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Interrelationships Among Livelihood Security Variables in Bankura District, West Bengal, India: Insights from Pearson Correlation Analysis

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Abstract: This paper investigates the interrelationships among various livelihood security variables in Bankura District, West Bengal, using Pearson correlation analysis. Utilizing data from nine key security dimensions across multiple enterprises, we conducted correlation analysis to shed light on their mutual dependencies and associations. Our findings reveal robust correlations, particularly between Economic Security and Habitat Security, Educational Security and Habitat Security, and Economic Security and Food Security. These correlations underscore the pivotal role of specific security dimensions in shaping livelihood sustainability within diverse sectors. Significance testing at both the 0.01 and 0.05 levels further validates the strength and statistical relevance of identified correlations, offering valuable insights for policy formulation and strategic decision-making. Moreover, the nuanced nature of these interdependencies, ranging from weak to strong correlations, emphasizes the complex dynamics of livelihood security within the region.

Keywords: Livelihood security, Pearson correlation analysis, Interrelationships, Policy formulation

INTRODUCTION

The estimation of the Pearson Correlation Matrix provides valuable insights into the interrelationships among various livelihood security variables. Utilizing SPSS 16, we obtained comprehensive results that illuminate the dynamics within the Bankura District of West Bengal's economic landscape. The correlation analysis encompasses nine key security dimensions across multiple enterprises, shedding light on their mutual dependencies and associations. Notably, certain pairs exhibit robust correlations, underscoring the significance of factors such as Economic Security and Habitat Security, Educational Security and Habitat Security, and Economic Security and Food Security. These findings emphasize the pivotal role of specific security dimensions in shaping livelihood sustainability within diverse sectors. Moreover, significance testing at both the 0.01 and 0.05 levels further validates the strength and statistical relevance of identified correlations, offering valuable insights for policy formulation and strategic decision-making. The diverse strengths of correlations, ranging from weak to strong, underscore the nuanced nature of these interdependencies, providing a nuanced understanding of livelihood security dynamics within the region.

MATERIALS AND METHODS

Process of Indexing of the Nine Aspects of Livelihood Security

Step-1: Formation of Standardized Indicator or Index for each household against each aspect of livelihood security

Maximum value and minimum value against each aspect of livelihood security are identified

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for each household. A Standardized Indicator or Index is formed for each household against each aspect of livelihood security (adopted by Hahn *et al*. 2009). The standardized formula is as follows-

$$\text{Standardized Livelihood Security Index} = \frac{\text{Score obtained} - \text{Minimum Score}}{\text{Maximum Score} - \text{Minimum Score}}$$

Step-2: Formation of average Standardized Indicator or Index for each group of households against each aspect of livelihood security

Average Standardized Indicator or Index for each group of households is formed simply by the process of making simple average of the group concerned, such as, Agriculture, Fish-Breeding, Agri-Business, Handloom, Terracotta enterprise and district as a whole, against each aspect of livelihood security.

Livelihood Interdependence

One important characteristic of livelihoods is their interdependence. Very few livelihoods exist in isolation. In social sciences, the concept of livelihood extends to include social and cultural means. There are nine aspects of livelihood security and nine indicators or indices, such as-

1. Economic security Index (X_1)
2. Food security Index (X_2)
3. Habitat security Index (X_3)
4. Health security Index (X_4)
5. Educational security Index (X_5)
6. Social security Index (X_6)
7. Political security Index (X_7)
8. Religious security Index (X_8)
9. Environmental security Index (X_9)

These nine indicators or indices have been considered as individual variables. Pearson Correlation Matrix have been done with using these variables. Pearson Correlation Matrix is a table showing correlation coefficients between sets of variables. Each random variable (Xi) in the table is correlated with each of the other values in the table (Xj). In this matrix table, it is found that which pairs have the highest correlation. The diagonal of the table is always a set of ones, because the correlation between a variable and itself is always 1. A correlation matrix is a symmetric matrix that means the upper-right triangle is the same as lower-left triangle in the same matrix table. The Pearson Correlation Matrix provides p values indicate the associations between two variables are statistically significant. When the p value is less than 0.01 then the correlation between two variables is statistically significant at 0.01 level and when the p value is less than 0.05 then the correlation between two variables is statistically significant at 0.05 level.

Pearson Correlation Coefficient (PCC) is a measure of the linear correlation between two variables. It is used when there are two quantitative variables. The possible research hypotheses are that there is a positive, negative or no linear relationship between the variables. It has a value between +1 and -1, where 1 is total positive linear correlation, 0 is no linear correlation, and -1 is total negative linear correlation. It was developed by **Karl Pearson** from a related idea introduced by **Francis Galton, 1877**. The bivariate Pearson Correlation produces a sample correlation coefficient, r, which measures the strength and direction of linear relationships between pairs of continuous variables. The Pearson Correlation is a parametric measure.

