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Quality of Groundwater in Relation to Agricultural Activity along the Karanja Watershed, Telangana State, India

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ABSTRACT

Critical land resources like soil, water, flora and fauna are crucial which influence the basic survival of human beings by supporting food production and providing a congenial living environment. The focus of this investigation was to assess ground water pollution due to agriculture activity, which falls adjacent to the villages in the vicinity of Medak District. It is necessary to have knowledge on impact of high concentrated chemicals on ground water at various levels. The water samples are collected through field survey at various places and the analysis has been carried out with different Hydro-geochemical process like Piper *Trilinear*, *SAR*, etc. Based on results the water quality has been classified.

Keywords: Pollutants, Hydro chemistry, Industrialisation, Contamination.

Introduction

Sustainable social and economic developments are largely dependent on water resources. However, fortifying water (quality and quantity) to gratify the needs of humans and ecosystems is one of the primary issues perplexing the 21st century Olumana & Loiskandl at al., (2015). Compounding the problem is the fact that water quality is one of the most liable issues worldwide, potentially inclined by many natural and anthropogenic factors Chen et al. (2012), Khanfar at al.,(2010). These include source of water, the degree of its evaporation, types of rock and mineral it has encountered (i.e. geology and mineralogy of the watershed), geological processes within the aquifer, velocity and direction of water movement and the time it has been in contact with reactive minerals. It is also pretentious by external pollution agencies such as effluents from agricultural return flow, industrial and domestic activities Ledesma-ruiz et al. (2015), Srinivas et al. (2015) Groundwater pollution ensues when used water is returned to the hydrological cycle. Intensive application of fertilizers, agrochemicals, sewage/drain water and mining activities on major lineaments are observed to be a serious threat to groundwater quality Srinivas et al. (2015) Azadhe et al.,(2010). Rainfall is the major sources of groundwater recharge in the study area containing small amounts of dissolved solids & gases such as carbon dioxide, sulfur dioxide, oxygen etc. As precipitation infiltrates through the soil; several biological and chemical process takes place by Azadhe et al., (2010). Slightly acidic water can dissolve the soluble rock material which increases the deliberations of chemical constituents such as calcium, magnesium, chloride and iron Basavarajappa & Manjunatha.,(2015).

The chemical composition of water continues to change by the addition of suspended constituents as longer residence time through an aquifer. Cation exchange is often a amending influence of ground-water chemistry and important exchange processes involves sodium-calcium, sodium-magnesium, potassium-calcium and potassium-magnesium. Cation exchanges

occur in clay-rich semi-confining layers that causes magnesium and calcium reductions resulting in natural softening of water Sakram et al.,(2013) Aquifers et al. (2015), Gopinath S et al. (2015).The assessment of water quality has become an important part of water resource studies, planning and management. It is gaining significant importance due to intense urbanization, industrialization and agricultural activities that are increasing the risk of contamination of soil and water.

Water quality monitoring is important for the protection of public health (drinking or domestic use), agriculture, industry, fishing, restitution, tourism and protection of aquatic ecosystems. The knowledge of the water quality status as well as the processes affecting water quality is vital for Integrated Water Resource Management (IWRM) activities within the catchment.

Study Area

Situated at a distance of 100 kms from Hyderabad, Medak district, Telangana State. It lies between 17° 45' and 17° 50' north latitude and 77° 30' and 77° 40' east longitude falling in survey of India Toposheet number 56 G/9 and 56 G

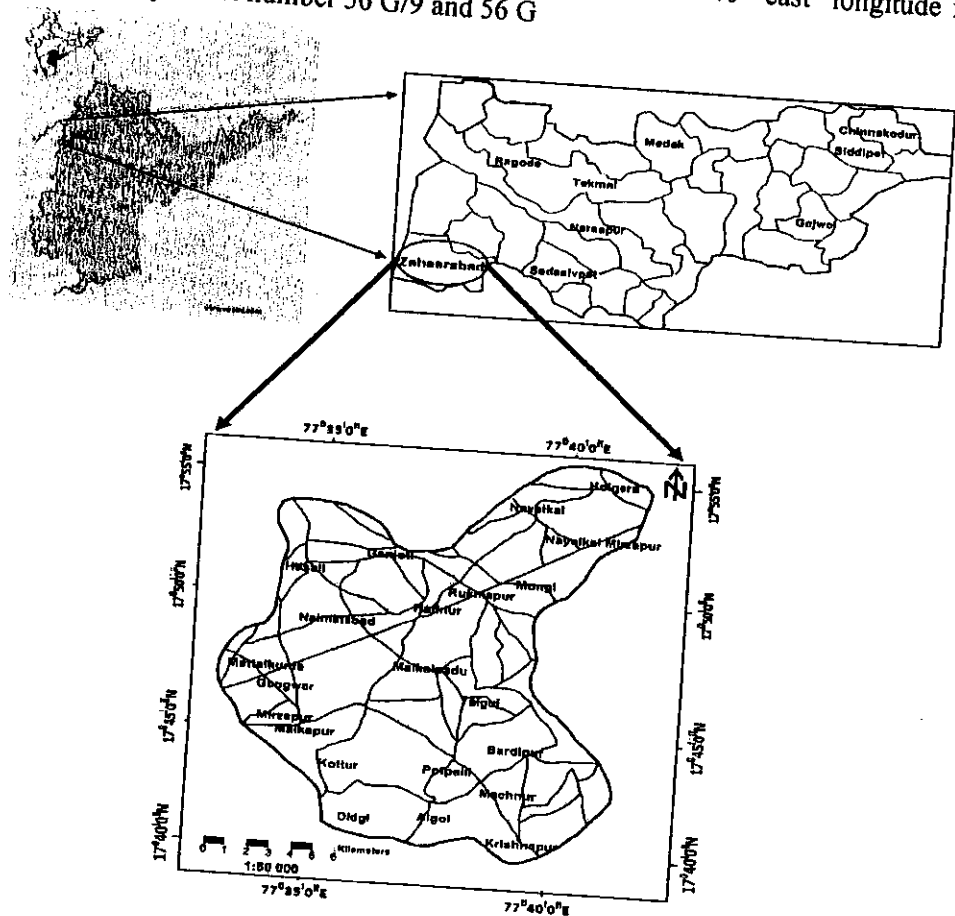


Fig. 1 Study Area Map.

