

# Analysis on Violence against Women in India: A Fuzzy Approach

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**Abstract-** Violence against women has increased in the recent years. Scientific studies have not been done to analyze the root causes of violence against women. A study of this nature becomes futile if the nexus between violence and caste system is not analyzed. In this paper as we analyze the causes of violence against women, we also analyze the role of caste system in justifying and aggravating this problem. In section one; we study in detail about violence against women and the role of caste system. Section two explains the Fuzzy Cognitive Maps (IFCM) and section three analyzes the problem using Induced Fuzzy Cognitive Maps (IFCM). In section four, we derive conclusion and make some suggestions.

**Keywords:** Violence, Women, Caste system, Dalits, Dalit women, gender

## I. INTRODUCTION

A person is born male or female but the society teaches him/her what it means to be a man or woman. It teaches, generally, that man and woman are not equal and therefore gender discrimination is required to care and protect women at all cost and in all occasions. This differentiation for the positive reasons has turned out to have negative impacts like suppression, violence and denial of equal opportunities. In India the male dominate everywhere and gender discrimination is customized habitually.

### 1. VIOLENCE AGAINST WOMEN

Violence against women in its various forms is a violation of human rights. It deprives women of their ability to enjoy fundamental freedom. It is an obstacle to equality and rights. Violence against women intersects with multiple forms of discrimination. While violence against women is universal, its manifestations and women’s personal experiences of it are shaped by factors such as:

- Economic dependence on men
- Lack of political representation
- Patriarchical system
- Caste discrimination
- Lack of social security
- Denial of justice
- Lack of proper laws
- Role of media/ cinema

#### 1.1 CASTE AND GENDER

In Dr. Ambedkar’s book "Caste in India: Their Mechanism, Genesis and Development", he observes that gender could not be seen in isolation from caste. "Superimposition of endogamy on exogamy means creation of caste" and concludes that there is no divine or natural cause for the origin of caste. Brahmins

of ancient India designed it by enclosing their class through means of controlling and subjugating their women. That the fact in order to maintain endogamy, the only ideal situation is to maintain constant sex ratio within a class, that is, one man for one woman. The problem of caste then, ultimately resolves itself into one of repairing the disparity between marriageable units of two sexes within it. Left to nature, the much-needed parity between the units can be realized only when a couple dies simultaneously. But this is rare contingency. The Husband may die before the Wife and create a Surplus woman, who must be disposed of, else through intermarriage she will violate the endogamy of man, whom the group, while it may sympathies with him for sad break the endogamy. Thus, both the surplus man and surplus woman constitute a menace to the Caste, if not taken care of, for not finding suitable partners inside their prescribed circle (and left to themselves they cannot find, any for it matter be not regulated there can only be just enough pairs to go round) very likely they will transgress the boundary, marry outside and import offspring that is foreign to caste". Therefore in the maintenance of strict endogamy surplus men and surplus women were the main challenge, here he also noted that man being powerful and posses the upper hand in society, man can’t be forcibly controlled. hus the society let him untouched but the women being inferior to man were easy prey of its victimization. So as a 'protective' measure Sati system was introduced, where by a surplus woman (= widow) was forced to burn along with her deceased husband. But in some cases it was difficult to operate so the second remedy was to compulsorily enforce widowhood on her for rest of her life, and in order to guard her morals and also morals of group, the widows were obliged to follow much restrictions such as shaven head, restriction on diets, wearing of colorless Sari and no intermixing with any one and in this way she is no longer source of alluremet.

As said above, both these treatments-Sati and Enforced Widowhood were not possible in the case of Surplus Man. Therefore, Surplus man was allowed to re-marry to recruit another bride, but here there is every possibility of increase in competition in consumption of woman in Caste, therefore as a corrective measure, man was allowed to recruit his wife from girls with lower marriageable rank like age and thus the beginning of Girl Marriage. In this way, the inhuman practices of

- i) Sati system
- ii) Enforced Widowhood and
- iii) Child marriage came into existence.

Table: 1- Crimes against Scheduled Castes and Scheduled Tribes in India 2011 and 2012

Years	Total No. of cases reported	Total No. of rape cases reported
2011	39,475	2,329
2012	39,577	2,305

1.2 CASTE

Violence against women in India mainly focus on Scheduled Castes and Scheduled Tribes (Dalits) and takes a unique form when gender and caste intersect. Today The Scheduled Castes and Scheduled Tribes women are placed at the absolute bottom of the social hierarchy as they face systemic and structural discrimination.

