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STATUS AND CONSTRAINTS OF JUTE CULTIVATION IN BANGLADESH: AN EXPERIENCE FROM SELECTED UPAZILAS UNDER CHANDPUR DISTRICT

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Abstract

This study aimed at exploring the obstacles of jute cultivation under Chandpur Districts in Bangladesh by the principle component analysis (PCA). The required data were collected through structured interview schedule from 803 jute farmers sampled conveniently. Though jute diversified industry has been seen as potential since the last decade in Bangladesh, raw jute production is not satisfactory due to several obstacles. The study has identified three categories of constraints that hinder sustainable jute production. These are lack of capital and inputs, knowledge and natural resources, and market information. Basically farmers cultivate jute for earning profit but they are not conscious about forward market. Lack of jute diversification knowledge is the unique findings of this study. The findings may help policy makers and stakeholders for taking effective decision in addressing the barriers to jute cultivation in Bangladesh.

Keywords: Constraints**,** jute cultivation, jute diversification, Bangladesh

1. INTRODUCTION

In the history of human civilization jute occupies a unique position in the array of natural fiber. Jute is very vital sector in agricultural, industrial, and commercial context in Bangladesh. It was once known as the golden fiber of Bangladesh, since it was the most important cash crop for the country. Bangladesh enjoys comparative advantages in jute production over other countries in the world. In

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Bangladesh, jute is locally popular by the name *Paat*. Jute fiber is produced mainly from two commercially important species, namely *White Jute* or *Deshi Paat* (*Corchours capsularis*), and *Tossa Paat* or *Boghi Jute* (*Corchorus olitorius*). Jute occupies approximate 6% of the total land area and about 10% of the total agriculture land area of the country. The share of jute in agriculture export is around 39% (IJSG, 2012). Bangladesh produces around 33% of the total global jute and is the largest exporter in the world with around 29% as raw jute. Moreover, Bangladesh earns foreign currency by exporting raw jute, jute manufactures, jute carpet, yearns and twine. Over the past six years jute export has been doubled from USD 326.15 million in 2003-2004 to USD787.99 million in 2009-2010. Moreover, there is increasing raw jute export growth has observed during 2010-11 to 2011-12 by 1.1% and 2.36% respectably but 1.1% decreased in 2012-13 (IJSG, 2013). It indicates that jute sector is prospective in Bangladesh but with some challenges. In Bangladesh, approximately 32 million people are involved in agricultural activities of which 12.5% is involved with jute sector (Molla, 2014). Being ignored by adequate government policy, Bangladesh's jute glory has been grabbed by the mighty synthetic corporate house. As jute sector is economically important in Bangladesh, any problem of this sector should be studied and solved very carefully as early as possible. However, the researchers are not much aware any research on jute cultivation in Chandpur District. Nowadays jute cultivation and raw jute marketing is not satisfactory because of enormous challenges which are still unaddressed. The recent success of small jute diversified industries show that diversified finished jute products exporting can revive the weaken jute sector and livelihoods of the jute famers. However, there are no well documented research evidences of solving the problems of jute sector through alternative approach other than the raw jute export. Nevertheless, a holistic problems identification is the precondition for looking appropriate ways of addressing them. As problems are multifaceted, policy intervention for sustainable and vibrant jute sector deserve knocking at critical gates to improve the lives of farmers and sustainable development of the country.

1.1. Literature review of jute cultivation constraints

Based on research objectives, researchers have investigated obstacles of jute growers in jute cultivation in different previous research. Hussain *et al.* (2002) investigated various problems in producing jute likely low market price, low demand of jute, farias influence of government purchasers, and inadequate grading knowledge of the farmers etc. Another scholar has also found different constraints in jute producing such as physical (limited water availability etc) technological (lack of more productive technical knowledge and know how) etc. (Hussain, 1969). According to Skidar and Banerjee (1990), jute farmers face several obstacles such as insufficient irrigation facilities, high inputs price, insufficient credit facilities, and lack of market and particularly scarcity of clean water for jute retting in their study. For retting, farmers usually have to go away from his house; it will incur the cultivation cost. Hossain *et al.* (2002) found that agricultural knowledge and attitude are significantly related and these directly impact in farmer's decisions making. Raw jute has been passing through challenges due to low and unstable price at the growers' level (Dass, 1999). Anonymous (2010) found that the jute sector of Bangladesh is hindered by lack of availability of quality seed, retting problems, mill efficiency, product diversification issues and market linkages. In Nepal, the area and production of land has decreased in jute production due to several obstacles such as unstable and low price of raw jute, unavailability of quality seed, labor shortage during peak season, weed problem, irrigation at sowing period and disease complex (wilt) etc. (Ghimire and Thakur, 2013). This study has considered some contemporary issues in research such as diversified use, knowledge and natural resource issues of farmers which contributing jute cultivation decisions. It is noted that researchers in not much aware any academic research how these factors are contributing in jute cultivation decisions by jute farmers.

