

Mechanism of Interlinking of WARDHA Rivers Using ERDAS Model

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ABSTRACT: Water has been perceived as fundamental and vital characteristic assets for general improvement of a country. Be that as it may, the accessibility of water does not coordinate with the request in term of amount and quality in time and space. To satisfy the necessity of water for water system and water supply, humanity has been misusing the surface or subsurface assets locally since long. The orange developing zone, prominently known as "California of Maharashtra" and the Cotton developing territory , prevalently known as Manchester of India are arranged in this locale. In any case, now a days by over abuse of surface and ground water, the supposed Cotton developing zone is drawing nearer towards the leave and also because of absence of one watering to the cotton, declination in product yield which causes the enormous suicide instances of the cultivators. The shortage of water in Akola, Amravati, Washim, Buldhana, Yeotmal city in 2005 wanted to convey water from upper Wardha Project. The cultivators of Melghat try to develop edits in stormy seasons overlooking their lack of healthy sustenance youngster lying in the home.

In the present paper ERDAS MODEL is used to interlink the WARDHA RIVER. ERDAS is the GIS tool in which supply network can be planned. This also involves planning of field channel network so as to divert the water from the main canal. The spatial analysis capabilities of ERDAS will offer good facilities towards the planning of the command area along with the link canals.

ERDAS is used for minimizing the problem of scarcity, for providing plenty of water supply to towns and villages enroute, for determining water allocations for irrigation or the development of the drought area. Most of the areas or villages in Vidarbha affected by water scarcity because they just aren't close to anywhere that has water.

KEYWORDS: Interlinking River, Morphometric Analysis, Agricultural Development, Wardha River, Water Resources, Geography and Geology.

I. INTRODUCTION

Wardha River originates at an altitude of 777 meters Satpura Range in village Khairwani near Multai, Betul District of Madhya Pradesh. From the origin it flows 32 km in Madhya Pradesh and then enters into Maharashtra. After traversing 528 km, it joins the Wainganga forming the Pranahita, which ultimately flows into the Godavari River. Kar, Wena, Jam, Erai are the left tributaries. Madu, Bembla, Penganga are the right tributaries.

A huge dam Upper Wardha Dam is built on Wardha river near Morshi . It is considered as lifeline for Amravati city and Morshi and Warud Talukas considered as California of India for its orange plantations. A dam on Bembala river under construction, to be considering a lifeline for part of Yavatmal Dist A Lower Wardha Dam is also being constructed near Dhanodi village.

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In Vidarbha there is plenty of rainfall occurs but during the summer season the many areas are affected with the water scarcity. There are various reasons behind water scarcity in Vidarbha such as over use of water, pollution of water, conflict, distance, drought, governmental access

For minimizing the problem of scarcity, for providing plenty of water supply to towns and villages enroute, for determining water allocations for irrigation or the development of the command area ERDAS MODEL is used for INTRLINKING of WARDHA RIVER. Most of the areas or villages in Vidarbha are affected by water scarcity because they aren't close to anywhere that has water.

ERDAS TO SOLVE THE ISSUES OF INTERLINKING:

Technical issues

- **Drinking water supply to towns and villages enroute**
It is worthwhile to plan for domestic water supply to towns and villages enroute. Water supply network planned in GIS environment to carry out route tracing and resources allocations. People may come forward to get the consensus of concerned socio-political authorities, as they get water
- **Water allocation for irrigation**
optimum usage of water for irrigation has to be facilitated by distribution channels upto the agricultural field from the link canals. This involves planning of field channels network so as to divert the water from the main link canal. Quantity of water can be metered and monitored. The above aspect can be very well planned using network analysis capability of GIS
- **Command area development**
The spatial analysis capabilities of GIS will offer excellent facilities towards the planning of the command area along with the link canals. ERDAS displays and enhance digital images for mapping use in GIS by manipulating imaginary data values and positions, it is possible to see features that would or may be visible and to locate.

