Quantification of Crime & CAW Using Statistical Methods and GIS... A Case Study at Diamond Harbour Municipality, South 24 Pargans, W.B

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Abstract: *American sociologist Louis Wirth said that 'Urbanism as a Way of Life' in the American Journal of Sociology in 1938 because more and more people were moving into cities and the urbanization process is stimulated. this hyper growth of cities ensure the "urbanized world". But now a day's urbanism concept is critited by sociologist. They polled that urbanism developed a narrower mental structure on citizen of a town. Parallely urbanization stimulates more physical and social problems. In those social problems crime is an important phenomenon. Crime has a vast concept and categories. But crime against woman is a specific type of crime which has a great significant in our personal life, family life. Is also say that domestic violence against woman is much affected in child mental growth. We are generated a vulnerable index model using various socioeconomic indicator of crime at Diamond Harbour Municipality, South 24 Pargans District, West Bengal.*

Keywords: *Social Vulnerability, Education Index, Income Index, Life Expectancy Index, Security Index, Time Based Woman Security Index, Vulnerability Index.*

1. INTRODUCTION

Etymological Meaning: "*T*he word *crime* is derived from the Latin root *cernō*, meaning "I decide, I give judgment". Originally the Latin word *crīmen* meant "charge" or "cry of distress."The Ancient Greek word *krima* (κρίμα), from which the Latin cognate derives, typically referred to an intellectual mistake or an offense against the community, rather than a private or moral wrong. In 13th century English *crime* meant "sinfulness", according to etymonline.com. It was probably brought to England as Old French *crimne* (12th century form of Modern French *crime*), from Latin *crimen* (in the genitive case: *criminals*). In Latin, *crimen* could have signified any one of the following: "charge, indictment, accusation; crime, fault, offense"." … Wikipedia

Socioeconomic Definition: According to Sir Harold "A crime is an act or default which prejudices the interests of the community and is forbidden by law under pain of punishment. It is an offence against the state, as contrasted with loot or a civil wrong, which is a violation of a right of an individual and which does not lead to punishment." In generally crime is an activity by group people or individual which is not recognized by a society or an organized constitutional body and those activity mush have a punishment.

Semantic meaning of "Crime against woman" may be defined as the physical or mental torture of a woman by individual or group of people (here the gender is not important, beside men women are take apart in crime). Delhi Police Research Bureau classified crime against woman from the base of law. First one is crime against woman under Indian penal code-IPC. Seven types of crimes are enlisted in this category. Those are – Rape, Kidnapping, Death by Dowry system, Physical and Mental torture, Molestation, Eve Teasing, Sealing and baying of woman in the age of 21 and beneath. And the second one is Local and Special Level – SLL crime. Four types of crimes as Dowry System, "Satidaho", illegal business activity about woman, vulgar treatment to woman (Ahuja, 2014) are included on this type of crime.

2. BACKGROUND OF THIS STUDY

In 1970th a new ideology was developed in geography by D.M. Smith (1977). According this approach geographers must be use their geographical knowledge to reduce the recent problems of human life and ensure wellbeing. Now a day's crime including CAW (Crime against Woman) is a big problem in an urban society. Crime incident and CAW reports takes a major part of news paper. In India Delhi Nirbhaya rape case (16 December 2012), Park Street Rape Case (February 2012) play a significant role to think something about CWA to the Geographers and Sociologist.

CAW has a relation with Geography. Because Crime against Woman is determined some physio socio-economic factors as geographical location, political location, climatic and environmental condition (if we consider the climatic determinism after *Huntington* and Ellen Churchill Semple), age structure, income, security system etc.

3. STUDY AREA AND METHODOLOGY

For this study we selected Diamond Harbour Municipality located in South 24 Parganas, West Bengal with the extension of 22° 13' 24"N to 22° 9'29" N and 88° 13' 33" E to 88° 9' 16" E, on the eastern banks of the Hooghly River quite near where the river meets the Bay of Bengal. Diamond Harbour municipality was established in 1982. This small town with a picturesque setting is the gateway to the south-western part of the district. Earlier known as Hajipur, this location was named Diamond Harbour by the British although currently there are no piers or jetties at this location, except for the ruins of a fort. It used to be considered a safe resting spot for oceangoing ships and offered a spectacular view of the river. After the Rupnarayan River joins the Hughli, the river bends south and widens out to a form a huge expanse of water. A little further down, the Haldi River joins it.

For this study we collect some secondary data as demographic data crime data and a sample survey was run by us. This sample survey cover 30% population of each ward.
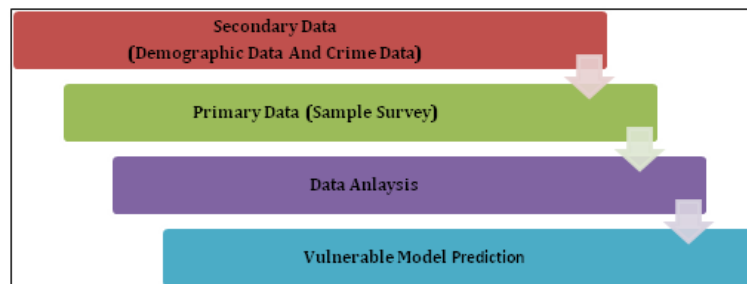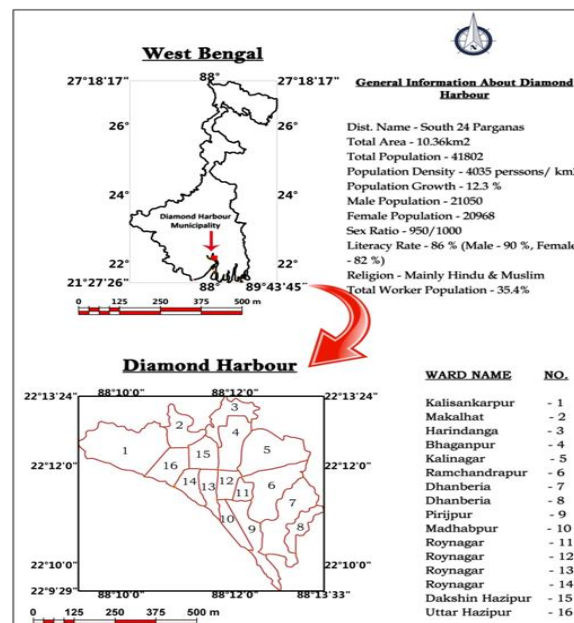