1.2. Status of jute cultivation

Bangladesh produces best quality jute fiber in the world. The land of Bangladesh is suitable for jute production. It should be noted that Bangladesh stood first position in producing jute among the countries of the world. For the last couple of years, India took the first position of raw jute

production defeating Bangladesh. Recently, Bangladesh government has developed "Mandatory Jute Packaging Act 2010" and "Mandatory Jute Packaging Rules 2013." Furthermore, demands of jute products have increased significantly at home and abroad. But raw jute production is not satisfactory at farm levels. Farmers are reluctant to cultivate jute due to obstacles at different phases of the cultivation. The statistics shows that jute cultivation area has been declined gradually from 84 hectare in 2011 to 74.36 hectare in 2014. On the other hand, jute production has been reduced from 7.09 metric tons to 6.66 metric tons during the last four years (Figure 1).

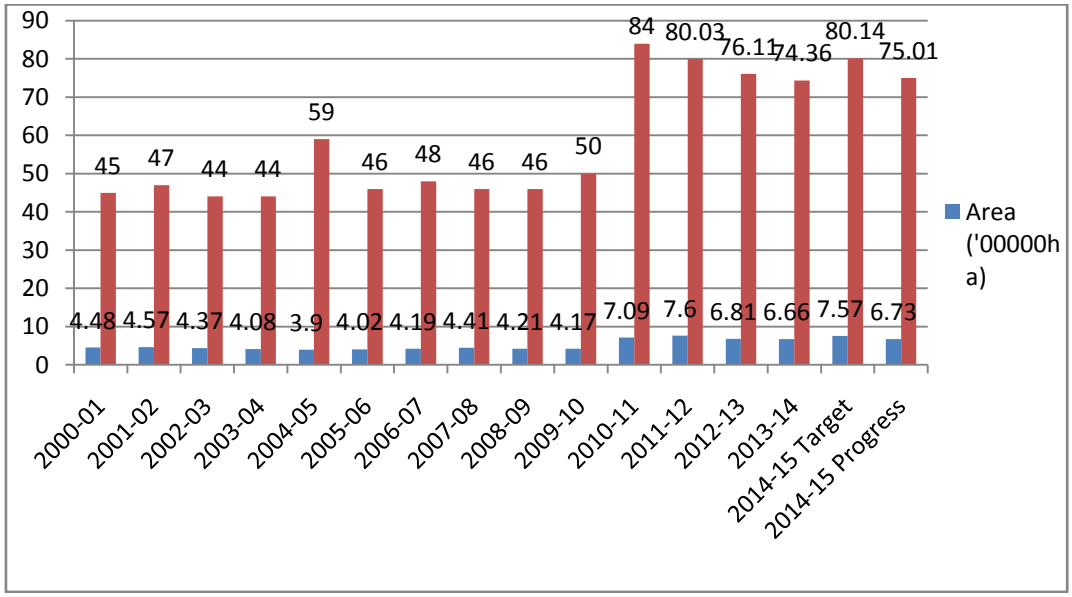

Figure 1: Jute cultivation area and production trends in Bangladesh

Source: IJSG (2012) and DAE (2015)

