

# Comparative Study of the Physiochemical Characteristics of Water Samples Collected from Different Reservoirs, Khyber Pakhtunkhwa, Pakistan.

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**Abstract** – The study was conducted to analyze the physiochemical properties like color, taste, odor, TS, electrical conductivity, pH, temperature and TDS of water samples collected from various reservoirs of Khyber Pakhtunkhwa (KPK), Pakistan. The recorded and analyzed data of the current study disclosed that all physiochemical parameters were found to be in allowable range and are non-fatal. Henceforth; this study provided convenient information that the water of wells, tube wells, dam etc. is suitable for domestic as well as commercial use.

**Keywords** – Physiochemical Characteristics, Pollution, Water reservoirs

## 1. Introduction

A number of analyses have been conducted to study the physicochemical properties of water from different Rivers, Dams, Wells and Tube wells etc. [1-5]. Dams, Wells, Rivers etc. play vital and extraordinary role in agriculture, fishery, and electricity, industries along with its huge use for domestic and drinking purpose. Contamination of water primarily influences its chemical nature and also damages the community alarming the delicate food web. Miscellaneous uses of water reservoirs are seriously diminished because of contamination and pollution. Pollution of water is a universal problem, so its active ensuring is required [6, 7]. Both physical and chemical properties of water are frequently changed when it is contaminated with heavy metals and other pollutants, which makes water inappropriate and inconvenient for plant growth and other activities. pH, Organic matter, clay minerals, redox potential, temperature and interrelationships between heavy metals are all themselves physicochemical factors which affect the relationship between microorganisms and toxic metals [8].

Anthropogenic influences including, agricultural industrial, and other urban activities as well natural phenomena such as, precipitation inputs, erosion, weathering of crustal material and enriched utilization of water resources, collectively determine the water quality in that region. Rivers, Dams etc. play major and significant role in assimilating or carrying off industrial and agricultural waste [9]. Enormous number of griefs and deaths occur because of infections, and diseases related to open water supplies in the tropical developing countries. In unindustrialized countries there are many people who drink contaminated water, which result in water borne diseases [10].

Countless factors are responsible for water pollution, which makes it moderately unbecoming for life. Such factors includes: Emancipation of sewage, which affects the OD and nutrient contents of water leading to destabilization and

unbalanced aquatic life. Pollution effortlessly rises and increases with increase in population [11]. It is a communal practice of those people who live near the river catchments to discharge their excreta and domestic wastes into the rivers. Both wild and domestic animals' use same drinking water and contaminates and pollutes water through direct defecation and urination [12].

Many physical and chemical parameters such as EC, TDS, phytoplankton and temperature all have influences on aquatic life and estimate potential fish yields from dams and reservoir, so it is convenient and essential to analyze the physical and chemical properties of water from dams, rivers, well and tube wells etc. The aim of research work was to analyze the physiochemical characteristic of different type of water.

## 2. Materials and Methods

### 2.1. Sampling

Six samples of water were collected from each reservoir. Water samples were collected in thoroughly washed vessels and placed in air tight bags for further analysis.

### 2.2. Physiochemical characteristics

The physiochemical physiognomies i.e. TDS, EC, color, temperature, odor, pH and elasticity of water samples was analyzed. Features like color, odor were noticed at the time of sampling while the remaining characters were studied in lab.

### 2.3. Electrical conductivity & Total dissolved solids

Electrical conductivity and TDS of both (water and soil) samples were analyzed by means of *Jenway* conductivity meter, 0.1 M solution of Potassium chloride was used for its calibration. The electrodes were washed properly before and after dipping it into water and soil samples.

#### 2.4. Temperature and Hydrogen ion concentration

Temperature as well as pH is amongst those factors which seriously affect the ecology. Thus it is convenient to determine the temperature of the dam as it helps in understanding the behavior of life under water. For temperature and pH measurement APHA method and Electrical Jenway pH meter was used individually [13, 14].

### 3. Results and Discussion

All the physiochemical characteristics of different water were shown in Table 1.

#### 3.1. Color and Odor

Although color of water varies place to place, these colors lay down whether the water is suitable for the growth and survival of organisms beneath it or not, for example greenish and light greenish colored water is suitable for survival, while dark green and brown colored water is deadly for growth and survival [15]. Likewise the presence of plankton was also confirmed with the help of water color [16].

#### 3.2. Total Dissolve Solids

The permitted limits of TDS in water are shown in (Table and Fig. 1). All values lies within permissible limits suggested by WHO(i.e. 500-1000mg/l) [17]. Henceforth is suitable for drinking purpose and other domestic and commercial uses. Present research showed that the recorded values of TDS from Panjkora River, Sanam Dam, Shangari Stream, Spring Shangri, AlibabaTubewell, Shangri well,

Shangri Pressure pump and Shangri Hand pump are found 100,135,75,35,40,25,80,120 individually.

#### 3.3. Temperature

As pronounced temperature greatly affect the ecosystem. Life either directly or indirectly depends on the temperature of water. The crucial temperature ranges from 26-32 °C [18]. The temperature beyond this range might increase the growth of microorganism which definitely increases the chance of hazardous effect upon life. Hereafter from present research it can be concluded that the temperature is suitable for the growth. The temperature of all examined areas is given in (Table 1).

#### 3.4. Electrical Conductivity

The optimum range of conductivity varies from 15-500  $\mu$ s/ml [19]. Current research showed that the EC value of Panjkora River, Sanam Dam, Shangari Stream, Spring Shangri, AlibabaTubewell, Shangri well, Shangri Pressure pump and Shangri Hand pump are found to be 0.21, 0.34, 0.4, 0.65, 0.56, 1.37, 0.86 and 0.66 respectively.