Fig1. *Methodology Flow Chart*
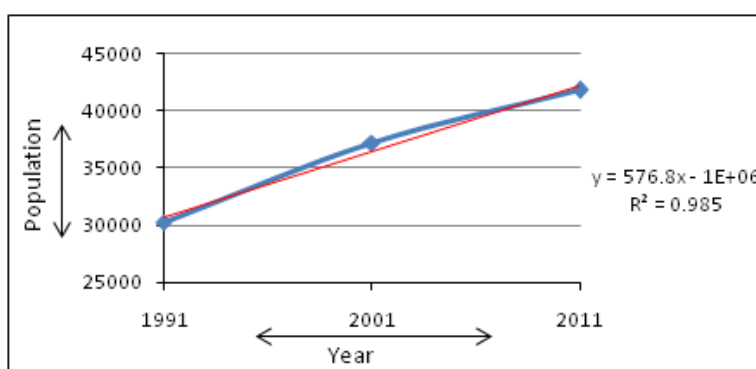

Fig2. *Location Map of Diamond Harbour Municipality*

4. DATA ANALYSIS

4.1. Demographic Data

Diamond Harbour Municipality consist 16 wards with 10.36 km2 area. According to census 2011 total population of that town is 41802, population density 4035persons/ km2. Population growth of last 10 years (2001 – 2011) is 12.3%. Total male population is 21050 and female is 20968. Sex ratio is 950/1000. Literacy rate is 86 %(male-90%, female – 82%). Major religious community of this city is Hindu and ihe minor community is Muslim, Sikh and others. 35.4 % people of total population are engaged with various governmental and non-governmental working sectors.
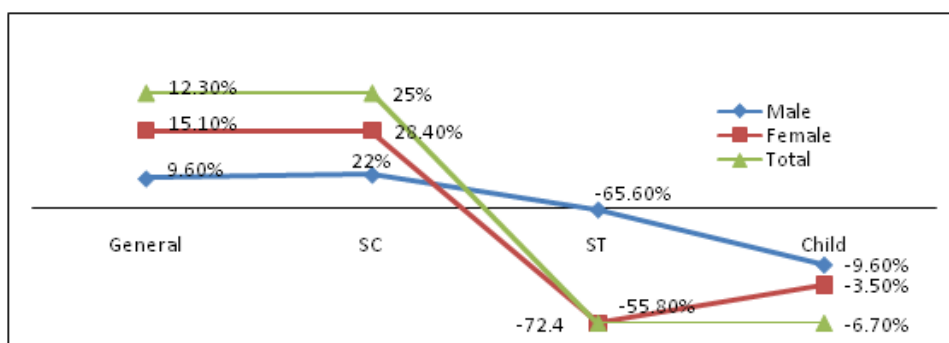
Year Wise Population Growth of Diamond Harbour Municipality 1991, 2001, 2011

Year	Population
1991	30266
2001	37234
2011	41802

Population Growth of Diamond Harbour Municipality – 2011 Among General, S.C, S.T, & Child

	General	SC	ST	Child
Male	9.60%	22%	-65.60%	-9.60%
Female	15.10%	28.40%	-72.4	-3.50%
Total	12.30%	25%	-55.80%	-6.70%

Population Growth of Diamond Harbour Municipality 2001 & 2011

Ward No	2001	2011	Growth (%)
1	3064	2661	-13.2
2	2365	2667	12.8
3	1620	1624	0.2
4	1808	2346	29.8
5	3178	3793	19.4
6	1900	2564	34.9
7	1384	1521	9.9
8	1329	1414	6.4
9	3063	3226	5.3
10	2832	2989	5.5

11	1428	1763	23.5
12	2146	2262	5.4
13	2765	3163	14.4
14	2148	2517	17.2
15	3615	4385	21.3
16	2590	2907	12.2
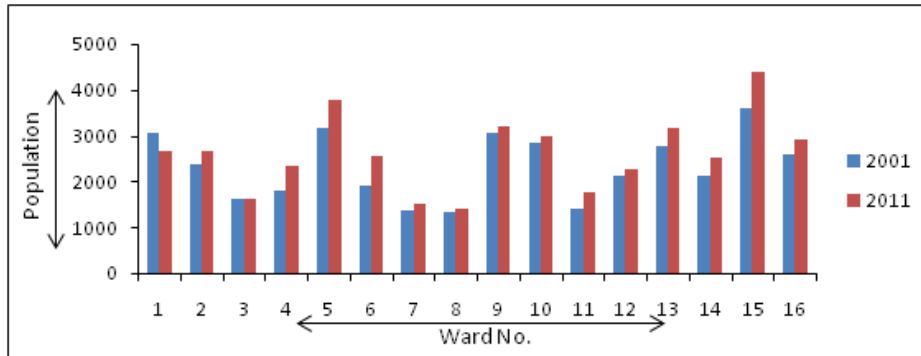
Ward Wise Population Density of Diamond Harbour Municalility - 2011

| Ward No	Population	Area (km2)	Density/km2	Density Class
1	2661	3.61	737	Less Density
2	2667	1.02	2614	High Density
3	1624	1.1	1476	Moderate Density
4	2346	1.48	1585	Moderate Density
5	3793	2.48	1529	Moderate Density
6	2564	2.2	1165	Moderate Density
7	1521	2.48	613	Less Density
8	1414	0.75	1885	Moderate Density
9	3226	1.39	2320	High Density
10	2989	0.73	4094	High Density
11	1763	0.42	4197	High Density
12	2262	0.66	3427	High Density
13	3163	0.78	4055	High Density
14	2517	0.74	3401	High Density
15	4385	0.95	4615	High Density
16	2907	1.17	2484	High Density
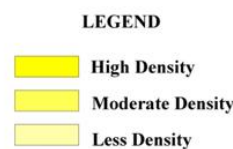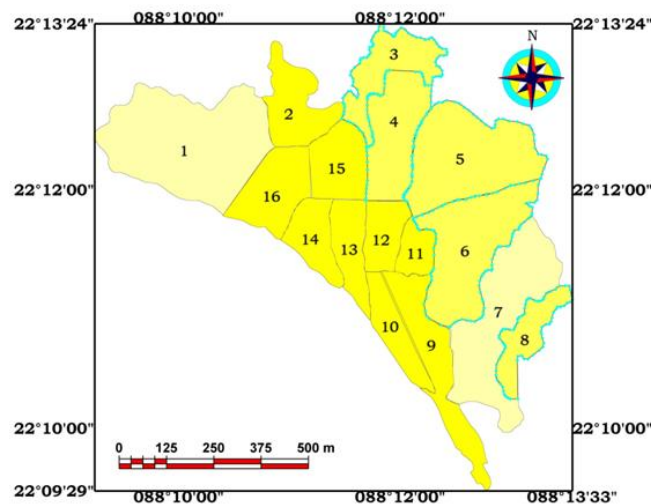
Literacy Rate of Diamond Harbour Municipality 2001 & 2011

