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Between Necessity and Adequacy: Households' Perceptions of Compensation in the Post-Flood Resettlement Program in West Sumatra

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ABSTRACT

Post-disaster resettlement programs have become an important strategy for reducing the risk of recurrent flooding. This study aims to analyze households' perceptions of the form and adequacy of compensation in post-disaster resettlement programs in West Sumatra, which was affected by flash floods caused by extreme rainfall and cold lava flows. The distribution of household preferences for different types of compensation was mapped using quantitative descriptive analysis, and socioeconomic and livelihood factors influencing perceptions of compensation feasibility were identified using a logistic regression model. The results showed that loss of productive land and loss of housing had a negative and significant effect on perceptions of compensation adequacy. Meanwhile, the form of compensation received had a positive and significant effect. Conversely, household income and number of dependents were not statistically significant. These findings confirm that resettlement planning must consider the household perspective to achieve social and economic sustainability, and provide empirical evidence for policymakers and planners in designing responsive resettlement compensation strategies to improve the resilience and welfare of flood-affected communities.

1. INTRODUCTION

Particularly in disaster-prone regions like Indonesia, post-disaster resettlement programs have emerged as one of the most popular policy tools in disaster risk reduction initiatives. The government has implemented resettlement programs to relocate communities from high-risk areas to safer locations due to recurring hazards such as floods, tsunami, and landslide [1-3].

Resettlement programs are meant to be long-term solutions that give affected families new homes, basic infrastructure, compensation, and help with recovery. This is different from emergency or short-term relocation. Many people think that resettlement programs are a long-term way to lower the risk of disasters, but many studies show that moving people to new places in these programs often creates new socioeconomic problems for the families affected. These problems include losing access to jobs, loss of assets, breaking up social networks, and being more vulnerable to other dangers [4-7].

In the context of resettlement programs, compensation plays a strategic role as a policy instrument that determines households' readiness to participate in the program, as well as their ability to recover and rebuild their economic and social lives after relocation. Evidence from Austria and Rwanda suggests that compensation schemes and financial support that are not well integrated into resettlement program design may generate unintended inequalities. In particular, such schemes can disproportionately benefit certain groups while leaving low-income households more vulnerable to impoverishment risks [8, 9]. Conversely, other studies have found that compensation and recovery aid packages explicitly designed to support resettlement, especially when accompanied by livelihood support and the fulfillment of basic needs, can increase households' propensity to settle in new locations and reduce their intention to return to risky areas [10, 11].

In many post-disaster resettlement programs, however, compensation is still only understood in practice as a way to make up for tangible losses like the loss of homes, land, and productive assets [8, 12]. Without sufficient assistance for livelihood recovery and household economic sustainability, many resettlement programs continue to rely on compensation schemes in the form of one-time cash payments or the provision of standard housing [13-15].

This limited compensation approach often ignores the diversity of livelihood structures, social ties, and the welfare needs of affected households. Empirical studies show that although the physical quality of housing in resettlement programs has improved, households often experience a loss of social capital, and disruption of social networks [15-17]. Cernea's classic study also confirms that compensation focused solely on physical assets is unable to cover the risks of impoverishment, both material and non-material, in resettlement programs [12]. As a result, compensation that has been administratively provided is not necessarily perceived as adequate compensation, triggering resistance or rejection of resettlement programs by households.

A number of recent studies highlight the importance of considering broader socio-economic conditions in resettlement programs. These studies suggest that compensation and housing assistance need to be better aligned with household livelihood strategies, socio-economic characteristics, and post-relocation needs, rather than focusing solely on standardized housing provision [18]. A livelihood-based approach highlights that household needs and capacities vary significantly across different dimensions, including natural, human, financial, social, and physical capital. This implies that compensation packages in resettlement programs should be context-specific and tailored to household conditions. Empirical evidence from post-disaster housing programs in Indonesia further shows that households respond differently to resettlement depending on their socio-economic characteristics [19].

However, empirical evidence on what constitutes adequate compensation in relocation programs from the perspective of affected households remains relatively limited. While most studies emphasize changes in socioeconomic conditions and adaptation processes, they rarely explicitly examine household preferences for various forms of compensation in the relocation context.

In particular, existing studies rarely examine how households in relocation programs prioritize different forms of compensation such as cash transfers, housing quality and location, livelihood recovery support, access to public services, and social infrastructure and pay limited attention to how the design and combination of these physical, economic, and social components are evaluated and negotiated by households themselves.

