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Climate Change Induced Saltwater Intrusion and Migration Intentions in the Mekong Delta

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ABSTRACT

This study uses the Theory of Planned Behavior to examine how saltwater intrusion information affects dry season migratory intentions in impacted areas. The study collected data from coastal communities in Ca Mau, Bac Lieu, Soc Trang, and Ben Tre using online and in-person questionnaires. The data that was gathered was then evaluated using Partial Least Square – structural equation modeling. The findings indicate that individual attitudes toward saltwater intrusion play a significant role in shaping their perception of its impact. Notably, there is a willingness to adapt. Although subjective norms are not yet clearly expressed, this factor influences salinity intrusion awareness, meaning that people actively monitor and apply adaptive solutions to respond to environmental changes. Moreover, perceived behavioral control directly influences migration intentions, suggesting that enhanced resilience and coping strategies could mitigate migration pressures. Government policies and infrastructure play a crucial moderating role by providing essential support and adaptations, which influence residents' responses to environmental challenges. This study underscores the need for targeted governmental and community-focused interventions to enhance resilience and reduce migration driven by environmental stressors in the Mekong Delta, contributing to the broader discourse on climate change adaptation and community resilience.

1. INTRODUCTION

Climate change is unquestionably one of the most significant and urgent concerns confronting the globe. Climatic change refers to long-term changes in sea levels, temperature, precipitation, and other climatic indicators [1]. Rising sea levels and increasing salt in coastal regions endanger freshwater resources and livelihoods, making climate change a huge problem for vulnerable locations across the world. One of the regions experiencing effects of climate change, including saltwater intrusion, the Mekong Delta in southern Vietnam. This intrusion results from saltwater from the ocean invading freshwater supplies, thereby compromising agriculture, freshwater supplies, and the general viability of coastal towns.

As per the General Department of Meteorology and Hydrology, saltwater intrusion significantly affects rivers and channels in the Mekong Delta between February and July. Consequently, it has a substantial impact on the lives of residents and agricultural activities in the region. The Mekong Delta has seen severe damage since 2016, affecting over 160,000 hectares of rice and more than 7,000 hectares of crops. Apart from that, these incidents have affected about 400,000 homes. The region had yet another, more intense and widespread saltwater intrusion catastrophe in 2020 [2].

Famous as Vietnam's "rice bowl" the Mekong Delta is home to a large population and an abundance of rice and seafood [3]. A combination of its low elevation, complex river system, and high dependence on freshwater for agriculture and trade makes it susceptible to saltwater invasion. The risk of saltwater intrusion is growing as climate change intensifies the frequency and intensity of extreme weather events such storms and doughs, therefore seriously compromising the socioeconomic growth and environmental sustainability of the area [4].

While earlier studies have looked at how climate change influences world migration patterns, major knowledge gaps still exist on how saltwater intrusion especially influences migratory intentions in the Mekong Delta environment. Modern research frequently focuses solely on objective measures of environmental transformation, such as rising sea levels and salt levels, while failing to adequately integrate the subjective perspectives and experiences of communities affected by environmental change [5]. Research on the impact of socioeconomic status, cultural beliefs, and government policies on migration patterns in saltwater-affected areas remains scarce. This study seeks to fill this gap by investigating the relationship between migration intentions in the Mekong Delta and individuals' perceptions of saltwater intrusion. The research delves into the causes and motives behind migration decisions in response to saline intrusion using a mixed-methods technique, which combines qualitative

interviews and quantitative surveys [6]. In particular, the project intends to investigate the socio-economic aspects that impact these choices, the ways in which people understand the dangers of salt incursion, and how these understandings impact their plans to either move or adjust.

The advancement of transformation techniques, land use arranging, and strategy mediations to work on the flexibility of waterfront networks in the Mekong Delta and other weak regions requires a comprehension of the cooperations between ecological dangers, financial elements, and movement aims [7].

2. LITERATURE REVIEW

This research will consider people's perceptions of climate change and those directly impacted by environmental impact change. The theory of planned conduct has been given a transparent model accounting for the effect of intentions and actions on human behaviour, including subjective norms, attitudes, and perceived behavioral control [8]. It can measure the participants' understanding of this issue and their strategies for migration by considering how they rate its impacts and consequences. Failure to adopt negative attitudes will lead to indifference or denial, while evaluating favourable attitudes might lead to the migration's actions, including moving to other less affected areas [9]. It has been found that this objective criterion can cause subjective factors to affect people's decisions to stay, change, or leave [10]. Perceived behavioural control is also essential as it regards people's confidence in dealing with the salinity issue independently with their resources and actions [11]. Financial resources, professional possibilities, and social networks influence perceived control over migratory intents, which leads to movement as an adaptive reaction.

