3. Drought and Human Suffering in Afghanistan

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I. Background

It is a privilege for me to speak about a life supporting substance, such as water in a country that has experienced natural and man-made disasters for more than two decades.

The man-made disaster caused about 2 million of Afghans to lose their lives, 1 million to become disabled, 3 million to refuge to other countries; while the natural disaster, or the drought has forced about 700,000 people to be displaced from their areas to other places as well as the loss of life for a number of inhabitants. This is in addition to two major earthquakes that happened in year 2000 and caused more than 8,000 loss of life and displacement of more than 100,000 inhabitants of the area.

Afghanistan is a mountainous country with snow-covered mountains of high altitude, up to 7,500 m above sea level (asl). It has fertile valleys and large dessert plains (Fig. 1). From topographic point of view, Afghanistan is classified into: low lands, (with 300 to 500 m elevation asl), medium lands (with 500 to 2,000 m elevation asl), and high lands (with altitudes higher than 2,000 m asl).

In terms of climate, Afghanistan is known by its continental climate. Nevertheless, the presence of mountains causes many local variations. The mountain ranges of Hindu Kush are normally moderate humid and covered by permanent snow and glaciers at altitude above 5,000 m asl. In these areas, temperature is low and precipitation occurs in the form of snow, whereas during summer, temperatures go high and virtually precipitation is nil.

Precipitation in Afghanistan is mainly correlated with altitudes. However, the presence of surrounding mountains in several regions (e. g., the Wakhan corridor and Bamyan highlands) alters this rule.

More than 50% of the country which is lower than 2000 m asl receive 100 mm to 300 mm of precipitation per year; while the remaining 50% of the country (except Ghore and Bamyan) receive 300 to 800 mm. Mansoon also influences in part the country during summers. This is evidenced especially in southeastern parts of the country.

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In Afghanistan nearly 50% of precipitation occurs in winter (January to March); much in the form of snow; 30% in spring (April to June) and the remaining 20% during summer and autumn. Zaranj, in south-west the driest part of the country receives a normal long-term precipitation of 58 mm and most humid part of the country, i. e., South Salang, north-east receives 1023 mm of precipitation per year (Fig. 2,).