	Male (%)	Female (%)	Overall (%)
2001	85.6	74	80
2011	89.6	82.2	85.9
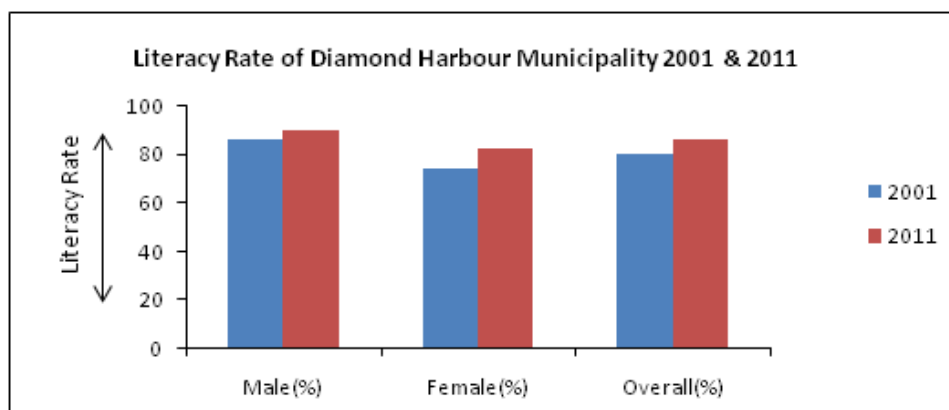
Ward Wise Literacy Rate of Diamond Harbour Municipality - 2001, 2011

Ward No.	Ward Name	2001		2011	
		Male (%)	Female (%)	Male (%)	Female (%)
1	Dakshin Hazipur	54.8	40.3	74.9	64.4
2	Kalinagar	85.3	72.5	85.3	76.3
3	Pirijpur	94.1	82.5	94.3	85.8
4	Roynagar	94.5	82.4	93.7	87.8
5	Madhabpur	69.7	56.5	81.8	72.1
6	Uttar Hazipur	91.1	76.7	88.2	85.1
7	Makhal Hat	87.3	70.4	93.8	82.8
8	Kalisankarpur	83.6	68.1	84.3	71.5
9	Ramchandrapur	94.1	84.1	95.2	89.1
10	Roynagar	82.1	73.7	88.4	78.9
11	Bhagabanpur	95.3	90.9	94.1	90
12	Roynagar	90.1	79.9	92.3	86.9
13	Roynagar	96.2	87.3	96.9	91.8
14	Harinnagar	96.5	90.4	95.4	91.9
15	Dhanberia	82.4	68	86.6	78.5
16	Dhanberia	91.4	78	93.2	85.1
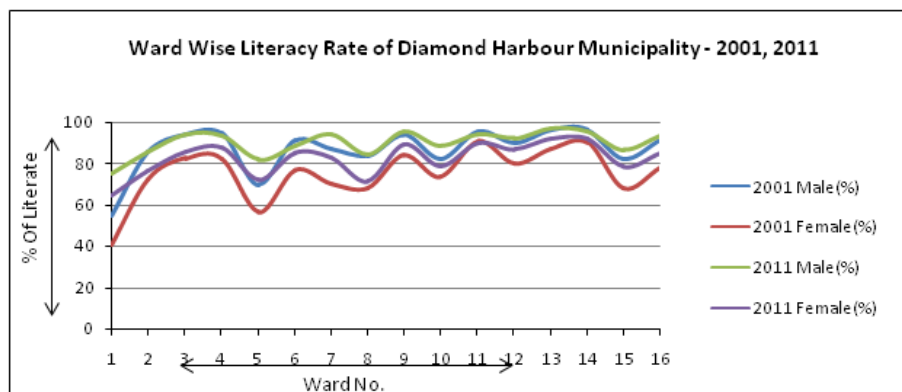
4.2. Crime Data

**Crime Activity in South 24 Parganas in the Year of 2005, 2006, 2007**

Year	2005	2006	2007
Violent Crime	823	729	772
Riots	262	265	505
Crime Against Woman	1214	1438	2034
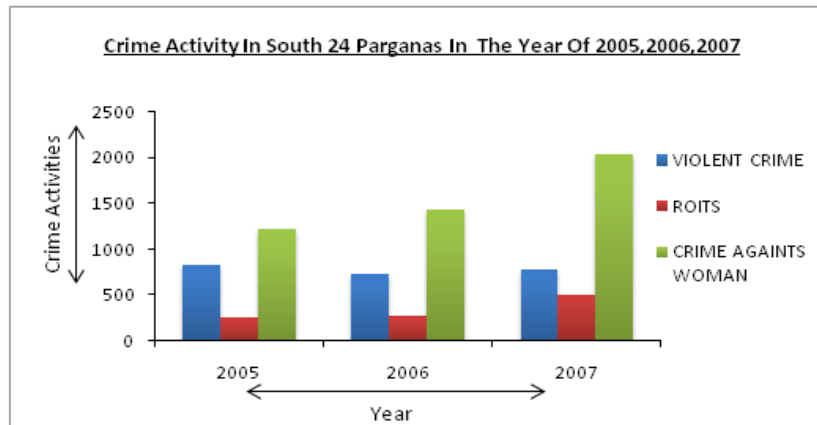
*Source: Human Development Report 2009

