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The Role of Ecological Justice on the Buffer Zone Management in Indonesia: Mediating Role of Satisfied and Motivated People

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Abstract

Buffer zone management is a worldwide requirement due to substantial economic activities and environmental degradation. This element necessitates the researchers' goal, and the current research explores the influence of ecological justice, such as reduced air and water pollution, appropriate transportation, and adequate access to nutritious food, on buffer zone management in Indonesia. The research also analyzes the moderating effect of contented and motivated individuals on air and water pollution reduction, appropriate transportation, adequate access to healthy food, and buffer zone management in Indonesia. The article uses survey questions to obtain data from respondents using smart-PLS to examine the relationship between factors. Reduced air and water pollution, appropriate transportation, and access to healthy food were found to have a beneficial relationship with buffer zone management in Indonesia. In addition, the results demonstrated that contented and motivated individuals significantly mediate the relationships between reduced air and water pollution, appropriate transportation, adequate access to nutritious food, and buffer zone management in Indonesia. The paper assists policymakers in formulating buffer zoon management policies by promoting ecological justice.

Key words:
Ecological justice, satisfied and motivated people, reduced air and water pollution, adequate transportation, adequate access to healthy food, buffer zone management.

Introduction

Some portions of the nation's landmass have natural heritage or natural riches. These places are considered core areas for protecting natural reserves. Protecting these places is beneficial for the nation because it ensures environmental protection, human health, and the preservation of natural resources and supports the nation's economic progress. The buffer zones surround the core zones (Lamichhane et al., 2019). The development and protection of the core zone are heavily dependent on the management of the buffer zone. According to Walton et al., (2020), a buffer zone is a territory outside of a national park or similar reserve where specific development measures are implemented to enhance the area's conservation values or where resource use is restricted. Several buffer zone management strategies exist depending on the nature and objectives of the conservation area for which they are created. For instance, it is recommended that activities in the buffer zones surrounding certain protected areas be regulated to protect the core zone. In addition, a buffer zone can serve as a venue for research to develop strategies for resource conservation, ecosystem restoration, education, and training, as well as for properly planned tourism and recreation. There are differing degrees of legal protection for the buffer zone (Zak et al., 2019).

Ecological justice enforcement effectively enhances buffer zone management in accordance with conservation or core area objectives (Ajibade et al., 2022). Ecological justice is the fair treatment of all people, regardless of race, color, social status, income, or national origin, in the formulation, implementation, and enforcement of laws, regulations, and

policies for environmental protection and appropriate utilization of natural resources (Zhang et al., 2022). There are various ecological justice methods, such as reduced water and air pollution, appropriate transportation, and adequate access to nutritious food. The implementation of ecological justice reduces the effects of humans and their practices on the environment, aids in resolving environmental problems, conserves natural resources, promotes the growth of natural resources, and improves the health of all living things, both human and nonhuman. Therefore, buffer zone management, which includes ecological human capital development, a clean environment, expanding plants and greenery, and wildlife protection, is effective (Ishiyama, 2021).

This study investigates buffer zone management in Indonesia. In Indonesia, over 500 conservation zones are surrounded by buffer zones, including 54 national parks covering 16.4 million hectares and 527 nature and game reserves covering an additional 28.3 million hectares. Over fifteen percent of Indonesia's overall area consists of protected land. Around 15.7 million hectares of marine protected areas, or approximately 5% of all territorial seas (Nadhira et al., 2021). There are 54 national parks in Indonesia, 9 of which are primarily marine. Six of them, including the three-park Sumatran Tropical Rainforest Heritage, are World Heritage Sites. The Ramsar Convention has classified five wetland areas as wetlands of international significance, while seven national parks are included in the World Network of Biosphere Reserves. Janthoi Nature Reserve/Hutan Pinus and Singkil Barat Nature Reserve in Sumatra, Tangkoko Batuangus Nature Reserve in Sulawesi, and Ubud Monkey Forest in Bali are the Indonesian natural reserves (Hakim et al., 2019). In 2012, Indonesia had around 100 marine protected areas with a total size of 15,7 million ha, 32 of which were managed by the Ministry of Forestry and 80 by local governments. President Susilo Bambang Yudhoyono aimed to reach 20 million hectares by 2025. In 2010, Indonesia also declared a long-term objective of protecting 10% of its territorial seas, or 31 million hectares, with marine protected zones (Waluyo et al., 2021).

