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Proposed Rural Water Supply and Sanitation System for Angadi Village, District Karwar, Karnataka

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Abstract*: *The aim of the study is to assess the water supply & environmental sanitation conditions with regards to water, waste water, solid waste management and hygiene of households of Angadi village, District Uttar Kannada, Karnataka. In this study, various water quality parameters (physic-chemical parameters), various parameters of pollution of soil will be test. In India more than 70 percent of its people live in rural villages, but only few of them have some form of potable water supply. It hasn't been feasible to cover all villages with piped water supply because of various constraints such as Scattered and inaccessible nature of villages, Non-availability of nearby water sources. Hence, this project focuses on a selected rural area to plan a suitable water supply scheme in accordance with their demands & requirements. The project also covered planning of facilities to maintain better sanitation and beautification of surroundings. It also ensures reduction in environmental pollution.
Keywords: Physico-chemical Parameter, Angadi Villege, Rural Water Supply, Contaminated Water, Drinking Water.

I. INTRODUCTION

Water and sanitation are key elements in the field of development. Shortage of water is r recognised as one of the world's biggest problems. However India is still far behind other developing nations in terms of achievement in some of the very basic social and economic development indicators especially in the rural areas where majority of our people lives, 65% of its rural areas are without sanitation facilities and large parts of rural India face acute water shortage. It is recognized that many households in rural India still rely on basic infrastructure such as hand pumps, dug wells and springs etc with chronic problems of water quality due to poor sanitation and hygiene. Establishing behaviour change to ensure open defecation free villages remains the first step towards provision of good safe drinking water. These communities require interim strategies on the road towards piped water supply.

II. OBJECTIVES OF STUDY

The work has been taken up with the following objectives:

1) To gain a practical knowledge about the selection of source, supply of good quality water and its effective maintenance.
2) To give suggestions to economical water supply system and to improve the water supply conditions of villages (i.e. Overhead tank).
3) To study the design of overhead tank.
4) To give suggestions to adopt well economical sanitation system to improve sanitary conditions of village.
5) To study the design of common septic tank & sewer line.
6) To create the awareness among the villagers by organizing the awareness program to achieve healthy environment and improve living standard.

III. METHODOLOGY

Preliminary study is carried out in various villages and to investigate about water supply and sanitation problems existing in those areas.

1) Selection of suitable rural area for the study of available water supply and sanitation facilities.
2) Complete study on the existing water supply and sanitation facilities in the area and to identify the problems.
3) The additional requirement necessary to fulfill the needs of people are to be accessed.
4) Complete study on existing sanitation facilities in the area and to identify the problems associated with sanitation.
5) Planning of suitable sanitation scheme in the area so as to provide a better living standard in terms of public health and also environmental protection.

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A. Case Study Area

Present study is carried out in Angadi village Karwar Taluka, Uttarkannada districtKarnataka. The total population of Angadi village is 624 and total number of houses are I64. Angadi village is divided into 6 wards Namely, Dhumshita, Crosswarda, Courtvada, Churchwada, Dadanbhag and Wajantriwada. In Angadi village roads are either concrete and bituminous road, and condition of these roads are average. The major crops which are grown in Angadi village are watermelon, paddy and coconut etc.

1) Name of the village: Angadi,
2) Taluk: Karwar,
3) District: Uttar Kannada.
4) State : Karnataka