Crime Figure of South 24 Parganas Dist. for the Year of 2012

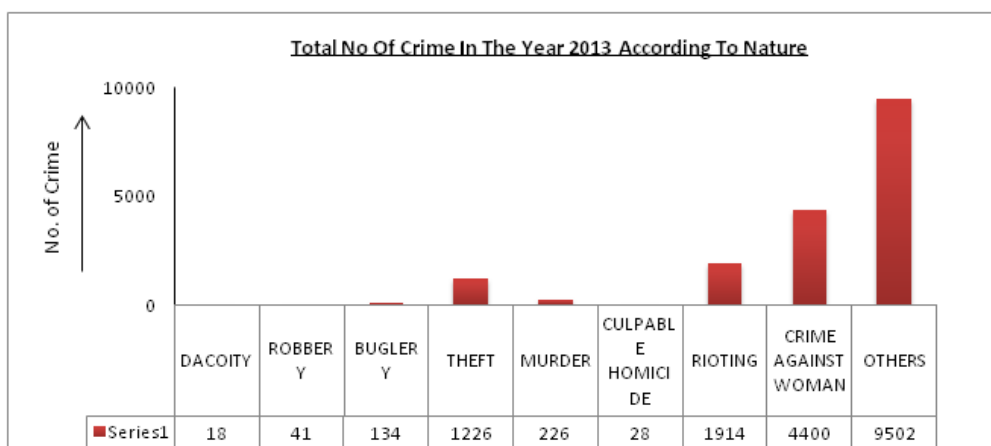| Month	Dacoity	Robbery	Buglery	Theft	Murder	Culpable Homicide	Rioting	Crime Against Woman	Others	Total
Jan	5	3	0	114	16	4	151	252	537	**1082**
Feb	2	2	0	106	17	1	197	323	545	**1193**
Mar	2	5	1	97	32	4	128	358	721	**1348**
Apr	4	0	2	124	15	3	163	384	771	**1466**
May	4	4	0	99	28	3	169	406	765	**1478**
Jun	3	1	0	109	9	0	134	398	793	**1447**
Jul	2	6	1	113	21	0	211	426	182	**962**
Aug	4	2	4	129	23	3	194	415	783	**1557**
Sept	1	3	14	94	13	3	189	364	758	**1439**
Oct	3	1	12	92	14	2	163	312	662	**1261**
Nov	1	5	6	103	17	2	137	334	663	**1268**
Dec	3	3	12	101	18	2	151	325	627	**1242**
Total	**34**	**35**	**52**	**1281**	**223**	**27**	**1987**	**4297**	**7807**	
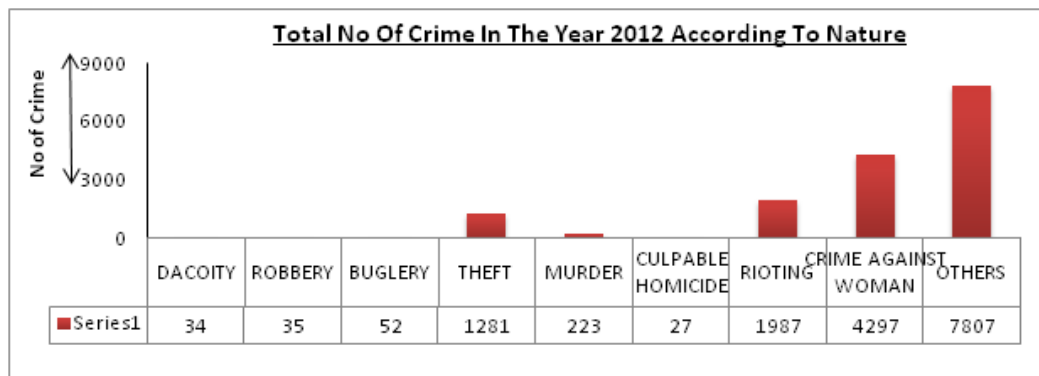
*Source: Office of the SP South 24 Pargans

Crime Figure of South 24 Parganas Dist. for the Year of 2013

Month	Dacoity	Robbery	Buglery	Theft	Murder	Culpable Homicide	Rioting	Crime Against Woman	Others	Total
Jan	1	9	10	107	15	4	125	282	625	**1178**
Feb	0	4	1	83	13	2	119	298	645	**1165**
Mar	2	5	8	113	20	2	119	398	736	**1403**
Apr	0	1	3	121	16	2	125	425	827	**1520**
May	1	1	14	125	21	3	264	492	984	**1905**
Jun	3	2	9	95	15	1	203	367	930	**1625**
Jul	0	2	8	97	22	3	132	287	679	**1230**
Aug	2	6	19	117	29	3	206	371	868	**1621**
Sept	4	5	13	103	18	3	137	375	711	**1369**

Oct	1	1	24	82	20	2	180	365	767	**1442**
Nov	0	2	12	99	16	2	127	359	788	**1405**
Dec	4	3	13	84	21	1	177	381	942	**1626**
Total	**18**	**41**	**134**	**1226**	**226**	**28**	**1914**	**4400**	**9502**	

*Source: Office of the SP South 24 Pargans

Crime Figure of South 24 Parganas Dist. for the Year of 2014

Month	Dacoity	Robbery	Buglery	Theft	Murder	Culpable Homicide	Rioting	Crime Against Woman	Others	Total
Jan	2	3	15	108	14	4	194	362	884	**1586**
Feb	5	4	10	100	14	3	162	388	827	**1513**
Mar	2	3	11	143	21	6	241	530	1251	**2208**
Apr	2	1	14	128	30	3	176	497	1152	**2003**
May	1	2	12	101	25	1	152	410	930	**1634**
Jun	0	6	11	150	19	0	216	551	1049	**2002**
Jul	4	3	11	160	21	4	126	462	1137	**1928**
Aug	3	4	9	120	29	1	248	535	1224	**2173**
Sept	8	3	6	128	23	1	178	430	1062	**1839**
Oct	1	5	12	118	23	3	95	359	880	**1496**
Nov	4	4	13	129	15	0	166	573	1193	**2097**
Dec	1	5	11	138	14	5	210	435	1107	**1926**
Total	**33**	**43**	**135**	**1523**	**248**	**31**	**2164**	**5532**	**12696**	

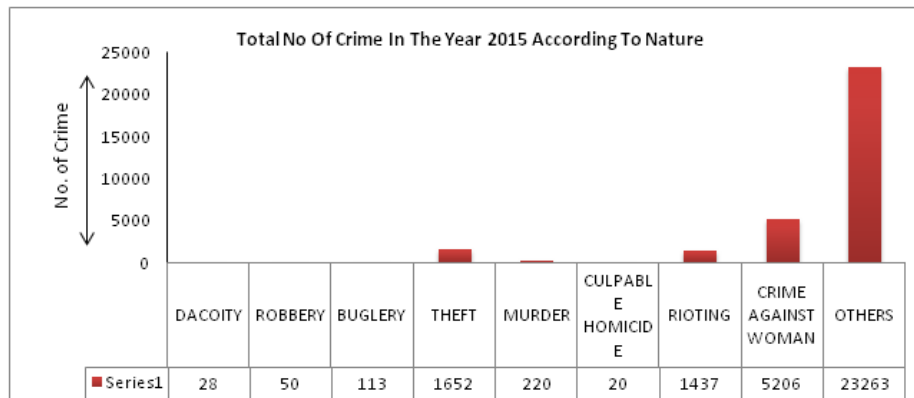***Source:** Office of the SP South 24 Pargans

Crime Figure of South 24 Parganas Dist. for the Year of 2015

Month	Dacoity	Robbery	Buglery	Theft	Murder	Culpable Homicide	Rioting	Crime Against Woman	Others	Total
Jan	1	3	6	139	18	0	155	378	1700	**2400**