The formula is used to find the PCC value, that is,

$$r = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{[N\Sigma x2 - (\Sigma x)2][N\Sigma y^2 - (\Sigma y)2]}}$$

Where,

N= number of pairs of scores

∑xy= sum of the products of paired scores

∑x= sum of x scores

∑y= sum of y scores

∑x2= sum of squared x scores

∑y2= sum of squared y scores

Hypotheses

The null hypothesis (H_0) and alternative hypothesis (H_1) of the significance test for correlation can be expressed in the two ways,

depending on one-tailed or two-tailed test. Here, two-tailed test is used.

Two-tailed significance test:

H_0: ρ = 0 ("the population correlation coefficient is 0; there is no association")

H_1: ρ ≠ 0 ("the population correlation coefficient is not 0; a non-zero correlation could exist")

Test Statistic: The sample correlation coefficient between two variables x and y is denoted r or r_{xy} , and can be computed as:

$$r = \frac{\text{cov}(x, y)}{\sqrt{\text{var}(x)} \cdot \sqrt{\text{var}(y)}}$$

Where,

cov(x, y) is the sample covariance of x and y;

var(x) is the sample variance of x;

andvar(y) is the sample variance of y.

Correlation can take on any value in the range [-1, 1]. The sign of the correlation coefficient indicates the direction of the relationship, while the magnitude of the correlation (how close it is to -1 or +1) indicates the strength of the relationship.

(i) r> 0, indicates a positive association, that is as the value of one variable increases, then the value of the other variable also increases.

(ii) r = 0, there is no association between two variables.

(iii) r< 0, indicates a negative association, that is as the value of one variable increases, then the value of the other variable also decreases.

The strength can be assessed by these general guidelines.

0.1 < | r | < 0.3 … small / weak correlation

0.3 < | r | < 0.5 … medium / moderate correlation

0.5 < | r | large … strong correlation

In order to find out the relationship between two components of livelihood security of the sample households of the study area, Pearson Correlation Matrix model is used. There are altogether 9 variables taken in to consideration, namely (i) economic security index, (ii) food security index, (iii) habitat security index, (iv) health security index, (v) educational security index, (vi) social security index, (vii) political security index, (viii) religious security index and (ix) environmental security index. These variables are listed as rows and again as columns and the intersection of a given row with a given column provide the correlation coefficient between these two variables. Here, the Pearson Correlation Matrix is 9x9 matrix. In Pearson Correlation Matrix, the results will display the correlations in a table. Correlation of one variable (suppose, X_1) itself (r=1) and number of non-missing observations for the variable (X_1) (n=50 for each enterprise and n=250 for overall five enterprise).

RESULTS AND DISCUSSION

To estimate the Pearson Correlation Matrix, we have used SPSS 16 version and obtained the following results.

Pearson Correlation Matrix for Combinations of Nine Livelihood Security Variables of the Enterprises

The Correlation of one variable with itself (r = 1) and the number of non-missing observations for the same variable (N= 50). Correlation of one variable and another variable based on N=50 observations with pair wise non missing values

Cultivation of Agriculture: Table 1 presents the Pearson Correlation Matrix for combinations of nine livelihood securities of the enterprise – cultivation of agriculture of Bankura District of West Bengal. From the table, it is observed that, **Economic Security** and **Habitat Security** have the highest and strongest correlation among all other pairs of continuous variables.

Agri-Business: Table 2 shows the Pearson Correlation Matrix for combinations of nine livelihood securities of the enterprise -- agri-business of Bankura District of West Bengal. From the table, it is observed that, **Educational Security** and **Habitat Security** have the highest and strongest correlation among all other pairs of continuous variables.

Fish-Breeding Sector: The Table 3 reveals the Pearson Correlation Matrix for combinations of nine livelihood securities of the enterprise -- fish-breeding Sector of Bankura District of

West Bengal. From the table, it is evident that, **Economic Security** and **Food Security** have the highest and strongest correlation among all other pairs of continuous variables.

Handloom: The Table. 4 reveals the Pearson Correlation Matrix for combinations of nine livelihood securities of the enterprise handloom of Bankura District of West Bengal. From the table, it is understood that, **Economic Security** and **Food Security** have the highest and strongest correlation among all other pairs of continuous variables.

Terracotta: The Table.5 indicates the Pearson Correlation Matrix for combinations of nine livelihood securities of the enterprise -- terracotta of Bankura District of West Bengal. From the table, it is understood that, **Health Security** and **Habitat Security** have the highest and strongest correlation among all other pairs of continuous variables.

The Pearson Correlation Matrix for combinations of nine livelihood security variables of five selected unorganized sectors in Bankura District, West Bengal, presented in Table 6, highlights that Economic Security and Food Security exhibit the highest and strongest correlation among all other pairs of continuous variables, emphasizing their pivotal role in sustaining livelihoods within these sectors. Here, the total sample size is 250.

p value, level of significance

Significant at 0.01 level

Correlations from Table 1 indicate statistically significant relationships: Economic Security and Habitat Security (p = 0.000), Economic Security and Food Security (p = 0.000), Economic Security and Environmental Security (p = 0.000), Economic Security and Social Security (p = 0.002), Economic Security and Political Security (p = 0.006), Economic Security and Educational Security (p = 0.001), Food Security and Habitat Security (p = 0.000), Food Security and Environmental Security (p = 0.008), Food Security and Educational Security (p = 0.008), Habitat Security and Environmental Security (p = 0.000), Social Security and Educational Security (p = 0.004), all significant at the 0.01 level.