More than 80% of world jute grows in the Ganges delta of Bangladesh which has been categorized in to three areas such as- Jat area (*Brahmaputra Alluvium*), the Nothern area (*Teesta Silt*) and the Districts area (*Ganges Alluvium*). The Jat area covers the grater Dhaka, Comilla and Mymensingh districts. The Northern area comprises grater Rangpur, Dinajpur, Bogra, and Rajshahi district. The District areas are composed of greater Faridpur, Jessore, Pabna and Kustia. Jat area contributes to 41.69% of total raw jute production whereas Northern and Districts area contributes 30.08% and 28.23% respectively. But the picture has been changed over the couple of decades. District area accounted for 63.72% of total jute cultivation area where as Jat area contributed only 17.87% during 2009-10 (Molla, 2014). The total cultivated land of Chandpur district was 2666.88 hectare during 2008-09 and 4783.79 hectare during 2010-11. The total jute cultivated land area decreased more than 446.32 hectare during 2013-14 compare to the year 2010-11/12 (BBS, 2013). Furthermore, the targeted area is only 4714 hectare in 2015-16 (DAE, 2015). Despite conducive environment for jute cultivation, the size of jute cultivation land is decreasing in Chandpur Districts over the last few years. The government and policy makers needs to be well informed about the status of jute cultivation as well as causes of deviation that undermine jute production and livelihoods of the farmers. If farmers get the motivation and benefits, they will cultivate jute. So it is very urgent to address farmers' problems and obstacles in growing jute. Bangladesh can enjoy and lead the natural fiber market through jute production and by making diversified eco-jute products. The policy makers and authorities may take urgent steps to resolve jute cultivation obstacles.

2. MATERIALS AND METHODS

The study was conducted in purposively selected four upazillas (sub-district) of Chandpur Districts. These four Upazillas are Chandpur Sadar, Matlab Dakkhin, Kachua and Hajiganj. Purposive selection was favoured because maximum numbers of jute growers are located in these Upazillas. Moreover, the areas are familiar to the researcher. All jute farmers under these four upzillas were considered as population. To get generalizable data in short time 803 jute growers were sampled following a convenience sampling. Data were collected through a structured interview schedule from accidentally meet available jute farmers during February to March of 2015. The researchers were guided by local NGO workers who have informal relationship with the jute farmers. A five point Likert scale was used to get the ratings against 31 selected constraints. Data were entered into computer package SPSS 17 version for analysis. Descriptive statistics like frequency distribution, mean and standard deviation were used to analyze the socio-economic status of the jute growers whereas factor analysis was performed to identify the major constraints for jute cultivating in the selected areas.

3. RESULT AND DISCUSSION

A summary of nine characteristics of the respondents has been presented in table 1. The information of the table shows that the majority of the respondents (54.1%) were at middle aged (31-50 years), 5.8% respondents were young (up to 30 years), the remaining were old age (above 51 years). Women respondents of the survey were about 8.1%. Medium sized (5-9) family (65%) dominates in the locality. About 75.3 % household possess 1-3 family labor. In addition, more than half of the respondent's farm size is between 10.1-20 decimal (0.0409 to 0.081 hectares) and almost 50% of the respondents possess up to up to 6 decimals (0.0243 hectares) land for jute cultivation. The table 1 also indicates that 84.6% respondents have more than 10 years experiences in jute cultivation. About half of the respondents have annual income BDT.35000 to 75000. Traditionally most of the respondents (57.90%) prefer to cultivate native varieties of jute locally named as *Shutli*.

3.2. Constraints of Jute cultivation

Based on literature review and expert opinion, the study has chosen thirty one (31) probable constraints of jute cultivation in Bangladesh (Table 4). Respondents' opinions regarding the constraints were matched with a 5-point Likert scale. Principal Component Analysis (PCA) has been operationalized to extract perceived constraints of jute cultivation in reduced form. From the correlation matrix [appendix table-1], it has been seen that some of the items have scores more than 0.3 and hence it is appropriate for factor analysis (Tabachnick and Fidel, 2007). In addition, for checking data normality and sample advocacy, Kaiser-Mayer-Olkin (KMO) measure and Bartlett test of Sphericity is frequently used by different practitioners and researchers. If Bartlett's test of Sphericity is large and significant and the KMO is greater than 0.6 then factorability is assumed. High value of KMO between 0.5 and 1.0 indicates the data feasibility for factor analysis (Leech *et al.*, 2005). As the study found 0.631 from KMO test and significant Bartlett's test of Sphericity as $P< 0.01$ (see table-2), hence the study goes for operating factor analysis.