STUDY AREA:

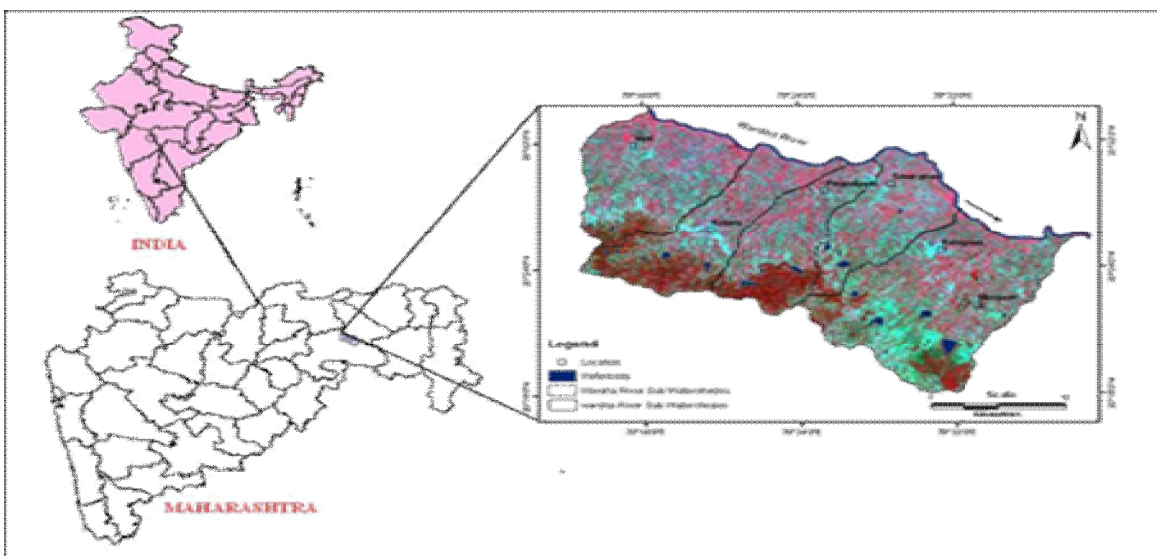


FIG NO 01 STUDY AREA

The study area comprises of Deccan trap basaltic hard rock and recently deposited alluvium connected by an intervening tract. The lower Wardha watersheds are elongated watershed in shape occupies in Yeotmal district of Maharashtra, India (Fig. 1). The study area is bounded within 78° 12' 00'' E and 78° 40' 00'' E longitudes and 20° 16' N latitude.

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00''N to 20° 36' 00''N latitudes. The given study area is major part of the lower Wardha river sub which flows up the hilly terrain of Yeotmal district of Maharashtra, India from northwest to south east direction.

