



---

**Anthropogenic riposte confirmation the impact of climate change on human lives in Thar Desert, Pakistan**

---

S. MEGHWAR<sup>++</sup>, G. M. MASTOI\*, K. F. ALMANI\*\*, A.R. ABBASSI\*\*\*, K. H. LASHARI\*\*\* A. KHAND\*\*\*\*,  
Z. A. PULH\*\*\*, M K. SHAIKH\*\*\*\*\*, A. SAMOON\*\*\*\*\*, N. BAIG\*\*\*\*, S. SOOMRO\*\*\*\*\*,  
S. KAUSAR\*\*\*\*\*, M. R. QAMBRANI\*\*\*\*\*, M. PANHWAR\*\*\*\*\*, A. HINGORO<sup>++</sup>

Department of Geography, University of Sindh, Jamshoro

Received 14<sup>th</sup> April 2020 and Revised 26<sup>th</sup> September 2020

**Abstract:** The Climatic status quo of Thar desert is deplorable. It is severely affected by global as well as local climate shift phenomena. The primary face density of population is alarmingly high with the rate of 14.6 people per kilometer. The temperature is tremendously varied and it is risen through 1.00 -2.50 centigrade, which induces to reduce precipitation and humidity initiates 5-25 percentages 5-12 millimeters respectively in the 20<sup>th</sup> century. The temporal climate time series and SPSS analysis suggested climate change is single most significant factor to distress human life.

**Keywords:** Impact, Status Quo, Temperature, Tremendous Climate Change

## 1. INTRODUCTION

Climate change has harshly affected through the invariable escalation of temperature and lessening of precipitation and humidity since the ancient climate 18,000 to 20,000 years ago (Fein, 1987). Thar desert is dominated with arid land over the sub-continent and it is varied in atmospheric circulation since the Pleistocene (Stamp, 1965). This constantly devastating atmospheric condition distorted the climate of the region and it caused perpetuation to rise for the 20<sup>th</sup> century (James, 2007). As it is of the utmost belief that Thar desert has an unquestionably dense population in Asia (SCOPE, 2010). This region influenced by the Arabian Sea and the variation of monsoon climatic patterns. Which is identified as the backbone in the shift of the climate in the sub-continent, which caused a gravely devastated climatic scenario in the entire Thar desert (Chauhan, 1996; Gupta, 1997). The Arabian Sea was unceasingly much warmer in 20<sup>th</sup> century, which also

caused a 10 percentage dry atmosphere to the Thar desert, which translates straight increase in the temperature, decrease humidity, and precipitation ratio has led to unbearable climate fluctuation (Roy, 2005). The lowest rainfall and fluctuation caused climatic degradation in the Thar desert, as the Population of Thar desert dwells early on precipitation. Therefore, the lesser the precipitation higher the temperature is the radical prime movers to grieve human social settings (Simister, 2005; Saini, 2005; Meghwar, 2019). The inadequate annual rainfall demonstrated a significantly higher rate of evapo-transpiration from the range of 1650 to 2000 millimetres (Rao, 1992). The annual occurrence of Precipitation is reduced exceptionally 14 to 32 percentages from 1901 to 2001 (Dhir, 2003). This atmospheric circulation of the earth's surface and Arabian Sea movement indicate an intolerable climatic shift in the Thar desert (Srivastava, 1998).

---

Contact: Sujo, [sujo@usindh.edu.pk](mailto:sujo@usindh.edu.pk), Cell # +92 (0) 3332668352

\*Institute of Chemistry, University of Sindh, Jamshoro 76080, Sindh, Pakistan

\*\*Centre for Environmental Sciences, University of Sindh, Jamshoro 76080, Sindh, Pakistan

\*\*\*Department of Fresh Water Biology and Fisheries, University of Sindh, Jamshoro 76080, Sindh, Pakistan

\*\*\*\*Department of Physiology, University of Sindh, Jamshoro 76080, Sindh, Pakistan