From Table 2, Row 2-Column 5 and Row 4-Column 3 reveal a significant correlation between Educational security and Habitat security, with a p-value of 0.000, indicating statistical significance at the 0.01 level. Similarly, Row 10-Column 10 and Row 9-Column 11 demonstrate a significant correlation between Economic security and Food Security, with a p-value of 0.000.

From Table 3, the correlation between Economic Security and Food Security (Row 10-Column 10 and Row 9-Column 11) is statistically significant at the 0.01 level with a p-value of 0.000, indicating a strong relationship. Additionally, the correlation between Economic Security and Religious Security (Row 9-Column 8 and Row 7-Column 11) as well as between Social Security and Religious Security (Row 5-Column 8 and Row 7-Column 6) is also statistically significant at the 0.01 level with p-values of 0.006 and 0.008, respectively.

From Table 4, the correlation between Economic Security and Food Security (Row 10-Column 10 and Row 9-Column 11) is statistically significant at the 0.01 level with a p-value of 0.000, indicating a strong relationship. Additionally, correlations between Economic Security and Educational Security (Row 9-Column 5 and Row 4-Column 10), Economic Security and Religious Security (Row 7-Column 10 and Row 9-Column 8), Food Security and Educational Security (Row 4-Column 11 and Row 10-Column 5), Food Security and Religious Security (Row 7-Column 11 and Row 10-Column 8), Educational Security and Social Security (Row 5-Column 5 and Row 4-Column 6), Educational Security and Religious Security (Row 7-Column 5 and Row 4-Column 8), and Social Security and Religious Security (Row 7-Column 6 and Row 5-Column 8) are all statistically significant, with p-values less than 0.01 or 0.05 levels.

In Table. 5, the correlations between various factors are statistically significant at the 0.01 level, including those between Health Security and Habitat Security (p = 0.000), Economic Security and Food Security (p = 0.000), Social Security and Religious Security (p = 0.008), and Political Security and Social Security (p = 0.000), indicating a strong association between these variables.

From Table 6, significant correlations are observed between Food Security and Economic Security (p = 0.000), Health Security and Habitat Security (p = 0.000), Educational Security and Habitat Security (p = 0.000), Environmental Security and Habitat Security (p = 0.001), Economic Security and Habitat Security (p = 0.000), Social Security and Political Security (p = 0.000), Social Security and Religious Security (p = 0.000), Social Security and Economic Security (p = 0.000), Social Security and Food Security (p = 0.002), Religious Security and Food Security (p = 0.004), Religious Security and Economic Security (p = 0.001), and Environmental Security and Economic Security (p = 0.001), all significant at the 0.01 level.

Significant at 0.05 level

Correlations from Table 1 reveal significance: Economic Security and Religious Security (p = 0.014), Health Security and Environmental Security (p = 0.025), Religious Security and Educational Security (p = 0.043), Social Security and Religious Security (p = 0.022), Educational Security and Habitat Security (p = 0.025), Educational Security and Political Security (p = 0.021), Educational Security and Environmental Security (p = 0.036), all significant at the 0.05 level.

In Table 2, Row 8-Column 10 and Row 9-Column 9 exhibit a statistically significant correlation between Economic security and Environmental security, with a p-value of 0.031, meeting the threshold for significance at the 0.05 level. Similarly, Row 8-Column 5 and Row 4-Column 9 demonstrate a significant correlation between Educational security and Environmental security, with a p-value of 0.050. Additionally, Row 3-Column 5 and Row 4-Column 4 reveal a significant correlation between Educational security and Health security, with a p-value of 0.015, while Row 8-Column 8 and Row 7-Column 9 indicate a significant correlation between Religious Security and Environmental security, with a p-value of 0.039.

From Table 3, the correlation between Health security and Habitat security (Row 2-Column 4 and Row 3-Column 3) is statistically significant at the 0.05 level with a p-value of 0.020. Similarly, the correlations between Food Security and Religious Security (Row 10-Column 8 and Row 7-Column 11), Food Security and Environmental Security (Row 10-Column 9 and Row 8-Column 11), Economic Security and Social Security (Row 5-Column 10 and Row 10-Column 6), Religious Security and Political Security (Row 7-Column 7 and Row 6-Column 8), Economic Security and Environmental Security (Row 9-Column 9 and Row 8-Column 10), Health Security and Environmental Security (Row 8-Column 4 and Row 3-Column 9), and Educational Security and Food Security (Row 10-Column 5 and Row 4-Column 11) are all statistically significant at the 0.05 level, with p-values of 0.026, 0.034, 0.050, 0.024, 0.046, 0.019, and 0.050, respectively.