Though several buffer zones have been declared in Indonesia to meet the objectives of conservation zones, however, it is necessary to strengthen buffer zone management in several instances. The present study aims to eliminate this risk with a focus on buffer zone management. This study aims to investigate the effects on buffer zone management of ecological justice measures such as reduced water and air pollution, adequate mobility, and appropriate access to nutritious food. It also investigates the role of contented and motivated individuals as mediators between decreased water and air pollution, proper mobility, adequate access to healthy food, and buffer zone management.

Management of buffer zones has been the subject of several earlier studies, and the current study has derived its research topic from existing literature. Nonetheless, the new study makes substantial literary contributions and has a unique place in literature. Initially, several authors

have highlighted the importance of environmental justice in buffer zone management. The authors, however, paid no consideration to individual ecological justice measures, such as reduced water and air pollution, appropriate mobility, and adequate access to healthy food or their significance in buffer zone management. This study contributes to the body of knowledge by examining the effects of ecological justice measures such as reduced water and air pollution, adequate mobility, and adequate access to nutritious food on buffer zone management. Second, in earlier research, the role of contented and motivated individuals in buffer zone management has been explored. There is minimal debate on the role of contented and motivated individuals as mediators between ecological justice initiatives such as reduced water and air pollution, adequate mobility, and adequate access to healthy food and buffer zone management. This study contributes to the literature by examining the role of contented and motivated individuals as mediators between ecological justice policies such as reduced water & air pollution, adequate mobility, and adequate access to healthy food and buffer zone management. The remainder of the paper consists of the following sections: In the second section, the relationship between ecological justice measures, such as reduced water and air pollution, appropriate mobility, adequate access to healthy food, and buffer zone management is examined. In the third section, all procedures associated with data collecting and analysis are described and their relevance to the study. In the fourth section, outcomes are derived from the observed data. Their congruence proves the practical applicability of the results with prior studies with similar reasoning. The ramifications, findings, and limitations of the study are then presented.

Literature Review

To safeguard the conservation zones, buffer zones are shaped and must be managed. The efficacy of buffer zone management determines the goals attained by protected zones, which are to safeguard natural heritage or sensitive land areas. The objectives of effective buffer zone management and conservation zone protection benefit national development and economic progress (Van Sant et al., 2021). The management of buffer zones is affected by ecological justice, in which environmental regulations are designed and executed without regard to race, color, creed, or income. Implementing ecological justice practices such as reduced water and air pollution, appropriate mobility, and adequate access to nutritious food enhance buffer zone management (Zwickl, 2019). The relationship between ecological justice practices such as reduced water & air pollution, appropriate transportation, adequate access to healthy food, contented and motivated individuals, and buffer zone management holds a prominent place in the existing research. In the following paragraphs, the link between the abovementioned variables is studied considering prior research (Aljazzazen et al., 2021).

Reducing water pollution through good water management and air pollution by prohibiting toxic materials enhances nature's capacity and

restores balance to the weather cycle. The buffer zone's soil quality and plant and flora growth are preserved by the buffer zone's more productive environment. Therefore, reducing air and water pollution enhances buffer zone management (Kolcsár et al., 2021). Valkama et al., (2019) examine the relationship between reducing air and water pollution and buffer zone management. A meta-analysis research technique compiled a summary of 46 studies published between 1980 and 2017 on pollution and buffer zone management. If employees responsible for buffer zone management implement effective water & air management and overcome water pollution (both in surface runoff and subsurface water) and air pollution, they carry out their responsibilities effectively, according to the study. Management of buffer zones is hence effective. Barbieri et al. (2019) examine the effects of pollution reduction on air temperature and water quality in the agricultural and household aquifer system in Limpopo National Park, Gaza Province, Southern Mozambique. The collection of data from 25 groundwater samples. The results demonstrated that decreasing air and water pollution enhances buffer zone management for temperature and water quality regulation. Based on the discussion above, the following can be hypothesized:

H1: Reduced water & air pollution has a positive association with buffer zone management.