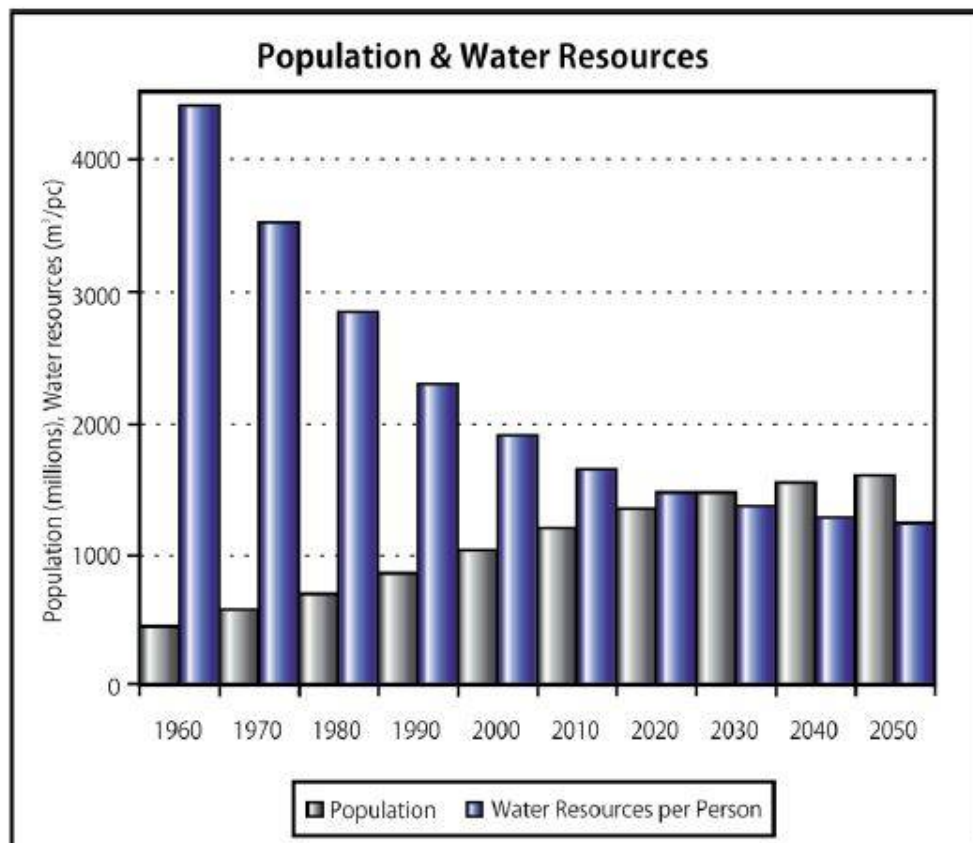


FIG NO 02 Source: Home Page of International Water Management Institute (IWMI) <http://nrlp.iwmi.org/> (as per 2012). The new homepage of International Water Management Institute is www.iwmi.cgiar.org

II. REVIEW OF LITERATURE

The interlinking of waterways including bury bowl water exchange has trenches, passages or water lifts, for water to spill out of one stream bowl to another and making utilization of abundance water (Sonali A. More-2014)

The interlinking of streams is a noteworthy attempt to make extra storerooms and exchange water from water-surplus districts to more dry spell inclined territories through between bowl exchanges. Interlinking of real waterways in India, goes for adjusting the intense spatial imbalance in the accessibility of water assets in India. An incorporated approach gets to be distinctly important when managing assets, for example, water, which rise above state limits and shape helps for whole groups. Stream deltas and waste regions experience the ill effects of disequilibrium in water supplies that may require the exchange of water from surplus to deficiency ranges. The idea of between bowl exchange on a vast scale has been under thought for some time. (Mary C. George)

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Water accessibility is getting to be deeper and deeper step by step in India because of rainstorm and expanding populace drive. Connecting of bowls through channels is not another idea, but rather has been by and by since times immemorial. Between bowl water exchange (B.S.Prakasa Rao-2010)

Indian farming to a great extent relies on Monsoon which is constantly unverifiable in nature. Subsequently, there is an extreme issue of absence of water system in one locale and water signing in others. Harm to crops because of dry season and pitiable seepage office could be overseen. Draining and diminishing status of water assets might be a standout amongst the most basic asset issues of the 21st century. The center targets of the paper are to study issues and difficulties in interlinking of waterways in India and to concentrate natural effect of Inter-River Linking Project (IRL). At the setting of this, the present paper is an endeavor to study issues and difficulties in interlinking of waterways in India from the perspective of society on the loose. (Dharmendra Meheta (19/2013))

The since quite a while ago wrangled about and delightfully fantasized uber extend between bowl linkages have prefigured the arrangements of water lack issue. In any case, such arrangement has gigantic biological and social implications for the nation like India. This article draws out the sense about the plausibility and practicability of such venture by investigating its land and social results. It recommends measures to moderate and enlarge water assets that are less harming to nature.(Kiran K. Singh)

III. RESEARCH METHODOLOGY

i. Collection of data

The list of data required for the study is as below:

- Meteorological data: rainfall, evaporation, humidity, maximum temperature, minimum temperature
- Water requirement data: domestic water supply & livestock, industrial, Evaporation losses
- River data: cross section, discharge, velocity, slope
- Drainage data obtained from Survey of India Topographical map

ii. Data sorting

iii. Data analysis

iv. Digital mapping: Digital mapping is the most elegant and compact method of displaying the spatial data. Graphical representation of natural resources, utilities and facilities smoothen the progress of decision-making. Maps that are difficult to make manually such as 3-D maps or stereoscopic maps can be created. Statistical analysis of attribute data can be performed and mapping can be done accordingly. Mapping of resource can be done at different scales small, medium or large, which depends on the level of study (national, regional or local). National level planning (small scale mapping) is needed for sustainable water resources development of the country, where as local level planning (large scale mapping) is needed for the benefit of the villages enroute the river link.