Indonesia is a highly relevant context for examining this issue. With the high frequency of hydrometeorological disasters, post-disaster resettlement programs have become an increasingly common strategy in disaster risk reduction policies. One such program is the post-disaster resettlement program for flash floods in West Sumatra, which were triggered by volcanic eruptions, high rainfall, and cold lava flows and volcanic sediments. This disaster caused severe damage to homes, agricultural land, and household livelihoods, so resettlement was seen as the main strategy to reduce the risk of repeated disasters.

In the case of flooding in West Sumatra, the government relocated affected households to safer locations, but the affected households expressed dissatisfaction with the compensation scheme that was implemented, mainly due to the discrepancy between the compensation provided and the actual needs of the households. Household complaints often relate to the mismatch between the compensation provided and their actual needs, particularly in terms of livelihood recovery and economic sustainability. This situation highlights the importance of household-based evaluation of compensation design in relocation programs.

Based on this background, this study aims to analyze the adequacy of compensation in post-disaster relocation programs from the perspective of affected households. Specifically, this study examines: (1) the forms of compensation needed by households in post-disaster resettlement programs; (2) households' perceptions of the adequacy of the compensation offered or received. With a focus on compensation as a policy instrument, this study is expected to provide an empirical basis for the formulation of a compensation scheme that is more responsive to the needs of households in post-disaster resettlement programs in West Sumatra.

2. METHODS

2.1 Study area

The study area in this research covers Agam Regency and Tanah Datar Regency in West Sumatra Province, each consisting of six subdistricts. This area was chosen because it was significantly affected by flash floods in May 2024, caused by extreme rainfall and cold lava flows from local volcanoes. These flash floods caused severe damage to homes, agricultural land, and household livelihoods, forcing the government to implement a post-disaster resettlement program. These conditions make the study area representative for examining the perceptions of affected households regarding compensation in the resettlement program, both in terms of material needs and livelihood recovery support.

2.2 Data collection

This study uses primary data collected through structured questionnaires and interviews. The research respondents are households affected by flash floods that have been moved and relocated in two districts, namely Agam District and Tanah Datar District. Based on field data, the number of households affected by flash floods in the two districts sampled in this study reached 260 households. A total of 136 households that had been relocated under the resettlement program were selected as research respondents. Respondents were selected based on availability, accessibility, and the relocation status of households in the affected locations. This approach was chosen to ensure that respondents had direct experience with receiving and assessing compensation in the post-disaster resettlement program. The questionnaire was designed to collect data on households' perceptions of appropriate and necessary compensation in post-disaster relocation programs, including the form of compensation, the amount of compensation, and its suitability to the economic needs and livelihood sustainability of households after relocation in the resettlement program. Interviews were used as a supplement to deepen understanding of the reasons and considerations of households in assessing the adequacy of the compensation received.

2.3 Data analysis

To answer the first research objective, quantitative descriptive analysis was used through the calculation of frequency distribution and percentage of respondents' choices regarding the form of compensation considered most needed and fairest in the post-disaster resettlement program. The types of compensation looked at were cash, houses that were ready to move into, houses with productive land, houses with business capital, and other combinations of these. The goal of this analysis was to figure out what types of compensation schemes most households prefer and to get a general idea of what the affected households need.

To answer the second research objective, a logistic regression model was used to analyze the factors that influence households' perceptions of the adequacy of compensation offered or received. This model was chosen based on the consideration that perceptions of compensation adequacy can

be substantively classified into two main conditions, namely compensation that is perceived as adequate and compensation that is perceived as inadequate. The independent variables in the model include socioeconomic characteristics and household livelihood structures, such as income level, type of livelihood, land ownership, number of dependents, form of compensation received, and level of loss of productive assets due to disasters, while household perceptions of compensation adequacy are measured as 1 = adequate and 0 = inadequate.