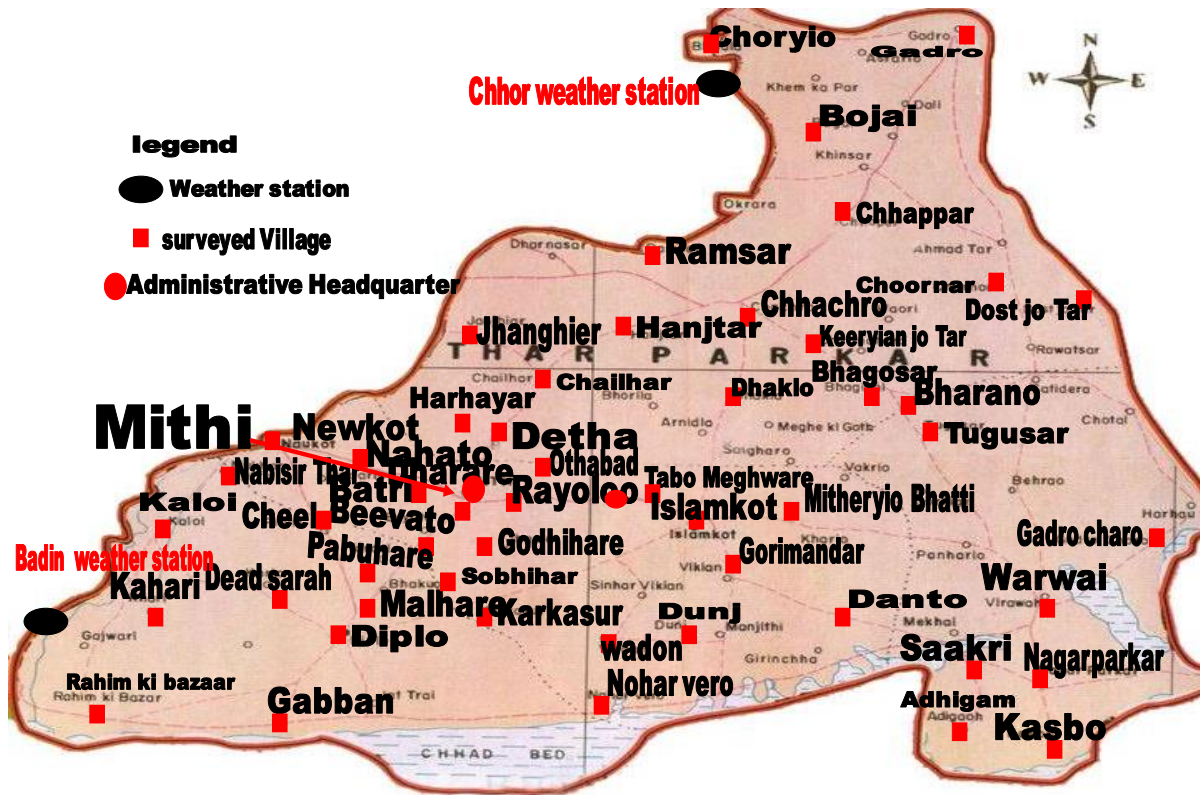
\*\*\*\*\*Department of Computer Science, Federal Urdu University of Arts Science and Technology Karachi Pakistan.

\*\*\*\*\* Department of Economic, University of Sindh, Jamshoro 76080, Sindh, Pakistan

\*\*\*\*\*Assistant Professor, Department of Communication and Media studies, University of Sargodha, Punjab, Pakistan

\*\*\*\*\*Centre for Physical Education, Health & Sports Science, University of Sindh, Jamshoro, Pakistan

\*\*\*\*\* Institute of Plant Science, University of Sindh, Jamshoro, Pakistan



**Figure 1. Location Map: represent 53 villages, which questionnaire surveyed**

The geography of Thar desert is determined over the sub-tropical desert, with the coordinates 690, 53' longitudes and 240, 43' (Time Atlas, 1959). It is laid at the south-east map of Pakistan (Fig. 1) and is about a wide 490 east-west and 800 km north-south over the land area of 22000 km<sup>2</sup>, and the total population is 955,812 (Census 1998), which is distributed 44.6 persons per kilometres (44/km<sup>2</sup>) (Herani, *et al.* 2007). As it is a sandy desert, which is interconnected with Indus River and it is composed of geomorphological sand dunes (Alvi *et al.* 2008; SAZDA 1988; Muslehuddin *et al.* 2006).

