IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Conference on Advances in Civil Engineering 2018 (CACE-2018)

Thakur College of Engineering and Technology, Thakur

Vol. 5, Special Issue 3, February 2018

Canal - A Boon for Rainwater Harvesting

Haresh Tarani[1], Dr. S. K. Ukarande[2], Prof. Seema A. Jagtap [3]

Research Scholar, Civil Engineering Department,

Yadavrao Tasgaonkar College of Engineering & Management, India[1]

Principal, K. J. Somaiya Institute of Engineering and Information Technology, India[2]

Head of Civil Department I/C, Thakur College of Engineering & Technology, India[3]

Abstract: Water is important part of human life. Without water there is no life. There are various techniques to preserve and use harvested rainwater. Canal is one of them. A Canal is a long narrow place that is filled with water and was created by people so that boats could pass through it or to supply fields, crops, etc.., with water. In this paper a detailed canal system is presented.

Keywords: Water, Rainwater, Canal

I. INTRODUCTION

Rajkot is the 35th-largest urban agglomeration in India having total area of 11203km2 with a population more than 1.2 million as of 2015. Rajkot is the eighteenth cleanest city of India. Rajkot has a semi-arid climate, with hot, dry summers from mid-March to mid-June and the wet monsoon season from mid-June to October, when the city receives 590 mm of rain on average. The months from November to February are mild, the average temperature being around 20 °C, with low humidity. The canal is a man-made waterway. Canals are built for a variety of uses including irrigation, land drainage, urban water supply, hydroelectric power generation, and transportation. The increased demand of water is due to growing competition which can be done artificial recharge. It is the process where the excess water enters the ground by means of recharge wells or other techniques. Artificial recharge is the way to store water underground which can be used at hard times of shortage. This water recovered from recharge projects can be used for various uses.

NEED OF CANAL

1) Relief work during famine
2) Protect area against future famines
3) Generates employment

II. METHODOLOGY

Canal irrigation is the most important form. It is cheaper. It is of greatest advantage in the river valley regions. Canal irrigation is of much use in the deltas of rivers, the Godavari, the Krishna, the Kaveri and the Mahanadi and the Ganga, and in the coastal plains of Kerala. They are planned to serve dual purpose effectively. They provide irrigation facilities and control flood. Many of these river valley projects are called multipurpose projects as they benefit from events such as flood controls, irrigation and generation of power, etc. The layout of the canal is also important as it should ensure smooth flow by gravity in each channel. The Wrong alignment of canal can cause of problem of stagnation of water at some places or too fast moving which may damage the canal itself. Population of Rajkot: According to the registration of 2011, the number of inhabitants in the city was 1.2 Million. Talking about population, in order to check out the population of Rajkot in 2018, we need to have a look at the population of the past 5 years. They are as per the following:

1. 2013 – 1.3 Million
2. 2014 – 1.42 Million
3. 2015 – 1.51 Million
4. 2016 – 1.6 Million

IARJSET
ISSN (Online) 2393-8021
ISSN (Print) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
Conference on Advances in Civil Engineering 2018 (CACE-2018)
Thakur College of Engineering and Technology, Thakur
Vol. 5, Special Issue 3, February 2018

5. 2017 – 1.7 Million
6. 2018 – 1.78 Million (Estimated)

Taking a look at the population of Rajkot from the year 2013-17, it has been noticed that there has been an increase of 0.4 Million in the past 5 years. Therefore, it has been seen that every year the population increases by 0.08 Million. Hence, the population of Rajkot in 2018 is forecasted to be 1.7 Million + 0.08 Million = 1.78 Million. So, the population of Rajkot in the year 2018 as per estimated data = 1.78 Million.

Size of Canal
Canal Top Length = 5.2m
Canal Bottom Length = 3m
Canal Height = 2.5m