2.1 Attitudes towards saltwater intrusion

Saltwater intrusion perceptions mean people's beliefs and evaluations of how significant the consequence of this issue is to their lives. Sengupta and Samanta [12] found that knowledge about threats may produce a positive attitude among people who want to take early measures or otherwise move to safer areas. Indeed, Rakib et al. [13] also elucidate that these perceptions are formed based on how the other consequences associated with seawater intrusion affect people's lives. On the other hand, knowledge, as used in the context of seawater infiltration, means an individual's appreciation of it as much as the content has been seen, experienced, or learnt from other people or another information source [10]. Studies showed that people with a poor perception of seawater intrusion consider it dangerous to health and wealth compared to those with a better perception of it. It makes them more willing to consider relocation to another place as one of the possible options to avoid such outcomes [13].

Migration intentions are shaped by persons' attitudes and understanding of saltwater intrusion. These factors represent their inclination or plans to deal with the perceived hazards and effects of saltwater intrusion, which occur annually and persist for extended periods [14].

H1. Individual's attitudes are related to perceptions of saltwater intrusion

2.2 Subjective norms

Subjective norms significantly shape how residents of the Mekong Delta perceive and respond to saltwater intrusion, especially concerning decisions to migrate. These norms dictate acceptable approaches to environmental challenges and the feasibility of migration, as outlined by Hasnat et al. [15]. Typically, these norms are established through the social expectations and pressures imposed by influential figures, including family members, coworkers, and community leaders [16].

According to Koerth et al. [17], individuals with strong subjective norms may experience a sense of communal responsibility or duty to react to saltwater intrusion in specific ways. These responses could involve staying in their current location and adapting to the changing environment, or considering migration as a viable option when faced with saltwater intrusion [18].

Individuals in a community who understand the impact of saline intrusion on their standards may feel more motivated to relocate to less impacted locations, resulting in higher support [10]. Individuals who believe that strong societal expectations favor staying in a certain position may feel required to do so, even if it jeopardizes their well-being.

H2. Subjective norms influenced by saltwater intrusion and shaping migration intentions

2.3 Perceived behavioral control

The concept of perceived behavioral control in research reflects an individual's belief in their capability to manage or alleviate the effects of saltwater intrusion through personal actions. This perception is influenced by factors such as access to resources, knowledge, survival skills, and supportive policies, which in turn shape individual responses to saltwater intrusion and decisions to migrate as an adaptive strategy [19].

Individuals with high perceived behavioral control are likely to feel confident in their ability to implement adaptive measures, such as constructing protective infrastructure or managing water effectively, to lessen the intrusion's impact on their lives and livelihoods. Conversely, individuals with low perceived behavioral control may feel overwhelmed by the challenges of saltwater intrusion and consider migration as a viable escape from these threats [20].

Additionally, recent studies indicate that migration intentions are also shaped by individuals' perceptions of their control over migration decisions in response to saltwater intrusion [21]. Those with a strong sense of behavioral control may feel empowered to make proactive migration decisions, weighing the risks and opportunities of staying or relocating. In contrast, individuals with limited behavioral control might feel constrained in their decision-making and more cautious about considering migration as a means to improve their circumstances.

H3. Perceived behavioral control has an effect on salinity intrusion perception

H4. Perceived behavioral control have an impact on migration settlement

2.4 The perception of saltwater intrusion and intentions to migrate

The perception of saltwater intrusion, defined as an individual's awareness of the scale and severity of saltwater encroaching into freshwater sources in the Mekong Delta,

significantly influences the migration intentions of the region's residents. The Mekong Delta, with its low-lying terrain and reliance on freshwater for agriculture and livelihoods, is particularly vulnerable to the impacts of saltwater intrusion due to climate change [13].

As residents witness the condition of saltwater infiltrating rivers, canals, and agricultural fields, their awareness of the risks and consequences associated with intrusion increases. High levels of saltwater intrusion can lead individuals to perceive greater threats to their welfare, livelihoods, and the community's resilience, thereby affecting their intentions to migrate [12].