Under ecological justice, proper transportation infrastructure facilitates access to life essentials, resources for a healthy environment in a buffer zone, and human capital resources. Thus, appropriate mobility facilitates the management of buffer zones (Numanovich et al., 2020). Constantinou et al., (2020) investigate the connection between ecological justice and sufficient transportation and buffer zone management. In a situation following a violent conflict, data were obtained from United Nations buffer zones. The study suggests that residents can access equitable and adequate transportation infrastructure under ecological justice, buffer zone, and surrounding regions. In times of need, it facilitates the transformation of products and services. Therefore, the elimination of spatial obstacles aids in managing the buffer zone. Adequate mobility under ecological justice enhances buffer zone management. Numanovich et al., (2020) examine the correlation between ecological justice defined by appropriate transportation and buffer zone management. Under ecological justice, local shared transport is operated using clean energy supplies and energy-efficient engines. In transition and buffer zones, adequate transportation promotes the transfer of resources and the preservation of air quality. Consequently, buffer zones can be managed effectively to obtain the intended outcomes. Based on the cited findings, we propose the following hypothesis:

H2: Adequate transportation has a positive association with buffer zone management.

Food is essential to life. All humans require nutritious food, and other living organisms, such as plants, require seeds, fertilizer, and other materials; land and aquatic animals also require certain foods. As a result of the implementation of a buffer zone, which is the administrative and protective region for sensitive land patches containing natural heritage, people may have appropriate access to nutritious food. Consuming nutritious foods keeps natural living resources healthy and more effective at achieving their objectives. With high-quality live natural resources, buffer zone may be managed successfully. Bennett et al., (2022). Zhang et al. (2022) study the relationship between healthy food accessibility and buffer zone management in the context of ecological justice. The study suggests that environmental justice provides a condition in which everyone can have equitable access to sufficient and nutritious food to eat and feed their domesticated animals. Consequently, buffer zones are characterized by growing human capital and high-quality living resources. Therefore, buffer zones are likely to be maintained as conservation zones. Further, equal access to appropriate healthy food improves human capital development and helps manage buffer zones. The perspectives of the authors demonstrate:

H3: Adequate access to healthy food positively affects buffer zone management.

With ecological justice, decreasing water and air pollution in protected areas and buffer zones creates a healthy, comfortable environment for the local population. These individuals develop an appreciation for the management staff. They are motivated to cooperate with regulators and administrators in buffer zone management. Management of buffer zones is hence effective. It implies that contented and motivated individuals mediate between water and air pollution reduction and buffer zone management (Cabada, 2020). Anbleyth-Evans et al. (2020) investigate the connection between pollution reduction, human satisfaction and motivation, and buffer zone management. Suppose regulators demonstrate equal concern for the people and alleviate water & air pollution issues. In that case, everyone will have clean water, nutrient-rich and productive soil, and clean air to breathe. These individuals have a high level of satisfaction with the function of the regulator and are highly motivated to adhere to the enforceable regulations. The collaboration of the populace supports authorities in managing buffer zones effectively. Rutovskaya et al., (2020) claim that the environment, due to reduced water & air pollution, nurtures contented and motivated individuals, hence resulting in improved buffer zone management. Consequently, it may be stated that

H4: Satisfied and motivated people significantly mediate between reduced water & air pollution and buffer zone management.

A buffer zone is created around conservation zones, typically remote, sensitive, and significant land pieces. With the implementation of ecological justice, people are provided with adequate transportation

facilities to suit their needs. The populace has access to convenient transit amenities that do not compromise environmental cleanliness, and they are pleased with the behavior of administrators accountable for area administration. They are self-motivated to defend the environment, which makes buffer management feasible (de Lima Marques et al., 2019). According to Analytica (2019), people with access to adequate transportation can meet their daily demands and buy necessary items. When people's requirements are satisfactorily supplied, they feel satisfied, and their positive perception inspires them to comply with the buffer zone management's rules and regulations. Hence, buffer zone management improves. Sadaula et al. (2022) suggest that good transportation contributes to people's contentment and motivation. People who are content and motivated are cooperative in buffer zone maintenance. Hence, we may say:

H5: Satisfied and motivated people significantly mediate between adequate transportation and buffer zone management.