From Table 4, the correlation between Economic security and Social security (Row 9-Column 6 and Row 5-Column 10) is statistically significant at the 0.05 level with a p-value of 0.018, indicating a meaningful relationship. Additionally, correlations between Economic security and Habitat security (Row 2-Column 10 and Row 9-Column 3), Economic Security and Environmental Security (Row 9-Column 9 and Row 8-Column 10), Habitat Security and Food Security (Row 2-Column 11 and Row 10-Column 3), Social Security and Food Security (Row 10-Column 6 and Row 5-Column 11), Environmental Security and Food Security (Row 10-Column 9 and Row 8-Column 11), Educational Security and Habitat Security (Row 4-Column 3 and Row 2-Column 5), Religious Security and Habitat Security (Row 7-Column 3 and Row 2-Column 8), Educational Security and Health Security (Row 3-Column 5 and Row 4-Column 4), Environmental Security and Health Security (Row 8-Column 4 and Row 3-Column 9), Environmental Security and Educational Security (Row 8-Column 5 and Row 3-Column 9), and Political Security and Religious Security (Row 7-Column 7 and Row 6-Column 8) are all statistically significant at the 0.05 level.

In Table. 5, the correlation between Food Security and Habitat Security (p = 0.012) and between Political Security and Religious Security (p = 0.025) is statistically significant at the 0.05 level, indicating a notable relationship between these variables.

From the Table 6, significant correlations are observed between Health Security and Political Security (p = 0.05), Health Security and Environmental Security (p = 0.033), Health Security and Economic Security (p = 0.026), Educational Security and Political Security (p = 0.034), Educational Security and Economic Security (p = 0.038), Educational Security and Food Security (p = 0.040), and Religious Security and Environmental Security (p = 0.019), all significant at the 0.05 level.

r value

The correlations derived from Table 1 reveal various degrees of relationship strengths between different security factors. A perfect positive linear relationship is observed between Economic Security and Habitat Security (r = 0.569), Economic Security and Food Security (r = 0.566), Economic Security and Environmental Security (r = 0.566), Political Security (r = 0.383), Health Security and Environmental Security (r = 0.317), Economic Security and Educational Security (r = 0.462), Social Security and Religious Security (r = 0.324), Food Security and Habitat Security (r = 0.541), Food Security and Environmental Security (r = 0.372), Educational Security and Habitat Security (r = 0.317), and Social Security and Educational Security (r = 0.403), indicating that as one variable increases, the other also increases in a linear fashion. Additionally, the strengths of these correlations vary, with some exhibiting strong relationships such as Economic Security and Habitat Security, Economic Security and Food Security, and others showing moderate correlations like Social Security and Religious Security, Food Security and Environmental Security. There are also weak correlations noted, such as between Religious Security and Educational Security, and Educational Security and Environmental Security. These findings provide insights into the interrelatedness and varying strengths of different security factors.

In Table 2, several correlations between different security variables reveal distinct levels of linear relationships. For instance, Row 2-Column 5 and Row 4-Column 3 depict a perfect positive linear relationship between Educational security and Habitat security, with a correlation coefficient (r) of 0.664. Similarly, Row 10-Column 10 and Row 9-Column 11 indicate a perfect positive linear relationship between Economic security and Food Security, with an r value of 0.647. Moreover, Row 8-Column 10 and Row 9-Column 9 display a perfect positive linear relationship between Economic security and Environmental security, though with a slightly lower r value of 0.305. These correlations suggest that as the value of one security variable increases, the value of the corresponding security variable also increases. In terms of strength, correlations such as these exceeding 0.5 indicate strong relationships, while those between 0.3 and 0.5 signify moderate associations, and values below 0.3 indicate weak correlations. These observations contribute to understanding the interconnections and dependencies within the security framework, offering insights for policy and decision-making processes.

In Table 3, several correlations display perfect positive linear relationships between different security variables. For example, the correlation between Economic Security and Food Security (Row 10-Column 10 and Row 9-Column 11) exhibits a correlation coefficient (r) of 0.873, indicating a perfect positive linear relationship, meaning as Economic Security increases, Food Security also increases. Similar perfect positive linear relationships are observed between Health security and Habitat security (Row 2-Column 4 and Row 3-Column 3) with an r value of 0.329, and between Food Security and Environmental Security (Row 10-Column 9 and Row 8-Column 11) with an r value of 0.301. These correlations illustrate how changes in one security variable correspond to changes in another, providing valuable insights into their interrelationships within the security framework.

From Table. 4, several correlations exhibit a perfect positive linear relationship, such as the correlation between Economic Security and Food Security (r = 0.987), Economic Security and Educational Security (r = 0.625), and Food Security and Educational Security (r = 0.608), indicating that as one variable increases, the other also increases. Additionally, moderate correlations are observed between various factors, including

Economic Security and Social Security (r = 0.333), Social Security and Food Security (r = 0.358), and Environmental Security and Health Security (r = 0.326), suggesting a meaningful but not perfect linear relationship. Weak correlations, such as those between Economic Security and Habitat Security (r = 0.283), Economic Security and Environmental Security (r = 0.299), and Political Security and Religious Security (r = 0.284), indicate a less pronounced relationship between the variables.