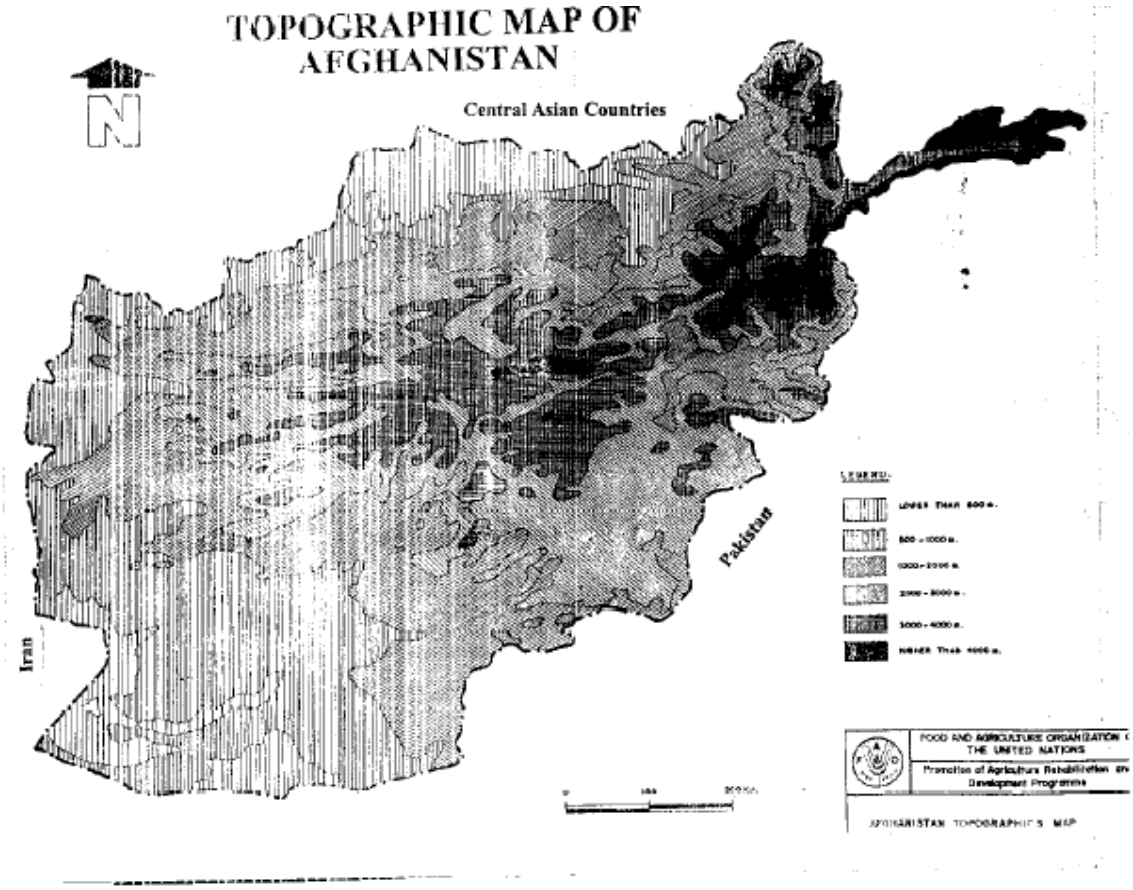

Figure 1. Topographic Location of Afghanistan

The cultivable land area has been estimated at 8 million hac, which is 12% of total area of Afghanistan. Out of this, 3.4 million hac is under cultivation. The total grazing area or pasture in the country is around 34.7 million hac. FAO/UNDP survey estimates the livestock population in 1995-1998 to 3 million cattle and 22.8 million sheep and goat. The total evergreen forests in the southeastern part of the country were 2.2 million hac, i. e., 3.4% of the total territory prior to the war. However, the armed conflict associated with the lack of law enforcing institutions has caused this to reduce to only 2.2%.

Population of Afghanistan (projected from 1991 data) is regarded about 25 million inhabitants. In pre-war periods, about 85% of this number was dependent on agriculture. However, due to the current transient situation and the return of refugees, this data is in need of update.