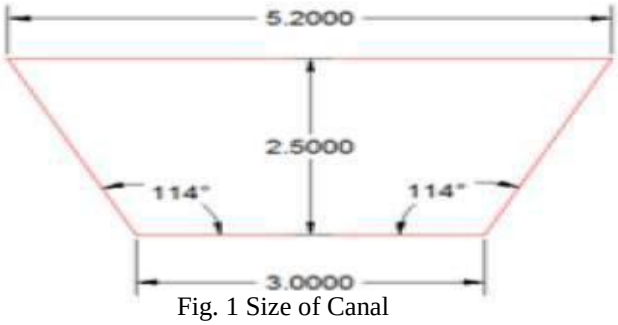

Fig. 1 Size of Canal

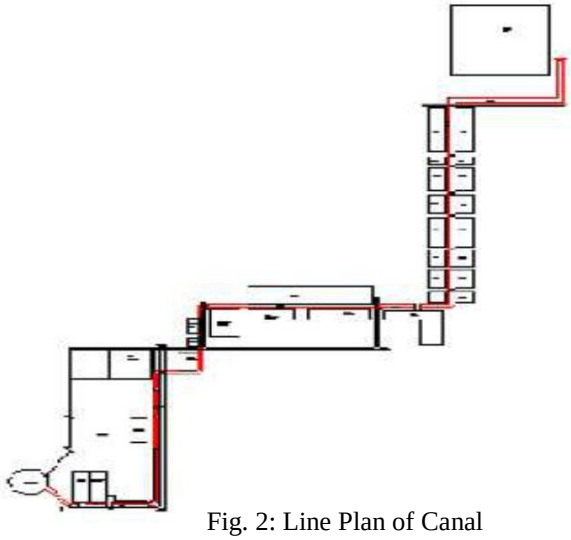
Fig. 2: Line Plan of Canal


Fig 3: Red line shows Route of Canal

IARJSET
ISSN (Online) 2393-8021
ISSN (Print) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
Conference on Advances in Civil Engineering 2018 (CACE-2018)
Thakur College of Engineering and Technology, Thakur
Vol. 5, Special Issue 3, February 2018

PROBLEMS FACED

On 15 July 2017, 11:19: With 348 mm rain, Rajkot breaks a decade old record; flooding likely:
As predicted for heavy rains by Sky met Weather for Rajkot, the city has recorded a whopping three digit rainfall to the tune of 348 mm. this even crossed its monthly mean of 253.4 mm. Moreover, such heavy rains are expected to continue in Rajkot for the next 24 hours. Such continuous heavy rains may also result in the possibilities of flash floods in parts of the city.

On 15 July 2017, 13:00: Rajkot records 67 mm rains in 3 hrs., red alert issued as flood threat looms large Heavy rains continued in Rajkot city with the recording of 67 mm of rain for three hours from 8:30 am to 11:30 am. In past few hours, the well-marked low-pressure area has moved further westwards. This will keep the weather conditions conducive for more torrential rains today. Due to this local authorities gave a red alert over Rajkot and advised people to be safe at home. Several streets and roads have been blocked with water.

On 15 July 2017, 18:48: Rajkot records 89 mm in 9 hours, red alert issued as flood threat persist Monsoon rains have continued to batter Gujarat with am till 5:30 pm, Rajkot has recorded heavy rains of 89 mm at that time. According to Sky met Weather, as more heavy showers are anticipated to fall over these regions, no relief is as of now in sight. Moreover, these gave a threat of floods also. Blocked roads and heavy traffic were also been experienced. Red alert was also issued by the local authorities in Rajkot.

ADVANTAGES OF CANAL

1. Wastelands can be developed as canal irrigation which can give ample of benefits.
2. Dangerous droughts can be avoided. Dependence on rainfall can be minimized.
3. Canals are fed by rain water received by rivers, and the water is used for irrigation.
4. Canal system is a permanent structure; but should be maintenance for its benefits for a long time.
5. Groundwater level does not go down on account of canal irrigation, but on the contrary water level increases, which facilitates digging of wells.

DISADVANTAGES OF CANAL

1. Imbalance distribution of canal water can create scarcity or water logging problems.
2. Many diseases are caused due to spread of mosquitoes, worms and insects on account of stationary water in canals.
3. Sometimes efficient canal management results in excessive production of crops, due to which the farmers are not able to get suitable price for their product in the market.
4. Due to shortage of water in inundation canals, crops are destroyed for want of water for irrigation.
5. Regular maintenance of canals is not done, due to which sediments are collected resulting in reduction of capacity of canals.

CONCLUSION

The role of Canal irrigation for modernization of irrigation in India is great. Modern Canal irrigation is now conducted, controlled and administered as a part and parcel of river valley projects. The canal method of water is a dynamic system with variation in demand occurring according to the crops planted in the command area. Also, the source of water, usually a river, may not be able to supply sufficient amount of water all times. So it is very essential to have a proper canal in the city to avoid the problems of water logging and floods.

"Water Is Essential for All Dimensions of Life So,
Come on Guys, Let's Be Water Wise"

ACKNOWLEDGEMENTS

We are thankful to RMC and GSDMA for providing valuable data and information for the purpose of study.

REFERENCES

[1]. Gujarat Engineering Research Institute, Handbook Vol. 14, Vadodara, 2014
[2]. Dr.K.R. Arora. "Irrigation, Water Power and Water Resources Engineering " Chapter 22.kota 21
[3]. R. M. Dhoble, Dr. A. G. Bhole," Review on Rain Water Harvesting in India" National Seminar on Rainwater Harvesting and Water Management, Nagpur. pp. 46-53, 2006
[4]. International Water Technology Conference, pp. 893-899, Egypt, 2008