

Factors affecting habitat preference for environmental migrants in coastal Bangladesh

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Operational definition

We refer to ‘environmental migrant’ as the households who were displaced from their rural dwelling place due to environmental hazards and later settled in other rural areas or urban slums.



Flooded and disconnected houses



Submerged agricultural fields



Flooded and disconnected houses





This study specifically addresses two research questions:

- (i) What factors drive environmental migrants to choose relocation destinations following climatic events?
- (ii) How do environmental migrants' habitat preferences impact their post-migration well-being?

Methodology

Study Design

Quantitative approach used in this study.

The research is based on primary data collected from the respondents.

Sampling technique and data collection

408 household respondents data was collected by applying a **random and systematic random sampling method, respectively**. We interviewed 200 respondents from urban slums in Khulna and Satkhira and 208 respondents from rural areas of Koyra of Khulna and Shyamnagar of Satkhira.

Methodology (cont.)

Analytical Tools

Linear normalization

This study used linear normalization or commonly known as min-max normalization to calculate dependent variable that is, ‘**Household satisfaction score of the environmental migrants**’. The formula of linear normalization:

$$\textit{Normalized value of } X = \frac{X_i - X_{min}}{X_{max} - X_{min}} \dots \dots \dots (1)$$

Here, X_i = This denotes the single data point from the dataset for variable X.

X_{min} = This is the lowest value of the variable X from the dataset.

X_{max} = This is the highest value of the variable X from the dataset

Methodology (cont.)

The minimum value of that feature transformed into a 0, the maximum value transformed into a 1, and every other value transformed into decimals between 0 and 1.

Finding the mean of the normalized numbers was the next step after normalization was finished.

$$\text{Average normalized value} = \frac{\sum_{i=1}^n \text{Normalized value of } X_i}{n} \dots\dots\dots (2)$$

Here, n= Total twelve variables that was normalized by the formula applied in equation (1).

Analytical tool

- **Regression models (OLS and logistic)**

Table 1: Variables used to construct respondents' well-being score

Variables Name	Unit of Measurement	Literature Support
I have better income prospect here	Likert scale	Benítez et al.,2019
I felt much secured here	Likert scale	Blanco and Díaz, 2005
My neighbors supported me at time of a hazard and other emergencies	Likert scale	Blanco and Díaz, 2005
Community level help	Likert scale	Blanco and Díaz, 2005
Help from elite people	Likert scale	Blanco and Díaz, 2005
Living expenditure has been very affordable for me here	Likert scale	Xiong et al., 2023
I thought that I would have a better social capital here	Likert scale	Xiong et al., 2023
I would receive more financial advantage here in any post disaster situation	Likert scale	WaterAid, 2021
I receive help from political leader at time of a hazard emergency	Likert scale	WaterAid, 2021
I have an advantage of accessing to natural resources here	Likert scale	WaterAid, 2021
Government help post disaster	Likert scale	Joarder et al. (2017)
I would receive more assistance from political figures here in any post-disaster situation	Likert scale	Joarder et al. (2017)