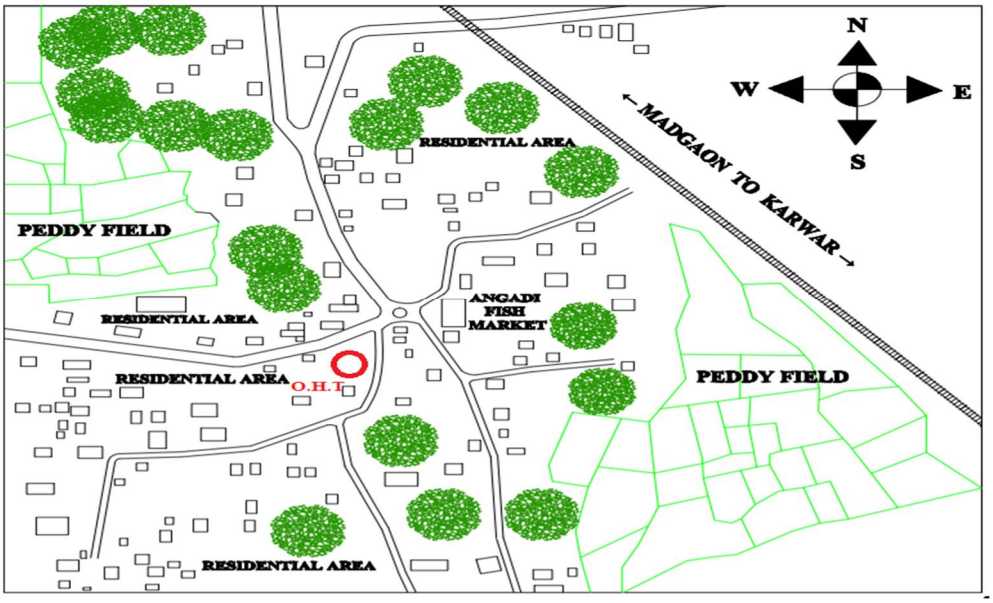


Fig.1 Layout of Angadi Village.

B. Existing Water Supply facilities

The major water source for the Angadi village is supplied from Gotegali dam, which is stored in an overhead tank and then it is distributed for irrigation & drinking purpose. But it is not regularly supplied. This Angadi Panchayat hasalso provided bore wells and open wells facility to the villagers. But some of them are not in functional conditions. Mostly there is a scarcity of water during summer season. Since ground water has better quality and required no treatment accept chlorination for disinfection, it can be used at least economy. So, in this location there is insufficiency of water hence required more number of bore wells, open wells & one more overhead tank.

Table. 1: Type And Status Of Water Scheme In Angadi Village

WADA	WATER SCHEME TYPE			FUNCTIONAL STATUS		
	SHALLOW WELL	DEEP WELL	ROPE PUMP	FUNCTIONAL	NON FUNCTIONAL	TOTAL
Dhumshitta	2	10		10	2	12
Crosswada	2	3		5	-	5
Courtwada	2	3		4	1	5
Churchwada	1	3		3	1	4
Dadanbagh	3	2		3	2	5
Wajantriwada	1	5		6	-	6
					TOTAL :	37

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C. Existing Sanitary System Facility

In Angadi village we observed there is no proper sewage system and also there is no proper adoption of solids waste disposal, they are let it on streets in slum areas that lead to breeding of insects. It also found that some solid waste causes environmental pollution due to burning process. As per our study there is need of testing on contaminated soil & water. To provide proper drainage system and common septic tank for Angadi villagers to improve the present condition of sanitary system in Angadi village.

Table. 2: The present condition of sanitation in Angadi village

Sanitation facilities	Number (household)
Household (private) :	
Sewage system	0
Sanitary latrine	103
Unsanitary latrine	4
Without any facilities	4
Institutions:	
School latrine	5
Medical centre latrine	4

IV. RESULTS AND DISCUSSIONS

A. Test On Drinking Water

Table. 3: Experimentally calculated parameters for Drinking Water

Sr. No.	Parameter	Unit	Result	Acceptable Limits	Permissible Limits
				As per IS 10500 : 2012	
1	pH at 25°C	……	6.81	6.5 - 8.5	No relaxation
2	Temperature	°C	30°C	……	……..
3	Total Alkalinity as $CaCO_3$	mg/ltr	55.00	Max 200	Max 600
4	Total Hardness as $CaCO_3$	mg/ltr	65.24	Max 200	Max 600
5	Turbidity	NTU	2.97	Max 1.0	Max 5.0
6	Total Dissolved Solids	mg/ltr	113.00	Max 500	Max 2000
7	Bio-Chemical Oxygen Demand (3days at 27°C)	mg/ltr	1.50	…	Max 6
8	Dissolved Oxygen	mg/ltr	8.2	…	Max 5
9	Fluorides as F	mg/ltr	0.11	Max 1.0	Max 1.5
10	Chlorides as Cl	mg/ltr	28.40	Max 250	Max 1000
11	Nitrates as NO_3	mg/ltr	4.74	Max 45	No relaxation
12	Iron as Fe	mg/ltr	0.07	Max 1.0	No relaxation

