CHAPTER-V

DATA ANALYSIS AND RESULTS

This chapter represents the data analysis part of the collected data and the results obtained by applying various mathematical and statistical tools and techniques. Here the results obtained have been discussed in the light of the objectives and hypotheses of the study keeping in sight the findings of other researches in this area of study. Considering the objectives of the study the chapter has been divided into four parts. The first part represents profile of the sample households of Nagaon district (Section-1), second part represents data analysis and results obtained by applying fuzzy Set Technique (Section-2), third part represents data analysis and results obtained by applying Factor Analysis method (Section-3) and the last part represents the regression analysis results of regression models constructed by arraying relevant socio economic and background characteristics of households on women Empowerment of Nagaon district (Section-4).

Section-1

5.1 Profile of the Sample Households of Nagaon District

As pointed out in the methodology section of the study, the primary data for the study has been collected from rural and urban areas of the Nagaon District of Assam.

5.1.1. Area Wise Distribution of Sample Units

The distribution of sample units is shown area wise, in this sub-section of the study.

Table-5.1: Area Wise Distribution of Sample Units

District: Nagaon **Area: Rural**

CD Block	No. of Selected Households	No. of Selected Respondents (Women in 18-60 Years Age Group)	% of Selected Household to Total	% of Selected Respondents to Total
Khagorijan	60	60	20	20
Barhampur	60	60	20	20
Dolongghat	60	60	20	20
Raha	60	60	20	20
Pakhimoriya	60	60	20	20
Total	300	300	100%	100%

Data Source: Field Survey,2014

For collection of rural data five CD Blocks are selected purposively. The Blocks are Khagorijan Development Block, Barhampur Development Block, Dolongghat development Block, Raha Development Block, and Pakhimoriya Development Block. From each development block 60 households are selected for household sample survey. From each household one woman respondent belonging to the age group of 18-60 years is selected for the interview. Direct personal interview method through a pre-tested and structured schedule is used for collection of data. The numbers of households selected and respondents interviewed from each CD Block are shown in Table-5.1. In total 300 target group women from 300 selected rural households, one from each household, are interviewed from rural areas of Nagaon District.

The picture of sample drawn from the urban areas of Nagaon District is shown in Table- 5.2. The Municipality Board (MB) Area is the largest urban area of the District. There are other small urban areas in the District but socioeconomically these areas are semi-urban in nature. Therefore, all the urban sample units for the study are selected from the MB Area of the District only.

Table-5.2: Area Wise Distribution of Sample Units

District: Nagaon **Area: Urban**

Urban	No. of Selected Households	No. of Selected Respondents (Women in 18- 60 Years Age Group)	% of Selected Households to Total	% of Selected Respondents to Total
Municipality Board Area	100	100	100	100
Total	100	100	100%	100%

Data Source: Field Survey,2014

For collection of urban dada, total 100 target group women from 100 selected urban households taking one from each household are interviewed from the selected urban area of Nagaon District.

5.1.2: Demographic and Socioeconomic Characteristics of Sample Units

The demographic characteristics of the sample households are shown in Table- 5.3

Table-5.3: Demographic Characteristics of Sample Households

Area	Male	Female	Total	Avg. Family Size	No. of Women(18-60) Years Old	Dependency Ratio	Sex Ratio	Avg. No. of Women (18-60)Years Per Family
Rural	587	580	1167	3.89	484	0.3514	988.07	1.61
Urban	174	173	347	3.47	149	0.3244	994.25	1.49
Total	761	753	1514	3.78	633	0.3545	989.48	1.58

Data Source: Field Survey,2014

Table-5.3 reveals that in rural areas the total numbers of persons in 300 selected rural households are 1167 out of which males are 587 and females 580. Average family size is 3.89. The total number of women in the age group of 18-60 years (Target group) in rural areas is 484. The dependency ratio and sex ratio in rural areas of Nagaon district are 0.3514 and 988.07 respectively. Besides these, the average number of women in 18-60 years age group, per family is 1.61. From the urban subsample it is seen that total number of persons is 347 out of which males are 174 in numbers and females are 173. Average family size is 3.47. The total number of women in the age group of 18-60 years is 149. The dependency ratio and sex ratio in urban areas of Nagaon district are 0.3244 and 994.25 respectively. The average number of women in 18-60 years age-group per family is 1.49. Now if both rural and urban are taken together, total number of persons is 1514 out of which males are 761 and females are 753. Average family size in Nagaon district is 3.78 and the total number of women in the age group of 18-60 years is 633.

The dependency ratio and sex ratio of Nagaon district are 0.3545 and 989.48 respectively and the average number women per family in 18-60 years age-group is 1.58.

The socio-economic characteristics of sample households are shown in Table-5.4(A) and Table-5.4(B)

Table- 5.4 (A): Socio- Economic Characteristics of Sample Households

Area	Family Type (nuclear, in %)	% of General Category HH to Total	% of Household to Total		% of BPL to Total	Avg. Education (6 years.& above)
			Hindu	Muslim		
Rural	93.67	18.33	56.67	43.33	11	8
Urban	100	20	95	5	0	11
Total	95.25	18.75	66.25	33.75	8.25	9

Data Source: Field Survey,2014

Table-5.4 (A) represents socio- economic characteristics of sample households. It is found that the family type which is nuclear in nature in rural, urban and both in combined areas of the district is 93.67 percent, 100 percent and 95.25 percent respectively. The percentage of general category households to total households is 18.33 percent in rural areas, 20 percent in urban areas and 18.75 percent in total areas. The percentages of Hindu and Muslim households to total households are 56.67 percent and 43.33 percent in rural areas, 95 percent and 5 percent in urban areas and 66.25 percent and 33.75 percent in total including both rural and urban areas respectively. Besides these, the percentage of BPL households to total households is 11 percent

in rural areas, 0 percent in urban areas and is 8.25 percent in rural and urban combined areas respectively. The average level of education completed by a person aged six years and above is 8^{th} standard in rural areas, 11^{th} standard in urban areas and 9^{th} standard in total areas respectively.

Table- 5.4 (B): Socio- Economic Characteristics of Sample Households

Area	Avg. HH Income (Annual in Rs)	Avg. PCI (Annual in Rs)	% of HHs having Primary Occupation(of HOH) in		
			Primary Sector	Secondary Sector	Tertiary Sector
Rural	302128.88	77668.093	8	32.33	53.67
Urban	569976.00	164258.213	0	38	62
Total	369090.66	97514.045	6	33.75	55.75

Data Source: Field Survey,2014

Table-5.4(B) shows that the average annual income of the selected households is Rs.302128.88 in rural areas and Rs.569976.00 in urban areas. In rural-urban combined areas, the average household annual income is Rs.369090.66. The average per capita annual income is Rs.77668.093 in rural areas, Rs.164258.213 in urban areas and in combined areas, it is Rs.97514.05. Besides these, the percentage of households having primary occupation (of Head of Household) in primary sector in rural, urban and in combined areas is 8 percent, 0 and 6 percent respectively. The percentage of households having primary occupation (of HOH) in secondary sector in rural, urban and in combined areas is 32.33 percent, 38 percent and 33.75 percent respectively. The percentage of households having primary occupation (of HOH) in tertiary

sector in rural, urban and in combined areas is 53.67 percent, 62 percent and 55.75 percent respectively.

The physical infrastructure and asset of the sample households are shown in Table-5.5

Table-5.5: Physical Infrastructure and Asset of the Sample Households

Area	% of HHs Living in Own House	% of Pucca HHs	% of HHs Having Electricity	% of HHs Using LPG for Cooking	Avg. No. of Asset Owned(Out of Specified Assets)*	% of HHs Having Sanitary Latrine
Rural	99.67	51.67	98.33	79	3.77	74
Urban	67	84	100	99	4.78	97
Total	91.5	59.75	98.75	84	4.025	79.75

*Data Source: Field Survey,2014, * Specified Assets: Television, Bicycle, Mobile Phone, Refrigerator, Two Wheeler, Four Wheeler, Computer and Washing Machine.*

Table-5.5 represents the physical infrastructure and assets of the sample households. From the table it is found that out of the selected households, 99.67 percent households in rural areas are living in their own houses. The corresponding percentage for urban areas and combined areas are 67 percent and 91.5 percent respectively. The percentage of households living in pucca houses in rural, urban and combined areas is 51.67 percent, 84 percent and 59.75 percent respectively. Again from the data it is found that the percentage of households having electricity is 98.33 percent in rural areas, 100 percent in urban areas and 98.75 percent in combined areas. The percentage of households using LPG for cooking in rural, urban and in combined areas is 79

percent, 99 percent and 84 percent respectively. The average number of assets owned, out of a selected set of specified assets, by the households is 3.77(in number) in rural areas, 4.78 (in number) in urban areas and in combined areas, it is 4.025 (in number). The selected specified assets are Television, Bicycle, Mobile Phone, Refrigerator, Two Wheeler, Four Wheeler, Computer and Washing Machine. The percentage of households having sanitary latrine in rural, urban and in combined areas is 74 percent, 97 percent and 79.75 percent respectively.

The sources of drinking water in selected households are shown in Table-5.6

Table -5.6: Source of Drinking Water in Selected Households (in %)

Area	Well	Pond	River	Tape	Tube well	Supply
Rural	2	0.33	0	3.33	89.33	5
Urban	0	0	0	15	17	68
Total	1.5	0.25	0	5.25	71.25	21.75

Data Source: Field Survey,2014

Table-5.6 shows the households' sources of drinking water in percentage term. It is found that 2 percent households in rural areas collect their drinking water from well, the corresponding percentage in urban areas is zero. Taking both urban and rural areas, the percentage of such households is 1.5 percent. The largest number of households depends on tube well for drinking water in rural areas (89.33 percent). In urban areas the main source of drinking water is supply water from government water supply system (68 percent). 3.33 percent of households in rural areas, 15 percent of households in urban areas and 5.25 percent of households in combine areas

use tape as a source of drinking water. There is no household in rural and urban areas which collect drinking water from river and very few households are there who depend on pond.

5.1.3 Socioeconomic Characteristics of Respondent Women

The target group women for the study are women in the age group of 18-60 years. Since they are the focus group, it is necessary to examine their socioeconomic status in the study area. The following discussion highlights these aspects.

Education is one of the most important factors that contribute immensely in the process of women empowerment. As shown in Table- 5.7, the average level of education (in completed years) of sample women are found to be very high in urban areas (13^{th} standard), it is also moderately high in rural areas at 9^{th} standard. Percentage of women respondents having education 12^{th} standard and above in rural, urban and in combined areas is 39.33 percent, 72 percent and 47.5 percent respectively.