Under ecological justice, everyone is guaranteed enough nutritious food. When people in buffer zones consume nutrient-rich food, they enjoy good health, avoid wasting money and time on sickness treatments, and achieve their goals without interruption. These individuals generate a favorable opinion of the effectiveness of the area managers. Individuals who experience positive emotions are motivated to contribute effectively to improving buffer zones. So, buffer zone management is effective (Lind et al., 2019). Yioutani-Iacovides (2019) emphasizes that when individuals have appropriate access to healthy food, their happy lifestyle and good health improve their attitudes toward the regulators accountable for the area's growth. As a result, individuals have a high level of satisfaction and are highly motivated to participate in buffer zone management, leading to an improved outcome. Putra et al., (2019) also claim that people have access to healthy, nutrient-dense food and are motivated in buffer zones. Their cooperation aids in achieving the objectives of buffer zone management. So, we can say:

H6: Satisfied and motivated people significantly mediate between adequate access to healthy food and buffer zone management.

Research Methods

This study examines the influence of reduced air and water pollution, adequate transportation, and adequate access to nutritious food on buffer zone management in Indonesia and the impact of contented and motivated individuals as a moderator between these variables. Using survey questionnaires, the author collects data from respondents. These items were utilized to assess the structures. The reduced air and water pollution are measured with seven items extracted from Cho et al., (2020), adequate transportation is measured with ten items extracted from Cusack (2021), adequate access to healthy food is measured with six items extracted from

Drisdelle et al., (2020), satisfied and motivated people are measured with five items extracted from Ayalew et al. (2019). Buffer zone management is measured with six items adopted by Lamichhane (2019).

In Indonesia, the researchers collect primary data from employees of the State Ministry of Environment (MOE). The researchers sent the questionnaires by mail. They distributed approximately 693 surveys but only obtained 374 legitimate responses, a response rate of roughly 53.96 percent. The researchers also utilized smart PLS to examine the relationship between factors. It yields the most significant results using complicated models and massive data sets (Hair et al., 2017). The research examined three independent factors, including reduced air and water pollution (RAWP), adequate transportation (ADT), and appropriate access to nutritious food (AAHF). In addition, the study utilized one dependent variable, such as buffer zone management (BZF), and one mediating variable, such as satisfied and motivated individuals (SMP). Figure 1 has these factors.

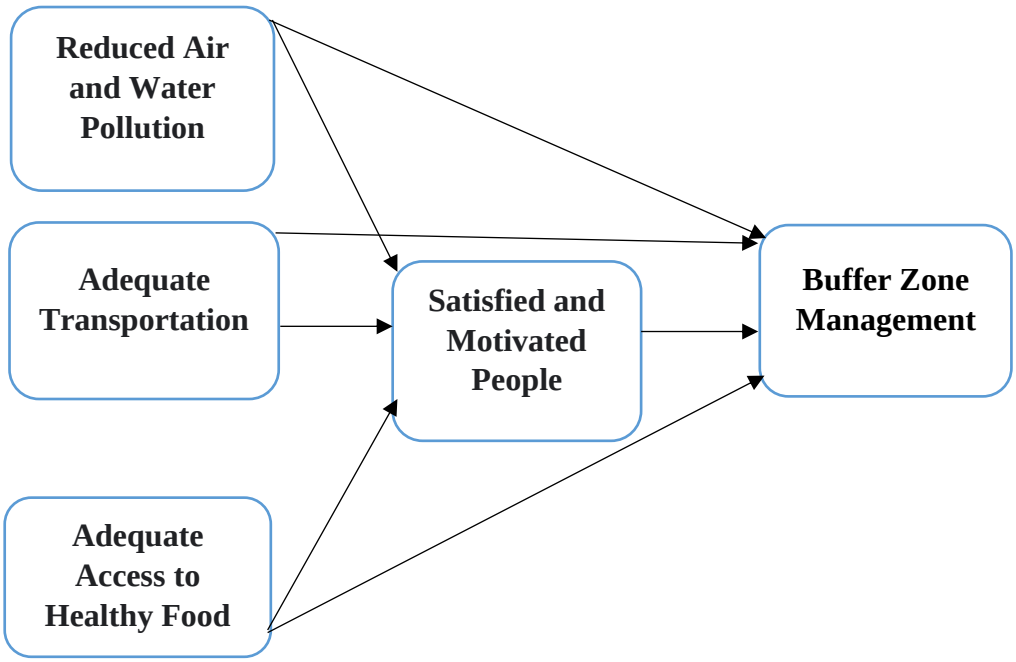

Figure 1: Theoretical Framework

Research Findings

The research examines the correlation between the items, and the results indicate that the composite reliability (CR) and Alpha test scores are more significant than 0.70. In addition, the results demonstrated that both the average variance extracted (AVE) and factor loadings test values exceed 0.50. These results revealed a strong link between items. These results are listed in Table 1.