Table 1: Demography and Characteristics of jute farmers

Characteristics of jute farmers	f	%	Range	M	SD
Age (in full years)					
Below 30	48	5.8			
31-50	437	54.1	20-69	47.90	7.86
51 Above	318	39.5			
Gender					
Male	738	91.9	-	-	-
Female	65	8.1			
Family Members					
1-4	43	5.3			
5-9	525	65.4	2-16	8.69	2.24
10 and above	235	29.27			
Household Labor					
1-3	605	75.3	1-5	2.63	0.89
4-6	198	24.7			
Total Farm size (in decimal)					
Below 10	18	2.22			
10.1-20	408	50.9	3-180	28.25	24.93
20.01-30	250	31.1			
Above 30	127	15.8			
Jute cultivation Area (in decimal)					
Below 6	401	49.94			
6-12	386	48.07	3-40	7.63	3.76
Above 12	16	1.99			
Experience of jute production					
Less than 5 years	56	7.0			
5-10 years	68	8.4	1-40	21.96	9.73
Above 10 years	679	84.6			
Annual House Income (000' BDT)					
Less than 35	228	28.4			
35 -75	428	53.3	15-200	65.78	38.81
Above 75	147	18.3			
Name of varieties					
Jute (Deshi)	465	57.90			
Jute (Tossa)	298	37.12	-	-	-
Jute (Mesta /kenaf)	40	4.98			

Source: Field Survey

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**0.631**
Bartlett's Test of Sphericity	Approx. Chi-Square	3475.567
	Df	465
	Sig.	0.000

To identify the optimum number of components, authors have tested two different options. Kaiser's criterion, as one of two options, suggests extracting the factors with Eigen value of equal to or more than one. The PCA shows that there are 12 factors consist of Eigen values more than 1 [see table-3]. These twelve factors explain 59.528 percent of variance (from cumulative percentage column in total variance explained table). However, scree-plot is another option that can facilitate researchers to extract the right factors for the further study. From the scree-plot, it has been seen that 5 components exist above the third elbow [appendix figure-1]. Therefore, it suggests five categories of factors significantly hinder jute cultivation in Bangladesh.

Table 3: Total Variance Explained

Component	Initial Eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.728	12.025	12.025	3.728	12.025	12.025	3.266
2	1.730	5.581	17.605	1.730	5.581	17.605	1.915
3	1.607	5.185	22.790	1.607	5.185	22.790	2.168
4	1.466	4.730	27.520	1.466	4.730	27.520	1.586
5	1.442	4.650	32.170	1.442	4.650	32.170	1.495
6	1.372	4.427	36.597				
7	1.340	4.324	40.921				
8	1.239	3.997	44.918				
9	1.191	3.842	48.760				
10	1.163	3.752	52.512				
11	1.135	3.661	56.173				
12	1.040	3.355	59.528				
13	0.974	3.142	62.670				
14	0.947	3.055	65.725				
15	0.895	2.887	68.612				
16	0.861	2.778	71.391				
17	0.853	2.752	74.143				
18	0.798	2.575	76.718				
19	0.737	2.378	79.097				
20	0.722	2.329	81.425				
21	0.707	2.281	83.707				
22	0.690	2.225	85.932				
23	0.654	2.111	88.042				
24	0.596	1.922	89.965				
25	0.569	1.835	91.799				
26	0.511	1.647	93.446				
27	0.475	1.533	94.980				
28	0.448	1.445	96.425				
29	0.404	1.305	97.730				
30	0.377	1.215	98.944				
31	0.327	1.056	100.000				

Extraction Method: Principal Component Analysis

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance

From the total variance explained table [see table 3], it has been seen that five components cumulatively explain 32.17 percent variance whereas twelve components cumulatively explain 59.528 percent variance. In addition, to interpret five components elaborately, Oblimin rotation was performed which is given in the structure matrix table 4.

Table 4: Structure matrix

Constraints	Component				
	1	2	3	4	5
Lack of capital	0.650				
No purchasing of jute by govt. and mills	-0.635				
Unavailability of quality seeds	0.545				
Insufficient credit facilities	0.517		0.483		
Lack of transport facilities	-0.507				
Lack of subsidies from government	0.484				
Lack of suitable land	-0.469				
Cyclone	-0.456				
Lack of knowledge of crop rotation	-0.397	0.303			
High price of inputs	0.335		0.318		
Hail storm	-0.353	-0.535			
Lack of knowledge on diversified use		0.503			
Drought	-0.309	0.498			
Lack of knowledge on retting methods		0.485	0.343		
Lack of knowledge for jute cultivation		0.385			0.300
Distance market					
No grade difference in pricing			0.509		
Unavailability of buyer			0.485		
Fixed soil (unproductive soil)	-0.372		-0.449		
Inadequate knowledge on ecosystem			-0.429		
Low price of jute			0.420		
Lack of information on market price			-0.359		
Strong syndicate among local buyers			0.356		-0.307
Weak extensions service				-0.537	
Lack of storage facilities				-0.524	
Lack of bargaining power with buyer				-0.460	
Highly laborious				0.446	0.358
Scarcity of water		0.314		-0.412	
Lack of monitoring in fake seed import					0.620
Lack of processing facilities					0.504
Shortage of knowledge on environmental benefits					

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization

The component correlation matrix (table 5) shows the strength of correlation between two components. Correlation among the variables of the existing study varies from -0.056 to 0.119. It shows week correlations among the variables as it is less than 0.2. Moreover, the components are almost independent from or no relation to one another. Hence, the decision of Oblimin's five factor solution is appropriate for the study.

