2. REVIEW OF LITERATURE

Ground water sources are degraded gradually due to pressure of human activity, urbanization and industrialization. Therefore pure, safe, healthy and odorless drinking water is a matter of deep concern. Various workers have carried out extensive studies in the relevant area.

Ochir Altansukh et al. (2011) have analyzed index to evaluate the water quality of the Tuul river in Mongolia\(^9\). Mouna Ketata et al. (2011) were used geographical information system and water quality in El Khairat deep aquifer\(^84\).

J.M.Ishaku (2011) has evaluated groundwater quality index for Jimeta YZZSalo area, northeastern Nigeria. Result indicates that high value of WQI mainly from chloride, nitrate, dissolved oxygen, chromium hexavalent and EC. The source of these contaminated is attributed to anthropogenic origin\(^66\).

K.S.Parmar et al. (2011) evaluated seasonal variation of physico–chemical parameters and Water Quality Indexing of Harike lake\(^114\).

P.J.Puri et al. (2011) have assessed surface water (lake) quality of Nagpur city by using WQI. Results showed that the quality of water is fair in monsoon which then changed to medium in winter and poor in summer\(^112\).

A.R.Karbassi et al. (2011) developed NSF WQI with different conditions and explains characteristics of the Gorganrood river such as geographical, hydrological, discharge rate and pollution sources\(^80\).

Gajanand Thakre et al. (2011) have used WQI for evaluating the river Tapti for public usage. Result shows high value of WQI due to high values of TDS, phosphate, sulphate, COD and turbidity\(^159\).

May Afif Massoud (2011) has used WQI for assessed the water quality along a recreational section of the Damour river in Lebanon. Result revealed that water quality of this river is affected by the anthropogenic activities\(^101\).
Deepshikha Sharma and Arun Bansal (2011) analyzed water quality of river Yamuna in the national capital territory by using WQI\textsuperscript{138}.

S. Islam et al. (2011) were evaluated water quality of the Titas river using NSF WQI. Result indicates that the water can be used for recreation, pisciculture and irrigation purposes but requires treatment before using for drinking\textsuperscript{67}. Sami G. Daraigan et al. (2011) has studied the correlation analysis of drinking water quality data for Almukalla city, Hadhramunt, Yemen\textsuperscript{36}.

Vikram Bhardwaj and Dhruv Sen Singh (2011) have evaluated surface and groundwater quality in Deoria district, Ganga plain, India to assess the suitability of surface and ground waters for domestic, agricultural and industrial purposes\textsuperscript{19}.

Sandow Mark Yidadana and Adadow Yidana (2010) were assessed water quality using Water Quality Index and multivariate analysis. The study reveals that three main factors silicatemineral weathering, reverse cation exchange, carbonate minerals weathering and chemicals from agricultural activities are controlling the hydrochemistry of groundwater\textsuperscript{174}.

Rizwan Reza and Gurdeep Singh (2010) have assessed groundwater quality through Water Quality Index method in Orissa, India. Result indicates that water quality is poor during post monsoons as compared to summer season due to more seepage and movement of groundwater during post monsoon\textsuperscript{125}.

M. Vasanthavigar et al. (2010) have evaluated the Water Quality Index by using hydro geochemical parameters (major cations and anions) in Thirumanimuthar sub-basin. He found that the pre monsoon samples show poor quality in greater percentage compared with post monsoon due to over exploitation of groundwater, direct discharge of effluents, effective leaching of ions, and agricultural impact\textsuperscript{165}.

M.K. Chaturvedi et al. (2010) have evaluated WQI by using five parameters nitrate, pH, TDS, turbidity and temperature for bore wells and a water treatment plant in Delhi city. He found that the WQI in site 3, indicates “good,” water quality and in site 1 and site 2. WQI indicate that these bore wells were classified as “medium” water quality\textsuperscript{26}. 
Abdul Hameed (2010) has evaluated the WQI for Dokan lake ecosystem, Kurdistan region, Iraq. This result indicates WQI is a very helpful tool to evaluate water quality of lakes in Iraq\textsuperscript{60}.

J.Yisa and T.Jimoh (2010) were analysed WQI of river landzu. Result indicate that due to high of iron, chromium and manganese, COD and turbidity high value of WQI had been found in this river\textsuperscript{175}. Charmaine Jerome (2010) has evaluated the WQI and correlates it with quality of life in an industrial area in Bangalore, South India\textsuperscript{70}.

Ashok Kumar Yadav et al. (2010) have evaluated WQI of groundwater in Todarisingh tehsil of Rajasthan state. Result shows that drinking water is polluted due to hardness causing salts\textsuperscript{172}. Li pei yue et al. (2010) has assessed WQI value for ground water in Pengyang county, Ningxia, Northwest China. Result indicates that high value WQI is due to high value of TDS, F, sulphate, nitrite and TH\textsuperscript{94}.