Table 1: Convergent validity

Constructs	Items	Loadings	Alpha	CR	AVE
Adequate Access to Healthy Food	AAHF1	0.785	0.863	0.898	0.595
	AAHF2	0.840			
	AAHF3	0.739			
	AAHF4	0.743			
	AAHF5	0.814			
	AAHF6	0.698			
Adequate Transportation	ADT1	0.792	0.918	0.931	0.573
	ADT10	0.754			
	ADT2	0.736			
	ADT3	0.727			
	ADT4	0.724			
	ADT5	0.758			
	ADT6	0.730			
	ADT7	0.812			
	ADT8	0.792			
	ADT9	0.740			
Buffer Zone Management	BZF1	0.787	0.828	0.879	0.594
	BZF3	0.789			
	BZF4	0.701			
	BZF5	0.787			
	BZF6	0.784			
Reduced Air and Water Pollution	RAWP1	0.642	0.891	0.915	0.606
	RAWP2	0.722			
	RAWP3	0.826			
	RAWP4	0.789			
	RAWP5	0.821			
	RAWP6	0.837			
	RAWP7	0.794			
Satisfied and Motivated People	SMP1	0.878	0.868	0.905	0.658
	SMP2	0.866			
	SMP3	0.670			
	SMP4	0.818			
	SMP5	0.809			

The research examines the variables' correlation and cross-loadings. Fornell Larcker's findings indicate that the figures showing a relationship with the construct are greater than those indicating a relationship with other constructs. These results revealed a low degree of connection between variables. These results are presented in Tables 2 and 3.

Table 2: Fornell Larker

	AAHF	ADT	BZF	RAWP	SMP
AAHF	0.771				
ADT	0.658	0.757			
BZF	0.613	0.716	0.771		
RAWP	0.461	0.577	0.652	0.779	
SMP	0.499	0.480	0.624	0.444	0.811

Table 3: Cross-loadings

	AAHF	ADT	BZF	RAWP	SMP
AAHF1	**0.785**	0.603	0.532	0.423	0.375
AAHF2	**0.840**	0.446	0.414	0.330	0.419
AAHF3	**0.739**	0.428	0.435	0.376	0.396
AAHF4	**0.743**	0.561	0.521	0.334	0.336
AAHF5	**0.814**	0.418	0.373	0.286	0.383
AAHF6	**0.698**	0.548	0.525	0.361	0.394
ADT1	0.369	**0.792**	0.494	0.452	0.299
ADT10	0.649	**0.754**	0.568	0.446	0.399
ADT2	0.685	**0.736**	0.587	0.421	0.403
ADT3	0.688	**0.727**	0.608	0.432	0.426
ADT4	0.614	**0.724**	0.523	0.396	0.372
ADT5	0.343	**0.758**	0.478	0.394	0.316
ADT6	0.314	**0.730**	0.466	0.445	0.294
ADT7	0.406	**0.812**	0.556	0.466	0.378
ADT8	0.433	**0.792**	0.635	0.527	0.426
ADT9	0.338	**0.740**	0.422	0.353	0.245
BZF1	0.469	0.648	**0.787**	0.468	0.375
BZF3	0.477	0.626	**0.789**	0.513	0.472
BZF4	0.371	0.449	**0.701**	0.456	0.686
BZF5	0.528	0.528	**0.787**	0.568	0.446
BZF6	0.516	0.500	**0.784**	0.504	0.421
RAWP1	0.280	0.298	0.404	**0.642**	0.247
RAWP2	0.281	0.388	0.434	**0.722**	0.209
RAWP3	0.439	0.499	0.609	**0.826**	0.397
RAWP4	0.404	0.502	0.470	**0.789**	0.338
RAWP5	0.345	0.483	0.512	**0.821**	0.370
RAWP6	0.368	0.492	0.577	**0.837**	0.418
RAWP7	0.368	0.448	0.508	**0.794**	0.386
SMP1	0.475	0.433	0.575	0.381	**0.878**
SMP2	0.370	0.360	0.490	0.364	**0.866**
SMP3	0.393	0.449	0.528	0.431	**0.670**
SMP4	0.420	0.363	0.479	0.299	**0.818**
SMP5	0.336	0.308	0.420	0.298	**0.809**

The research checks the correlation of the variables, and the Heterotrait Monotrait (HTMT) ratio revealed that the figures are lower than 0.85. These outcomes exposed a low correlation between variables. These outcomes are mentioned in Table 4.