In Table.5, several perfect positive linear relationships are observed. For instance, the correlation between Health Security and Habitat Security (r = 0.841), Economic Security and Food Security (r = 0.539), Economic Security and Habitat Security (r = 0.597), Economic Security and Health Security (r = 0.594), Economic Security and Educational Security (r = 0.602), Health Security and Environmental Security (r = 0.588), Political Security and Social Security (r = 0.806), Habitat Security and Environmental Security (r = 0.427), and Health Security and Educational Security (r = 0.412) all indicate perfect positive linear relationships. These strong correlations suggest that as the value of one variable increases, the value of the other variable also increases.

From Table 6, several pairs of variables exhibit a perfect positive linear relationship, as indicated by correlation coefficients (r) ranging from 0.123 to 0.672. Notably, correlations between Health Security and Habitat Security, Educational Security and Habitat Security, Environmental Security and Habitat Security, Economic Security and Habitat Security, and Food Security and Habitat Security all demonstrate this perfect positive linear relationship. Additionally, the strength of correlation varies across different pairs, with some showing strong correlations ($|r| > 0.5$), such as Food Security and Economic Security, while others exhibit medium or moderate correlations ($0.3 < |r| < 0.5$), like Social Security and Political Security. Weak or small correlations ($0.1 < |r| < 0.3$) are observed in several pairs as well, highlighting the diverse nature of relationships between these livelihood security variables in the Bankura District of West Bengal.

CONCLUSION

The analysis of the Pearson Correlation Matrix for combinations of nine livelihood security variables across various sectors in Bankura District, West Bengal, reveals significant insights into the interrelationships and strengths of these variables. Economic Security and Food Security consistently emerge as the most strongly correlated variables across all sectors, underscoring their pivotal role in sustaining livelihoods within these communities. Moreover, the correlations highlight not only perfect positive linear relationships but also varying degrees of association, ranging from strong to weak correlations, among different security factors. These findings provide valuable insights for policymakers and stakeholders in understanding the complex dynamics of livelihood security and can inform targeted interventions aimed at enhancing the resilience and sustainability of livelihoods in the region. Further research and analysis could delve deeper into the causal mechanisms driving these correlations and explore potential strategies to address identified vulnerabilities and strengthen livelihood security within these sectors.

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Table 1: Pearson Correlation Matrix for Combinations of Nine Livelihood Security Variables of the Enterprise -- Cultivation of Agriculture

		Habitat-SI	*Health-SI*	*Educational-SI*	*Social-SI*	*Political-SI*	*Religious-SI*	*Environmental-SI*	*Economic-SI*	*Food-SI*
Habitat-SI	Pearson Correlation	1	-.134	.317*	.067	.226	.046	.488**	.569**	.541**
	Sig. (2-tailed)		.354	.025	.643	.115	.750	.000	.000	.000
	N	50	50	50	50	50	50	50	50	50
Health-SI	Pearson Correlation	-.134	1	-.083	.113	.032	-.205	.317*	-.005	-.129
	Sig. (2-tailed)	.354		.565	.434	.826	.152	.025	.974	.372
	N	50	50	50	50	50	50	50	50	50
Educational-SI	Pearson Correlation	.317*	-.083	1	.403**	-.325*	.287*	.297*	.462**	.371**
	Sig. (2-tailed)	.025	.565		.004	.021	.043	.036	.001	.008
	N	50	50	50	50	50	50	50	50	50
Social-SI	Pearson Correlation	.067	.113	.403**	1	-.135	.324*	.227	-.425**	-.153
	Sig. (2-tailed)	.643	.434	.004		.351	.022	.114	.002	.290
	N	50	50	50	50	50	50	50	50	50
Political-SI	Pearson Correlation	.226	.032	-.325*	-.135	1	-.094	-.145	.383**	.163
	Sig. (2-tailed)	.115	.826	.021	.351		.518	.317	.006	.258
	N	50	50	50	50	50	50	50	50	50
Religious-SI	Pearson Correlation	.046	-.205	.287*	.324*	-.094	1	.012	-.344*	-.148
	Sig. (2-tailed)	.750	.152	.043	.022	.518		.936	.014	.306
	N	50	50	50	50	50	50	50	50	50
Environmental-SI	Pearson Correlation	.488**	.317*	.297*	.227	-.145	.012	1	.566**	.372**
	Sig. (2-tailed)	.000	.025	.036	.114	.317	.936		.000	.008
	N	50	50	50	50	50	50	50	50	50
Economic-SI	Pearson Correlation	.569**	-.005	.462**	-.425**	.383**	-.344*	.566**	1	.566**
	Sig. (2-tailed)	.000	.974	.001	.002	.006	.014	.000		.000
	N	50	50	50	50	50	50	50	50	50
Food-SI	Pearson Correlation	.541**	-.129	.371**	-.153	.163	-.148	.372**	.566**	1
	Sig. (2-tailed)	.000	.372	.008	.290	.258	.306	.008	.000	
	N	50	50	50	50	50	50	50	50	50
** and * , Correlation is significant at 0.01 & 0.05 level respectively										
(2 tailed)										

(Figures in parenthesis indicate p value and ** indicates significant at 0.01 level and * indicates significant at 0.05 level).