Veena Chaudhary et al. (2010) have studied to access the fluoride and nitrate concentrations in ground water samples of different villages in Indira Gandhi, Bhakra, Northwest Rajasthan, India. Study revealed that there was no industrial pollution in the study site; hence, availability of these compounds in groundwater was due to natural reasons and by the use of chemical fertilizers\textsuperscript{33}.

R Nagarajan et al. (2010) have evaluated the quality of groundwater and its suitability for drinking and agricultural purpose by using five parameters electrical conductivity, pH, temperature, major ions, and nitrate in Thanjavur city, Tamil Nadu, India. Study concluded that 34% of samples are not suitable for drinking purpose due man-made activities\textsuperscript{109}.

K.Jothivenkatachalam et al. (2010) have analyse correlation between drinking water quality in and around perur block of Coimbatore district, Tamilnadu, India\textsuperscript{77}.

Rima chatterjii et al. (2010) have assessed ground water quality of Dhanbad district, Jharkhand, India\textsuperscript{25}.

Pradyusa samantray et al. (2009) assessed water quality in Mahanadi and Atharabanki rivers and Taldanda Canal in paradip area, India by using WQI. Result
show that due to industrialization and human activities water quality in the rivers are deteriorated\textsuperscript{130}.

C.R Ramakrishnaiah (2009) has been assessed the ground water quality by using Water Quality Index in Tumkur Taluk, Karnataka states, India. Result indicate high value of WQI mainly from the higher values of iron, nitrate, total dissolved solids, hardness, fluorides, bicarbonate and manganese in the ground water\textsuperscript{121}.

Bruce Banoeng Yakubo et al. (2009) have studied Water Quality Index to illustrate the hydrochemistry of groundwater from the northern part of the Volta region of Ghana. Result implies that geology has an impact on the WQI of groundwater in the area. A groundwater sample shows higher WQI value than samples taken from surface water sources in the area\textsuperscript{173}.

P.N.Rajanker (2009) has assessed the WQI of groundwater resources in Nagpur region. Result indicate that Dug well showed fair water quality in post monsoon and medium in summer and winter seasons, but in bore wells and hand pumps water quality is medium in all seasons\textsuperscript{118}.

B. Karami et al. (2009) have evaluated relationship between WQI and physical, chemical and biological parameters of water in Bamdezh wetland, Iran. Temperature, biochemical oxygen demand (BOD), nitrate, phosphate, pH, turbidity, TSS, coli form, chemical oxygen demand (COD) and dissolve oxygen (DO) were used. Results show that relationship between Water Quality Indexes and mention parameters are nonlinear\textsuperscript{79}.

CH.Ramakrishna et al. (2009) have studied WQI on ground water quality in slums of Visakhapatnam, Andhra Pradesh\textsuperscript{120}.

Dhirendra Mohan Joshi et al. (2009) have assessed WQI for drinking purpose in river Ganga, Haridwar district. Result indicates that due to high value of dissolved solids and sodium some station water is quite unfit for drinking purpose\textsuperscript{76}.

B.B.Mishra & G.Chaturvedi (2008) have evaluated WQI and suitability of water of Koharga DDI dam at district Balrampur, India. Result indicates poor status
of water during rainy and winter season, and very poor status was reported during the summer season.\(^{103}\)

M. Santosh Avvannavar et al. (2008) have evaluated Water Quality Index for drinking purposes at eight different stations along the river basin of Netravathi at Mangalore by using six water quality parameters such as dissolved oxygen (DO), biochemical oxygen demand (BOD), most probable number (MPN), turbidity, total dissolved solids (TDS) and pH measured and found water quality of Netravathi was from excellent to marginal due to unprotected river sites, high anthropogenic activities and the lack of proper sanitation\(^{16}\).

S. Shanker (2008) has calculated the Water Quality Index for the ground water of K.P puram industrial area in Bangalore using some parameters. Analysis reveals that the groundwater quality of this area is poor and protection from the perils of contamination and treated before consumption are needed\(^{137}\).

Navneet Kumar and D. K. Sinha (2009) have conducted correlation and regression among various physicochemical parameters. Result indicates that conductivity of the drinking water is an important parameter and it is significantly correlated with most of parameters\(^{91}\).

