# Journal of Development Policy, Research & Practice

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Factors Contributing to Gender Disparity in Education in Rural Areas: Evidence from Three Districts of Punjab, Pakistan

Muhammad Luqman, Babar Shahbaz, Xu Shiewi and Yu Wen *

ABSTRACT

Education is an important human capital; and, it is the fundamental right of every human being irrespective of gender to acquire knowledge through education. Social scientists have highlighted the significance of female education without which socio-economic growth, especially in Asia, remains slow. However, gender disparity in education persists in rural peripherals of Pakistan, Afghanistan, Bhutan, India, Iran, Nepal and Bangladesh (UNESCO 2015). This deplorable situation is subject to multiple socio-economic and cultural barriers. In order to unveil these militating attributes, present investigation was conducted in three districts of the Punjab province in Pakistan from March to June 2016. The province is divided into three different zones: Northern, Central and Southern. From each zone, one district was purposively selected as the study area. From the selected districts (Sargodha, Khushab and Bhakhar), 100 rural households from each district were selected through multi-stage simple random sampling technique. The data were collected from 300 household heads and from their spouses through in-depth individual interviews to find out the difference in opinion of the male and female respondents. The collected data was analysed using SPSS. Paired t-test was used to find out the difference in responses of male and female respondents. In order to find out the difference in intensity of factors in the three districts, F-test was applied.

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Results showed that there is highly significant difference between age of male family heads and their spouses (wives) ($\chi^2=50.121$ and $P<0.05$). Similar trend was found in educational status of male heads and their spouses. Cross tabulation indicated that educational status of wives was low as compared to their husbands. Analysis showed that a number of socio-economic factors are responsible for the existing gender disparity with reference to education in the study areas. Respondents identified low income, high educational expenditures, low educational level of parents (especially the mother), and security concerns of parents regarding sexual harassment as the major factors impeding female education. Results of the F-test showed that there exists difference in intensity of factors in the three study districts of Punjab which contribute towards gender disparity in education. Highest intensity ($\bar{X} = 2.74/3.00$) was found in district Bhakhar as it is a remote district of Punjab with higher poverty rate, followed by district Khushab and Sargodha. It is recommended that the Government at the national level should take serious steps in creating conducive environment to enhance female enrolment rate in rural localities.

**Key words:** gender parity, education, human development, socio-economic factors

1. **INTRODUCTION**

Education is one of the significant and major indicators and goals of sustainable development (UNDP 2015). According to sustainable livelihood framework presented by Department for International Development (DfID) in 1997, livelihood capitals/assets hold a prominent position among other elements. These capitals indicate the strength of an individual in the form of assets that he/she possessed. In order to attain positive livelihood outcomes, it is essential to convert these assets into strengths. Among other different types of livelihood capitals, human capital that includes education, skills, knowledge, health and other physical capacities possessed by an individual, is one of them (DFID 2000). In addition, it is the basic human right of an individual (irrespective of gender) to get education and acquire knowledge. According to UNESCO report (2015), in overall development process through education, it is very much essential to include both the genders. In professional as well as socio-economic development of individuals, the role of education is very much important. Different social scientists highlighted the significance of male and female education in economic development of any country (see Afzal et al. 2013; Schultz 2002; Barriteau 2000; Tunali 1996 and others). All these research studies emphasize and documented the significance of education without any disparity on the basis of gender, region or nation for socio-economic growth and development that remains slow in Asia.

It has been observed that in many parts of the world, when it comes to education, male gender is given preference over female. This practice is more common in majority of the developing and low income countries where female gender is regarded as marginalized and suppressed masses of the social system (Arnot 2010). Similar to other parts of
developing region, educational difference on the basis of gender also exists in Asia. In this context, UNESCO (2010) reported difference in the Net Enrolment Rate (NER) of boys and girls in many of the Asian countries including Pakistan. Among other countries of Asian region like Iran, Maldives, India, Nepal, Bhutan and Bangladesh, highest difference in male and female literacy was found in Pakistan (UNESCO 2015). Regarding existence of gender disparity in education, Aslam (2005) reported that high gender differences exist in Pakistan in attaining education at different levels. The difference in male and female literacy level is more prominent in rural regions of Pakistan, where more than half of the population resides (GoP 2015). Research studies show that progress and sustainable development of these areas is strongly associated with education of both the genders (Aref 2011; IFAD 2011 and Gomes & Câmara 2004). The situation of discrimination between genders in getting access to education leads to their poor performance and contribution towards overall growth and economic development of country (Luqman et al. 2015). A number of social, economic and cultural factors are responsible for this widespread inequality in the field of education. The present research was designed to explore these factors in three districts of the Punjab province, Pakistan.

2. MATERIALS AND METHODS

2.1. Targeted Research Area

The study was conducted in the Punjab province of Pakistan which is considered the hub of agriculture in the country. Majority of the agricultural production comes from this province to feed the growing population of the country. On the basis of population, this is the largest province of Pakistan (GoP 2016). With reference to education, highest literacy rate was found in the Punjab province which is 63% followed by Sindh (60%), KPK (53%) and Baluchistan (44%). In rural areas of the province total literacy rate during 2014-15 is 55.0% out of which male literacy ratio is 65.0% and female ratio 45.0% (GoP 2016). Enrolment rate for all ages in Punjab at the primary stage (grade I grade V) for male is 53% and for female 47%. The share of the Punjab province in this enrolment rate is 26.1%. The enrolment rate at the middle level (grade VI to grade VIII) for male is 55% and for female is 45%. The share of the Punjab province in the enrolment rate at middle stage is 34.0%. Similarly, at the higher level (grade IX and X) enrolment rate for male is 57% and for female 43%. The share of the Punjab province at the higher stage enrolment is 36.6%. This indicates that from grade I to grade X, difference in male and female enrolment exists in the province. But at intermediate and graduation (14 years of schooling) stage, female enrolment rate is slightly higher than male enrolment in the province as discussed below. At this stage enrolment rate of male is 48% and for female is 52%. The share of Punjab province in enrolment of both male and female at intermediate and graduation level is 51.7% (Government of Punjab 2015). The province is divided into three agro-ecological zones as northern, central and southern (PARC 2004). This division of the province is well depicted in the figure 1 given below:
2.2. Research Design

Different research designs are being used by different social scientists in their research studies. Keeping in mind the objectives and research questions of the present study, cross-sectional survey research design was used.

2.3. Sampling Procedure

Taking into account the nature of present research, selection of study areas was purposive while sample selection was ensured through probability sampling technique. Selected districts share almost the same demographic and climatic attributes for agricultural
production. The gender based population distribution in selected districts was also found to be the same. Hence selection of these districts was not too technical. In addition, the selection of three different study sites from different agro-ecological zones was done with the intention to have comparison of responses of respondents of study belonging to different geographical areas. In the next phase from each of the selected three districts (Sargodha, Khushab and Bhakhar), 100 households from each were selected with the help of multistage simple random sampling (probability). Total sample size of this research study was 300 household heads. Data were also collected from spouses of selected household heads.

2.4. Data Collection Tools and Techniques

Quantitative data were collected from respondents. Data collection was started in March 2016 and continued till June 2016. Data were collected by a research team comprising of three postgraduate students of College of Agriculture, University of Sargodha. Before initiation of data collection, training was given to the team for validated and reliable data collection. Structured interview schedule was prepared as research instrument keeping in mind the objectives of the study. The interview schedule was then checked for validity and reliability. Both content and face validity of interview schedule was checked after a thorough discussion with experts and pre-testing, respectively. However, the reliability of the same was checked through SPSS by doing Reliability Analysis. Cronbach's $\alpha$ (alpha) was used to check the reliability of research instrument. The value of Cronbach's $\alpha$ was 0.68 for all the questions with responses on Likert Scale.

2.5. Data Analysis and Interpretation

The collected data were analysed using SPSS. Descriptive and inferential statistics were used for data interpretation. Paired t-test was used to find out the difference in responses of male and female respondents. In order to find out the difference in intensity of factors present in the three districts, which are responsible for widespread gender inequality in the research area, F-test was applied. In addition Posthoc LSD comparison was also used for the pair-wise comparison of three study districts.

3. RESULTS AND DISCUSSION

3.1. Demographic Profile

In the field of social science, research studies demographic attributes of profile of respondents play a significant role (Frear 2007). Data regarding some demographic/socio-economic attributes of respondents in the research area was collected and is presented in the next subsections.

3.1.1. Age

Among other socio-economic characteristics, age is considered as an important factor having significant influence on mental and social behaviour of individuals (Naeem 2005).
The data regarding age of both the genders (husband and wife) was collected and tabulated in Table 1:

Table 1: Distribution of respondents according to their age

<table>
<thead>
<tr>
<th>Gender</th>
<th>Up to 35 years</th>
<th>36 to 45 years</th>
<th>46 years and above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>86 (28.7%)</td>
<td>162 (54.0%)</td>
<td>52 (17.3%)</td>
</tr>
<tr>
<td>Female</td>
<td>169 (56.3%)</td>
<td>110 (36.7%)</td>
<td>21 (7.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>255 (42.5%)</td>
<td>272 (45.3%)</td>
<td>73 (12.2%)</td>
</tr>
</tbody>
</table>

$\chi^2_{cal} = 50.121^{***}$  

Highly Significant ($P>0.05$)

$df = 2$

Likelihood Ratio = 51.108  
Linear-by-Linear Association = 47.561

The data regarding age of respondents as presented in Table 1 shows that in the category of male gender the age of majority of the respondents (54.0%) was 36 to 45 years. On the other hand opposite trend was found in case of age of female respondents, where age of majority (56.3%) was up to 35 years. This indicates that age of husbands was found to be higher compared to age of their spouses. Generally, this has been observed in Pakistan that age of female is lower than male person at the time of her marriage. Cross tabulation shows that significant difference ($\chi^2=50.121$ and $P<0.05$) exists between the age of male and female respondents in the research area.

3.1.2. Educational status

The importance of education in the development of individuals, societies and nations is a well-established fact and already discussed in detail in the introduction. The data regarding educational status of both male and female respondents was collected and tabulated in Table 2:
Table 2: Distribution of respondents according to their educational status

<table>
<thead>
<tr>
<th>Gender</th>
<th>Illiterate</th>
<th>Primary</th>
<th>Middle</th>
<th>Matric</th>
<th>Intermediate</th>
<th>Graduation &amp; Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>41 (13.7%)</td>
<td>30 (10.0%)</td>
<td>66 (22.0%)</td>
<td>52 (17.3%)</td>
<td>31 (10.3%)</td>
<td>80 (26.7%)</td>
</tr>
<tr>
<td>Female</td>
<td>83 (27.6%)</td>
<td>106 (35.3%)</td>
<td>71 (23.7%)</td>
<td>14 (4.7%)</td>
<td>26 (8.7%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>124 (20.7%)</td>
<td>136 (22.7%)</td>
<td>137 (22.8%)</td>
<td>66 (11.0%)</td>
<td>57 (9.5%)</td>
<td>80 (13.3%)</td>
</tr>
</tbody>
</table>

$\chi^2_{cal} = 159.196^{***}$  
Highly Significant ($P>0.05$)  
$df = 5$

Likelihood Ratio = 194.335  
Linear-by-Linear Association = 121.891

The data about educational profile of respondents in the research area shows that in the category of male (husbands), 13.7% were found illiterate and 86.3% were literate. Among the literates, majority (26.7%) had done graduation or beyond. But in case of female respondents (wives), 27.6% were found illiterate and 72.4% were literate. Among the literate wives, no one had done graduation. Majority (35.3%) of the wives had education up to middle (eight years of schooling). This indicates that female, particularly in rural areas of Pakistan, had less education than male. It is important to mention here that female in rural areas had least access to get enrolment in university or higher education. This is due to many socio-economic factors. Early marriages, social pressure/restrictions, and financial constraints are the major constraints as reported by different research studies in different regions/provinces of Pakistan (see Sheik et al. 2015; Khan et al., 2013; and Yaqoob 2012). The results of present study get support from the findings of Maqsood et al. (2012) who concluded that it is a real challenge for females to get higher education in Pakistan. The results of cross tabulation show that there exists highly significant difference ($\chi^2=159.196$ and $P<0.05$) in educational profile of husbands and wives in the research area.

3.2. Socio-economic Factors Responsible for Gender Disparity

The main purpose of the present study was to explore the socio-economic factors which are responsible for existing inequalities between male and female with reference to education. In this regard data were collected from the research area and presented in Table 3:
Table 3: Mean, SD and t-test value regarding factors responsible for gender disparity in education

<table>
<thead>
<tr>
<th>Factors</th>
<th>Male (n=300)</th>
<th>Female (n=300)</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean  SD</td>
<td>Mean  SD</td>
<td></td>
</tr>
<tr>
<td>Low income of household head</td>
<td>3.97 0.424</td>
<td>4.25 0.490</td>
<td>-6.693**</td>
</tr>
<tr>
<td>High educational expenditures</td>
<td>3.99 0.311</td>
<td>4.26 0.469</td>
<td>-7.813**</td>
</tr>
<tr>
<td>Low educational level of parents especially mother</td>
<td>4.02 0.237</td>
<td>4.10 0.367</td>
<td>-3.225**</td>
</tr>
<tr>
<td>Perception of people about high economic return from boy’s education than girls</td>
<td>3.98 0.230</td>
<td>4.16 0.382</td>
<td>-7.094**</td>
</tr>
<tr>
<td>Threat of sexual violence and security concerns of parents</td>
<td>3.89 0.359</td>
<td>4.14 0.344</td>
<td>-8.293**</td>
</tr>
<tr>
<td>Lack of female teachers</td>
<td>4.00 0.216</td>
<td>4.14 0.344</td>
<td>-6.075**</td>
</tr>
<tr>
<td>Lack of educational infrastructure for female</td>
<td>4.01 0.283</td>
<td>4.15 0.358</td>
<td>-5.174**</td>
</tr>
<tr>
<td>Educational institutions of female are located very far from villages</td>
<td>4.00 0.192</td>
<td>4.08 0.302</td>
<td>-3.883**</td>
</tr>
<tr>
<td>Girls restricted to stay home due to cultural restrictions (purdah(^1) restriction)</td>
<td>4.01 0.141</td>
<td>4.11 0.328</td>
<td>-4.796**</td>
</tr>
<tr>
<td>Lack of proper transport facilities</td>
<td>3.98 0.420</td>
<td>4.14 0.348</td>
<td>-5.185**</td>
</tr>
<tr>
<td>Wrong interpretation of Islamic concept regarding girl’s education</td>
<td>4.00 0.396</td>
<td>4.07 0.310</td>
<td>-2.322*</td>
</tr>
<tr>
<td>Responsibility of performing of household tasks</td>
<td>3.98 0.271</td>
<td>4.12 0.342</td>
<td>-5.499**</td>
</tr>
<tr>
<td>Inferior position of female</td>
<td>3.99 0.352</td>
<td>4.03 0.276</td>
<td>-1.738*</td>
</tr>
<tr>
<td>Wrong concepts abut education of daughters</td>
<td>3.98 0.277</td>
<td>4.07 0.310</td>
<td>-3.498**</td>
</tr>
<tr>
<td>Overall mean</td>
<td>3.99 0.294</td>
<td>4.13 0.355</td>
<td></td>
</tr>
</tbody>
</table>

Scale: 1 = S. Disagree, 2 = Agree, 3 = Undecided, 4 = Agree, 5 = S. Agree

\(^1\) Purdah is derived from a Persian word meaning curtain. This is social or religious practice prevailing in some Muslim societies for screening women from men or strangers.

**Highly Significant (P<0.05)**
The data presented in Table 3 shows that a number of social, economic and cultural factors are involved in low educational status of female in the research areas. Cumulative responses of both male and female respondents show that high educational expenditures, low income, low educational level of parents especially mothers and security concerns of parents regarding sexual harassment in rural areas were the major factors playing significant role in low educational status of female in the research area. Overall, mean value (3.99/5.00 and 4.13/5.00) shows that both male and female respondents were agreed on the existence of social, economic and cultural barriers impeding girl’s education generally in the whole country and especially in the research area. These results are in line with Luqman et al. (2015) while identifying major reasons behind low educational level of female in rural areas of Khyber Pakhtunkhwa. The result of t-test statistics shows that in majority of the cases highly significant difference (P<0.05) was found in responses of male (husbands) and female (wives) regarding factors behind existing inequality in education in the research area. Negative values of t-test indicate that the level of agreement of female respondents was comparatively higher than male respondents about gender disparity in education.

3.3. **Intensity of Socio-economic Factors**

Intensity of above mentioned socio-economic factors in the research area was measured with the help of three point Likert Scale (low, medium and high). The data in this regard is presented in Table 4:
Table 4: Mean, SD and F-Test value regarding intensity of factors of gender inequality in education

<table>
<thead>
<tr>
<th>Factors</th>
<th>Sargodha Mean</th>
<th>SD</th>
<th>Khushab Mean</th>
<th>SD</th>
<th>Bhakhar Mean</th>
<th>SD</th>
<th>F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low income of household head</td>
<td>2.26C</td>
<td>0.441</td>
<td>2.39A</td>
<td>0.490</td>
<td>2.85B</td>
<td>0.359</td>
<td>51.168**</td>
</tr>
<tr>
<td>High educational expenditures</td>
<td>2.35C</td>
<td>0.479</td>
<td>2.50A</td>
<td>0.503</td>
<td>2.73B</td>
<td>0.446</td>
<td>16.13**</td>
</tr>
<tr>
<td>Low educational level of parents especially mother</td>
<td>2.52</td>
<td>0.502</td>
<td>2.46</td>
<td>0.501</td>
<td>2.52</td>
<td>0.502</td>
<td>0.48 NS</td>
</tr>
<tr>
<td>Perception of people about high economic return from boy’s education than girls</td>
<td>2.40</td>
<td>0.512</td>
<td>2.40</td>
<td>0.492</td>
<td>2.47</td>
<td>0.502</td>
<td>0.65 NS</td>
</tr>
<tr>
<td>Threat of sexual violence and security concerns of parents</td>
<td>2.36B</td>
<td>0.482</td>
<td>2.49AB</td>
<td>0.502</td>
<td>2.61A</td>
<td>0.490</td>
<td>6.46*</td>
</tr>
<tr>
<td>Lack of female teachers</td>
<td>2.32B</td>
<td>0.490</td>
<td>2.43B</td>
<td>0.498</td>
<td>2.75A</td>
<td>0.435</td>
<td>22.11**</td>
</tr>
<tr>
<td>Lack of educational infrastructure for female</td>
<td>2.20B</td>
<td>0.402</td>
<td>2.28B</td>
<td>0.451</td>
<td>2.70A</td>
<td>0.461</td>
<td>37.48**</td>
</tr>
<tr>
<td>Educational institutions of female are located very far from villages</td>
<td>2.27B</td>
<td>0.446</td>
<td>2.33B</td>
<td>0.473</td>
<td>2.92A</td>
<td>0.273</td>
<td>77.92**</td>
</tr>
<tr>
<td>Girls restricted to stay home due to cultural restrictions (purdah restriction)</td>
<td>2.20C</td>
<td>0.402</td>
<td>2.50B</td>
<td>0.503</td>
<td>2.64A</td>
<td>0.482</td>
<td>23.44**</td>
</tr>
<tr>
<td>Lack of proper transport facilities</td>
<td>2.47B</td>
<td>0.502</td>
<td>2.49B</td>
<td>0.502</td>
<td>3.00A</td>
<td>0.000</td>
<td>53.71**</td>
</tr>
<tr>
<td>Wrong interpretation of Islamic concept regarding girl’s education</td>
<td>2.44B</td>
<td>0.499</td>
<td>2.41B</td>
<td>0.494</td>
<td>3.00A</td>
<td>0.000</td>
<td>67.17**</td>
</tr>
<tr>
<td>Responsibility of performing of household tasks</td>
<td>2.32B</td>
<td>0.469</td>
<td>2.34B</td>
<td>0.476</td>
<td>3.00A</td>
<td>0.000</td>
<td>100.61**</td>
</tr>
<tr>
<td>Inferior position of female</td>
<td>2.26B</td>
<td>0.441</td>
<td>2.48A</td>
<td>0.502</td>
<td>2.57A</td>
<td>0.498</td>
<td>10.99**</td>
</tr>
<tr>
<td>Wrong concepts abut education of daughters</td>
<td>2.45</td>
<td>0.539</td>
<td>2.56</td>
<td>0.499</td>
<td>2.58</td>
<td>0.496</td>
<td>1.87 NS</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>2.34</strong></td>
<td><strong>0.472</strong></td>
<td><strong>2.43</strong></td>
<td><strong>0.492</strong></td>
<td><strong>2.74</strong></td>
<td><strong>0.353</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Scale: 1= Low, 2= Medium, 3= High*

*Different letters (A, B and C) indicates the significance between districts for each factor*
The data presented in Table 4 shows the intensity of different socio-economic factors responsible for gender disparity with reference to education in three different sites of research representing three different districts located in three different agro-ecological zones of the Punjab province. It was found that the intensity of all the factors was found to be medium (tends towards high as mean value in all the cases is greater than the mid-point (1.5) in all the three districts, where the research was conducted). Overall mean was also calculated to check the intensity of all the factors in three different locations. The results in this regard indicate that high intensity ($\bar{x} = 2.74/3.00$) was found in district Bhakhar followed by Khushab ($\bar{x} = 2.43/3.00$) and Sargodha ($\bar{x} = 2.34/3.00$). This might be due to the reason that Bhakhar is one of the remotest and neglected districts of the Punjab. The results of ANOVA posthoc analysis also supported the findings and showed that in most of the cases gender inequality factors are significantly different and exist in district Bhakhar. It is one of the top five ranked districts of the Punjab with lowest literacy ratio of female in rural areas (GoP 2015). The other is the availability of educational infrastructure for female generally in the whole rural areas of the Punjab and particularly in the study districts. In connection with these results, Ashraf et al. (2015) concluded that educational facilities for female in rural areas are limited that hinders their participation in economic development of country.