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Integrated Remote Sensing and Factor Analysis Gis Model for Evaluating Groundwater Pollution

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ABSTRACT

Groundwater is one of the most valuable natural resources, which supports human health, economic development and ecological diversity. In this process, the remote sensing and the ancillary data will be of high potential for the synergistic use and development. Ground water samples have been collected from the study area to carry out the qualitative investigations. The study area being an industrial area, untreated effluents are being discharged in open areas. Fifty seven ground water samples were collected in two seasons of same agricultural year (Kharif & Rabi) and analyzed for pH, electrical conductivity, chlorides, total dissolved solids, bicarbonates, sulphate, sodium, potassium, fluoride, calcium, magnesium, TH as CaCO₃ and nitrate as N. The controlling factors on the ground water chemistry and criteria for water uses are discussed. The results have shown that the concentrations are more than permissible limits for industrial use and drinking purpose. The pollution of groundwater may be due to large scale discharge of untreated effluents.

KEYWORDS: *Remote sensing Geographic information system (GIS) GIS-based subsurface modeling Groundwater vulnerability Groundwater management*

1. GENERAL

The relation between dependent and independent variable can be studied with many statistical methods. The principal component analysis and factor analysis are mostly used techniques for the environmental geochemistry. Large number of variables will be reduced with various multivariate approaches. The pattern of relationship for many dependent variables can be studied through factor analysis with the aim of discovering independent variables that effect them and these variables are directly not measurable. Such identified independent variables are called as factors.

It is a perfect model for multivariate data to measure the sort of independence. In this model, this variable depends on latent factors which are in small number. Some factors affect the variables commonly which are known as common factors. Every variable depends on common

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A Review on the Biodiversity Heritage Site – The Ameenpur Lake, Hyderabad City, Telangana, India

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Abstract

The Indian National Biodiversity Authority declared 18 Biodiversity Heritage Site (BHS) and among them one is present in the state of Telangana i.e., the Ameenpur Lake. It is the first urban lake to be declared as the BHS. The Ameenpur Lake once occupied an area of more than 300 acres (1.2 km²) but, due to encroachment, the lake currently covers an area of 93 acres (0.38 km²).⁽¹⁴⁾ Various resident and migratory birds, such as flamingos, egrets, herons, cormorants, kingfishers, and river terns, visit the lake. Ameenpur Lake is a major spot for birdwatchers in Hyderabad.⁽¹¹⁾⁽¹⁵⁾ In 2017 it was reported that the lake was home to 8 species of mammals, 166 birds, 45 herpetofauna (12 amphibians and 34 reptiles), 9 species of fish, and 143 invertebrates (26 aquatic beetles, 41 butterflies, 18 odonates, 25 arachnids, and 33 other invertebrates).⁽¹⁰⁾ The present review paper discusses in general about the various BHS in India and in specific about the Ameenpur Lake.

Keywords: Biodiversity, Biodiversity Heritage Site, Ameenpur Lake, Urban Lake

1. Introduction

Biodiversity being the variety and variability among the living organisms and are of high value as they provide services that meet the human needs of both material and non-material. Values of Biodiversity are either direct or indirect.

The indirect benefits of them are in the form of Cultural, Ethical, Optional, Aesthetical and most importantly the ecosystem services it provides. The ecosystem services include pollination, maintaining soil fertility, maintaining the composition of gases in air, providing food, fodder and livelihood.

1.1 Biodiversity in India

India, a mega-biodiversity country with only 2.4% of the world's land area, accounts for 7-8% of all recorded species, including over 45,000 species of plants and 91,000 species of animals. It has ten biogeographic zones and is known to be a home of rich biodiversity of which 8.58% are the mammalian species, avian species being 13.66%, for reptiles 7.91%, for amphibians 4.66%, for fishes 11.72% and for plants 11.80%. India is also known for its endemic species. Through the Biodiversity hotspots these species are being conserved and protected. Around the world there are 34 biodiversity hotspots. Hotspots are those areas which have lost 90% of their primary vegetation and occupy an area of 2.5% of the total geographical area showing rich endemism. The four hotspots present in India are, namely the Himalaya, Indo-Burma, the Western Ghats-Sri Lanka and Sundaland. The key criteria for determining a hotspot are endemism (the presence of species found nowhere else on earth) and degree of threat.

The total forest cover area in India is 692,027 km covering about 21.05% of the total geographical area. ⁽⁹⁾ In many of the developing countries either the forest cover has increased or decreased. But India has added 3 million hectares of forest and tree cover over the last decade. Ministry of Environment and Forest has been persistently working towards increasing the total forest cover in India by initiating targeted afforestation programmes such as the Green India Mission (GIM). The total tree cover in India is estimated to be 9.08



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EVALUATION OF WATER QUALITY STATUS OF AMEENPUR LAKE, HYDERABAD, TELANGANA, INDIA USING WATER QUALITY INDEX (WQI) AND GEO-SPATIAL TECHNOLOGY

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The present study was carried out to evaluate the water quality of the Biodiversity Heritage Site i.e., Ameenpur Lake (Telangana, India) using Water Quality Index (WQI) and spatial distribution technique. The water samples were collected during Pre-Monsoon, Monsoon and Post-Monsoon seasons of the year 2019-20 and analysed for physico-chemical parameters as per the American Public Health Association (APHA) standard methods for water and wastewater treatment. The WQI were calculated by using the standard method of Weighted Arithmetic Water Quality Index (WAWQI) and National Sanitation Foundation Water Quality Index (NSFWQI). The WAWQI and NSFWQI methods indicated that overall water quality of the lake was found to be poor in all the seasons. According to the WAWQI map, majority of the samples were found to be in the poor water quality in all the three seasons and according to the NSFWQI map, all the samples were found to be bad in condition in all the seasons. The same is represented in the spatial distribution maps. The decline in the quality of lake water is due to various anthropogenic activities like enrichment through surface and agricultural runoff and also due to discharge of untreated sewage and industrial effluents.

Keywords: Ameenpur Lake, Biodiversity Heritage Site, Water Quality Index, Geo-spatial tools, Spatial Distribution.

