DROUGHT AS ENVIRONMENTAL HAZARD: A STUDY OF DROUGHT SITUATION IN SINDH 2002

Shahnaz Qazi *
Shafique Ahmed Junejo **
Sujo Meghwar ***
Khanjimal Harijan ****

ABSTRACT

The wider regional weather phenomenon has its impact on a number of countries in South Asia and Southwest Asia including Pakistan. Sindh province is also facing the drought condition for the last three years (1999- 2001). The dry spell of weather (drought) has seriously affected about 1.3 million population and 2664 villages with three million heads of cattle in the region. This study presents a scenario of drought and its types in Sindh [Kheer thar range and Thar Desert]. In this connection, the early thirty years (1900-1930) and last thirty years (1970-2000) have been taken into account for evaluation of the situation in Sindh.

INTRODUCTION

Drought is the most common natural cause and the prime contributor to famine in arid and semiarid regions. Sometimes drought in the headwaters of a major river used for irrigation can cause famine in an irrigated region downstream. The earliest recorded famines date back to the 4th millennium BC and occurred in ancient Egypt and the Middle East. These early famines were called physical famines because of the natural environment's general hostility to intensive sedentary agriculture. Since 1700, Asia has been the principal, but not the only, famine region of the world. Many of Asia's famines have been characterized as food shortages due to overpopulation. These have occurred in drought- and flood-prone areas with agricultural production at or barely above the subsistence level. *[1985 Encyclopedia Britannica]*

* *Associate Professor, Department of Geography, University of Sindh*
** *Lecturer, Department of Geography, University of Sindh*
*** *Lecturer, Department of Geography, University of Sindh*
**** *Lecturer, Department of Mechnical Engineering, Mehran University of Engineering & Technology, Jamshoro*

Drought is categorized into the following types:

1. Hydrological
2. Meteorological
3. Agricultural drought.

I. Hydrological: Climate is the main contributor to hydrological drought. In addition, there are a few other factors such as land degradation, deforestation, and construction of dams which affect the hydrological characteristics of the basin. Hydrological drought is associated with the duration of precipitation. Although, all droughts are caused due to deficiency of precipitation, but hydrological drought is more concerned with how this acts through the hydrologic system.

Hydrological droughts are out of phase with occurrence of meteorological and agriculture drought. It takes longer time for precipitation deficiencies to show up in soil moisture, stream flow, and ground water and reservoir levels. As a result, the other economic sectors depend on these resources for water supplies are affected.

II. Meteorological Drought: This is defined on the basis of the degree of dryness and duration of dry period. Meteorological drought should be considered as region specific since the atmospheric considered as that result in deficiencies of precipitation are highly variable from region to region. For example, some definitions of meteorological drought identify days with precipitation less than some specified threshold. This measure is only appropriate for regions characterized by a year round precipitation regime.

III. Agricultural Drought: Agriculture drought links various characteristics of meteorological or hydrological drought to agricultural impacts, focusing on shortages of precipitation, differences between actual and potential evapotranspiration, soil water deficits, reduced ground water or reservoir levels, and so forth. Plant water demand, depends on prevailing weather conditions, deficient topsoil moisture at planting may hinder

germination, leading to low plant population per hectare and a reduction of final yield. However, if topsoil moisture is sufficient for early growth requirements, deficiencies in subsoil moisture at this early stage may not affect final yield if subsoil moisture is replenished as the growing season progresses or if rainfall meets plant water needs.

DROUGHT SITUATION IN SINDH

Sindh Province lies between the latitudes of 23^0 and 29^0 North (just North of Tropic of Cancer) and between longitudes 67^0 and 71^0 East. The region forms the southern part of Pakistan and the length of the region, from North to South is about 360 miles and its average width is about 170 miles. The Province as a whole is hot and arid and falls into the desert-section of Desert group *[UNESCO: 1963]*. The climate is the identified as BWh (Arid with hot summer and mild winter) *[Khan 2001]* the cloud base in the region is 900-1200 meters *[Shamshad 1988]* while the aerographic rain fall is reported to be maximum at a height of about 2000 meters. The relief in Sindh attains a height of about 5000 ft. while the Laki hills just reach a little above 2000 ft. which is not sufficient height to catch monsoon current. As a result, the rain fall is meager, and at an interval of 5-6 years, there is a severe drought in the region. As such, it is the hottest and driest region, in the sub-continent *[Pithawala 1937]*. The distribution of solar radiation plays a great part in it, aridity being its main characteristic, with Jacobabad having its mean maximum temperature of 113^0 F. and the Tropic of cancer passes just below its boundary and so the heat is great. The Thermal Equator also passes through this region. The years, 1903, 1914, 1921, 1924, 1929-30, 1942, 1948, 1973, 1978, 1992, 1994, and 1995 were the flood years but during this period, there was dry spell of weather which has been recorded in the Gazetteers of Sindh district.