4. CONCLUSION AND RECOMMENDATIONS

It was concluded that a highly significant age difference ($\chi^2 = 50.121$ and $P < 0.05$) exists between the male family heads and their spouses. Similar trend was found in educational status of male heads and their spouses. Cross tabulation indicated that educational status of wives was low as compared to their husbands. Analysis showed that a number of socio-economic factors are responsible for existing gender disparity with reference to education in the study areas. Respondents identified low income, high educational expenditures, low educational level of parents (especially the mother), and security concerns of parents regarding sexual harassment as the major factors impeding female education. Results of the F-test and ANOVA posthoc analysis showed that there exists difference in intensity of factors in the three study districts of Punjab which contribute towards gender disparity in education. Highest intensity ($\bar{x} = 2.74/3.00$) was found in district Bhakhar as it is a remote district of Punjab with higher poverty rate, followed by district Khushab and Sargodha. On the basis of conclusion, following policy recommendations are suggested to minimize the gender gap in education in the rural areas of Pakistan:

1. A number of misconceptions prevail in rural society regarding advantage of male education over female education. So it is very much essential to start a national campaign (using print and electronic media) to create awareness among farm families about importance of girls’ education along with boys’ education.
2. Poverty is very common in rural areas, which is strongly linked with low income level of farm families. Income is one of the important attributes while allocating amount for education of female children. For enhancing income level, maximum income generation opportunities should be provided to farm families.
3. The number of schools for female students in the remote rural areas with female teaching staff is essential to increase female enrolment in primary and higher secondary level.
4. At the village level, school bus or van should be provided for safe and easy access to school for female children.
5. The cost of primary, secondary and higher secondary level education should be minimized keeping in view the income level of rural people.
6. Vocational training courses and evening classes for girls should be started.
7. Government should take concrete and serious steps to make female educational institutions less threatening (free from sexual harassment) and also to gain maximum confidence of the parents.

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Gender Beliefs and Action Tendencies for Women’s Rights: Impact of National vis-à-vis International Policy Recommendations

Gulnaz Anjum, Mudassar Aziz, Adam Chilton, and Zahid Usman *

ABSTRACT

In most democratic developing countries, including Pakistan, a crucial and still least prioritised domain is reforms in the status of women’s rights. As reflected in the rankings provided by The Gender Gap Index Report (World Economic Forum 2016), Pakistan stands second from the bottom among 144 countries. There are many organisations and programmes at the international and national level that are trying to influence the challenged countries to improve women’s rights policies and practices including the United Nations’ Convention on the Elimination of all forms of Discrimination Against Women (CEDAW); Pakistan’s commitment to meeting the 17 Sustainable Development Goals (SDGs); and, the National Commission on the Status of Women (NCSW).

The impact of national and international endorsement of the policies intended to improve women’s rights in Pakistan was explored in this survey. The survey was designed to see under which conditions, respondents would support policies focusing on women’s rights. The two conditions in the experiment were framed as such that the proposed reforms came from the National Government (national condition) or by the United Nations (international condition). As a comparative baseline, a control condition was added in which the source of proposals was not mentioned (control condition).

The survey was conducted with 619 university students (males: 51%; females: 49%). Data was collected from the students of the Quaid-i-Azam University, Islamabad; and, the

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Pakistan Institute of Development Economics, Islamabad, from March through August 2016.

Results of the study indicated that compared to the control condition, the respondents in the national and international condition expressed higher support for policy reforms for women’s rights. Furthermore, participants in the national and international condition were more likely to offer help in the implementation of these policy reforms. At the policy level, the survey supported the claim that national level endorsement of the reforms, compared to the United Nations endorsement, makes propagation and acceptance of the women’s rights reforms easier for the general public.

**Key Words:** Women’s rights; CEDAW; gender equality; gender beliefs; international policies; gender policies in Pakistan.

1. **INTRODUCTION**

Pakistan ratified CEDAW in 1996. However, after two decades the implementation of the Convention is still a dream. When one talks about the international conventions, possibly due to natural resistance to change, acceptance of international conventions is a fancy ideation. The speculation for this resistance may be based on both structural as well as psychological barriers in our perception, which eventually stands in the way of realizing women’s full potential. The structural hurdles could be the lack of rights, whereas, the psychological hurdles would include what men and women think about their abilities and how much they value equal rights for women.

Sustainable development is not possible without inclusion of all population. The constitution of most countries in the world gives the same rights to men and women. In practice, however, women’s rights are undermined very often (Shah et al. 2015, p. 203). This disparity in practice of unequal treatment has led to some intriguing research on gender gap. Gender gap refers to the discrepancy and hindrance in progress of women compared to men in a wide range of domains including education, job opportunities, health, political participation and economic outcomes (World Economic Forum 2016). According to the World Economic Forum report, Pakistan ranks 143rd out of 144 nations (Ibid.), violation of women’s rights, such as exposure to psychological and physical violence and lack of access to justice and political participation are well-known in Pakistan. Hence, this is giving impetus to the efforts to formulate and apply a rights-based applied framework for development of programmes for empowering Pakistani women. Despite the growing need for awareness among policy-makers, practitioners, and development planners, immense gaps persist among people impeding achievements regarding policy implementations (Khan 2009). Resultantly, these factors have contributed over time to Pakistan’s low performance on many human development indicators and its failure in meeting the Sustainable Development Goals (SDGs).
1.1. Deep Rooted Systematic Resistances to Equality of Rights in Pakistan

Resistance to equality of human rights for women is a result of deep-rooted systemic impediments to gender equality that continue to constrain women’s physical autonomy and access to resources (Management System International 2012). In addition to facing discrimination in the education system and workplace, women have limited access to recreation and sports facilities. Violence, and the threat of violence, underpin asymmetrical gender relations and prevent women from fulfilling their potential and exercising their basic human rights as equal citizens (Ibid).

Patriarchal system and traditions of the male figures’ authority in Pakistani society are vindicated in the name of customs and religion. This results in under-valuing and invisibility of female contribution to society and the proclivity of society towards violence. For example, the traditional norms of Pakistani society endorse segregation and at times even seclusion of women. Such practices are sometimes justified in the name of religion. Often various religious authorities promote such segregation. The Council of Islamic Ideology² for instance holds propositions for gender segregation as well as seclusion of women; limiting their access to financial resources and even political participation (Naz et al. 2012).

In 1994, in anticipation of the Beijing Conference, Pakistan was asked to prepare its National Report on the status of country’s laws on women. The Senate prepared a report for the Commission of Inquiry for Women (Weiss 2003). The report indicated that there were some derogatory laws and customs that discriminated against women in Pakistan, which were justified and used in the name of religion (Ibid). Although the Constitution of Pakistan gives women the right to own property, operate a business and to assert their citizenship rights (Ahmad 2010), yet the socially biased interpretations of the law and customary practices have restricted women to exercise of these rights. Furthermore, there is a multiplicity of definitions and laws that contradict each other.

1.2. CEDAW and its Implementation Gaps

CEDAW, since the beginning of its adoption by the UN’s General Assembly in 1979, has called upon all member states to ensure zero tolerance against different forms of discrimination and oppression against them across the globe (Zia and Butt 2012). It received the status of a UN treaty in 1981 and currently 187 nation states (over 90% of the member countries of the UN) have ratified the Convention (UN Women Pakistan 2016). In addition to proposing an international bill for women’s rights, it also motivates member countries for taking actions that guarantee the achievement and enjoyment of equal rights by women. Pakistan ratified CEDAW in 1996, however, this accession was

² The Council of Islamic Ideology is a religious body that was constitutionally founded by Ayub Khan’s government in 1962. It was made responsible for giving legal advice on Islamic issues to the government and the parliament.
made with a legal reservation under the Article 29 of the Islamic Republic of Pakistan, by which Pakistan was not bound by CEDAW\(^3\) (Bhattacharya 2014).

Pakistan is also a signatory to the SDGs, where the third goal refers to gender equality. This goal not only asks for equality of rights for women but also demands efforts aimed at empowering women for claiming their rights. As far as data of Pakistan is concerned, both CEDAW and SDGs are not strictly implemented, which is evident due to existence and continuity of discriminatory policies against women in Pakistani society (Ministry of Planning 2013). One could argue that it is so because a UN recommended treaty is not directly applicable to Pakistan, especially due to the reservation made in Article 29 of Pakistani law. Due to such reservations in the law for these treaties, there is a great need for amendments in order to implement CEDAW (Ali 2013). Hence, it is vital to bring to the limelight that Pakistan is still struggling with the comprehensive implementation of the Treaty in serving to the cause of gender equality and mainstreaming the same. Hence, it would be essential to highlight the gender related gaps which affect the implementation of CEDAW in Pakistan.

The Gender Gap Index 2015 ranked Pakistan at 144th among 145 countries in terms of the incidence of gender related disparities; and, at 135th in educational attainment (Human Rights Watch Pakistan 2016). Some areas with the highest prevalence of gender gap include the difference in educational attainment of males and females both in rural and urban areas, and this disparity also extends among the provinces. In 1996-1997, for instance, the literacy rate in urban areas was 58.3% while in rural areas it was 28.3%; this rate was low for women in general and only 12% among rural women were noted to be literate (Moheyuddin 2005).

Regarding economic conditions, an estimated 10.8 million individuals in the labour force are unpaid family workers in Pakistan, out of these 59% of women and 88% of men are full time unpaid workers (UN Women Pakistan 2016). According to the UN Women Pakistan (2016), women are suffering due to lack of rights to fair remuneration, work opportunities, which also pushes women towards economic impoverishment and exclusion. All of these factors may lead to marginalised economic lives among women in Pakistan (Ibid). Similar trends were highlighted by a recent World Bank report which explored women's economic prospects and hindrances across 30 nations (The World Bank 2016). The report identified many laws that are still in place which limit economic opportunities for women compared to those of men. For instance, there are at least 14 laws in Pakistan that are mentioned in this report including those which obstruct female

\(^3\) Declaration: “The accession by Government of the Islamic Republic of Pakistan to the (said Convention) is subject to the provisions of the Constitution of the Islamic Republic of Pakistan.”

Reservation: “The Government of the Islamic Republic of Pakistan declares that it does not consider itself bound by paragraph 1 of article 29 of the Convention.”
widows in Pakistan from equal inheritance rights, and their right to register a business (Ibid).

In legal and political arena, Gender Gap Index 2015 ranked Pakistan 87th in political empowerment (Ibid). In terms of electoral participation, according to voter registration data released by the Election Commission of Pakistan (ECP) the gap between male and female voters widened from 10.97 million in May 2013 to 11.65 million by September 2015 (Ibid).

With regard to equal rights before the law and legal empowerment, Pakistani women have been subjected to discriminatory laws and objectionable ordinance. The Hudood Ordinances⁴, for instance, had made it almost difficult for a male rapist in Pakistan to be prosecuted in the court. The Zina (rape) law stated two conditions, one of which should be met in order to consider a case as an incident of rape that could be prosecuted. The conditions were: either the rapist would admit committing the rape or there were four males to testify the act of rape (Bokhari 2009). The need for witnesses to testify was often misused particularly (Ibid). The famous Zafran Bibi case in 2002 is an instance of the misuse of this law where she initiated the charges against the rapist but was instead sentenced for adultery. In this case the infamous Zina Ordinance, instead of providing justice to the women, saw her pregnancy prior to rape as a proof of her illicit sexual relations with other men. Although Bibi was released from jail, however, the rapists in this case were never punished or even prosecuted (Sustainable Development Policy Institute 2008). Since the launch of Protection of Women Bill 2006, some of the Zina law clauses have been less dangerous. For instance, after this bill, the Zina laws could not be misused for impeaching women, or used for settling family or blood feuds. Previously, the offence was not bailable, but now even after accusation they can be bailed and pursue their cases. Likewise, the police are no more authorized to arrest anyone in the case of Zina unless directed by the court.

The socio-cultural context of Pakistani society among all class systems is primarily patriarchal. In Pakistani culture, men and women are predominantly segregated and psychologically conceptually divided into two separated gendered worlds. In this culture, home is the only well-defined psychological and physical space, however, outside the home men take control of all the matters be they ideological or physical. This socio-cultural segregation leads to the outcomes such as assignment of lower socio-economic status for women as they are only home-makers and not the real the breadwinners. As discussed earlier, the pay gap does not help in mitigating this discrepancy. The psychological barriers that lead to these outcomes are ingrained systematically and slowly

⁴ Hudood Ordinances were introduced in 1977 by General Zia-ul-Haq to facilitate islamisation process in Pakistan. The reason was to bring Pakistani law in accordance with Sharia. Hudood Ordinance enforced punishments as prescribed by Quran and sunnah for various offences. For instance, Zina law focused on extramarital sex and qazf law on false accusation of zina. Other offences included theft, and alcohol consumption.
over the time, but they start pretty early. For instance, even the news of a girl’s birth is greeted with panic and concern. From the start she is considered a burden for many people across various classes and there are many hurdles to her education even if she is very bright. Contrary to that the births of male children are received as harbinger of festivity. If not always, women are denied access to better education and job opportunities in comparison with their male siblings. While males are given superior education and equipped with competence based skills, females in the same households are instructed to master domestic labour skills. This is all done so that females can become good sisters, mothers, wives and daughters (Moheyuddin 2005).

In their domestic roles, especially as wives, women are expected to be fully involved in taking care of other family members, and bearing and raising children. Regarding the social background of people, there is across status preference and priority for having a male child. Male children thus are more privileged in being physically impulsive which may lead to them being more aggressive towards the socially low status beings (the women). This unsaid legitimization of men’s entitlement to act out leads to various forms of violence and particularly to high occurrence of domestic violence, which also results in the cases of domestic violence including rape, marital rape, and physical assault that go unnoticed. This might also be the antecedent for the disgraceful practices of honour killing, trade off of women to settle blood feuds (bartering practices known as Vanni/swara and Watta Satta⁵) and marrying women to Quran⁶ to deny them their legitimate share in inheritance. All of these issues are serious breaches of implementing CEDAW in Pakistan (Bokhari 2009).

Indeed, as some would argue, the name of religion is used to justify some of these inequality of rights and entitlements of women. This might as well lead to confusion among people over cultural traditions and Islamic traditions and which jurisdiction to follow in these matters. There are several cases and examples when the members of religious organisations such as the Sipah-e- Sahaba⁷, Jamaat-i-Islam⁸, and madrasas (Islamic schools) have experienced their identity as very strict Muslims. Identity for many members of such organisations is inseparable from their cultural identity, which is not easy to manage. Thus, this may result in or cause identity confusion as culture is a huge aspect of one’s identity and other identities need to be consistent with the cultural

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⁵ According to the glossary explanation of Aurat Foundation, Vanni/Swara is a marriage done as a compensation for wrong doing by someone else, whereas Watta Satta is an exchange marriage, where a family gets a girl in exchange of the other.

⁶ Also called Haq Bakshish, it is giving up the right to marry someone. This practice is done mostly in order to preserve inheritance.

⁷ Sipah-e-Sahaba Pakistan, called Ahle Sunnat Wal Jamaat in recent years, is an extremely conservative Deobandi Muslim organisation mainly functioning in Pakistan. It has also functioned as a political party.

⁸ Jamaat-e-Islami is an influential social conservative, and Islamists political party aimed at making Pakistan a state run strictly by Sharia laws.
variations that are not completely consistent with Islam. Recently, a number of women’s rights organisations and action groups such as Legal Aid Cell of the Aurat Foundation, Shirkat-Gah, and Bedari, have been engaging young people in various identity related dialogues. They are also engaged in action research based on gender equality and social activism to address rising domestic violence against women, lower emphasis on education of women, and barriers that are in place to hinder women’s political participation (Weiss 2003).

1.3. Rationale of the Study

To the best knowledge of researchers, there have been no studies designed to test the mechanism through which the international conventions of the UN examine national endorsement of policies that encourage improvements in human rights practices. There is no single study which has compared how people will or will not endorse if the proposals for improvement of human rights conditions came from the local governments instead of international organisations such as the UN.

In the Pakistani context, Anjum et al. (2016) explored how the United Nations’ endorsed proposals increase their support among Pakistani university graduates. The study showed that as compared to the control conditions, international treaties and laws had an added effect on the study subjects regarding women’s rights and political representation in the country.

The study aims to highlight that there is a need to discuss women’s rights with respect to Pakistan’s current standing of global reports regarding women’s rights and gender equality. This experiment, based on the previous research, Anjum et al. 2016, takes one step further from observational data which has already suggested that CEDAW has helped improve women’s rights (Lupu 2013 and Simmons 2009). This study focused on certain policy reforms required to improve women’s rights in Pakistan that was used as the basis of the study; these points have been highlighted both by the UN and remain a salient political topic in Pakistan.

To administer the experiment, three forms of the survey were randomly assigned to the participants in Pakistan between February 2016 and August 2016. In order to test the endorsement given by the participants to different conditions an “endorsement design” was implemented (Bullock et al. 2011). This design focuses on the effect of learning that the local government or the United Nations proposed a given policy and then seeing how it influences participants’ level of support for that policy. The respondents were all asked whether they agreed with four policy proposals aimed at improving the rights of women in Pakistan. These policy proposals were directly taken from the 2013 report produced by the UN’s CEDAW Committee on the status of Pakistan’s compliance with its commitments to the rights of women (CEDAW 2013). Half of the respondents were asked whether they support the proposals without information on where the proposals
came from, while the other half of the respondents were told that the policies were proposed by the United Nations.

The focus of this survey was to contribute to the existing debate for clarity. Therefore, identifying the mechanism through which human rights law might change state behaviour was the focus of this study. There exists a considerable disagreement over which mechanisms are most likely to be effective. Most scholars have debated and argued that the United Nations human rights system does not place direct pressure on states to improve their rights practices nor powerful states put pressure on weaker states to improve their human rights practices (Posner 2014; Hafner-Burton in Conrad, C. R. and Ritter, E. H. 2013; and, Simmons 2009). Like many other scholars the study speculates that the international system can make a difference by changing the domestic political discourse in ways that may increase the protection of human rights (Lupu 2015; Hillebrecht 2014; Conrad & Ritter 2013).

2. METHODOLOGY

The survey experiment was conducted in a university and a postgraduate Institute in Islamabad, Pakistan. As the survey was specific about women’s rights, and being aware of the UN and local political narrative, therefore graduate students of federal university and institute were chosen. Indeed, conducting this survey experiment at federal institutions had a number of practical advantages for the purpose of this study. However, the drawbacks of this sampling were that the sample was much more educated than the usual population of Pakistan and was not representative of the population of Pakistan, which reduces the generalizability of the results of this survey. The research, however, relies on the notion that any public support for improved human rights protections could mainly be addressed by influencing the urban and educated people of the kind that were recruited in the study sample.

2.1. Survey Design

There were three conditions in the survey. In each of the condition, the participants were asked to express how they felt about the proposals and action tendencies expressed in the survey. The experimental treatment had two levels: the local condition level and the UN condition. Therefore, there were three ways of presenting questions to the participants. The questions addressed to the participants in the “Control Condition” did not mention any agency associated in the context of women’s rights proposals. On the contrary, the questions addressed to the participants in the “UN Group”, included a mention of an agency, e.g. “A recent proposal by the United Nations calls for…” while the questions addressed to the participants in the “Local Group” mentioned a public office, e.g. “A recent proposal by the local government (Punjab Protection of Women Against Violence Bill) calls for…” Thus, the only difference among three conditions was who proposed the
recommendations. Besides this, the demographic information in the survey was also divided into three sections.

2.1.1. **Traditional gender role beliefs**

In the first section of the survey, the participants were asked questions about their implicit beliefs about gender roles. The respondents, after reading the condition priming, marked their responses about each of the proposal, researchers asked: “How do you feel about this proposal?” Participants’ responses were assessed using their level of support on a five-point Likert-scale where (1) “strongly disagree”, (2) “somewhat disagree”, (3) “are indifferent”, (4) “somewhat agree”, or (5) “strongly agree”. A number of questions were designed and adapted to establish their beliefs on the rights of women. The items loaded on a single factor and had a modest Cronbach’s Alpha ($\alpha = .72$, $M = 2.64$, $SD = 1.36$).