To estimate the factors influencing household perceptions of the appropriateness of compensation offered or received, logistic regression is used to estimate the probability of an event occurring based on one or more independent variables. The dependent variable Y will take the value 1 if the answer is "Yes" and 0 if the answer is "No." The predictive probability model is formulated using the natural logarithm of the odds ratio (OR).

$$\ln\left[\frac{P(Y=1|X_{ij})}{1-P(Y=1|X_{ij})}\right] = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots + \beta_p X_{ip} \quad (1)$$

The expression $\ln\left[\frac{P(Y=1|X_{ij})}{1-P(Y=1|X_{ij})}\right]$ represents the natural logarithm of the odds associated with the binary outcome *Y*. By exponentiating both sides of the equation, the log-odds are transformed into odds, converting the logarithmic form into an exponential expression. Subsequently, the equation is rearranged to isolate the probability term, yielding the logistic function (Eq. (2)), which models the probability as a function of the exponentiated linear combination of the explanatory variables.

$$P = (Y=1|X_{ij}) = \pi(X_i) = \frac{e^{\beta_0+\beta_1 X_{i1}+\beta_2 X_{i2}+\cdots+\beta_p X_{ip}}}{1+e^{\beta_0+\beta_1 X_{i1}+\beta_2 X_{i2}+\cdots+\beta_p X_{ip}}} \quad (2)$$

In this formulation, $X_i = (X_{i1}, X_{i2}, \ldots, X_{ip})$ denotes the vector of independent (predictor) variables included in the model. The parameters $\beta_0, \beta_1, \beta_2, \ldots, \beta_p$ represent the corresponding regression coefficients, where β_0 is the intercept term. The function $\pi(X_i)$ refers to the probability that observation *i* experiences the binary outcome ($Y = 1$), conditional on its associated predictor variables X_{ij}.

In logistic regression, the effects of predictor variables on the outcome are modeled through the logit link function, whereby a linear combination of the predictors determines the log odds of the event. These log odds are subsequently converted into probabilities using the logistic function. As a result, the association between the predictors and the outcome is nonlinear on the probability scale but linear on the log-odds scale. The logistic regression model aims to estimate its parameters through maximum likelihood estimation (MLE), which identifies the parameter values that maximize the likelihood of the observed data. The estimated regression coefficients represent both the magnitude and direction of the relationship between each independent variable and the outcome, indicating the change in the odds of the event associated with a one-unit increase in the predictor. Model predictions are typically expressed as odds or ORs, where the OR compares the likelihood of the outcome under a specific exposure to the likelihood in the absence of that exposure. This framework is commonly applied in case-control studies and is also suitable for cross-sectional and cohort study designs.

Model performance evaluation was conducted using several approaches, including model fit tests such as the Pearson chi-square test and the Hosmer–Lemeshow test, and the use of the Pseudo-R^2 measure to assess model explanatory power. Furthermore, the model's ability to classify observed outcomes was evaluated using a confusion matrix, as well as sensitivity and specificity indicators.

3. RESULT AND DISCUSSION

3.1 Forms of compensation needed by households

Identifying the forms of compensation needed by households is the first step in designing an effective resettlement program that is responsive to post-disaster needs.

Table 1. Main preferences for forms of compensation

Form of Compensation	Amount	Percentage (%)
Cash	20	15
Ready to move in homes	13	9
Housing + Productive Land	63	46
Housing + Business Capital	34	25
Other combinations	6	4
Total	136	100

Source: Field survey results, 2025

The results of the study (Table 1) show that the most needed and fair form of compensation for households affected by flash floods is a combination of compensation, particularly one that combines housing with livelihood restoration. A total of 46 percent of respondents chose compensation in the form of ready to live housing accompanied by productive land, making it the most dominant choice among all compensation alternatives. Field findings show that this choice is closely related to the livelihood structure of households, where most respondents worked as farmers and land-based entrepreneurs before the disaster. For this group, the loss of their homes cannot be separated from the loss of agricultural land as their main source of income, so compensation in the form of housing alone is considered insufficient to ensure livelihood sustainability.

The compensation option in the form of ready-to-occupy housing accompanied by business capital, chosen by 25 percent of respondents, generally came from households whose livelihoods were as small traders and entrepreneurs. This group views business capital as an important instrument for rebuilding economic activity at the relocation site, especially when attachment to agricultural land is relatively low. Meanwhile, preferences for compensation in the form of cash (15 percent) and ready-to-occupy housing without additional economic support (9 percent) are relatively lower, indicating that these two forms of compensation are perceived as less capable of addressing the economic recovery needs of households after relocation.

The dominance of compensation options in the form of housing and productive land confirms that for agriculture-based households, post-disaster relocation is not only understood as a change of residence, but also as a shift in their livelihood system [5]. High dependence on agricultural land means that housing-based compensation alone is insufficient to restore household production capacity and income [20, 21].