Table-5.7: Socio- Economic Characteristics of Respondent Women (18-60 Years)

Area	Avg. Level of Education (In Standard)	% of Women Having Education 12 Std. and Above	% of Women Found Married	Avg. Income (Annual in Rs.)	% of Women Found Employed in		
					Primary Sector	Secondary Sector	Tertiary Sector
Rural	9	39.33	97	72058.08	6.67	35	26
Urban	13	72	95	226008	0	25	55
Total	10	47.5	96.5	110545.56	5	32.25	32.5

Data Source: Field Survey,2014

Marriage is also an important factor which has impact on women empowerment. From the Table-5.7 it is found that 97 percent respondents are married in rural areas. In urban and in combined areas, the corresponding figures are 95 percent and 96.5 percent respectively. Apart from education and marriage, employment and income of women are the other two important factors that have connection with women empowerment. It is seen that the average annual income of the sample women respondents in rural, urban and in combined areas is Rs.72058.08, Rs.226008 and Rs.110545.56 respectively. In case of employment, the percentages of women respondents found engaged in primary sector in rural, urban and combined areas are 6.67 percent, 0 and 5 percent respectively. As expected there is no respondent in the urban sample who is found engaged in primary sector. Percentages of respondent women found engaged in valued works in secondary sector are 35 percent in rural, 25 percent in urban and 32.25 percent

in total sample. Again the percentages of women engaged in tertiary sector for their livelihood are 26 percent in rural, 55 percent in urban and 32.5 percent in the total sample respectively.

5.1.4 Livelihood Pattern and Valued, Unvalued Works of Women (18-60 Years)

Literature suggests and corroborates the fact that much of the works done by women are either undervalued or unvalued. This is one of the many reasons responsible for the socioeconomic backwardness of women in many developing countries of the world. The present study, therefore, attempts to assess the livelihood patterns and the nature of the valued and unvalued works of the women of Nagaon district of Assam which is one of the most backward districts of the state.

Table -5.8: Current Valued Livelihood of Women (% Participation)

Nature of Work Done	% of Women Doing as Primary Job	Avg. Wage/ Salary Per Month	Regular (%)	Avg. Distance of Workplace from Home (In KM)	Avg. % Satisfaction from Job
1. Teacher in School	23	20885.714	98.90	3.88	80
2. Teacher in College	2.25	80555.56	100	5.78	97.67
3. Lawyer	0.5	20000	100	3	85
4. Beautician	1.75	3857.14	100	1	80
5. Saleswomen	5.25	3214.29	95.24	1.5	70
6. Nurse	2.25	18666.67	100	3.55	86.67
7. Office Assistant	2.25	19181.82	100	5.36	90
8. Doctor	0.5	70000	100	2	96.5
9. Engineer	0.25	35000	100	4	95
10. Police	0.75	26666.67	100	3	85
11. Tuition	2.25	1514.28	100	0	72.85
12. Weaving	2	4625	100	0.25	76.25
13. Diary Business	1.25	1250	100	0	72.5
14. Cook	2	1250	100	1	66.25
15. Home Maid	1	1000	100	1.5	62.5
16. Agricultural Labour	5	1600	15	1.4	60.5
17. Shop Keeper	1	1500	100	0.3	65
18. Tailor	0.5	5500	100	0.5	70
19. Music Teacher	0.25	3000	100	1	80
20. Care Taker	0.25	2000	100	1.5	50
21. Writer	0.25	10000	100	0	90
22. Worker in Company	0.25	3000	100	2	70
23. SHG	13.5	70	7.41	1.5	51
24. Letting Home for Hire	0.25	5000	100	0	80
25. Agent of Insurance Company	0.25	20000	100	3	85

Data Source: Field Survey,2014

Table-5.8 throws light on the current valued livelihoods of respondent women as found at the time of survey. There are 25 different types of valued works as shown in column 1 of the table in which the respondents are found engaged as their primary valued job. Majority of women are found to be doing jobs of teaching in schools (23 percent) in Nagaon district. Their average salary per month is Rs. 20885.71. The percentage of women doing this job on regular basis is 98.90 percent. The average distance of workplace from their home of these women is 3.88 KM and their average job satisfaction level is 80 percent. Out of 400 respondent women, 2.25 percent respondents are doing job as college teachers. Their average salary per month is Rs. 80555.56. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace from home of those women is 5.78 KM and their average satisfaction level is very high at 97.67 percent. The percentage of women respondents working as lawyer is 0.5 percent. Their average income per month is Rs. 20000. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace of these women from home is 3 KM and their average satisfaction level is 85 percent. Again 1.75 percent of women respondents are working as beautician. Their average income per month is Rs. 3857.14. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace of these women from home is 1 KM and their average satisfaction level is 80 percent. 5.25 percent of women respondents are working as saleswomen. Their average income per month is Rs. 3214.29. The percentage of women doing this job on regular basis is 95.24 percent. The average distance of workplace from home is 1.5 KM and their average satisfaction level is 70 percent. 2.25 percent of women respondents are engaged as nurse. Their average salary per month is Rs. 18666.67. The percentage of women doing this job on regular basis is 100 percent. The average

distance of workplace from home is 3.55 KM and their average satisfaction level is 86.67 percent. 2.25 percent of women respondents are working as office assistant. Their average salary per month is Rs. 19181.82. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace from home is 5.36 KM and their average satisfaction level is 90 percent; 0.5 percent of women respondents have their livelihood as doctor. Their average salary per month is Rs. 70000. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace from home is 2 KM and their average satisfaction level is 96.5 percent. 0.25 percent of women respondents are engaged as engineer. Their average salary per month is Rs. 35000. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace from home is 4 KM and their average satisfaction level is 95 percent, 0.75 percent of women respondents are engaged in police department. Their average salary per month is Rs. 26666.67. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace from home is 3 KM and their average satisfaction level is 85 percent; 2.25 percent of women respondents are earning by carrying on tuition classes for their livelihood. Their average income per month is Rs. 1514.28. The percentage of women doing this job on regular basis is 100 percent. They take tuition class at their own house and their average satisfaction level is 72.85 percent, 2 percent of women respondents are engaged as weavers. Their average income per month is Rs. 4625. The percentage of women doing this job as regular basis is 100 percent. The average distance of workplace from home is 0.25 KM and their average satisfaction level is 76.25 percent; 1.25 percent of women respondents are engaged in diary business. Their average income per month is Rs. 1250. The percentage of women doing this job on regular basis is 100 percent. They carry

out their business from their own house and their average satisfaction level is 72.5 percent. Two percent of women respondents are engaged as cook in hotels and schools. Their average salary per month is Rs. 1250. The percentage of women doing this job as regular basis is 100 percent. The average distance of workplace from home is 1 KM and their average satisfaction level is 66.25 percent. 1 percent of women respondents are working as home maid. Their average income per month is Rs. 1000. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace from home is 1.5 KM and their average satisfaction level is 62.5 percent. 5 percent of women respondents are engaged as agricultural laborers. Their average income per month is Rs. 1600. The percentage of women doing this job as regular basis is 15 percent. The average distance of workplace from home is 1.4 KM and their average satisfaction level is 60.5 percent; 1 percent of women respondents are engaged as shopkeeper. Their average income per month is Rs. 1500. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace from home is 0.3 KM and their average satisfaction level is 65 percent, 0.5 percent of women respondents choose tailoring as their livelihood option. Their average income per month is Rs. 5500. The percentage of women doing this job on regular basis is 100 percent. The average distance of workplace from home is 0.5 KM and their average satisfaction level is 70 percent. 13.5 percent of women respondents are engaged in SHGs. Their average income per month is Rs. 70. The percentage of women doing this job as regular basis is 7.41 percent. The average distance of workplace from home is 1.5 KM and their average satisfaction level is 51 percent. 0.25 percent of women respondents are engaged as music teacher, writer, agent of insurance company, care taker, letting house for hire. Their average income per month is Rs. 3000, Rs. 10000, Rs 20000, Rs. 2000 and Rs. 5000

respectively. The percentage of women doing these jobs as regular basis is 100 percent. Their average distance of workplace from home is 2 KM and their average satisfaction level is 85 percent. From the above Table-5.8 it can be conclude that there is a positive correlation between higher level of income and higher level of satisfaction. In other words, those respondents who have higher income their satisfaction level is also high.

The important unvalued works that the respondent women are currently doing on regular and temporary basis are shown in Table-5.9. Unvalued works represents those works in return of which women do not receive payments in terms of money. Some particular types of works such as child care, care giving for the family members, cooking, cleaning etc. which have very high moral value but have no money value. These works are still considered as low skilled and they are unvalued in the society.

Table- 5.9: Current Unvalued Works of Women

Types of Work done	% of Women Doing Work		Avg. Hrs. Spend in Activity Per Day
	Regular Basis	Temporary Basis	
1. Cooking	96.5	3.5	3.38
2. Family Care	99	1	3.58
3. Washing Cloth and Cleaning Home	96.26	3.75	3.34
4. Weaving	8.69	45.36	2.21
5. Gardening	0	52	1.68
6. Stitching/Cutting	0	44.5	1.36
7. Woolen Work	0	25.5	1.62
8. Embroidery	0	24	1.4
9. Shopping	0	55	1.38
10. Agricultural Work	0.67	24.33	4.68

Data Source: Field Survey,2014

In the present study it is found that women respondents are doing such unvalued works on regular basis and sometimes on temporary basis for which they do not get anything in return. From the Table-5.9 it is seen that 96.5 percent women do cooking on regular basis by spending time on an average of 3.38 hours per day and only 3.5 percent women are doing it on temporary basis, 99 percent women are found engaged in care giving for their family members on regular basis by spending time on an average of 3.58 hours per day and just only 1 percent women do it on temporary basis. Similarly, 96.26 percent respondents use their time of 3.34 hours per day for cleaning of home on regular basis and only 3.75 percent do it on temporary basis. Again, 0.67

percent of rural respondents are doing agricultural work on regular basis and 24.33 percent of rural respondents are doing agricultural work on temporary basis. Besides these, some other unvalued works such as weaving, gardening, stitching/cutting, woolen work, embroidery, shopping etc. are being done by the respondents on temporary basis.

Table -5.10: Current Activity Based Decomposition of Valued-Unvalued Work of Women

Area	% of Women Doing Valued Works Only (Regular Basis)	% of Women Doing Unvalued Works Only (Regular Basis)	% of Women Doing Both Valued and Unvalued Works (Regular Basis)
Rural	60	99.33	59.33
Urban	80	90	70
Total	65	97	62

Data Source: Field Survey,2014

From Table- 5.10 it is found that 60 percent of women respondents in rural sample, 80 percent of women respondents in urban sample and 65 percent of women respondents in combined areas have been doing valued works respectively on regular basis. Besides this, 99.33 percent of women respondents in rural, 90 percent women respondents in urban and 97 percent women respondents in the total sample have been doing unvalued work on regular basis. But it is important to note that 59.33 percent women respondents in rural, 70 percent women respondents in urban and 62 percent women respondents in the total sample have been doing both valued and

unvalued works on regular basis. Surprisingly, this percentage is higher in urban areas than that in rural areas.

5.1.5 Women's Own Interpretations of, Priorities for, and Abilities for their Livelihoods

The preceding tables have shown the livelihood patterns of the respondent women. It is observed that the respondent women are engaged in different types of valued works in the study area. The following tables throw light on women's own interpretations of, priorities for and their abilities for livelihoods. These have important connections with women empowerment; more empowered women are expected to be more interpretative about their livelihood prospects. Table- 5.11 shows the percentage of respondent women who interpreted their present livelihood as very good, good, bad or very bad.