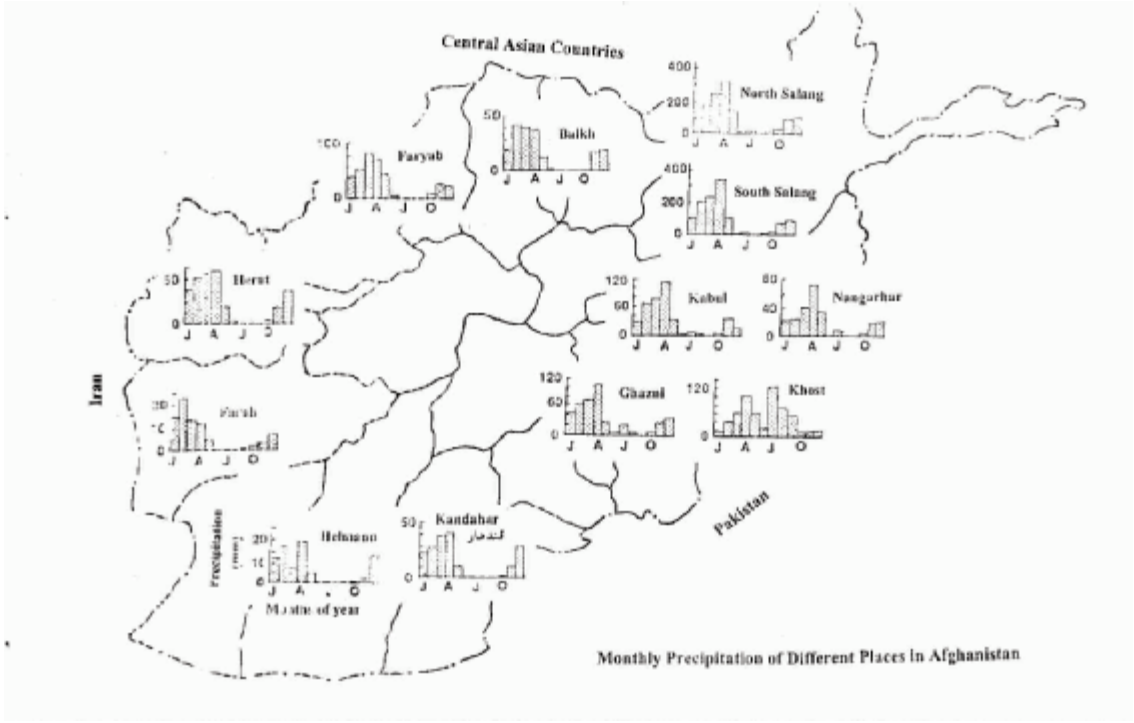

Figure 2. Monthly Amount of Precipitation in Different Parts of Afghanistan.

II. Water Resources

Surface water

The river basin in Afghanistan can be divided into 3 major river basins. The Amu River Basin in the north is separated from the Sistan and Indus Basins by Hindu Kush mountains. Water catchment area of ***Amu River*** basin is estimated to 86,000 km^2. ***Sistan (Helmand) River Basin*** collects precipitation of an estimated catchment area of 418,800 km^2. The generated run-off from this basin some disappear in sandy dessert of the west, while the remaining drains in Hamoon-e-Helmand. ***Indus or Kabul River basin*** has an estimated catchment area of 140,160 km^2 and drains finally in Indian sea via Pakistan (Fig. 3).

Groundwater

Afghanistan has huge reserves of groundwater bodies. According to FAO/UNDP estimates of 1996, the potential reserves of groundwater in the country is about 18 billion m^3 per year. Currently, about 3 billion m^3 is under usage, and up to about 8 billion m^3
more can be explored. Recently, especially during the drought years, there has been a large development of groundwater use in agriculture and water supply in the country.

Hydrogelogically, Afghanistan as shown in Fig. 4 is divided into 3 hydrogeological regions:

1. Greet southern plains (Sistan Basin)
2. Central Highland region or hydrogeologically folding region (Hindu Kush ranges in its broadest sense)
3. Northern Plains (Amu River basin).