The migration intentions of Mekong Delta residents are closely linked to their perceptions of saltwater intrusion and the adaptive strategies they deem necessary to mitigate its impact. Faced with increasing salinity and the accompanying challenges to agricultural productivity, available freshwater, and community resilience, residents may view migration as an appropriate response to minimize the impacts [19]. Migration can be seen as a means to escape immediate risks and uncertainties associated with saltwater intrusion, as well as to seek better economic opportunities and living conditions in less affected areas [7].

H5. Perception of saltwater intrusion has an effect on migration intention

2.5 The moderate role of government policies and infrastructure

In the context of the Mekong Delta, government policies and infrastructure play a crucial moderating role in shaping how saltwater intrusion, driven by climate change, influences migration intentions [22]. Research indicates that robust government interventions and infrastructure development can significantly mitigate the adverse effects of saltwater intrusion, thereby influencing whether residents choose to migrate or stay [23]. Policies that focus on enhancing water management systems, constructing saltwater barriers, and improving irrigation facilities are essential in providing alternatives to migration by enhancing resilience and adaptability among local populations [24].

Moreover, infrastructure improvements that facilitate better drainage and flood management can reduce the vulnerability of agricultural lands to saltwater damage, directly affecting livelihoods and indirectly influencing migration decisions [25]. However, the effectiveness of these policies and infrastructures often depends on their alignment with local needs and the extent of community involvement in planning and implementation phases, which can vary significantly across different regions of the Mekong Delta [26].

In summary, government policy and infrastructure development not only provide physical solutions to the challenges posed by saltwater intrusion but also play a pivotal psychological role in stabilizing communities, thereby potentially reducing the perceived need to migrate.

H6. Effective government policies and infrastructure development weaken the impact of perceived saltwater intrusion on migration intentions in the Mekong Delta

The literature review informs the development of hypotheses, which are modeled according to the conceptual measurement structure illustrated in Figure 1.

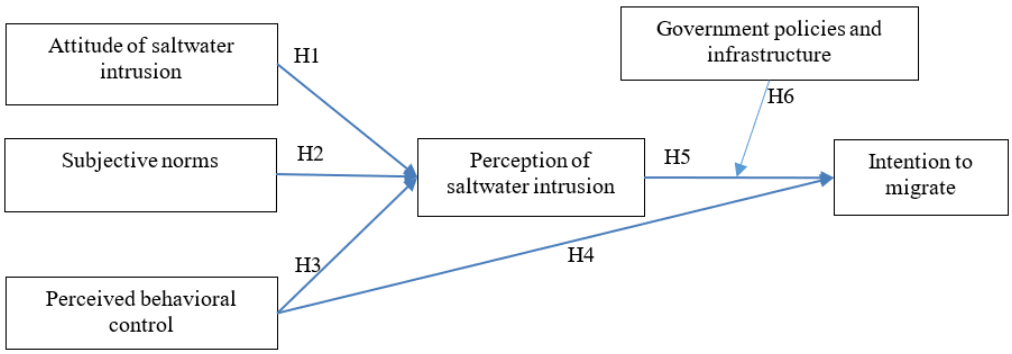

Figure 1. The model analyzes how individuals form their intention to migrate

3. METHOD

3.1 Measuring concepts

The purpose of the study is to examine how people perceive climate change related migration intentions. The characteristics of the study sample are determined by Nguyen [27] demographic factors such as age, gender, and job groups (farmers, fishermen, workers).

The concept of attitudes towards saltwater intrusion has been synthesized from previous studies [10-14]. To understand how each individual's subjective level affects their perception of saltwater intrusion, this concept is measured based on subjective norms and content synthesized from other studies [10, 15-18]. Furthermore, in forming migration intentions, each individual may perceive behavioral control before making a decision, this concept is measured as perceived behavioral control, with content synthesized from related studies [19-21]. As factors influence individual perceptions and form migration intentions, the mediating role of the perception of saltwater intrusion is considered before the behavior of migration intentions forms and the content for measuring this concept is synthesized from previous related studies [7, 12, 13, 19, 28].

3.2 Sample size and data collection

In this study, there were a total of 30 observations from 7 measurement concepts, and the data processing method used was the PLS-SEM algorithm. The sample size estimation is recommended according to the principle of 10 times the number of observed variables, thus estimating a minimum sample size of 210 responses [29]. To ensure a sufficient sample size for the study and reduce bias in data processing

due to inadequate samples, this research design required responses from 350 individuals; the actual number of responses received was 238, resulting in a sample collection success rate of 68%.