I. Chenini et al. (2009) have evaluated ground water quality using multiple linear regression and structural equation modeling in Maknassy basin, central Tunisia\(^{27}\). Omer Altun et al. (2009) have analyzed physical and chemical parameters of water samples in brackish water lagoon, Kucukcekmece, Istanbul. Of the parameters measured, some parameter like sulphate, COD showed changes than Turkish Water Pollution Control Regulation Principal Component which are previously published data\(^{10}\).

I. Khodpanah et al. (2009) have evaluated groundwater quality for different purposes in Eshtehard district\(^{85}\). Besma Zouabi Aloui et al. (2009) have studied long-term water quality monitoring data including precipitation, evaporation, temperature, pH, conductivity, dissolved oxygen, turbidity, total suspended solids, major anions and cations, fluoride, BOD, NO\(_3\), NO\(_2\), NH\(_4\), fecal coliform bacteria, boron and heavy metals (Fe, Zn, Cu, Ni, Pb, Cr and Cd). The study reveals that the water quality
assessed using the Canadian Water Quality Index as good to excellent, which confirmed its suitability for drinking, aquatic life and irrigation purposes. Narendra Singh Bhandari et al. (2008) have studied the correlation between physico-chemical parameter. They were found that an significant positive correlation occur for chloride with pH, Mg, Na, hardness and total suspended solid and sodium with hardness, EC and sulphate. The negative correlation occurs between potassium with turbidity, chloride, EC and hardness in Kosi river, Uttarakhand. M.A.M Joarder et al. (2008) have developed linear regression equations to predict the concentration of water quality constituents having significant correlation coefficient with EC in sunamganj district, Bangladesh. S.L.Dwivedi and Vandna Pathak (2007) were assigned WQI to Mandakini river, Chitrakoot. Investigation shows that all the sampling sites have slight to moderate water pollution. E. Gomez Sergio et al. (2007) have provided a Water Quality Index of the Buenos Aires Pejerrey, Odontesthes Bonariensis (Atheriniformes, Atherinopsidae) and evaluated relative influence of total conductivity and particular ions and gave the relationship of water traits with the fish distribution. P.N.Palanisamy et al. (2007) has assessed the ground water quality in and around Gobichettipalayam town erode district, Tamilnadu. I.M.Adekunle et al. (2007) has evaluated the quality of groundwater in a typical rural settlement in southwest Nigeria. Cesar A. Almeida et al. (2007) evaluated the effect of the anthropogenic activities on the water quality of Potrero De Los Funes San Luis – Argentina with different physicochemical and bacteriological parameters which indicated a significant degradation of the water quality at urban zones. Mohammad Shuhaimi-Othman (2007) has studied the water quality changes of Chini lake, Pahang, West Malaysia using some water quality parameters. According to Malaysian WQI, Chini lake water is classified as class II, and suitable for recreational activities.
Adriano A. Bordalo (2006) applied the Scottish WQI to an International shared Douro river basin using modify nine parameter and assess the monthly water quality of the Duoro river. This study shows that the water quality at all study areas was medium to poor and it decreased from winter to summer.

Jesiamma Joseph and Geeta Parameswaran (2006) evaluated WQI during pre monsoon, monsoon and post monsoon for the suitability of surface and bore waters for human consumption.

Rashmi Sisodia (2006) has evaluated the WQI and impact of industries, agriculture and human activities of wetland Kalakho lake of Rajasthan, India. The results revealed that dumping of wastes from municipal, domestic sources and agricultural runoff increase the value of WQI than acceptable levels at all the sampling stations.

Susheel Kumar Sindhu and Amit Kumar (2006) studied some physico–chemical parameters of ground water of Rampur district. Result indicates that water quality of this area is very poor and unsuitable for drinking purposes.

Patrick Debels et al. (2005) have calculated Water Quality Index (WQI) in Chillan river (central chile) using nine physicochemical parameters. The results showed that the upper and middle parts of the watershed, water quality was good but in downstream, due to effects of the urban wastewater discharge, water quality conditions were critical during the dry season.

Shiow-Mey Liou et al. (2004) have proposed better Water Quality Index in Taiwan and its application in Keya river by using thirteen variables which are categorized into three aspects organics, particulates and microorganisms referred to the principal components analysis. This analysis provides comprehensive information for water quality assessment.

Ubale et al. (2001) have analysed various water quality parameter of underground water from Hikathana industrial area of Aurangabad (Maharashtra) and determined correlation coefficient among different constituents.
Jan Dojlido et al. (1994) have applied WQI to the Vistula river basin in Poland. According to this paper, the better the water quality, the higher the value of the index. Very clean water has an index of 100, and much polluted water has an index of 0.44.

However, a survey of literature reveals that there is no systematic and significant study on Water Quality Index of ground water of Jaipur city and its agglomerates for drinking purpose; hence, present work has been undertaken for the studies.