#### 3.5. Hydrogen Ion Concentration

The optimum pH of water, supporting the growth varies from 6.5-9.5 and 6.5 to 8.4 correspondingly [20, 21]. From recorded data it has been shown that the pH value of Panjkora River, Sanam Dam, Shangari Stream, Spring Shangri, AlibabaTubewell, Shangri well, Shangri Pressure pump and Shangri Hand pump are 7.2, 7.24, 7.5, 7.38, 6.61, 6.88, 6.95 and 7.05 correspondingly.

Table 1. Physiochemical values for different water samples

Water Samples	pH	Conductivity	Temperature	TDS(mg/50ml)	TS(mg/50ml)	Color	Odour	Taste
Panjkora River	7.2	0.21	31.6	100	35	colourless	odourless	Tasteless
Sanam Dam	7.24	0.34	31.4	153	60	colourless	odourless	Tasteless
Shangari Stream	7.5	0.4	31	75	58	colourless	odourless	Tasteless
Spring Shangri	7.38	0.65	31.3	35	65	colourless	odourless	Tasteless
AlibabaTubewell	6.61	0.56	30.9	40	18	colourless	odourless	Tasteless
Shangri well	6.88	1.37	30.8	25	32	colourless	odourless	Tasteless
Shangri Pressure pump	6.95	0.86	30.8	80	56	colourless	odourless	Tasteless
Shangri Hand pump	7.05	0.66	31	120	94	colourless	odourless	Tasteless

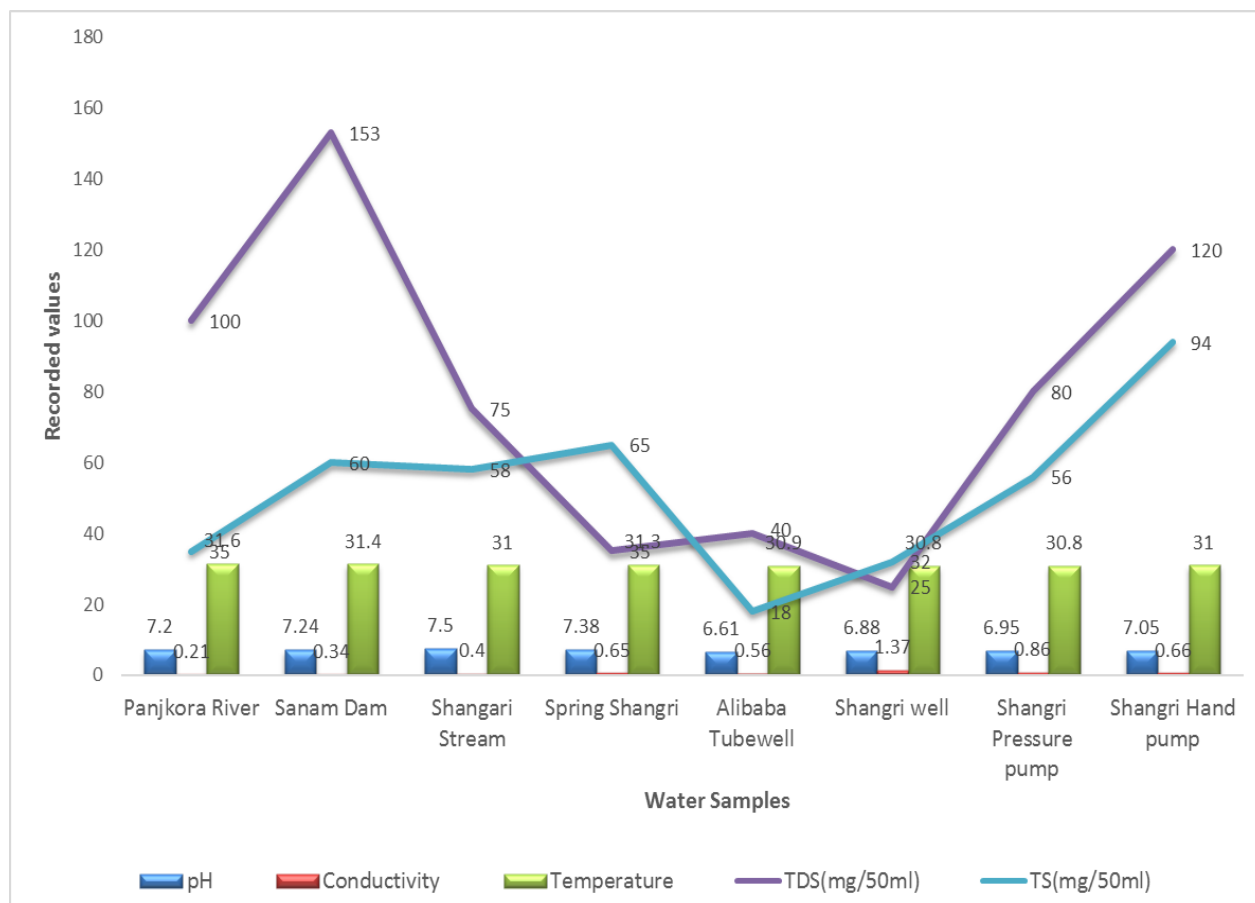


Figure 1. Comparative layout of physiochemical properties of various water samples

#### 4. Conclusion

The research was conducted in order to compare the physiochemical properties of water samples collected from various reservoirs. From the physiochemical analysis of samples it can be concluded that the water of studied areas is suitable in all respects as the values of all parameters are within the permissible range.

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