Feb	3	4	12	144	17	1	163	412	1718	**2474**
Mar	2	7	17	141	18	1	138	484	2084	**2892**
Apr	4	4	15	97	13	3	106	493	1858	**2593**
May	3	3	7	135	24	1	147	279	2183	**2782**
Jun	0	8	7	121	21	0	131	360	2187	**2835**
Jul	3	2	15	140	21	3	111	468	1939	**2702**
Aug	5	5	8	155	10	2	108	508	2028	**2829**
Sept	2	5	3	145	19	2	128	511	2012	**2827**
Oct	2	2	9	130	15	1	102	471	1917	**2649**
Nov	1	1	9	132	23	5	54	377	1716	**2318**
Dec	2	6	5	173	21	1	94	465	1921	**2688**
Total	**28**	**50**	**113**	**1652**	**220**	**20**	**1437**	**5206**	**23263**	

*Source: Office of the SP South 24 Pargans

Crime Figure of South 24 Parganas Dist. for the Year of 2016

Month	Dacoity	Robbery	Buglery	Theft	Murder	Culpable Homicide	Rioting	Crime Against Woman	Others	Total
Jan	1	3	3	176	14	2	105	398	1032	**1734**
Feb	1	5	7	157	17	1	118	520	1359	**2185**
Mar	1	5	6	172	28	3	94	507	1467	**2283**
Apr	1	2	3	113	16	6	68	469	1222	**1900**
May	0	1	5	188	22	1	73	594	1478	**2362**
Jun	1	5	3	185	20	2	62	486	1291	**2055**
Jul	2	2	9	209	22	1	57	497	1295	**2094**
Aug	1	4	8	221	19	3	61	578	1284	**2179**
Sept	0	2	7	190	20	2	43	526	1161	**1951**
Oct	0	5	10	169	20	3	28	490	1152	**1877**
Nov	0	3	5	178	18	2	35	405	1022	**1668**
Dec	0	2	7	163	18	1	64	466	1138	**1859**
Total	**8**	**39**	**73**	**2121**	**234**	**27**	**808**	**5936**	**14901**	
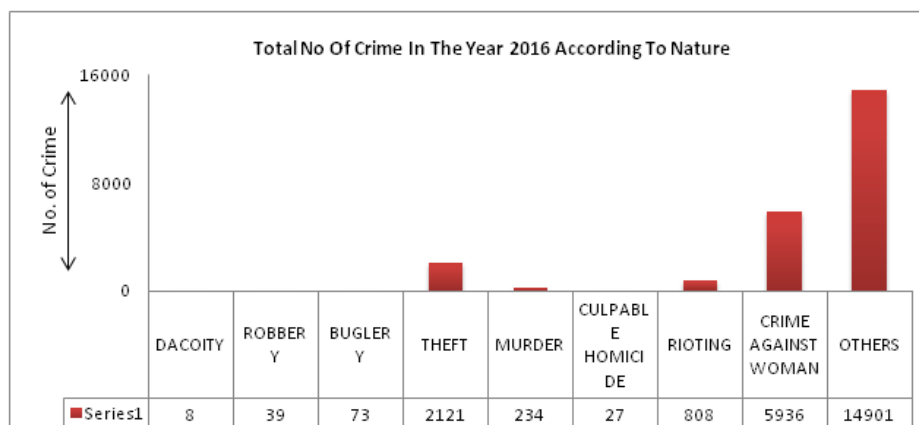
*Source: Office of the SP South 24 Pargans

Summarized Record of Crime against Woman

Year	Crime Against Woman
2005	1214
2006	1438
2007	2034
2012	4297
2013	4400
2014	5532
2015	5206
2016	5936
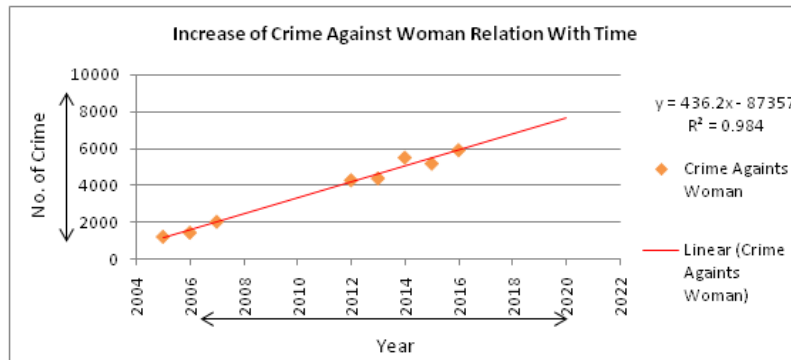
***Source:** Office of the SP South 24 Pargans

From the above data it is clear that Diamond Harbour city is a violated city. Theft, rioting robbery types of crime occurs frequently. But the most dominating crime is CAW. In the year of 2005 the figure was 1214 but in the year of 2016 it reach 5936. Linear relation of CAW with time shows the positive relationship. R^2 value is 0.9846 means the degree of its relationship is very high. So it's must say that in feature CAW will get rapid growth.

4.3. Sample Data Analysis

Our survey was run in 2017 in the month of Oct. We collect the sample data from the entire wards of Diamond Harbour Municipality. This survey is Random Sample Survey in nature. It covers 30 % population of each ward. Our goal was to find out the actual cause of crime and CAW. Also we are trying to find out the responsible behind CAW and perception about CAW from the grass route of our society the housewife.

Respondent Opinion Regarding Factors that Influence Crime

Respondent point out some factors that influence crime. Those are illiteracy, patriarchal system, negligence of police, social awareness etc. Maximum no of the population polled that patriarchal system; negligence of police takes the dominant role to influence crime. At Diamond Harbour there has an officially good police system, recently here developed a Woman Police Station. But reality shows that police system is not working well, at list the inhabitants mark out police negligence behind crime. (Fig – 3))
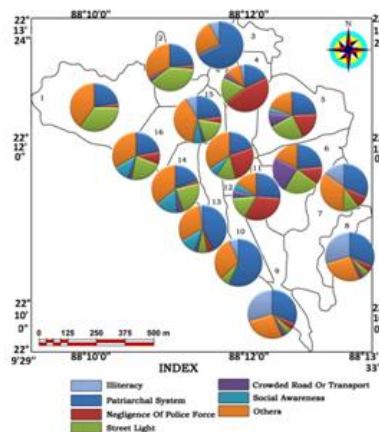
Fig3.