Table 2: Pearson Correlation Matrix for Combinations of Nine Livelihood Security Variables of the Enterprise -- Agri-Business

		Habitat-SI	*Health-SI*	*Educational-SI*	*Social-SI*	*Political-SI*	*Religious-SI*	*Environmental-SI*	*Economic-SI*	*Food-SI*
Habitat-SI	Pearson Correlation	1	.396**	.664**	.097	.054	-.022	.124	-.005	.019
	Sig. (2-tailed)		.004	.000	.501	.709	.879	.392	.970	.898
	N	50	50	50	50	50	50	50	50	50
Health-SI	Pearson Correlation	.396**	1	.341*	.148	.197	.232	.401**	.012	.009
	Sig. (2-tailed)	.004		.015	.307	.171	.105	.004	.933	.952
	N	50	50	50	50	50	50	50	50	50
Educational-SI	Pearson Correlation	.664**	.341*	1	.153	.062	.145	.279*	-.156	-.187
	Sig. (2-tailed)	.000	.015		.289	.669	.315	.050	.279	.195
	N	50	50	50	50	50	50	50	50	50
Social-SI	Pearson Correlation	.097	.148	.153	1	.395**	.374**	.276	-.141	-.226
	Sig. (2-tailed)	.501	.307	.289		.005	.008	.052	.330	.115
	N	50	50	50	50	50	50	50	50	50
Political-SI	Pearson Correlation	.054	.197	.062	.395**	1	.156	-.029	-.173	.016
	Sig. (2-tailed)	.709	.171	.669	.005		.279	.839	.228	.914
	N	50	50	50	50	50	50	50	50	50
Religious-SI	Pearson Correlation	-.022	.232	.145	.374**	.156	1	.293*	.021	-.160
	Sig. (2-tailed)	.879	.105	.315	.008	.279		.039	.885	.266
	N	50	50	50	50	50	50	50	50	50
Environmental-SI	Pearson Correlation	.124	.401**	.279*	.276	-.029	.293*	1	.305*	-.230
	Sig. (2-tailed)	.392	.004	.050	.052	.839	.039		.031	.108
	N	50	50	50	50	50	50	50	50	50
Economic-SI	Pearson Correlation	-.005	.012	-.156	-.141	-.173	.021	.305*	1	.647**
	Sig. (2-tailed)	.970	.933	.279	.330	.228	.885	.031		.000
	N	50	50	50	50	50	50	50	50	50
Food-SI	Pearson Correlation	.019	.009	-.187	-.226	.016	-.160	-.230	.647**	1
	Sig. (2-tailed)	.898	.952	.195	.115	.914	.266	.108	.000	
	N	50	50	50	50	50	50	50	50	50
** and * , Correlation is significant at 0.01 & 0.05 level respectively										
(2 tailed)										

(Figures in parenthesis indicate p value and ** indicates significant at 0.01 level and * indicates significant at 0.05 level).

Table 3: Pearson Correlation Matrix for Combinations of Nine Livelihood Security Variables of the Enterprise -- Fish-Breeding

		Habitat-SI	*Health-SI*	*Educational-SI*	*Social-SI*	*Political-SI*	*Religious-SI*	*Environmental-SI*	*Economic-SI*	***Food-SI***
Habitat-SI	Pearson Correlation	1	.329*	-.011	-.045	.122	-.157	-.017	.076	.130
	Sig. (2-tailed)		.020	.937	.758	.400	.278	.905	.598	.367
	N	50	50	50	50	50	50	50	50	50
Health-SI	Pearson Correlation	.329*	1	.192	.000	.200	-.063	.331*	-.143	-.187
	Sig. (2-tailed)	.020		.182	.996	.165	.662	.019	.323	.193
	N	50	50	50	50	50	50	50	50	50
Educational-SI	Pearson Correlation	-.011	.192	1	-.079	-.068	-.025	-.071	.215	.275
	Sig. (2-tailed)	.937	.182		.586	.638	.861	.622	.134	.050
	N	50	50	50	50	50	50	50	50	50
Social-SI	Pearson Correlation	-.045	.000	-.079	1	.146	.369**	.067	.269	-.188
	Sig. (2-tailed)	.758	.996	.586		.313	.008	.643	.050	.190
	N	50	50	50	50	50	50	50	50	50
Political-SI	Pearson Correlation	.122	.200	-.068	.146	1	-.318*	.086	.185	.164
	Sig. (2-tailed)	.400	.165	.638	.313		.024	.553	.199	.256
	N	50	50	50	50	50	50	50	50	50
Religious-SI	Pearson Correlation	-.157	-.063	-.025	.369**	-.318*	1	.223	-.382**	-.314*
	Sig. (2-tailed)	.278	.662	.861	.008	.024		.120	.006	.026
	N	50	50	50	50	50	50	50	50	50
Environmental-SI	Pearson Correlation	-.017	.331*	-.071	.067	.086	.223	1	.284*	.301*
	Sig. (2-tailed)	.905	.019	.622	.643	.553	.120		.046	.034
	N	50	50	50	50	50	50	50	50	50
Economic-SI	Pearson Correlation	.076	-.143	.215	.269	.185	-.382**	.284*	1	.873**
	Sig. (2-tailed)	.598	.323	.134	.050	.199	.006	.046		.000
	N	50	50	50	50	50	50	50	50	50
Food-SI	Pearson Correlation	.130	-.187	.275	-.188	.164	-.314*	.301*	.873**	1
	Sig. (2-tailed)	.367	.193	.050	.190	.256	.026	.034	.000	
	N	50	50	50	50	50	50	50	50	50
** and * , Correlation is significant at 0.01 & 0.05 level respectively										
(2 tailed)										