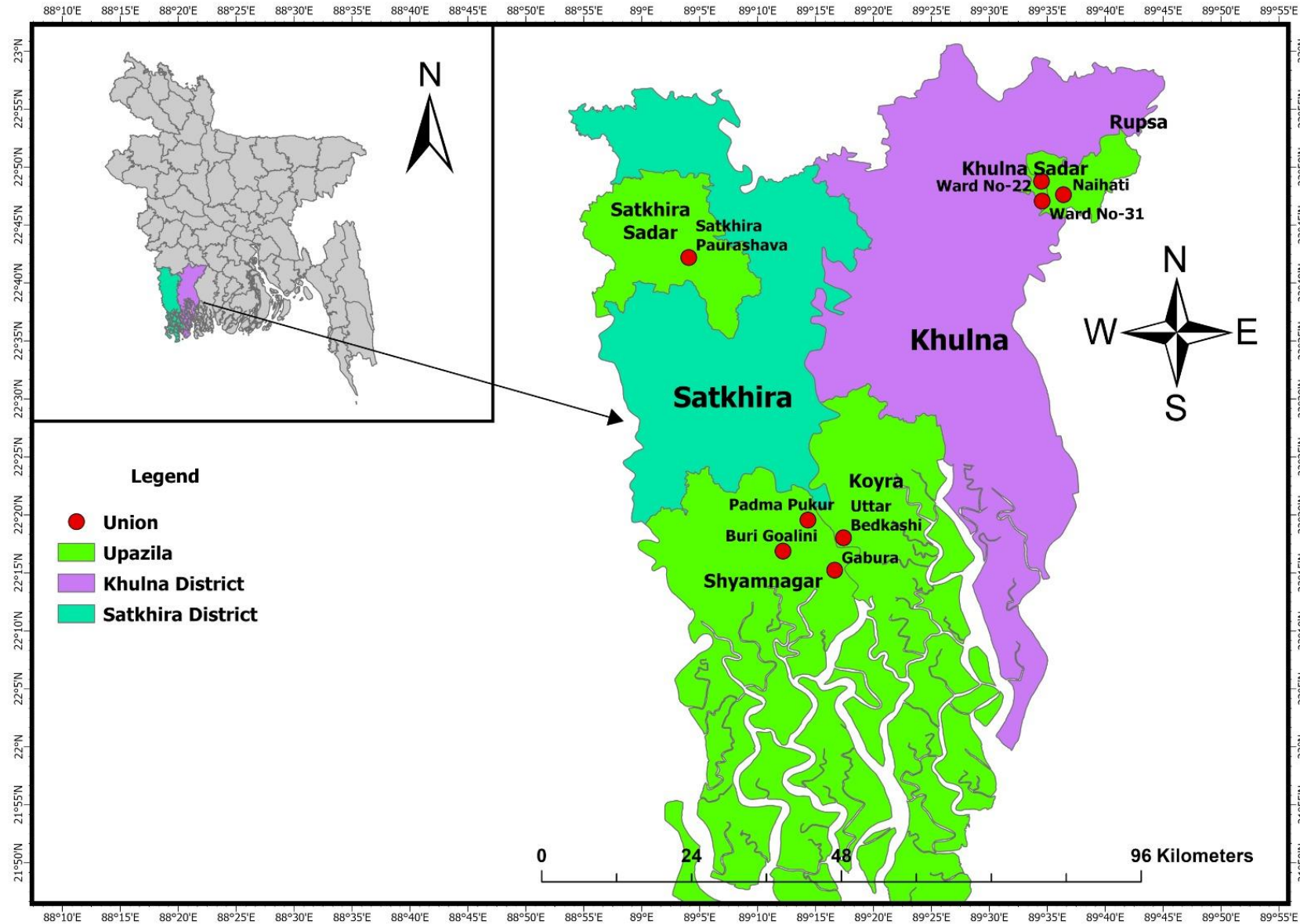


Fig. 1: Map of the study locations

Results

- **Determinants affecting the well-being of the environmental migrant households**
- **What other factors affect the habitat choice of the environmental migrant households**

Table 2: Regression results of determinants of household well-being

Variables	DV: Well-being score Coefficient (R. Std. Err.)
Environmental migrant type (Ref: <i>Rural dwellers</i>)	
Slum dwellers	-0.107* (0.029)
Gender (Ref: <i>Women</i>)	
Men	-0.033** (0.016)
Age (years)	-0.001 (0.001)
Living duration in the current area (in years)	0.000 (0.001)
Household size (in numbers)	0.001 (0.004)
Monthly income (log transformed)	-0.013 (0.016)
Training on income-generating activities (in numbers)	-0.005 (0.006)
Total preparation actions taken (numbers)	-0.006 (0.015)
Alternative income source (1=Yes; 0=Otherwise)	0.011 (0.018)
Access to educational support (1=Yes; 0=Otherwise)	0.051* (0.017)
Access to healthcare support (1=Yes; 0=Otherwise)	0.047** (0.020)
Access to training support (1=Yes; 0=Otherwise)	0.042* (0.016)
Access to financial support (1=Yes; 0=Otherwise)	0.017 (0.016)
Access to agricultural support (1=Yes; 0=Otherwise)	-0.000 (0.016)
Access to social safety net support (1=Yes; 0=Otherwise)	-0.004 (0.015)
Access to sanitation support (1=Yes; 0=Otherwise)	-0.013 (0.015)
Access to safe drinking water (1=Yes; 0=Otherwise)	0.029*** (0.015)
Source of receiving early warning (in numbers)	0.027* (0.005)
Duration of suffering from disasters (in months)	-0.003 (0.009)
Interaction term (alternative income source* number of benefits received)	-0.007*** (0.004)
Intercept	0.602* (0.152)
Number of observations	408
R-squared	0.24