Table 4: Heterotrait Monotrait Ratio

	AAHF	ADT	BZF	RAWP	SMP
AAHF					
ADT	0.709				
BZF	0.717	0.806			
RAWP	0.516	0.626	0.752		
SMP	0.569	0.518	0.727	0.488	

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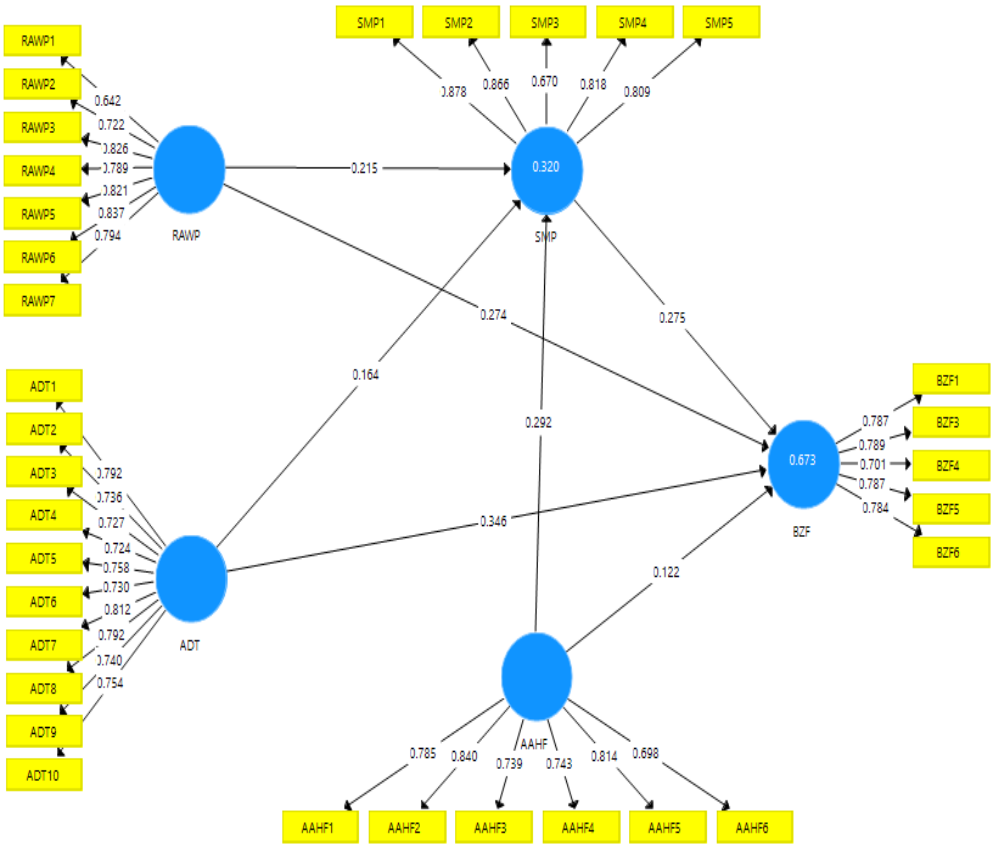

Figure 2: Measurement Model Assessment

The research examines the direct relationship first. The results reveal that buffer zone management in Indonesia is positively associated with reduced air and water pollution, adequate transportation, and adequate access to nutritious food, therefore accepting hypotheses H1, H2, and H3. These results are listed in Table 5.

Table 5: Direct path analysis

Relationships	Beta	Standard Deviation	T Statistics	P Values
AAHF -> BZF	0.122	0.043	2.830	0.005
AAHF -> SMP	0.292	0.060	4.881	0.000
ADT -> BZF	0.346	0.043	7.993	0.000
ADT -> SMP	0.164	0.077	2.118	0.035
RAWP -> BZF	0.274	0.037	7.383	0.000
RAWP -> SMP	0.215	0.062	3.436	0.001
SMP -> BZF	0.275	0.038	7.194	0.000

In addition to examining the indirect relationship, the study reveals that satisfied and motivated individuals significantly mediate the relationship between reduced air and water pollution, adequate transportation, adequate access to healthy food, and buffer zone management in Indonesia and acceptance of H4, H5, and H6. These results are listed in Table 6.