Table 5: Component correlation matrix

Component	1	2	3	4	5
1	1.000	0.119	0.162	-0.036	-0.026
2	0.119	1.000	0.041	-0.038	0.006
3	0.162	0.041	1.000	-0.036	-0.056
4	-0.036	-0.038	-0.036	1.000	0.040
5	-0.026	0.006	-0.056	0.040	1.000

Extraction Method: Principal Component Analysis
Rotation Method: Oblimin with Kaiser Normalization

From the structure matrix (table 4), it has been seen that eight variables loaded under identifiable component-1 with negative scores (such as; -0.635, -0.507, -0.372, -0.353, -0.309, -0.469, -0.456, -0.397) which indicate an opposite relationship between the observed variables and component-1. As the study deals with the constraints of jute cultivation at selected upzillas under Chandpur districts in Bangladesh, these negatively loaded variables have excluded from the component-1. However, component-1 loads five variables with high positive scores of more than 0.4 each: lack of capital, lack of subsidies from government, insufficient credit facilities (as strongly correlated at .517 with component-1 than 3), lack of subsidies from government and high price of inputs. By considering the nature of and the literature on the extracted variables, authors argue financial and inputs obstacle as one of the constraints behind the jute cultivation in study area.

Similarly, by excluding the variable 'hail storm' as it is negatively loaded under component-2, the study realizes another constraint which consists of five variables: lack of knowledge of crop rotation, lack of knowledge on diversified use, drought, and scarcity of water, lack of knowledge on modern retting methods (as it is strongly correlated with component-2 than 3), and lack of knowledge for jute cultivation. Hence, the second broad constraint of jute cultivation in Bangladesh is knowledge and natural resources obstacle. Similarly, the third broad constraint of jute cultivation is market and information obstacle which consists of four closely related variables: strong syndicate among local buyers, low price of jute, no grade difference in pricing, and unavailability of buyers.
Most of the variables under component 4 and 5 are negatively correlated with each other and the rest of the variables under each component (only 1 and 2 under component- 4 and5 respectively) are considered as constraints of jute cultivation in study area due to significant constraints. Thus a fourth constraint is highly labourious. Farmers think that whole process of jute cultivation is labourious work compare to other crops. Finally the fifth as others constraints are lack of monitoring in fake seed import and lack of processing facilities. Therefore, broad barriers of jute cultivation at Chandpur district are lack of sufficient finance and other inputs, knowledge and natural resources, and market and information

4. CONCLUSIONS

The main findings of this study have generated some important obstacles which have been faced by jute growers of Chandpur Districts such as lack of capital and inputs, knowledge and natural resource constraints, and market and information obstacles. These obstacles make difficult in decision making of jute cultivation in study area. Problems could be minimized by providing sufficient jute crop credit facilities and subsidies on inputs from government for sustainable jute cultivation. Awareness program on modern jute retting and cultivation methods, diversified uses of jute and adoption of climate change effects should be addressed by the concern authority to minimize the knowledge and natural resource obstacles. However, most of the obstacles could be removed by promoting jute diversified entrepreneurs and develop its market at home and abroad. As a result, automatically farmers will get high price, buyer and market benefits. Besides, promoting farmers to be an entrepreneur or ensuring strong linkage among jute diversified industries will also minimize the market related obstacles. Finally, it is expected that the results of this study will be useful for jute farmers, policy makers and researchers to address the contemporary obstacles of jute cultivation in effectively.

4.1. Recommendations

In view of the concluding remarks, the following suggestion are given for addressing several obstacles in jute cultivation and for sustainable jute production on the basis of analysis as well as information gathers from the selected areas.

1. Department of agricultural extension should identify and address farmers problem in effective way. They can set farmers complain box at local level and respond accordingly.
2. NGO's should offer seasonal loan to the jute growers without collateral.