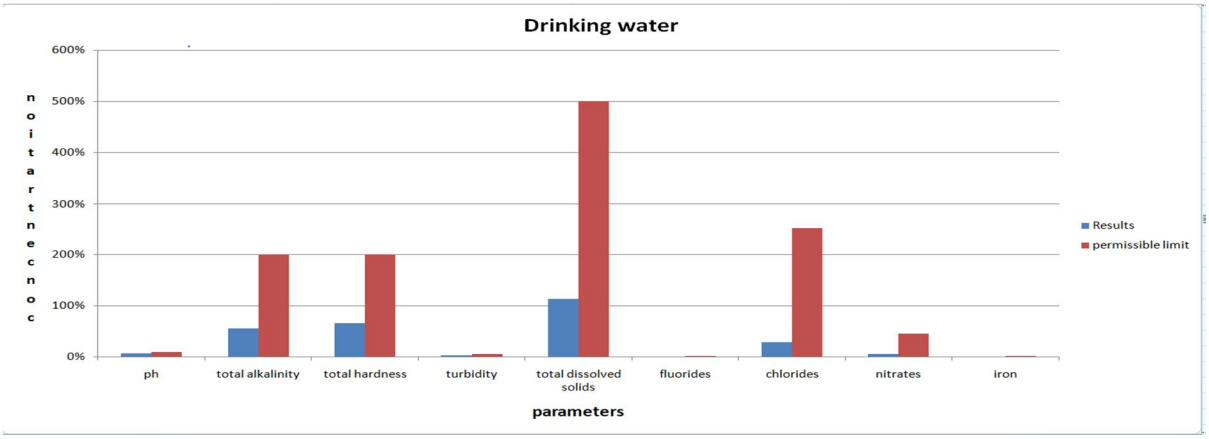


Fig.2 Graph analysis on drinking water quality parameters

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B. Contaminated Water Analysis

Table. 4: Experimentally Calculated parameters for Contaminated Water

Sr. No.	Parameter	Unit	Result	Permissible limit
1	pH at 25°C	……..	6.74	8.4
2	Total Solids	mg/ltr	1085.00	2000
3	Bio-Chemical Oxygen Demand (3 days at 27°C)	mg/ltr	16.50	133
4	Chemical Oxygen Demand	mg/ltr	509.60	71
5	Calcium as Ca	mg/ltr	15.63	200
6	Magnesium as Mg	mg/ltr	4.62	100
7	Sulphates as SO_4	mg/ltr	26.54	500
8	Nitrates as NO_3	mg/ltr	0.03	
9	Total Organic Carbon	mg/ltr	30.65	
10	E.coli/100 ml		Present	---