Victim Age of Woman

From our sample survey 2017 we observed that the age group of 15-20 is the most effected by crime against woman. They are hurrahs in publicly by teasers. Teenagers said that they are suffers the problems specifically some area as River Side, Station area etc. Also the age group of 20- 50 is affected. Inhabitance says that the intensity of crime is getting loss after 30 years of a woman. We have a concept that after marriage, such case as eve teasing, taunting will stop. But that concept is decline lot of women of the city. They conface that are also victimized at open place as market in front of their husband. (Fig – 4)
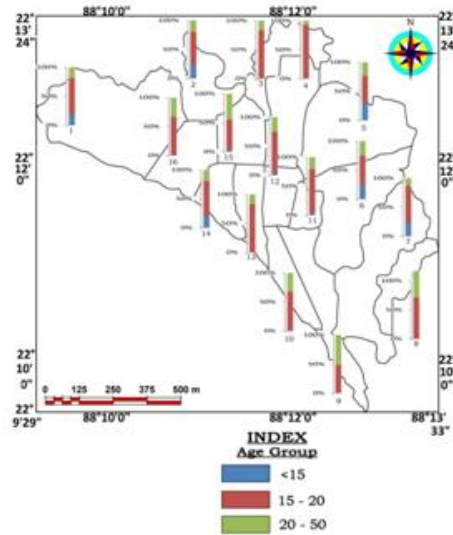

Fig4.

Nature of Domestics Violence

In India maximum number of women are suffer with domestic's violence after marriage. We classified the domestic's violence into three categories – Physical Violence, Mental Violence, and Sexual Violence.

Inhabitance of Diamond Harbour polled that above those types of domestics violence, mental torture is most frequently. Also Physical Torture is so usually in ward no 1, 2 etc. Sexual torture is rear in this city region. But we mast say that is sexual is rear or not it is under debate. Most of sexual torture is not come out in our society. In our society we always try to put off the Sexual incident. (Fig – 5)
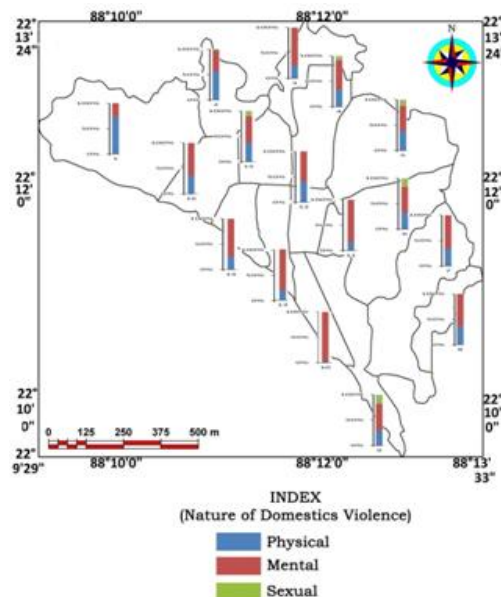

Fig5.

Persons behind Domestics Violence

Domestics violence mainly occurred by husband. Housewives are told that people from the law as mother in law, father in law are also responsible behind domestic's violence. In some cases family member as father, elder brother, husband's friends take a part to do domestics violence. (Fig- 6)
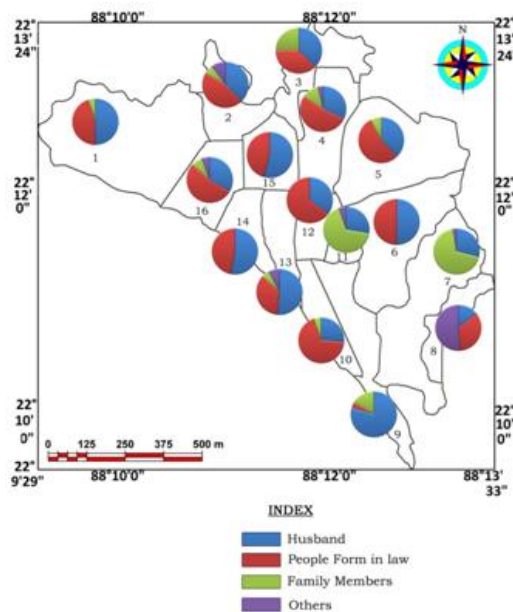

Fig6.

5. VULNERABLE ZONE & INDICATORS

Vulnerability derives from the Latin word "*vulnerare*" (to be wounded) and describes the potential to be harmed physically and/or psychologically. Vulnerability is often understood as the counterpart of resilience, and is increasingly studied in linked social-ecological systems. The Yogyakarta Principles, one of the international human rights instruments use the term "vulnerability" as such potential to abuse or social exclusion. .. Wikipedia

Taking a structuralize view, Hewitt (1997, p143) defines vulnerability as being: "...essentially about the human ecology of endangerment...and is embedded in the social geography of settlements and lands uses, and the space of distribution of influence in communities and political organization." This is in contrast to the more socially focused view of Blaikie et al. (1994, p9) who define vulnerability as the: "...set of characteristics of a group or individual in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. It involves a combination of factors that determine the degree to which someone's life and livelihood is at risk by a discrete and identifiable event in nature or society." Now a day's social vulnerability is an important phenomenon to discuss Social wellbeing.

We conceder Education, Income, Life Expectancy, Social Security, and time Base Women Security as the determining factor behind crime and CAW. We calculate the index value of those five indicators. The formula defining the HDI is promulgated by the United Nations Development Programme. Each of these indicators defined as a dimension with value between 1 to 0 with reference to maximum and minimum values. The general formula for calculating each dimension index is:

Index = (Actual Value-Minimum Value) / (Maximum Value – Minimum Value).

To calculate Social Vulnerability Index (SVI) we used Variables Cluster Index Method. The formula is:

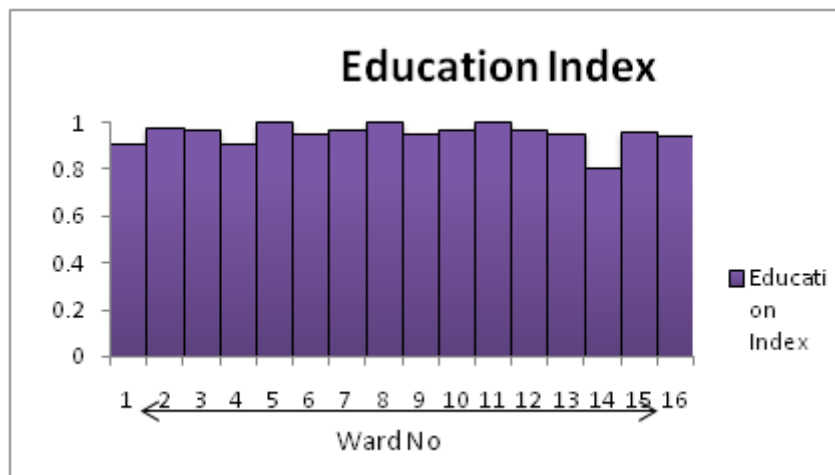***SVI= Σi/n***. Where i= indicators and n= number of indicator.