To achieve the sampling results, the authors approached a non-probability convenience sampling method. In areas affected by saltwater intrusion in Ca Mau, Bac Lieu, Soc Trang, and Ben Tre, the authors approached residents and asked for their permission to explain the research purpose. Those residents who agreed allowed the authors to interview them and explain the measurement concepts [30]. Finally, a link connected to a Google Drive survey content was sent for the residents to respond, with data recorded throughout the survey process from May 25 to August 25, 2024.

3.3 Data analysis

This study used a mixed methods approach to define the measurement content, drawing from previous research. Initial consultations involved structured discussions with five faculty experts specializing in the subject matter, aimed at refining and adjusting the questionnaire to better suit the specific research context and target demographic. Additionally, a preliminary survey was conducted with a sample of 60 residents to gauge their understanding of the measurement concepts, ensuring the readiness and appropriateness of the instruments for the main data collection phase [31].

For the quantitative analysis, the design of this study measured the variables using a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). To ensure the reliability of our scale, the research calculated Cronbach's Alpha, which assesses the internal consistency of the scale, thus indicating how well the items that comprise the scale are correlating to form a single factor. Subsequently, Confirmatory Factor Analysis (CFA) was applied to verify the hypothesized factor structure of the measurement model, helping to confirm the constructs' validity by examining the extent to which each variable correlates with its respective latent construct [32]. Finally, the approach method Partial Least Squares Structural Equation Modeling [33] to explore the relationships within the conceptual framework, particularly how individual impacts influence the perception of saltwater intrusion and, ultimately, the formation of migration intentions. This method is particularly useful in models aiming to maximize explained variance in dependent constructs, providing a clearer understanding of the underlying dynamics between perceptions, environmental changes, and adaptive behaviors.

4. RESULTS

4.1 Demographic characteristics

Table 1 presents basic demographic information about the sample, including gender, age group, and occupation. Of the participants, 57.10% were female. The predominant age group was 18-30 years, representing 58.80% of the respondents. A significant portion of the sample, 65.5%, were engaged in farming. Based on these demographics, the research might focus on how this group adapts to challenges such as climate change or economic shifts, potentially providing valuable insights into sustainable practices and resilience in rural communities [34].

Table 1. Demographic descriptive statistical information

Demographics	Contents	Frequency	Percent (%)
Gender	Male	102	42.857
	Female	136	57.143
Age group	18 - 30	140	58.824
	31 - 40	68	28.571
	41 - 50	14	5.882
	Up 50	16	6.723
Occupation	Workers	35	19.748
	Fishermen	47	65.546
	Farmers	156	14.706

4.2 Scale reliability testing

To assess the internal consistency of the measurement content, a widely accepted method includes calculating Cronbach's alpha coefficients for the constructs. As described in Table 2, all Cronbach's alpha values exceed 0.70, confirming the strong internal consistency reliability of all measures [35]. Furthermore, the values of external loadings exceeding the threshold of 0.708 indicate that the reliability of the measurement structure is assured. To address potential multicollinearity issues within the analysis model, the Variance Inflation Factor (VIF) was applied. The results show no concerns about multicollinearity as all VIF values remain below 3, aligning with the acceptable threshold [36].

Table 2. Results of analysis of scale inspection indicators

Items	Contents	Cronbach's Alpha	Outer Loading	VIF
AS	**Attitudes towards saltwater intrusion**	**0.891**		
AS1	Residents believe that saltwater intrusion has severe consequences for daily life.		0.871	2.519
AS2	Residents are concerned about the long-term effects of saltwater intrusion on the local community.		0.877	2.499
AS3	Residents feel that considering migration is a necessary response to saltwater intrusion.		0.864	2.261
AS4	Residents are hesitant about migration as a response to saltwater intrusion; they prefer to stay and adapt.		0.863	2.351
SN	Subjective norms.	**0.896**		
SN1	Residents perceive community support as a significant factor influencing their decision to migrate in response to saltwater intrusion.		0.880	2.575
SN2	Residents' perceptions of individual coping strategies influence migration decisions based on community information.		0.849	2.147
SN3	Residents cling to their homeland due to social pressure despite the risks of saltwater		0.889	2.781
SN4	Residents' migration intentions in response to saltwater intrusion are shaped by social ties and policies.		0.882	2.660