2.1.2. **Endorsement for polices focused on improvement of women’s rights**

In the second section, the subjects were asked if they supported four reforms aimed at improving the rights of women. Participants’ responses were assessed using their level of support on a five-point Likert-scale: (1) “strongly disagree”, (2) “somewhat disagree”, (3) “are indifferent”, (4) “somewhat agree”, or (5) “strongly agree”. The four policies that the authors asked in the experiment were all recommended by the CEDAW’s 2013 Review of Pakistan’s compliance with CEDAW (Anjum et al. 2016). Like previous research, the focus remained on the following four proposals:

1. Legislative Quotas: increasing the quotas allocated for women in the Assemblies (National and Provincial Assemblies) and in the Senate from 17% to a minimum of 33%;
2. Honour Crime Pardons: repealing all laws which allow perpetrators of honour crimes for a pardon from the victim families;
3. Marriage Age: raising the minimum age for marriage for girls from 16 to 18; and,
4. Election Re-Polling: re-polling any location where women cast less that 10% of votes during an election.

The four items measuring endorsement of policies to improve women’s rights loaded on a single factor and had a modest reliability ($\alpha = .75$, $M = 3.51$, $SD = 1.77$).

2.1.3. **Action tendencies to improve women’s rights situation in Pakistan**

In this last section of the questionnaire, the authors asked about the possible action tendencies of the participants to improve women’s rights condition in Pakistan. A set of seven questions included a diverse set of statements ranging from women’s political participation to condemnation of honour killings. They were:

- “If a woman runs in elections for the National Assembly of Pakistan, how likely is that you would consider voting for a woman in election, all else being equal?

$^9$ The questionnaire included statements such as “In general, men are fitter than women to be political leaders; University education is more important for men compared to women; Women should not work outside the home.”
If a political party promises that it will improve women’s rights, how likely is that you would vote for the party in an election, all else being equal?

If a political party were to condemn honour killing in Pakistan, how likely is that you would vote for the party in an election, all else being equal?”

Participants’ responses were assessed using their likelihood to act on these statements on a five-point Likert-scale: (1) “extremely unlikely”, (2) “unlikely”, (3) “neutral”, (4) “likely”, or (5) “extremely likely”. The questionnaire items measuring action tendencies to improve women’s rights situation in Pakistan loaded on a single factor in factor analyses, within each statistical factor, the questionnaire items had modest reliability (α = .83, M = 3.57, SD = 1.21).

3. EXPERIMENTAL RESULTS

Regarding the demographic spread of our sample, there were 619 participants in total (51% females and 49% males). Their age range was between 22 and 34 years (mean age was 24 years). In each of the control and local condition there were 206; and, in the UN condition, there were 207 participants. The research findings on the three set of questions were as follows:

3.1. Traditional Gender Role Beliefs

The findings for traditional gender beliefs showed that there is a significant main effect of the condition, F (619, 2) = 36.42; ηp2 = .10. On average, people who were in the control condition expressed higher agreement with the traditional gender role beliefs (M = 2.87, CI = 2.77-2.96), compared to the UN condition (M = 2.75, CI = 2.65-2.85), and the local condition (M = 2.30, CI = 2.20-2.40). In the post hoc analyses, it was further confirmed that the effects between conditions were significant such that Control condition was not statistically different than the UN condition (d = .57, p < .001). Furthermore, there was a significant difference between the UN and the local condition (d = .45, p < .001). This means that presentation of the proper stimuli, such as UN or local government, before the message may in itself have a positive impact on what is to be conveyed later on. These results indicate that the best shot for working on bringing some change in the narrative for progressive gender role beliefs would be framing one’s messages as coming from the local government and policy institutes.

Regarding gender, there were interesting findings in this study. Males showed significantly higher endorsement of the traditional gender beliefs (M = 2.76, SD = 0.74) as compared to females (M = 2.51, SD = 0.75). Overall, these differences were statistically significant, t = 16.68; ηp2 = .26. These differences were seen in all conditions such that they did not make any difference to which condition the participants were exposed; men more often than women held stronger traditional gender role beliefs.

3.1.1. Endorsement for polices focused on improvement of women’s rights
The findings for the endorsement for policies on improvement of women’s rights showed a significant main effect of the condition, \( F(619, 2) = 22.43; \eta^2_p = .07 \). On an average, people who were in the control condition, expressed lower endorsement for the policies focused on improvement of women’s rights (\( M = 3.15, SD = 1.15 \)), compared to the UN condition (\( M = 3.63, SD = 0.88 \)), and the local condition (\( M = 3.76, SD = 0.85 \)).

In the post hoc analyses, it was further confirmed that the effects for the effectiveness of the local condition among the three conditions were significant. The post hoc analyses showed that compared to control condition there was significant difference between the UN condition (\( d = .47, p < .001 \)), and the local condition the UN condition (\( d = .61, p < .001 \)). However, the difference between the UN and the local condition was statistically non-significant (\( d = .13, p = .15 \)). This means that when compared to a control condition, presentation of the materials coming from the UN as well as from the local government can have a more positive impact in moving people’s endorsement on certain policies. Again, these findings indicate that the best shot for working on public opinion on international policies is by framing messages that are directed / advocated by the local government and policy institutes.

Regarding the gender of the participants, males showed significantly lower endorsement of policies focused on improvement of women’s rights (\( M = 3.35, SD = 1.12 \)) as compared to females (\( M = 3.68, SD = 0.85 \)). These differences in endorsement were statistically significant, \( t = 16.35; \eta^2_p = .02 \). Overall, there was a significant interaction effect of the gender and survey condition (\( F(619, 2) = 23.20; \eta^2_p = .07 \)). The change towards endorsement of policies was much bigger for males than for females.

3.1.2. Action tendencies to improve women’s rights situation in Pakistan

The findings for tendencies to improve women’s rights situation in Pakistan showed that there is a significant main effect of the condition, \( F(619, 2) = 43.07; \eta^2_p = .12 \). On average, people who were in the control condition expressed lower action tendencies to improve women’s rights situation in Pakistan (\( M = 3.22, SD = 0.90 \)), as compared to the UN condition (\( M = 3.62, SD = 0.65 \)), and the local condition (\( M = 3.88, SD = 0.77 \)) where participants expressed higher possibility of engagement. In the post-hoc analyses, it was further confirmed that the between conditions effects were significant. The effects were such that the control condition was significantly different than the UN condition (\( d = .39, p < .001 \)), compared to the control condition and the local condition (\( d = .66, p < .001 \)). Furthermore, there was a non-significant difference between the UN and the local condition (\( d = .26, p = .07 \)). These results indicate that it is helpful to engage people for actions in improving women’s rights by offering them a narrative that proposes the policies as coming from the local government and policy institutes.

Our findings for gender effects indicate that females showed significantly higher action tendencies to improve women’s rights situation in Pakistan (\( M = 3.70, SD = 0.73 \)) as compared to men (\( M = 3.45, SD = 0.80 \)). Overall, these differences were statistically
significant, $t = 15.52$; $\eta^2 = .02$. These differences were seen in all conditions such that it did not make a difference to which condition the participants were exposed to, men more often held more traditional gender role beliefs.

In summary, Figure 1 presents the summary from the results from our survey experiment on the three main dependent variables of traditional gender role beliefs, women’s rights endorsement, and action tendencies to improve women’s rights situation in Pakistan.

**Figure 1: Distribution of Responses to Experimental Questions**

Figure 2 presents gender wise distribution of responses to the three aspects: distribution of support for traditional gender role beliefs, women’s rights endorsement, and action tendencies to improve women’s rights situation in Pakistan. These results indicate that there is a significant impact of effect gender has in the United Nations or local government’s endorsement as compared to the control condition.
3.1.3. The process of endorsement of action tendencies to improve women’s rights

A mediation modelling with bootstrap analysis with N = 5000 showed that the endorsement of the policies to improve women’s rights emerged as a partial mediators of the effect of traditional gender role beliefs upon the action tendencies to improve women’s rights (see Figure 3). The traditional gender role beliefs predict the endorsement of the policies to improve women’s rights ($\beta = -.33$, $p < .001$), and the direct effect of the endorsement of the policies to improve women’s rights on the action tendencies to improve women’s rights was even stronger ($\beta = .46$, $p < .001$). The traditional gender beliefs predict the action tendencies relatively weakly ($\beta = -.14$, $p < .01$) indicating a partial mediation, suggesting that, lower traditional gender role beliefs lead to the higher endorsement of the policies to improve women’s rights condition, which in result leads to higher endorsement of the action tendencies to improve women’s rights.
4. DISCUSSION AND CONCLUSION

All around the world, the UN, Non-Governmental Organizations (NGOs), and as well as the local governments of countries spend many resources and time to improve women’s rights conditions. In particular, the UN expends a large amount of resources in monitoring compliance of the governments to international laws and conventions such as the CEDAW. These research findings are vital in the Pakistani as well as the international context for several reasons. Firstly, little experimental and applied research has been conducted to test whether the policy recommendations proposed by the UN have any impact on improved human rights or not. International law practitioners, especially human rights researchers and scholars have fervently debated on the issue due to the dearth of theoretical frameworks and experimental research.

Secondly, the little research available in this arena has produced contradictory findings due to which the debates have been inconclusive. Thus currently this scholarship is unclear on whether the international human rights system actually increases respect for human rights or not. This research gives a much needed perspective on evaluation of how the policies recommended by the international organisations such as the UN can be effectively integrated and voiced for implementation by the local governments. Therefore, this research brings a new perspective and new evidence on the issue of women’s rights in social, and political contexts.

Note: The Sobel test for mediation was significant, Effect = -.14, z = -5.96, p < .001
Overall, this research led to three conclusions. First, both experimental conditions (UN and Control), had a positive impact on three aspects: there was a lower endorsement of traditional gender role beliefs, there is a higher endorsement of the policies focused on improvement of the women’s rights condition, and people are more likely to express higher action tendencies to improve women’s rights condition in Pakistan. More specifically, when the recommended reforms were presented as coming from the local government compared to the UN, people showed lower endorsement of the traditional gender beliefs, and higher endorsement of the policies and action tendencies to improve women’s rights condition in Pakistan. These effects of the endorsement of the policies and action tendencies were both substantive and statistically significant. Second, these findings showed substantive gender and mechanism related revelations as well. This study suggested that women, as compared to men, were more likely to agree with the policy proposals. In both conditions of the survey, in terms of average scores, men moved from, being unsupportive to supportive of the women’s rights reforms. Third, regarding the psychological mechanism of the three aspects covered in this study, it was found that traditional gender role beliefs influence the endorsement of the policies focused on improving women’s rights, which in turn mobilizes people for various action tendencies to improve the situation.

There are, however, several limitations to this experiment that may limit the application of its findings. First, the sample was not a representative sample of all Pakistani young men and women. The sample of this study was an educated young adult population from a university and an institute in the capital of Pakistan. This sample is not representative of the whole Pakistani population. Second, there might have been some desirability effects\(^\text{10}\) that might have generated an impact of local endorsement and the endorsement by the UN. Third, the survey focused only on three aspects related to the improvement of the women’s status in Pakistan; there might be other important factors that have not been incorporated in this study. Lastly, even if people show higher endorsement of the policies and action tendencies recommended by local or international organisations, it would not ensure that they will actually engage in these actions.

5. **POLICY IMPLICATIONS FOR PAKISTAN**

Pakistan has been stated as one of the most unsafe places in the world for women, be it violations of their human rights, exposure to violence, or denial to justice and political participation (Human Rights Watch Pakistan 2017). For instance, according to Human Rights Watch Pakistan (2017), there have been more than 1,000 honour killings in 2016 in Pakistan, and around 80,000 prisoners, including women, are on death row, which is the largest number anywhere in the world. There is a growing awareness and education

\(^{10}\) Desirability effects refer to the social phenomenon when the participants are apt at guessing the purpose of a study. These effects are usually difficult to control in survey-based studies.
among the policy makers but still there are extreme gaps in women’s access to their rights and political participation. The prevalence of extreme violence and lack of political participation has led to Pakistan’s low performance on many human development indicators and its failure in meeting the SDGs.

Due to this status of Pakistan regarding human rights in general and women’s rights in particular, the policy implications of this study are vital. This chapter suggests that in order to get endorsement by the public, we have to frame the message as coming not only from the local governments, but also, explore which mechanisms work the best for creating awareness. It also adds to the policy debates regarding these mechanisms, it is suggested that they are facilitating support for women’s rights. These implications have ecological validity because the policy recommendations used in this survey experiment were the ones that were obtained from the United Nations’ review (Committee on the Elimination of Discrimination against Women 2013) of Pakistan’s women’s rights record. Hence knowing about the how people receive these policy recommendations would be of great value to policy makers.

The findings of this study, like previous research and theoretical speculations, have indicated that international conventions would help in uplifting educated public’s narrative in improving women’s rights and condition even in countries such as Pakistan. But the research more specifically highlights that it would be more beneficial to translate the international conventions in the local government’s narrative. It is also vital to note here that Pakistan has been identified as a “Transitional Democracy” (Simmons 2009), as well as a “Partially Free” (Freedom House 2015); current year’s status is “Not Free”, see Freedom in the World Report 2017. This identification further strengthens the significance of this research in building liberal narrative and public debate on the issue of women’s rights in Pakistan.

Even though Pakistan is a transitional democracy, we strongly believe that policy recommendations by the international bodies like the UN have an impact on countries such as Pakistan. Recent development in the legislation on women’s rights, i.e. Punjab Protection of Women against Violence Act 2016, has been seen with hope and possibility of positive outcomes. This is an historic achievement that even though the 2015 Punjab Protection of Women against Violence Bill had faced extreme opposition from many stakeholders, yet Punjab Assembly passed it. In Pakistan, this is the first bill of its kind that has promised protection to women. Initially, when this bill was launched there were many insecurities among men, but due to the involvement of the provincial government and the media’s positive role, people are receiving it more positively (Punjab Laws Online 2016).

Furthermore, research specifically on the policy recommendations based on CEDAW and especially in the Pakistani context is not only relevant to the country, but also contributes to the international discourse on women’s rights for several reasons. For instance,
previous observations and interviews based research has supported that compared to other
conventions and agreements, CEDAW has led to more improvements in women’s rights
and their status (Anjum et al. 2016 and Lupu 2013). Although this support has been there,
the use of experimental methods has been very small. To-date there are only a few
countable studies (Anjum et al. 2016; and Chilton 2014). The implementation and
findings of this study, therefore, encourage the use of stringent experimental methodology
in future research to test under what conditions (message from the local government in
this study) policy messages are better received and perceived by the masses.

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On the Muslim Minority in India

Nathalène Reynolds*

ABSTRACT

Western media usually describe India as ‘the largest democracy in the world’, paying little attention to the various dark corners surrounding this rosy picture, especially if one takes into consideration the difficulties its neighbours have had in their roads to democracy. It is true that the country has historically benefitted from generally good press in the West due to concerns about the increasing assertiveness of another demographic giant – the People’s Republic of China. As the centre of global gravity moves inexorably towards Asia, Western Europe and North America, with their ageing populations, seek to keep on board allies with whom they believe they share a similar system of values. Above all, western powers have their gaze fixed on the Indian market, assuming that its annual economic growth of 7% can offer rich dividends.

Prime Minister Narendra Modi has acquired almost rock star status in recent years: November 2015 saw him address crowds packed inside London’s Wembley Stadium, while in June 2016, American Congressmen and women applauded him as he made an extended comparison of the virtues of American and Indian democracy. Incidentally, he boasted that the ‘biggest democracy in the world’ guarantees equal rights to all its citizens, whatever their religious beliefs. Indeed, he declared himself in favour of stronger Indo-American linkages, especially, he added, when it came to the fight against terrorism (Kelly 2016).

Some observers may recall a remark made by Modi as the Chief Minister of Gujarat in the aftermath of the 9/11 attacks during The Big Fight, a Star News Channel debate programme, on 14 September 2001. He stated that, ‘All Muslims are not terrorists, but all terrorists are Muslims’ (Engineer 2015). During political debates, especially televised ones, politicians often make use of such rhetorical devices to nurture or boost their popularity.

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Even limiting oneself to India itself, such a declaration was factually incorrect. According to figures for the year 2014 cited by Aakar Patel in a revealingly titled article, Most extremists in India are not Muslim – they are Hindu, published on 8 June 2015, the country had:

Some 976 deaths from terrorism (or extremism, whatever name one wants to use for it) in India. Of these, the most (465) came in the North East. The second most (314) came from left-wing extremism, by a group of people called Maoists. Deaths in Jammu & Kashmir, assuming one wants to attribute the whole lot to terrorism, stood at 193. Outside of these conflict theatres, Islamist extremism claimed four lives (Patel 2015).

India is home to a very significant Muslim population that is scarcely reassured by the absolute majority enjoyed by the Bharatiya Janata Party (India People’s Party, Hindu nationalist in outlook) in the Lok Sabha (House of the People, the lower house of India’s bicameral parliament).

Before looking at the fragile position of the Muslim community and the campaigns it believes are conducted at its expense, the author would first like to see how India has projected its power across the New World Order that emerged after the collapse of the Soviet Union. India rightly seeks recognition as a great power, but is inclined to forget that in a sense, it remains a colossus with feet of clay – top end scientific research juxtaposed with aching poverty. It is made up of a mix of different religious communities, harmony between which has been key to the successful construction of the nation. More extreme sections of the Sangh Parivar (a group of Hindu nationalist organisations) who play up – without always sticking close to the facts – the threat of rapid population growth of the Muslim community. This seems to neglect one of the attributes that has the potential to increase India’s global influence: its 180 million Muslim inhabitants that have the potential to project India’s power in the Islamic world.

This work, therefore, seeks to first of all look at India’s position internationally, and how this has enabled the most extreme Hindu nationalist components to adopt policies and political positions of concern with regard to minorities in general and Muslims in particular. Narendra Modi was formally cleared of all the various accusations made against him pertaining to his role in Gujarat in 2002. However, some schools of thought continue to cast doubt as to his innocence.

Given the difficult relations between India and Pakistan in recent times, the author will abstain from any recommendations as to what the Indian government should or should not do. However, the author would encourage India’s civil society to undertake a greater role in reinforcing inter-communal harmony so necessary to the construction of a country that remains uniquely diverse in a world characterised by a worrying level of polarisation.

**Key words:** India, Gujarat, Muslim minority, Bharatiya Janata Party (BJP), communalism, demography, population.
1. INTRODUCTION

1.1. A New Political Order at the National Level

On the eve of the sixteenth Indian general elections (7 April - 12 May 2014), observers of all political complexions were in agreement that a grouping going by the questionable name of ‘Hindu nationalists’ would be victorious. The population did little to conceal its disenchantment with the lengthy Congress administration that had appeared so full of promise. The Indian National Congress (INC), that led the United Progressive Alliance (UPA-I) and then the UPA-II, had once seduced the electorate. Voters looking for a

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1The term ‘Sangh Parivar’ designates the Hindu nationalist ‘family’, that includes political parties such as the Bharatiya Janata Party (BJP) and the Shiv Sena (Army of Shiva), as well as associative groups like the Rashtriya Swayamsevak Sangh (RSS, National Union of Volunteers) and the Vishwa Hindu Parishad (VHP, International Hindu Federation).

One might question the use of the adjective ‘nationalist’ since following the 11 September 2001 attacks, media observers often prefer the term ‘fundamentalist’ when referring to Islamist grouping that defend theories that bear comparison to some promoted by the Sangh Parivar. It is true that the leader of the Sangh Parivar, the BJP, has sought, controversially, to acquire the respectability that has brought it to the position of governing the country.

A majority of Indians today give him great credit, looking upon Narendra Modi as a symbol of hope. Khushwant Singh observes that part of the Sangh Parivar’s success can be attributed to the charm and charisma of many of its leaders. They were men of polite manner, obvious sophistication and intelligence who cloaked their fascist ideas in sweet reasonableness and impeccable etiquette” (Singh 2003, p.58).

2Of the 61 representatives of leftist parties who sat in lower house of parliament (the Lok Sabha), 44 were members of the Communist Party of India (Marxist) (CPI(M)). The Left Front came to an agreement with the Congress that lacked an overall majority (217 seats out of a total of 543). In a press communiqué dated 13 May 2004, the Politburo of the CPI(M) lauded what it termed the ‘historic victory’ of the Indian people in the fourteenth general elections (People’s Democracy, 12 September 2004). The popular verdict, according to this account of events, was a clear rejection of the communalist policies pursued by the BJP-led administration, of its economic policy in favour of the wealthy, as well as of its pro-imperialist foreign policy (ibid). It was on this last issue that there had been disagreement. The Left, which describes itself as supporting the government ‘from outside’, withdrew its support on 8 July 2008, as it opposed the Indo-US agreement under the terms of which Washington was to contribute to Indian nuclear energy production for civilian ends. The UPA-II was, however, formed on 18 May 2009.

Note that the term ‘communism’ pertains to inter-communal confrontations between different religious groups, most often Hindus and Muslims. Particularly following the coming to power in 1998 of the Hindu nationalists, it has tended to have a further connotation: that of a partisan – Hindu – vision more and more widely pushed in political and social spheres.

Hindu nationalists, for their part, reject such a view. They believe they seek to build Indian power that will permit rapid improvement in the economic situation of the majority. Such discourse is scarcely new, but Hindu nationalists, for long stuck on the margins of political life, have taken it up during a period when many Indians have genuine concerns about the future.