## 2. RESEARCH METHODOLOGY

The climate model and 67 years of meteorological data were demonstrated climate variation examined also analyses to observe a climatic variation.

The 16.1 version software surfer practised for the gridding, contouring and map program. It is popularly registered by the Golden software Inc trademark. This software can be useful for climatologist, foresters, biologist, oceanographers, bio-geographers, geologist, hydrologist, geophysicists, and medical researchers.

The met-data of two weather station of Badin and Chhor was analysed and co-ordinate all three elements, that was relatively demonstrated the inter-link and variation. This situation represented climate change in the Thar desert. In this software-surfer, the data was processed through the XYZ data set. This context the base map was built up, which was generated XYZ data set in excel worksheet and that was easily produced the grid file and grid map such as contour, image, relief etc.

This map indicated the boundary of the Thar desert in the forms of curves, text, points, images and metafiles. Which demonstrated the link in weather elements. The anthropogenic responses were considered as the viewpoint of the local population (from the horse's mouth) from 53 villages, covering the whole region who were above 60-year-old (Senior Citizens) and permanent dweller of the area. Because older people were entirely conscious about climatic changes and temporal progression of precipitation. In this context, the survey questionnaire was formulated about climatic variations and their impacts over various aspects. i.e human life and health, climate pattern changes. The survey questioners were analysed employing SPSS (Statistical Package for Sciences) software version 22 with a significant level 1.5.

### 3. CLIMATE CHANGE INDUCES TO LEAD VARIABILITY OF ARABIAN SEA.

The Arabia Sea is heating over global atmospheric circulation and climate change is directly influenced surrounding local area. This shift further shot up during the 20th century. Which in turn caused the burning temperature of Thar desert, and it reinforced the fluctuation in a climate like a temperature, rain and humidity. That led to viral the horrific spell of diseases in the region (Swanson, 1999; Thomas, 1999).

### 4. TEMPERATURE UPSURGE PROPORTION INFLICT CLIMATE VARIATION

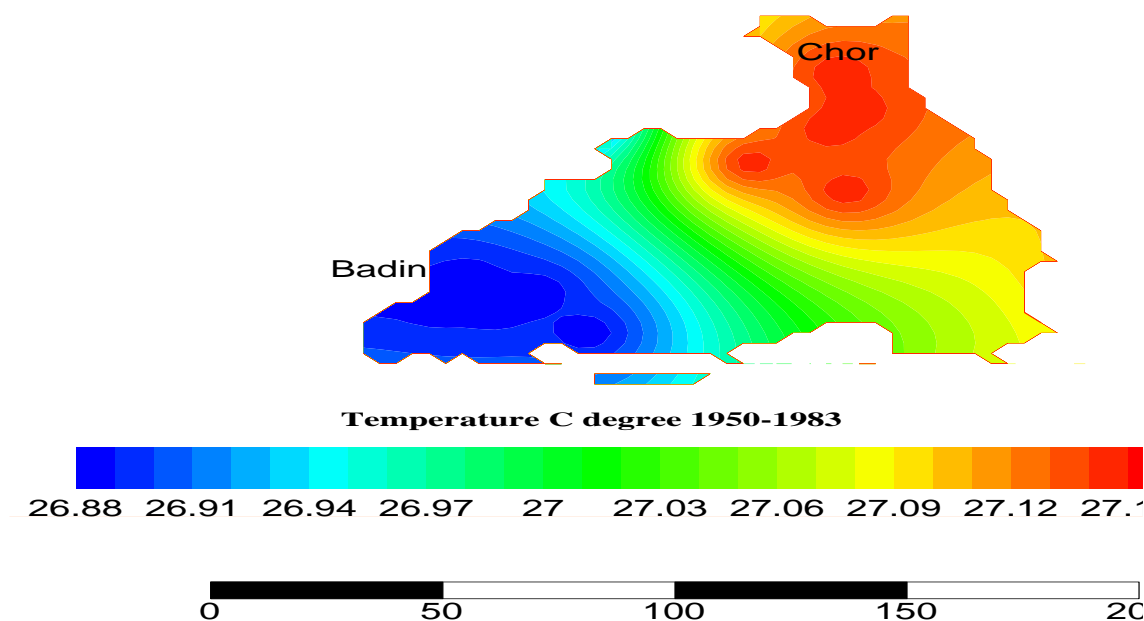
The temperature of the Thar desert is tremendously varied in the range of 3-10 centigrade, which caused a remarkably huge fluctuation span of 1961-2000 and it induced to raise temperature 2 to 2.25 centigrade. This led to a decrease in precipitation 5-25 percentages and humidity 10-25 percentages (Roy, 2005; Ragab, 2001). This manifested discernible form of ailments in human health