5.1. Education

Education is one of the important factors behind crime and CAW. Sociologist concedes that education can reduce the crime. In the case of our country Education consist the minimal education means the

"the knowledge of A, B, C". Still it is under debate that what will be the consideration point to certify a person an educated person. Rishi Rajnarayan Basu the famous educationalist said that in our education there is the lack of value education.

Education Index of Diamond Harbour Municipality (Based on Sample Data - 2017)

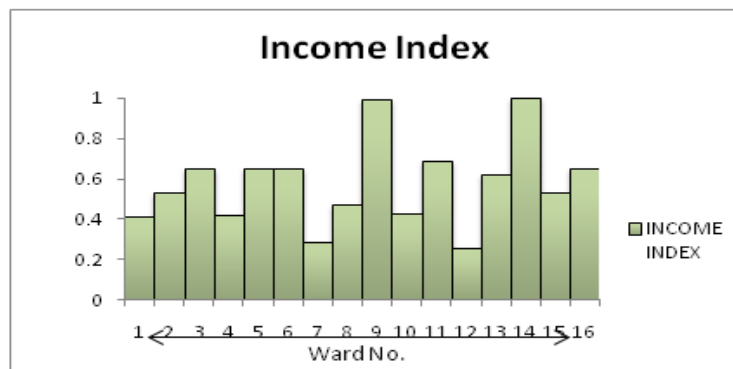| Ward No.	Maximum Literacy Rate (%)	Minimum Literacy Rate (%)	Education Index [(Actual Value - Minimum Value)/ (Maximum Observed Value- Minimum Observed Value)]
1	91	0	0.91
2	98	0	0.98
3	97	0	0.97
4	91	0	0.91
5	100	0	1
6	95	0	0.95
7	97	0	0.97
8	100	0	1
9	95	0	0.95
10	97	0	0.97
11	100	0	1
12	97	0	0.97
13	95	0	0.95
14	81	0	0.81
15	96	0	0.96
16	94	0	0.94

5.2. Income

From the theory of crime income is the sociological factor that operates the crime. According Karl Marks when an individual person or group of people cannot able to perches their basic needs they become surplus population. In that condition they are involves with crime. In modern time lot of sociologist also consider income as a indicator of crime. As, World Bank economists Pablo Fajnzylber, Daniel Lederman, and Norman Loayza (2002) , it was found out that crime rates and inequality are positively correlated within countries and also between countries. The correlation is causation – inequality induces crime rates. This finding is parallel with the theory on crime by American economist Gary Becker, who pronounces that an increase in income inequality has a big and robust effect of increasing crime rates. Not only has that, but a country's economic growth (GDP rate) had significant impact in lessening incidence of crimes. Since reduction in income inequality gap and a richer economy has an alleviating effect on poverty level, it implies that poverty alleviation has a crime-reducing effect. Vise versa some geographers said that income is not an indicator of crime. Only the type of crime will be changed by income status. As the evidence of this concept we can recognized some recent incident in our national and state scenario as "Cool Block Distribution Ghotala", "2G Spectrum Ghotala", "Sarada Scam" and very recent PNB Scam.

Income Index of Diamond Harbour Municipality (Based on Sample Data - 2017)

Ward No.	Highest Monthly Income (H.M)	Lowest Monthly Income (L.M)	Income Index (H.M-L.M)/(Highest Income Of Wards-Lowest Income Of Wards)
1	40000	3000	0.42
2	50000	2500	0.54
3	60000	2000	0.66
4	40000	2500	0.42
5	60000	2000	0.66
6	60000	2000	0.66
7	28000	2500	0.29
8	45000	3000	0.47
9	90000	2000	0.99
10	40000	2000	0.43
11	65000	4000	0.69
12	25000	2000	0.26
13	60000	5000	0.62
14	90000	1500	1
15	50000	3000	0.53
16	60000	2000	0.66

5.3. Life Expectancy

The crime rate probably doesn't directly affect the length of a person's life but it is indicative of social issues that do so.

High crime rates typically occur in areas of deprivation. Health care is in short supply especially in countries like the US where you have to pay for it. Wages are probably low leading to poor eating habits because basic essentials are too expensive. Housing is likely to be poor as well. Educational achievement orientation is also likely to be low considering the lack of opportunities in the area. This leads to a culture of trying to make yourself part of the community by joining gangs which gives a young person a sense of belonging. Invariably drugs and guns becomes part of that culture as doe's intergang violence.

For older members of the community all the environmental factors apply as does the stress of living with constant turf wars, robbery, and burglary. People don't feel safe on the street with the fear of crime often being high than the actual incidence of crime.

Life Expectancy Index of Diamond Harbour Municipality (Based on Sample Data - 2017)

Ward No	Highest Life Expending	Lowest Life Expending	Life Expending Index
1	64.5	29	0.59
2	68.33	34	0.57
3	72.5	32.4	0.69
4	61.86	29	0.55
5	63.6	30.3	0.56
6	58.6	18.42	0.67
7	76.67	29	0.79
8	60.22	29	0.52

| 9	85	33	0.87
10	62.25	39.33	0.38
11	64.5	35.2	0.49
12	62.25	26	0.60
13	58.6	29	0.49
14	68.5	31.67	0.61
15	72.5	39.33	0.55
16	68.5	26	0.71
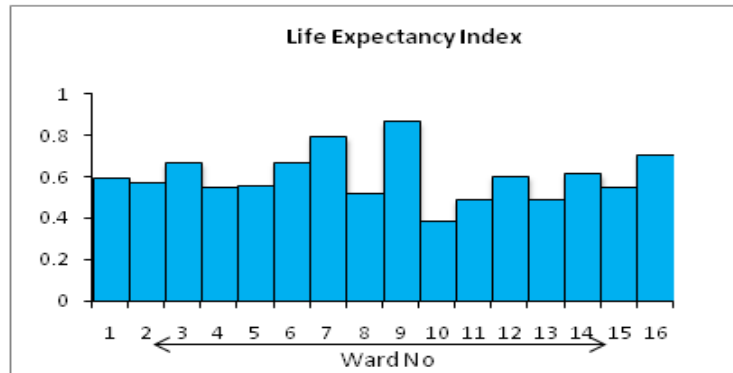
5.4. Social Security

The word Social security covers a large meaning. In our study social security covers only police surveillance system. Police surveillance is one of the most determining factors behind crime. That must say police patrolling can reduced the occurrence crime. In our country a maximum number of populations have a negative approach about police surveillance system. Behind the occurred crime they blame the police's duty.