- Satellite imaginary IRS LISS III false color composite data (23.5mt) of the study area
- ASTER DEM data of (30 mt) the study area

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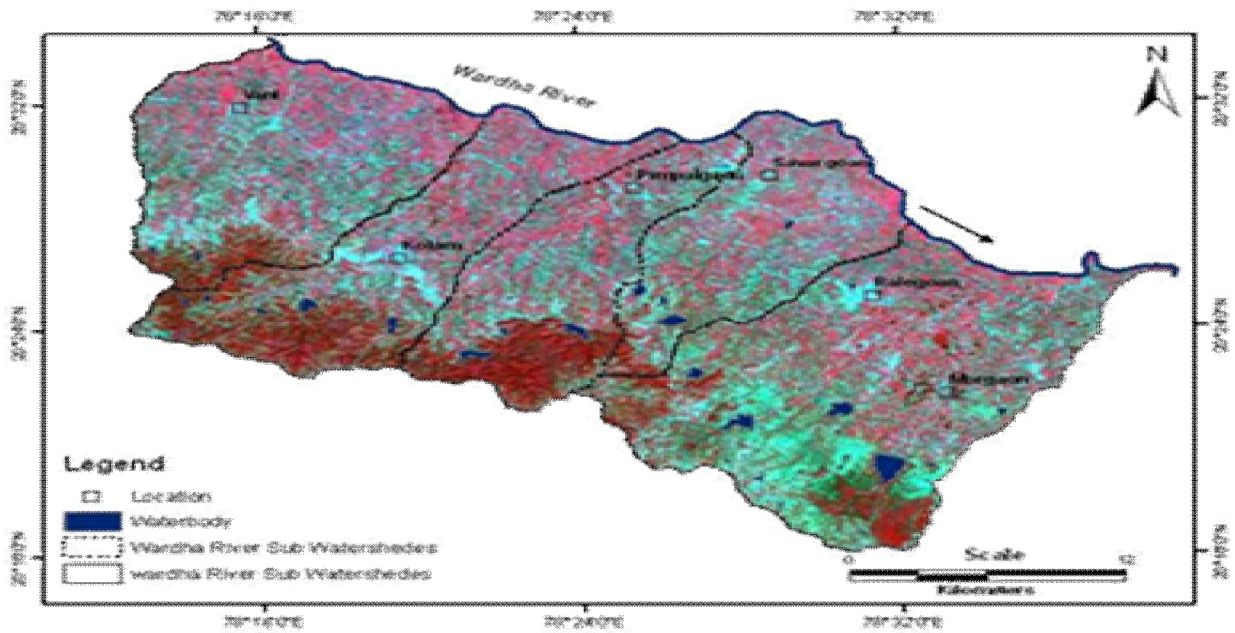


FIG NO 03: Satellite imaginary IRS LISS III false color composite data (23.5mt) of the study area