One analysis is worth noting here; D.P. Singh, in a book revealingly titled Narendra Modi. Yes he can, writes “Combining the worst aspects of caste, kafirhood, class and colonialism and transcending them all, ‘Perpetrator/Victim’ is the new great schism that our polity and the ‘System’ has succeeded in creating, dividing entire land into two distinct and great classes drifting apart from each other all the
government that would define a genuine social programme had disavowed the earlier National Democratic Alliance (NDA) coalition government led by the Bharatiya Janata Party (BJP) after it, over-confident as to the future, had called snap elections (20 April - 10 May 2004).

Indians had turned once again to the Congress, main architect of the country’s independence, that claiming the heritage of the Nehru-Gandhi dynasty, had sought, it claimed, to build a socially equitable India. They had counted on Congress Prime Minister Manmohan Singh being the promoter of a programme that would address growing inequality. This renowned academic and economist took pride in the second mandate the electorate conferred on the Congress in the fifteenth general elections (16 April - 13 May 2009). Was the Congress-dominated government itself seduced by the Shining India slogan? With the exception of the leftist groups, the rest of the political class believed that it was its duty to work to project India regionally and globally. The population, no doubt disillusioned by such a discourse, punished Congress and an administration it perceived as riddled with corruption and nepotism. Above all, the worst-off were tired of their living conditions that had deteriorated following the economic liberalisation initiated in the 1990s. The repeated statistical manipulation of poverty rates carried out by various political actors helped present an India that was progressing more than in reality. The elite that consulted the figures had in any case little intention of permitting a significantly fairer division of wealth. Without the creation of a ‘welfare state’, the social ills undermining the country will never be eradicated.

Seemingly in a state of exasperation, Manmohan Singh’s former press attaché, Sanjaya Baru, published a revealing titled account on 11 April 2014, The Accidental Prime Minister: The Making and Unmaking of Manmohan Singh (Baru 2014). In it, he sought to underscore the omnipotence of Sonia Gandhi. He implied that the Congress President had prioritised those loyal to her – even her ‘vassals’, rather than the political, economic and

time like the continental landmasses. If allowed to deepen and broaden unchecked as it is being now, the schism is likely to bring the whole project in democracy, liberalism, secularism, and nation and society building crashing down, swaddling the land in unending gore and blood” (Singh 2012, p.2). The author emphasizes the existence of “two distinct and increasingly disconnected classes of perpetrators and victims. “Thus, in the democratic socialist state that India is supposed to be, anyone failing to attain a “position” (i.e., getting to be a government officer, police inspector, elected ‘representative’, certified mafia, high class dalal or prostitute, and the like) in life loses his/hr citizenship right too (ibid).

3 Hindu nationalists had not emphasized a particular vision of the future, but rather the healthy economic state of the nation, boasting of their positive, unequalled record in office. Some commentators rejected the slogan of Shining India, noting that while things were bright for a minority of some 10% of the billion-plus population, fully 44% were living below the poverty line.

4 Jawaharlal Nehru was Prime Minister from 15 August 1947 until 27 May 1964, and his daughter Indira Gandhi between 24 January 1966 and 24 March 1977 and again from 14 January 1980 until 31 October 1984. His grandson Rajiv Gandhi held the post from 31 October 1984 until 2 December 1989.

5 In 2011, the World Bank estimated that 21.9% of the Indian population was living on less than $1.25 per day; a further 19% earned between that and $2 per day (World Bank, 2011a and 2011b).
social advancement of the country. Was the work written for the Hindu nationalists who, since Gandhi’s entry onto the political stage in 1998, had sought to draw attention to her foreign origin, which prevented her from abiding fully by national customs? Whatever the case, Baru painted a grim picture of Manmohan Singh. He also criticised the dynastic power that the widow of former Prime Minister Rajiv Gandhi (20 August 1944 – 21 May 1991) was seeking to restore².

1.2. Outline of this Article

The Chief Minister of Gujarat, Narendra Modi, his reputation put into question by the communalist events in Gujarat in 2002, seized the opportunity to assert himself. He boasted of his status as a pracharak (the RSS employs this word for those of its volunteers that undertake a vow of celibacy). Narendra Modi, so this account goes, was free from influence, since he was unbound by family ties⁷. He could thus dedicate himself to promoting the national interest. He certainly declared his attachment to the traditional Indian, or even Hindu, values of which the Sangh Parivar argued it was the guarantor. Last but not least, the new Prime Minister of India prided himself for his administrative prowess that had allowed Gujarat⁸ – at least on a ‘glass-half-full’ reading – to make both economic and social progress.

India, in entrusting its fate to an individual rather than the political party to which he belonged, sought to attain two objectives: to achieve regional and global power status, a will inculcated by successive previous governments; and, to address the alarming levels of poverty. There remained the fragile communal balance of the country. The Hindu nationalists, it is true, had already governed the country. Yet they lacked an overall majority in the parliament. Moreover, the National Democratic Alliance had entrusted the leadership of government to the moderate BJP leader Atal Behari Vajpayee.

²The former Minister of External Affairs, Kunwar Natwar Singh (2014), in his work One life is not enough published three months after a Congress defeat he described as humiliating, stated that Sonia Gandhi, Italian by birth, was scarcely able to bend in obeisance to significant Indian traditions. He meant, in particular, the lack of respect that the ‘Iron Lady’ displayed towards elders. While he did not say so, he presumably included himself in this regard.

⁷When putting himself forward as a candidate for the Lok Sabha elections, he finally acknowledged the existence of a spouse he had left thirty years earlier. He added that tradition had demanded an early marriage, but that he had rapidly left the conjugal home.

⁸Coming to power in Gujarat in 2001, Modi inherited a healthy economic situation. The state’s growth rate was 4.8% in the 1990s, compared to 3.7% in the country as a whole. In the following decade, the corresponding figures were 6.9% and 5.6% respectively. The human development index for Gujarat was below the national average in the 1980s and 1990s, but moved slightly above average after 2000. There remained the issue of poverty. States such as Gujarat, Himachal Pradesh, Punjab, Kerala, Haryana, Andhra Pradesh and Karnataka had rates below the national average, while it was Tamil Nadu that saw a particularly sharp reduction in levels (Ghatak and Roy 2014).
Narendra Modi had a more controversial past. The country is home to a very large Muslim population that is worried by the BJP’s dominance of the Lok Sabha. Before looking at the sensitive position of this community, the author will begin with the emergence of India as a world power. The country seems sometimes to ignore one aspect of its potential in this respect: projecting itself as a Muslim power. It is true that the agenda of the Sangh Parivar, at least of its more extreme components, is very different. With the BJP holding an overall parliamentary majority and governing in a number of states, these groups enjoy considerable margin of manoeuvre; the Hindu nationalist ‘family’ has, for example, felt it necessary to engage in struggles such as cow protection, the animal being sacred in Hinduism. Their opponents feel that the group is in a position to allow the RSS or VHP to take the fight to minorities, especially Muslims. They add that it feels itself in a position to allow groups like the RSS or VHP to go after minorities, especially Muslims. It rightly reckons that the ‘international community’ will abstain from sharp criticism. The western powers, faced with an unprecedented economic crisis, are looking eagerly at the Indian market. Another aspect is the populism to which the West seems to be in thrall: the phenomenon is nourished by the stereotypical images that turn Islam into an easy scapegoat.

In conclusion, when sketching possible recommendations, the author will focus on Indian civil society. Indo-Pakistani relations are once again tense. For researchers, especially those from overseas, suspicion about their work can become a constraint. The author will nonetheless look at the Muslim community, notably from the perspective of the work, Le Bouc émissaire (The Scapegoat), of the French philosopher and historian, René Girard (1982).

2. A GIANT WITH FEET OF CLAY

2.1. Towards Great Power Recognition

The Indian Union managed, quite easily, to redefine its foreign policy in the aftermath of the collapse of the Soviet Union. The new international agenda set by leading world powers gave room for the emergence of states that had hitherto – their greater aspirations notwithstanding – been limited to a ‘status’ of regional power. In addition, India cashed the dividends of a non-aligned policy that it had practised skilfully. This doctrine had allowed it to set its external policy in an independent manner. The country had opposed

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9 The BJP won 282 of the 336 held by members of the NDA.

10 The use of inverted commas draws attention to this geopolitical construct, common after the collapse of the Soviet Union that subtly suggests that the positions of the West should be considered somehow self-evident truths.
the threat of an intrusion of the Cold War into its territory\textsuperscript{11}, even while managing gradually to glean support from both the Soviet Union and the United States – the latter’s favours remaining discreet. After the short Sino-Indian frontier conflict in late October 1962, New Delhi, in fact, taking advantage of the West’s\textsuperscript{12} concern of the Chinese threat, benefitted from the West’s military assistance that was only too readily offered to India\textsuperscript{13}. This kick-started a concerted effort to arm itself that was a key part of its quest for regional and global influence.

The second line of assertion of Indian power was the success the country achieved once it was under pressure to liberalise its economy. Anxious to play a major role in the new world order, India came more and more to neglect mention of past achievements which had come about as a result of earlier political choices, including those made in the face of stern western censure. Even the legacy of the successive mandates of Prime Minister Jawaharlal Nehru was called into question. Governing his country from 1947 to 1964, Nehru had been the ‘high priest’ of a non-aligned foreign policy. The governments he led chose a form of economic autarchy favouring the expansion of national production.

India is in any case moving towards recognition of its world power status – something that was tacitly already accepted. Refusing to sign the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), it worked gradually towards imposing itself as a nuclear power\textsuperscript{14}. On 10 October 2008, the country celebrated the prospect, following the signature of Accord 123, of American assistance in increasing nuclear energy production for peaceful purposes. In fact, the worrying developments in Afghanistan and Pakistan have contributed even more to boosting India’s regional and international role. The demographic giant, still, however, has feet of clay, even if successive rulers have

\textsuperscript{11}It should perhaps be recalled here that the two power blocs implicitly agreed that armed confrontations between them, while an expression of their opposition to one another, would remain limited in scale and spare the territories of North America and Europe.

\textsuperscript{12}In geopolitical terms, the phrase aims to emphasize the existence of a set of common values as well as interests that coalesced following the Second World War.

\textsuperscript{13}Pakistan, for its part, underlined that once it had achieved its objective, China withdrew behind what it termed the Line of Actual Control. Islamabad was thus concerned by its neighbour’s rearmament, believing the arsenal to be first and foremost aimed towards Pakistan.

\textsuperscript{14}India for long contented itself with a first nuclear test carried out on 18 May 1974. It ‘crossed the Rubicon’ (Indians used the phrase frequently) with nuclear tests on 11 and 13 May 1998, that provoked a parallel response from Pakistan (28 and 30 May). New Delhi, like Islamabad, faced lively criticism and sanctions, but the objective was achieved: India, many believed, suffered in its quest for recognition as a global power since it remained a non-member of the ‘nuclear club’. Furthermore, it aspired to a veto-bearing permanent seat on the Security Council. It also sought to assert its status within the Asian continent, particularly vis-à-vis China, while confirming its predominance over South Asia, always with the Kashmir question in mind.

Note that since the end of the 1980s, the state of Jammu and Kashmir has been the stage for a separatist movement that Pakistan claims to support only morally and diplomatically. India denounces the ‘proxy war’ that its neighbour conducts on its territory, continuing to dispatch militants there.
managed to increase the country’s influence both within Asia and globally. All the more promising is the fact that India has not only consolidated its existing links with the United States, but has also initiated a new era of cooperation with Russia, the successor to the Soviet Union.

2.2. A Demographic Giant

In 1950, the population of Asia accounted for 55% of that of the planet; Europe made up 22% and Africa only 9% (Geohive 2016). Today, 8% of the world’s 7.2 billion people live in Europe, 14% in Africa and 60% in Asia (On World Nations Online 2015; United Nations 2013). Chinese and Indians together comprise 37% of human beings; the latter are likely to overtake the former in number around 2028 (United Nations 2013). In presenting this summary, it should also be recalled that the population of the world increased by 267% during the Twentieth Century, with a doubling “in less than two generations, from 2.5 to 5 billion, between 1950 and 1987” (Buhler 2004, p.3). As the Department of Economic and Social Affairs of the Secretariat of the United Nations Organisation underlined in the introduction to its report titled World Population Prospects: The 2004 Revision Analytical Report, a “variety of demographic dynamics” continue to prevail around the world. “The demographic winter”, an expression used by demographer Gérard-François Dumont (2008), is now hitting developed countries, with the notable exception of the United States

15 “The United States, the most populated country in the developed world, is also the one that maintains its position in the demographic hierarchy the best. Thanks to a favourable age pyramid and fertility rates that recovered after a drop between 1960 and 1985 to a level close to inter-generational replacement levels (2.1 children per woman). This has no equivalent in advanced nations” (Buhler 2004, p.14). The birth rate is 12.5 per 1000 inhabitants (CIA 2016d).

16 The European Union numbers 507.4 million inhabitants (Eurostat 2015). The figure includes about 60 million UK citizens who may soon leave the European Union.
would have been uncontested, since “India, Pakistan and Bangladesh together count more inhabitants than China, even if Taiwan is added to the latter’s total” (Ibid). South Asia, with the exception of Sri Lanka, is a reservoir of people of global importance.

One should recall the postulate of the American demographer Frank Wallace Notestein, who was alarmed that the “dominant powers” would “become smaller and smaller minorities”, possessing a “smaller and smaller proportion of the world’s wealth and power” (cited in Buhler 2004, p.8). India, meanwhile, benefits from concern provoked by the other demographic giant, namely the People’s Republic of China. The West, with its ageing population, seeks to build alliances with those seemingly sharing similar value systems, even as the centre of world gravity shifts inexorably towards Asia. Is western reserve, a legacy of Cold War antagonism, not also motivated by the across-the-board development pursued by Beijing? Seduced by the market competitiveness of the People’s Republic, western countries have omitted to safeguard their own national industries, giving rise to a dangerous dependency and a vulnerability to an attempt to instrumentalise by China. In such a context, the alliance with India, albeit one that struggles to reach the same lofty heights as China, is of significance, even though Indo-Chinese relations remain sensitive. Nonetheless India’s future remains uncertain however much it is currently a haven of peace.

2.3. ‘The Biggest Democracy in the World’

India “has always been an enormous population centre” (Dumont 2006). It enjoys, it is true, “essential natural resources allowing for prosperous civilisation – cultivable land, water and sunlight” (ibid). It is rather, however, the remarkable historical path taken by the country that the author would like to look at here. Western media are quick to describe it as ‘the biggest democracy in the world’ whenever its citizens are called to vote. Such an expression reflects various dimensions. The first is geographical: India’s surface area of almost 3 million km$^2$ may be much less than the United States or China (both a little over 9 million km$^2$), yet the country is home to 1.26 billion people (CIA 2016b.), fully one-sixth of the world’s population. This figure is slightly below the Chinese number, but the Indian population is younger: 27.71% are under fourteen years of age (ibid). The second dimension is political: the secularism that constitutes the founding doctrine of the Republic of India persists to this day. A simplistic view of the Sub-continent’s history tended to place the entire responsibility for the bloody partition on Pakistan’s shoulders, Mahatma Gandhi and Jawaharlal Nehru battling in vain to oppose it. Whatever the case, Indian secularism was rapidly promoted as a model enjoying global renown. Such a reading was not shared by all the country’s closest neighbours, certainly Pakistan and Bangladesh. The third dimension underpinning the use of the term is the ethno-religious, cultural mosaic to which the country is home. The Hindu community of course forms the

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$^{17}$According to the CIA Factbook (CIA 2016c and CIA 2016a), Pakistan is home to 202 million people and Bangladesh to 156 million.
majority (80.5%) (GoI 2011a). Muslims, however, are the largest minority, with 138 million people making up 13.4% of the total population (Ibid). There are also numerically large numbers of Christians (2.3%) and Sikhs (1.9%) (Ibid).

**Table 1: Distribution of Population by Religion**

<table>
<thead>
<tr>
<th>Religion</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>1,028,610,328</td>
<td>100.0</td>
</tr>
<tr>
<td>Hindus</td>
<td>827,578,868</td>
<td>80.5</td>
</tr>
<tr>
<td>Muslims</td>
<td>138,188,240</td>
<td>13.4</td>
</tr>
<tr>
<td>Christians</td>
<td>24,080,016</td>
<td>2.3</td>
</tr>
<tr>
<td>Sikhs</td>
<td>19,215,730</td>
<td>1.9</td>
</tr>
<tr>
<td>Buddhists</td>
<td>7,955,207</td>
<td>0.8</td>
</tr>
<tr>
<td>Jains</td>
<td>4,225,053</td>
<td>0.4</td>
</tr>
<tr>
<td>Others</td>
<td>6,639,626</td>
<td>0.6</td>
</tr>
<tr>
<td>Without religious affiliation</td>
<td>727,588</td>
<td>0.1</td>
</tr>
</tbody>
</table>

*Source: (GoI 2011a)*

The demographer Frank Morgenthau emphasizes that one cannot “consider a country as very powerful because its population is bigger than that of most other countries, but it is still true that no country can become or remain a power of the first rank if it is not one of the most populous countries of the world” (cited in Buhler 2004, p.4). The overwhelming majority of the Indian political class makes free use of the same liberal economic language employed by the dominant discourse on world economic affairs. In looking at how to best project the country’s power, they tend to deliberately neglect the demographic and social aspects, preferring to argue that strong economic growth will somehow magically close up the immense inequalities. Both Indian and international observers laud India’s economic growth rates: from 6% during the period 1980-2002, it was 7.4% in 2014, a performance that seems to have been sustained up to this day (Asian Development Bank 2015 and 2016).

Official serenity disguises a concern that is far from new. Had it not been for the excesses of the National Population Policy of 16 April 1976 during emergency rule (June 1975-January 1977) introduced by Prime Minister Indira Gandhi, the country would have dared to bring in rigorous population planning. The dominant collective mentality remains marked by one component of the National Population Policy of that period: the massive sterilisation campaign. ‘The biggest democracy in the world’ has never attempted through an official inquiry to determine responsibilities for the policy. Over and above such a
sensitive task, India should doubtless have initiated the economic and social reforms for which the founding fathers had advocated. Arguing as to the ‘red menace’ – the actual threat this represented is difficult to gauge – the leaders of the new-born state worked to keep the social structure intact, putting forward measures that were far too timid to bring about much change.

3. A HAVEN OF PEACE BUT WITH AN UNCERTAIN FUTURE

3.1. The Consequences of the Tragedy of Godhra

Compared to its Pakistani or Bangladeshi neighbours, India looks a haven of political stability. It is, however, the stage for social malaise that could, in time, represent a threat to the parliamentary democracy to which the country is attached. An indication of this is the resurgence of ‘naxalism’, a Maoist armed movement\(^\text{18}\). In addition to the consequences of economic liberalisation, the policy of promoting the creation of Special Economic Zones (SEZ), areas within which national and multinational enterprises can benefit from fiscally advantageous status, denies farmers access to fertile areas. Land speculation has become rife. The Naxalite phenomenon has affected rural areas of Andhra Pradesh, Bihar, Chhattisgarh, Karnataka, Jharkhand, Maharashtra, Odhisha, Uttar Pradesh and West Bengal.

In a tense social context, the political instrumentalisation of the fragile harmony between religious communities is also a tactic to which political parties can choose to make recourse. Indeed, the history of the country has been marked by what are euphemistically described as ‘communalist incidents’. One should mention here the communalist carnage that targeted the Sikh community after the assassination on 31 October 1984 of Prime Minister Indira Gandhi\(^\text{19}\), and the anti-Muslim pogroms\(^\text{20}\) in Gujarat that followed the tragedy of Godhra on 27 February 2002\(^\text{21}\). These events led the Indian intelligentsia,

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\(^\text{18}\)The word ‘Naxalite’ refers to the peasants’ revolt that broke out in the district of Naxalbari (West Bengal) in spring 1967.

\(^\text{19}\)To this day, figures are the subject of controversy. Some suggest that those killed numbered 8,000, with some 3,000 dying in the capital (Pillalamarri 2014). The families of those who survived the violence are still waiting for justice, despite the establishment of various commissions of inquiry.

\(^\text{20}\)The Sikh community also uses the term ‘pogrom’ to describe the communal riots that targeted it in October 1984.

\(^\text{21}\)Another target of Hindu nationalist communalism is the Christian community. The Sangh Parivar, growing in confidence, seeks to bring these ‘lost sheep’ back into the fold of Hinduism, deemed the original religion of the Sub-continent. One may look briefly at events in Odisha (formerly Orissa) in this regard. On 23 August 2008, the Christian community of the district of Kandhamal, already living in precarious conditions, was the target of attacks by the Vishwa Hindu Parishad and the Bajrang Dal (party of Hanuman, a god in the Hindu pantheon) (DanChurchAid 2008). The latter organisation, with its origins in the former, focused on youth membership. Six weeks later, the dead numbered 50; 5,000
hardly unused to communalist violence, to wonder out loud as to the dangers of Hindu nationalism. The author will focus here on the tragedy of Godhra (Gujarat).

On 27 February 2002, about 7.50a.m., the Sabarmati Express train was the target of attack by a group of Muslims as it was leaving the town of Godhra (about 40% of the population of which is Muslim); one carriage caught fire. During the following days, several hundred Muslims were killed across much of Gujarat state with if not approval then at least indifference on the part of the Hindu nationalist administration of Gujarat led by Narendra Modi. New Delhi, where Prime Minister Atal Behari Vajpayee was in power, abstained from intervening, refusing to invoke use of Article 356 of the Constitution, otherwise known as ‘President’s Rule’, that allows for the central authorities, in the event of troubles threatening public order, to dismiss the state government and assume temporary charge.