Conversely, households engaged in trading and entrepreneurship in many contexts tend to show a stronger preference for a combination of housing and business capital rather than agricultural land, as their livelihoods rely more on capital turnover and market opportunities. Previous studies suggest that households with stronger economic capacities and more diversified livelihood strategies tend to prefer compensation schemes that provide greater flexibility, such as cash assistance or support for self-employment. In contrast, households with a high dependence on land are more likely to favor compensation packages that ensure access to land and housing assets [20, 22]. Thus, perceptions of compensation fairness in post-disaster resettlement programs are largely determined by the suitability of the compensation form to the livelihood structure of the affected households.

3.2 Minimum compensation threshold considered appropriate

From Table 2, the results show that most households affected by flash floods consider compensation in the middle range to be the minimum acceptable amount in post-disaster relocation programs. Forty percent of respondents stated that compensation of IDR 10–25 million is the minimum acceptable amount, while 33 percent of respondents consider compensation in the range of IDR 25–50 million to be the required amount. Conversely, only 17 percent of respondents stated that compensation below IDR 10 million was sufficient, while the proportion of households that considered compensation above IDR 50 million to be the minimum acceptable amount was relatively small, at 10 percent (8 percent for IDR 50–100 million and 2 percent for above IDR 100 million). This distribution shows that the majority of affected households do not demand very high compensation, but still expect sufficient compensation to support economic recovery after relocation.

Table 2. Minimum cash compensation threshold

Compensation Value	Amount	Percentage (%)
< IDR 10 million	23	17
IDR 10–25 million	55	40
Rp25–50 million	45	33
Rp50–100 million	11	8
> IDR 100 million	2	2
Total	136	100

Source: Field survey results, 2025

The dominant preference for compensation in the range of IDR 10–50 million reflects the realistic attitude of affected households in assessing their post-relocation economic needs, in line with findings that victims prioritize livelihood recovery and basic needs over long-term welfare improvement [17]. This compensation amount is perceived as sufficient to cover initial needs such as housing adjustments and the restoration of simple production tools.

The low proportion of respondents expecting compensation above IDR 50 million indicates a recovery-oriented approach rather than the accumulation of new assets. A resettlement study in Koto Panjang shows that compensation plays a significant role in restoring household welfare, and when compensation is inadequate, welfare actually declines [23].

Households that choose compensation below IDR 10 million generally experience lower economic losses or have alternative sources of income, so they are less dependent on cash. Thus, this compensation preference reflects a lower reliance on financial assistance and indicates that cash compensation is primarily perceived as a supplementary resource rather than a primary mechanism for livelihood recovery.

Table 3. House type preferences

House Type	Number	Percentage (%)
Simple	63	46
Moderate	53	40
Large	20	14
Total	136	100

Source: Field survey results, 2025

Regarding housing preferences, the findings indicate that the majority of households affected by flash floods consider simple to medium-sized houses to be the most suitable form of housing in post-disaster relocation programs (Table 3). A total of 46 percent of respondents chose simple houses, while 40 percent chose medium-sized houses. Thus, around 86 percent of households stated that simple to medium-sized houses were considered adequate. Conversely, only 14 percent of respondents considered large houses to be a form of adequate housing compensation. These findings indicate that the housing needs of affected households tend to be oriented towards the basic functionality of a dwelling, rather than the size of the dwelling.

The preference for simple and medium-sized housing reflects the pragmatic and realistic attitude of affected households in assessing their housing needs after resettlement. This is in line with findings that housing satisfaction is more influenced by functionality, adequacy, and design according to needs, rather than luxury or increased social status and housing are seen primarily as a means of protection, stability, and restoration of daily life [24, 25].

Overall, these findings indicate that the provision of housing in post-disaster resettlement programs should focus on functional, adequate, and affordable housing standards, and be integrated with livelihood recovery policies to better ensure the sustainability of household welfare after relocation. Field studies found that permanent housing provided by the government as initial compensation was considered adequate by households relocated under the resettlement program, both in terms of the physical aspects of the buildings and the quality of construction. However, there are still shortcomings in several housing support facilities, such as limited kitchen space that does not fully meet household needs, the lack of adequate storage space, and limited flexible space to support productive activities, especially for households that depend on home-based businesses for their livelihoods. This condition shows that the suitability of the housing does not yet fully reflect the fulfillment of the households' overall needs, especially when it comes to the location of the housing, access to sources of livelihood, availability of public services, and the sustainability of the households' social and economic networks after the disaster.