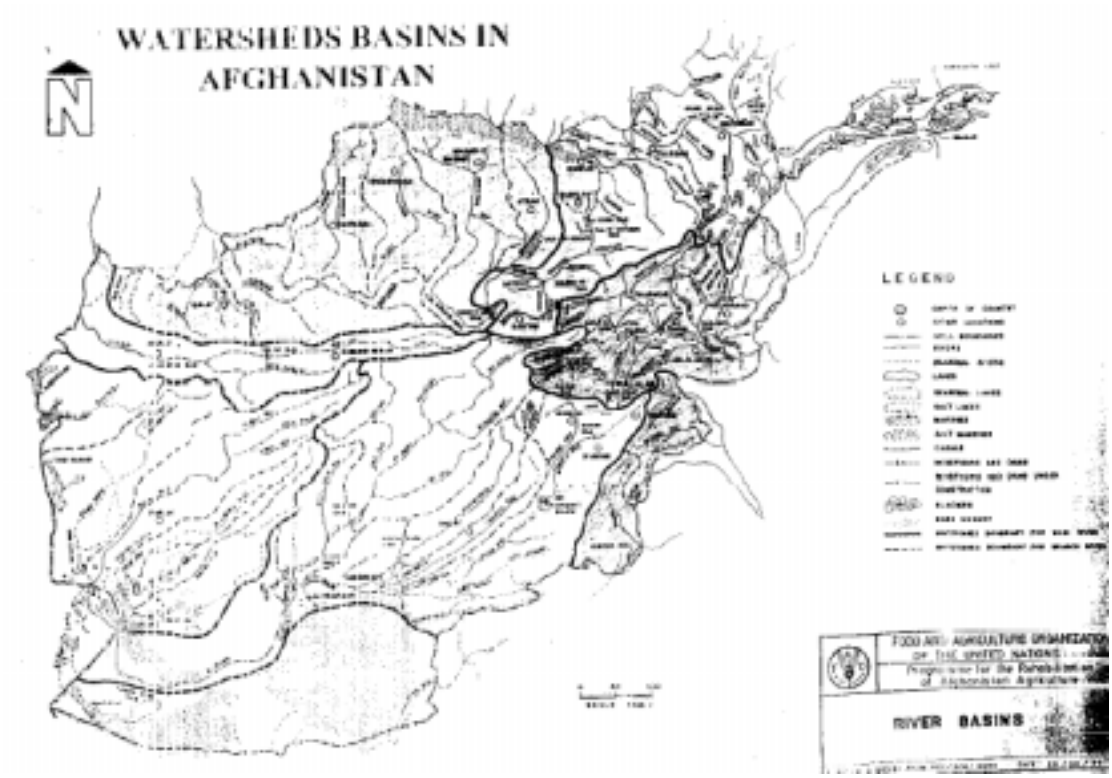

Figure 3. Watershed Basins in Afghanistan.

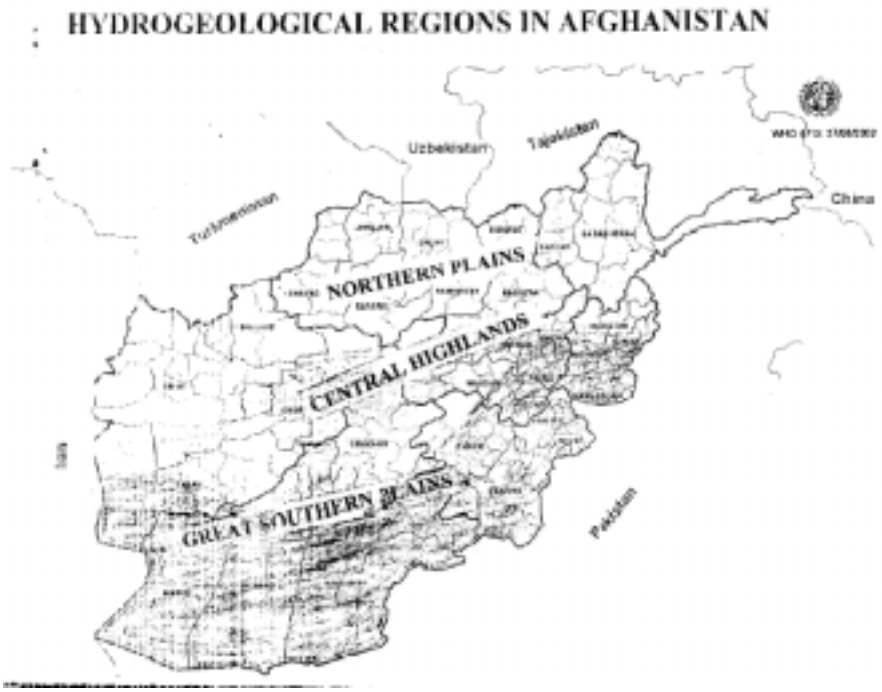

Figure 4. Hydrogeological Regions in Afghanistan

Great Sistan Plain is situated in the vast sand dessert between the rivers of Helmand-Arghandab and the boarder line with Pakistan in the west. Because of minimum precipitation and absence of surface water, the aquifer is very low productive and groundwater to be brackish to saline. Depth of water bearing strata in the basin varies from 50 to more than 100 m and the electro conductivity in some places exceeds 10,000 micromohs.

Highland Region in Afghanistan has 3 hydrogeological media. These are: the carbonate massive, the non.carbonate complex and intermountain structures. The carbonate massive is composed of limestone and dolomite locally interbeded with sandstone /conglomerate. Therefore, this structure is more or less karstified and there are occurrences of sinkholes, caves and various caverns.

The non-carbonate complex, which includes all pre-quaternary formations are of limited importance in terms of groundwater development aspect. Unfortunately, the largest part of the highland region consists of such formations.

Intermountain structural and river basins are of the highest hydrogeological significances in the highland regions. Either of the tectonic or erosion origin, they are in filled with alluvial and locally glacial deposits saturated with groundwater.

Northern Plains located in the narrow belt along the Amu River; composed of fluvial and delta deposits; saturated with fresh groundwater. Except for the hills of Hindu Kush Mountains, productivity of soil strata in terms of groundwater reserving is high.

III. Irrigation Systems in Afghanistan

Irrigation in Afghanistan is practiced by using both surface and groundwater.