### 4. CLIMATE CHANGE UPSHOT ON HUMAN HEALTH

History has it, human activities usually have been observed and experienced turning against the very fabric of the environment and themselves as well, which consequently turned out to be profusely detrimental to the very existence of living beings (Zhu, 2011). That indicated the radical shift in climate, has resulted in several diseases to human health (Hasnain *et al.* 2012). The high temperature, low rainfall and humidity are dually triangle element of climate change, which administered to proliferation respiratory, allergy, dental carries, Gastro-intestinal problems, renal calculi, Tuberculosis, and vectors disease.

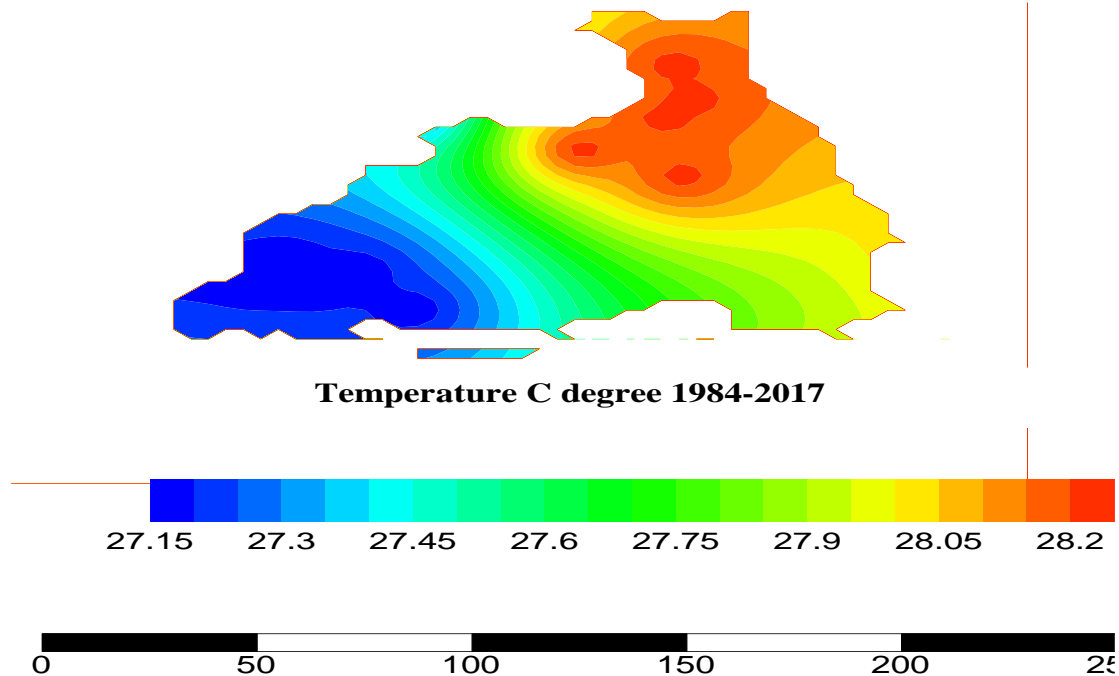
### 6. RESULT

Badin weather station is situated near and Chhor weather station is positioned at distance from Arabian Sea of Thar desert. That proximity of the sea has affected the climate. The annual temperature of Badin weather station was recorded highest 31° c (1981) 30° c (1986) and lowest was 25° c (1976) which and 22° c (1997), while distant weather station Chhor the highest temperature 30° c (1990) and 32° c (1981) and its lowest temperature 25° c in the reporting years (1997).