Table 6: Indirect Path Analysis

Relationships	Beta	Standard Deviation	T Statistics	P Values
ADT -> SMP -> BZF	0.145	0.024	6.042	0.000
AAHF -> SMP -> BZF	0.080	0.018	4.346	0.000
RAWP -> SMP -> BZF	0.059	0.018	3.252	0.001

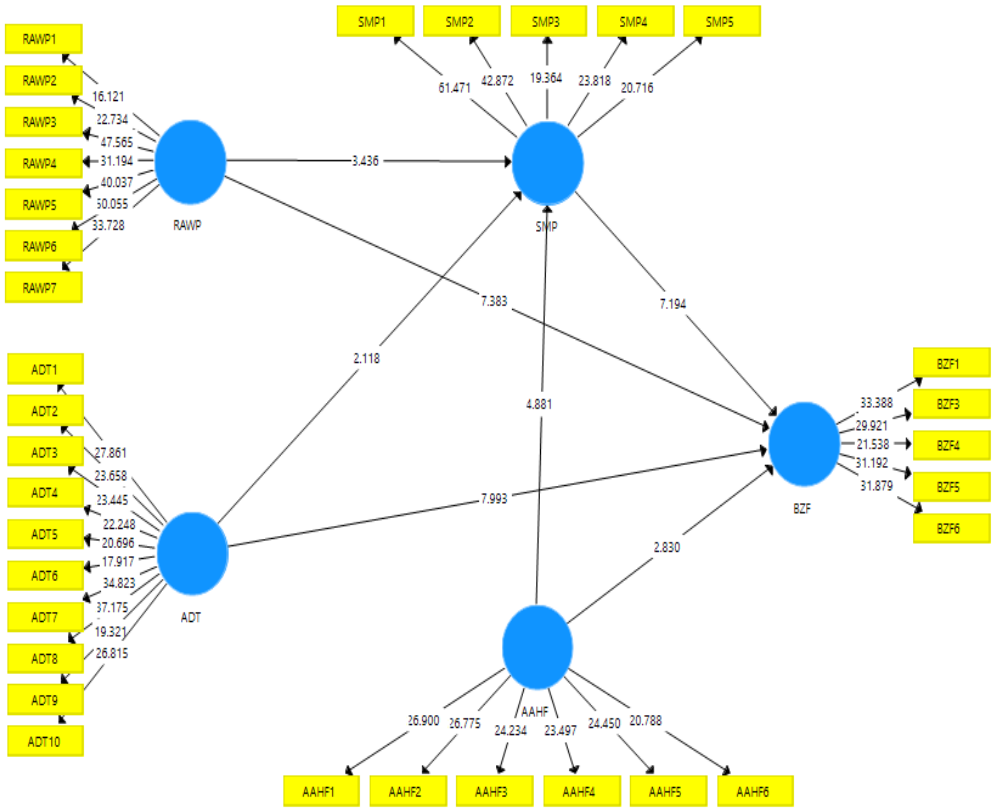

Figure 3: Structural Model Assessment

Discussions

The results indicated that buffer zone management positively correlates with lower water and air pollution. Carluer et al., (2019) all support these findings. The study demonstrates that when policies are created and implemented to properly carry out water & air management and decrease the development of toxins in water streaming throughout the region and the atmosphere, the animals in the buffer zone and conservation zone have access to clean water & food. In this scenario, buffer zones can be managed efficiently to accomplish conservation zone objectives. These results are also consistent with the findings of Gene et al. (2019), which indicate that buffer zone management can be enhanced if water and air pollution are reduced, the atmosphere becomes cleaner, and the soil becomes more productive. The results demonstrated a correlation between adequate transportation and buffer zone management. Cole et al., (2020) corroborate these findings, concludes that citizens can quickly obtain life's requirements if they have access to adequate transportation facilities. They do not have to deal with life concerns. Consequently, regulators can more effectively control buffer zones. These results are also consistent with Xu

et al. (2020)'s examination of the role of buffer zones in reducing pollution. This study suggests that it will be easier for regulators to regulate buffer zones if they adhere to ecological justice and provide fair, pollution-free transportation facilities to individuals in buffer zones.