Surface water is utilized for irrigation purpose in traditional and un-organized irrigation systems. Traditional irrigation systems are established for centuries back in Afghanistan. Maintenance and reconstruction are generally arranged on communal village basis. Technical knowledge and operational system are thus dependent on traditional community structures.

The organized or the formal irrigation system or the organized large-scale irrigation system in Afghanistan is relatively recent event. By late 1970s, five large-scale modern irrigation systems were built and were put into operation. These are the Helamnd irrigation system in the southwest, Nangarhar in the east, Sardeh in the south, Kunduz-Khanabad in the north and Parwan in central part of the country. The armed conflict and the drought have imposed great influences on these irrigation systems and have malfunctioned a number of them. Location of these projects can be seen in Figure 5.

Groundwater resources are also widely used for irrigation purpose in Afghanistan.
As per collected data, more than 15% of Afghanistan's traditional irrigated land is fed from groundwater reservoirs. Water from this reservoir is discharged in springs, qanats and shallow wells.

Figure 5. Organized Irrigation Schemes in Afghanistan.

Qanats are long tunnels dug horizontally in groundwater bearing formations of unconfined aquifers. They are like infiltration galleries, with a mother well on the uppermost and several access wells along its length. There are a total number of 6,741 qanats in the country that irrigate around 167,750 hac of land.

Springs are also water source of irrigation. About 5,558 springs are known to exist in Afghanistan. These springs feed around 187,430 hac of land.

Shallow wells are other water source for irrigation. As per available data, before the war, there were about 8,595 shallow wells for irrigation that could irrigate around 12,060 hac of land. But because of war and destruction of water supply systems in the country, an unpredictable tendency resulted in drastic increase in the number of shallow wells. Only in Kabul, there are about 130,000 shallow wells dug in private houses and public places for domestic water use.

IV. Drought in Afghanistan

Background

Afghanistan is not regarded as drought prone country. However, droughts have been recorded almost everywhere in different years. The most relevant one was recorded in 1970-71 in almost all the country, but it particularly hit southwestern and northern regions. That drought resulted in displacement of population, loss of animals and sever food shortage. Other droughts happened in 1948 and 1955 in southern part of the country, 1961-62 in central parts and in 1973 in central and northern regions and in 1977 in northwestern regions. Minor droughts have been recorded in 1981and 1992 in Ghazni, Ghore and Farah provinces. Drought hit areas occurred during the time is shown in Figure 6.