1.3 Dalit Women of India

India is many has 100 million Dalit women (census 2011). The Dalit women are subjected to inhumane living conditions and human rights violations; discrimination and violence systematically deny them opportunities, choices and freedoms in all spheres of life. This undermines not only their dignity and self-respect, but also their rights to equality and development and affected entire family.

Source: crimes against Scheduled castes- National Crime Records Bureau

1.4 Dalit women in Tamilnadu

In 19<sup>th</sup> century and in the middle of the 20<sup>th</sup> century, the Travancore (Districts in southern Tamilnadu) low caste women (like Nadars, saanars, pulaiyars, ect.) were not allowed to cover their breasts and below the knee. There were rules restricting the people from wearing a turban and dressing like that of the higher castes. They were not permitted to wear “dhoti” extending below their knees from waist. It was during these periods “The upper cloth revolution” started. Now a day the Tamil Nadu has a relatively highest Dalits population. As against the national average of 16 percentages, 19 percentages of Tamil Nadu’s population consists of Scheduled Castes and Scheduled Tribes (Dalits). It is the fifth largest Dalit populated state in the country. Within this, Dalit women number 5.9 million or 49.9 percentages.

Incidence & Rate of Crimes Committed Against Scheduled Castes During 2012

		Incidence	Percentage Contribution To All-India Total	SC/ST Population* (in lakhs)	Rate Of Total Cognizable Crimes
All over India	SC	33,655	100.00	2013.78	16.71
	ST	5922	100.00	1042.81	5.68
Tamil Nadu	SC	1,647	4.89	144.38	11.41
	ST	27	0.46	7.95	3.40

1) Socio-economic status:

Majority of Scheduled Castes and Scheduled Tribes (Dalit) women (about 70 percentages) reside in villages and the vast majority of them do not own land. The vast majority of Dalit women are poor; they are landless wage labourers; and lack access to basic resources. Landlessness combined with their concentration in wage labour resulted in higher poverty rate among Dalits. Poverty ratio among Dalits in very high compared to non Dalits with 33%.

2) Social and Gender based violence:

Dalit women suffer violence at the hands of the dominant caste men due to their socio, economic and political power. Dalit women are considered as easily available for all forms of violence. The UN report on violence against women has noted that “Dalit women face targeted violence even rape and murder

by the state actors and powerful members of dominant castes, used to inflict political lessons and crush dissent with the community.” Violence against Dalit women reinforces caste norms. Analysis of the cases also denotes that Dalit women are targeted when they dare to assert their rights – be it for right to land, resources, government programs and for accessing legal justice.

Gender based violence by own community/family Dalit women face violence from their own community and family which is obviously the manifestation of the patriarchal order and gender discrimination. Gender inequality sanctified by religious and cultural norms subordinate women to face discrimination and violence. Dalit women face gender based violence from within their home to public places at the hands of their family members and non-family members.

II. FUZZY COGNITIVE MAPS (FCM)

Fuzzy Cognitive Maps (FCMs) are more applicable when the data in the first place is an unsupervised one. The FCMs work on the opinion of experts. FCMs model the world as a collection of classes and causal relations between classes.

Definition 2.1: An FCM is a directed graph with concepts like policies, events etc. as nodes and causalities as edges. It represents causal relationship between concepts.

Definition 2.2: When the nodes of the FCM are fuzzy sets then they are called as fuzzy nodes.

Definition 2.3: FCMs with edge weights or causalities from the set  $\{-1, 0, 1\}$  are called simple FCMs.

Definition 2.4: The edges  $e_{ij}$  take values in the fuzzy causal interval  $[-1, 1]$ .  $e_{ij} = 0$  indicates no causality,  $e_{ij} > 0$  indicates causal increase  $C_j$  increases as  $C_i$  increases (or  $C_j$  decreases as  $C_i$  decreases).  $e_{ij} < 0$  indicates causal decrease or negative causality.  $C_j$  decreases as  $C_i$  increases (and or  $C_j$  increases as  $C_i$  decreases). Simple FCMs have edge values in  $\{-1, 0, 1\}$ . Then if causality occurs, it occurs to a maximal positive or negative degree. Simple FCMs provide a quick first approximation to an expert stand or printed causal knowledge. If increase (or decrease) in one concept leads to increase (or decrease) in another, and then we give the value 1. If there is no relation between two concepts, the value 0 is given. If increase (or decrease) in one concept decreases (or increases) another, then we give the value -1. Thus FCMs are described in this way. Consider the nodes or concepts  $C_1, \dots, C_n$  of the FCM. Suppose the directed graph is drawn using edge weight  $e_{ij} \{0, 1, -1\}$ . The matrix E be defined by  $E = (e_{ij})$ , where  $e_{ij}$  is the weight of the directed edge  $C_i C_j$ . E is called the adjacency matrix of the FCM, also known as the connection matrix of the FCM. It is important to note that all matrices associated with an FCM are always square matrices with diagonal entries as zero.