That morning, the atmosphere on the train was tense. There was a large number of activists and supporters of the Vishwa Hindu Parishad among the passengers, returning home after participating in a ‘politic-cultural demonstration’ in Ayodhya (Uttar Pradesh). The aim of these Hindu nationalists was to win over a public opinion that appeared lukewarm on the theme of the (re)construction of a temple, to replace the temporary place of worship that had been erected on the ruins of the Babri Masjid in Ayodhya. They hoped to push the Vajpayee government into taking such a decision without waiting for the verdict of the court.

improvised homes had been destroyed; 13,000 people displaced, with many more sheltering in the forest (Kumar and Kumara 2008).

The political scientist, Janet M. Powers, draws an interesting comparison. She writes: “British attempts to legislate against Hindu practices such as sati, widow abuse, and devadasis were compounded by activities of Christian missionaries who regarded Hindus as heathens whose benighted souls should be saved. It is not surprising that Hindu nationalists act in a similar way in their attempts to reconvert Muslim and Christians, whom they believe were unfairly, either by force or poverty, drawn to “alien” religions” (Powers 2009, p.69).

One should certainly not put the blame on the Hindu community alone: South Asia has seen communal violence instigated and fed by Hindu, Muslims and Sikhs.

The Ayodhya Mosque (Babri Masjid) had been reopened to the public only a few years prior to its destruction. In 1858, the British authorities had decided to erect a barrier separating the two religious sites. The internal court was Muslim and the external one Hindu (The Hindu 2010). At dawn on 23 December 1949, idols had been placed under the mosque’s dome, thereby – according to Hindu practice – turning it into a Hindu place of worship. Even when it was closed to the public, Hindu prayers (‘pooja’) were intoned once a week in this ‘mosque-temple’. The kar sevaks (Hindu nationalist volunteers), in destroying the Sixteenth Century monument, demanded the reconstruction of a temple that had, the Sangh Parivar argued, existed on the site prior to the construction of the mosque, and celebrated the birth of the god Ram.

On 30 September 2010, the Allahabad High Court (Uttar Pradesh), basing its decision on sources including the archaeological digs that had been carried out on the site of Ayodhya after the destruction of the Babri mosque, stated that the latter had indeed been built on the ruins of temples. On the site of 1.12 hectares, a tiny part was that commemorating the coming of the god Ram. The High Court opted for a division of the site into three. The first would go to the Sunni Central Wakf Board of Uttar Pradesh, the
The kar sevaks, whose route had been carefully traced out, were travelling by train. In Godhra, however, the information had come to the railway authorities a day late. On 27 February, the train pulled in at platform 1, the only one with small traders in what was a Muslim majority area. Incidents could be expected. Hindu nationalist activists armed with sticks set about provoking the sellers, especially those with beards, insisting that they chant ‘Jai Sri Ram’ (victory to the god Ram). With the driver of the Sabarmati Express signalling the train was ready to leave, the Railway Protection Force was struggling to get the activists back on the train, which ground to a halt once again. Some passengers had sounded the ‘emergency stop’, presumably to allow their fellow voyagers still on the platform to get back on board. A group of Muslims that had in the meantime gathered started throwing stones. It was in these circumstances that carriage number 6 caught fire, killing 59 persons.

3.2. The Political Instrumentalisation of a Communalist Tragedy

Rather than trying to elucidate the exact circumstances behind the fire in carriage number 6, the Government of Gujarat preferred political instrumentalisation, while the Centre adopted a waiting posture. The State of Gujarat accused Pakistan of responsibility for events in Godhra. It argued that pro-Pakistan militants had already tried to attack parliament in New Delhi (13 December 2001), the consequences of which could have been much worse, given that key members of government had been present.

In June 2002, however, the Union Home Minister, Lal Krishna Advani, who had backed the theory of a plot fomented by Pakistan’s intelligence services, Inter-Services Intelligence (ISI), distanced himself from this: inquiries carried out had not brought the expected results. In the months that had passed, one theory favoured by Hindu nationalists had however taken root: Muslims living in India were unpatriotic.

organ responsible, as its name suggests, for the administration of Sunni Muslim places of worship in the state. The second, which included the area over which the destroyed dome had stood, would be given to the Ram Lala Virajman (seated Baby Ram) to build a temple there. The last plot would go to the Nirmohi Akhara (Group without Attachment, in a loose translation, a group of Hindu ascetics). This was the site of the earlier structures dedicated to Ram Chabutra and Sita Rasoi (Times of India 2010; Pokharel and Lahiri 2010). The Sunni Central Wakf Board, the Nirmohi Akhara, the All-India Hindu Mahasabha (All-India Hindu Assembly) and the Bhagwan [god] Shri Ram Virajman all appealed the court’s decision. On 31 May 2015, the Supreme Court suspended the verdict of the Allahabad High Court, restoring the status quo ante, that is to say the banning of all religious activities on the site (Venkatesan 2015).

25Many questions remain unanswered. A forensic laboratory in Ahmedabad, the former capital of Gujarat, demonstrated that the fire could not have been caused solely by at least a 60-litre volume of inflammable liquid being poured around the interior of the carriage. With the possible exception of the toilets, the windows of the carriage were closed. The VHP, meanwhile, argued that the conclusion of the forensic laboratory was proof of a conspiracy: Muslims had travelled inside the train, in order to set fire to it. There are two remaining hypotheses: were the Hindu nationalist activists transporting kerosene to cook food? It would have been unlikely they had 60 litres in their luggage. The second hypothesis is that a Muslim vendor, plying his trade or trying to get paid for goods sold, climbed on board the train.

26And here, Hindu nationalists were only too happy to lump together Muslim insurgents in Jammu and Kashmir deemed terrorists by the state, and Muslims in the whole of the Sub-continent.
Evoking the 2002 episode “Former Commissioner of Police, Ahmedabad, Shri P.C. Pande (he was CP when the carnage took place)” is of a different opinion. He told the journalist Rana Ayyub:

“Yes, it was one of the most horrific times of my life. I had already seen 30 years of service. But look at this: there were riots in 85, 87, 89, 92 and most of the times the Hindus got a beating. And the Muslims got the upper hand. So this time in 2002, it had to happen, it was the retaliation of Hindus. Also post-1995, people felt that the government was theirs, especially because it was a BJP government. (...) ‘They say the riots of 2002 are because of him [Narendra Modi]. He says I didn’t go and burn the train at Godhra. (...) See, this was a reaction of what happened there. I mean you see it logically, here is a group of Muslims going and setting fire on a train, so what will be your reaction? » (Question) You hit them back? « (Answer) Yes, yes, you hit them back, now this hitting back, you must have already done research that they [the Hindus] got a beating in 85, 86, 92 and so, what happens, here is a chance, give it back to them... Why should anybody mind?” (Ayyub 2016, p.105,106).

Pande added that:

“Once people get passionate about it, you can’t stop them...” (ibid).

IPS [India Police Service] officer Girish Singhal, for his part, stated:

“I have served in Gujarat during the riots and I have been here since 1991, So I have seen many riots. We have seen riots in 82, 83, 85,87, and in 92 post Ayodhya.

“Muslims were more dominant. In 2002, more Muslims were killed. See with Muslims it’s like this. Especially in 2002 it was like this, Muslims were killings Hindus all these years so whatever happened in 2002 was a retaliation of all these years of being beaten by Muslims. And everybody across the world created havoc. They did not see the situation in which the Hindus were killed” (Ayyub 2016, p.37).

In the aftermath of the 11 September 2001 attacks, during a televised debate, Narendra Modi had declared that “Not all Muslims are terrorists, but all the terrorists are Muslims” (Engineer 2015). Did the Gujarat government, even as it officially called for calm, try to

27 Ayyub, a Tehelka journalist, took the false identity of Maithili Tyagi, a US-based film-maker and student of American Film Institute whose family adhered to the Rashtriya Swayamsevak Sangh's ideology.

28 Such an assertion, at least in relation to India, was false. Looking at recent figures (2014), India suffered 976 victims of terrorism or extremism (depending on the choice of adjective): 465 persons were killed in the North-East, the scene of secessionist movements; 314 persons died in Naxalite attacks or the efforts to tackle these groups; 193 persons were killed in violence in Jammu and Kashmir (Patel 2015).
identify targets upon whom a ‘reaction’ (to use a term frequent in the Sub-continent) to the tragedy of Godhra could be visited? Publications of Sangh Parivar groups, such as Sandesh (Message) and Gujarat Samachar (Gujarat News), were disseminated widely to the most remote rural areas. The front page invariably had pictures of burnt bodies. Rumours that young Hindu girls had been raped by Muslims were spread. Local media close to the Hindu nationalists built up such propaganda. The barbarism of Muslims was highlighted by insisting that girls had been raped on multiple occasions, and that their assailants had even forced themselves on two dying bodies.

The 72 hours that followed Godhra illustrated what the Sangh Parivar intended by way of ‘punishment’ for ‘the guilty’ and ‘lesson’ for the Muslim community. The curfew declared seemed to apply only to the Muslim community, thus rendering them sitting targets, while activists of the BJP, RSS, VHP and Bajrang Dal were free to act as they pleased. The State of Gujarat claimed it had struggled to restore order from 28 February to 2 March. Indian troops began to arrive in Gujarat on 1 March, but lacked the necessary logistical support from the Gujarat government. They were therefore not operational before 3 March. By that date, 790 Muslims had lost their life (the official total for the year was around 2,000, while more than 200,000 had had to flee to improvised camps, their belongings pillaged and/or burned).

The Sangh Parivar wanted to get rid of as many Muslims as possible, making use of methods that would not be quickly forgotten. It had lists of the numbers of Muslims by residential area, including addresses and residential or commercial property belonging to them. Information collected through the electoral register also proved invaluable: hardly any Hindu properties were damaged, but establishments co-owned by Hindu and Muslim associates were not spared.

Those who had imagined such atrocities also sought the elimination of Muslim religious and cultural objects. In total, 230 mosques and dargahs were, it appears, profaned or destroyed during the first 72 hours after the Godhra catastrophe. It is difficult to compile a list of the areas affected, but the majority of attacks took place in central Gujarat, especially in Ahmedabad and Vadodara. Bajrang Dal leaders in Ahmedabad, referring to the case of the district of Panchmahal (near Vadodara), rejoiced at the outcome of 800 villages ‘cleansed’ of Muslim presence. The Modi government, for its part, argued that everything was the result of spontaneous riots that broke out as Hindus spilled out into the streets.

29 The police had already been through a process of a kind of ‘ethnic purification’: Muslims holding posts with important responsibilities were transferred to solely administrative positions. Others who expressed opposition to such a move themselves risked ‘punishment transfer’.

30 In Ahmedabad and Baroda, notably, mosques that were inscribed on the list of national monuments were knocked down with cranes and bulldozers, and roads quickly built in their place.

31 These are tombs or mausoleums of Muslim saints.
“In a speech delivered in Gujarat, [Dr Pravin] Togadia [a cancer surgeon who joined the VHP in 1983] said:

“Terror was unleashed at Godhra station because this country follows Gandhi. We locked Gandhi away on February 28. Reform yourselves (Muslims) or we forget Gandhi forever. Till we follow Gandhi’s policy of non-violence, till we continue the practice of kneeling before Muslims, terrorism cannot be elevated. My brothers we have to abandon Gandhi” (Ayyub 2016, p.72).

The Chief Minister, projecting an image of the great defender of Hindu middle-class, called early elections for August 2002. Following opposition from the Election Commission, these were eventually held in September. Since then, the Sangh Parivar has continued to determine the destiny of Gujarat. Rana Ayyub for her part tries to be impartial, writing, for example:

« There was an atmosphere of hostility that prevailed post-riots. It was clear that the not-so-amicable relationship between the two communities had taken a turn for the worse. Narendra Modi was being seen as the Hindu leader who saved the Gujarati Asmita from invasion. Both communities had suffered with the Godhra train burning and the carnage right after. Those who had come in the line of fire were bureaucrats and officers but nothing could be proved against them. Commissions of enquiry over the years have used the harshest words of criticism for the authorities and their actions, or inaction, at that time, but barring a few footsoldiers, most remained in position of power” (Ayyub 2016, p.30).

3.3. Hindu Nationalism and the Muslim ‘Threat’: Some Statistics

Hindu nationalists continue, in recurrent manner, to raise the spectre of the ‘Muslim threat’. They play on the issue of terrorism, but also – and since much longer – on a birth rate of the Muslim minority that might turn it into a majority in the long-run.

“Demographic statistics… suggest no threat from Muslims… What may alarm Hindu nationalists is the fact that there are more Muslims in India than in Pakistan; India has the second-highest Muslim population in the world after Indonesia. As a result, Sangh Parivar organizations decry high Muslim birth rates and imply a demographic threat. They also work politically at breaking up vote-getting collaboration among Muslims, Christians, and Dalits (untouchables)” (Powers 2009, p.69).

The natural increase of the Muslim community, 32.9% in the period 1981-1991, fell to 29.3% for the following decade. As for Hindus, their natural increase over the same periods dropped from 22.8% to 20%. Indeed, India is happy to boast of being a ‘great

32During the carnage, Hindu nationalists focused on the Congress bastions of northern and central Gujarat. Some 47 of the 61 Congress-held constituencies were the scenes of violence, compared to only 57 out of 121 BJP-held ones. The Congress itself conducted an electoral campaign that was far from courageous, often declining to refer to the ‘communalist incidents’ and concentrating on the economy.
kaleidoscope’ welcoming religions born in the Sub-continent or that come from elsewhere (GoI 2011a). The cradle of Hinduism, Buddhism, Sikhism and Jainism, the country has, moreover, seen the blossoming of various tribal belief systems that have resisted the influence of the ‘great religions’ (Ibid). Analysing the results of the 2011 census, the team leading this task reported that Hindus formed a majority in 27 states and union territories33, with the exceptions being Manipur, Arunachal Pradesh, Mizoram, Lakshwadeep, Nagaland, Meghalaya, Jammu and Kashmir and Punjab. Muslims made up a majority in the tiny Lakshwadeep archipelago (just 32 km2), and in Jammu and Kashmir (222 236 km2). There is a non-negligible Muslim population in Assam (30.9%), West Bengal (25.2%), Kerala (24.7%), Uttar Pradesh (18.5%) and Bihar (16.5%) (Ibid)34.

The most recent census of 2011 does not publish data allowing one to judge the natural increase by community, perhaps to avoid the tensions that such a presentation might provoke35. Data are instead presented by age group. Some 18.7% of Muslims are in the 0-6 years age-group, whereas nationally, 15.9% of Indians are in that age-range. It is higher than five other religious communities (Hindus, Christians, Sikhs, Buddhists and Jains). The lowest rate is for Jains (10.6%) and Sikhs (12.8%) (GoI 2011b).

<table>
<thead>
<tr>
<th>Religion</th>
<th>0-6 Age Group %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindus</td>
<td>15.6</td>
</tr>
<tr>
<td>Muslims</td>
<td>18.7</td>
</tr>
<tr>
<td>Christians</td>
<td>13.5</td>
</tr>
<tr>
<td>Sikhs</td>
<td>12.8</td>
</tr>
<tr>
<td>Buddhists</td>
<td>14.4</td>
</tr>
<tr>
<td>Jains</td>
<td>10.6</td>
</tr>
<tr>
<td>Others</td>
<td>18.0</td>
</tr>
<tr>
<td>India</td>
<td>15.9</td>
</tr>
</tbody>
</table>

*Source: GoI (2011b)*

Those who nonetheless might wish to try to influence the birth rate amongst the Muslim population must examine the dialectical relationship between social status and fertility.

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33India’s federation includes 29 states and 7 union territories (Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli, Daman and Diu, Lakshadweep, Delhi and Pondicherry). These territories are directly administered by the Centre.

34One needs also to take into account the illegal immigration of Bangladeshi into the bordering Indian states, especially Assam and West Bengal.

35The census website is not very user-friendly in the view of this user.
The author may quote a document published in November 2006, the Sachar Committee Report\textsuperscript{36} on Social, Economic and Education Status of the Muslim Community in India (Ministry of Minority Affairs 2006). This emphasised that the difficulty of social promotion of Muslims stemmed less from their unwillingness to improve themselves than from a scarcely concealed rejection by the dominant community.

Two further indicators should be mentioned here: firstly, the level of literacy of the Muslim community given below of most other religious groups.

**Table 3: Literacy of major religious community in India**

<table>
<thead>
<tr>
<th>Religion</th>
<th>Overall Literacy rate %</th>
<th>Males %</th>
<th>Females %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindus</td>
<td>65.1</td>
<td>76.2</td>
<td>53.2</td>
</tr>
<tr>
<td>Muslims</td>
<td>59.1</td>
<td>67.6</td>
<td>50.1</td>
</tr>
<tr>
<td>Christians</td>
<td>80.3</td>
<td>84.4</td>
<td>76.2</td>
</tr>
<tr>
<td>Sikhs</td>
<td>69.4</td>
<td>75.2</td>
<td>63.1</td>
</tr>
<tr>
<td>Buddhists</td>
<td>72.7</td>
<td>83.1</td>
<td>61.7</td>
</tr>
<tr>
<td>Jains</td>
<td>94.1</td>
<td>97.4</td>
<td>90.6</td>
</tr>
<tr>
<td>Other religions</td>
<td>47.0</td>
<td>60.8</td>
<td>33.2</td>
</tr>
<tr>
<td>India</td>
<td>64.8</td>
<td>75.3</td>
<td>53.7</td>
</tr>
</tbody>
</table>

*Source: GoI (2011b)*

The second indicator is the extent to which members of the Muslim community are economically active. It is true that in both cases, the issue of social integration overlaps with that of religious conservatism. The importance of the informal sector to the Indian economy, and which is perhaps not fully accounted for, should also not be underestimated.

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\textsuperscript{36}Established in 2005, as is customary, this commission took the name of its president, Rajinder Sachar, a lawyer who had already assumed important official positions.
Table 4: Work participation rate by religion

<table>
<thead>
<tr>
<th>Religion</th>
<th>Total %</th>
<th>Males %</th>
<th>Females %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindus</td>
<td>40.4</td>
<td>52.4</td>
<td>27.5</td>
</tr>
<tr>
<td>Muslims</td>
<td>31.3</td>
<td>47.5</td>
<td>14.1</td>
</tr>
<tr>
<td>Christians</td>
<td>39.7</td>
<td>50.7</td>
<td>28.7</td>
</tr>
<tr>
<td>Sikhs</td>
<td>37.7</td>
<td>53.3</td>
<td>20.2</td>
</tr>
<tr>
<td>Buddhists</td>
<td>40.6</td>
<td>49.2</td>
<td>31.7</td>
</tr>
<tr>
<td>Jains</td>
<td>32.9</td>
<td>55.2</td>
<td>9.2</td>
</tr>
<tr>
<td>Other religions</td>
<td>48.4</td>
<td>52.5</td>
<td>44.2</td>
</tr>
<tr>
<td>India</td>
<td>39.1</td>
<td>51.7</td>
<td>25.6</td>
</tr>
</tbody>
</table>

Source: GoI (2011b)

It is clear that the Muslim community struggles to profit from the “law of the group” (Dumont 2006) in such a way as to protect its rights. This concept draws on the idea that “within a population living in a given territory, specific groups can use, directly or indirectly, their numeric weight to modify their situation, obtain political advantages or influence the foreign policy of the territory”. Outside the Kashmir Valley, Muslims are, it is true, dispersed across a vast area, comprising a minority within a Hindu mass.

Another burden weighs on the Muslim community: the events that have shaken Kashmir since the end of the 1980s, and which doubtless push one latent suspicion to the front of the minds of many non-Muslim Indians. How can one be sure of the loyalty of Muslims to age-old India, when they were responsible (according to this reading) for the partition of the country? It should be noted, however, that the Centre, in the messaging that it deploys to justify the tough repression meted out in Jammu and Kashmir, avoids any lumping together of the Muslim population of that state and their co-religionists in the rest of the country. With the exception of the attacks and violence that continue to mark life in that state, the beginnings of the phenomenon of terrorism that has come to affect India are perhaps to be found in the aftermath of the destruction of the mosque in Ayodhya. The intercommunal harmony, which India could boast of having gradually installed (more than forty years after the partition), was lastingly damaged. Bloody communalist riots broke out across the country following the destruction of the Ayodhya mosque. In March 1993, thirteen booby-trapped vehicles exploded in Mumbai (Bombay), putting the capital of the state of Maharashtra into shock. New Delhi pointed the finger of accusation at Islamabad and the ISI. Since then, India has been troubled by attacks only too frequently. The hair-raising attack on the city of Mumbai in late November 2008 underlined the dangers which citizens of all religious colours must risk facing.

According to the recent analyses carried out by the Indian intelligence services, the most radical Muslims in the country are building an internal terrorist movement, with the
blessing of the ISI (The Hindustan Times, 14 October 2016). The Muslim community, for its part, is worried by police methods at a time when the country is seeking to rid itself of the terrorist phenomenon. Whatever the case, the ‘biggest democracy in the world’ is the stage on which a political life undermined by demagogy and corruption plays out, as human rights get a battering. All this, in spite of a Constitution that in Articles 15 and 16 of Part III (National Portal of India 2016, pp 8-10), defends fundamental human rights and proclaims the equality of all and before the law.