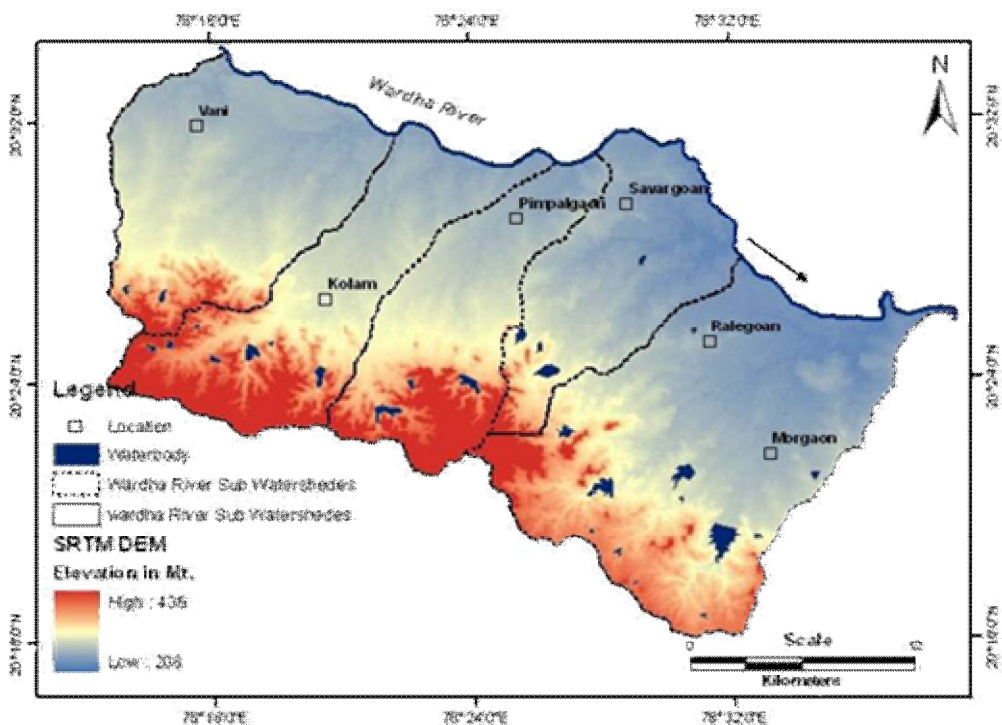


FIG NO 04: ASTER DEM data of (30 mt) the study area

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Accessible from <http://www.gdem.ASTER.ersdac.or.jp>. For the planning of construct guide, SOI beat sheets in light of 1:50,000 scales were utilized. The computerized information and georectified from Indian Remote Detecting Satellite (LISS) III with 23.5 m spatial determination with four ghastly groups was utilized to meet the prerequisite of territory under review. False shading composite (FCC) on 1:50,000 scale, having band mix of 3:2:1 (NIR: red: green). The SOI topsheets and computerized satellite information were geometrically corrected and georeferenced and blended utilizing ARC GIS 10.2 programming. The morphometric examination of the Lower Wardha watershed has been broke down utilizing Indian remote detecting satellite symbolism which were gathered and enrolled to review of India geographical sheets at 1:50,000 scale. The review region has been subdivided into five subwatersheds in light of the course of action of the stream specifically Kotha watershed, Chakravati watersheds, Pimpalgaon watersheds, Savargaon watersheds and Ralegaon watersheds . A quantitative, morphometric examination of a seepage bowl is thought to be the most palatable strategy since it empowers (i) to comprehend the relationship among various parts of the waste example of the bowl, (ii) to make a similar assessment of various waste bowls created in different geologic and climatic administrations and (iii) to characterize certain helpful factors of seepage bowls in numerical terms. The morphometric parameters registered incorporate stream arrange (u), Bifurcation proportion (Rb), stream length (Lu), stream recurrence, bowl shape, frame consider (Rf), circulatory proportion (Rc), and waste thickness (D), steady of channel support.

- v. **Overlay analysis:** Using the overlay technique, various thematic layers can be overlaid and specific information can be derived from it. For example, layer consisting of proposed canal of any particular stretch can be overlaid over the land use map, of that region. From the resulting layer, one can get the information of land uses that are affected based on which the problems of deforestation, land acquisition, resettlement and impact on environment can be analyzed. The strategies can be framed to solve the above issues within the stipulated time and proceed with the works . drought prone area can be identified and planning of alignment can be made so as to benefit the deficit
- vi. **Interpolation:** spatial variation of any water related aspect such as rainfall, surface water, etc could be interpolated using GIS. Various interpolation techniques used are natural neighborhood, krigging, etc which are provided by GIS. For instance, spatial variation of seasonal rainfall can be interpolated over a region to get an overview of rainfall deficit and excess regions
- vii. **Network analysis:** the other more specialized spatial analysis functions provided by GIS are the network routines. These routines were basically developed for transportation planning and allocation analysis. Shortest route and least cost path analysis are common example of network functions. Canal alignment can be finalized using this technique. Optimum and shortest possible option can be determined before execution. Using the network routines, it is possible to make an analysis of the movement from one location to another. Inputs to routine are the river network configuration, source of river (u/s end), outlet of river and constrain upon the movement of the resources across the network. Transport of water through a system of link canals can be modeled by network functions. Alignments of canal, reservoir projects and water used for command area and domestic purpose en route of the canal. Visibility analysis can be made using Network analysis capabilities of GIS

IV. OBSERVATION OF STUDY AREA

1. GEOGRAPHY AND GEOLOGY

Amravati, Akola and Buldhana area are situated at the foot slope of Satpuda, Tapi stream ascends in Madhya Pradesh and streams east to west at the Border. Purna waterway is a noteworthy tributary of Tapi ascends in M.P. at first streams north south then streams west wards upto conversion of Tapi. Wardha waterway additionally ascends in M.P. streams north south then turns east west upto Upper Wardha extend then streams north south along the fringe of western Vidarbha. There is a presence of "Achalpur Fault" between the western streaming line of Purna Wardha waterways and Satpura foot slopes. The alluvial of pebble,sand, residue , lime and Kankar is filled in this blame. In this way this range along the blame is rich of under ground water which is called buzzada zone. The waterway Wardha is streaming closer to this buzzada zone henceforth framed all around depleted track however waterway Purna streams on plain level and is far from the buzzada zone subsequently sedimentation occurred. Furthermore a colossal keep running off from Chikhaldara slopes arranged on high elevation got entered in the ocean like profound Achalpur blame. The

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method of salt development held alike in the Arabic ocean. The salts collected in plain sediment valley. Along these lines all around depleted soil track i.e. buzzada zone and non depleted soil tract i.e. saline tract are framed.

