



# **iJRASET**

International Journal For Research in  
Applied Science and Engineering Technology



---

# **INTERNATIONAL JOURNAL FOR RESEARCH**

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

---

**Volume: 7      Issue: VI      Month of publication: June 2019**

**DOI: <http://doi.org/10.22214/ijraset.2019.6197>**

**[www.ijraset.com](http://www.ijraset.com)**

**Call:  08813907089**

**E-mail ID: [ijraset@gmail.com](mailto:ijraset@gmail.com)**

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

Vaibhav R. Shirodkar<sup>1</sup>, Lokesh L. Marathe<sup>2</sup>, Preetesh D. Faldessai<sup>3</sup>, Keval K. Velip<sup>4</sup>, Prasad B. Kalmo<sup>5</sup>

<sup>1</sup>Assistant Professor, <sup>1,2,3,4</sup>UG Student, Department of Civil Engineering, Girijabai Sail Institute of Technology, Karwar, Karnataka

**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 Uttara Kannada, Karnataka. In this study, various water quality parameters (physico-chemical parameters), various parameters of pollution of soil will be tested. 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 Village, Rural Water Supply, Contaminated Water, Drinking Water.*

## I. INTRODUCTION

Water and sanitation are key elements in the field of development. Shortage of water is 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.

**A. Case Study Area**

Present study is carried out in Angadi village Karwar Taluka, Uttarkannada district Karnataka. The total population of Angadi village is 624 and total number of houses are 164. Angadi village is divided into 6 wards Namely, Dhumshita, Crosswada, Courtwada, Churchwada, Dadanbhadg 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

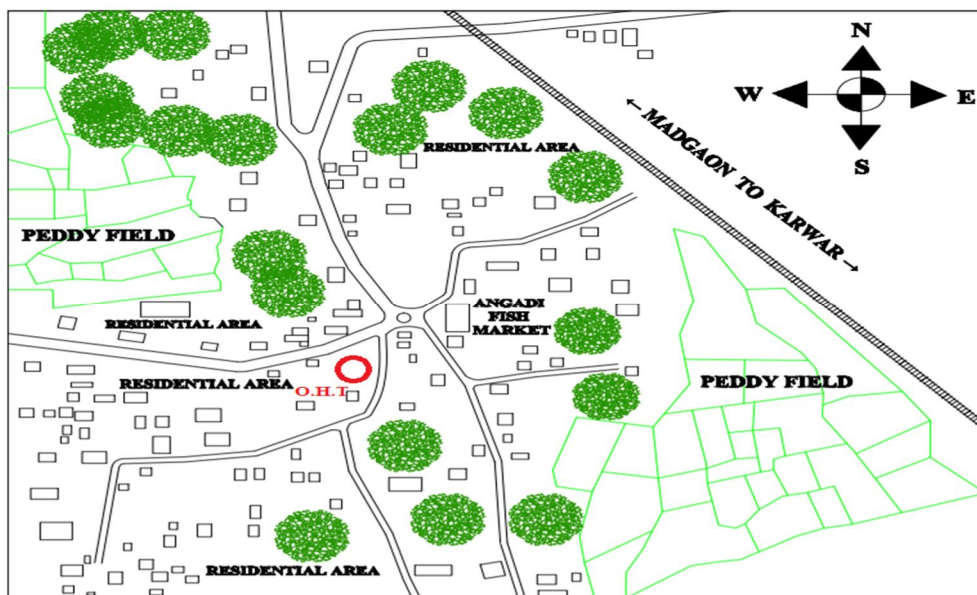


Fig.1 Layout of Angadi Village.