INTRODUCTION

Surface waters play a crucial role both in social and economic development, especially when it comes to freshwater lakes and rivers. They are the most beneficial resources to the society in many ways such as agriculture; fishing, as a drinking water source, for industrialization and most importantly support rich biodiversity. A lake is a watershed area in which its quality depends upon every component of that ecosystem (Indra 2006). Its quality depends on the Topography of the surrounding area, soil type, geology and vegetation as it determines the kind of materials entering into lake (Dong *et al.*, 2010). In the last few decades, the haphazard population increase, urbanization and industrial development are the major reasons for deteriorating both the rural and urban water quality and ultimately affecting the aquatic ecosystem. Under this pressure with worldwide environmental concerns most of the urban and rural lakes have vanished (Sen *et al.*, 2008; Prasanna *et al.*, 2010). Once the groundwater and surface water quality is contaminated, the quality can't be restored by stopping the pollutants from the source (Ouyang, Y *et al.*, 2006). According to the WHO, CPCB, BIS and ICMR about 70% of the India's water quality is polluted due to discharge of industrial effluents and sewage wastewater making the natural stream unfit for consumption (Nida Rizvi 2016). Evaluating the water quality is crucial before its use for various purposes

has become indispensable (Sashikkumar M.C. 2013). It therefore becomes imperative to regularly monitor quality of surface water resources and to devise ways and means to protect it.

Water quality index (WQI) is considered one of the best tools to provide information on the quality of water to the concerned citizens and policy makers. This method also gives an idea about the overall quality of water to the concern policy makers (Asadi *et al.*, 2007). For both assessment and management of surface water it thus becomes an important tool as assessment of water quality helps in knowing the water suitability for various purposes. In 1970's the WQI was developed to monitor water quality changes which was proposed by Horton (1965) and Brown *et al.*, (1970). Later Bhargava (1983 a,b,c) introduced the water quality index concept in India and gave an index scale ranging from 0 to 100 for highly polluted to unpolluted water.

The prime objective of the index is to turn the different water quality parameters into information, which is comprehensible and usable by the layman (Brown *et al.*, 1970 and Boyacioglu H. 2007). Using the biological, chemical and physical properties, the WQI is usually illustrated and based on these properties; the quality of water can be expressed via a numerical index (i.e. Water Quality Index, WQI) by combining measurements of

GIS based approach for the assessment of water quality of the biodiversity heritage site of India- the Ameenpur lake, Hyderabad

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Abstract

Ameenpur Lake, the Biodiversity Heritage Site of India is the first urban lake to be given the status of a heritage site by the National Biodiversity Authority of India in the year 2016. In the present study, the water quality of Ameenpur Lake has been carried out using GIS technology. The water samples were collected during Pre-Monsoon, Monsoon and Post-Monsoon seasons of the year 2019-20 and analysed for various physico-chemical parameters such as pH, Electrical Conductivity, Total Dissolved Solids, Turbidity, Total Hardness, Total Alkalinity, Calcium, Magnesium, Sodium, Potassium, Chloride, Sulphates, Carbonates, Bicarbonates, Fluorides, Phosphates, Nitrates, Dissolved Oxygen, Chemical Oxygen Demand and Biological Oxygen Demand in the laboratory using American Public Health Association¹ standard methods for water and wastewater treatment. Obtained results were compared with Bureau of Indian Standards.³

The results indicate that lake water is slightly alkaline in nature and most of the parameters were exceeding the permissible limits in all the three seasons. Statistical analysis has been used to calculate the correlation coefficient of different parameters. The correlation matrix shows that total alkalinity has significant correlation with calcium and magnesium, EC with chlorides, nitrates and fluorides, total hardness with calcium, magnesium, bicarbonates and total alkalinity and bicarbonates with calcium.

Keywords: Ameenpur Lake, Biodiversity Heritage Site, GIS, Physico-Chemical Parameters, Correlation, Urban Lake.

Introduction

Water is one of the main ingredients for sustaining the life on earth. It is considered to be the most limiting factor for many aspects like environmental stability, biodiversity conservation, economic growth, health care and food security². Due to its importance, the need to understand its quality and quantity has brought it the status of being monitored and managed. The quality of aquatic environment arises from physical, chemical and biological interactions².

Surface waters are most vulnerable to pollution due to their easy accessibility for disposal of wastewaters⁷. As for the lake water is concerned, it plays a significant role in various dynamic activities and hence constant assessment of water quality is needed.

Discharge of untreated sewage, industrial effluents and storm water runoff are few of the reasons for adding the nutrients⁵ like phosphates, detergents and caustic soda etc. which are responsible for the huge amount of aquatic macrophytes. These effluents also have high levels of toxicity, colour, BOD, COD and at the same time it contains high level of heavy metals⁹. Though nutrient enrichment is beneficial for algal growth, it leads to deterioration of water quality and degradation of entire ecosystems⁶.

It is a well-known fact that water quality deterioration is not due to any one specific reason. There exists strong correlations among different parameters and a combined effect of their inter-relatedness indicates the water quality⁴.

The present study is aimed to determine the rate of degrading water quality and to give information about the parameters responsible for it. Spatial distribution zone maps of the surface water quality by using physico-chemical parameters such as pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Turbidity, Total Hardness (TH), Total Alkalinity (TA), Calcium (Ca^{2+}), Magnesium (Mg^{2+}), Sodium (Na^+), Potassium (K^+), Chloride (Cl^-), Sulphates (SO_4^{2-}), Carbonates (CO_3^{2-}), Bicarbonates (HCO_3^-), Fluorides (F^-), Phosphates (PO_4^{3-}), Nitrates (NO_3^-), Dissolved Oxygen (DO), Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) were made.

The geospatial tools like ArcGIS 10.8, IDW interpolation and GPS were used to generate the spatial distribution map of surface water for the Ameenpur Lake, Telangana. For the statistical analysis, Karl-Pearson correlation coefficient (r) was calculated and correlation of different physicochemical parameters was assessed.

Ameenpur Lake ($17^\circ 31.198'N$, $78^\circ 19.524'E$) situated in Patancheru Mandal, Sangareddy District, Telangana State, India (Figure 1) covering an area of 93.15 acres⁸ is the first urban lake to be declared as the Biodiversity Heritage Site in 2016 by the National Biodiversity Authority of India. Due to its rich biodiversity harbouring, the lake has received national recognition. But on the other side due to

Assessment of Water Quality of Ameenpur Lake: The Biodiversity Heritage Site of India

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ABSTRACT

Across the world, the various water bodies are being exposed to different forms of environmental degradation and deterioration caused due to population explosion, urbanization and development in the industrial sector. Another factor affecting the quality of water is the aggregations of producers of the water ecosystem i.e., the phytoplankton, macro algae and occasionally colourless heterotrophic protists which can discolour the water giving rise to foam. Due to this, there is decrease in Dissolved Oxygen (DO) level which ultimately affects the ecological balance of the water and eventually leads to eutrophication in water bodies. The present paper deals with water quality of Ameenpur Lake, Hyderabad, Sangareddy, Telangana, India, the first urban lake to be declared as a Biodiversity Heritage Site. The water quality assessment is made through Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD).