Our study identifies, a cycle of 5-6 years i.e. 1902, 1908, 1913, 1921, 1926, 1932 as the drought years. *[Pithawala1976]*

In the light of above facts it appears that there was a drought situation in 1902 while in 1903 flood occurred. 1913 was a

drought year, while flood occurred in 1914. Thus a cycle of wet and dry period is noticeable. 1995 was the last flood year in the past century and from 1995 to 2002, there was a dry period but most severity of this dry spell of weather appeared in 1999-2000 when almost all parts were affected, while 2003 was the flood year. From the study of weather conditions in Sindh, it appears that after every severe drought, floods occur.

The total population of Sindh according to the census of 1998 is 29,991,161. The entire region is vulnerable to disasters; it is exposed to almost all types of hazards like earthquake, cyclone and floods, but the most disturbing natural hazard is Drought in the region.

In Table-I the cumulative loss is given with the interval of 10 years since 1900-2000. In this table the life loss and the population which is affected by drought is given, while the loss of live stock is also shown.

TABLE-I
SINDH: STATISTICAL DATA OF DROUGHT 1900 - 1930

Year	1900 – 1910	1910 - 1920	1920 - 1930
Population	*	*	*
Life loss	1489	777	597
Live stock	10600	21609	*

* The data is not available.

Source: Gazetteer of Sind, Karachi 1919 & 1927, Thar & Parkar 1927, Nawabshah 1927, Larkana 1919, Hyderabad 1927, Sukkur 1927, and Dadu District 1927.

TABLE-II
SINDH: STATISTICAL DATA OF DROUGHT 1970 - 2000

Year	1970 – 1980	1980 - 1990	1990 - 2000
Population	866524	3190275	1 38[M]
Life loss	*	*	*
Live stock	1247668	4841010	*

* The data is not available.

Source: Sindh Relief Commissioner Shahbaz Building, Hyderabad

The drought situation in Sindh is described as one of the worst environmental disasters in the 50 years history. It has affected more than 2664 villages with 3 million cattle heads *[SAZDA 2001]*. It has claimed many human lives, eroded sustenance and livelihood opportunities with multiple impacts on human health and eco-biological diversity. The region receives less than 200mm rainfall annually and is, therefore, considered as arid [Figure - II fall 1971 to 1998]. Poor and rocky soils, deserts and rough topography also impose the climatic factors limitations. Underground water table too is reduced during the drought period [See Table - II]

TABLE-III
WATER TABLE BEFORE AND AFTER DROUGHT

S. No.	Before drought (ft)		After drought (ft)
1	5	Badin, Sanghar, Mirpurkhas	10
2	10	Dadu, Larkana, Khairpur Mirs, Nawabshah, Hyderabad	15
3	>10	Umerkot, Mithi	>15

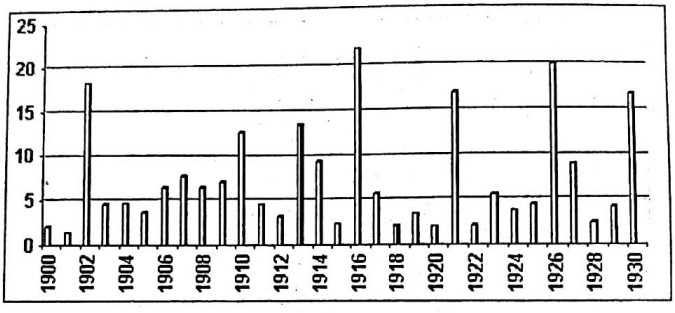
Source: DRC, Tandojam, 2002.

The areas most affected in Sindh are Tharparkar, Mirpurkhas and Sanghar, and Kachho and Kohistan regions of Dadu and Thatta districts. All these areas are within the range of monsoon rainfall, which, however, is erratic and scattered.