Definition 2.5: Let  $C_1, C_2, \dots, C_n$  be the nodes of an FCM. Let  $A = (a_1, a_2, \dots, a_n)$ , where  $a_i \in \{0, 1\}$ . A is called the instantaneous state vector and it denotes the on-off position of the node at an instant.

$a_i = 0$  if  $a_i$  is off and  
 $a_i = 1$  if  $a_i$  is on, where  $i = 1, 2, \dots, n$ .

**Definition 2.6:** Let  $C_1, C_2, \dots, C_n$  be the nodes of an FCM. Let  $\overrightarrow{C_1 C_2}, \overrightarrow{C_2 C_3}, \dots, \overrightarrow{C_i C_j}$  be the edges of the FCM ( $i \neq j$ ). Then, the edges form a directed cycle. An FCM is said to be cyclic if it possesses a directed cycle. An FCM is said to be acyclic if it does not possess any directed cycle.

**Definition 2.7:** An FCM with cycles is said to have a feedback.

**Definition 2.8:** When there is a feedback in an FCM, i.e., when the causal relations flow through a cycle in a revolutionary way, the FCM is called a dynamical system.

**Definition 2.9:** Let  $\overrightarrow{C_1 C_2}, \overrightarrow{C_2 C_3}, \dots, \overrightarrow{C_i C_j}$  be a cycle. When  $C_i$  is switched on and if the causality flows through the edges of a cycle and if it again causes  $C_i$ , we say that the dynamical system goes round and round. This is true for any node  $C_i$ , for  $i = 1, 2, \dots, n$ . The equilibrium state for this dynamical system is called the hidden pattern.

**Definition 2.10:** If the equilibrium state of a dynamical system is a unique state vector, then it is called a fixed point. Consider a FCM with  $C_1, C_2, \dots, C_n$  as nodes. For example let us start the dynamical system by switching on  $C_1$ . Let us assume that the FCM settles down with  $C_1$  and  $C_n$  on, i.e. the state vector remains as  $(1, 0, 0, \dots, 0, 1)$ . This state vector  $(1, 0, 0, \dots, 0, 1)$  is called the fixed point.

**Definition 2.11:** If the FCM settles down with a state vector repeating in the form  $A_1 \rightarrow A_2 \rightarrow \dots \rightarrow A_i \rightarrow A_1$ , then this equilibrium is called limit cycle.

**2.12: Method of determining the hidden pattern**

Let  $C_1, C_2, \dots, C_n$  be the nodes of an FCM, with feedback. Let  $E$  be the associated adjacency matrix. Let us find the hidden pattern when  $C_1$  is switched on. When an input is given as the vector  $A_1 = (1, 0, 0, \dots, 0)$ , the data should pass through the relation matrix  $E$ . This is done by multiplying  $A_1$  by the matrix  $E$ . Let  $A_1 E = (a_1, a_2, \dots, a_n)$  with the threshold operation that is by replacing  $a_i$  by 1 if  $a_i > k$  and  $a_i$  by 0 if  $a_i < k$  ( $k$  is a suitable positive integer). We update the resulting concept, the concept  $C_1$  is included in the updated vector by making the first coordinate as 1 in the resulting vector. Suppose  $A_1 E \rightarrow A_2$  then consider  $A_2 E$  and repeat the same procedure. This procedure is repeated till we get a limit cycle or a fixed point.

**2.13 Induced Fuzzy Cognitive Maps**

Suppose that there are  $n$  attributes, say  $x_1, x_2, \dots, x_n$ , where  $n$  is finite, associated with violence against women. The connection matrix  $M$  of order  $n \times n$  is obtained through an expert's opinion. Let  $C_1$  be the initial input vector. A particular component, say  $c_1$ , is kept in ON state and all other components in OFF state and we pass the state vector  $C_1$  through the connection matrix  $M$ . To convert the resultant vector as a signal function, choose the first two highest values to ON state and other values to OFF state with 1 and 0 respectively. The resulting vector is multiplied with  $M^T$  and thresholding yields a new vector  $D_1$ . This vector is related with the connection matrix and that vector which gives the highest number of attributes to ON state is chosen as  $C_2$ . That is, for each positive entry we get a set of resultant vectors; among these vectors the one which contains maximum number of 1s is chosen as  $C_2$ . If there are two or more vectors with equal