Key words : Ameenpur Lake, Biodiversity Heritage Site, Water Quality, Dissolved Oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand.

Introduction

Water - the main source of life and one of the most important natural resource of the ecosystem (Lingaswamy and Praveen Raj Saxena, 2016). It is the needed natural resources for the entire living organism for various metabolic activities. About 73% of earth is covered with marine (97%) and freshwater (3%) which is present in different forms like ponds, lakes, rivers, swamps, marshes, sea, oceans and glaciers etc. In the freshwater bodies the lakes play a very important role in urban ecosystem. As they perform significant environmental, social and economic functions, like groundwater recharge, a drinking water source, effecting ground water

quality and ground water table, in controlling floods, influence microclimatic conditions, enhance the aesthetic value, supporting biodiversity and livelihoods etc. It also plays a tremendous role in maintaining environmental sustainability regardless of them being man-made or natural, fresh water or brackish.

Factors influencing lake water quality is the quantity of dissolved oxygen in the water column. The guideline for the minimum instantaneous DO concentration for aquatic life is 5 mg/l (BC Ministry of Environment, 1997). The major inputs of dissolved oxygen to lakes are the atmospheric oxygen which gets diffused into the water and photosynthetic activity by aquatic plants and algae. Dissolved

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DISTRIBUTION OF FLUORIDE IN THE GROUNDWATER IN CHANDUR AREA, NALGONGDA DISTRICT, TELENGANA, INDIA

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Abstract

This study was carried out to assess the fluoride concentration in groundwater of Chandur Mandal, Nalgonda District, where groundwater is the main source of drinking water. Water samples collected from bore wells and open wells were analyzed for pH, Electrical Conductivity (EC) and Fluoride (F⁻) content. Fluoride concentration of groundwater ranges from 1.00 to 4.00 mg/l. Out of 15 samples from five villages studied 4 villages have fluoride concentration below 1 mg/l and 6 villages have fluoride concentration above 1mg/l. 5 villages have fluoride above 3 mg/l. As per the desirable and maximum permissible limit for fluoride in drinking water (1.5mg/l) prescribed by WHO (2004) and Bureau of Indian Standards (2009), 30% groundwater sources in the study area is unfit for drinking purposes. Due to the higher fluoride levels in drinking water several cases of dental and skeletal fluorosis have appeared at alarming rate in the investigated area. The wells in the investigated area have been demarcated into safe and unsafe wells for consumption of water with respect to the fluoride.

Keywords: Fluoride, pH, EC, Groundwater, Chandur

1. Introduction

Rapid industrialization, urbanization and population growth led to overexploitation of groundwater mostly in urban areas resulted in deterioration both in terms of quality and quantity. The importance of groundwater quality in human health attracted a great deal of interest in recent years. 80% of all diseases are related to poor drinking water and sanitary condition in developing countries (Vasanthavigar et al, 2010; UNESCO, 2006; Liebman, H. 1969). Ascertaining quality of water is crucial before its use for various intended purposes such as potable water, agricultural, recreational and industrial water uses, etc. (Sargaonkara and Deshpandev, 2003). The groundwater once gets contaminated its quality cannot be restored. Therefore it is essential to monitor the quality of groundwater and to take necessary measures to protect from further deterioration of quality. Fluoride is a key aspect of water quality in rural water supply system, which potentially affects the sustainability of water if it exceeds its prescribed limit. Approximately 62 million people including 6 million children suffer from fluorosis because of consumption of water with high fluoride concentrations (Susheela, 1999). The amount of fluoride occurring naturally in groundwater is governed by climate, composition of the host rock, and hydrogeology (Gupta et al., 2006). The major sources of fluoride in groundwater are due to fluoride bearing minerals such as fluorspar, cryolite, fluoro-apatite and

ICT mediated ODL for Environmental Education

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P. Madhusudhana Reddy

Abstract

The environmental issues are multidimensional and multidisciplinary in nature. Different groups may require knowledge on different issues of environment, based on their interest and professional necessities. The knowledge on environmental issues needs constant review and updating. To have such upgradation, ICT mediated ODL methods are the best suitable. ODL has emerged as a significant mode to provide opportunities for education and training in the developing countries. The spread of ODL has been accelerated with the advent of new ICTs. The focus of this paper is to explore the use of different on-line and off-line ICT tools for various environmental awareness programs such as natural disaster preparedness, sanitation and health, pollution, sustainable development, environmental impact assessment, greener technologies, conservation of natural resources, environmental laws, peoples participation, AIDS control, conjunctive use of fertilizers, pesticides and insecticides, organic farming etc. This paper discussed about ICT mediated ODL for imparting Environmental Education to different stakeholders of the society.

Introduction

The Impact of Climate Change on the Quantity and Quality of Groundwater

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ABSTRACT

Groundwater resources and their long-term replenishment are controlled by long-term climate conditions. Climate change will therefore have a great impact on groundwater resources. Groundwater has to be used and managed in a sustainable way in order to maintain its buffer and contingency supply capabilities as well as adequate water quality for human consumption, also under predicted climate changes. Land use planning has to consider groundwater resources as a precious and finite resource, and take all possible measures to protect groundwater resources and their recharge mechanisms in the long run.

The weight of current evidence suggests that climate change is occurring and will continue to occur in the foreseeable future. The rate and intensity of change is not immediately known; however, the impacts can already be observed in changes to the quality of drinking water utility source waters. Climate change models, in general, predict an overall warming of the earth. The warmer temperatures associated with climate change are predicted to decrease dissolved oxygen levels, increase contaminant load to water bodies, reduce stream and river flows, foster algal blooms, and increase the likelihood of saltwater intrusion near coastal regions. Climate change impacts to water quality are occurring over a very dynamic range. All of these climate change impacts play a role in water quality and have implications for water, wastewater, and storm water utilities. The need is pressing for utilities to address changing water qualities, and this will require fundamental changes in utility operations.