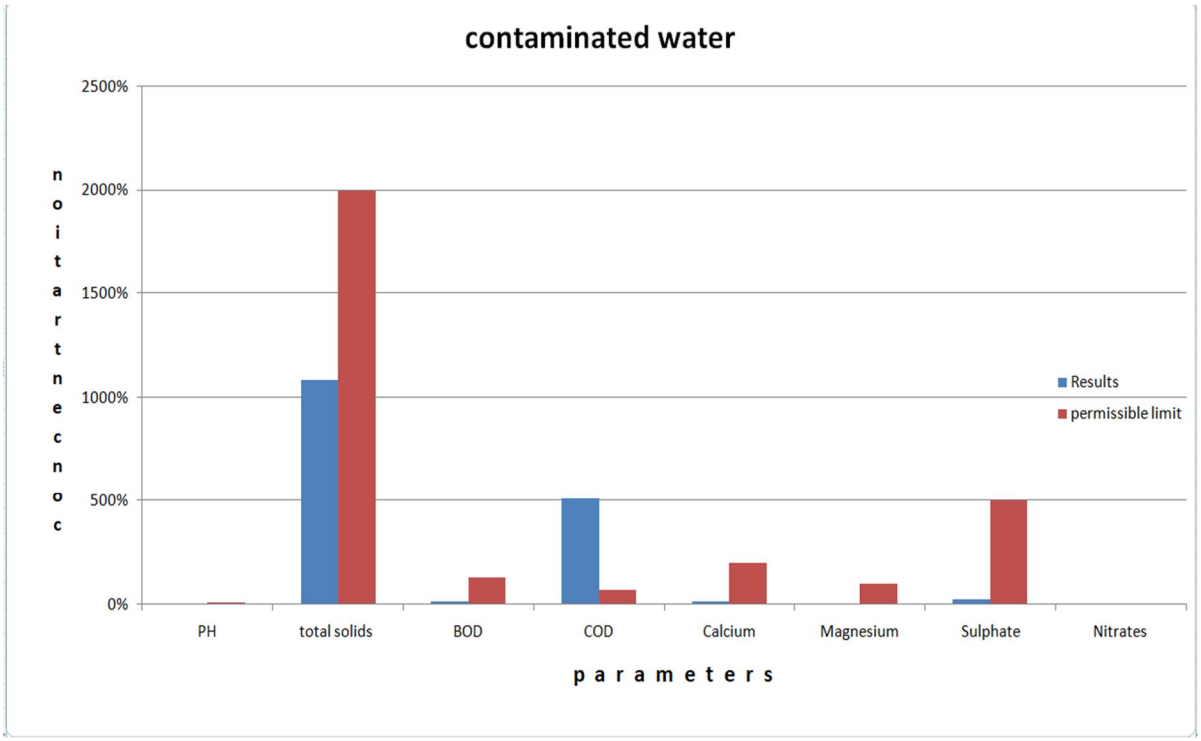


Fig. 3 Graph analysis on contaminated water quality parameters

C. Disinfection by Chlorination

Since all parameters tested satisfied the acceptable range of portable water given by Indian Standard. A minimum Treatment of disinfection is enough. Using bleaching powder that contains 30-35% of chlorine 1Kg contains 30% strength. When 1Kg is added to 1ml it gives 0.3mg/l. Chlorine which is the dosage limit as per IS. Hence, it can be dosed 5mg/l with 30 minutes contact period.

D. Education for Awareness

We visited each and every houses of Angadi village and try to educate them regarding saving water in the form of pamphlets “Save Water and Save Life”.

Even we requested to the gram panchayat of Angadi village to provide dustbins in village to maintain hygienic environment.

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V. CONCLUSION

A. The water supply and sanitation scheme has been studied in the selected rural area

B. Open wells were the ultimate source of portable water in that particular area and overhead water tanks were designed as per Indian standards, to meet the additional requirements of water demand calculated as per BIS.

C. The quality of water was also assessed to ensure the safety of public health.

D. In Angadi village there is higher percentage of peoples which are washing their hands and taking bath inside or outside the yard / premises, thro which water get stagnant in the same premises.

E. To avoid unhygienity thro waste water the underground drainage lines are necessary for the village, where testing of water is shown COD and salinity are exceeds the limit; in future it is possible to treat it with low cost treatment such as anaerobic lagoon which is possible way for the rural areas.

F. To meet the scarcity of water in non-monsoon seasons "Rain water harvesting techniques" was suggested in that village for conserving water.

G. Regarding the domestic waste water disposal, 40% of the households disposed their waste water in open yard / premises, which is not good as per hygienic conditions for small children's and old peoples especially. The surrounding premises get dirty and stagnant water over the surrounding premises produces houseflies breeding due to which food contamination may occur and possibilities of borne diseases. To avoid unhygienic condition proper collection and disposal of liquid waste is to be required.

H. The bio gas plant is also suggested for effective utilization of waste and for the purpose of energy production which generates biogas from organic waste, latrine and +night soil which can be used as Cooking gas, Fuel for Bio lamps etc.