Table: 5.11 Age-Group Wise Respondents Own Interpretation of their Current Livelihood (Primary)

Age-Group	% of Respondents			
	Very Good	Good	Bad	Very Bad
18-24 (Young)	0	40	60	0
25- 45 (Economically Most Productive)	36.87	42.40	20.74	0
45- 55 (Older)	68.18	22.73	9.09	0
55-60 (Oldest Respondents)	78.57	7.14	14.29	0

Source: Field Survey,2014

From the Table-5.11 it is clear that in the age group of 18-24 years which is generally considered as young age group, 40 percent respondents considered their livelihood as good and 60 percent respondents considered their livelihood as bad. In the age group of 25-45 years which is

economically most productive age group, 36.87 percent respondents express their current livelihood as very good, 42.40 percent respondents express their livelihood as good and 20.74 percent respondents express their livelihood as bad. In the age group of 45-55 years which are considered as older group, 68.18 percent respondents express their livelihood as very good, 22.73 percent respondents express their livelihood as good and 9.09 percent women respondents express their livelihood as bad. Besides these, the oldest respondents in the age group of 55-60 years, 78.57 percent respondents express their livelihood as very good, 7.14 percent of women respondents express their livelihood as good and 14.29 percent respondents express their livelihood as bad.

Table: 5.12 Major Reasons Stated by Respondents for their Own Interpretation of their Current Livelihood (Primary)

Own Interpretation	Major Reasons for Stated Interpretation (% of Respondents)					
	Enhancement of Family Income	Exposure to Outside World	Application of Skill and Knowledge	Undervalued	Strenuous	Absence of Alternatives
Very Good	37.14	1.43	3.93	-	-	-
Good	28.93	2.85	-	-	-	3.57
Bad	-	-	-	9.28	5.73	7.14
Very Bad	-	-	-	-	-	-

Source: Field Survey,2014

From the Table-5.12, it is clear that out of the respondents who considered their livelihood as 'very good', 37.14 percent believed that their livelihood enhances their family income, only 1.43

percent believed that it exposes them to outside world and 3.93 percent stated that their livelihood is very good because it permits them to apply their skill and knowledge. Out of the respondents who rated their current livelihood as 'Good', 28.93 percent believed that it enhances their family income which enables them to live a better life; only 2.85 percent considered it as an outlet for having exposure to outside world. Very few respondents rated their current livelihood as 'Bad'. More or less equal percentage of women stated 'Undervalued', or 'Strenuous' or 'Absence of Alternatives' as reasons for rating their current livelihood as 'Bad'.

Table- 5.13: Respondents who could State their Priorities for Livelihood (in %)

Priorities	% of Respondents who Could State
1st Priority	99.5
2nd Priority	97.5
3rd Priority	65.75
4th Priority	0

Source: Field Survey,2014

The Table-5.13 represents that 99.5 percent women respondents could state their first priorities for their livelihood. 97.5 percent of women respondents could state their second priorities for livelihood and 65.75 percent respondents could state the third priorities for their livelihood. But no respondent could express their fourth priorities for livelihood. This in one sense shows the limitations of livelihood options for the women.

Table- 5.14: Abilities of the Respondents for their Livelihoods (Respondents Own Observation)

Nature of Ability	% of Respondents giving Affirmative Response
Have Physical Ability	99
Have Skills	90
Have Experience	5.25

Source: Field Survey,2014

From the Table-5.14 it is shown that 99 percent women respondents have physical ability to engage in livelihood option according to their priorities. 90 percent women respondents have skills to engage in livelihood option according to their priorities. But only 5.25 percent women respondents have experience in various livelihood options according to their priorities.

Section-2

5.2 Women Empowerment: By Applying Fuzzy Set Technique

Women empowerment is considered as a function of a set of attributes. Each woman of the sample 400 was asked questions to understand her ability to take decision within family, her freedom of movement, her level of political participation, control over economic resources and her freedom to enjoy the exposure to media. The selected attributes as explained in the methodology chapter are quantified as 1 if the respondent is fully empowered, 0.5 if the respondent is partially empowered and 0 if the respondent has no power. By using the fuzzy set technique in analyzing the data to get the level of women empowerment in Nagaon district the Table-5.15 is constructed.

Table- 5.15: Degree of Empowerment & Weighted Women Empowerment Index

Constituents	$\mu_E(X_j)$	w_j	$\mu_E(X_j)w_j$
X_1 (Decision Making within the Family)	0.5335	0.2728	0.1455
X_2 (Freedom of Movement)	0.4488	0.3479	0.1561
X_3 (Political Participation)	0.5552	0.2555	0.1418
X_4 (Control over Economic Resources)	0.516	0.2873	0.1482
X_5 (Freedom to Enjoy the Exposure to Media)	0.5515	0.2584	0.1425

Source: estimated by the researcher

In Table-5.15, X_1 represents respondent's decision making power within the family. X_2 represents respondent's freedom of movement, X_3 represents respondent's political participation, X_4 represents respondent's control over economic resources and X_5 represents respondent's freedom to enjoy the exposure to media. $\mu_E(X_j)$ represents degree to empowerment according to the constituents, w_j indicates the weight of the constituents and $\mu_E(X_j)w_j$ represents weighted women empowerment index.

Now the overall women empowerment index (WEI) of women (18-60 years) of Nagaon district is calculated by using the formula-

$$WEI = \sum_{j=1}^{m} \mu_E\left(X_j\right) w_j \Big/ \sum_{j=1}^{m} w_j$$

=0.7341/1.4219

=0.5163

From above it is found that the women empowerment index of women of Nagaon district is only 0.5163 in the range of (0,1). In percentage, the level of women empowerment in Nagaon district is 51.63 percent.

5.2.1The Contribution to Women Empowerment Level by Constituents (Percentage Value)

The percentage contribution to women empowerment level of the five constituents of empowerment used in the analysis can be obtained by using the following formula-

$$\mu_E\left(X_j\right) w_j \Big/ \mu_E$$

where j=1,2,3,4,5

The contribution to the empowerment level by constituents (percent values) is shown in the following Table -5.16

Table-5.16: Constituent –wise Women Empowerment Level (in %)

Constituents	Empowerment Level
X_1	41.38
X_2	15.54
X_3	14.13
X_4	14.76
X_5	14.19

Source: Estimated by the researcher

From the Table-5.16 it is clear that decision making power within the family (X_1) has the highest contribution towards the level of women empowerment in Nagaon district. But the other constituents do not contribute much (which is less than 20%) to the level of empowerment. In other words, as compared to other constituents women are more empowered in case of decision making within the family i.e. they can participate in decision making within households. Thus, in percentage contribution, freedom of movement, political participation, control over economic resources and freedom to enjoy the exposure to media, the level of women empowerment in Nagaon district is very low.

5.2.2 Sub Group Empowerment Decomposition

It is possible to decompose women empowerment index by sub population. Suppose the total population is divided into *K* subgroups - S_k , of size n_k (*k*=1,2,..,*K*). The intensity of women empowerment of *i*-th individual of S_k is given by

$$\mu_E\left(a_i^k\right) = \sum_{j=1}^{m} x_{i\,j}^{k} w_j \,/ \sum_{i=1}^{m} w_j$$

where $x_{i\,j}^{k}$ is the degree of membership related to the fuzzy sub set *E* of *i*-th individual (*i*=1,2,..,*n*) of S_k with respect to the *j*-th constituents (*j*=1,2,..,*m*). Hence, the fuzzy women empowerment associated with group S_k is:

$$\mu_E^k = 1/n_k \sum_{i=1}^{n_k} \mu_E\left(a_i^k\right)$$

Here total 400 respondents are divided on the basis of their sector wise occupation distribution. In other words respondents are divided into four groups i.e.

1. **Primary Sector**- It includes those respondents who are engaged in agriculture, plantation etc.
2. **Secondary Sector**- It includes those respondents who are engaged in different types of business such as big, medium and small scale businesses.
3. **Tertiary Sector**- It includes those respondents who are regular salaried and engaged in various government services and non-government services.
4. **Not employed**- It includes those respondents who are not engaged in any valued work. In other words they do not have any income.

After analyzing the data according to the groups the result obtained are shown in Table-5.17

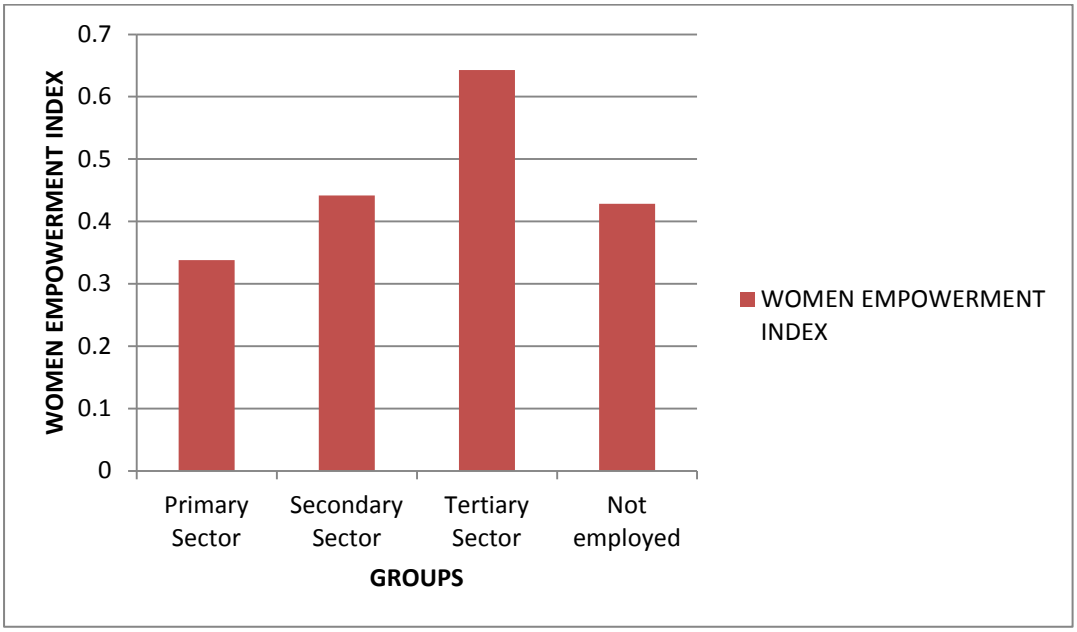
Table-5.17: Occupation Category and Empowerment of Women

Group	WEI
Primary Sector	0.3381
Secondary Sector	0.4419
Tertiary Sector	0.6426
Not Employed	0.4285

Source: Estimated by the researcher

Table-5.17 figures can be represented with the help of Bar Diagram as in Diagram-5.1

Diagram-5.1: Women Empowerment of Nagaon District



From the Table- 5.17 and Diagram: 5.1 it is seen that the respondents who are engaged in primary sector for their livelihood have the lowest level of empowerment which is only 34 percent. The reason for low level of empowerment is that the levels of educational qualification of these women are low. Besides this, the economic condition of such families is also low. Most of such respondents in the primary sector are living below poverty line. These respondents are not able to participate in household decision making, have limited freedom of movement, less political participation, have no control over economic resources and do not have the facility to enjoy the exposure to media. These respondents are found in rural areas of Nagaon district.