This paper gives information concerning the impacts of climate change on water resources, and particularly groundwater. It provides an overview of the current insights and knowledge on the impacts and associated technical and management challenges due to climate change.

INTRODUCTION

Changes in temperature, precipitation patterns and snowmelt can have impacts on water resources. Temperature is predicted to rise in most areas, but is generally expected to increase in highland areas and at higher latitudes. Higher temperatures will increase loss of water through evaporation. The net impact on water supplies will depend on changes in precipitation and changes in the total amount of water available from precipitation.



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RESEARCH ARTICLE

CLIMATE CHANGE AND WATER RESOURCES: IMPLICATIONS AND MITIGATION

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ABSTRACT

Rising global temperatures will lead to an intensification of the hydrological cycle, resulting in dryer dry seasons and wetter rainy seasons, and subsequently heightened risks of more extreme and frequent floods and drought. Climate change will also have significant impacts on the quality and quantity of water that is available and accessible. Changes to hydrological regime may lead to increased flooding, water logging, salinity and salt water intrusion in coastal regions, changes in freshwater availability due to decreased surface runoff and increased evaporation. These changes in the hydrological regime may affect agriculture, food security, health and economy of the nations. The measures for mitigation are better water management, Clean Development Mechanism (CDM), afforestation to sequester Carbon, bio-fuels, renewed interest in storage infrastructure for irrigation, explore wide range of options such as large scale reservoirs, small village ponds, groundwater, water harvesting (i.e. soil moisture storage), virtual storage (food), diversity of storage options within a basin, increasing land and water productivity, basin water allocation, early warning and insurance, focused drought monitoring systems using hydrological-climate indicators and remote sensing techniques, developing of drought preparedness plans, climate risk assessment and climate insurance schemes, new research agenda on what are the impacts of climate change on water. This paper reviews on water resources, impacts of climate change, water resource management and other necessary mitigation responses towards the possible impacts of climate change.

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INTRODUCTION

Climate change is caused by greenhouse gases (GHGs), which enhance the "greenhouse" properties of the earth's atmosphere. These gases allow solar radiation from the sun to travel through the atmosphere but prevent the reflected heat from escaping back into space. This causes the earth's temperature to rise. GHG emissions have been rising since industrialization in the 1900s, due to increased burning of fossil fuels. Further significant increases in GHG levels are expected, particularly as developing countries become more industrialized. As emerging economies, such as China and India, grow their contribution to energy demand will account for an increasing proportion. Fossil fuels are expected to dominate this increase, and the subsequent GHG emissions will in turn lead to rising temperatures¹. The average global surface temperature is projected to increase by 1.4-3°C from 1990 to 2100 for low-emission scenarios and 2.5-5.8°C for higher emission scenarios of greenhouse gases (under the new SRES 'Marker' scenarios) in the atmosphere. Over the same period, associated rise in global mean sea level is projected between 9 and 88 cm². More recent scientific research finds that these temperature projections are actually much higher than previously thought. GHG emissions are not remaining stable – they are increasing due to increased energy consumption as a result of population growth and industrialization. Changes to India's annual monsoon are expected to result in severe droughts and intense flooding in parts of India. Scientists predict that by the end of the 21st century the country will experience a 3^o to 5^o C

temperature increases and a 20% rise in all summer monsoon rainfall. The disappearance of large glaciers in Himalayas, may affect hundreds of millions in India².

The hydrological cycle, a fundamental component of climate, likely to be altered in important ways by climate change. Precipitation is very likely to continue to increase on average especially in middle and high latitudes, with much of the increase coming in the form of heavy downpours. Changes in the amount, timing, and distribution of rain, snowfall, and runoff are very probable, leading to changes in water availability as well as competition for water resources. Groundwater supplies are likely to be more susceptible than surface water to short term climate variability they are more affected by long-term trends³. Changes are likely in the timing, intensity, and duration of both floods and droughts, with related changes in water quality. These conditions will be further exacerbated by increasing natural disasters and their impacts on water for human populations. Significant changes in average temperature, precipitation, and soil moisture caused by climate change are very likely to affect demand in most sectors especially in the agriculture, forestry, and municipal sectors. Irrigation water needs are likely to change, with decreases in some places and increases in others. It is very likely that demand for water associated with electric power generation will increase to the increasing demand for air conditioning with higher temperatures, unless advances in technology make it possible to use less water to be used for electrical generation. All regions of the world show an overall net negative impact of climate change.

Hydrogeochemistry of Ground Water in Jeedimetla Industrial Area, Greater Hyderabad, Andhra Pradesh

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ABSTRACT

Qualitative investigations are carried out with the ground water samples collected from Jeedimetla industrial area of Hyderabad city. The study area being an industrial area, untreated effluents are discharging in open areas. Fifty Seven ground water samples were collected from bore wells of the study area and analyzed for pH, total dissolved solids, electrical conductivity, total hardness, chloride, sulphate, bicarbonate, fluoride, potassium, sodium, calcium, magnesium and nitrates as N. The controlling factors on the ground water chemistry and criteria for water uses as discussed. The results showed that the concentrations are more than the permissible limits for drinking purposes and industrial use. The pollution of ground water may be due to large scale discharge of untreated industrial effluents.

INTRODUCTION

Evaluation of ground water quality is as important as quantity, since the usability of water is determined by its physical characteristics. The quality of ground water depends upon the nature of rock formation, recharge and discharge conditions in the area. About one - third of the flux absorbed by the earth's crust is used to drive the hydrological cycle. Precipitation provides us with water supply and reserves of fresh water. Water due to precipitation reaching the ground water reservoir has to percolate through, soil and weathered / fractured rock. In this process it comes in contact with several organic and inorganic substances. During its slow movement through different layers below the ground, the percolating water reacts with number of minerals, organic and inorganic, and carries them along with it in dissolved state (Sivardhan & Sudarshan, 2003).

Dissolved minerals determine the usefulness of the ground water for various purposes. Presence of some substances beyond certain limits may make it unsuitable for irrigation, domestic or industrial uses. Corrosion or rusting of tube well screens is another hazard related to ground water quality.

Before using the ground water for any of the purposes, it is essential to find out possible hazardous substances, if they contain. Water quality studies bring out the concentrations of hazardous elements. Some organic components are known to be either toxic, or carcinogenic (cancer producing) or to produce odours and tastes. Chemical substances can be found either in suspension or in solution. Ground water gets rid of suspended particles through natural filtration mechanism during the process of

percolation. Substances carried in the solution determine the suitability of water for various purposes.