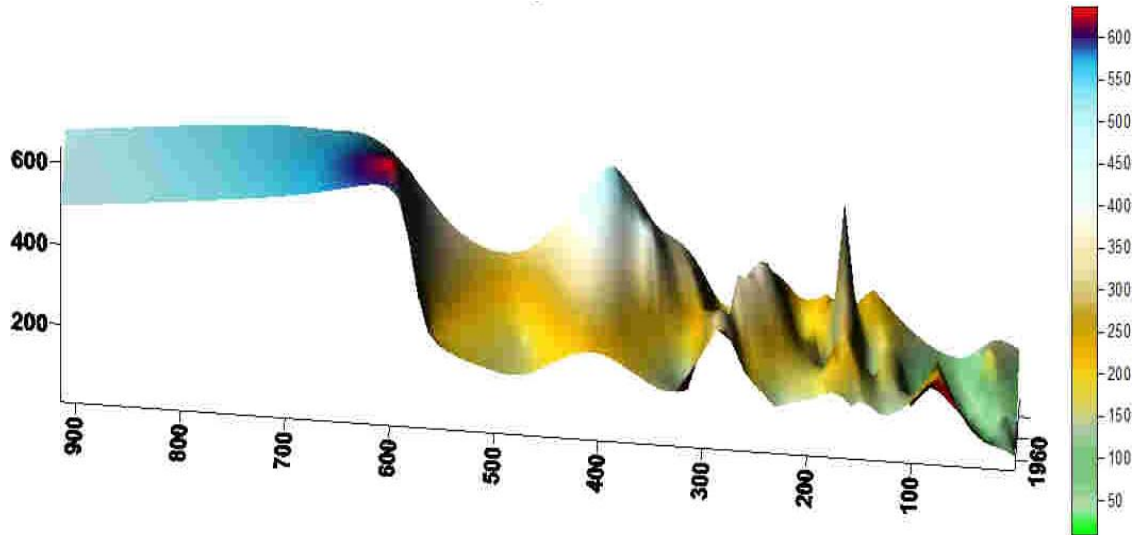
**Figure 2. Temperature of Badin and Chhor station increase 1950-1983**

The average range of annual temperature of Badin and Chhor stations are 26° c to 27° c respectively represented are the conditions caused variation in climate of the entire region in the Thar tropical desert in Sindh, Pakistan (Fig. 3).



**Figure 3. Temperature of Badin and Chor station increase 1984-2017**

Whereas it is suggested above 30 centigrade temperature caused harmful for human health. The annual rain of Badin weather station has tremendously fluctuated in the range of 1 millimetre to 586 millimetres while Chhor rain is varied in the range of 8 millimetres to 645 millimetres (**Fig. 4**).



**Figure 4 Rainfall of Badin and Chhor station decrease 1950-1983**

The average rainfall has decreased of Badin and Chhor during the reported period in the range 209 to 235 millimetres. This reduction rain ratio suggested a significant change in rainfall pattern, which is extremely harmful to human health in general. The annual humidity has decreased in the effluence of rainfall and temperature in the range of 5 to 25 percentages (**Fig. 5**).