Security Index of Diamond Harbour Municipality (Based on Sample Data - 2017)

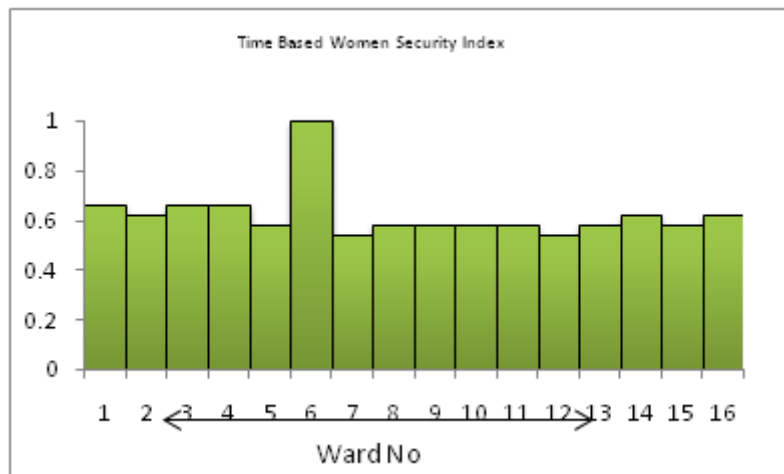| Ward No	Max. Distance From P.S (M)	Mini. Distance From P.S (M)	Security Index
1	2500	1500	0.21
2	2000	1000	0.21
3	3000	1500	0.32
4	4500	1000	0.74
5	4000	500	0.74
6	1500	700	0.17
7	5000	1000	0.84
8	3500	1000	0.53
9	2000	1000	0.21
10	1500	1000	0.11
11	1500	250	0.26
12	1500	400	0.23
13	3000	400	0.55
14	3000	500	0.53
15	2500	700	0.38
16	2000	500	0.32
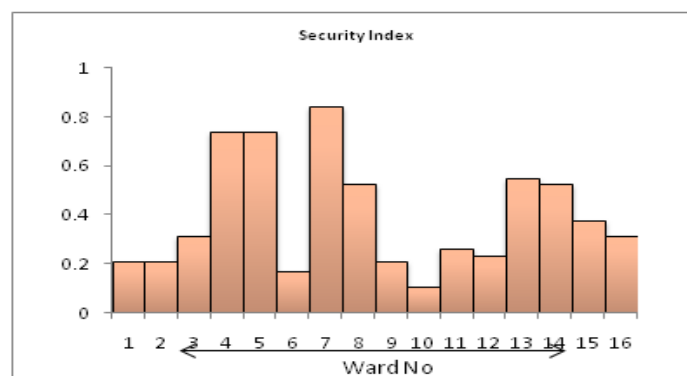
5.5. Time Based Woman Security

Also time is one of the important factors of crime. We think that crime against woman and the other types of crime should occur high intensively in night time. But that opinion has hug criticism. Most of the feminist says that crime against woman may occur any time. That's type of sentences are comes from our superstitious view.

Time Based Woman Security Index (Based on Sample Data – 2017)

| Ward No	Time For Insecure For Women(T.I.W)	Total Insecure Time (T.I.W - 6 Am)	Total Secure Time (24 -Insecure Time)	Time Based Women Security Index (Secure Time /24)
1	10PM	8	16	0.67
2	9PM	9	15	0.63
3	10PM	8	16	0.67
4	10PM	8	16	0.67
5	8PM	10	14	0.58
6	Secure All Time	0	24	1
7	7PM	11	13	0.54
8	8PM	10	14	0.58
9	8PM	10	14	0.58
10	8PM	10	14	0.58
11	8PM	10	14	0.58
12	7PM	11	13	0.541
13	8PM	10	14	0.58
14	9PM	9	15	0.63
15	8PM	10	14	0.58
16	9PM	9	15	0.63

Vulnerability Index of Diamond Harbour Municipality (Based on Sample Data - 2017)

Ward No	Income Index (i1)	Life Expending Index (i2)	Education Index (i3)	Time Based Women Security Index (i4)	Security Index(i5)	Vulnerability Index [(i1+i2+i3+i4+i5)/5]
1	0.42	0.59	0.91	0.67	0.21	**0.56**
2	0.54	0.57	0.98	0.63	0.21	**0.59**
3	0.66	0.69	0.97	0.67	0.32	**0.66**
4	0.42	0.55	0.91	0.67	0.74	**0.66**
5	0.66	0.56	1	0.58	0.74	**0.71**
6	0.66	0.67	0.95	1	0.17	**0.69**
7	0.29	0.79	0.97	0.54	0.84	**0.69**
8	0.47	0.52	1	0.58	0.53	**0.62**
9	0.99	0.87	0.95	0.58	0.21	**0.72**
10	0.43	0.38	0.97	0.58	0.11	**0.50**
11	0.69	0.49	1	0.58	0.26	**0.60**
12	0.26	0.6	0.97	0.541	0.23	**0.52**

13	0.62	0.49	0.95	0.58	0.55	**0.63**
14	1	0.61	0.81	0.63	0.53	**0.72**
15	0.53	0.55	0.96	0.58	0.38	**0.60**
16	0.66	0.71	0.94	0.63	0.32	**0.65**

Vulnerable Zone of Diamond Harbour Municipality (Based on Sample Data - 2017)
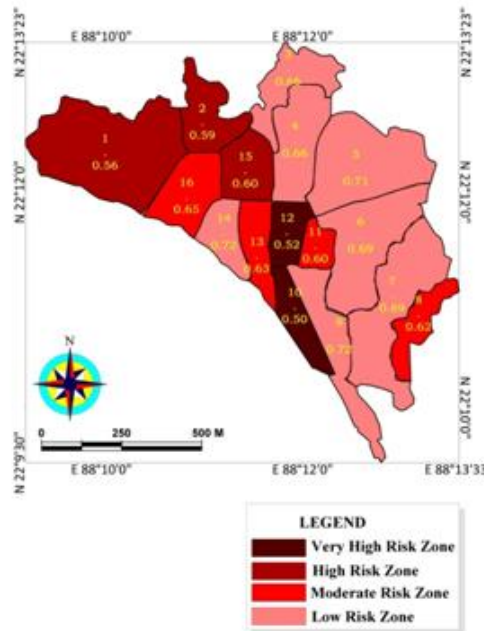
6. RESULT AND DISCUSSION

On the basis of vulnerable index data we classified the entered Diamond Harbour Municipality into 4 risk zone Very High Risk Zone, High Risk Zone, Moderate Risk Zone, and Low Risk Zone.

Ward no 12, 10 is the very high crime prone zone. Also we can say that this area is so vulnerable to live. Vise versa ward no 3, 4, 5, 6, 7, 9 are lesser crime prone zone. It is the best livable zone of the entire Diamond Harbour Municipality. Here the women are much secure than the other area.

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