The study area is located 20 km north of Hyderabad city and form part of the survey of India topo sheets 56 K/6 and 56 K/7 and lies within latitudes 17°27' to 17°33' N and longitudes 78°25' to 78°29' E. In the study area many industries like pharmaceuticals, plastic, paints, polymers, chemical manufacturing units etc are discharging effluents either treated/ untreated in open areas causing ground water pollution. With the growing population of Qutbullapur revenue mandal together with considerable floating population from Hyderabad city and surrounding areas, the water demands have increased drastically. Small residential colonies have come into existence all around the industrial area. Thus, the ground water plays a vital role in water supply for domestic and drinking water needs of the residents. The ground water abstraction is taking place by means of dug wells and bore wells. Some areas are having piped water supply schemes. The climate is of humidity with monthly mean temperature ranges from 14°C to 40°C. The average annual rainfall of the area is 1033.6 millimeters (Handbook of Statistics, Ranga Reddy District, Hyderabad) and most of the rain receives from southwest monsoon, during the months of June to September.

METHODOLOGY

Geochemical studies have been carried out on 57 ground water samples (Fig. 1) collected from bore wells during 2005 with necessary precautions (Brown et al., 1974). The samples were collected in clean two litre polythene bottles and analyzed for chemical parameters such as pH, TDS, Ec, TH, Ca, Mg, Na, K, HCO₃, Cl, F, NO₃ and N

4). Meta-analytic studies of findings on computer-based instruction. In Baker, E.L. and O'Neil, Jr. (Eds.), *Technology Assessment in Education and Training*. Hillsdale, NJ: Lawrence Erlbaum. Comparative Human Cognition. (1989). Kids and computers: A positive vision of the future. *World Educational Review*, 59, 73-86.

5. S. Burtis, D. C. Wright V. L., & Hildbreth, G. J. (1986). Effects of computer-assisted instruction on teacher-assisted instruction on arithmetic task achievement scores of kindergarten children. *Journal of Educational Research*, 80(2), 121-125.

6.996). Multimedia information and learning. *Journal of Educational Multimedia and Hypermedia*, 129-150.

7.80). *Mindstorms: children, computers, and powerful ideas*. New York: Basic Books.

8. Dewalt, M.W. (1993). *Effects of the computerized Accelerated Reader program on reading achievement*. Paper presented at the meeting of the Eastern Educational Research Association, Arwater Beach, Florida. (ERIC Document Reproduction Service No. ED 3632269)

9. Castine, W. H., & King, F. J. (1989). *The impact of micro computer based instruction on teaching and learning: A review of recent research*. ERIC digest. Syracuse, NY: ERIC Clearinghouse on Information Resources.

10.999). *The impact of education technology on student achievement: What the most current research has to say*. Milken Family Foundation Publication.

INTERACTIVE LEARNING IN DISTANCE EDUCATION THROUGH ICT

P. Madhusudhana Reddy

ABSTRACT

Distance Education is growing rapidly as a means of teaching and learning because of flexible nature. The education and instruction in DE is often on individual basis. The interaction is crucial to the students in distance mode. Interaction makes students to reach higher level of learning. The interaction is broadly categorised into three types, which are learner to content, learner to learner and learner to instructor. The other important thing for better interaction is the interaction with technology. Information and communication technologies provide a solution for distance mode, however the suitable technologies for better interaction are internet enabled services, satellite technologies and mobile technologies. In the era of information technology these services are more appropriate and will reach every part of the globe. Access to anywhere and anytime learning can be achieved with ICTs. By incorporating these services in the distance education pedagogy, the individual learner concept may be removed and the learner may acquire knowledge on par with conventional student. The study suggests that ICTs may have high level of student interactivity, inexpensive, worldwide access and allow self paced instruction.

INTRODUCTION

Distance Education is a mode of delivering education and instruction, often on an individual basis to learners, who are not physically present in a traditional setting such as classroom. The widespread use of computers and the internet have made distance education easier and faster and today several educational institutions deliver full curricula on line. The use of interactive technology in learning for these students is as natural as using a pencil and paper by the past generations. With the technological innovations, communication appears to increase amongst students and teachers, as well as students and their classmates. Such interaction is crucial in Distance Education (DE) for easy understanding of the course content. Interactive Learning is a pedagogical approach that incorporates social networking and urban computing into course design and delivery. Interactive Learning has evolved out of the hyper-growth in the use of digital technology and virtual communication, particularly by students. In view of this an attempt is made to review the various aspects of interaction in DE using information and communication technologies (ICTs). Daniel and Marquis (1988) defined interaction as an activity in which a student is in two way contact with one or more persons. Wagner (1994) defined instructional interaction as an event that takes place between a learner and learner's environment and its purpose is to respond to the learner in a way intended to change his or her behaviour towards an educational goal. Gilbert and Moore (1998) opined that interactivity in computer based instruction as reciprocal exchange between technology and learner. Thurmond and Wambach (2004) describe interaction in distance education as the learner's engagement with the course content other learners, the instructor and the technology medium used in the course. Teaching in a distance learning program requires instructors to completely rethink how they deliver their courses. Interaction is one of the most difficult aspects of education to be built into distance education, but it is also one of the most important pedagogical approaches. The level of interactivity from student-to-student and from student-to-instructor has a major impact on the quality of distance learning programs (Muirhead, 2001). Research studies on interactivity show that students have a real need to make connections with other students and with their instructors (Florence Martin, 2012). DE, which is valuable and flexible option for both students and faculty, also brings some limitations and concerns. The transitional distance theory defines DE in terms of not only the physical separation of teacher and student, but also a psychological separation. In order to overcome this difficulty ICTs have better solution. Interaction has to be intentionally built into the instructional plan of the course has the following benefits:

ion builds a sense of community among the students, which leads to student satisfaction, and increased learning (Brown, 2001).

ion provides students with the feedback they need to determine if they are mastering the content course.

ion exposes students to a variety of learning resources, including content materials and nces and knowledge shared by other students.

tion makes students become more actively engaged in the learning process, leading to higher if learning.

lerner-to-Content Interaction: This type of interaction results from students examining the course d participating in class activities.

lerner-to-Lerner Interaction: This type of interaction can take place between two students or several students.