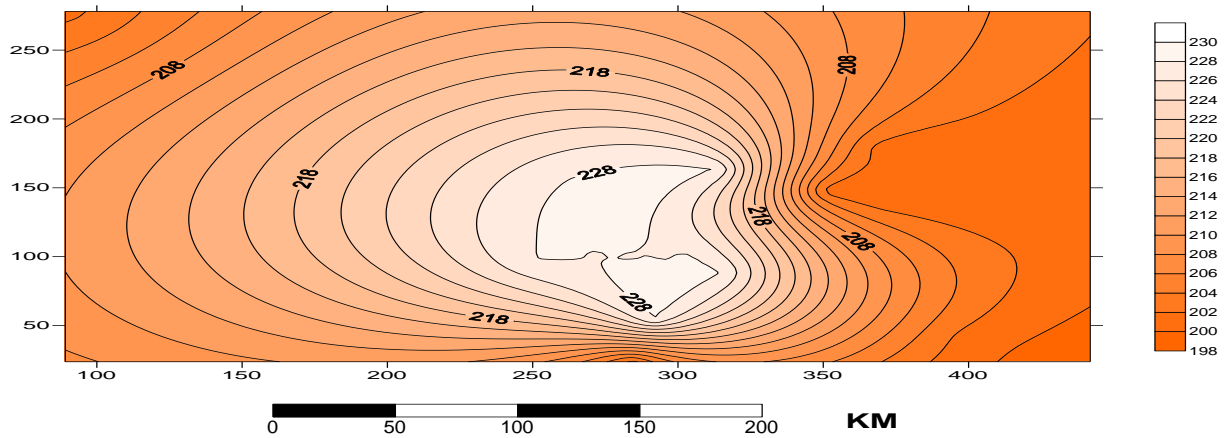


Figure 5 Rainfall of Badin and Chhor station decrease 1984-2017

The irregular range of humidity is negatively correlated to human heart, skin and brain, this decrease assortment is very critical and taking a significant toll on human health (Fig. 6).

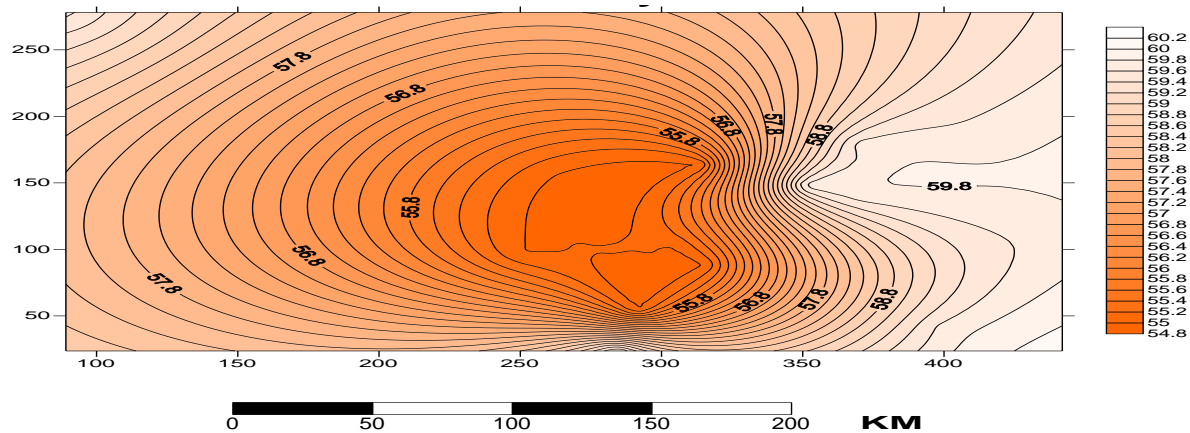


Figure 6 Humidity of Badin and Chhor station decrease 1950-1983

That is a life-threatening situation that led to decrease humidity, which left vice versa effect on climate and human life (Fig. 7).