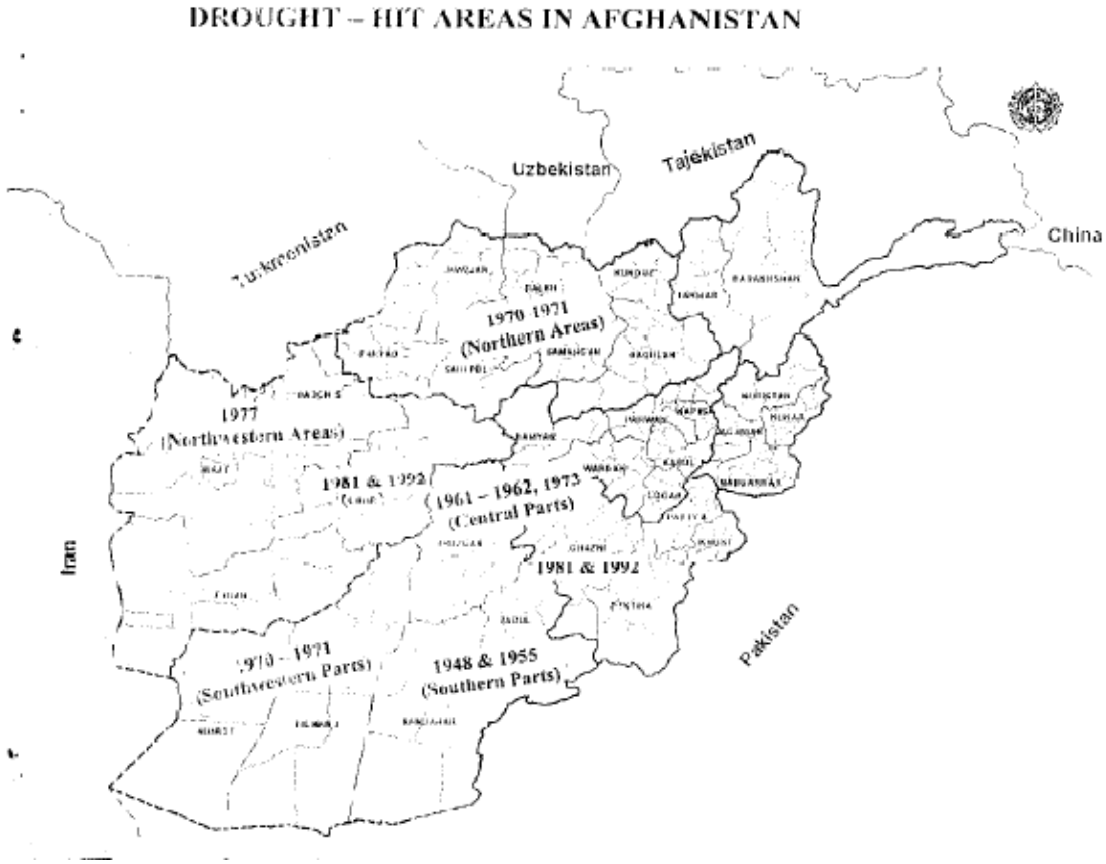

Figure 6. Drought Record in Afghanistan

The recent drought is the only one that has caused unrecorded impacts. The recent drought comparing with the previous droughts is multi-dimensional in its effect and severity. This worst drought has not been recorded in the last 50 years in Afghanistan. Drought occurred previously had affect only to some part of the country and had lasted for only maximum period of 2 years. But the current drought has so far continued for 3 to 4 years. This has affected rural and urban areas of Afghanistan, except for few places located in the valley along the perennial rivers.

The droughts recorded so far in the country can be categorized as:

- Local drought in small parts of the country; occurring each 3-5 years
- Regional (zonal) drought occurring each 9-11 years
- Countrywide droughts occurring each 20 to 30 years.

V. Effects of Current Drought

Livelihood

Preliminary estimates suggest that the current drought has imposed negative impacts on at least half of population. 3 to 4 million people are affected severely; 8 to 12 million are under threat of famine and starvation. An estimated 700,000 people abandoned their houses in search of food, water and fodder (pasture); around 300000 have fled to neighboring countries and more than 400,000 people (IDPs) have moved to the closest and safest places. Figure 7 shown population movement inside and outside of Afghanistan.