The results demonstrated a correlation between appropriate access to nutritious foods and buffer zone management. According to the paper by Goudarzian et al., (2021), under ecological justice, individuals have equitable access to healthy food for themselves and to feed animals (cattle, birds, and fish), human capital grows, and other living resources are likewise of high quality. Thus, the buffer zones surrounding protected sites are adequately controlled. These findings are also consistent with Benassi et al., (2020)'s research, which demonstrates that if there is appropriate availability of nutritious food, the residents of buffer zones will be healthy, active, and cooperative. Therefore, it will likely maintain a buffer zone. The findings revealed that contented and motivated individuals significantly mediate the relationship between decreased water and air pollution and buffer zone management. These findings are reinforced by Dong et al., (2021), who demonstrate that reduced water and air pollution leads to satisfied and motivated individuals, enhancing buffer zone management. These findings are also consistent with the research conducted by Du et al. (2019), which indicates that satisfied and motivated individuals, as a result of a decrease in water and air pollution, improve buffer zone management. The findings demonstrated that contented and motivated individuals significantly moderate the relationship between appropriate transportation and buffer zone management. According to Ji et al., (2019), when sufficient, clean, and high-quality transportation facilities are made available, people feel satisfied and motivated. This contributes to enhanced buffer zone management. These findings are also consistent with Carstensen et al. (2020).'s assertion that people who have access to enough transportation are satisfied and motivated; hence, buffer zone management may be helpful. The results demonstrated that contented and motivated individuals significantly moderate the relationship between appropriate access to nutritious food and buffer zone management. Vidon et al., (2019) support these findings; when people have access to good food, they are satisfied and driven. These individuals are assisted in the management of buffer zones.

Implications

As a result of the study's originality in the academic literature, scholars who read the article may gain valuable insights from it. This study explores the effects of buffer zone management on ecological justice practices, such as reduced water and air pollution, adequate mobility, and adequate access to nutritious food. It also contributes to the body of knowledge regarding the role of satisfied and motivated individuals in mediating the relationship between reduced water and air pollution, appropriate mobility, and adequate access to nutritious food with buffer zone management. In addition, the study commences an analysis of the role of reduced water and

air pollution, enough mobility, and adequate access to nutritious food in Indonesian buffer zone management.

The research has numerous practical ramifications. The report provides authorities with recommendations for improving buffer zone management. For buffer zone management to be effective, the study suggests that a policy must be created and implemented to reduce water and air pollution in the buffer zone and transitional zone. The report also proposes that the public be provided with appropriate, clean, quick transit facilities. It would improve the management of buffer zones. A guideline for regulators stipulates that people must have adequate access to nutritious food; buffer zone management must therefore be undertaken. The paper assists policymakers in formulating buffer zoon management policies by promoting ecological justice. The study also indicates that policymakers must increase people's pleasure and motivation through appropriate transportation, decreased water and air pollution, and adequate healthy food with buffer zone management.

Conclusion

The study aimed to determine the role of reduced water and air pollution, appropriate transportation, adequate access to nutritious food, and content and motivated individuals in buffer zone management. Indonesian data demonstrated a positive correlation between these characteristics. The results indicated that if water and air pollution are reduced, the atmosphere will be clean, the environment will be more productive, and living resources will be abundant. Consequently, buffer zone management can be enhanced. According to the findings, it is simple to properly regulate buffer zones provided regulators adhere to ecological justice and give people more environmentally friendly mobility options.

Similarly, if management and the general population have appropriate access to nutritious foods, they are healthy, energetic, and cooperative. Therefore, it will likely maintain a buffer zone. According to the study, contented and motivated individuals moderate the relationship between decreased water and air pollution, appropriate mobility, adequate access to healthy food, and buffer zone management. People will be satisfied and motivated to improve buffer zone management if there is a reduction in water and air pollution, appropriate access to transportation, and adequate access to healthy food.

Limitations

The role of environmental justice measures such as reduced water and air pollution, appropriate mobility, and adequate access to healthy food in buffer zone management has just been investigated. Even though administrators' management abilities, which play a crucial part in buffer zone administration, are largely neglected, future researchers must also evaluate managers' management abilities while assessing buffer zone

management. In addition, Indonesia was the focus of the study surveys, and the relationship between components was investigated. For complete and general results, it is suggested that future authors do analyses in numerous nations.]

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