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ESTIMATION OF SEDIMENTATION OF GONDUR TANK WITH THE HELP OF G.I.S. TECHNIQUE

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Abstract:

India is continental land fulfill its water requirement from the monsoon rainfall which is uncertain with its intensity and time.

In satisfying the need of agriculture, drinking water, industrial supply of water, dams are playing very important role. These tanks are suffering from the problem of sediment deposition which leads to decline the storage capacity of water with successive proceeding year.

The Gondur tank is situated at Gondur village in Dhule taluka near Dhule city.

This paper attempts to estimate the sedimentation with GIS techniques. It is estimated that sedimentation since from 1965 to 2010 is near about 378.35 metric tons and ground level rises near about 2.35 mt.

KEYWORDS:

GIS, Sedimentation.

INTRODUCTION :

India is the continental land, receives maximum amount of rainfall from monsoon wind. Now a day's monsoon is characterized with its uncertainty in location and intensity, finding inadequacy in fulfilling necessity of agricultural field, drinking water purpose and other domestic use etc.

To meet the need of irrigation for agriculture, Dams, tanks are playing very important role. In India 14.5% of the total land under irrigation is supported with Dams/ tanks.

These tanks are suffering form the problem of sediment deposition which leads in to decline the storage capacity of water with successive proceeding years.

The Gondur Tank is situated at Gondur village near Dhule city. The aim of this paper is to estimate the amount of sedimentation in Gondur Tank with the help of G.I.S. technique.

AIMS AND OBJECTIVES:-

To estimate the amount of sedimentation in tank.

The above said purpose is served with following objectives.

For the estimation of the sedimentation, use of G.I.S.

To access the present storing capacity of water and usefulness of tank.

To rejuvenate the Gondur tank for irrigation, drinking water purpose.

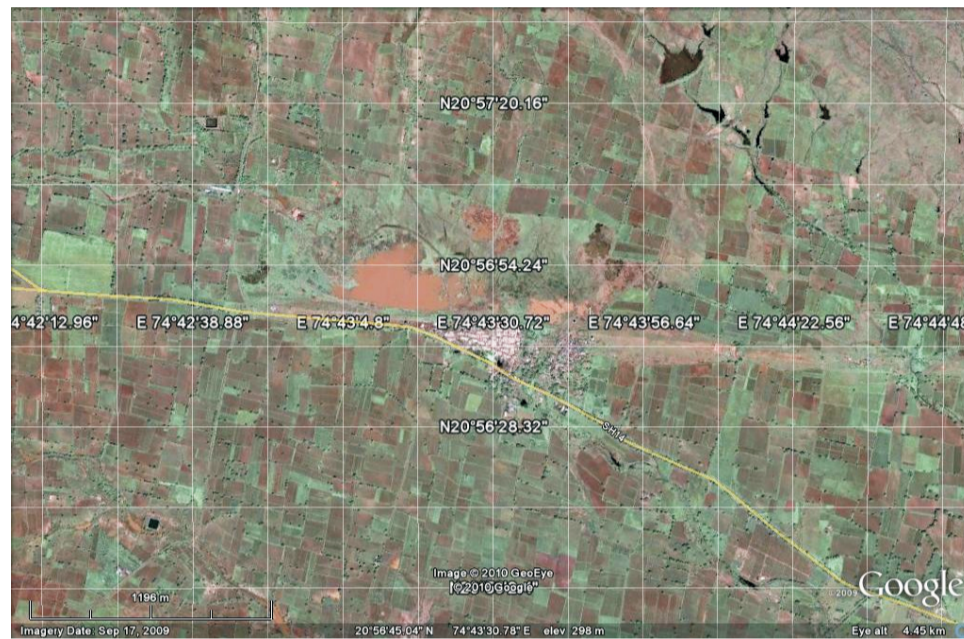
ESTIMATION OF SEDIMENTATION OF GONDUR TANK WITH



To suggest remedies, suggestions to avoid sedimentation problem.

STUDY AREA:-

LAND-SAT OF STUDY AREA.