The respondents who are engaged in secondary sector for their livelihood have higher empowerment level than the respondents engaged in primary sector, which is 44 percent. The reason is that the income and economic condition of respondents engaged in secondary sector is higher than those of primary sector. These respondents are engaged in different types of big,

medium or small scale businesses. Besides this, these respondents have higher abilities than the respondents engaged in primary sector in different constituents of women empowerment.

Again from the Table- 5.17 it is seen that the respondents who are engaged in tertiary sector have the highest level of empowerment which is 64%. These respondents are engaged in different government sector and non-government sector services. Most of these women are highly educated and their level of income is also high. They are more conscious about their rights and keep themselves up-to-date in the society. They are able to participate more in all the constituents of empowerment. Therefore their level of empowerment is higher than the other groups.

But it is important to notice that the respondents who are not employed or those who do not earn money have their employment level as 42% which is higher than the respondents engaged in primary sector and lower than the respondents who are engaged in secondary and tertiary sectors. The reason for such variation can be attributed to the fact that though these women are not employed most of these respondents are educated therefore they are aware of their rights and they can participate more effectively in different household, political and social activities. Besides this, the economic conditions of these households are better because their household income is comparatively higher than women engaged in primary sector in particular.

From the above discussion it can be concluded that education, status of occupation of women and economic condition of the households have great bearing on women empowerment.

5.2.3 Empowerment Level of Women in Rural Areas of Nagaon District

To get the actual picture of the level of women empowerment in rural and urban areas of Nagaon district, the collected data are separately analyzed for rural and urban areas. For this the data collected from 300 rural respondents are analyzed separately. The following table represents the women empowerment index of rural areas of Nagaon district.

Table-5.18: Degree of Empowerment & Weighted Rural Women Empowerment Index

Constituents	$\mu_E(X_j)$	w_j	$\mu_E(X_j)w_j$
X_1 (Decision Making within the Family)	0.5079	0.2941	0.1493
X_2 (Freedom of Movement)	0.4391	0.3574	0.1569
X_3 (Political Participation)	0.5376	0.2694	0.1448
X_4 (Control over Economic Resources)	0.4673	0.3303	0.1543
X_5 (Freedom to Enjoy the Exposure to Media)	0.484	0.3151	0.1525

Source: estimated by the researcher

Now the overall rural women empowerment index (WEIR) of rural areas of Nagaon district is calculated by using the formula-

$$WEI = \sum_{j=1}^{m} \mu_E\left(X_j\right) w_j / \sum_{j=1}^{m} w_j$$

=0.7578/1.5663

=0.4838

The women empowerment index of rural areas of Nagaon district is only 0.4838 in the range of (0,1). In percentage, the level of women empowerment in rural areas is 48.38 percent which is lower than the women empowerment level of the district as a whole. The reason for this is that the educational qualification of most of the rural women is very low and they have less knowledge about the various programmes and schemes of the government. Moreover, rural women get less facility in all aspects than the urban women.

5.2.4 The Contribution to the Rural Women Empowerment Level by Constituents (Percentage Value)

The percentage contribution to the rural women empowerment level of the five constituents of empowerment used in the analysis can be obtained by using the following formula-

$$\mu_E\left(X_j\right) w_j / \mu_E$$

where j=1,2,3,4,5

The contribution to the rural women empowerment level by constituents (percent values) is shown in the Table -5.19

Table- 5.19: Constituent –Wise Women Empowerment Level (in %)

Constituents	Empowerment Level
X_1	19.71
X_2	20.69
X_3	19.11
X_4	20.36
X_5	20.13

Source: estimated by the researcher

From the Table-5.19 it is clear that all the constituents of women empowerment almost equally contribute to the women empowerment level in rural areas. In other words, there is no remarkable difference is seen in case of percentage contribution made by all the constituents of empowerment towards rural women empowerment level.

5.2.5 Sub-Group Empowerment Decomposition

To analyze sub-group empowerment decomposition in rural areas of Nagaon district, the rural 300 respondents are classified into four groups in terms of their occupational distribution in different sectors .i.e.

1. Primary sector
2. Secondary sector
3. Tertiary sector
4. Not Employed

After classifying the rural respondents into the above said four groups, data are analyzed to examine the level of rural women empowerment in different groups. The Table-5.20 represents

the level of rural women empowerment index (WEIR) in different groups in rural areas of Nagaon district.

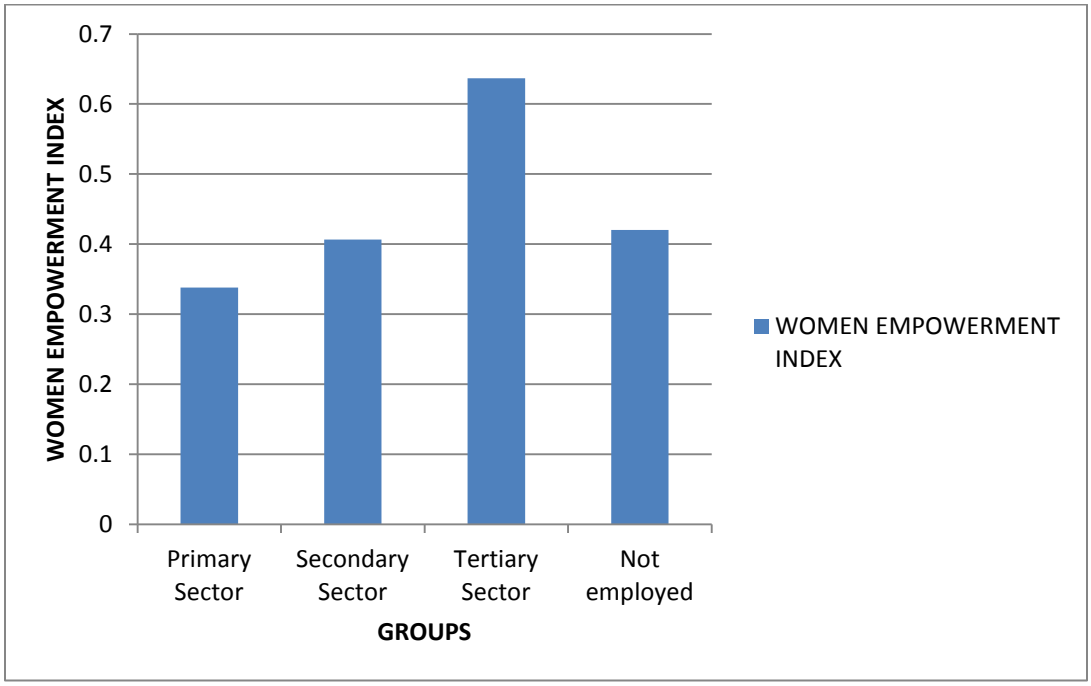
Table- 5.20: **Occupation Category and Empowerment of Rural Women**

Group	WEIR
Primary Sector	0.3381
Secondary Sector	0.4064
Tertiary Sector	0.6367
Not employed	0.4203

Source: estimated by the researcher

Table: 5.20 figures can be represented with the help of Bar Diagram as in Diagram-5.2

Diagram-5.2: Women Empowerment in Rural Areas of Nagaon District



From the Table- 5.20 and Diagram: 5.2 it can be said that a similar trend is seen in case of rural women empowerment level. The women who are engaged in primary sector have the lowest level of empowerment which is only 33%. The respondents who are engaged in secondary sectors for livelihood have higher level of empowerment value than primary sector which is 40%. The reason is that the income and economic condition of respondents engaged in secondary sector is higher than those of primary sectors. These respondents are engaged in different types of big, medium or small scale businesses. Similarly, the respondents who are engaged in tertiary sector have the highest level of empowerment which is 63%. These respondents are engaged in different government and non-government sector services. They are able to participate more in all the attributes of empowerment. Therefore their level of empowerment is higher than the other groups. Besides these, the respondents who are not employed or those who do not earn money

have their employment value as 42% which is higher than the respondents engaged in primary sectors and secondary sector and lower than the respondents who are engaged in tertiary sector.

5.2.6 Empowerment Level of Women in Urban Areas of Nagaon District

To examine the level of urban women empowerment, the urban data collected from 100 respondents are analyzed separately. The Table-5.21 represents the women empowerment index in urban areas of Nagaon district.

Table-5.21: Degree of Empowerment & Weighted Urban Women Empowerment Index (WEIU)

Constituents	$\mu_E(X_j)$	w_j	$\mu_E(X_j)w_j$
X_1 (Decision Making within the Family)	0.6102	0.2145	0.1309
X_2 (Freedom of Movement)	0.4778	0.3207	0.1532
X_3 (Political Participation	0.608	0.2161	0.1314
X_4 (Control over Economic Resources)	0.662	0.1791	0.1186
X_5 (Freedom to Enjoy the Exposure to Media)	0.754	0.1226	0.0924

Source: estimated by the researcher

Now the overall Urban Women Empowerment Index (WEIU) in urban areas of Nagaon district is calculated by using the formula-

$$WEI = \sum_{j=1}^{m} \mu_E\left(X_j\right) w_j / \sum_{j=1}^{m} w_j$$

=0.6265/1.053

=0.5949

The women empowerment index of urban areas of Nagaon district is 0.5949 in the range of (0,1). In percentage, it is 59.49 percent which is higher than the overall women empowerment level of the district.

5.2.7 The Contribution to the Urban Women Empowerment Level by constituents (Percentage Value)

The percentage contribution to urban women empowerment level of the five constituents of empowerment used in the analysis can be obtained by using the formula-

$$\mu_E\left(X_j\right) w_j / \mu_E$$

where j=1,2,3,4,5

The contribution to urban women empowerment level by constituents (percent values) is shown in the Table -5.22

Table-5.22: Constituent –wise Women Empowerment Level (in %) In Urban Areas

Constituents	Empowerment Level
X_1	20.89
X_2	24.45
X_3	20.98
X_4	18.93
X_5	14.75

Source: estimated by the researcher

From the Table-5.22 it is clear that all the constituents of women empowerment have unequal contribution varying from highest 24.45 percent in case of X_2 (freedom of movement) to the lowest 14.75 percent in case of X_5 (freedom of enjoying exposure to media).

5.2.8 Sub- Group Empowerment Decomposition

To analyze sub-group empowerment decomposition in urban areas of Nagaon district, the urban 100 respondents are classified into four groups in terms of their occupational distribution in different sectors .i.e.

1. Primary sector
2. Secondary sector
3. Tertiary sector
4. Not Employed

After classifying the urban respondents into the above said four groups, data are analyzed to examine the level of urban women empowerment in different groups. But it is important to note

that there is no respondent in the urban sample who is engaged in primary sector. In this research work the agriculture sector, plantation etc. are included in primary sector. But in urban areas these sectors are generally absent. Since, no respondent in the urban sample are found engaged in primary sector for their livelihood therefore the primary sector has been excluded from the data analysis.