PC	Perceived behavioral control.	**0.888**		
PC1	Residents' perceived control and its importance in adapting to saltwater intrusion.		0.868	2.365
PC2	Residents' perceptions of accessing resources and knowledge necessary to cope with saltwater intrusion.		0.858	2.253
PC3	Residents feel anxious about the long-term impacts of saltwater intrusion.		0.857	2.242
PC4	Residents' perceptions of their ability to control impacts influence their intentions to migrate as an adaptive strategy to saltwater intrusion.		0.876	2.427
PS	Perception of saltwater intrusion	**0.898**		
PS1	Residents perceive saltwater intrusion as a significant threat to agriculture and livelihoods in the Mekong Delta.		0.861	2.264
PS2	Residents are concerned about the resilience to long-lasting saltwater intrusion not being addressed.		0.876	2.472
PS3	Residents believe that migration could offer better economic opportunities in less affected areas.		0.867	2.469
PS4	Residents are willing to adjust their migration plans based on the increasing impact of saltwater intrusion.		0.884	2.687
RG	Government policies and infrastructure	**0.898**		
RG1	Residents view government policies as effective against saltwater intrusion.		0.877	2.636
RG2	Residents find local infrastructure adequate for protecting against saltwater effects.		0.878	2.828
RG3	Residents feel government support reduces the need for migration due to saltwater intrusion.		0.854	2.174
RG4	Residents trust the government's commitment to improving infrastructure for future challenges.		0.887	2.454
IM	Intention to migrate	**0.895**		
IM1	Residents see migration as a viable option to mitigate the impact of saltwater intrusion on their livelihoods.		0.876	2.501
IM2	Residents are concerned about the long-term sustainability of their livelihoods in the Mekong Delta due to saltwater intrusion.		0.871	2.459
IM3	Residents consider migration as a way to improve living standards and secure their future.		0.874	2.575
IM4	Residents plan to move to ensure safety and welfare for themselves and their families.		0.866	2.251

Table 3. Discriminant validity of Heterotrait Monotrait ratio

	CR	AVE	AS	IM	PC	PS	RG	SN
AS	0.925	0.754	0.868					
IM	0.927	0.760	0.220	0.872				
PC	0.922	0.748	0.479	0.487	0.865			
PS	0.927	0.761	0.629	0.467	0.568	0.872		
RG	0.928	0.764	0.123	0.344	0.378	0.127	0.874	
SN	0.929	0.766	0.719	0.247	0.475	0.621	0.102	0.875

Table 4. Results of the direct relationship analysis

Hypothesis	The Direct Relationship	Estimation Coefficient	Standard Deviation	T Statistics	P Values
H1	AS -> PS	0.291	0.064	4.538	0.000
H2	SN -> PS	0.269	0.069	3.932	0.000
H3	PC -> PS	0.300	0.057	5.254	0.000
H4	PC -> IM	0.222	0.093	2.370	0.018
H5	PS -> IM	0.332	0.080	4.161	0.000
H6	RG x PS -> IM	0.204	0.065	3.154	0.002

Note: Attitude of saltwater intrusion (AS), Subjective norms (SN), Perceived behavioral control (PC), Perception of saltwater intrusion (PS), Intention to migrate (IM), Government policies and infrastructure (RG).

4.3 Testing for discriminant and convergent validity of the scale

According to Fornell and Larcker's guidelines [37], convergent validity is confirmed as the Average Variance Extracted (AVE) values exceed the 0.50 threshold, as shown in Table 3. For discriminant validity, the square roots of AVEs for each construct are greater than their inter-variable squared correlations, demonstrating adequate separation between constructs.

4.4 Hypothesis testing

From Table 4, the analysis of the structural model regarding the relationship among the measured variables indicates that the beta (β) coefficients determine the strength of the impact. The path coefficients of all latent variables are higher, indicating a stronger impact. The β values need to be tested at the 0.05 significance level, and the T-test values must exceed 2. Generally, the estimated values for the impact of the latent variables meet the T-test requirements and are statistically significant at the 0.05 level.