Learner-to-Instructor Interaction: This type of interaction is intended to reinforce student ding of course materials and provide the student with feedback. Hillman, Willis, and Gunwardana produce a fourth type of interaction, *interaction design strategies* that will facilitate students' rface interaction and recommend instructional design strategies that will facilitate students' n of the skills needed to participate effectively in the online classroom. The learner must id not only the procedures of working with the interface but also why these procedures obtain aving one or more of the three interaction types at a high level may satisfy the educational

ICTS THROUGH ICTS

Information and Communication Technologies (ICTs) is the modern science of gathering, storing, ing, processing and communicating desired types of information in a specific environment r technology and communication technology are the two main supporting pillars of ICTs and the f these two in the information storage and dissemination is vital. It is impossible to deny its ce in education (Mahajan, 2002). There are several modern communication services which have e to DE, such as Electronic Mail, Telex, Facsimile transmission, Bulletin Board services, Teletext, Voice Systems, Voice message Systems, Teleconferencing, Audio conferencing, Audiographics, rting, Video conferencing etc.

E-mail: Sending e-mail messages is a common and inexpensive way for students to communicate ructors. In some cases, an entire distance learning course may be structured using e-mail as the h of communication. In other cases, e-mail may be used to supplement audio or video gies. The advantages of e-mail communications include versatility and convenience. In addition to straight text, most e-mail systems now allow students to attach files. That means that they can oint files, spreadsheets, or any other type of file to each other. The convenience of e-mail is that it ised at any time of the day or night. In addition, students can often obtain an e-mail account for little st.

Internet Chat and Conferencing: E-mail communications are asynchronous, meaning that they do e place simultaneously. However, synchronous communications are possible through online chat, whiteboards, and videoconferences. Online chat refers to a two-way, interactive exchange on the t in chat mode, two or more people at remote computers connect to the same chat "room" and type es. As each type his or her message, the others can see the messages on a shared screen. Shared cards are another form of collaboration through the Internet. If two or more people are connected to the t at the same time, they can communicate through graphic images on a shared whiteboard. Simple gs tools are provided that allow them to draw arrows, circles, and other simple symbols in the shared. In addition, one or both of them can paste in images or text that was copied from another source. If the more advanced software even allows users at remote sites to share applications. The advantages e collaboration through chat or shared whiteboards are that the communications are synchronous e feedback for the students is immediate.

WebQuests: WebQuest is an inquiry-oriented activity that provides an excellent example of how gms resources on the Internet can be effectively integrated for a classroom project. WebQuests are d to the public learners as they research a specific issue and to incorporate the results of the research

education, teachers can locate relevant Websites for students to explore or have students conduct searches for information related to a specific topic. Bookmark files or Web pages with links can be developed to provide quick access to appropriate sites for the students.

CREATING WEB RESOURCES FOR THE CLASSROOM

Satellite Videoconferencing: Full-motion video teleconferencing (referred to as videoconferencing) offers the "next best thing to being there." Satellite transmission is one of the oldest-most established techniques for videoconferencing. In most cases, satellite delivery offers one-way video and two-way audio. Two sets of equipment are needed for satellite systems. The uplink transmits the video and audio signals to the satellite. The downlink receives and displays the signals. When satellite videoconferences are used for distance learning, a studio classroom must be properly wired for the lighting, microphones, and cameras needed to produce an acceptable lesson. The cameras are usually connected to a control room, where one or more technicians control the signals. The resulting television signal is then sent to the uplink transmitter. Uplink transmitters are very expensive and are often shared with other schools or businesses. The receiving sites of satellite videoconferences must have satellite downlinks. These dishes select, amplify, and feed the signals into the classrooms, where they can be displayed on standard television monitors. To provide two-way audio with interactions from the remote classrooms back to the teacher, a telephone bridge is usually employed. Satellite videoconferencing can be very expensive. It may not be cost-effective for most school systems to use uplinks to originate distance-education classes unless the school systems were in a position to market the classes over wide geographic areas. It is reasonable, however, for a school to use a downlink to receive commercial courses that are delivered through satellite channels.

Microwave Television Conferencing: Satellites are a popular method for enabling video communications over long distances. Microwave transmissions provide a cost-effective method for videoconferencing in more localized areas. Most microwave systems are designed to transmit video signals to areas that are not more than 20 miles apart. The most common microwave systems use frequencies that have been designated by the Federal Communications Commission (FCC) as Instructional Television Fixed Service (ITFS) stations. When compared with satellite or commercial broadcast television, ITFS stations operate at a lower power, and the transmission equipment is relatively inexpensive. Reception equipment is also reasonably priced, as long as the receiving sites are located within 20 miles of the transmitter and there are no hills or tall buildings to block the line-of-sight signal. One drawback of microwave ITFS communication involves the limited number of channels available in any one area. Many metropolitan areas already have all available channels in use, so no further expansion of ITFS teleconferencing is possible in these areas.

Cable and Broadcast Television: Cable and public broadcast television have been used to distribute instruction for years. In addition to the educational networks, almost all public cable television systems allow schools to transmit television courses. This type of connection can be used to transmit one-way video and one-way audio to the community at large or between specific schools. For example, if two area high schools do not each have enough students to justify an advanced math course, they might team up to teach a single course delivered through cable television. In one school, the teacher would conduct a regular class; in the other school, the students would watch and listen through a standard cable television channel. Distance learning through cable television systems requires both a studio and channels through which to broadcast. The cost depends largely on the "partnership" offered by the cable or broadcast system. Even though the broadcast will take place at a scheduled time, research shows that the majority of the students will record the program and play it back at a convenient time.

Desktop Videoconferencing: Desktop videoconferencing uses a computer along with a camera and microphone at one site to transmit video and audio to a computer at another site or sites. The remote sites also transmit video and audio, resulting in two-way video and two-way audio communications. Although desktop videoconferencing is considerably less expensive than satellite or microwave systems, there are a couple of limitations: First, the images are usually transmitted at 15 images per second, half the normal video speed. This causes the video to appear somewhat jerky if any rapid motion takes place. A second concern is related to the connection between the computers. Most systems are connected either through local area networks (LANs) or through relatively fast connections.