3. Government can disseminate knowledge through different media or agencies on modern jute cultivation and environmental changes to address knowledge and natural resources obstacles.
4. Government also should take initiative for farm mechanization instated of traditional inefficient agricultural tools to reduce before and after the process of jute cultivation. It will reduce the lengthy process and make the work easy for farmers. Besides government should monitor all imported inputs such as seeds, machines, fertilizers etc strictly.
5. Government should take massive roadmap for enhancing jute cultivation at farmer's level by using jute wing of Department of Agricultural Extensions. Extension workers may give suggestions before and after crop cultivation in selection of quality seed and fertilizer. Government can be more active by taking help from DAE and Bangladesh Jute Research Institute for identifying effective strategies in jute cultivation.
6. Contract farming can help to reduce hindrances of the jute cultivation. Through contract farming farmers will be benefited and they will get security in jute cultivation. It will help to ensure sustainable jute production.
7. Government should develop and implement Minimum Price Support policy for the poor jute growers.
8. Government could distribute and subsidies agricultural inputs to the poor jute farmers and give reward on the basis of jute production.
9. Promoting farmers to be entrepreneurs of diversified jute products through training and providing other facilities. Here Jute Diversification Promotion Centre (JDPC) can play a good role. Ultimately jute farmers will be motivated in jute production.