*** p<0.01, ** p<0.05, * p<0.10

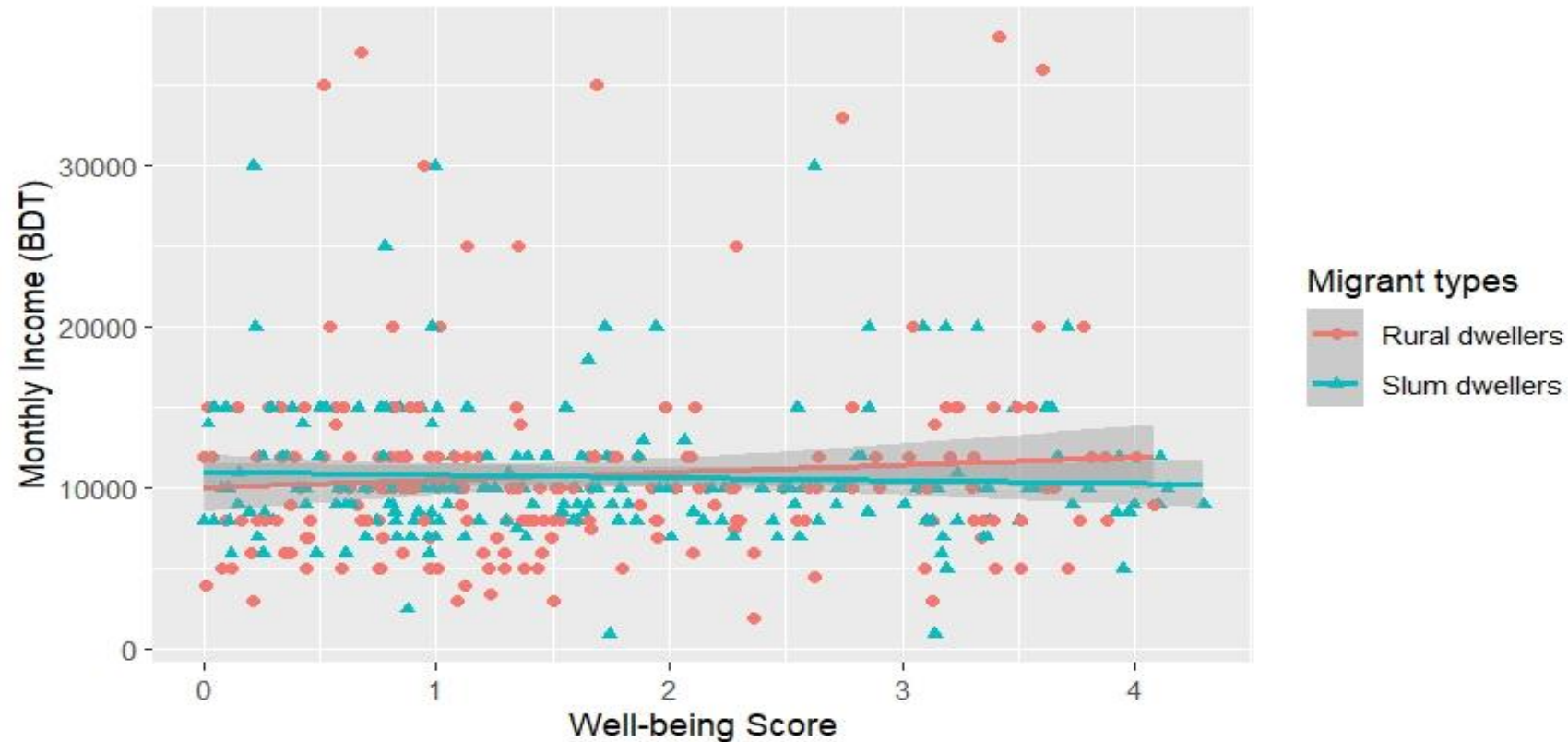
It explores the determinants of well-being scores among environmental migrants residing in rural and slum areas using multivariate regression analysis. The regression results suggest that environmental migrants in slum areas have a well-being score of 0.107 units lower compared to those in rural areas ($p < 0.10$). Additionally, men's well-being scores are 0.033 units lower than their counterparts ($p < 0.05$). These findings underscore a nuanced relationship where accumulating advantages may not necessarily linearly enhance overall well-being.