The Table-5.23 represents the level of Urban Women Empowerment Index (WEIU) in different groups in urban areas of Nagaon district.

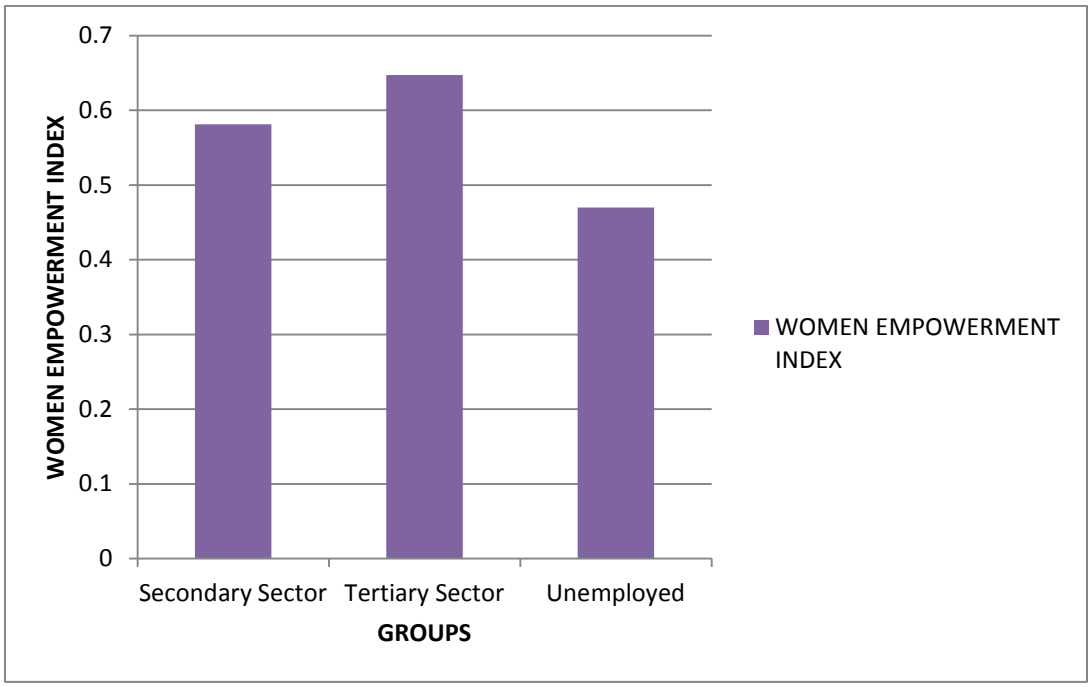
Table-5.23: Occupation Category and Empowerment of Urban Women

Group	WEI
Secondary Sector	0.5811
Tertiary Sector	0.6473
Not Employed	0.4698

Source: estimated by the researcher

Table- 5.29figures can be represented with the help of Bar Diagram as in Diagram:5.3

Diagram- 5.3: Women Empowerment in Urban Areas of Nagaon District



From the Table- 5.23 and Diagram:5.3 it is found that the urban respondents who are engaged in secondary sector for livelihood have empowerment value as 58%. From the analysis it is found that in secondary sector, the urban empowerment value is higher than rural empowerment value. The reason for this is that the income and economic condition of respondents engaged in secondary sector in urban areas is higher than those of rural areas of the district. The facilities of different types of businesses are more available in urban areas in comparison to rural areas. Besides this, urban women are highly educated, more conscious than rural women. These respondents are engaged in different types of big, medium or small scale businesses. Moreover, urban respondents can participate more than the rural respondents in different constituents of women empowerment.

Again, the Table-5.23 shows that the respondents who are engaged in tertiary sector have the highest level of empowerment which is 65%. These respondents are engaged in different government and non-government sector services. Most of these women are highly educated and their level of income is also high. They are more conscious about their rights and keep up-to-date themselves in the society. From the study it is seen that in tertiary sector the urban empowerment value and the rural empowerment value are almost same. It means the urban and rural women engaged in this sector can equally participate in all the attributes of women empowerment. They are able to participate more in terms of all the attributes of empowerment. Therefore their level of empowerment is higher than the other groups.

Moreover, the respondents who are not employed or those who do not have any income have their empowerment index value as 46% which is lower than other groups. If the rural and urban empowerment values in this category are compared, it can be said that urban empowerment value is higher than rural empowerment value which is 42%. It indicates that urban women are more empowered than rural women.

From the above discussion it can be said that women in the high salaried occupation have higher empowerment. This is probably because of higher prerogatives and position associated with higher occupations that enable a woman to raise her voice in household decision making process, to move around with more freedom and also to participate more actively in political system, to control over economic resources and to enjoy the exposure to media. Moreover, the women empowerment level of urban areas is higher than the women empowerment level of rural areas.

Section-3

5.3 Women Empowerment: By Applying Factor Analysis Method

The Principal Component Analysis (PCA) is a branch of well-known multivariate technique of factor analysis. It is relatively straight forward method of transferring a given set of variables or indicators into a new set of composite variables or principal components that are orthogonal to each other. Accordingly principal component factor explains more variance than the loadings obtained from any other method of factoring. It is designed primarily to synthesize a large number of variables into a smaller number of general components, which retain the maximum amount of descriptive ability.

This method does not require any assumption about the underlying structure of the variables. One has simply to find out the best linear combinations of variables. In other words, one tries to identify the particular combination of variables, which could account for maximum of the variance in the data matrix than any other linear combination of variables. The first principal component may, therefore, be viewed as the single best summary of linear relationship demonstrated in the data. The second component is orthogonal to the first. To be orthogonal to the first component, the second one must account for the proportion of the variance not accounted for by the first one. Similarly, the second component may be defined as the linear combination of variables that accounts for the most residual variance after the effect of the first component has been removed from the data.

The subsequent components are defined in the same manner until all the variance in the data is completely exhausted. Unless at least one variable is perfectly determined by the rest of the

variables in the data, the principal component solution requires as many components as there are variable (Tewari, R.T., 1984, p.36). The sum of the variance of all the principal components is equal to the sum of the variances of the original variables.

The full-fledged principal component model can be expressed as follows:

$Z_j = a_{j1}P_1 + a_{j2}P_2 + a_{j3}P_3 + \ldots\ldots\ldots\ldots + a_{jn}P_n$ (j=1 to n)

Where

Z_j= the standardized values of the observed variables;

P_n= the new uncorrelated components

a_{jn}= the coefficients known as '*factor loading'* or *weights*

Each of the n observed variables is described linearly in terms of *n* new uncorrelated components P_1, P_2, P_3,……,P_n, each of which is, in turn, defined as a linear combination of the n original variables. Since each component is defined as the best linear summary of variance left in the data after the previous components are taken care of, the first m components usually much smaller than the number of variables in the set may explain most of the variance in the data.

In this section of research work, Principal Component Analysis (PCA) is used to determine women empowerment index (WEI) of Nagaon district. Women empowerment here is considered as a composite of a set of constituents which are represented here in the form of

- Decision making within the family
- Freedom of movement

- Political participation
- Control over economic resources
- Freedom of women to enjoy the exposure to media

All the attributes representing the above constituents of women empowerment are quantified as

- Entirely by the respodent-1
- Partially by the respondent- 0.5
- Entirely by others- 0

These are discussed in details in the preceding methodology section of the thesis.

Standard Factor Analysis method is applied to find out the weights of the attributes of empowerment mentioned above. The composite index of women empowerment is estimated by using the following formula-

$$WEI = \sum Z_i W_i / \sum W_i ----(i)$$

where WEI is the composite index of women empowerment, Z_i is the *i*-th attributes of women empowerment and W_i is the weight of the *i*-th attributes derived from factor analysis.

1. For the first constituent decision making within the family the following attributes are taken into consideration-

i. Family health care (FHC)
ii. Larger household purchase (LHP)
iii. Routine household purchase (RHP)
iv. Job of women (JW)
v. Going outside home of any member (GOHAM)

vi. Family day to day expenditure (FDDE)

vii. Spending personal income (SPI)

By applying Factor Analysis Method here, the result obtained is shown in Table-5.24

Table-5.24: Factor Analysis Results for Women's Decision making within the Family

Attributes	Component	Communalities	Relative Weight	Weight in (%)
	1			
Family health care(FHC)	0.891	0.793	0.6807	14.57
Larger household purchase(LHP)	0.856	0.733	0.6540	13.99
Routine household purchase(RHP)	0.904	0.817	0.6906	14.78
Job of women(JW)	0.846	0.715	0.6463	13.82
Going outside home of any member(GOHAM)	0.881	0.777	0.6731	14.41
Family day to day expenditure(FDDE)	0.910	0.829	0.6952	14.88
Spending personal income(SPI)	0.827	0.684	0.6318	13.53
% of Variance	76.398		Total Weight= 4.6717	Total=100
Cumulative %	76.398			

Source: Estimated by the researcher. Extraction Method: PCA, KMO Measure: 0.904 (Significant at 1%), Bartlett's Test= Chi- Square value: 2740.510 (Significant at 1%)

Factor analysis result for decision making within family are represented in Table-5.24. The table shows that out of seven selected attributes, one component is extracted. The component explains 76.398% of variance. The cumulative percentage is explained by 76.398%. The communality values vary between 0.684 and 0.829 (i.e. 68.4% and 82.9%) suggesting that the component

derived from the seven attributes are sufficient to account for most of the variations. Here all the seven attributes are associated with one component. Then by multiplying the values of each attribute by the percentage of variance, the weight of each attribute is estimated. The respective weights of the attributes are

FHC=0.6807, LHP=0.6540, RHP=0.6906, JW=0.6463, GOHAM=0.6731, FDDE=0.6952, SPI=0.6318. Thus the total weight= 4.6717

The objective weights derived from factor loading varies between 0.6952 and 0.6318. From Table-5.24 it can be seen that the weights of all attributes are almost equal in importance. Thus it can be said that all variables can equally contribute in respondents' decision making within family.

The formula to determine Women Empowerment Index (WEI_{FA}) is denoted as,

$$WEI_{FA} = \sum Z_i W_i / \sum W_i$$

By using the above formula, the WEI_{FA} (for Decision Making within the Family) for all the 400 respondents is equal to 0.5436. In percentage, it is 54.36 percent.