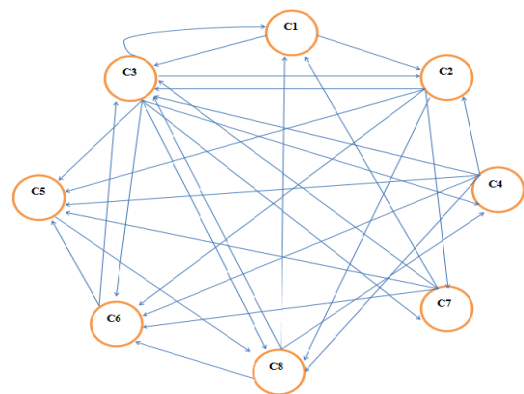
number of 1s in ON state, choose the first occurring as  $C_2$ . Repeat the same procedure till a fixed point or a limit cycle is obtained. This process is done to give due importance to each vector separately as one vector induces another or many more vectors into ON state. Get the hidden pattern by the limit cycle or by getting a fixed point. Next we choose the vector with its second component in ON state and repeat the same to get another cycle. This process is repeated for all the vectors separately. We observe the hidden pattern of some vectors found in all or many cases. Inference from this hidden pattern highlights the causes.

**III. ADAPTATION OF FUZZY COGNITIVE MAPS (FCM) TO THE PROBLEM**

We take the following eight causes of violence against women as the nodes of an FCM

- $C_1$  - Economic dependence on men
- $C_2$  - Lack of political representation
- $C_3$  - Patriarchy
- $C_4$  - Caste
- $C_5$  - Lack of social security
- $C_6$  - Denial of justice
- $C_7$  - Lack of proper laws
- $C_8$  - Role of media/ cinema

The directed graph which gives the relation between the nodes of FCM is as follows:



The fuzzy relational matrix which gives the relation between the nodes is as follows

$$\begin{matrix}
 & C_1 & C_2 & C_3 & C_4 & C_5 & C_6 & C_7 & C_8 \\
 \begin{matrix} c_1 \\ c_2 \\ c_3 \\ c_4 \\ c_5 \\ c_6 \\ c_7 \\ c_8 \end{matrix} & \begin{bmatrix} 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 & 0 & 1 & 0 & 0 \end{bmatrix} & = m
 \end{matrix}$$

We choose the initial input vector  $C_1 = (1\ 0\ 0\ 0\ 0\ 0\ 0\ 0)$  in which the attribute  $C_1$ , that is, Economic dependence on men is taken in ON state and all other nodes are in OFF state.

Input vector	Hidden pattern
(1 00 0 00 00)	(1 1 1 1 1 1 1 1)
(0 1 0 0 0 0 0 0)	(1 1 1 1 1 1 1 1)
(0 0 1 0 0 0 0 0)	(1 1 1 1 1 1 1 1)
(0 0 0 1 0 0 0 0)	(1 1 1 1 1 1 1 1)
(0 0 0 0 1 0 0 0)	(1 1 1 1 1 1 1 1)
(0 0 0 0 0 1 0 0)	(1 1 1 1 1 1 1 1)
(0 0 0 0 0 0 1 0)	(1 1 1 1 1 1 1 1)
(0 0 0 0 0 0 0 1)	(1 1 1 1 1 1 1 1)

The following table gives the list of various input vectors and their corresponding limit points.

$$c_1 = (1 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0)$$

$$c_1 \times m = (0 \ 1 \ 1 \ 0 \ 0 \ 0 \ 0 \ 0)$$

$$\mapsto (1 \ 1 \ 1 \ 0 \ 0 \ 0 \ 0 \ 0) = x_1$$

$$x_1 \times m = (1 \ 2 \ 2 \ 1 \ 2 \ 2 \ 2 \ 2)$$

$$\mapsto (1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1) = x_2$$

$$x_2 \times m = (3 \ 3 \ 6 \ 2 \ 5 \ 5 \ 2 \ 4)$$

$$\mapsto (1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1) = x_3 = x_2$$

#### IV. CONCLUSION

As the model implies every attribute from  $C_1$  to  $C_8$  influence every other attribute equally. Therefore all the factors need to be addressed with immediate action. Based on our analysis we have few suggestions to make. Economic independence and political representation of women are very important as they enable them to be free from the hold of men and from the situations which perpetrates violence. Therefore adequate seats in political bodies and adequate amount of economics resources have to be reserved for women. As the Dalit women are at the receiving end, special reservation should be given to them also. Proper laws for women need to be enacted so as to confirm their representation and security. It should be made as part of the curriculum in schools and colleges to educate the children and the youth to treat women as equals and better half.

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