**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 has also 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 except 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
Dadanbhadg	3	2		3	2	5
Wajantriwada	1	5		6	-	6
					TOTAL :	37

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 <sub>3</sub>	mg/ltr	55.00	Max 200	Max 600
4	Total Hardness as CaCO <sub>3</sub>	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 <sub>3</sub>	mg/ltr	4.74	Max 45	No relaxation
12	Iron as Fe	mg/ltr	0.07	Max 1.0	No relaxation

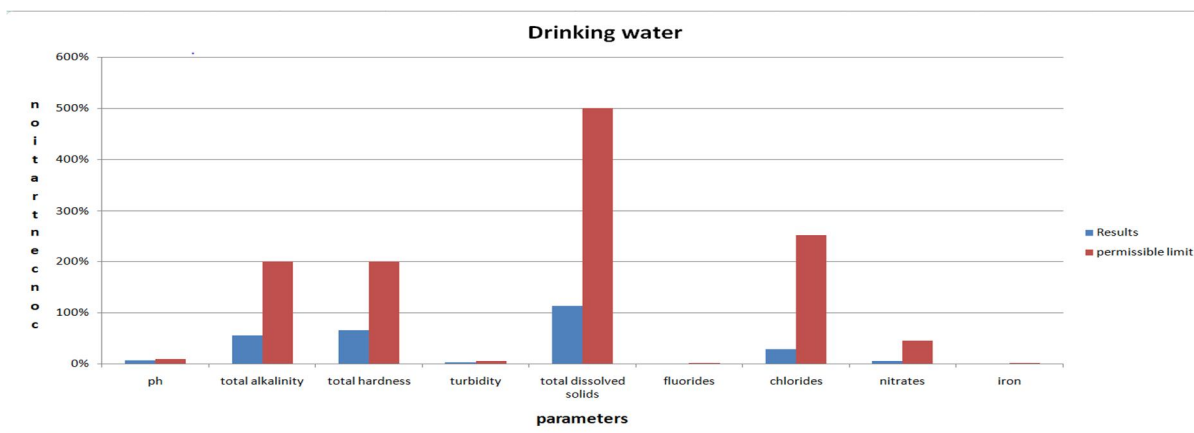


Fig.2 Graph analysis on drinking water quality parameters



**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 <sub>4</sub>	mg/ltr	26.54	500
8	Nitrates as NO <sub>3</sub>	mg/ltr	0.03	
9	Total Organic Carbon	mg/ltr	30.65	
10	E.coli/100 ml		Present	---