Table 3: Determinants of habitat preference among environmental migrants

Variables	Migrant type
	(1=Slum dweller; 0=Rural dweller) Odd Ratio (Std. Err.)
Well-being score	0.003** (0.007)
Gender (Ref: <i>Women</i>)	
Men	3.313*** (2.217)
Age (in years)	1.066*** (0.037)
Living duration at the current area (in years)	0.899* (0.025)
Household size (in numbers)	0.834 (0.157)
Monthly income (log transformed)	3.337 (2.982)
Training on income generating activities (in number)	0.916 (0.231)
Disaster preparedness actions adopted (in number)	0.288** (0.164)
Duration of sufferings from disasters (in months)	4.441* (1.466)
Access to educational support (1= Yes; 0= Otherwise)	6.557* (4.238)
Access to healthcare support (1= Yes; 0= Otherwise)	25.843* (17.730)
Access to financial support (1= Yes; 0= Otherwise)	0.983 (0.641)
Access to agricultural support (1= Yes; 0= Otherwise)	0.604 (0.357)
Access to social safety net support (1= Yes; 0= Otherwise)	0.454 (0.260)
Access to sanitation support (1= Yes; 0= Otherwise)	57.005* (40.062)
Access to safe drinking water (1= Yes; 0= Otherwise)	3.672** (2.199)
Received early warning (1= Yes; 0= Otherwise)	0.943 (0.218)
Intercept	0.000*** (0.000)
Number of observations	408
Log likelihood	-50.46
AIC	136.92

This table presents the factors influencing income levels among environmental migrants in rural and slum areas. The regression results indicate that the explanatory variables explained 33% of the variation in income levels. Factors such as time constraints during the survey process, cultural differences, and individual heterogeneity accounted for the remaining unexplained variation.