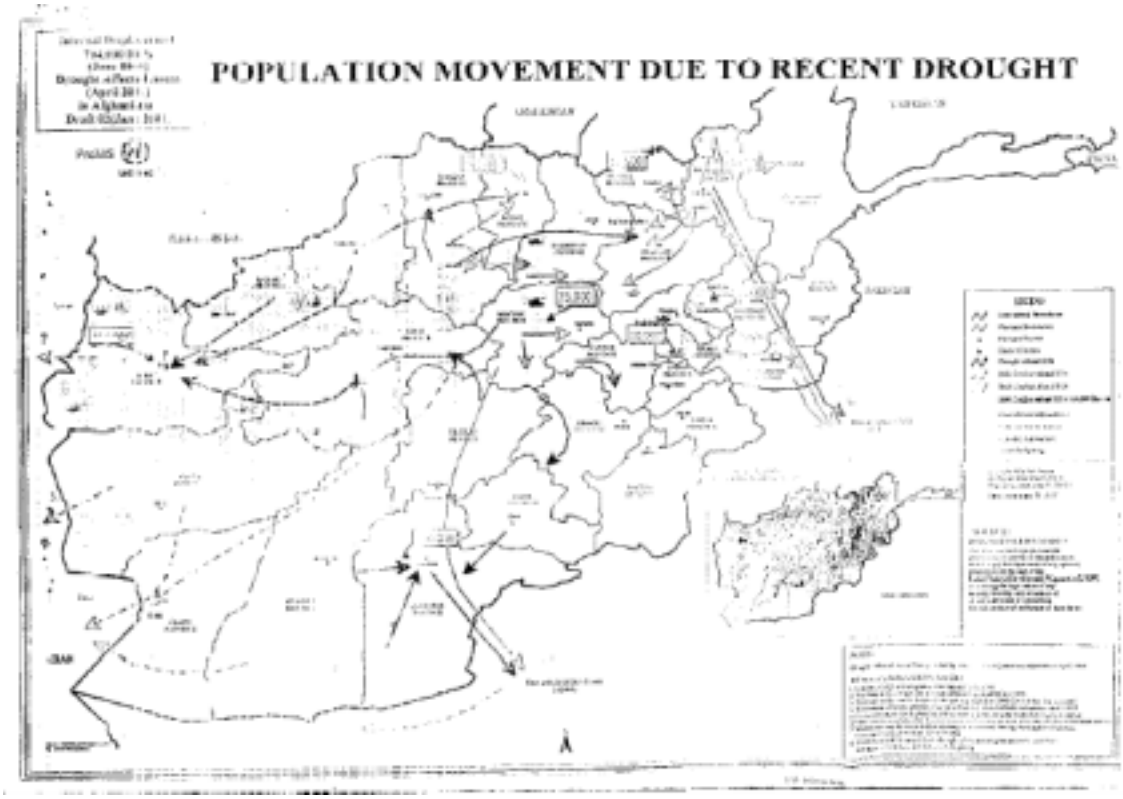

Figure 7. Population movement inside and outside of Afghanistan.

Lack of water, food and shelter for IDPs has led to malnutrition, disease and death. According to available reports, the acute malnutrition rate among children under 5 years of age is 24.6% and mortality rate is recorded 2 people per 10,000 populations. Many of those who remained in their houses in drought hit areas are those inhabitants who could not manage to move to other places due to inability in covering transportation costs, lack of job opportunities, and mistreatment and abuse of refugees in the neighboring countries.

As per FAO/UNDP estimates in 1997, due to continued war and instability in the country, out of 3.4 million hac of arable land in Afghanistan, only 30% is estimated to be cultivated. 20% has poor on-farm water management, 10% is destroyed by war, 40% is damaged due to the lack of maintenance or abandoned by farmers.

In 2001, most of families consumed the seeds kept for sowing their land for the next year. Consumption of wild food (wild sugar beet and wild grass) is wide spread among the population of drought-hit areas. In some cases the situation is aggravated by the fact that districts has no road link and can only be reached on horse back or on foot.

Precipitation During the Year 2001

The winter 2001 witnessed around 5 to 20 % more snowfall than the year before. However, due to lack of spring rainfall and increase of air temperature, the snow reserves exhausted faster. At the beginning of spring, the river discharges were higher than the year before, but decreased drastically during spring. Amount of precipitation recorded as an example in Kabul during the droughts of 1971, 1972, 2000 and 2001 is shown in Figure 8.