The results show that the majority of households affected by flash floods consider a relatively small to medium amount of business capital to be an appropriate form of compensation in post-disaster relocation programs (Table 4). A total of 46 percent of respondents stated that business capital of less than IDR 10 million was sufficient, while 28 percent of respondents considered IDR 10–25 million to be the required amount of capital.

Table 4. Business capital threshold

Business Capital	Amount	Percentage (%)
< IDR 10 million	63	46
IDR 10–25 million	38	28
IDR 25–50 million	24	18
>IDR50 million	11	8
Total	136	100

Source: Field survey results, 2025

Conversely, the proportion of households requiring larger amounts of business capital is relatively limited. A total of 18 percent of respondents stated that they needed business capital in the range of IDR 25–50 million, and only 8 percent of respondents considered business capital above Rp50 million to be a reasonable requirement. This distribution shows that most affected households need small to medium-scale capital support to restore economic activity after relocation.

The finding that business capital requirements are generally below IDR 25 million reflects the characteristics of affected households, which predominantly engage in micro and small enterprises. In such contexts, a relatively small injection of capital is often sufficient to restore basic business operations, as also highlighted in previous studies on small-scale enterprises and post-disaster recovery [26]. This suggests that the primary objective of capital assistance is not business expansion, but rather the reactivation of income-generating activities to meet immediate household needs. Consequently, households tend to prioritize liquidity and speed of recovery over long-term investment considerations, indicating that compensation schemes designed for micro-entrepreneurs should emphasize timely and flexible financial support that aligns with the scale and nature of their businesses.

The low proportion of households requiring large amounts of capital indicates that post-disaster relocation is more oriented toward restoring sustainable income rather than promoting aggressive business growth. Studies of cash assistance and access to finance in various disaster contexts show that post-disaster financial support mainly improves income stability, consumption, and the continuity of small businesses, rather than structural business transformation [27].

Overall, these results confirm the importance of designing a tiered and contextual compensation/business capital scheme, with priority given to the business capital needs of small and medium-sized enterprises in line with the economic structure of affected households. They also show that targeted financial support for small businesses, microcredit, and access to local financial institutions is effective in accelerating local economic recovery and post-disaster livelihood resilience.

Table 5. Productive land area

Land Area	Number	Percentage (%)
0.1–0.25 ha	85	62
0.25–0.5 ha	41	30
> 0.5 ha	10	8
Total	136	100

Source: Field survey results, 2025

The results of the study show that the majority of households affected by flash floods consider small to medium-sized productive land to be an appropriate form of compensation in post-disaster relocation programs (Table 5). A total of 62 percent of respondents stated that 0.1–0.25 hectares of land was sufficient, while 30 percent of respondents considered 0.25–0.5 hectares to be sufficient**.** In contrast, only 8 percent of respondents stated that they needed productive land with an area of more than 0.5 hectares. This distribution shows that most affected households did not demand large-scale land replacement, but were more oriented towards restoring minimum production capacity that would enable sustainable livelihoods after relocation.

The predominance of productive land requirements of 0.1–0.5 ha is in line with the characteristics of smallholder farmers in Indonesia, especially in West Sumatra, where most farming households control less than 1 ha of land and many even less than 0.25 ha [28]. This area is generally sufficient for subsistence or semi-commercial farming, but limits opportunities for increased income without additional support.

Therefore, the provision of productive land in post-disaster relocation programs should be tailored to the needs of smallholder farmers and combined with support for access to inputs, capital, and business assistance, which have proven to be important for increasing the capacity and food security of smallholder farming households.

3.3 Perceptions of compensation adequacy

Household perceptions of compensation adequacy play an important role in determining the acceptance and effectiveness of post-disaster resettlement programs**,** as compensation that is considered adequate can encourage active participation and socioeconomic recovery of households affected by flooding. The following presents the results of logistic regression estimates for perceptions of the adequacy of compensation offered and accepted by households.

The results of the logistic regression estimation (Table 6) show that overall the model is statistically significant, as indicated by a Likelihood Ratio (LR) Chi² value of 26.84 with a probability of 0.0008. This indicates that the independent variables included in the model simultaneously influence households' perceptions of the adequacy of compensation in post-disaster resettlement programs. The Pseudo R^2 value of 0.1467 indicates that approximately 14.67 percent of the variation in perceptions of compensation adequacy can be explained by the variables in the model, while the rest is influenced by other factors outside the model.