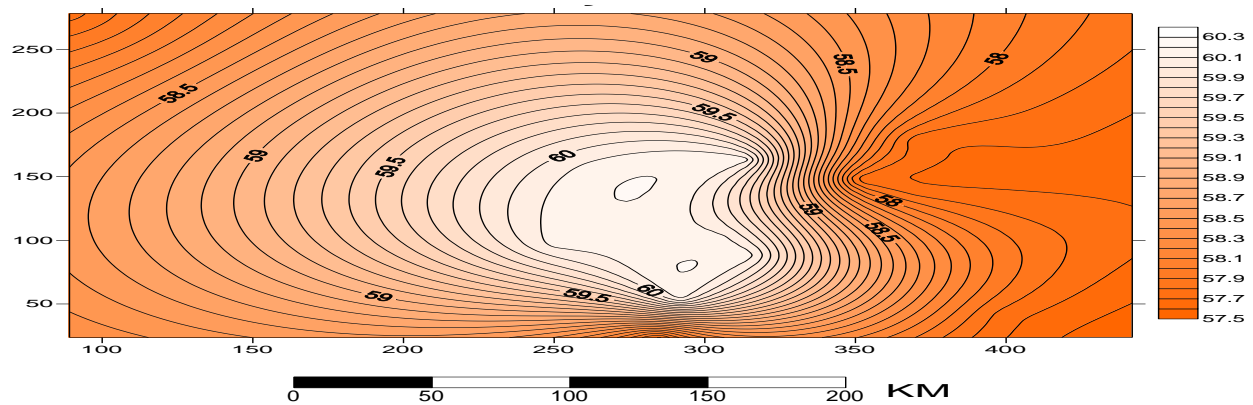


Figure 7 Humidity of Badin and Chhor station decrease 1984-2017

Therefore, the climate shift led to immense miseries to substantially devastate human life. The 76 percentages population came to understand climate shift caused incredibly irrevocable problems to human health (Fig.8).



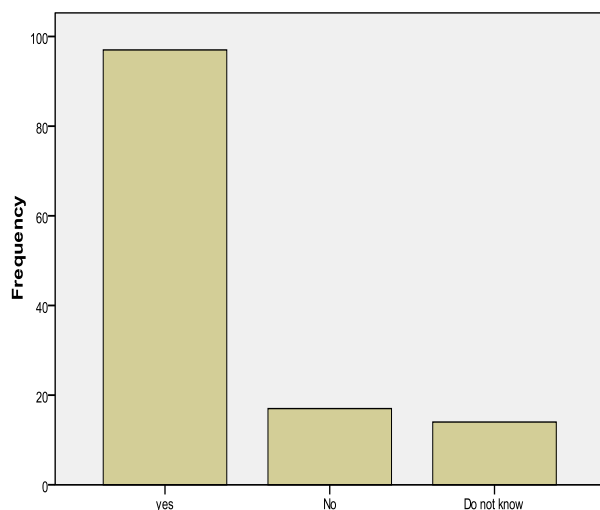


Figure 8 Anthropogenic response the climate change effects on human health

This is suggested that climate change affected physically and cognitively to the dwellers of the region, the very invariably unstable climatic shift invited the range of numerous diseases in this region. A very significant rise of temperature and a sharp decline in the rainfall and humidity-induced to climate, which were rudimentary elements to take the toll on human health. The 98 per cent of the population suggested the in-negligible rise in temperature is the ultimate cause affecting human health (**Fig. 9**)

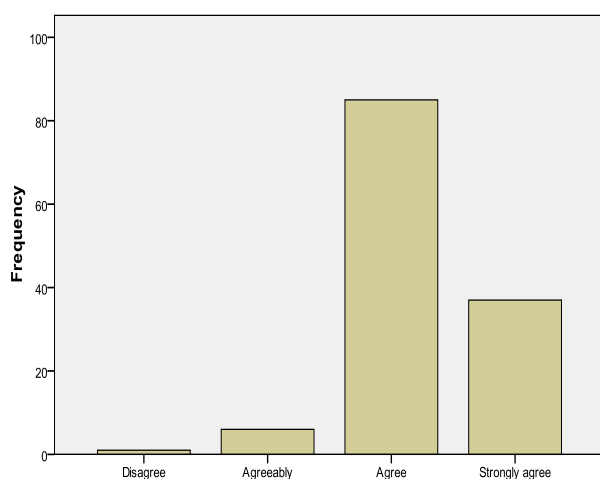


Figure 9 Anthropogenic response temperature, Humidity and rain increase the eff

This is the very element to lead several diseases to the region as well. The population of this region is directly linked to the rate of climate change. Local people Population activities are directly affected by climate change such as increasing temperature and decrease of rainfall and humidity respectively. Which

changed the pattern of social activities of human and its behaviour. Because the people of Thar desert economic depended on seasons of climate particular precipitation. This led to the effect of climate change in the area.

#### REFERENCES:

Alvi, S. K., U. Asghar, F. Parveen, F.A. Khan, and T. H. Usmani, (2008), Ground water quality of District Tharparkar, *Sindh, Pakistan: Focus in fluoride and Fluorosis*, Journal of chemical society of Pakistan (30) 3: 273.

Chauhan, S. O. (1996), Aeolian deposition of Arabia and Somalia sediments on the south-western continental margin of India, *Current Science*, Vol.71, No.3, 10, 233-34.

