak, K.; Rajiani, I.; Grabara, J. The Destructive Impact of Burned Peatlands to Physical and Chemical Properties of Soil. *Acta Montan. Slovaca* **2020**, *25*, 213–223. [[CrossRef](#)]
29. Hutagalung, S.; Indrajat, H. Adoption of Local Wisdom in Disaster Management in Indonesia. *Int. J. Sci. Technol. Res.* **2020**, *9*, 48–52.
30. Purnomo, E.P.; Zahra, A.A.; Malawani, A.D.; Anand, P. The Kalimantan Forest Fires: An Actor Analysis Based on Supreme Court Documents in Indonesia. *Sustainability* **2021**, *13*, 2342. [[CrossRef](#)]
31. Jalil, A.; Yesi, Y.; Sugiyanto, S.; Puspitaloka, D.; Purnomo, H. The Role of Social Capital of Riau Women Farmer Groups in Building Collective Action for Tropical Peatland Restoration. *For. Soc.* **2021**, *5*, 341–351. [[CrossRef](#)]
32. Ariyanto, D.P.; Sumarno, S.; Supriyono, S.; Yunus, A.; Pudjiasmanto, B.; Rahayu, R.; Widijanto, H.; Suntoro, S. The Productivity Increasing of Peatlands on Community Land by Multi-Cropping Model in Riau Indonesia. *IOP Conf. Ser. Earth Environ. Sci.* **2019**, *393*, 012103. [[CrossRef](#)]
33. Terzano, D.; Attorre, F.; Parish, F.; Moss, P.; Bresciani, F.; Cooke, R.; Dargusch, P. Community-led Peatland Restoration in Southeast Asia: 5Rs Approach. *Restor. Ecol.* **2022**, *30*, e13642. [[CrossRef](#)]
34. Syahza, A.; Suwondo; Bakce, D.; Nasrul, B.; Mustofa, R. Utilization of Peatlands Based on Local Wisdom and Community Welfare in Riau Province, Indonesia. *Int. J. Sustain. Dev. Plan.* **2020**, *15*, 1119–1126. [[CrossRef](#)]

**Disclaimer/Publisher’s Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.