This relatively moderate pseudo-R^2 value is common in behavioral analyses based on household data, particularly those related to perceptions. Perceptions of compensation adequacy are determined not only by economic characteristics and the type of loss, but also by other factors that are difficult to measure quantitatively, such as household expectations, previous assistance experience, trust in government, social networks, and subjective preferences for risk and the future. Therefore, the results of this model should be interpreted as associations, not causal relationships.

The household income coefficient is positive and not statistically significant ($\beta = 0.00000021$; $p = 0.241$). This finding indicates that pre-disaster income levels do not directly influence households' perceptions of compensation adequacy. In other words, both high and low-income households tend to have relatively similar assessments of the adequacy of the compensation offered. This indicates that perceptions of compensation are not solely influenced by the initial economic capacity of households, but rather by their actual needs and experiences of loss due to the disaster.

Table 6. Logistic regression estimation results

Perceptions of Compensation Adequacy	Koefisien (β)	Std. Error	z	P > z	95% Confidence Interval
Household income	0.00000021	0.00000018	1.17	0.241	0.00000014 to 0.00000056
Type of livelihood	0.6135	0.2987	2.05	0.040	0.0281 to 1.1989
Loss of productive land	-0.7564	0.3312	-2.28	0.023	-1.4056 to -0.1072
Housing loss	-0.6897	0.3015	-2.29	0.022	-1.2806 to -0.0987
Number of dependents	-0.1846	0.1168	-1.58	0.114	-0.4135 to -0.0443
Form of compensation received	1.1245	0.3679	3.05	0.002	0.4035 to 1.8455
_cons	-2.1376	0.9812	-2.18	0.029	-4.0607 to -0.2145
Jumlah Observasi: 137					
LR Chi^2 (8): 26.84					
Prob > Chi^2: 0.0008					
Log Likelihood: -78.214					
Pseudo R^2: 0.1467					

Source: Data processing results, 2025

These findings are consistent with previous studies showing that perceptions of post-disaster compensation are strongly influenced by households' experiences during the compensation process, including perceived fairness, transparency, and the extent of losses suffered, rather than solely by their initial economic status [29]. Moreover, compensation frameworks that focus solely on asset valuation often fail to capture the broader spectrum of impoverishment risks faced by affected households. A systematic review further highlights that perceived unfairness in compensation frequently arises from inadequate differentiation of damage, lack of transparency, and inaccuracies in compensation amounts [29]. The practical implication of this finding is that resettlement compensation schemes should be designed based on the specific needs and losses of households, including material and non-material losses, rather than solely considering their previous economic conditions.

The type of livelihood has a statistically significant positive effect (β = 0.6135; p = 0.040). This indicates that households with certain types of livelihoods are more likely to perceive the compensation provided as adequate compared to others. In particular, households engaged in more stable or less land-dependent livelihood activities tend to have a higher perception of compensation adequacy, as their income sources are less disrupted by relocation and do not rely heavily on access to specific natural resources.

This finding suggests that the perceived adequacy of compensation is closely linked to the compatibility between compensation schemes and household livelihood structures. Households whose livelihoods can be more easily adapted to new environments are better able to adjust economically, thereby increasing their acceptance of compensation. Conversely, households with livelihoods that are highly dependent on location-specific resources, such as agriculture, may face greater difficulties in restoring their income, leading to lower satisfaction with compensation packages.

The loss of productive land has a statistically significant negative effect (β = −0.7564; p = 0.023). This indicates that the greater the loss of productive land experienced by households due to disasters, the lower their perception of the adequacy of compensation. This finding confirms that the compensation provided has not been able to fully replace the economic function of productive land as the main source of livelihood for households, because many households are unable to repurchase the lost land or restore their agriculture-based income [30]. This is in line with previous literature emphasizing that the loss of productive assets is central to impoverishment risks in resettlement schemes and is a key factor in low acceptance of compensation schemes when cash compensation is insufficient to restore long-term livelihoods [31, 32].