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Appendix

Table 1: Correlation Matrix

	LKCR	UB	LSF	LTF	LPF	HL	SW	DM	LBP	NGP	LMP	LKR	LKD	IKE	SKEB	LKJC	WES	LPJ	LSG	LMFS	NPJG	D	H	C	UQS	FS	ICF	HPI	SSLP	LC	LSL
LKCR	1.000	-.074	-.121	.079	.074	.011	.023	.057	-.030	-.007	.180	.018	-.074	.035	-.087	.063	-.007	.000	-.188	.048	.183	.192	-.021	.014	-.160	.183	-.146	-.129	-.041	-.155	.071
UB	-.074	1.000	.006	-.076	-.072	-.025	.029	.037	-.095	.110	-.083	.080	-.061	-.048	.038	.095	-.122	.193	.016	.006	.031	-.055	-.080	-.004	-.009	-.207	.079	.021	.052	.139	.000
LSF	-.121	.006	1.000	-.053	.058	-.105	.130	.018	.091	-.010	-.178	.074	.048	-.072	-.077	.099	.071	.121	-.025	.086	-.065	-.033	-.029	-.089	.118	-.093	.164	.022	.168	.098	-.015
LTF	.079	-.076	-.053	1.000	.009	.089	-.039	.181	-.055	.004	.132	.006	-.018	.004	-.045	.003	.065	-.210	-.150	.041	.232	.148	.159	.213	-.232	.128	-.200	-.091	-.024	-.227	.131
LPF	.074	-.072	.058	.009	1.000	.013	-.083	-.124	.041	.079	.053	-.113	.037	.042	.055	.098	-.152	.033	-.025	.140	.106	.099	-.107	.059	-.041	.054	-.014	-.063	.033	.079	.070
HL	.011	-.025	-.105	.089	.013	1.000	-.163	-.021	-.003	-.046	.072	-.079	-.211	.118	.040	.046	-.064	-.190	.034	.072	.034	.093	.092	.142	.016	.025	.004	.063	-.140	-.046	.037
SW	.023	.029	.130	-.039	-.083	-.163	1.000	-.040	.046	-.025	.071	.149	.180	.005	.031	.050	.140	.104	.061	-.033	-.066	.017	-.057	-.087	.127	-.139	.020	.036	.021	.114	-.014
DM	.057	.037	.018	.181	-.124	-.021	-.040	1.000	-.016	.033	.022	.015	-.191	.051	-.043	-.019	.036	-.052	-.117	-.001	.102	-.115	.151	.094	-.015	.027	-.073	-.048	.006	-.195	.011
LBP	-.030	-.095	.091	-.055	.041	-.003	.046	-.016	1.000	-.016	-.016	-.027	.038	.111	-.004	-.036	.090	.058	-.062	.039	-.098	.057	.090	.102	-.006	.056	-.049	-.042	.008	.101	.120
NGP	-.007	.110	-.010	.004	.079	-.046	-.025	.033	-.016	1.000	-.123	.108	.039	-.125	.069	-.037	.044	.093	-.024	.056	.012	-.021	-.032	-.049	-.088	-.058	.173	.106	.022	-.029	.110
LMP	.180	-.083	-.178	.132	.053	.072	.071	.022	-.016	-.123	1.000	-.056	-.058	.053	.086	-.002	-.041	-.079	.022	.083	.187	.147	.131	.156	-.091	.198	-.151	-.111	-.011	-.255	-.029
LKR	.018	.080	.074	.006	-.113	-.079	.149	.015	-.027	.108	-.056	1.000	.143	.018	.053	.128	-.032	.264	.063	.010	-.095	.080	-.215	-.169	.154	-.160	.322	.175	.027	.178	-.086
LKD	-.074	-.061	.048	-.018	.037	-.211	.180	-.191	.038	.039	-.058	.143	1.000	-.030	-.022	.101	.069	.021	.079	-.073	-.041	.192	-.130	-.058	.005	-.067	.116	.112	-.010	.194	.006
IKE	.035	-.048	-.072	.004	.042	.118	.005	.051	.111	-.125	.053	.018	-.030	1.000	-.027	.073	.080	-.073	.060	-.022	.074	.074	-.069	.027	.085	.080	-.143	-.085	-.127	-.071	.108
SKEB	-.087	.038	-.077	-.045	.055	.040	.031	-.043	-.004	.069	.086	.053	-.022	-.027	1.000	-.003	-.001	.039	.094	.053	-.071	.054	.081	-.014	.059	-.035	.007	.055	.057	-.039	.046
LKJC	.063	.095	.099	.003	.098	.046	.050	-.019	-.036	-.037	-.002	.128	.101	.073	-.003	1.000	.116	.257	.075	.053	-.064	.033	-.183	-.046	.068	-.039	.088	-.047	.027	.148	.008
WES	-.007	-.122	.071	.065	-.152	-.064	.140	.036	.090	.044	-.041	-.032	.069	.080	-.001	.116	1.000	.055	-.002	.160	.032	.121	.032	-.038	-.031	.092	.048	-.029	.038	-.003	-.080
LPJ	.000	.193	.121	-.210	.033	-.190	.104	-.052	.058	.093	-.079	.264	.021	-.073	.039	.257	.055	1.000	.078	.032	-.110	-.114	-.097	-.086	.137	-.178	.140	.136	.104	.217	-.117
LSG	-.188	.016	-.025	-.150	-.025	.034	.061	-.117	-.062	-.024	.022	.063	.079	.060	.094	.075	-.002	.078	1.000	.078	-.241	-.093	-.067	-.166	.104	-.061	.216	.079	-.045	.174	-.194
LMFS	.048	.006	.086	.041	.140	.072	-.033	-.001	.039	.056	.083	.010	-.073	-.022	.053	.053	.160	.032	.078	1.000	.041	-.031	.118	.025	-.159	.045	.042	-.105	-.173	-.026	.131
NPJG	.183	.031	-.065	.232	.106	.034	-.066	.102	-.098	.012	.187	-.095	-.041	.074	-.071	-.064	.032	-.110	-.241	.041	1.000	.184	.151	.322	-.161	.240	-.218	-.110	.021	-.329	.206
D	.192	-.055	-.033	.148	.099	.093	.017	-.115	.057	-.021	.147	.080	.192	.074	.054	.033	.121	-.114	-.093	-.031	.184	1.000	.000	.091	-.097	.023	-.120	-.031	-.039	-.117	.073
H	-.021	-.080	-.029	.159	-.107	.092	-.057	.151	.090	-.032	.131	-.215	-.130	-.069	.081	-.183	.032	-.097	-.067	.118	.151	.000	1.000	.280	-.227	.236	-.266	-.146	-.078	-.239	.091
C	.014	-.004	-.089	.213	.059	.142	-.087	.094	.102	-.049	.156	-.169	-.058	.027	-.014	-.046	-.038	-.086	-.166	.025	.322	.091	.280	1.000	-.268	.135	-.194	-.198	-.142	-.180	.118
UQS	-.160	-.009	.118	-.232	-.041	.016	.127	-.015	-.006	-.088	-.091	.154	.005	.085	.059	.068	-.031	.137	.104	-.159	-.161	-.097	-.227	-.268	1.000	-.130	.211	.169	.037	.315	-.229
FS	.183	-.207	-.093	.128	.054	.025	-.139	.027	.056	-.058	.198	-.160	-.067	.080	-.035	-.039	.092	-.178	-.061	.045	.240	.023	.236	.135	-.130	1.000	-.303	-.145	-.087	-.251	.114
ICF	-.146	.079	.164	-.200	-.014	.004	.020	-.073	-.049	.173	-.151	.322	.116	-.143	.007	.088	.048	.140	.216	.042	-.218	-.120	-.266	-.194	.211	-.303	1.000	.353	.179	.394	-.232
HPI	-.129	.021	.022	-.091	-.063	.063	.036	-.048	-.042	.106	-.111	.175	.112	-.085	.055	-.047	-.029	.136	.079	-.105	-.110	-.031	-.146	-.198	.169	-.145	.353	1.000	.091	.179	-.126
SSLP	-.041	.052	.168	-.024	.033	-.140	.021	.006	.008	.022	-.011	.027	-.010	-.127	.057	.027	.038	.104	-.045	-.173	.021	-.039	-.078	-.142	.037	-.087	.179	.091	1.000	.016	-.013
LC	-.155	.139	.098	-.227	.079	-.046	.114	-.195	.101	-.029	-.255	.178	.194	-.071	-.039	.148	-.003	.217	.174	-.026	-.329	-.117	-.239	-.180	.315	-.251	.394	.179	.016	1.000	-.310
LSL	.071	.000	-.015	.131	.070	.037	-.014	.011	.120	.110	-.029	-.086	.006	.108	.046	.008	-.080	-.117	-.194	.131	.206	.073	.091	.118	-.229	.114	-.232	-.126	-.013	-.310	1.000