I. The improvement in existing amenities in village must be upgraded.

J. Moreover the growth of a village depends upon the people understanding their nation trends "Save Water and Save Life". Thus need for educational awareness about energy conservation among public were suggested.

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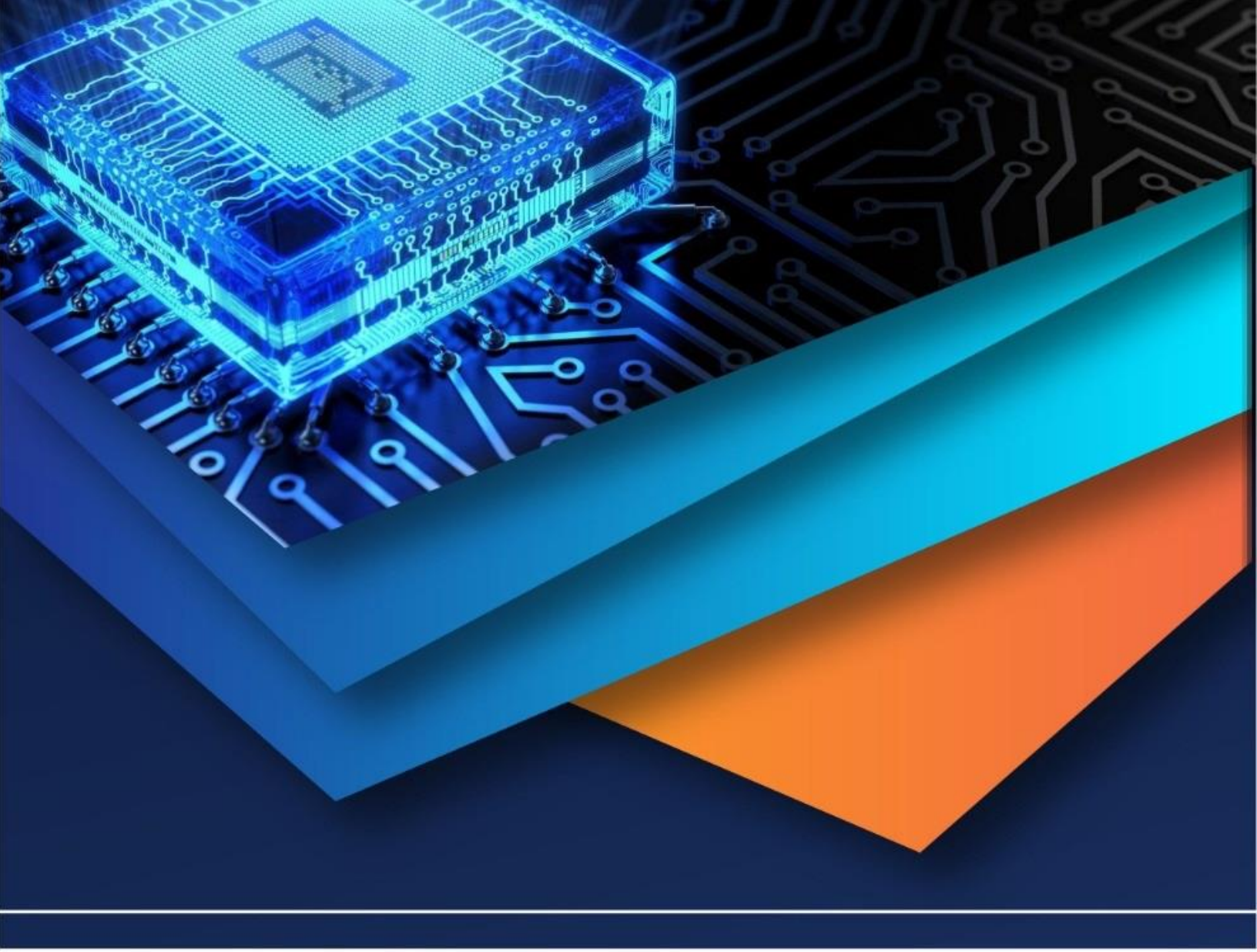
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