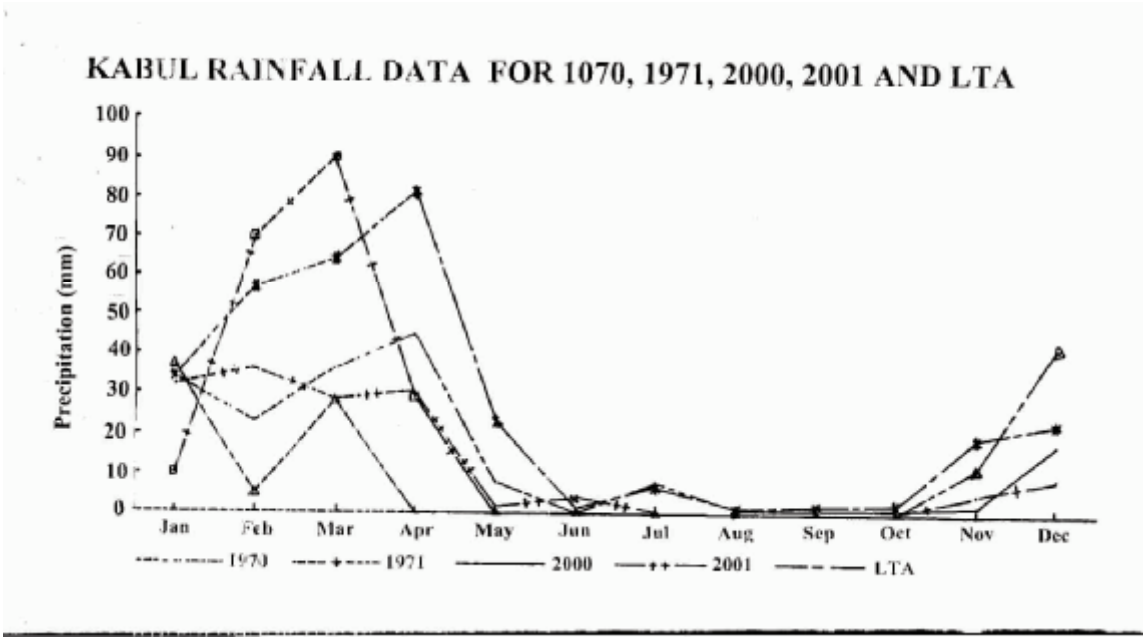

Figure 8. Precipitation in droughts of 1971, 1972, 2000, and 2001 with the Long term Average Records.

The current drought has not much affected the discharge of main rivers with main discharge forming basin above 4000 m asl, but the discharge of tributaries with lower catchment area are affected. In these types of rivers, water can flow (lower than the normal discharge) up to the end of their normal destination. In territory of Afghanistan there is enough water for the land adjacent to these rivers, and no affect of drought has been seen in their valleys. But the drought

affects are seen in the adjacent valleys, where the main rivers do not provide irrigation water but the tributaries.

The rivers with a main discharge forming catchment basin between 3000 to 4000 m asl have enough water in the upper and middle parts, however, in lower parts, shortage of water is observed noticeably. In all tributaries of these rivers shortage of water is acute.

The rivers with main discharge forming basins in an elevation lower than 3000 m asl an acute shortage of water is seen. In some cases, the groundwater table in the valleys of these rivers has declined. These types of rivers are mainly located in the northern, southwestern and southern part of the country.

All valleys and low land plains with an altitude lower than 2000 m asl except for the valleys of main rivers crossing the area, which consist most of the rain fed lands are seriously affected by the drought. According to reports from the field, all ephemeral rivers dried out in early spring and perennial rivers in early or mid summer. Perennial rivers such as Helmand river (mean discharge of 196.26 m^3/sec) in southwest, Farah Rud (mean discharge of 48.25 m^3/sec) in the west, Murghab River (mean discharge of 47 m^3/sec) in northwest and Kunduz River (original mean discharge of 106 m^3/sec) in the north can now be crossed by foot.

During the recent drought water level in the existing reservoirs of the country has reached to the critical and even some of them are dried completely. These reservoirs are Dahla in Kandahar, Qargha (Kabul), Band-e-Ghazi (Kabul), Sorkhab and Kharwar (Logar), Sultan and Sardeh (Ghazni).

The effect of drought in groundwater resources is also noticeable. As per an estimate, all traditional irrigation systems have reduced or dried up completely. 60 to 70% of Qanats are not currently in use and 85% of shallow wells were dried out. The main reason for low discharge or failure is the low groundwater recharge. In addition to this, boring of deep wells close to qanats and shallow wells imposed adverse effects on the discharge of these traditional irrigation systems.

Food Production and Demand

In year 2001, at the beginning of spring, the river discharges were higher than the year before and hence; about 14% higher wheat was harvested than year 2000. This amount is still 25% less than production in 1999. Due to the lack of rainfall, production of rain fed crops (wheat and barely) have reduced significantly, about 40% less than year 2000. In some parts of northern regions, the rain fed crops dried out completely. Due to 30% shortage of water flow in Kunduz river, a significant reduction in the cultivation of paddy has also occurred. It is worthy

to mention that Kunduz valley in the north is one of the best and main rice producers in the country.

Grazing (pasture) and livestock

Nomads and farmers due to drought and acute shortage of fodders, low growth or drying up of pasture and lack of potable water in grazing area have sold or eaten an estimated 40%, in some case they have exhausted their herd. Movement of nomads has occurred earlier in 2001 than the previous year. This is due to drying up of low land pasture. The drought has paralyzed nomad activities as well.

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