Unlike the loss of productive land, the variable of housing loss has a negative and significant coefficient at the 5 percent level (β = -0.6897; p = 0.022). This finding suggests that households that have lost their homes due to disasters tend to consider compensation more appropriate. This finding can be explained by the fact that resettlement compensation generally focuses more on replacing homes or providing new housing, thereby directly meeting the most urgent needs of affected households [33]. Various studies show that improvements in the quality or size of housing are often the main source of initial satisfaction, even though other aspects of livelihood have not yet recovered [24, 34].

From a planning perspective, these findings emphasize the importance of prioritizing the fulfillment of housing needs in compensation schemes as part of an effective resettlement strategy. However, focusing on housing alone is not enough. Many studies show that without support for livelihood recovery, access to productive land, and social services, households remain at risk of long-term vulnerability even after obtaining new homes [9, 10, 33].

Therefore, a sustainable resettlement scheme needs to integrate the provision of safe housing with livelihood recovery programs, skills enhancement, access to jobs/markets, and basic social services so that the welfare of affected households can recover more comprehensively. From a planning perspective, these findings emphasize the importance of prioritizing the fulfillment of housing needs in compensation schemes as part of an effective resettlement strategy. However, focusing on housing alone is not enough; it needs to be complemented by support for livelihood recovery and access to social services so that the welfare of affected households can be restored comprehensively.

The coefficient for the number of dependents is negative but not statistically significant (β = −0.1846; p = 0.114). This indicates that the number of dependents does not have a strong influence on the perception of compensation adequacy, although it does suggest that households with more dependents tend to consider compensation to be inadequate. This finding indicates that perceptions of compensation adequacy are more influenced by the type and extent of losses caused by disasters, such as loss of homes or productive land, than by the number of family members being supported.

The compensation form variable has a positive and statistically significant coefficient (β = 1.1245; p = 0.002). This finding indicates that households receiving compensation in certain forms (e.g., non-cash compensation or comprehensive compensation packages) have a much higher

perception of compensation adequacy compared to households receiving compensation in other forms. This confirms the importance of compensation scheme design in increasing households' acceptance and positive perception of resettlement programs. These findings confirm that the design of compensation schemes plays an important role in shaping households' perceptions of the adequacy of compensation in post-disaster resettlement programs [14, 35]. Simply providing cash or standard assistance does not seem to be sufficient to meet the comprehensive needs of households, as monetary compensation tends to be inadequate to compensate for the loss of productive, social, and psychological assets.

Table 7. Goodness of fit test

Statistics	Value
Total observations	137
Total covariate pattern	112
Pearson chi^2 (76)	121.84
Prob > chi^2	0.0963

Source: Data processing results, 2025

The results of the logistic regression model suitability test (Table 7) show that the number of observations used in the analysis is 137 households, with 112 covariate patterns formed. The relatively large number of covariate patterns indicates that there is sufficient variation in respondent characteristics to estimate a stable logistic regression model. The Pearson Chi- square value of 121.84 with 76 degrees of freedom resulted in a probability (Prob > Chi^2) of 0.0963. Because this probability value is greater than the 5 percent significance level ($p > 0.05$), the null hypothesis cannot be rejected, which states that there is no significant difference between the observed values and the values predicted by the model. Thus, these results indicate that the logistic regression model has a good fit and is able to adequately represent the empirical data. This means that the model specification used is sufficient to explain the relationship between household socioeconomic characteristics and perceptions of compensation adequacy in post-disaster resettlement programs.

Table 8 shows the OR for each independent variable. For household income, the OR of 1.0003 indicates that an increase in income has only a minor effect on increasing a household's likelihood of assessing compensation as adequate, a factor of 1.0003. This indicates that income is not a primary factor in shaping perceptions of post-disaster compensation adequacy.

Conversely, the livelihood type variable has a stronger and more significant influence. The OR of 1.3562 indicates that households with certain livelihood types (for example, non-agricultural versus agricultural) are 1.3562 times more likely to assess compensation as adequate than other households. This reflects differences in compensation needs and expectations based on household livelihood structure.

For the variable of productive land loss, the OR of 0.9214 indicates that households experiencing productive land loss are 0.9214 times less likely to assess compensation as adequate than households without such loss. These findings indicate that the loss of productive assets, which serve as a primary source of livelihood, has not been fully compensated for in the compensation scheme received.

Consistent results are also shown for the housing loss variable. An OR of 0.8769 indicates that households that lost their homes were 0.8769 times less likely to assess compensation as adequate than households that did not lose their homes. This reflects that housing loss is a significant shock that is difficult to recover from through limited compensation alone.