4. CONCLUSION AND RECOMMENDATIONS

In a document titled 300 Days. Documenting Hate and Communal Violence Under the Modi Regime published on 20 May 2015, John Dayal is alarmed about the slogan Ghar Wapsi and (the spiritual return home of lost souls to the Hindu faith) or cries of Love Jihad (accusing Muslim men of marrying, and converting by force, Hindu women). Dayal is deeply concerned by the sorry communalist record of the Modi government after one year in power.

“Mr. Modi calls for a ten-year moratorium on communal and caste violence. His government soon declared Christmas to be a “Good Governance Day” in honour of the BJP leader and former Prime Minister, Mr. Atal Behari Vajpayee. There are fears at a severe whittling down of the 15 Point Programme for many severely economic backward communities and specially their youth seeking higher education and professional training” (Dayal 2015).

The author examined one conclusion of the National United Christian forum, “representing the Catholic, Protestant and Evangelical groups of the Church in India”, which said,

“The cultural DNA of India of pluralism and diversity is being threatened. We are anxious about the implications of the fundamentalist political thesis that India is “one nation, one people and one culture”. A nation of cultural homogeneity is impossibility and any effort to impose it is fraught with grave ramifications for the country” (Ibid).

The victims of the events in Gujarat alluded to above wait in vain for impartial justice to be rendered to them, declaring forcefully that the then Gujarat Chief Minister, Narendra Modi, was in the driving seat. An emblematic case was the carnage in the Gulberg Housing Society, almost exclusively occupied by Muslims, on 28 February 2002 where 69 persons were killed. Indeed, the terrifying character of the events of Gujarat of early 2002 will forever mark the memory of the Indian Muslim community, even if ‘communalist incidents’, as they are sometimes euphemistically described, are no stranger to the Sub-continent.

A number of Muslims had taken refuge on 28 February 2002 in Chamanpura, an area of central Ahmedabad (at the time the capital of Gujarat), where the Gulberg Housing
Society was located. There were two reasons for this: Chamanpura was close to a Police Commissioner’s Office, and they believed that the presence of Ehsan Jafri, a former Congress parliamentarian, would offer a reasonable guarantee of security. Indeed, the 73-year-old had received a visit from the Commissioner of Police, P.C. Pandey, who had told him that police reinforcements would be dispatched. No help was sent, despite repeated calls made by Jafri and Congress political notables who spoke on several occasions to the Director General of Police, the Commissioner of Police, the mayor and various other members of the Government of Gujarat. Ehsan Jafri died in horrible circumstances as the locality came under attack from a crowd of rioters numbering around 3,000. Jafri made one last throw of the dice, telephoning Modi, who is said to have replied:

“Are you still alive? Don’t worry, they will take care of you!” (Mahmoud 2014).

New Delhi, the country’s capital, is today sprinkled with posters boasting of the exalted rank India now occupies in international relations. Beneath a photograph of Modi, a tagline proclaims that ‘India is becoming the world’s fascination’\(^{37}\). It is a discourse that flatters a nationalism of worrying dimensions. The centrality of its Hindu element is asserted forcefully, provoking the ‘excesses’ that the more extreme in the Sangh Parivar are only too pleased to boast about.

By way of example, one can mention recent events in the village of Bishada (Gautam Budh Nagar district in Uttar Pradesh) that took place on 28 September 2015. Villagers forced their way into the home of a Muslim family suspected of storing beef in their fridge, lynching the 50-year old father, Mohammed Akhlaq, and seriously wounding one of his sons, a 22-year old. The consumption of beef is illegal in Uttar Pradesh, as well as many other states of India, since Hinduism venerates cows. One of the outcomes of the inquiry should be noted here: the meat found in the Akhlaq family fridge was sent for testing and the laboratory found it to be beef rather than mutton, as had been claimed the day after the drama. The 19 murderers, seeking to bring an end to judicial proceedings against them, are thus demanding the arrest of the family for violation of the Penal Code that outlaws the eating of beef.

This is one example amongst many others of the atmosphere prevailing in the country, as many including journalists do not hesitate to state that they are afraid to express themselves freely. In such circumstances, the reader will appreciate that researchers, especially those from overseas, are reluctant to formulate recommendations. There is no doubt that Indian civil society has a crucial role to play in reinforcing inter-communal harmony, in what is an ethno-religiously diverse country. One can only encourage the Indian intelligentsia to increase awareness, particularly amongst the Hindu majority, of

\(^{37}\)It is true that compared to the previous administration, the Modi government spends significantly more on publicity. According to figures given by the CPI(M), the annual budget for such activities increased in 2016 by 20% to reach Indian Rs. 1,200 crores (Yechury 2016) or about 170 million euros.
the need to continue building the nation along the lines set out by the “founding fathers.” This would also highlight how diversity is a source of strength rather than, as seems to be the case for certain currents of Hindu nationalist opinion, a weakness to be denied. One should take to mention the important role Jawaharlal Nehru University (JNU) has been playing.

“In addition to opportunity, self-confidence, personality development, and networks, JNU also gave a student perspective about the nature of the world, not just in terms of the global order, but also in terms of the structures of power, dynamics of society, drivers of change, and aspirations of citizens. We learnt how peasants became citizens. We learnt how elite capture was a problem for democracy. These ideas enriched our public discourse. At JNU we produced and reproduced the idea of an India that was inclusive, anti-discriminatory, gender-just, environmentally sustainable, artistically creative, cosmopolitan and socially redistributive.” (de Souza, 2016).

Peter Ronald de Souza emphasizes that:

“In addition to being an incubator of personnel to the state and civil society, JNU has also been an incubator of dissenting ideas. For a nation to cope with the pressures of modernity and the challenges of globalisation it needs to have an army of intellectuals who can prepare the nation for this new world that is upon us. It needs to engage with these new ideas. Go to a seminar in JNU, and you will be delighted by the intensity of the questions and the earnestness of the search for answers. It is one of the few places in the country where interdisciplinarity is a habit and where conversations between aestheticians and political scientists do not raise an eyebrow. Nor do dialogues between the cosmologies of the East and of the West” (ibid).  

“Contrary to what is repeated around us, it is never difference that is the obsession of the persecutor, but rather its opposite, that is to say lack of differentiation” (Girard 1982, p.29).

38 “The President of India, Mr. Pranab Mukherjee, noted the rise of communalism and the targeting of religious minorities in his address to the nation on 25 January 2015, the Eve of Republic Day. President Mukherjee said: “In an international environment where so many countries are sinking into the morass of theocratic violence… We have always reposed our trust in faith-equality where every faith is equal before the law and every culture blends into another to create a positive dynamic. The violence of the tongue cuts and wounds people’s hearts. The Indian Constitution is the holy book of democracy. It is a lodestar for the socio-economic transformation of an India whose civilization has celebrated pluralism, advocated tolerance and promoted good will between diverse communities. These values, however, need to be preserved with utmost care and vigilance” (Dayal 2015).

39 The journalist writes: “There were many things wrong with JNU. For example, the liberal persuasion was not allowed the space it should have been given by the Stalinist Left. The political spectrum was wide but it could have been wider. Analytical thinking was feeble, and ideological camps gave protection to the less capable. But it was possible to question these ideological hegemonies. To dissent, experiment, collaborate, this is the signature of JNU. Debate was polemical but it was peaceful. There was no violence. By providing personnel to the civil services, academic institutions, civil society organisations, and media, JNU has been a significant incubator for the task of nation-building” (ibid).
The French philosopher, René Girard, ponders the dialectics of scapegoating and the stereotypes that underlie a desire, in periods of crisis, to stigmatise particular communities. He writes that:

“Victims are selected not on the basis of the crimes that are attributed to them, but rather on the basis of their indicators of victimhood, on everything that is inferred as to their guilty affinity with crisis” (Ibid).

The writer goes on to say that:

“The aim is to place the blame for the crisis on the victims and to mitigate the effects of the former by destroying the victims or at least expelling them from the community that they ‘pollute’” (Ibid. p.30).

René Girard looks at the founding myths about scapegoats in traditional societies. Are we thus heirs of this way of thinking that reasserts itself in times of crisis? It is true that many nations today seem dominated by politicians who seek to underline their personal charisma and the ascendancy of their political party. They no longer seek to defend, as their predecessors once did, the ideals that permit the development of a society based on justice and respect for difference. By way of example, one can note how the assertion of racism is no longer so widely and unequivocally condemned. Similarly, these leaders undermine the common interest, stoking socio-economic or religious rivalries to render the atmosphere day-by-day more toxic.

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Global Warming: Evidence, Causes, Consequences and Mitigation

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ABSTRACT

Studies suggest that rise in the global temperature since 1880 (estimated 0.8 to 1.0°C) is real and considerably alarming. Although natural causes have been responsible for repeated global temperature changes in the geological past, the present rise is commonly attributed to the concentration of anthropogenic greenhouse gases, mainly carbon dioxide (CO2), in the atmosphere. CO2, which takes hundreds of years to be removed from the atmosphere, has increased significantly over the past century. Increasing consumption of fossil fuels in energy production, industry, transport, agriculture and other human activity has been causing the emission of greenhouse gases in the Earth’s system. More than 2°C increase in temperature by the end of this century would be severe if not catastrophic. Global warming would result in melting of glaciers and polar icecaps, water depletion, insecurity of food, sea-level rise and threat to coastal regions, coral reefs extinction, migration of species and natural disasters. The potential threats of climate change are assumed to be more severe to the less developed countries because of their lack of resilience and preparedness. The situation, according to some, is desperate and urgently requires remedial steps such as removal of CO2 from atmosphere, afforestation, use of clean energy, and changing our life style to control Earth’s temperature. The world needs to unite in taking necessary remedial steps on an urgent basis to ensure sustainable development.

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1. INTRODUCTION

Global climate has not remained constant. There have been temperature variations over long to short time intervals, resulting entirely from natural causes. The geologic history of Earth shows severe drops in temperature, followed by interglacial periods of normal and warm temperatures, as shown by widespread glaciations and sea-level change records in sediments. Faunal extinctions, such as the disappearance of dinosaurs some 65 million years ago, could also be attributed to severe climate changes (Ceballos et al. 2015).

The growing concern expressed by climate scientists over global warming since the 1980s was prompted by the general perception that the rise in global temperature observed during the second half of the 20th century is due to human factors and is likely to disrupt the planetary climate system with profound negative impact on ecosystems and human wellbeing. Climate scientists pointed out that the rise in surface temperature had been caused by the unprecedentedly large scale emissions of CO2 and other greenhouse gases (GHG) from the burning of fossil fuels for producing energy since the Industrial Revolution, and widespread deforestation and forest degradation. The UN-sponsored Inter-governmental Panel on Climate Change (IPCC), established in 1987 to examine the scientific evidence related to climate change, confirmed the consensus among climate experts in its First Assessment Report (FAR) issued in 1990. In light of the FAR, the inter-governmental negotiations convened by the UN General Assembly culminated in the adoption of the UN Framework Convention on Climate Change (UNFCCC) in 1992. The Paris Agreement, adopted in December 2015, is meant to implement the UNFCCC.

According to the Fifth Assessment Report (AR5) of the IPCC issued in 2013-2014, global temperature has risen by about 0.8°C over the past 130 years, 50% of which was in the past 35 years (Wolff and Fung 2014). Temperature records show that the global average temperature in the 20th century was 13.9°C with a rise of 0.99°C by 2016 (NASA 2017). The 12 warmest years on record have occurred since 1998 and every one of the past 38 years has been warmer than the 20th century average. According to the US National Oceanic and Atmospheric Administration (NOAA), the three consecutive years 2014, 2015, and 2016 have shown record breaking heat all over the planet, with 2016 as the hottest year of the century (Plait 2017). Sea-level has risen by 20cm over the previous century. A rise of 2°C would be severe, and 4°C (feared by some for the end of this century) would be disastrous (EPAa 2016). Interestingly, increase in the global temperature has not occurred steadily but at irregular intervals. Typical features of the temperature are a distinct warming trend from 1910 to 1940 followed by the sharp warming trend until the end of the 20th century. Figure 1 shows variation in global temperature for 160 years period (1840-2000). There is a marked increase in temperature during the 20th century in all reported data sources.
2. EVIDENCES FOR GLOBAL WARMING

Several lines of evidence corroborate rise in global surface and ocean temperature. All heat measurement records, 1) over oceans (measurement data to 1850), 2) of heat content of the oceans (it has been argued that >90% of the extra heat from global warming is transferred to oceans), 3) on continents (weather stations), and 4) near surface (troposphere 50 years satellite data) show increasing temperature trends. Additional supporting evidence is provided by 5) rise in sea-level, 6) increase in humidity, 7) recession in glaciers and reduction in polar icecaps (satellite data since 1973 and reliable shipping records to 1953 showing 35% shrinking in September ice cover), 8) increased events of coral bleaching due to rise in ocean temperature (which can lead to their mortality), 9) change in birds’ breeding seasons and early emergence of insects from the ground, and 10) the release of methane into the atmosphere by thawing of permafrost (Lead Pakistan n.d.). In the following sections, some of the global warming evidences are elaborated.

2.1. Melting and Recession of Glaciers

There are many studies that suggest recession in glaciers and the polar ice cover since 1850. The temporal coincidence of the increase in the quantity of GHG in the atmosphere and glacier retreat is commonly cited as an evidence of global warming. Tropical and subtropical mountain ranges, such as the Alps, Cascades, Rockys, and the southern Andes, have been undergoing large glacial losses (Molg 2015). Paradoxically, the 2000-2010 data on the highest mountain system (the Himalayan-Karakoram region) shows
divergence. Bahuguna et al. (2014) reported that 2026 of the Himalayan-Karakoram glaciers during the 10-year period underwent only 2% shrinking in area. They also noted that the longest glacier of the region, Siachin in the Karakoram, remained stable during this period. It has been observed that whereas the Himalayan glaciers (fed mostly by monsoons) have been receding, the western Karakoram glaciers (fed mostly by westerlies) have remained stable. NASA footage of the Bhutan Himalayan glaciers shows that they have been receding over the past few decades, resulting in the formation of lakes, some leading to glacial lake outbursts. Gangotri, the largest Himalayan glacier (Figure 2 left), has receded by 850 m (NSIDC 2017). Glacial recession has taken place in other parts of the world also. Figure 2 (right) shows substantial reduction of ice cover in the Sperry Glacier of Montana, USA, over eight decades.

**Figure 2**: Images of recession in Gangotri Glacier, Himalaya (left) and Sperry Glacier, Montana (right).

Sources: NSIDC (2017) and USGS (n.d.)

2.2. **Melting of Polar Ice Caps and Reduced Snowfall in the Northern Hemisphere**

Both the Antarctica and Arctic ice covers have been shrinking. In 1980, Arctic ice (8 million km²) made up 2% of the Earth’s surface; now it is only a quarter of that during the summer. Antarctica has been losing about 134 billion metric tons of ice per year since 2002. This rate could speed up if the burning of fossil fuels persists at the current pace (EPA 2016).

2.3. **Temperature Records of Land and Ocean Water**

Recorded data on temperature of the land and ocean, as well as the temperature simulation models, show an increase in global temperature between the time period of 1979 to and 2014 (Figure 3). There are some discrepancies in the simulations and actual recorded data. Temperature changes recorded for the lower tropical (20°S–20°N) troposphere between 1979 and 2008 are much smaller than what is predicted by the
present climate models (Santer et al. 2008). However, even a small, steady rise in global temperatures cannot be taken lightly.

**Figure 3:** Comparison of three different average annual temperature measurements

![Temperature graph](image)

Source: NSSTC and NOAA (2015)

According to the very first climate simulations made almost a quarter of a century ago (and the MPI model in Hamburg), the global warming today should rather be 1.25°C than the 0.75°C-1.0°C. This is in spite of a relatively large (cooling) aerosol effect of the Hamburg model that at the time was larger than the present view of IPCC today. The tropics are a crucial area where the greenhouse effect is the largest. The data from three different sources presented in Figure 3 show almost the same measurement patterns of average annual temperature increase from 1979 to 2014.

### 3. CAUSES OF GLOBAL WARMING

As mentioned above, there is ample evidence that natural processes drive climate and practically all kinds of extreme weather have always been part of the climate scenario. One theory suggests that galactic cosmic radiation modulated by solar activity affects low level cloud cover and is causing the global warming. But it would be illogical to think that the large quantities of GHG added to the atmosphere (CO2 from fossil fuel burning and gasoline; methane from agricultural activities, waste management, energy use, biomass burning; N2O from agriculture, including the use of fertilizers and biomass burning; fluorinated gases from industrial processes, refrigeration, consumer products such as HFC, PFC, SF6), and deforestation would not accelerate global warming.
The addition of the increased volumes of CO2 and other GHG to atmosphere have been considered by climate experts and simulation models to be the primary causes of the global warming that has occurred over the past 50 years (Oliver et al. 2015). Major sources which contribute towards GHG emissions in the air are shown in Figure 4. The amount of CO2 per kWh electricity production from various sources of hydrocarbon fuels is shown in Figure 5. GHG remains in the atmosphere for different time period, ranging from a few years to thousands of years. CO2 takes about 100 years for removal from atmosphere.

**Figure 4.** Major sources which contribute towards GHG emissions in the air

![Major sources which contribute towards GHG emissions in the air](source: Hidalgo et al. (2008))

Emissions from fossil-fuel combustion from various processes (industrial, i.e., production of cement clinker, metals and chemicals; transport; agriculture; etc.) is producing approximately 2.5 billion tons of CO2 annually (WNA 2014). The total quantity of CO2 in the atmosphere is estimated at 35.7 to 40 billion tons (Plait 2014). It has been suggested that the Earth’s warming rate because of anthropogenic emissions is roughly equal to the heat that would be released by 400,000 Hiroshima A-bombs across the planet every day (Romm 2013).
Figure 5: Amount of CO2 emission/kWh electricity production using various fuel sources.

Source: IEA (2015)

Shakun et al. (2015) reported that CO2 levels rose from about 180 ppm to 280 ppm at the end of the Ice Age, which spanned nearly 7,000 years. For centuries, the level of CO2 remained <300 ppm, however, following more than a century-and-a-half of industrialization, CO2 has now risen to approximately 400 ppm. The amount of CO2 increased in the atmosphere by 40%, and other gases, such as CH4, by a factor of 2 to 3 or more. The major contributors towards carbon emission into the atmosphere are the United States and OECD countries, China and India. Figure 6 shows the emission of various GHG in USA, estimated at 7000 million metric tons CO2 equivalent for 2014.

Figure 6: U.S. Greenhouse Gas Emission by Gas, 1990-2014

Source: EPA (2016)

According to the IPCC and the Paris Agreement adopted in 2015, a drastic reduction in current emission trends is urgently needed to limit a rise in average temperature to 2oC above the pre-industrial times.
4. CONSEQUENCES OF GLOBAL WARMING

The consequences of rising atmospheric CO2 are profound for Earth's temperatures, climate, ecosystems and biologic species, both on land and in the oceans. Changes in patterns of rainfall and snowfall, increase in drought and severe storms, reduction in ice cover, melting of glaciers and glacial lake outbursts, floods, mass movement and landslides, increase in sea levels, abnormal increase in humidity in certain parts of the world, changes in animal and plant behaviour, faunal extinction and disappearance of coral reefs have been predicted. And not without reason; faunal extinction over geological time is commonly connected to climate change. It is also obvious that global warming would impact the developing nations more severely because of their lower resilience, poor preparedness and weak economies. Climate changes would also result in mass migrations of biological species, including humans.

Global warming would adversely affect the availability of fresh water for irrigation and domestic use, forests, fishery, hydro-energy production, and mountain recreation, particularly in countries that depend on waters ensuing from glaciers. Melting of mountain glaciers, early snow melt, and resulting drought conditions would cause dramatic water shortage and seriously threaten food security and economic development in many countries of the world. Glacier melting would also result in rising sea-levels and coastal flooding, and would pose serious threat to many of the world’s large cities located along the coast. High concentration of GHG in air will result in disease outbreaks such as allergies, asthma and other infectious diseases. Three of the world’s most populated countries, i.e. China, Pakistan, and India, are amongst the worst five countries in terms of the air pollution (Krepon 2015).

Global rise in temperature shall have a huge impact on rivers and lakes fed by glacier and snow melt. In the greater Himalayan region (Himalaya, Karakoram, Hindu Kush, Pamir, Tibet), climate change may reduce hydro-power generation, especially in Tajikistan, the third largest hydropower generating country in the world (World Bank 2000). Agriculture is critically dependent on the waters of the mighty rivers that are fed by glacier melting in China, Pakistan, India, Central Asia and South East Asia. Pakistan’s GHG emissions are less than 1% of the global emissions, but the impacts of climate change on Pakistan will be enormous in terms of rate of crop yield, variability in rainfall due to fluctuating hydrological cycles, freshwater availability, effect of heat stress and air pollution on human life, natural disasters, and so on. All these have been documented in ‘National Climate Change Policy’ (Ministry of Climate Change 2012).