(Figures in parenthesis indicate p value and ** indicates significant at 0.01 level and * indicates significant at 0.05 level).

Table 4: Pearson Correlation Matrix for Combinations of Nine Livelihood Security Variables of the Enterprise -- Handloom

		Habitat-SI	*Health-SI*	*Educational-SI*	***Social-SI***	***Political-SI***	***Religious-SI***	***Environmental-SI***	***Economic-SI***	***Food-SI***
Habitat-SI	Pearson Correlation	1	.169	.295*	-.138	-.069	-.333*	-.151	.283*	.313*
	Sig. (2-tailed)		.242	.037	.338	.635	.018	.296	.047	.027
	N	50	50	50	50	50	50	50	50	50
Health-SI	Pearson Correlation	.169	1	.287*	.000	.046	-.067	.326*	.244	.259
	Sig. (2-tailed)	.242		.044	1.000	.752	.644	.021	.087	.069
	N	50	50	50	50	50	50	50	50	50
Educational-SI	Pearson Correlation	.295*	.287*	1	.469**	-.173	-.387**	.343*	.625**	.608**
	Sig. (2-tailed)	.037	.044		.001	.231	.005	.015	.000	.000
	N	50	50	50	50	50	50	50	50	50
Social-SI	Pearson Correlation	-.138	.000	.469**	1	.126	.374**	.111	.333*	.358*
	Sig. (2-tailed)	.338	1.000	.001		.382	.007	.443	.018	.011
	N	50	50	50	50	50	50	50	50	50
Political-SI	Pearson Correlation	-.069	.046	-.173	.126	1	.284*	.131	.094	.114
	Sig. (2-tailed)	.635	.752	.231	.382		.045	.365	.518	.431
	N	50	50	50	50	50	50	50	50	50
Religious-SI	Pearson Correlation	-.333*	-.067	-.387**	.374**	.284*	1	.316*	-.454**	-.493**
	Sig. (2-tailed)	.018	.644	.005	.007	.045		.025	.001	.000
	N	50	50	50	50	50	50	50	50	50
Environmental-SI	Pearson Correlation	-.151	.326*	.343*	.111	.131	.316*	1	.299*	.305*
	Sig. (2-tailed)	.296	.021	.015	.443	.365	.025		.035	.031
	N	50	50	50	50	50	50	50	50	50
Economic-SI	Pearson Correlation	.283*	.244	.625**	.333*	.094	-.454**	.299*	1	.987**
	Sig. (2-tailed)	.047	.087	.000	.018	.518	.001	.035		.000
	N	50	50	50	50	50	50	50	50	50
Food-SI	Pearson Correlation	.313*	.259	.608**	.358*	.114	-.493**	.305*	.987**	1
	Sig. (2-tailed)	.027	.069	.000	.011	.431	.000	.031	.000	
	N	50	50	50	50	50	50	50	50	50
** and * , Correlation is significant at 0.01 & 0.05 level respectively										
(2 tailed)										

(Figures in parenthesis indicate p value and ** indicates significant at 0.01 level and * indicates significant at 0.05 level).

Table 5: Pearson Correlation Matrix for Combinations of Nine Livelihood Security Variables of the Enterprise -- Terracotta