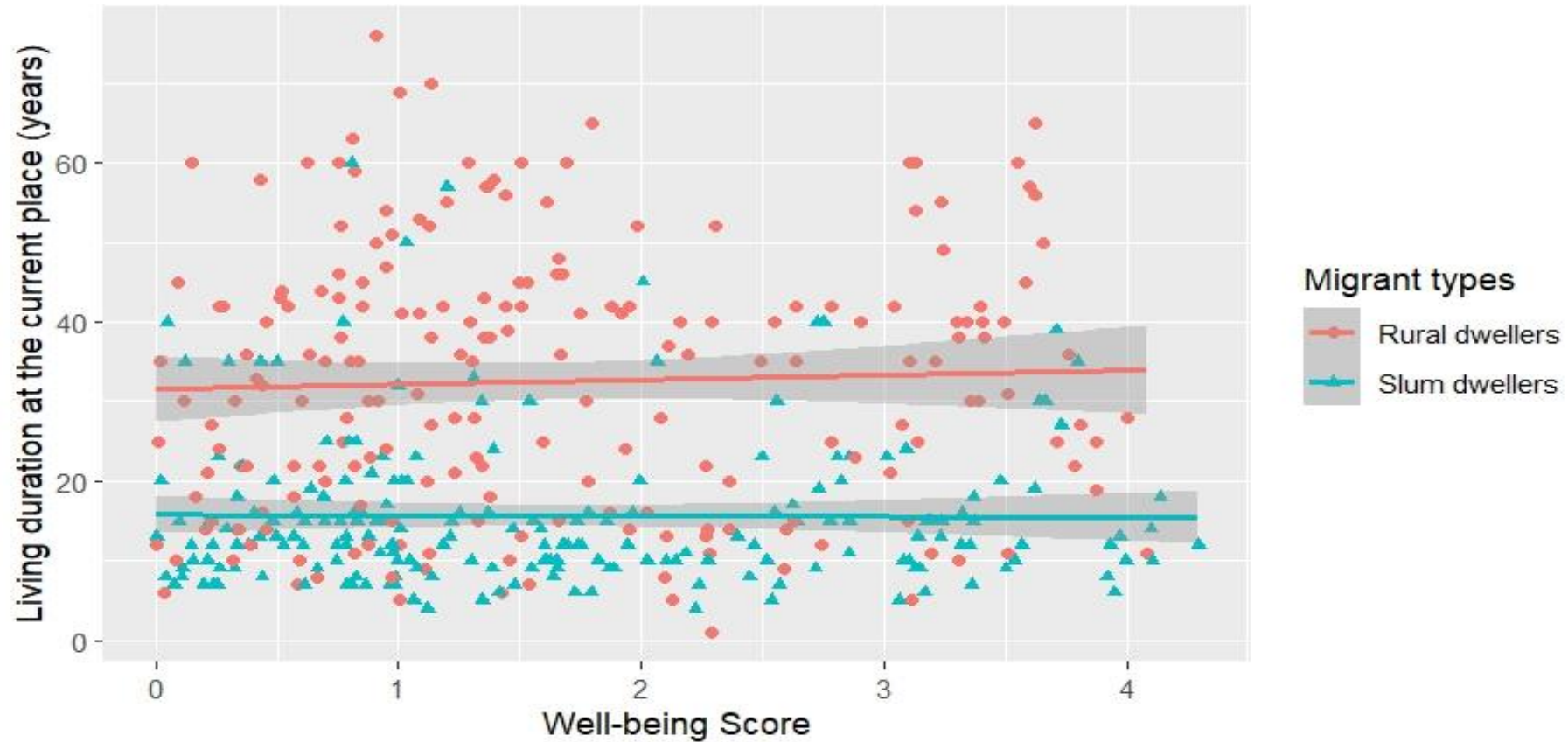
Figure 2 : Monthly income vs well-being among rural and slum residents



Source: Field survey, 2024

Although not any significant difference in monthly income between the rural and slum residents (BDT 5000 and BDT 12500), we found a slight positive association between income and well-being for both groups. Also, the trend lines show that as well-being levels increase, the monthly income of rural dwellers surpasses that of slum dwellers. This illustrates that higher well-being is associated with higher income, specifically for rural dwellers. In contrast, urban dwellers do not show a notable increase in well-being corresponding to their income levels.