2. For the second constituent freedom of movement following attributes are used-

i. Local market for purchase (LMP)

ii. Local health center/clinic (LHC)

iii. Neighborhood for gossip (NHG)

iv. Home of relatives/friends (HRF)

v. Other city or village (OCV)

vi. Cinema, club, festival or village fair etc. (CCFV)

vii. Visiting parental home (VPH)

viii. To participate in cultural programmes of village/town (PCP)

ix. To participate in religious programmes of village /town (PRP)

x. To participate in the meeting of women organization (PMWO)

xi. To do job/work outside home for your earnings (DJOHE)

By applying Principal Component Analysis in terms of factor loading and communalities and KMO and Bartlett test, the results are obtained as shown in Table- 5.25

Table-5.25: Factor Analysis Results for Women's Freedom of Movement

Attributes	Component				Communalities	Relative Weight	Weight in (%)
	1	2	3	4			
Local market for purchase(LMP)	0.559	0.409	0.167	0.110	0.519	0.0878	9.382
Local health center/clinic(LHC)	0.403	0.387	-0.089	-0.105	0.331	0.0633	6.764
Neighborhood for gossip(NHG)	0.112	0.128	-0.59	-0.696	0.518	0.0171	1.827
Home of relatives/friends(HRF)	0.088	0.103	0.009	0.809	0.673	0.0974	10.408
Other city/village (OCV)	0.770	-0.092	-0.027	0.004	0.603	0.1210	12.929
Cinema, club, festival or village fair etc(CCFV)	0.732	-0.061	0.126	-0.046	0.558	0.1150	12.29
Visiting parental home(VPH)	0.015	0.613	0.076	0.347	0.502	0.0821	8.773
To participate in cultural programme(PCP)	0.284	-0.464	0.450	0.013	0.498	0.0597	6.379
To participate in religious programmes(PRP)	-0.007	0.655	0.070	-0.186	0.469	0.0877	9.371
To participate in the meeting women's organization(PMWO)	-0.060	-0.083	0.832	0.031	0.703	0.1104	11.797
To do job/work outside home for earning(DJOHE)	0.143	0.302	0.707	0.059	0.614	0.0938	10.023
% of variance	15.723	13.395	13.273	12.045		Total Weight=0.9353	
Cumulative(%)	15.723	29.118	42.391	54.436			

Source: Estimated by the researcher. Extraction Method: PCA, KMO Measure: 0.586 (Significant at 1%), Bartlett's Test= Chi- Square value: 388.387 (Significant at 1%)

Table-5.25 represents the results of factor analysis for the constituent freedom of movement of the respondents. There are 4 components extracted from selected 11 attributes. The first

component explains 15.723% of variance. Second, third and fourth component explain 13.395%, 13.273 and 12.045% of variance respectively. These four components together explain 54.436% of observed variance. The communality values vary between 0.703 and 0.469 (i.e. 70.3% and 46.9%). This confirms that four component are sufficient to account for most of the variance explained. It is seen from the table that the attributes local market for purchase (LMP), local health centre (LHC), other city or village (OCV), cinema, club, festival and village fair (CCFV) have higher association with the first component. The attributes neighborhood for gossip (NHG), visiting parental home (VPH), to participate in religious programmes of village/town (PRP) have higher association with the second component. On the other hand, the attributes participate in cultural programmes of village/town (PCP), to participate in the meeting of women organization (PMWO) and to do job/work outside home for earnings (DJOHE) have higher association with third component. The attributes home of relatives/friends (HRF) are highly associated with the fourth component. Besides this, the attribute local health centre/clinic (LHC) is almost equally associated with two components derived. It has net correlation coefficient 0.403 with first component while factor loading value in the second component is 0.387. Similarly, the attribute neighborhood for gossip (NHG) is also almost equally associated with first and second component with the values 0.112 and 0.128. To determine the weight of the first attribute (LMP), we multiply the value of that component which has the highest value out of four components by its respective weight. In the same process the weights of all the attributes are estimated and by calculating their summation the total weight is obtained which is 0.9353. The weights are -

LMP=0.0878, LHC=0.0633, NHG=0.0171, HRF=0.0974, OCV=0.1210, CCFV=0.1150, VPH=0.0821, PCP=0.0597, PRP=0.0877, PMWO=0.1104, DJOHE=0.0938, Total weight=0.9353

The objective weights so derived varied in a range of 0.0171 and 0.1210 and this confirms that freedom of movement is a multidimensional phenomenon and it should not be measured by one or two attributes.

Thus the WEI_{FA} (for Freedom of Movement) for all respondents= 0.4526. In percentage, it is 45.26 percent.

3. For the third constituent Women's political participation, following attributes are used-

i. Cast vote in election (CVE)

ii. Vote to the candidate of own choice (VCOC)

iii. Attend the speeches of the election candidates (ASEC)

iv. Update about the political system (UDPS)

v. Talk to political leaders/representatives (TPL)

By applying Principal Component Analysis in terms of factor loading and communalities and KMO and Bartlett test, the results are obtained as shown in Table- 5.26

Table-5.26: Factor Analysis Results for Women's Political Participation

Attributes	Component		Communalities	Relative Weight	Weight in (%)
	1	2			
Caste vote in election (CVE)	0.946	0.145	0.916	0.4212	27.26
Vote to the candidate of own choice(VCOC)	0.955	0.082	0.920	0.4252	27.52
Attend the speeches of the election contestants(ASEC)	0.102	0.801	0.653	0.2091	13.53
Update about the political situation(UDPS)	0.637	-0.092	0.414	0.2836	18.35
Talk to the political leaders/representatives (TPL)	-0.047	0.792	0.629	0.2067	13.37
% of variance	44.529	26.110		Total Weights= 1.545	
Cumulative %	44.529	70.639			

Source: Estimated by the researcher. Extraction Method: PCA, KMO Measure: 0.549 (Significant at 1%), Bartlett's Test= Chi- Square value: 1197.545 (Significant at 1%)

The Table-5.26 represents the results of factor analysis for the constituent respondents' political participation. From the results it is found that two components came out from the 5 attributes. The first component explains 44.529% of variance. The second component explains 26.110% of variance. Together these two components explain 70.639% of observed variance. The communality values of all attributes vary between 0.920 and 0.414 (i.e. 92% and41.4%). This implies that these two components are sufficient to account for most of the variance explained. Cast vote in election (CVE), cast vote to the candidate of her own choice (VCOC) and update herself about the political system (UDPS) are the attributes which are highly associated with the

first component with values 0.946, 0.955 and 0.637. On the other hand, attend the speeches of election contestants (ASEC) and talks to political leaders/representatives (TPL) are associated with second component. The objective weights so derived vary in a range of 0.4252 and 0.2067. Thus political participation is multi-dimensional and it should not be measured by one or two variables.

The weights of the respective attributes are calculated. The weights are -

CVE=0.4212, VCOC=0.4252, ASEC=0.2091, UDPS=0.2836, TPL=0.2067, Total weight=1.545

By applying the same formula given above, the WEI_{FA} (for Political Participation) for all respondents= 0.67. In percentage, it is found as 67 percent.

4. For the fourth constituent women's control over economic resources the following attributes are considered-

i. Routine household spending (RHS)
ii. Purchasing jewelry/bonds/shares (PJBS)
iii. Purchasing gifts for relatives (PGR)
iv. Control the saving for use (CSU)
v. Purchasing clothes & make-up articles (PCMUA)
vi. Own and control household variables (OCHV)
vii. Sale/purchase or exchange land/house/livestock (SPELHL)
viii. Purchasing daily food (PDF)
ix. To open bank account / insurance policy by her name (OBIHN)

By applying Principal Component Analysis in terms of factor loading and communalities and KMO and Bartlett test, the estimated results are shown in Table-5.27

Table-5.27: Factor Analysis Results for Women's Control over Economic Resources

Attributes	Component	Communalities	Relative Weight	Weight in (%)
	1			
Routine household spending(RHS)	0.877	0.768	0.6698	11.154
Purchasing jewelry/bond/share(PJBS)	0.874	0.764	0.6675	11.115
Purchasing gift for relatives(PGR)	0.910	0.829	0.6950	11.573
Control the saving for use(CSU)	0.894	0.800	0.6827	11.369
Purchasing clothes/make up articles(PCMUA)	0.883	0.779	0.6743	11.229
Own & control household variables(OCHV)	0.842	0.708	0.6430	10.707
Sale/purchase or exchange land/house/ livestock(SPELHL)	0.838	0.702	0.6400	10.657
Purchasing daily food(PDF)	0.847	0.717	0.6468	10.77
To open bank account/insurance policy by her name(OBIHN)	0.898	0.807	0.6858	11.42
% of variance	76.375		Total Weights=6.0049	
Cumulative %	76.375			

Source: Estimated by the researcher. Extraction Method: PCA, KMO Measure: 0.938 (Significant at 1%), Bartlett's Test= Chi- Square value: 3862.090 (Significant at 1%)

The Table-5.27 represents the result of factor analysis for women's control over economic resources. From the table it can be said that only one component is extracted from the nine

attributes. This component explains 76.375% of variance. The communality values of all attributes are more than 70% and vary between 0.829 and 0.702 (i.e. 82.9% and 70.2%). Since there is only one component, all the attributes are highly associated with that component which is more than 80%. The objective weights derived from the attributes are varying between 0.6950 and 0.6400 (i.e. 69.50 and 64%). From the table it can be said that all the attributes have almost equal weights. Thus, all these nine attributes almost equally contribute in women's control over economic resources.

There is only one component extracted and we have one percentage of variance and one cumulative percentage. The weights of the respective attributes are calculated. The weights are -

RHS=0.6698, PJBS=0.6675, PGR=0.6950, CSU=0.6827, PCMUA=0.6743, OCHV=0.6430, SPELHL=0.6400, PDF=0.6468, OBIHN=0.6858, Total weight= 6.0049

Thus, WEI_{FA} (for Women's Control over Economic Resources) for all the respondents= 0.5185. In percentage, it is 51.85 percent.

5. For the fifth constituent freedom of women to enjoy the exposure to media, the following attributes are taken-
    i. Read daily newspaper of her choice (RDNPHC)
    ii. To watch TV programmes of her choice (WTVHC)
    iii. To read books/journals/magazines of her choice (RBJMHC)
    iv. To go to cinema house/ theatre to see movies (GCTSM)
    v. To use mobile phone/internet (UMPI)

By applying Principal Component Analysis in terms of factor loading and communalities and KMO and Bartlett test, the estimated results are shown in Table-5.28

Table-5.28: Factor Analysis Results for Freedom of Women to Enjoy the Exposure to Media

Attributes	Component	Communalities	Relative Weight	Weight in (%)
	1			
Read daily newspaper of her choice(RDNPHC)	0.959	0.920	0.7912	21.16
Watch TV programme of her choice(WTVHC)	0.915	0.837	0.7549	20.18
Read books/journals/ magazines of her choice(RBJMHC)	0.946	0.895	0.7805	20.87
To go to cinema/theatre house to see movies(GCTSM)	0.794	0.631	0.6550	17.51
To use mobile phone/internet(UMPI)	0.918	0.843	0.7574	20.25
% of variance	82.506		Total Weight=3.739	
Cumulative %	82.506			

Source: Estimated by the researcher. Extraction Method: PCA, KMO Measure: 0.872 (Significant at 1%), Bartlett's Test= Chi- Square value: 2281.591 (Significant at 1%)

The Table-5.28 represents the results of factor analysis for freedom of women to enjoy the exposure to media. Here only one component comes out from the five attributes. The percentage of variance of the principal component is explained by 82.506. The communality values of all attributes vary between 0.920 and 0.631 (i.e.92% and 63.1%). All the attributes are highly

associated with the principal component which is more than 90% except the attributes to go to cinema/theatre house to see movies (GCTSM) is associated with 79.4%. The objective weights so derived varied in a small range of 0.6550 and 0.7912. This shows that all the attributes contribute almost equally in the freedom of movement to enjoy the exposure to media.