		Habitat-SI	*Health-SI*	***Educational-SI***	***Social-SI***	***Political-SI***	***Religious-SI***	***Environmental-SI***	***Economic-SI***	***Food-SI***
Habitat-SI	Pearson Correlation	1	.841**	.369**	-.014	.038	.067	.427**	.597**	.351*
	Sig. (2-tailed)		.000	.008	.921	.795	.646	.002	.000	.012
	N	50	50	50	50	50	50	50	50	50
Health-SI	Pearson Correlation	.841**	1	.412**	.020	.121	.184	.588**	.594**	.416**
	Sig. (2-tailed)	.000		.003	.889	.403	.200	.000	.000	.003
	N	50	50	50	50	50	50	50	50	50
Educational-SI	Pearson Correlation	.369**	.412**	1	.384**	-.371**	-.059	.205	.602**	.401**
	Sig. (2-tailed)	.008	.003		.006	.008	.684	.153	.000	.004
	N	50	50	50	50	50	50	50	50	50
Social-SI	Pearson Correlation	-.014	.020	.384**	1	.806**	.374**	.164	-.119	.006
	Sig. (2-tailed)	.921	.889	.006		.000	.008	.256	.412	.967
	N	50	50	50	50	50	50	50	50	50
Political-SI	Pearson Correlation	.038	.121	-.371**	.806**	1	.318*	.232	-.127	.069
	Sig. (2-tailed)	.795	.403	.008	.000		.025	.106	.378	.632
	N	50	50	50	50	50	50	50	50	50
Religious-SI	Pearson Correlation	.067	.184	-.059	.374**	.318*	1	.078	.016	.134
	Sig. (2-tailed)	.646	.200	.684	.008	.025		.589	.914	.354
	N	50	50	50	50	50	50	50	50	50
Environmental-SI	Pearson Correlation	.427**	.588**	.205	.164	.232	.078	1	.196	.398**
	Sig. (2-tailed)	.002	.000	.153	.256	.106	.589		.172	.004
	N	50	50	50	50	50	50	50	50	50
Economic-SI	Pearson Correlation	.597**	.594**	.602**	-.119	-.127	.016	.196	1	.539**
	Sig. (2-tailed)	.000	.000	.000	.412	.378	.914	.172		.000
	N	50	50	50	50	50	50	50	50	50
Food-SI	Pearson Correlation	.351*	.416**	.401**	.006	.069	.134	.398**	.539**	1
	Sig. (2-tailed)	.012	.003	.004	.967	.632	.354	.004	.000	
	N	50	50	50	50	50	50	50	50	50
** and * , Correlation is significant at 0.01 & 0.05 level respectively										
(2 tailed)										

Figures in parenthesis indicate p value and ** indicates significant at 0.01 level and * indicates significant at 0.05 level).

Table 6: Pearson Correlation Matrix for Combinations of Nine Livelihood Security Variables of Five Selected Unorganised Sectors of Bankura District of West Bengal

		Habitat-SI	*Health-SI*	*Educational-SI*	*Social-SI*	*Political-SI*	*Religious-SI*	*Environmental-SI*	*Economic-SI*	*Food-SI*
Habitat-SI	Pearson Correlation	1	.263**	.220**	.034	.114	-.086	.207**	.275**	.219**
	Sig. (2-tailed)		.000	.000	.597	.072	.176	.001	.000	.000
	N	250	250	250	250	250	250	250	250	250
Health-SI	Pearson Correlation	.263**	1	.208**	.065	.123	-.008	.135*	.141*	.021
	Sig. (2-tailed)	.000		.001	.309	.050	.894	.033	.026	.744
	N	250	250	250	250	250	250	250	250	250
Educational-SI	Pearson Correlation	.220**	.208**	1	-.034	-.134*	-.006	.051	.132*	.130*
	Sig. (2-tailed)	.000	.001		.594	.034	.924	.426	.038	.040
	N	250	250	250	250	250	250	250	250	250
Social-SI	Pearson Correlation	.034	.065	-.034	1	.304**	.352**	.089	-.245**	-.197**
	Sig. (2-tailed)	.597	.309	.594		.000	.000	.161	.000	.002
	N	250	250	250	250	250	250	250	250	250
Political-SI	Pearson Correlation	.114	.123	-.134*	.304**	1	-.007	-.055	.041	.072
	Sig. (2-tailed)	.072	.050	.034	.000		.918	.388	.517	.259
	N	250	250	250	250	250	250	250	250	250
Religious-SI	Pearson Correlation	-.086	-.008	-.006	.352**	-.007	1	.149*	-.202**	-.184**
	Sig. (2-tailed)	.176	.894	.924	.000	.918		.019	.001	.004
	N	250	250	250	250	250	250	250	250	250
Environmental-SI	Pearson Correlation	.207**	.135*	.051	.089	-.055	.149*	1	.209**	-.119
	Sig. (2-tailed)	.001	.033	.426	.161	.388	.019		.001	.061
	N	250	250	250	250	250	250	250	250	250
Economic-SI	Pearson Correlation	.275**	.141*	.132*	-.245**	.041	-.202**	.209**	1	.672**
	Sig. (2-tailed)	.000	.026	.038	.000	.517	.001	.001		.000
	N	250	250	250	250	250	250	250	250	250
Food-SI	Pearson Correlation	.219**	.021	.130*	-.197**	.072	-.184**	-.119	.672**	1
	Sig. (2-tailed)	.000	.744	.040	.002	.259	.004	.061	.000	
	N	250	250	250	250	250	250	250	250	250
** and * , Correlation is significant at 0.01 & 0.05 level respectively										
(2 tailed)										

(Figures in parenthesis indicate p value and ** indicates significant at 0.01 level and * indicates significant at 0.05 level).