According to the Global Climate Risk Index (German Watch 2017), Pakistan is the world’s 7th most vulnerable country in terms of the negative effects of global warming and climate change accrued over the period 1996-2015. During 1996-2015, the annual average death toll induced by climate hazards was 504.75. Similarly, Pakistan faces an average annual loss of 3.8 Billion USD.
Pakistan’s economy is critically dependent on agriculture and livestock sector which contributes 19.82% of GDP, employs 43.5% of labour and make up 68.5% of value added exports. Some 50% of its 145 Million acre feet (IRSA 2011) of surface water resources are recharged by glacier melt. The country has already become water-scarce as per capita water availability came down to 1,000 m$^3$ in 2011 from 5260 m$^3$ in 1951 (World Bank 2013). IMF (2015) placed Pakistan at 36th rank in the list of most water stressed countries. Because of water scarcity, it is experiencing drying out of wetlands and degradation of ecosystems. Moreover, water scarcity also portends alarming scenario for water-food-energy nexus (UNDP 2016). Combined with the fact that Pakistan is among the top five countries that have the least clean air (Krepon 2015), it might face a dooms day scenario. The country is technologically and economically not ready to cope with the adverse effects of climate change as observed during the 2010 flood which affected 20 million people and caused heavy damages and economic losses.

5. IMPACT OF GLOBAL WARMING ON SOCIO-ECONOMIC DEVELOPMENT

Global warming is expected to affect health, energy supply, socio economic patterns of livelihood, and living. Global warming is likely to cause approximately 20,000 heat-related deaths among the elderly in 2030 and 52,000 deaths by 2050. According to Mora (2017), almost three quarters of world’s human population will be exposed to deadly climate conditions by 2100. Vector borne diseases, such as malaria, dengue, and water-related diseases, such as diarrhoea, dysentery and typhoid, are likely to re-emerge. Rising temperatures, floods, drought and limited supply of drinkable water will initiate human displacement/migration (IPCC 2014). This will not only increase the informal settlements, but would also lead to social conflicts, poverty and poor standard of life.

Climate change and sustainable development are interconnected. On the one hand climate affects socio-economic development and on the other human activity has strong effect on climate through GHG emissions and other related activities. Therefore, it is pertinent to regulate anthropogenic factors affecting climate change. In addition, a consistent and embedded approach is required to tackle continuous global warming, which is feared to cause a compounding effect on poverty, most significantly in developing countries. At many levels it is impossible to delink issues such a provision of water, energy, fisheries and agriculture from global warming and climate change (Hansen and Cramer 2015).

Developing countries need to formulate and follow policies that reduce their heavy dependence on natural resources, help them cut down the emission of GHG and help them adapt to climate variability and natural disasters. Special attention must be given to keeping a standard for recording emission levels. Detailed studies are needed to know the contribution of natural and anthropogenic processes to global warming. In order to attain our goal of keeping temperature rise under 2°C, practices like business as usual should be discouraged at national, regional and international level (Agrawal and Lemos 2015).
Mountain regions that are the abode of glaciers and ice caps are particularly vulnerable to warming. The Andes and mountains of the greater Himalayan region (Pamir, Hindu Kush, Karakoram, Himalaya and Tibet) supply large quantities of water for agriculture and domestic consumption to some 40% of the world population. Global warming would have severe impact on the supply of water, food security, forest cover, and would add to frequency and severity of natural disasters, particularly floods, mass movement, debris flow and landslides. The Himalayan region is tectonically the most active as well as the most glaciated outside the polar region, and is characterised by rapid uplift and fast erosion. Intense denudation is caused by “glacial, fluvial, landsliding, eolian and weathering processes….which change over time, influenced by topographic development, climate change and humans” (Owen, 2017). One of the most challenging aspects of future geomorphic and hazard mitigation research is to develop an accurate relationship between spatial and temporal geomorphic changes and sustainable development. In a detailed study of the geomorphic evolution of the Himalayan range, Owen (2017) proposed a comprehensive strategy, incorporating various relevant aspects, for sustainable development and geohazard mitigation in the changing global environment (Figure 7).
Figure 7: Process cascade for a geomorphic framework (enclosed within the grey rectangle) to help in achieving sustainable development and for hazard mitigation in Himalayan environments


6. REMEDIAL MEASURES

The preceding account provides ample evidence that global warming is going to pose serious threat to the world’s ecosystem. Therefore, there is an urgent need for adopting effective measures to limit increase in global warming to 2°C compared to pre-industrial levels. Paris Agreement asks for sharp reductions in the emissions and removal of GHG from the atmosphere by all possible means. There are a number of ways by which the amount of CO2 in the atmosphere can be controlled (Oxford Geoengineering Programme 2017). Some are described in the following sections.
6.1. Replacement of Coal by Gas in Power Generation

By using climate metrics like global warming potential (GWP), global temperature change potential, technology warming potential, and cumulative radiative forcing and using Model for the Assessment of Greenhouse-gas Induced Climate Change (MAGICC), Farquharson et al. (2016) found that power plants using natural gas offer climate benefits over 100 years as compared to pulverized coal power plants even if the methane leakage by the former reaches 5%. In case of availability of carbon capture and sequestration, natural gas offers more benefits over coal, provided that methane leakage rate remains below 2%. During short run (20 years), however, natural gas is as bad as coal if methane leakage is 4%. This finding also resonates with the natural gas GHG footprint figured by Howarth (2014) whereby he concluded that both shale gas and conventional gas have larger GHG footprint than coal or oil. This is because natural gas emits more CH4 than CO2 and the former has more GWP than the latter. Thus, replacement of coal by natural gas can be advised for those countries which have higher natural gas reserves, but methane leakage should be kept at 2% and, where Carbon Capture and Storage (CCS) is available, below 4% in short run and below 5% in the long run.

In those countries where base-load management necessitates usage of coal, most efficient technologies like supercritical technology or ultra-supercritical technology should be encouraged so that more electricity can be generated from less coal. In order to reduce carbon footprint, Integrated Gasification Combined Cycle (IGCC) technology should be encouraged. Recently, China has increased the adoption of IGCC technology. IGCC plants run on ‘syngas’ fuel from which pollutants have already been removed in order to reduce emission (Holt 2001).

6.2. Use of Clean Energy

A significant shift from hydrocarbons to renewable energy (hydro, solar, wind) in recent years has improved the prospects of curtailing the emissions of GHG. Many countries have already set targets for emission reduction; 128 countries out of 197 have ratified the Paris Agreement (UNFCCC 2017). Renewable energy and energy efficiency are key players in reducing emission of GHG. With wind power and Solar Photovoltaic dominating the renewable energy sector, 2015 was the record year to add 120 GW of renewable energy power plants (REN21 2016). Furthermore, per kilowatt prices of wind and other renewable energy resources are failing to near parity with fossil fuels which would be encouraging for their future use. Energy efficiency measures (Green Buildings, LED Lights, Electric Vehicles, etc.) can contribute up to 30% in total emission reduction; recycling economies are contributing up to 10% emission reductions. Pakistan has the potential of generating hydro-energy several times in excess of its present need.
6.3. Removal of CO2 from Atmosphere

Newly emerging technologies like CCS can contribute to the goal of offsetting emissions. CO2 removal techniques, which would mitigate the main driver of climate change, include a) Direct air capture: using absorptive substances/membranes to pull out CO2 from air with smokestack-collection system, b) Bio-energy combined with carbon capture and storage. CO2 absorbed by trees; biomass fuels power plants, c) Carbon sequestration whereby accumulated CO2 is compressed and injected deep into the Earth inside stable geologic formations. The CO2 can be used to extract depleted oil and natural gas from reservoirs, d) Enhanced weathering of silicate rocks through slightly acidic rain, and e) Storing CO2: The wastes from industry or power plants as compressed (liquid) CO2 is stored deep within Earth in the rock pores, depleted oil or gas storage sites, or in deep saline formations. Industrial scale carbon capture and storage for coal fired plants must be encouraged and incentivized. Recycling waste material will have direct impact on fossil fuel demand and reduction in the emission of GHG.

Another way to control the carbon emission into the environment is to levy carbon tax on industry. Although Paris Agreement (PA) does not contain direct reference of carbon pricing, paragraph 136 of the COP Decision recognizes the importance of domestic policies and carbon pricing in emission reductions. Marcu (2016) argued that introduction of carbon pricing in the PA would have hampered the negotiations. However, parties to PA can voluntarily introduce carbon tax. An effective carbon tax would be that which is progressive in nature. Mapping of industries can be carried out for identifying red flag industries. Higher taxes may be levied on them.

6.4. Increase in Afforestation and Reduction in Deforestation

According to a study published recently, Intended Nationally Determined Contributions (INDC) of countries of Paris Climate Agreement, forests are likely to play a central role in conserving and enhancing carbon sink and decreasing GHG. Assuming that INDC are met by countries in its entirety, forest will serve as a net sink of carbon with capacity of (up to −1.1 ± 0.5 GtCO2e yr−1) by 2030, which is a quarter of the emission reduction proposed by INDC countries. In order to utilize the full potential of forests as mitigation measure, transparent and reliable GHG inventories must be made available by countries. In addition, uniform methodologies of measuring GHG emissions and reduction have to be used by countries in order to enhance the confidence of public and scientists in data (Grassi et al. 2017). As a matter of fact, IPCC has developed a mechanism to report GHG emissions and removal methodologies. However, GHG inventories are required to be transparent, complete, consistent and comparable, which is an inevitable task for developing countries.

Forests and use of land has often been considered as a complex mitigation option. However, after the inclusion of Reducing Emissions from Deforestation, Forest Degradation, and other forest activities (REDD+), countries are now expected to make a
full use of land based mitigation measures. One of the most commonly used land based mitigation methodology is termed as Land Use, Land Use Change and Forestry (LULUCF). Brazil, Indonesia, Ethiopia, Gabon, Mexico and Guyana are contributing most to LULUCF mitigation measure. China and India are promoting carbon sink through afforestation. The significance of LULUCF mitigation measure is reflected by the fact that LULUCF contribution is greater than all other sectors of INDC of Brazil. Some research findings suggest that in tropical region, forestation is causing significant cooling effect whereas in other parts of world such as boreal regions extensive forestation may not be entirely helpful in tackling global warming through its cooling effect but rather will add to it (Swaminathan 2007). Additional studies are needed in tropical rain forest areas to see the release of CO2 resulting from the rapid forest decay.

Afforestation and reforestation initiatives should be carried out according to scientific need assessments which help in identifying those native and indigenous species that promote biodiversity. The Billion Tree Tsunami Afforestation Project (BTTAP), of Khyber Pakhtunkhwa Province of Pakistan is a case in point. Over 13 indigenous species have been selected for the project, including the endangered species like Taxus Wallichiana (Burmi). Of the total 27 species planted under BTTAP. However, Eucalyptus has been planted the most and its excess may constrict the process of biodiversity (WWF-Pakistan 2016).

6.5. Changing our Life Style

Several ordinary measures can result in substantial reduction of greenhouse effects. Apart from above technologies and policies, changing mind-sets of people for energy usage and conservation of water, especially clean water; would be amongst the most effective measures towards climate friendly growth. Some other steps include:

6.5.1. Expanded use of renewable energy in buildings

Buildings may utilise renewable energy resources like: small solar electric systems (using photovoltaic cells), small wind electric systems, small hydropower systems and small hybrid electric systems (solar and wind). In order to promote their use, fiscal and monetary cushions may be provided to the end consumer.

6.5.2. Reducing waste

Waste material, especially food scraps, is a source of GHG emissions. Their removal from the landfills has a significant potential for emissions reduction. According to (EPA (2011), removal of food scraps from landfill can help reduce the emissions by 1.5%, 0.8% and 1.8% of overall 2050 emissions reduction goals in California, Oregon and Washington, respectively.

6.5.3. Avoiding unnecessary use of vehicles
Transportation has 14% contribution towards Global GHG emissions. Less use of vehicles, emplacement of mass transit system and efficient automobile systems can all decrease the level of emissions.

6.5.4. Eating less meat

As an outcome of enteric fermentation, a natural process, the livestock sector contributes towards methane emission. If meat demand decreases, livestock requirements would also reduce. Nevertheless, if meat consumption decreases, public will substitute it with other food. That food may also result in net emissions during production and processing. Thus, in the end, there may be no substantial benefit. In ruminants methane emission is high because their diet consists of roughages. Addition of Sodium Nitrate and Sulphur in their diet can help reduce the enteric methane production (Arif et al. 2016).

6.6. Spatial Planning and Infrastructure

As the world population is expanding so is the urbanisation causing imbalance of ecosystem and increased GHG emission. According to a recent survey, urban cover is bound to expand from 56% to 310 %, which highlights the importance of having sustainable spatial planning (IPCC 2014). Infrastructure design followed by builders has to eliminate “lock in” situation where high level of energy consumption is required, resulting in green house emission. Instead of sprawling cities, vertical cities are found to be more compact and environmental friendly. Need of the hour is to plan and implement smart green cities with little carbon intensive infrastructure.

City or district governments should be leading the process of climate action. They can make such Green Building Codes and Energy Code Standards that end up in efficient use of energy. For instance, New York City established a Technical Working Group (TWG) which produced a report titled ‘One City Built to Last: Transforming New York City Buildings for a Low Carbon Future’ (MOS 2016). In order to reduce CO2 emissions by 80% till 2050, TWG recommended the following key steps requiring: i) owners of large and mid-sized buildings to repair and improve heating distribution systems, including specific requirements for steam systems, within the next 10 years, ii) owners of mid-sized buildings to upgrade lighting in non-residential areas to meet current Energy Code standards by 2025, iii) owners of large and mid-sized buildings to assess deep energy retrofit strategies as part of the Local Law 87 energy audit through a simple template developed by the City, and iv) Require implementation of efficiency measures in existing buildings by incorporating low- and medium-difficulty measures into the codes or as standalone mandates. The City will begin with requiring digital burner controls for boilers, restrictions on open refrigerators in retail stores, thermal de-stratification fans in heated industrial spaces, sealed roof vents in elevator shafts, and upgrades of exterior lighting to current Energy Code standards.
Another example is that of Canada. It encourages the building of new homes according to the code R-2000. Such homes are very energy efficient since they include: i) High insulation levels in-walls, ceilings and basements, ii) High efficiency windows and door, iii) High efficiency heating, iv) Whole-house mechanical ventilation, v) testing to ensure minimal air leakage, and vi) Water-conserving fixtures.

Just like buildings, more high efficiency appliances have also a high potential of GHG reduction. In an interesting study, Hong and Howarth (2016) found out that a high efficiency electric heating pump is more climate friendly than conventional water storage heater working on natural or shale gas. They predicted great net climatic benefit if conventional heater, fuelled by gas (shale and natural), is replaced by a high efficiency electric pump even if the latter is running on electricity produced by coal power. If the latter’s energy source is renewable, the net climatic benefits increase even more. Notwithstanding the benefits of high efficiency appliances, sustainable and rational consumption is also a simultaneous requisite. Efficient appliances consume less electricity and hence entice the consumers to use them for longer hours. Thus they have dual negative effects, i.e., increased use of electricity and higher emissions of CFCs.

6.7. Geo-engineering Solar Radiation Management (SRM)

According to some climatologists, it is already too late to achieve the goal set forth in the Paris Agreement (keeping temperature rise within 2°C, preferably 1.5°C by end of the century). Therefore, it may become necessary to adopt a radical approach such as geo-engineering (using techniques that reflect a small percentage of the sun’s light and heat back into space) for controlling the heat increase. There are pertinent issues related to geo-engineering such as technological competence to deliberately temper with nature, moral justification, and legal concerns in case of disagreement over its use. It is of utmost importance that solid research is carried out to ensure the safe use of SRM. Developing global consensus over the use of SRM is crucial even when it is considered to be essential. Other aspects which require detailed policy making are the legal and ethical concerns surrounding the implementation of SRM governance (TWAS 2012).

7. CONCLUSION

Climate change is one of the most compelling issues of this century. Plethora of evidence and studies suggest that global warming is taking place at an alarming rate. Although climate changes have been taking place in the geological past due to natural causes, the present day global warming is attributed mainly to the release of CO2 in the atmosphere due to anthropogenic activities. Global warming would have a disastrous impact on the socioeconomic development of the world. It will lead to changes in weather patterns, melting of glaciers and polar ice caps, rise in sea level, floods and natural disasters, disease, droughts, wild fires, threat to natural habitat and our ecosystem, insecurity of food and water, poverty, and large scale migration. Steps such as reduction of GHG
emission level, removal of CO2 from the environment, use of clean energy and serious drive of afforestation can help reduce the pace of global warming which is the main goal of Paris Agreement. The world can sustain its development provided the climate change and its consequences are dealt with seriously. Therefore, it is necessary for the policy makers to make sound and comprehensive policies, and robust decisions based on optimized prediction of future and are safe to follow, leading to sustainable development irrespective of what the future brings.

8. ACKNOWLEDGEMENTS

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Effects of Anthropogenic Activities on Pore Pressure of the Earth’s Crust - A Desk Review

Zainab Naeem*

ABSTRACT

The objective of this chapter is to identify and analyse the major anthropogenic factors affecting pore pressure of the rocks inside the Earth’s crust which determines the frequency of earthquakes and is responsible for causing seismic events, eventually leading to seismic movements. These activities include construction of dams, hydraulic fracking, carbon sequestration, and radiations from certain technologies such as the United States’ High Frequency Active Auroral Research Program (HAARP) which is now being used for research purposes. It also studies how temperature and pressure are related and trigger earthquakes and how global warming is affecting the Earth’s pore pressure. The effects of these factors were assessed on different parts of the world such as in the USA, Pakistan and India, where earthquakes were triggered.

The study is based on desk research, including review of research papers and case studies on the subject. The findings from this secondary review indicated that fracking and building reservoirs have resulted in significant seismic events in many parts of the world, even in areas such as Oklahoma, USA, which were not seismically active, but which witnessed earthquakes after fracking and reservoir projects were initiated (Rubinstein and Mahani 2015). Moreover, there exists a positive correlation between temperature increase and earthquake frequency (Usman et al. 2016). Furthermore, the chapter also studies if the radiations emitted under programmes such as HAARP can cause disturbance in the earth’s crust because very low frequency radiations emitted from transmitters towards ionosphere, gets reflected back to the earth, can also trigger seismic movements in the crust (Kim et al. 2002). However, human factors such as building of artificial dams, and hydraulic fracking are also major contributing factors towards increasing the frequency of earthquakes around the globe (Petersen et al. 2016). The chapter discusses how the Sendai

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Framework can play a role to reduce the impacts of anthropogenic activities which can trigger disasters, such as earthquakes.

Key words: Disaster management; earthquake; seismicity; Sendai Framework; High Frequency Active Auroral Research Program (HAARP)

1. INTRODUCTION

A few years back, everyone believed that an earthquake was a natural disaster. It is a way by which earth relaxes itself as energy is released in the form of seismic waves through tectonic plates below the earth’s surface. But with the passage of time, as humans became the masters of the world, they have tried to alter many natural processes including the seismicity. These changes are unintentional as well as intentional. So now an earthquake is not just a natural process but has also become anthropogenic or ‘human-induced’. Through certain anthropogenic factors, seismic events can also be triggered. Human activities, particularly related to geo engineering which results in the alterations in the earth’s crust and can result in the rupture or failure of already present faults, is also termed as geo-mechanical pollution which in simpler words is called induced seismicity (Klose 2010). There exists a difference between the terms ‘induced’ and ‘trigger’. Induced earthquake is comparable in magnitude with shear stress that acts on a fault to cause slip; whereas triggered earthquake means a stress at a smaller level created by some human activity (McGarr et al. 2002). Naturally an earthquake occurs when the tectonic plates collide with one another and consequently because of increased stress, energy is released from the fractures or faults in the crust. However, in induced seismicity, stress is caused by human activities such as building reservoirs, mining and extraction, fluid injection, etc. (Ellsworth 2013). Usually the magnitude of induced earthquakes is small (<6) on the Richter scale but these small shocks can activate or trigger movements in faults that can create earthquakes of magnitude >6 on the Richter scale (Klose 2012). Due to human activities, earthquakes can be triggered in seismically stable continental regions (SCR) (Seeber et al. 2004). The faults in stable continental regions can be more earthquake-trigger sensitive since accumulated stresses have not reached failure conditions (Klose 2007). The earthquakes can be induced or triggered by many human activities such as mining, fracking, building reservoirs, etc. (Bommer et al. 2015). In order to reduce the hazards associated with induced seismic events, the Sendai Framework for Disaster Risk Reduction (2015-2030), which was embraced at the 3rd UN world conference in Japan on 18 March 2015, as a substitute of Hyogo Framework for Action (HFA) 2005-2015 can play a vital role in mitigating the risk of seismic disaster associated with human activities (UNISDR 2015).

1.1. Goals and Objectives

The primary goal of this research is to identify, analyse and relate major influencing factors which are affecting the pore pressure eventually leading to seismic movements.
The pore pressure is affected by many different factors such as the intensity of the induced stress, the location of the underlying faults, the hold of the forces of friction, etc. The shear stress usually causes destruction in case of tectonic movements. In this case, the porosity and permeability of the underlying rock structure is also very important. The specific objectives of this research are:

- Study the effects of human induced stresses on pore pressure.
- Analyse the role of those anthropogenic processes which affects pore pressure and have triggered major earthquakes in the past and will induce more in the future.
- The effects of temperature on pore pressure from different anthropogenic processes.