In the same process the weights of the respective attributes are calculated. The weights are -

RDNPHC=0.7912, WTVHC=0.7549, RBJMHC=0.7805, GCTSM=0.6550, UMPI=0.7574, Total weight= 3.739

Similarly, by applying the formula given above, the WEI_{FA} (for Freedom of Women to Enjoy the Exposure to Media) of all respondents= 0.5544. In percentage, it is 55.44 percent.

The above discussion shows constituent wise women empowerment index of Nagaon district. These are:

WEI_{FA} (for Decision Making Within Family)=54%

WEI_{FA} (for Freedom of Movement)=45%

WEI_{FA} (for Political Participation)=67%

WEI_{FA} (for Women's Control over Economic Resources)=51%

WEI_{FA} (for Women's Freedom to Enjoy the Exposure to Media)=55%

The results of Factor Analysis show that the level of women empowerment in Nagaon district is highest in case of political participation and lowest in case of freedom of movement. The level of women empowerment varies from 50% to 55% for the remaining three constituents. And the overall empowerment level of women is 0.5436 in the range of (0,1). In terms of percentage it is 54.36 percent.

Section-4

5.4 Regression Analysis to Identify the Socio-Economic Factors Affecting the Level of Women Empowerment

For identifying the effect of various socio-economic factors on the level of women mpowerment, two regression equations are constructed and estimated by applying the Ordinary Least Square (OLS) method. This throws sufficient light to identify the effect of various socio-economic factors on women empowerment in Nagaon district. In order to examine the causality of various factors with women empowerment, the regression models are constructed as follows:

5.4.1 Regression Analysis to Identify the Socio-Economic Factors Affecting the Level of Women Empowerment by Applying Factor Analysis Method

The Regression Model-1

$$WEI_{FA} = \beta_0 + \beta_1 RA + \beta_2 CASTE + \beta_3 REQ + \beta_4 HIERI + \beta_5 RI + \beta_6 PR + \beta_7 HMO + \beta_8 ES + \beta_9 NSAO + \beta_{10} PRIMARY + \beta_{11} SECONDARY + \beta_{12} TERTIARY + \mu$$

Here β_0 is the constant term, β_j's are the regression coefficients where j=1,2,...,12 and μ is the random disturbance term.

Since the aim of the research work is to study the level of women empowerment of Nagaon district, in the regression model, Women Empowerment Index constructed through Factor Analysis Method (WEI_{FA}) is considered as a dependent variable. Here women empowerment is measured in terms of five constituents, i.e. decision making within family, freedom of movement, political participation, control over economic resources and freedom to enjoy the exposure to media. Higher participation in these constituents refers higher level of women empowerment.

In regression mode-1, women empowerment index constructed through Factor Analysis is considered as a function of a set of explanatory variables which will explain the variation in the level of women empowerment. Age is an important factor that has impact on working capacity of people. People are not able to work in equal manner in all ages. Therefore in this research work the respondents belonging to age group 18-60 years are taken into account to study the level of women empowerment. Because, people of this age group are more courageous to work for their survival and to participate in different attributes of empowerment. In this regard, 'Respondent's Age' (RA) is considered as an explanatory variable. In this study, this variable measures respondent's capacity to participate in various economic, social, political and cultural activities.

Caste is an important factor effecting women empowerment in a developing country like India. Caste system creates discrimination among people on the basis of their work and

suppresses the untouchable or lower caste people and thus excludes them from the opportunity to grow as human being. From various literatures it is found that lower caste women are less empowered compared to upper class women. Women of lower caste people generally face certain kinds of domestic violence and social exclusion in all the fields of the society. Therefore in this regression model, 'Caste' is taken as an explanatory variable to study its effect on women empowerment. Here the variable is in dummy form. The variable 'Caste' is assigned value 1 if the respondent belongs to general caste, otherwise 0.

Another most important factor for women empowerment is education. Education is the key means of empowering women and it is itself a human right. Educated girls can lead better lives. Education is especially central to women's empowerment so far as it enables women to become more productive both inside and outside the household. Higher education leads to more empowerment. In this regard, 'Respondent's Educational Qualification' (REQ) is taken into account as an explanatory variable which can impact on women empowerment.

Next 'Household Income Excluding Respondent's Income' (HIERI) is taken as explanatory variable. The reason for this is that all respondents are not employed. Some of respondents are not employed and they have to depend on their household income. Therefore, here the effect of household income on women empowerment is important. From various study it is found that income has a positive impact on women empowerment. Employed women are economically, politically and socially more empowered than unemployed women. Higher level of income leads to more empowerment than lower income. Therefore, 'Respondent's Income' (RI) is also taken as an explanatory variable in the regression model.

Another variable 'Place of Residence' (PR) represents the urban and rural areas. Here the effect of urban and rural areas on women empowerment will be examined. The variable 'Place of Residence' (PR) is included in the regression model as a dummy variable. The variable is assigned value 1 if the respondent belongs to urban areas, otherwise 0.

'Household Main Occupation' (HMO) also hypothetically has influence on women empowerment. To determine the type of influences on women empowerment, HMO is included as an explanatory variable in the regression model. Hypothetically higher the type of Household's Main Occupation, higher will be the level of women empowerment and vice-versa. The variable HMO is in dummy form. The variable is assigned value 1 if the head of the household is engaged in agricultural sector, otherwise 0.

Another important factor effecting women empowerment is the 'Economic Status' (ES) of the household. Economic status is measured by APL and BPL condition of the household. Here the variable 'Economic Status' is in dummy form. The variable is assigned value 1 if the respondent belongs to APL family, otherwise 0.

The economic condition of a household can also be understood by the 'Number of specified Asset Owned' (NSAO). Since the position of household can also impact on women empowerment, therefore NSAO is taken as an explanatory variable in the regression model. Here the variable is quantified by the number of specified asset owned by the household.

Another important factor which effects on empowerment of women is the pattern of main occupation of women. In the regression model the explanatory variable 'PRIMARY' is taken as dummy variable. The variable is assigned value 1 if the respondent is engaged in primary sector

for her livelihood, otherwise 0. Here the primary sector includes the activities like agriculture, plantation etc.

The explanatory variable 'SECONDARY' is also taken as dummy variable in the regression model. This variable is assigned the value 1 if the respondent is engaged in secondary sector for her livelihood, otherwise 0. The secondary sector includes all the big, medium and small scale businesses in which respondents are engaged in for their livelihood.

Again the explanatory variable 'TERTIARY' is also in dummy form in the regression model. The variable 'TERTIARY' is assigned value 1 if the respondent is engaged in tertiary sector for her livelihood, otherwise 0. The tertiary sector includes all the regular government and non-government services.

The descriptive statistics of the selected variables shown in Table-5.29, which throws meaningful light on the characteristics of the sample of the study. The mean women empowerment index of the respondents of Nagaon district is found as 0.5436 as estimated by applying Factor Analysis method. Here standard deviation (SD) value of 0.23490 indicates that there is substantial variation in the level of women empowerment in the district. In other words, all the women are not almost equally empowered in the district. The mean age of the respondents is 38 years. But the value of SD is 9.1984 which indicate that there is high variation in the age of respondents. Here code system is used to determine the educational qualification level of the respondents. Value 1 is assigned for educational qualification from class 1 to class 5, value 2 from class 6 to class 9, value 3 for HSLC level, value 4 for HS level, value 5 for Graduate level and value 6 for Post Graduate level. The mean value of REQ is 3.41 which indicate that the

average educational qualification of the respondents is HSLC pass. But the value of SD indicates that there is no very high variation in the educational qualification of respondents. The mean value of the variable HIERI is 21543.43. It means the average monthly income of the households excluding respondent's income is Rs. 21543.43. But the moderately high SD value of 20444.16 is a pointer to the existence of income disparity among the households implying that at least some of the households are much better off than the others in terms of generation of income from their economic activities.

In case of the variable RI, the average monthly income of the respondents is Rs. 9237.13 But the moderately high SD value of 15911 indicates that there is the existence of very high income variation among the respondents which implies that at least some of the respondents have much higher income than the others. The mean value of the variable NSAO is 4.025 which indicates that every household has at least 4 assets at the time of survey and the value of SD of 1.5232 implies that there is less variation in case of number of asset owned by the households.

The mean values of the dummy variables are also meaningful in the sense that these mean values show the presence of attributes among the sample units in percentage term. For example, 0.1875 mean value of the variable 'Caste' means that 18 percent of the respondents are belonging to general caste. The mean value of the variable 'PR' is 0.25 which indicates that 25 percent of the respondents are living in urban areas of Nagaon district. Similarly, the mean value of the variable HMO is 0.06 which implies that 6 percent of the head of the households are engaged in agricultural sector. And the mean value of the variable ES is 0.92 which indicates that 92 percent of the respondents belong to APL families. Again the mean value of the variable PRIMARY is 0.0475 which indicates that only 4 percent of total respondents are engaged in

primary sector. The mean value of the variable SECONDARY is 0.3225 which indicates that 32 percent of total respondents are engaged in secondary sector. And the mean value of the variable TERTIARY is 0.3300 which indicates that 33 percent of total respondents are engaged in tertiary sector. These results can be shown in the Table-5.29

Table-5.29: Descriptive Statistics of Selected Variables (by applying Factor Analysis)

Variables	Mean	Std. Deviation	N
WEI_{FA}	0.5436	0.23490	400
RA	38.1400	9.19847	400
CASTE	0.1875	0.39080	400
REQ	3.4100	1.40956	400
HIERI	21543.43	20444.16019	400
RI	9237.1300	15911.48476	400
PR	0.2500	0.43355	400
HMO	0.0600	0.23778	400
ES	0.9200	0.27163	400
NSAO	4.0250	1.52321	400
PRIMARY	0.0475	0.21297	400
SECONDARY	0.3225	0.46802	400
TERTIARY	0.3300	0.47080	400

Source: Estimated by the researcher

Table-5.30: Dependent Variable: Women Empowerment Index constructed through Factor Analysis

Model-1	Coefficient	Std. Error	t	Sig.	Collinearity Statistics	
					Tolerance	VIF
Constant	-0.039	0.046	-0.836	0.404		
RA	0.007	0.001	8.031	0.000	0.854	1.171
Caste	-0.023	0.019	-1.224	0.222	0.965	1.037
REQ	0.054	0.007	7.193	0.000	0.461	2.170
HIERI	-1.5E-006	0.000	-2.928	0.004	0.489	2.045
RI	1.41E-006	0.000	1.952	0.052	0.387	2.585
PR	0.008	0.018	0.419	0.675	0.815	1.227
HMO	-0.090	0.032	-2.773	0.006	0.865	1.156
ES	0.038	0.032	1.181	0.238	0.665	1.505
NSAO	0.015	0.008	1.811	0.071	0.308	3.243
PRIMARY	-0.018	0.038	-0.478	0.633	0.790	1.265
SECONDARY	0.034	0.019	1.796	0.073	0.661	1.514
TERTIARY	0.188	0.026	7.343	0.000	0.352	2.837

Source: Estimated by the researcher

R^2 =0.643 *F*-Value= 57.978 (Significant at 1%)

$\overline{R}^2$ =0.631

In order to find out the determinants of women empowerment, a regression model is constructed with some selected variables where women empowerment index is the dependent variable and the set of explanatory variables comprises of variables such as women's age represented as Respondent's Age (RA), CASTE, women's (Respondent's) Educational Qualification (REQ), Household's Income Excluding Respondent's Income (HIERI), Respondent's Income (RI), Place of Residence i.e. rural or urban (PR), Household's Main Occupation (HMO), Economic Status of household (ES), Number of Specified Asset Owned by the household (NSAO), respondent's occupation in primary sector represented as PRIMARY, respondent's occupation in secondary sector represented as SECONDARY and respondent's occupation in tertiary sector represented in the model as TERTIARY. The econometric form of the equation and the definitions of the variables included in the model are discussed in details in the preceding chapter Methodology of the research work.