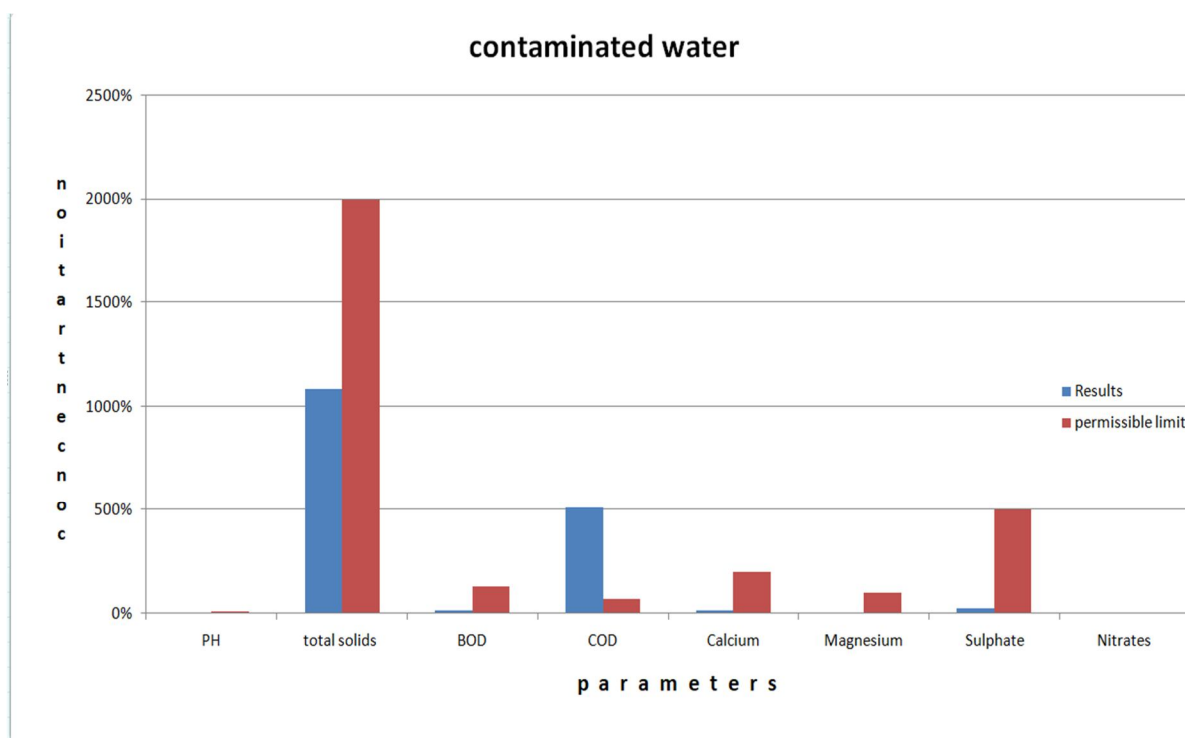


Fig. 3 Graph analysis on contaminated water quality parameters

**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.

## 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.

## VI. ACKNOWLEDGMENT

I am thankful to my paper guide for the guidance, motivation and constructive suggestions that are helpful for me in the execution of this paper. The authors wish to thank the reviews in impatience of receiving appreciated comments and suggestions for the possible progression.

## REFERENCES

- [1] Arjun kumar, kankesh kumar. “Design of water distribution system usingpanet”. International journal of advanced research (2015), volume 3, issue 9, 789-812.
- [2] Abhimanyu kumar and anshu tanku. “a study of sanitation of toilets in elementary and senior secondary schools located in rural areas of uttarakhand state in india”. International journal of sociology and anthropolology vol.2 (8), pp. 178-184, October 2010.
- [3] Fitsum dechasa kibret, fikirte demissie tulu. “Challenges of potable water supply system in rural Ethiopia: the case of gonji kolela woreda, west gojjam zone, Ethiopia”. Natural resource and conservation 2(4): 59-69,2014.
- [4] K. dutta roy, B. Thakur, T. S. konar and S. N. chakrabarty. “Rapid evaluation of water supply project feasibility in Kolkata, india”. Drink. Water eng. Sci., 3, 29-42, 201
- [5] Krishna priya R, Anjali ajay,seema k. nayar3. “Sustainability in rural water supply: a case study of jalandhi,kerala”. International journal of innovation research in science, engineering and technology.
- [6] Malikarjun sk, jyoyhi D O, manjureddy K H, Sandhya H B. “design of 24\*7 water supply for ranebennur town”. International journal of innovation research in science, engineering and technology.
- [7] Nikhilesh s gandhre, omkar jadhav, varsha rane. “Water supply scheme for mamadapur village”. International research of engineering and technology (IRJET) volume:03 issues:04|apr-2016.
- [8] Patel diptesh, dabhi nikunj H. “dream village- a case study of bakrol village”. International journal of advance engineering and research development. Scientific journal of impact factor (SJIF): 4.72 special issues sieicon-2017, april-2017
- [9] Richa R. savale, S. R. korake, M. V. jadhav. “Assessing environmental sanitation in rural area of sukena village, district-nashik, Maharashtra”. International journal of innovation in engineering and technology (IJET). February 2015.
- [10] Rucha Deshpande, Dr. Girish kulkarni and sudhir desai. “planning of jalihal village with respect to water supply and sanitation”. Imperial journal of interdisciplinary research (IJIR) vol-3, issue-5, 2017.
- [11] Renuka venkatesh, satheesh B. C. P. Sivaprakasam, mahendran c. “status of safe drinking water in the rural areas of a health unit district, tamil nadu, india”. International journal of community medicine and public health venkatesh R et al. Int J community med public health. 2016 may:3(5):1123-1128.
- [12] Sandeep raj.k and Dr. V. Shanmugam. “Rural Dinking water supply in Karnataka – a case study of mysore thaluk”. IOSR journal of Humanities and social science (IOSR-JHSS) volume 19, issue 8, ver. V (Aug.2014), PP 18-12
- [13] Srila gopal, rajiv Sarkar, 1146alian banda, jeyanthi govindarajan. “Study of water supply and sanitation practices in india using geographic information system:some design and other consideration in village setting”. Indian j med res 129, march, pp 233-241.



10.22214/IJRASET



45.98



IMPACT FACTOR:  
7.129



IMPACT FACTOR:  
7.429



# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24\*7 Support on Whatsapp)