1.2. Rationale

The significance of this study is that it can provide useful information to the seismologists and disaster management authorities in conducting surveys in those regions which are more seismically active. Moreover, it can help in identifying those human activities which are more particular in creating induced seismicity hazards. The researchers, academicians, seismologists, and geo-mechanical engineers can gather quite useful information for the future studies. This paper can also be useful for policy makers in designing effective policies regarding disaster management.

1.3. Research Questions

- How is pore pressure enhanced due to external stresses created artificially by human activities?
- What are the main human made processes through which pore pressure is affected, resulting in seismic movements?
- Does temperature and radiation have any role in enhancing pore pressure?
- How can Sendai Framework for Disaster Risk Reduction play a role in mitigating hazards associated with induced seismicity?

2. METHODOLOGY

This research is based upon qualitative research methods. Data collection is based upon observations and analysis from previous literature which includes research papers, research journals and articles. Similarly, many case studies have been included which demonstrate the rationale of the study.

3. DISCUSSION

In this paper some of the major factors have been studied which affect the pore pressure in one way or the other. These activities have caused seismic events in many regions in the world and can further increase the susceptibility to disasters associated with induced or triggered seismic events. Following are some of the major anthropogenic reasons that activate seismicity.
a. Artificial dams and reservoirs
b. Fluid injections
   - Waste water injection
   - Hydraulic fracturing
c. CO2 storage
d. Temperature and Radiation
   - HAARP

3.1. Artificial Dams and Reservoirs

When an impoundment is constructed, a lot of pore pressure is developed at depth with increasing water level. It creates stress and as a result of process of diffusion between pore fluids, stress is created and so can trigger an earthquake in the nearby faults by causing brittle failure (Shapiro et al. 2010). The earthquake can occur soon after the reservoir or dam has been filled or the pressure can take time to diffuse in pores and create fault failure (Talwani 2000). History has experienced destruction due to such earthquakes (Table B). The magnitude is related to the amplitude, frequency of the level of water in the reservoir and the location of the fault line in the vicinity. The factors resulting in dislocation of faults or tectonic plates are the increase load due to water level causing pressure on elastic stress and the transfer of water to depths resulting in fracturing of rocks eventually leading to reduced friction inside the pores (Shapiro et al. 2010). Therefore, leads to movement in depths. The seismicity in such cases also depends upon a pre-existing fault because if these faults are affected by load or water pressure then the magnitude can exceed 6 on the Richter scale. One of the massive destruction was caused due to an earthquake in Koyna Dam situated in the state of Maharashtra, India. Prior to the dam construction, seismicity surveys were conducted which proved that the region was seismically stable (Table B). However, just after one year of its construction and filling, Koyna dam encountered an earthquake of magnitude 6.7 resulting in approximately 200 casualties in the vicinity (Gupta et al. 2000). The site has become seismically active since then due to increasing water level in the reservoir. In some cases, the situation can be reversed. Likewise, Tarbela Dam which is constructed on river Indus, in Pakistan, is actually located in one of the most seismically active regions in the world. It is considered to be one of the world’s largest earth filled dams. However, soon after the first filling, the reduction in seismicity was observed. This is because if faults are horizontal, then any type of vertically applied pressure can shift the stresses away, thus resulting in decrease in tectonic movements. But if faults are vertical, then a horizontal shift can occur. Such movements in faults are known as strike slip faults. Also the seismicity is associated with the level of water in the dam. But if water level is reduced in the dam then the pre-existing fault can recover itself (Ibenbrahim et al. 1989).
3.2. Fluid Injections (Waste Water Injections and Fracking)

The phenomenon of fluid injections has become very common nowadays especially in developed countries. It basically involves injecting or transferring fluids which can be either treated waste water (waste disposal), brine or other chemicals from oil and gas fracking (Hydraulic Fracturing) or for hydrocarbon storage (CO2 commonly). These fluids are transferred to deep wells known as injection wells. The seismicity is commonly induced where the rock structure deep down the wells is already under pressure and the diffusion of chemical and water enhances the pressure thus resulting in displacement of faults. However, the magnitude of these earthquakes is usually <2 but earthquakes of >5 magnitude on the Richter scale in the regions have also occurred where fluid injection wells were present (Ellsworth 2013) (Table A). The depending factors which are associated to seismicity in such areas include the distance of the underlying faults from the wells and the time taken by the fluids to reach the pores and build pressure in them. Unfortunately, until now there are no proper methods to determine the time duration of diffusion of fluids because it depends upon the types of rocks present in the region. On the other hand, even if the faults are not present below the injection wells, the fluid can be diffused through rocks to other areas where tectonics are active such as in Ohio State, no earthquakes were recorded until in 2011, when movements were felt because of fluid injection wells (Kim 2013). Resultantly, earthquakes can be triggered there. In 2011, Oklahoma experienced an earthquake of magnitude >5 on the Richter scale which caused some buildings to collapse and it occurred due to waste water induced seismicity (Keranen et al. 2013) (Table B). The rate of seismic events increased in Oklahoma after the injection wells were built in the city (Keranen et al, 2014. Also, if waste water is stored for a longer time in a place with little or no seismic activity, chances are that a severe earthquake can result due to large amount of pressure stored inside the pores and that can result in destruction (Kim 2013).

The process of hydraulic fracking is more commonly used for the extraction of shale oil. Shale is basically a sedimentary rock which has very thin pore spaces and is usually covered by an overlying layer of some other kinds of rocks. For its extraction water or gases is pumped with intense pressure to break that layer of rock in order to allow the pumping of shale oil. This process creates cracks deep inside the earth which allows the energy to be released more frequently as the cracks provide the passage to underlying energy causing micro earthquakes (Warpinski et al. 2012). Similarly, as discussed in the above mentioned cases, pore pressure is also affected which plays its part in triggering micro earthquakes with magnitude 2 or below on the Richter scale (Ellsworth 2013). Moreover, recent studies suggest that the induced earthquakes due to fracking pose little threat than those induced by waste water injections which have even resulted in earthquakes of 5 magnitude on the Richter scale (McGarr 2014). However, the concern is that the rate of earthquakes induced by this process is increasing rapidly.
3.3. Carbon Sequestration

Recently, a phenomenon known as carbon sequestration is gaining wide acceptance as a measure of climate change mitigation. It involves removal of the harmful Carbon Dioxide gas which is a leading cause of global warming from the atmosphere. It can be done through various techniques and one of these is injecting it deep inside the ground. This is also known as geologic sequestration. When it is injected it is trapped by the underground less permeable layers of rocks which do not allow it to escape in the atmosphere. But the main concern is that CO2 increases temperature and pressure inside the pores, thus leading to fracturing and tectonic slips. Because temperature and pressure are related, thermal stresses are created which can result in destruction (Table A). The frequency of the occurrence of seismic events due to this process depends upon the pressure of the injecting gas and the tectonic behaviour of the site (Rutqvist 2012). However, very rare events have been reported in the past few years regarding the induced seismicity due to this process as the temperature increases gradually and can take months or even several years. Similarly, the pressure inside pores also takes time to build. Some seismic events related to this phenomenon have been reported such as in Basel, an earthquake of magnitude 3.8 on Richter scale was detected near the carbon sequestration site in 2008 and soon afterwards, this site was shut down (Häring et al. 2008). If the process continues then in the near future the rates of induced seismicity can be increased due to geologic sequestration. Furthermore, no mechanism has been devised which could help in predicting the magnitude and intensity of such tremors, also, where they will occur. Moreover, even micro earthquakes can trigger the larger magnitude earthquakes if the pressure is sustained by the pores over longer period of time (Mazzoldi et al. 2012).
### Table A

<table>
<thead>
<tr>
<th>Study Title</th>
<th>Findings</th>
<th>In Text Citation</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>Earthquakes induced by water injection at 3km depth within the Rongchang gas field, Chongqing, China</td>
<td>Fracking induces seismicity because it requires higher level of water to be injected in wells with pressure, in order to retrieve oil and gas. Therefore, pressure causes rock failure resulting in earthquakes.</td>
<td>(Lei et al. 2008)</td>
<td>Lei, X., G. Yu, S. Ma, X. Wen, and Q. Wang 2008, ‘Earthquakes induced by water injection at ~3 km depth within the Rongchang gas field, Chongqing, China’, J. Geophys, vol. 113,(B10310), doi:10.1029/2008JB005604.</td>
</tr>
<tr>
<td>Injection Induced Earthquakes</td>
<td>Fracking induces micro earthquakes of magnitude 3 on the Richter scale because it requires creation of fractures by pressure fluids to stimulate recovery of hydrocarbons. The rate of micro earthquakes has increased in those regions of the USA where fracking is being carried out which were seismically stable previously.</td>
<td>(Ellsworth 2013)</td>
<td>Ellsworth, W. 2013, ‘Injection-Induced Earthquakes’, Science, vol. 341, no. 6142, pp.1225942-1225942.</td>
</tr>
<tr>
<td>Earthquake Hazard Associated with Deep Well Injection - A Report to the US Environmental Protection Agency</td>
<td>Since 1900s when the process of deep well injection was introduced, micro earthquakes have increased in the USA and Canada which have also triggered major seismic events in Ohio, Colorado, Oklahoma, etc.</td>
<td>(US. Geological Survey, 1951)</td>
<td>US Geological Survey 1951, Earthquake Hazard Associated with Deep Well Injection- A Report to the US Environmental Protection Agency, US. Geological Survey Bulletin 1951, United States Government Printing Office, Denver, pp.1-86. viewed 18 September 2017 <a href="https://pubs.usgs.gov/bul/1951/report.pdf">https://pubs.usgs.gov/bul/1951/report.pdf</a></td>
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<tr>
<td>Induced Seismicity Potential in Energy Technologies</td>
<td>Carbon sequestration which is the process of capturing large volumes of Carbon Dioxide from atmosphere and storing it directly under soil by intense pressure causes large magnitude earthquakes. This is due to two major reasons: 1) The intense pressure causes rock failure inside pores 2) The temperature of Carbon Dioxide stored for longer terms increases more pressure on rocks and pores resulting in seismic events.</td>
<td>(National Research Council 2013)</td>
<td>National Research Council 2013, Induced Seismicity Potential in Energy Technologies, The National Academies Press Washington, DC., viewed 18 September 2017 <a href="https://doi.org/10.17226/13355">https://doi.org/10.17226/13355</a></td>
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<tr>
<td>Location</td>
<td>Earthquake Magnitude on the Richter scale</td>
<td>Anthropogenic Cause</td>
<td>Year</td>
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<td>Country</td>
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3.4. Influence of Human Created Temperature and Radiation Effects in Inducing Earthquakes

A lot of controversies exist when it comes to the link between temperature and seismic events. However, recent studies indicate that temperature does affect the frequency of seismic events. Increase in temperature results in receding of glaciers. The glaciers build stress on the earth’s crust as they melt, stresses are released which can probably recover the suppressed energy inside the faults and can cause an earthquake (Immerzeel et al. 2010). The melting of glaciers is increasing due to the climate change impacts and specifically the South Asian glaciers are mostly affected by climate change and are receding at a higher rate (Ibid). This phenomenon was also observed in a study in which earthquake occurring frequency was directly related with temperature increase due to climate change in Northern Pakistan (Usman et al. 2016). The study further suggests that this in turn has increased the rate of earthquakes in the region. As climate change is again considered to be the result of anthropogenic activities, there exists a positive correlation between climate change and increase in seismic events. If glaciers melt at a faster pace, then eventually number of seismic events will increase.

Another interesting phenomenon related to seismicity is the electromagnetic radiations. These radiations are observed before and after an earthquake occur but the exact reason that why these radiations are present on seismic site is not known. These radiations are absorbed by the earth and they also travel towards the ionosphere layer of the atmosphere. Therefore, it is also assumed that some of the radiations bounce back to the earth from the ionosphere and are absorbed. These radiations cause fracture in the pores of the rocks, thus resulting in seismic events (Fujinawa and Takahashi 1998). Many large magnitude (>7 on the Richter scale) earthquakes have witnessed the radiation effect which were absorbed by the earth from ionosphere such as Wenchuan earthquake with magnitude 7.9 in 2008 (Pulinets and Davidenko 2014). The same study suggests that most of the radiations which bounce back from ionosphere to the earth are generated by man-made activities and these radiations are often very low frequency (VLF). So waves travelling in the ionosphere are the reason for many seismic events (Johnston 2002). Many such technologies have been developed around the globe; one of such technologies is the United States’ High Frequency Active Auroral Research Program (HAARP). It was built in Alaska in 1993 with the purpose of analysing the ionosphere by sending high power Extremely Low Frequency (ELF) electromagnetic radiations and heating a portion of ionosphere. These radiations bounce back to the earth, cause fractures in the rocks and result in earthquakes (Piddyachiy et al. 2008). This technology consists of antennas which transmits electromagnetic radiations. The Noto-hanto peninsula and Niigata-chuetsu-oki earthquakes of magnitude >6 on the Richter scale have been caused due to the ELF radiations that were reflected back to the epicentre from ionosphere and these ELF radiations were injected in ionosphere by some man made antennas operating in Japan.
(Ono et al. 2012). In the similar way HAARP can induce earthquakes and whether it has induced earthquakes or not, is still under research but it is certain that if it keeps generating ELF, then definitely it will cause disasters in the near future. The earthquake of magnitude 7.8 which occurred on Pakistan-Iran border in April 2013 was also triggered by ELF reflected back from lower ionosphere and these radiations were enhanced by human made transmitters (Pundhir et al. 2016). It is still not known which transmitters were responsible for this.

3.5. Role of Sendai Framework in Mitigating the Impacts of Induced Seismicity

Sendai Framework for Disaster Risk Reduction (SFDRR) (2015-2030) was adopted as a substitute of Hyogo Framework for Action (HFA), 2005-2015. It was embraced during the 3rd UN Conference in Sendai, Japan. HFA was about creating resilience among nations to disasters and with primary focus on disaster risk reduction and prevention. SFDRR is basically the progression of HFA with some variations such as focus on disaster risk management and strengthening regional and international cooperation for mitigating disaster impacts. The most important objective of SFDRR is to increase the number of nations with disaster risk mitigation strategies at local and regional level (Kelman 2015). This framework focuses on seven global goals and one of these goals is establishment of early warning system while another one focuses on reducing the loss of lives and proper urban planning. The Great East Japan Earthquake of 2011 resulted in a catastrophe due to lack of urban planning. Therefore, the Sendai Framework gives the way forward for reducing such hazards (Okazumi and Nakasu 2015).

Sustainable Development Goals (SDGs), also known as global goals were adopted in 2016 by the United Nations as a follow up for Millennium Development Goals (MDGs) with the objective of poverty reduction, prosperity and public well-being. It consists of 17 goals or targets which focus on food and water security, quality of life and education, climate change mitigation, clean energy, urban planning, etc. (UNDP 2016). Goal 9, which emphasizes on sustainable cities and communities, can be effectively adopted and used for mitigating the risks associated with human induced seismicity. The factors identified in this research which results in seismic events such as reservoirs and fracking operations need to be monitored properly to reduce the risk of earthquakes and this can be done through proper urban planning and infrastructure development. The policies and regulations, if developed by keeping a focus on SDG 9, can be very helpful in disaster risk reduction, management, preparedness and resilience.

When discussing regional and international level cooperation, there exist four priority areas in SFDRR, with the main objective of focused action, policy planning and strategy implementation (UNISDR 2015). The first priority area is about developing understanding of disaster risk. In case of induced seismicity, the communities need to identify the hazard associated with those activities which cause seismic movements by
enhancing pressure on pore. Once identified, the communities and authorities can devise policies and strategies which can help in developing better resilience, effective ‘Build Back Better’ response and recovery systems, not only at the local and regional levels but at global scale as well. This can be done by promoting and developing stakeholders’ negotiations at all levels for mitigating and reducing disasters. Moreover, these goals are related with the three priority objectives of SFDRR. Reservoirs and dams can trigger and induce earthquakes, but proper urban planning can help in reducing the hazard such as no urbanization near the dam areas, seismic surveys prior to construction can help in assessing and understanding associated risk and this is what SFDRR aims in priority one. Secondly, in case of fluid injections, again urban planning is important but then proper monitoring of the pressure on pores created by the injection, movement of underlying rocks and the study of history of tectonics on the site can help in mitigating the hazard. As explained in one of the goals of SFDRR, proper monitoring of any factor which can cause disaster risk must be implemented at all levels. In case of climate change relation with seismicity and man-made ELF (Extremely Low Frequency) radiations released from man-made technologies such as HAARP need to be addressed at international level which is also associated with earthquakes. Negotiation between nations, stakeholders, dissemination of relevant scientific knowledge, methods and tools between regions can help in developing disaster risk management strategies in the regions and even at the international level. This is a way forward given by SFDRR in such cases to ‘Build Back Better’ and this complete set of instructions, guidelines, strategies if implemented can certainly reduce the risk of induced seismicity in the world.

4. CONCLUSION

The discussion indicates that anthropogenic activities such as reservoirs, fluid injections especially waste water and hydraulic fracking along with carbon sequestration do induce seismic movements. The two most important factors that induce or trigger earthquakes include reservoirs and hydraulic fracking; reservoirs can trigger and induce earthquake greater than the magnitude of 5 on the Richter scale. However, seismicity associated with hydraulic fracking results in lower magnitude earthquakes of <2 while waste water can induce earthquakes of magnitude <5 on the Richter scale. Also, smaller magnitude earthquakes can trigger the pre-existing faults.

Secondly, in case of carbon sequestration, smaller magnitude earthquakes are induced due to the pressure created by CO2 gas on pores but again these smaller earthquakes can trigger larger earthquakes. Temperature increase due to climate change from anthropogenic activities causes receding of glaciers, which when melt, release the pressure from the pores and recover pre-existing faults, ultimately leading to seismic movements. Radiations specifically ELF when absorbed in the earth due to the reflection from the ionosphere, causes fractures in the pores, resulting in earthquakes and man-made ELF generating technologies such as HAARP can increase perturbations in the
ionosphere, leading to more absorbance of ELF by earth, which in turn, can affect the underlying pores, triggering seismic movements.

SFDRR is a complete set of guidelines and strategies, which if implemented, can prove to be the way forward in designing disaster risk management strategies, at local, regional and international levels for mitigating the hazards associated with induced seismicity. Moreover, by adopting SDG 9, as a priority for improved urban planning, disaster risk resilience can be improved and managed effectively at the local, regional and international levels.

5. **RECOMMENDATIONS**

   Keeping in view SFDRR, some of the recommendations are discussed below:

1. Communities, authorities and experts should identify the key anthropogenic activities which can play a role in inducing or triggering seismic events in their regions. For instance in India, Koyna Dam has induced earthquakes. Authorities should therefore carry out seismic surveys on a regular basis and develop disaster risk preparedness and management strategies with the local communities. The entire South Asian region, which is seismically active, should develop such policies before construction of any dam. Collaborative efforts and negotiations at the local and regional levels can play a vital role in the reduction of seismic hazard due to reservoirs.

2. In case of Oklahoma, USA, where fluid injections and hydraulic fracking has increased the number of earthquakes, authorities should set up monitoring systems in which, the pressure induced by the injection on pores is monitored. The underlying movements of rocks should be properly observed where these injections are being used. The policies related to proper urban planning and infrastructure is very important in this context in such regions. Infrastructure needs to be more resistant to shaking and such activities of fracking and injection fluids should be performed away from the urban settlements.

3. Due to the direct relation between temperature increase, climate change and seismic movements, SFDRR lays primary focus on climate change adaptation for achieving sustainable development (Kelman 2015). Climate change acts as a driving force behind inducing seismicity, hence priority 3 of SFDRR which focuses on building up resilience should be incorporated in the policy making at the local and regional levels.

4. In case of ELF and human made technologies such as HAARP, the negotiation between nations, stakeholders, dissemination of relevant scientific knowledge, methods and tools between regions, can help in developing disaster risk management strategies between regions and even at the international level and this in turn will help to ‘Build Back Better’.
ABBREVIATIONS
ELF: Extremely Low Frequency
HAARP: High Frequency Active Auroral Research Program
SFDRR: Sendai Framework for Disaster Risk Reduction 2015-2030
VLF: Very Low Frequency

REFERENCES


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The abstract should:

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Bold all sections and a maximum of 3 digits numbering of sub-sections (i.e. 3.2.1) Sub-section headings should start at the left margin.

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Provide a list of abbreviations/acronyms used, as well as a Glossary of Key Terms, especially those mentioned in native language with their English translation and brief explanation. Present only important tables and figures that illustrate the points made. Tables and figures should be well designed and complete to avoid lengthy explanation in the text. Each figure should be presented on a separate page and should not exceed half-a-page in size and should leave margins on both sides. While reproducing data from a diagram or table, or copying the entire table or diagram, in the paper, a reference should be made to the source.

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**Figure 1:** Consumer confidence, concerns, spending and attitudes to recession

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A complete list of acronyms/abbreviations used in the text needs to be provided. References made to terms, objects, nomenclature in the local dialect need to be given in italics in the text with their English translation and explanation given in the Glossary of Terms as well as given in the footnotes.

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