The analysis results show that each individual's attitude towards saltwater intrusion, subjective norms, and perceived behavioral control significantly affect their perception of saltwater intrusion [11]. The highest impact is the residents' attitudes whenever saltwater intrusion complicates their lives (estimated beta coefficient of 0.291). The subjective impact of residents is not strong, meaning residents are proactive in monitoring and adapting to saltwater intrusion (estimated beta

coefficient of 0.269). Meanwhile, the ability to control behavior among the residents is also relatively strong; despite the difficulties caused by saltwater intrusion, they try to endure and adapt to each season of intrusion (estimated beta coefficient of 0.300). Notably, the level of behavioral control directly impacts migration intentions (estimated beta coefficient of 0.222). Meanwhile, the intermediary function of the perception of saltwater intrusion exhibits a correlation that fosters the migratory intentions of residents (estimated beta coefficient of 0.332).

Conversely, the research delves deeper into the influence of governmental regulations and infrastructural developments that have influenced the correlation between the perception of saltwater intrusion and the migration intentions of residents (estimated beta coefficient of 0.204). This phenomenon can be interpreted as indicating that efficacious government policies and robust infrastructure act as a moderating force, alleviating the direct repercussions of environmental stressors on individual decisions regarding migration [38]. By offering alternative ways to adapt to environmental changes, they reduce the immediate necessity for migration. While these measures don't directly lower migration intentions, they do influence how perceptions of saltwater intrusion translate into migration choices. Essentially, improved policies and infrastructure can potentially alter decision-making by providing residents with greater confidence and coping options in the face of environmental challenges.

Overall, the perception of saltwater intrusion is not yet a decisive issue for migration intentions every intrusion season, but it has shown its impact on migration intentions, also under the control of each individual's behavior before exhibiting migration behavior, the role of government policies and infrastructure has moderated the relationship between the perception of saltwater intrusion and residents' migration intentions. The research results are illustrated in Figure 2 showing how each individual expresses migration intentions during the saltwater intrusion season in the provinces of the Mekong Delta.

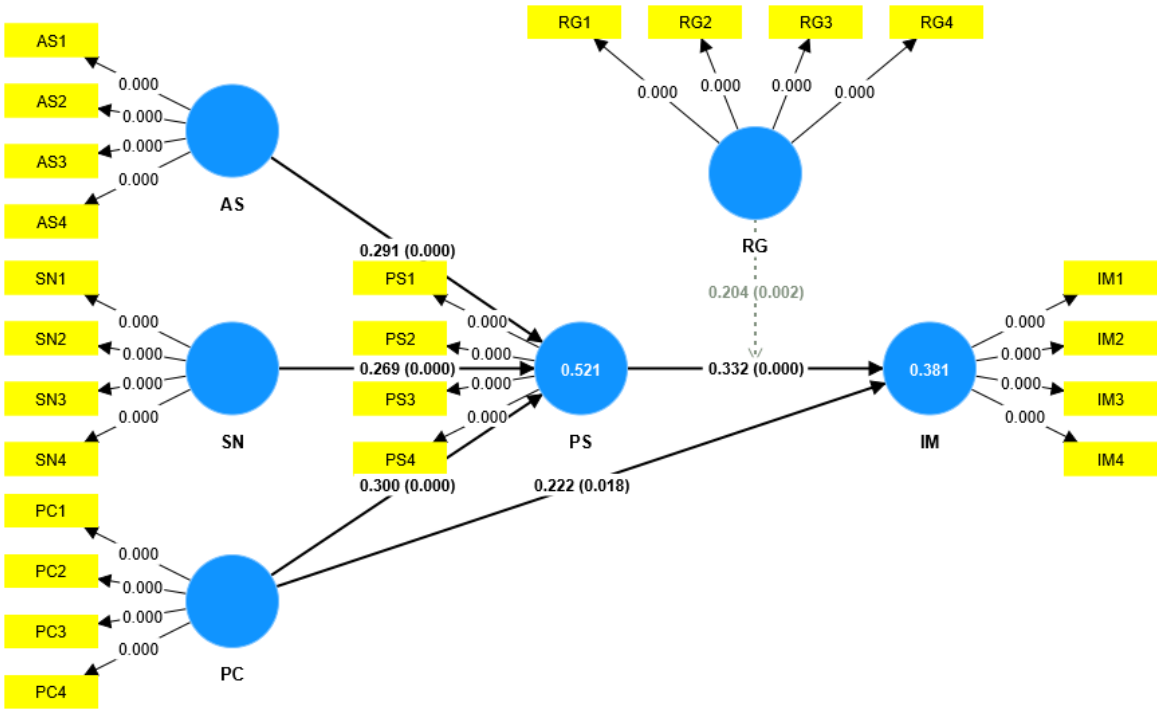

Figure 2. The structural model of the individual behavioural perceptions and migration intentions regarding saltwater intrusion