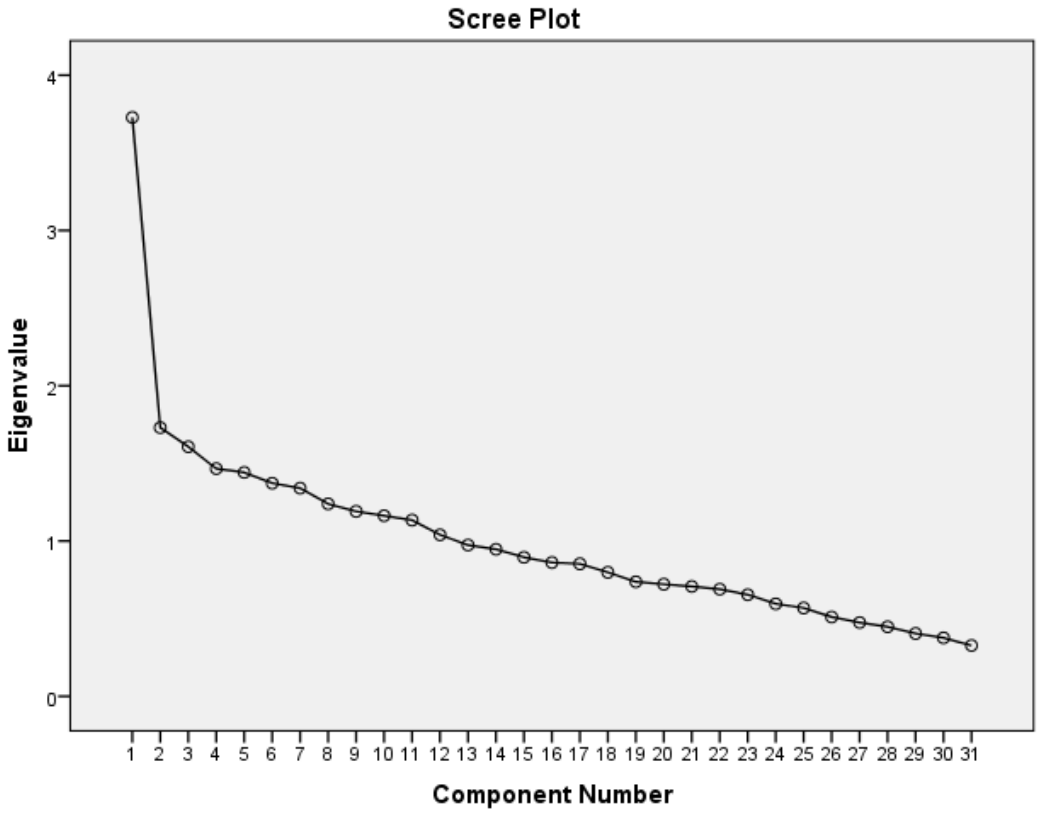

Figure 1: Scree Plot