The Gondur talaw is situated at Gondur village in Dhule Taluka near Dhule city. The latitudinal and longitudinal location of Gondur Talaw is 20° 55' N to 20° 57' N. and 74° 04' to 74° 44' E. longitude.

SAILENT FEATURES OF GONDUR MINOR IRRIGATION TANK.

SR.NO.	DESCRIPTION	DETAILS
1	Name of river / Nalla.	Local Nalla.
2	Village	Gondur.
3	Taluka	Dhule.
4	Catchment Area.	32.06 Sq.Km.
5	Submergence Area.	83.40 Ha.
6	Gross storage capacity.	1.30 M.Cum.
7	Live storage.	1.30 M.Cum.
8	Dead storage.	0.00 M.Cum.
9	Type of Dam.	Earthen Dam
10	Length of Dam.	838 meters.
11	Maximum Height of Dam.	11.60 meter.
12	Length of main canal.	2640 meters.
13	Benefit cost ratio.	1.96
14	Benefited Taluka.	Dhule.
15	Year of Completion.	Since British Era.

METHODOLOGY:-

Methodologically study is carried out in two phases

- 1) Field Work.
- 2) Laboratory Work.

1)Field Work.:-

This first phase comprises the intensive field work in which observation of the present state of the tank was done.

Measurements of various undulations (relief features.) was taken.

Information regarding the construction of Dam from local people was collected.

2)Laboratory Work.-

Laboratory work comprises preparation of base map of study area, calculations, estimation etc.

The wide use of G.I.S. techniques for the estimation of sedimentation amount in tank.

METHODOLOGY**Flow Chart**

STAGE	FIELD WORK	LABORATORY WORK
01	Actual measurement of relief	Use of G.I.S. Software.
02	Collection of Information from field.	Collection of Data from Land-sat imagery.
03		Processing
04		Contour Map, Physiography Map, Wireframe Map.
05		Preparation of present profile (wireframe) of bottom of gondur tank.
06		Preparation of past profile (wireframe) of bottom of gondur tank
07		Subtraction of Past wire frame area from Present wireframe area.
08		AMOUNT OF SEDIMENTAION IN METRIC TONNES.

ESTIMATION OF SEDIMENTATION OF GONDUR TANK WITH



At the very outset, levels of present surface of Gondur tank were accessed with help of Land-Sat Imagery, and present wire frame surface map was generated.

Then relative levels of ground surface of Gondur tank of year 1965, were collected from irrigation office Dhule and past surface wireframe map was generated.

With the help of surfer software two different wire frame maps we can calculate the amount of sedimentation occurred from 1965.

VOLUME COMPUTATIONS

UPPER SURFACE

Grid File: C:\Documents and Settings\Admin\Desktop\Gondur paper\Gondur x\GONDUR R.grd

Grid size as read: 100 cols by 30 rows

Delta X: 0.232323232323

Delta Y: 0.241379310345

X-Range: 4 to 27

Y-Range: 4 to 11

Z-Range: 291.103448276 to 299.858585859

LOWER SURFACE

Grid File: C:\Documents and Settings\Admin\Desktop\Gondur paper\Gondur x\GONDUR R past.grd

Grid size as read: 100 cols by 30 rows

Delta X: 0.232323232323

Delta Y: 0.241379310345

X-Range: 4 to 27

Y-Range: 4 to 11

Z-Range: 288.753448276 to 297.508585859

VOLUMES

Approximated Volume in Metric tones. by

Trapezoidal Rule: 378.35

Simpson's Rule: 378.35

Simpson's 3/8 Rule: 378.35

RESULTS:-

This way we are able to calculate the amount of sedimentation since from 1965 to 2010. It is approximately near about 378.35 cu.metric tones.

On an average approximately due to sedimentation the ground level rises near about by 2.35 meters from 1965 to 2010.

REMIDIAL MEASURES FOR PREVENTING SEDIMENTATION PROBLEM:-

- 1) Contour bunding.
- 2) Construction of masonry weirs to resist the soil loss with runoff.
- 3) To construct the masonry passages for safest way for runoff.
- 4) Cultivation of grass for preventing soil loss with running water.

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