According to an estimate, 1.3 million populations of Tharparkar, Umerkot and Dadu districts have been affected by the drought wave of the year 2000. The district of Tharparkar with 1,895 villages and a population of 900,000 persons and with 3 million cattle heads was severely affected. In the district of Umerkot 316 villages out of a total 1,066 declared calamity hit, and one million animals and 150,00 persons were affected. Likewise, in Dadu district, 453 out of a total of 4420 villages with 260,000 persons and about one million animals were affected *[Sindh Relief Commissioner 2002]*

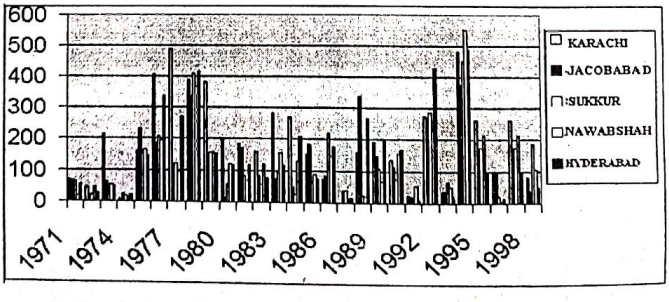
Human casualties are mainly because of viral infection and different types of water- borne diseases.

FIGURE - I
RAINFALL IN SINDH, 1900- 1930
In inches



Source: Pithawala 1976.

FIGURE - II
FAINFALL (IN MILLIMETERS) AT SELECTED STATIONS IN SINDH, 1971- 1998



Source: Meteorological Centre, Karachi, 2000.

CONCLUSION

Droughts are not new phenomena for the people of this area. Since the beginning of the British period it has been recorded that a major drought hit the region almost every decade.

The dry weather spell has developed in this year too and if rains are deficient in this season, the drought situation will become more acute with seasons consequences. In this regard necessary measures should be taken both by Government and Non Governmental Organizations in order to minimize the loss of life and other biological losses. People of arid lands are mostly dependent on livestock while agriculture is totally dependent on rainfall. In the past, they maintained their livestock during drought periods by migrating from one area to another. During the drought periods these communities engaged themselves in harvesting and thrashing of wheat crop in irrigated lands, as these operations were manual and required extra manpower.

However, the use of modern technology has changed the process altogether. The introduction of subsidized inorganic fertilizer, increase in horticulture, greater use of tractors and increase in commercial livestock farming by agricultural farmers have made all the difference. The historical cooperative relationships between the communities of the arid lands and the farmers of the irrigated agricultural lands hardy exist.

The drought condition is felt all over the country but more crises appeared at Khirthar range and Thar Desert, where the decrease in underground water is observed due to the scarcity of rainfall. Besides this, the rapid installation of tube wells has also affected the water table that too is making the drought situation more complex and fatal. As a result of prolonged drought, livestock losses to the tune of more than 60% of herds were estimated in Sindh. Extreme by low prices of animals, and decrease in the number of animals have eroded house holds purchasing power. In lower Sindh, cyclone A2 occurred in May 1999, and an earth quake in January 2001 which adversely affect

the economic condition of the people, leaving them all the more weaker to combat the situation.

BIBLIOGRAPHY

1. *Encyclopedia Britannica 1985*, Vol.4, p.231, Library of Congress, USA.
2. Khan, Fazle Karim, *Geography of Pakistan: Environment, People and Economy*, 2001 (Second Edition) Oxford University Press Karachi.
3. *Gazetteer of Sind*, Karachi District 1918, Government Central Press, Bombay.
4. *Gazetteer of Sind*, Hyderabad District 1927, Government Central Press, Bombay.
5. *Gazetteer of Sind*, Nawabshah District 1927, Government Central Press, Bombay.
6. *Gazetteer of Sind*, Larkana District 1918, Government Central Press, Bombay.
7. *Gazetteer of Sind*, Northwest Frontier District 1918, Government Central Press, Bombay.
8. *Gazetteer of Sind*, Sukkur District 1927, Government Central Press, Bombay.
9. Meteorological Centre, Karachi, 2000.
10. Pithwala, B. Mareck, *Physical and Economic Geography of Sindh*, (Lower Indus Basin), Sindhi Ababi Board, Hyderabad, Sindh, 2nd Imp. 1976.
11. Pithawala, *Climatic Effects on Life of Sind*, 1937, Diwali Swadeshi Exhibition Karachi.
12. Rehman, Mushtaqur, *Geography of Sindh*, Karachi Geographers Association, June 12, 1975.
13. *SAZDA Annual Report 2001*, Planning and Information Department, Hyderabad.
14. *Calamity Report 2002*, Sindh Relief Commissioner, Shahbaz Building, Hyderabad.
15. *UNESCO Annual Report 1963*, Paris.
16. *West Pakistan Gazetteer of Sind*, 1968, Government Press, Karachi.