Internet Videoconferencing: It is also possible to conduct videoconferences over the Internet. You need a video camera and digitizing card/camera to transmit video signals as well as a microphone and speakers/headset. Internet videoconferencing usually results in a small image, which may be jerky (a few

Technology: There are several types of mobile devices with each having different features. (e-books) readers are small, light weight devices that are designed primarily for reading. As PDFs and electronic books. Tablets are small profile computers with mobile operating systems. Mobile interactive opportunities through built in functionality and third party applications. Mobile mobile handsets with data connections via cellular and wireless networks. The use of mobile devices familiar to students is useful to harness the potential of mobile learning. Mobile access to learning regardless of location and time (Yousef, 2007). The strongest advantage of mobile devices however is portability (Park, 2011). Mobile technologies, with their ability to learning contexts is useful for the increased dialogue and communication; have great overcome the transitional distance divide that is inherently a part of distance education (gen, 2012). Flexibility, portability and accessibility contribute to an overall positive learning experience, while faculty concerns can be met with appropriate training and tailoring to the students, while faculty concerns present in distance education.

distance education provides a flexible option of education. However the scope for student's nominal when compared with regular class room situation. But student requires such for the better understanding the subject. There are three types of interactions, which are the relevant discipline. There are many information and communication technologies suitable learner. E-mail, Internet chat, Web quests, web based resources, satellite videoconferencing, television conferencing, cable and broadcast television, desktop video conferencing, internet and mobile technologies are the most suitable technologies for having better interaction and mobility. Mobile technologies such as tablets, smart phones are having added advantage portability and mobility.

35.

(2001, September). The Process of Community-Building in Distance Learning Courses. Journal of Asynchronous Learning Networks, 5(2). Retrieved June 2, 2005

Marquis, C. (1988). Interaction and independence: Getting the mix right. In D. Sewart, D. Keegan, & B. Holmberg (Eds.), *Distance education: International perspectives* (pp. 339-359). London: Routledge.

Yard, Michele A. Parker, and Deborah F. (2012) Deale Examining Interactivity in Synchronous Virtual Classrooms. University of North Carolina Wilmington, USA Vol 13, No 3 Research Articles

June 2012

& Moore, D. R. (1998). Building interactivity into web courses: Tools for social and instructional interaction. *Educational Technology, 38*(3) 29-35.

B. (2001). Interactivity Research Studies. Educational Technology & Society, 4(3). Retrieved June 20, 2005

S.L. (2002). Information communication technology in distance education in India: A Challenge. Indian Journal of Open Learning, 11(2) 269-277.

1, J. (1993). Three types of interaction. In K. Harry, M. John, & D. Keegan (Eds.), *Distance education theory* (pp. 19-24). New York: Routledge.

7. (2011). A pedagogical framework for mobile learning: Categorizing educational applications of mobile technologies into four types. *International Review of Research in Open and*

Distance Learning, 12(2), 79-102.

h Fiegen, (2012) The impact of mobile technologies on distance education: A review of the November/December, Volume 56, number 6, p 49

nd, V. A., & Wambach, K. (2004). Understanding Interactions in Distance Learning, vol 1(1).

literature. *International Journal of Instructional Technology and Distance Learning*, vol 1(1).

E. D. (1994). In support of a functional definition of interaction. *American Journal of Distance Education, 8*(2), 6-29.

M. (2007). Effectiveness of mobile learning in distance education. *The Turkish Online Journal of Education, 8*(2), 6-29.

M. (2007). Effectiveness of mobile learning in distance education. *The Turkish Online Journal of Education, 8*(2), 6-29.

M. (2007). Effectiveness of mobile learning in distance education. *The Turkish Online Journal of Education, 8*(2), 6-29.

MEN'S ATTITUDES TOWARD WOMEN'S REPRODUCTIVE HEALTH NEEDS: A STUDY AMONG COLLEGE STUDENTS

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ABSTRACT

Most reproductive health programmes focused on family planning and in turn most family planning programmes offered their services exclusively to women. Most viewed women as the target group and paid little attention to the roles that men might have with respect to women's reproductive health decision-making and behaviour. Today reproductive health professionals are working to from a consensus around the issue of men and reproductive health. Hence, the present study was carried out with the specific objectives to collect comprehensive information regarding men's attitudes towards women's reproductive health needs from the college going girls and boys, to examine the educational, occupational and familial profile of the college girls and boys, to assess the knowledge and attitude of the respondents on the supportive, participatory, decision making and communication, and natal care roles played by men in women's reproductive health. The present article discusses the important findings achieved through the study.

INTRODUCTION

There is a growing understanding in the international public health community of the role of gender as a fundamental influence along with decision-making power, access to education and earning power. It affects the health choices available to everyone. This understanding has been instrumental in making reproductive health professionals aware of the need to develop creative strategies to reach men-a need that has become increasingly urgent in the face of the growing worldwide spread of sexually transmitted diseases (STDs), including HIV. In the past, men's involvement has sometimes been opposed by women's health advocates, who understandably fear that adding these services will damage the quality of women's services and create additional competition for already scarce resources. However, adding programs for men can enhance rather than deplete existing programmes if the designers of these programmes carefully integrate them into the existing health care structure in a way that benefits both women and men. Both the 1994 International Conference on Population and Development in Cairo and the 1995 Fourth World Conference on Women in Beijing endorsed the incorporation of reproductive health services that include men, mandating that men's constructive roles be made part of the broader reproductive health agenda. In fact, neglecting to provide information and services for men can detract from women's overall health. Men who are educated about reproductive health issues are more likely to support their partners in decisions on contraceptive use and family planning, support that may be essential if women are to practice safe sex or avoid unwanted pregnancy. Moreover, if men are knowledgeable about reproductive health issues and can communicate about them with their partners, they are more likely to be supportive during pregnancy and may make better health care decisions: for example, by ensuring that their partner receives emergency obstetric services when needed, rather than delaying recourse to such care. The effect of men's attitudes and behaviour on women's health is perhaps most obvious in regard to the pandemic of AIDS and other STDs. Programmes that educate, test and treat only one partner will not be effective in safeguarding the continued health of both. Men need to share the responsibility of disease prevention, as well as the risks and benefits of contraception.

NEED FOR THE STUDY

The importance of male involvement in sexual and reproductive health decisions emerges especially to encompass the various ways in which men relate to reproductive health problems, programmes, reproductive rights and reproductive behaviour. There is an urgent need for equity in gender relation, responsible sexual behaviour and active involvement of men in reproductive health programmes in