Dhir. R. P. (2004), Calcretes in the Thar desert: Genesis, chronology and Palaeoenvironment, proceedings of the Indian Academy of Sciences, Vol.113, 473-515.

Fein, J. S. and P. L. Stephens, (1987), *Monsoons*, Wiley, New York.

Gupta, M. S. and A.A. Fernandes, (1997), Quaternary radiolarian faunal changes in the tropical Indian Ocean: inferences to Plaeo-monsoonal Oscillation of the 10's Hydrographic front, *Current Science*, Vol.72, No.12, 965-72.

Hasnain, S. E., and B. Friedrich, (2012). "Climate change and infectious diseases--impact of global warming and climate change on infectious diseases: myth or reality?" *Int J Med Microbiol* 302(1): 1-3

Herani, M. G., R. A. Wasayo and K. M. Ali, (2007), Reforming farming and rangeland in Tharparkar: Suggested implementations for income generation, *Indus Journal of management & Social Sciences*, Vol.1, 16-36

James F. R. (2007), Global desertification: Building a Science for Dry land Development, *Science* 316, 847-851.

Meghwar, S., G. M. Mastoi, K. F. Almani, K.H. Lashari, (2019), Drought and its Extermination of the Diastrophic Plants in the Thar desert, Pakistan, *Sindh University. Research. Journal. (Sci. Ser.)* Vol. 51 (01) 159-162

Meghwar, S (2020), Humidity disproportion incentive of precipitation fluctuation in Thar desert, *Sindh, Pakistan, Sindh University. Research. Journal. (Sci. Ser.)* Vol. 52 (02) 205-2012

- Meghwar, S (2019), Incensement of temperature triggered to induce severe drought in Thar desert, Pakistan, Sindh University. Research. Journal. (Sci. Ser.) Vol. 51 (04).
- Muslehuddin M., M. Hazrat and F. Nadeem, (2005), Sindh Summer (June September) Monsoon rainfall prediction, Pakistan Journal of Meteorology ,Vol. 2, issue.4, 95-102.
- Ragab R. and P. Christel, (2001), Climate change and water resources management in arid and semi-arid regions: Prospective and challenges for 21st century, Biosystems engineering, 81(1), 3-34.
- Rao, P. G. and K. K.Krishna, (1992), Climatic shifts over Mahanadi river basin, Currents Science, Vol.63, No.4, 192-95.
- Roy, P. D. and W. Kloss-smykatz. (2005), REE geochemistry of the recent playa sediments from the Thar desert, India: An implication to playa sediments provenance, Chemie der Erde Geochemistry, 67, 55-68.
- Saini, H. S. (2005), Lake Deposit of the northern margin of Thar desert: Holocene (?) Palaeoclimatic implications, Currents Science, Vol. 88, No.12, 1994- 1999.
- SAZDA, (1988), Special development programme for Sind Arid Zone during seventh five year plan (1988-1993): Planning & Development Department, Government of Sind, Karachi.
- SCOPE, (2010) Combating desertification through agro-forestry approaches in semi-arid Tharparkar district–Pakistan S. J. and V. E. Van de, (2005), Is there more violence in very hot weather? Tests over time in Pakistan, and across countries worldwide, Pakistan Journal of Meteorology ,Vol. 2, issue.4, 55-70.
- Srivastava, H. N. and G. Malti, (1998), Synthesis of meteorological observations and modelling studies to assess climate change mitigation strategies over India, Current Science, Vol.75, No.2, 95-97.
- Stamp, L. D., (1965), A History of landuse in arid regions, UNESCO, Paris, 33-54,144-158.
- Swanson, F. (1999), Evaluating the usefulness of natural variability in managing ecological systems, Ecological Applications, November, Vol. 9, No. 4, 1179-1188.
- Thomas, J. V. (1999), Late Pleistocene–Holocene history of Aeolian: accumulation in the Thar-desert, India. Zeitschrift für Geomorphologie N. F. Supplementary Band 116, 181– 194.
- The times Atlas of the world, (1959), Mid-century edition South-west Asia and Russian, Times office London, Vol. II, 29Pp.
- Zhu, J. P. (2011) Exploration of the relationship between geographical environment and human diseases in ancient China. J Tradit Chin Med 31(4): 382-385.