5. DISCUSSION

Saltwater intrusion is an ongoing issue in the terminal regions of the Mekong River basin, where annually during the dry season, the amount of seawater encroaching into the area is low, causing significant economic difficulties, major impacts on ecosystems, agricultural cultivation, and shortages of potable water [39]. The purpose of this study is to explore how individuals perceive saltwater intrusion and the formation of migration intentions, drawing upon the theory of planned behavior as a guiding framework. The analysis of this study's findings supports the theory of planned behavior because the findings show that the residents' perceived attitude toward saltwater intrusion, perceived subjective norms, and perceived behavioural control over their migration decisions are essential determinants.

Analysis results indicate a significant impact of individual attitudes, subjective norms, and perceived behavioral control on their perception of saltwater intrusion in the Mekong Delta. Among these factors, individuals' attitudes toward the challenges posed by saltwater intrusion have a certain impact, with a notable beta coefficient of 0.291 [12]. This suggests that individuals who perceive saltwater intrusion as affecting their lives exhibit certain attitudes, forming migration intentions as an appropriate response during the saltwater intrusion season [13]. Additionally, the study found that while the subjective norms of the residents are not particularly strong, individuals display active monitoring and acceptance of adapting to saltwater intrusion, reflected by an estimated beta coefficient of 0.269 [17, 18]. Moreover, residents demonstrate a relatively strong ability to control behavior, indicating the capacity to endure and adapt during each season of saltwater intrusion, despite potential difficulties (beta coefficient is 0.300). Importantly, the analysis emphasizes the direct impact of

behavioral control on migration intentions, with a beta coefficient of 0.222, showing that individuals' ability to cope with saltwater intrusion impacts their migration tendencies [19, 21]. Furthermore, the mediating role of the perception of saltwater intrusion moderates the relationship, promoting individuals' migration intentions with an estimated beta coefficient of 0.332. On the other hand, the role of government policies and infrastructure has moderated the relationship between the perception of saltwater intrusion and residents' migration intentions. Government policies and infrastructure play a moderating role by providing essential support and adaptations that influence residents' perceptions and responses to environmental challenges [40]. When these measures effectively mitigate the impacts of saltwater intrusion, they reduce the perceived severity and immediate threat, thus decreasing the urgency of migration as a coping strategy [14]. Statistically significant results indicate that enhanced governmental interventions are directly linked to lower migration intentions among residents facing saltwater intrusion challenges. This finding emphasizes the crucial role of individual perception in forming perceptions of saltwater intrusion about the risks related to saltwater intrusion and their subsequent decisions related to migration [15]. Here, the role of the government is crucial as it will reshape perceptions and migration intentions.

Overall, the findings underscore the intricate interplay among personal attitudes, perceived social norms, perceived behavioral control, and the awareness of saltwater intrusion, all of which collectively influence the migration intentions of inhabitants in the Mekong Delta area. This, in turn, offers insights into adaptive strategies and resilience capacities necessary to endure the repercussions of climate change in the future.

6. IMPLICATIONS FOR PRACTICE, SOCIETY, AND FUTURE RESEARCH

From the research findings, implications need to be considered from demographic characteristics, which are significantly relevant in terms of practical, social dynamics, and future research related to climate change. Particularly, the fact that females constitute 57.10% and the age group 18-30 accounts for 58.80% in the sample emphasizes the need to focus on gender-related solutions and leveraging the potential of the youth in developing adaptation strategies. Additionally, with 65.5% of participants engaged in agriculture, this highlights the vulnerability of agricultural livelihoods to saltwater intrusion, necessitating targeted support and diversification of livelihoods [12]. The government should focus on agricultural policies, resource investments to prevent saltwater intrusion, and provide specific guidance for farmers.