It is important to point out here that since two different estimation techniques are used for measuring women's empowerment level, viz., Fuzzy Set Technique and Factor Analysis (Principal Component Analysis); two regression equations are actually fitted for facilitating comparison between the two, where in the first model women empowerment index estimated by applying Factor Analysis technique is taken as dependent variable and in the second model, women empowerment index estimated by Fuzzy Set Technique is used as the dependent variable. The set of explanatory variables is the same for both the two models for obvious reason. This is also important to point out that the variables taken as explanatory variables for regression analysis are selected on the basis of thorough review of literature and the selected variables have literature support towards their established causal connection with women empowerment.

The result of the first regression model is given in Table-5.30. The table reveals that eight variables out of twelve variables have turned up statistically significant. Such variables are RA, REQ, HIERI, RI, HMO, NSAO, SEONDARY and TERTIARY. The variables RA, REQ, RI, NSAO, SECONDARY and TERTIARY have statistically significant positive impact on women empowerment level. The result is an expected line. In case of RA, the result shows that the level of women empowerment increases with the age of the respondents implying that older women have higher level of empowerment. This variable is found to be statistically significant at 1% level. In case of REQ, the result shows that women having higher level of education have higher level of empowerment. This is also found statistically significant at 1 % level. The economic conditions of the respondent and respondent's households have also positive statistically significant impact on women empowerment. RI representing respondent's income has positive statistically significant (at 5% level) impact on respondent's empowerment level. Number of assets owned by the households (NSAO) is a proxy variable that indicates the economic status of the households. This variable has positive statistically significant (at 10% level) impact on women empowerment. In case of the variable SECONDARY, the result shows that the variable is positively significant (at 10 % level) i.e. secondary sector as a livelihood option can positively impact on women empowerment. Besides this, the variable TERTIARY has positive statistically significant (at 1% level) impact on women empowerment. It means regular salaried various government and non-government services have very high impact on women empowerment. The others statistically significant variables namely HIERI and HMO have negative impact on women empowerment. Surprisingly, HIERI which represent households income excluding respondent's income is found to have statistically significant (at 1% level) negative impact on

women empowerment. Keeping results in respect to HIERI and RI, in view, this can be infer that respondent's income appears to be a great component of household income and in case of women empowerment respondent's income has more importance than HIERI in promoting empowerment level of women. This result supports the fact that in the process of building up women empowerment, women's income plays a more important role than women's household income.

HMO is a dummy variable where value 1 is assigned if household's main occupation is in agriculture, 0 otherwise. The result shows that women of households which have main occupation in agriculture sector are less empowered that women belonging to households who have primary occupation in other sectors of the economy. This results in the perspective of agricultural backwardness of the regions like Assam, is also in expected line and therefore, the variable HMO is found to have statistically significant (at 1% level) negative impact on women empowerment.

F-value of the model is found to be significant at 1% level implying that the model is a good fit and the value of adjusted R^2 explains that 63% variations in the values of the dependent variable is explained by the set of explanatory variables taken into consideration. The value of the Variance Inflating Factor (VIF) and Tolerance does not point towards the existence of sever multicollinearity in the set of explanatory variables.

5.4.2 Regression Analysis to Identify the Socio-Economic Factors Affecting the Level of Women Empowerment by Applying Fuzzy Set Technique

The Regression Model-2

For identifying the effect of various socio-economic factors on the level of women empowerment of Nagaon district, another regression equation based on Women Empowerment Index constructed through Fuzzy Set Technique is estimated by applying the Ordinary Least Square (OLS) method.

$$WEI_{FS} = \beta_0 + \beta_1 RA + \beta_2 CASTE + \beta_3 REQ + \beta_4 HIERI + \beta_5 RI + \beta_6 PR + \beta_7 HMO + \beta_8 ES + \beta_9 NSAO + \beta_{10} PRIMARY + \beta_{11} SECONDARY + \beta_{12} TERTIARY + \mu$$

Here β_0 is the constant term, β_j's are the regression coefficients where j=1,2,...,12 and μ is the random disturbance term.

In this regression model, Women Empowerment Index calculated through Fuzzy Set Technique (WEI_{FS}) is considered as a dependent variable. Higher participation in all the constituents of women empowerment refers higher level of women empowerment. Like the previous regression model constructed through Factor Analysis, in this regression model also the Women Empowerment Index constructed through Fuzzy Set Technique is considered as a function of a set of the same explanatory variables which will explain the variation in the level of women empowerment. The set of explanatory variables are Respondent's Age (RA), CASTE, Respondent's Educational Qualification (REQ), Household Income Excluding Respondent's Income' (HIERI), Respondent's Income (RI), Place of Residence (PR), Household Main

Occupation (HMO), Economic Status (ES) and Number of specified Asset Owned (NSAO), PRIMARY, SECONDARY and TERTIARY.

The descriptive statistics of the selected variables for this model are same as in Model 1 and are shown in Table-5.30 which throws meaningful light on the characteristics of the sample of the study. In Table- 5.31, however, the descriptive statistics of dependent variable WEI_{FS} is shown.

Table-5.31: Descriptive Statistics of Selected Variables (by applying Fuzzy Set Technique)

Variables	Mean	Std. Deviation	N
WEI_{FS}	0.5164	0.17208	400

Source: Estimated by the researcher

Table-5.32: Dependent Variable: Women Empowerment Index constructed through Fuzzy Set Technique

Model-2	Coefficient	Std. Error	t	Sig.	Collinearity Statistics	
					Tolerance	VIF
Constant	0.063	0.033	1.900	0.158		
RA	0.005	0.001	8.354	0.000	0.854	1.171
Caste	-0.017	0.013	-1.269	0.205	0.965	1.037
REQ	0.040	0.005	7.478	0.000	0.461	2.170
HIERI	-1.1E-006	0.000	-3.070	0.002	0.489	2.045
RI	7.74E-007	0.000	1.491	0.137	0.387	2.585
PR	0.008	0.013	0.612	0.541	0.815	1.227
HMO	-0.060	0.023	-2.601	0.010	0.865	1.156
ES	0.034	0.023	1.446	0.149	0.665	1.505
NSAO	0.013	0.006	2.191	0.029	0.308	3.243
PRIMARY	0.006	0.027	0.237	0.813	0.790	1.265
SECONDARY	0.037	0.013	2.771	0.006	0.661	1.514
TERTIARY	0.147	0.018	.010	0.000	0.352	2.837

Source: Estimated by the researcher

R^2 =0.656 *F*-Value= 61.402 (Significant at 1%)

$\overline{R}^2$ =0.645

Table-5.31 and Table-5.32 shows the regression results of second regression model where the dependent variable is Women Empowerment Index which is estimated by applying Fuzzy Set Technique. Table-5.31 represents that the mean women empowerment index of the respondents of Nagaon district is found as 0.5164 as estimated by applying Fuzzy Set Technique. Here standard deviation (SD) value of 0.17208 indicates that there is substantial variation in the level of women empowerment in the district. In other words, all the women are not almost equally empowered in the district. The results of other variables are similar as the results shown in regression model-1, i.e. the results of this model are identical with that of model 1. In this model also the same set of variables namely RA, REQ, HIERI, HMO, NSAO, SECONDARY and TERTIARY have turned out statistically significant and the algebraic sign of these variables is also similar to those found in the results of regression model 1.

Combining the regression results of regression model 1 and regression model 2, it can be concluded that age of respondent, respondent's educational qualification, respondent's income and household's asset level, respondent's occupation in secondary and tertiary sector are the factors that help improving women's (respondent's) empowerment level, where as household's income excluding respondent's income and primary occupation in primary sector has detrimental impact on women's empowerment level. Identification of these variables will help proper policy formation and implementation for raising the empowerment level of a backward developing region like Assam.

Finally it may be pointed out here that the variables Women Empowerment Index constructed by applying Factor Analysis (WEI_{FA}) and Women Empowerment Index constructed by applying

Fuzzy Set Technique (WEI_{FS}) are highly positively correlated with each other and it is also statistically significant at 1% level. The results found from two models are almost same. The result of Correlation Coefficient value is shown in Table- 5.33.

Table- 5.33: Correlation Coefficient Results

		WEI_{FA}	WEI_{FS}
WEI_{FA}	Pearson Correlation	1	0.991
	Sig. (2-tailed)		0.000
	N	400	400
WEI_{FS}	Pearson Correlation	0.991	1
	Sig. (2-tailes)	0.000	
	N	4000	400

Source: estimated by the researcher

Hypotheses Testing:

The present study attempted to test the following hypotheses:

(iv) Work force participation of women has no impact on their empowerment in urban areas.

(v) Women employed in informal sector have higher level of empowerment.

(vi) Education of women and their place of residence have no impact on the empowerment of women.

In case of the first hypothesis, from the study it is found that in urban areas (Table-5.23) the respondents who are engaged in secondary and tertiary sectors for their livelihood have higher level of empowerment than the respondents who are not employed. Again from Table-5.30 it is seen that the explanatory variable RI (Respondent's Income) has positive statistically significant impact on women empowerment. Therefore the null hypothesis work force participation of women has no impact on their empowerment in urban areas is rejected.

In case of the second hypothesis, from the Table-5.17 and Table-5.20 it is seen that respondents who are engaged in primary sector (Agriculture, Plantation etc.) have lowest level of empowerment than the respondents engaged in secondary and tertiary sector. Women engaged in informal sector such as agriculture, plantation etc. cannot participate fully in different constituents of women empowerment. Therefore the null hypothesis women employed in informal sector have higher level of empowerment is rejected.

Again, for the third hypothesis, it is found from Table-5.30 and Table-5.32 that the explanatory variable REQ (Respondent's Educational Qualification) has positive statistically significant impact on women empowerment. Thus it can be said that education of women has positive impact on women empowerment. But it is important to note that the explanatory variable PR (Place of Residence) is found to have statistically insignificant impact on women empowerment. Therefore the third hypothesis for education of women is rejected but for Place of Residence, it is accepted.