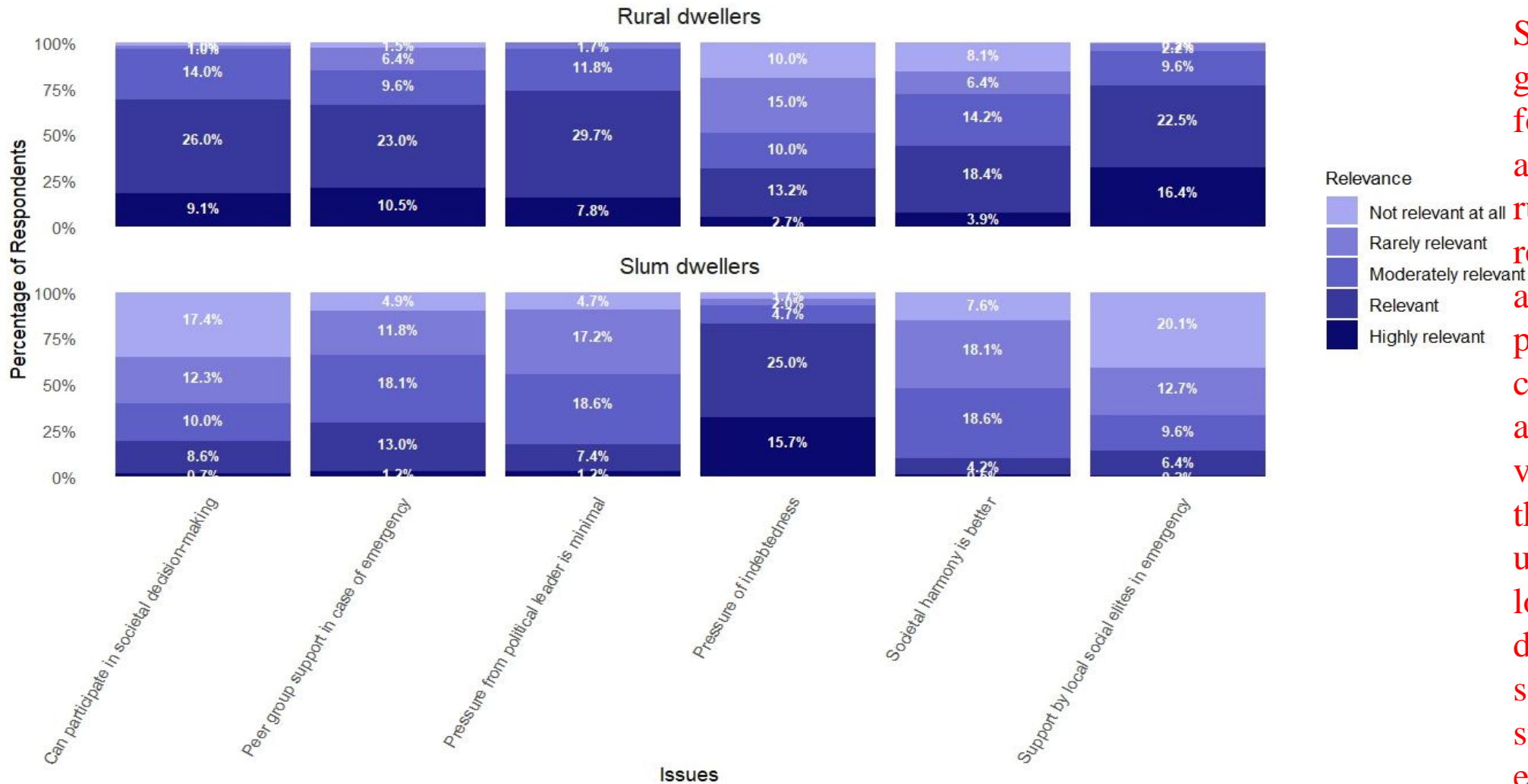
Figure 3: Well-being pattern of the respondents with respect to duration



Source: Field survey, 2024

This figure illustrates that environmental migrants living in rural areas generally remain in their current location longer than slum residents. This figure depicts that rural residents with longer living durations exhibit higher well-being scores than their counterparts in slum areas. Additionally, migrants who migrate to rural areas are typically less likely to migrate to urban areas because they hold a strong attachment to the rural context, including social connections, psychological attachment, and a sense of security in rural environments.

Figure 4: societal, political, and financial differences among the environmental migrants



Slum dwellers have a greater number of sources for receiving early warnings about disasters compared to rural dwellers. Both groups receive post-disaster assistance from local elites, political leaders, communities, peer groups, and the government to varying extents. Visualizing the disparities, migrating to urban areas emerges as a logical and sensible decision for individuals seeking improved living standards and to mitigate environmental risks, thus enhancing resilience to environmental hazards.

Source: Field survey, 2023

Concluding remarks

- **In rural areas respondents appeared to enjoy better social capital than slum areas**
- **Respondents in rural areas appeared to enjoy higher level of income**
- **Despite lower degrees of access to different services (e.g., sanitation, education etc.), respondents in rural areas exhibited higher level of well-being score**

ご清聴ありがとうございました。
Thank you very much for your attention.