These empirical research findings possess the potential to guide policymakers and community planners regarding the distinct requirements and reactions of inhabitants in the Mekong Delta to the phenomenon of saltwater intrusion. By meticulously exploring the pivotal factors that influence migration intentions, including personal dispositions, subjective norms, and perceived behavioral control, it is achievable to develop specific interventions [41]. Such initiatives may encompass the enhancement of infrastructural robustness, the improvement of resource accessibility, and the implementation of educational programs aimed at bolstering the adaptive capacities of residents in response to environmental transformations [11, 42]. Furthermore, governmental policies are increasingly centered on fortifying infrastructural resilience as a strategy to alleviate the adverse effects of saltwater intrusion. Specific measures entail the allocation of resources towards sustainable water management systems, the engineering of dams designed to thwart saltwater encroachment, the construction of coastal dikes, and the enhancement of agricultural support systems.

This study highlights the social aspects of environmental issues. It highlights how collective attitudes and community norms influence individual decisions, stressing the importance of community-oriented solutions in environmental management. Enhancing social support systems and community-based adaptation strategies could mitigate the adverse effects of saltwater intrusion, thus reducing migration pressures and fostering social cohesion [43].

Although this research delineates the principal findings pertinent to the established objectives aimed at elucidating the determinants influencing migration intentions attributable to saltwater intrusion, it is imperative to acknowledge the inherent limitations of this inquiry. Regarding limitations, the reliance on reported data presents certain challenges, as participants may not fully disclose their perceptions or probable migration behaviors. Furthermore, the nature of this study is cross-sectional, indicating that data is acquired at a singular moment, which complicates the assessment of alterations in perception or behavior over time [44]. Subsequent research endeavors should implement panel study methodologies that effectively capture such variations and elucidate the ramifications of ongoing climate change on migration strategies. Consequently, extending the scope of the research to encompass community-level analyses across various nations within analogous climatic zones, coupled with a comparative examination of outcomes from similar experiences in other regions, could prove beneficial in comprehending the spectrum of community responses while identifying the efficacy of diverse climate change mitigation strategies [45]. Therefore, it is essential to conduct further investigations to enhance the specificity of the integrated hypotheses pertinent to policies influencing a nation's governmental infrastructure, which are crucial for evaluating methods to shape approaches to environmental perception and the formulation of more robust climate resilience policies [24].

Overall, this research enhances the extensive dialogue regarding climate change adaptation by demonstrating the intricate relationships among environmental perceptions, community dynamics, and individual decision-making processes. It supports an extensive strategy that consolidates diverse fields to tackle the issues introduced by climate change, notably in high-risk locations like the Mekong Delta.

7. CONCLUSION

In light of the results derived from the analysis, numerous conclusions may be inferred regarding the attributes of the study, as well as the correlation between individual attitudes, subjective norms, perceived behavioral control, the perception of saltwater intrusion, and intentions to migrate within the Mekong Delta.

The data collected described demographic characteristics focusing on female genders, accounting for 57.10%, the age group 18 - 30 making up 58.80%, and the majority being involved in agriculture at 65.5%. This demographic

breakdown highlights the young, predominantly female agricultural workforce in the study area, emphasizing the potential impact of environmental changes on this critical segment of the population.

Regarding the measurement of individual attitudes towards saltwater intrusion, it significantly affects their perception of the impacts of saltwater intrusion [12]. Furthermore, when subjective norms are not strongly expressed, individuals display a high level of active monitoring and acceptance of adapting to saltwater intrusion. This shows that people are ready to adapt to changing environmental conditions [18].

On the other hand, the residents' inhabitants exhibit a comparatively robust capacity to comprehend behavioral control, demonstrating the ability to withstand and adjust during each season characterized by saltwater intrusion [14]. The degree of behavioral control exerts a direct influence on an individual's propensity for migration, suggesting that the capability to manage saltwater intrusion significantly affects migration choices [20]. Furthermore, the mediating function of the perception of saltwater intrusion will modulate this relationship, thereby enhancing the migration intentions of individuals.

Moreover, government policies and infrastructure play a moderating role by providing essential support and adaptations that influence residents' perceptions and responses to environmental challenges, thereby moderating the relationship between the perception of saltwater intrusion and residents' migration intentions [22].

In summary, these findings underscore the intricate interplay among individual attitudes, subjective norms, perceived behavioral control, perceptions of saltwater intrusion, and migration intentions. Grasping these dynamics is essential for formulating effective strategies aimed at adaptation and fortification against the repercussions of climate change within the Mekong Delta. By addressing individuals' perceptions and assisting them in managing saltwater intrusion, policymakers can more effectively facilitate the community's capacity to make informed decisions and bolster their resilience in the face of environmental adversities.

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