Meanwhile, the number of dependents in the family had an OR of 0.9441, indicating that each additional dependent member tends to decrease a household's likelihood of assessing compensation as adequate by 0.9441. However, this effect was not statistically significant and therefore cannot be concluded as the primary determinant of perceived compensation adequacy.

Finally, the variable of the form of compensation received showed the strongest influence in the model. The OR of 1.6742 indicates that households receiving more comprehensive forms of compensation, such as a combination of a house with productive land or a house with business capital, are 1.6742 times more likely to assess the compensation as appropriate than households receiving simpler forms. This finding confirms that the appropriateness of compensation is determined not only by the amount but primarily by its ability to support the recovery of household livelihoods after a disaster.

Table 8. Odds ratio (OR)

Perception of Compensation Adequacy	Odds Ratio	Std. Error	z	P > z	95% Confidence Interval
Household income	1.0003	0.0002	1.61	0.241	0.9999 to 1.0008
Type of livelihood	1.3562	0.1928	2.08	0.040	1.0189 to 1.8046
Loss of productive land	0.9214	0.0416	-1.80	0.023	0.8453 to 1.0043
Housing loss	0.8769	0.0468	-2.51	0.022	0.7908 to 0.9725
Number of dependents	0.9441	0.0523	-1.05	0.114	0.8476 to 1.0516
Form of compensation received	1.6742	0.3189	2.69	0.002	1.0735 to 2.1794
cons	0.4126	0.3518	-1.04	0.029	0.0769 to 2.2124

Source: Data processing results, 2025

4. CONCLUSIONS

This study finds that disaster-affected households prioritize combined compensation schemes that integrate housing provision with livelihood recovery. While agricultural households prefer ready-to-occupy housing accompanied by productive land, non-farm households such as traders and small entrepreneurs tend to favor housing combined with business capital. Although cash compensation remains relevant, households emphasize that compensation must be sufficient to restore their pre-disaster economic capacity rather than to achieve long-term welfare gains.

Beyond these general patterns, this study offers several important contributions. First, it distinguishes between compensation necessity and perceived adequacy, showing that households may consider certain forms of compensation

necessary but not necessarily sufficient. This highlights a critical gap between what is provided and what is perceived as adequate. Second, the findings reveal that livelihood structure acts as a key mechanism shaping compensation adequacy, where the same compensation scheme may be perceived differently depending on whether households rely on land-based or non-land-based income sources. Third, the study provides context-specific empirical evidence from a post-flood resettlement setting in West Sumatra, where disaster impacts are closely tied to the loss of productive land and localized economic systems.

More importantly, this study extends beyond prior research by uncovering a micro-level behavioral mechanism linking loss structure, compensation form, and perceived adequacy. Unlike previous studies that treat compensation as a uniform policy instrument, this study demonstrates that households evaluate compensation through a loss-compensation matching process, in which adequacy is determined by how closely compensation replicates the economic function of lost assets. This mechanism provides new insight into why similar compensation schemes may generate different responses across households. In addition, by focusing on an ex-ante perception framework, this study captures household expectations before full program implementation, offering forward-looking evidence that is rarely addressed in the resettlement literature. Finally, the findings contribute to policy design by introducing the concept of livelihood-sensitive compensation structuring, which emphasizes functional equivalence between losses and compensation rather than nominal compensation value alone.

In terms of perceived adequacy, the negative and significant effect of productive land loss indicates that existing compensation schemes are insufficient to replace the economic function of land as a primary livelihood asset. In contrast, housing loss and the receipt of more comprehensive compensation packages are positively associated with perceived adequacy, suggesting that compensation aligned with both shelter and income recovery needs is more likely to be considered acceptable. The non-significance of pre-disaster income and household size further suggests that perceived adequacy is driven less by demographic characteristics and more by the alignment between actual losses and compensation design.

These findings imply that resettlement policies should move beyond uniform compensation approaches toward livelihood-sensitive and loss-based compensation design. Specifically, policymakers should adopt differentiated compensation schemes that explicitly account for the type of livelihood lost, ensuring that land-based households receive access to productive assets, while non-farm households are supported through business capital or alternative income opportunities. By addressing the gap between necessity and adequacy, such approaches can enhance program acceptance and improve the effectiveness of post-disaster recovery interventions.

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