2. PROBLEMS IN THE STUDY AREA

A. IRRIGATION BACK LOG

The districtwise irrigation backlog of the region is increasing.

District	Irrigation Backlog		
	Dandekar Samiti In thousand Hec.	Stearling Committee In thousand Hec.	Latest Committee In thousand Hec.
Amravati	219	159	118
Akola	181	150	54
Washim			57
Buldhana	168	125	109
Yeotmal	158	89	36

The govt. of Maharashtra Irrigation Deptt. conveyed the governor of Maharashtra that the irrigation backlog is irremovable due to feasible sites are not available. This is happened due to 22393 Sq.Km spread area is saline track. It is presumed that irrigation in saline track may increase logging problem. The procurement of the material for construction is longer hence the projects becomes in-feasible. Since the plain area ideal sites are not available. Suitable foundation is not available. According to water account sufficient water is not available. Therefore the whole region is seriously facing the following problems.

- 1) Over exploitation problems in Warud Taluka.
 - 2) Water scarcity in Akola city 2005 plan to carry water from Upper Wardha Project.
 - 3) Replacement of Cotton by sowing 185% soyabean in Saline tract.
 - 4) Increasing deaths due to mal nutrition in Melghat.
 - 5) Suicides of farmers.
- To overcome the above problem inter river diversion are necessary to be taken

B PROBLEMS OF MELGHAT - Geographically this area is mountainous. Culturable area is less due to vast spread area covered under forest and wild sanctuary. Dec to scanty irrigation facilities they have to pick up the benefit of monsoon rains for kharif crops which is feeding support for whole year. Most of all the house members got engaged in Kharif season. Therefore they are unable to take care of their hungry and deceased child property. In some regions like Doma Katkumba there are member of small dams constructed by the local sector. Peoples of Melghat are of irrigation mentality. Wheat production of this area stood first in the whole district. Deaths due to malnutrition are also controlled. therefore the provision of irrigation facility in this area is a must.

C SALINE TRACT - Around 10% zone of the Purna Valley secured undersaline track along both the flanks of Purna waterway. The range of Amravati region around 1113 Sq.km, Akola area , 20637 Sq.km. what's more, Buldhana area 643 Sq.Km. inside 546 towns secured under saline tract. According to Geological report 98 water shades are secured under saline tract. According to Geolocial history greety alluvial conveyed from the mountains is topped off in the Achalpur blame zone. Finesilt particles are tossed route through the greety alluvial zone i.e. Buzzada zone. At the magma ejection time overwhelming stretch of Chikhaldara mountain causes Achalpur blame. Particles shaping technique as held in the Arabic ocean additionally, occurred in the flawed zone and frame the salts which is tossed downstream along the fine residue particles. In this track 18% shallow land, medium dark cotton soil 35%, 17% profound dark cotton soil and around 45% profound silty soil are framed. Seepage limit of this dirt is less. All the

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development material are to be acquired from long separation. Squander grounds are shaped by logging because of abundance water system. Subsequently the dams can not be developed around there. In droughts foundation of cotton extended . In the substantial downpours logging happens consequently trim yield decreases.

3. MORPHOMETRIC ANALYSIS OF A LOWER WARDHA RIVER

The review region is a piece of lower Wardha stream of Wardha River bowl, lies between 200 16' 00" N to 200 35' 00"N scope and 780 14' 00" E to 780 38' 00" E longitude with a range around 781.84 km² and whole review zone has been further separated into sub-watersheds,. It is shrouded in the Survey of India (SOI) toposheet numbers 55 L/2, L/3, L/6. L/7, L/11 and L/12 on 1:50,000 scale in Yeotmal and Wardha District Maharashtra region, India and shaping a piece of the hardrock territory. The waste system indicates dendritic to sub-dendritic example and is non-lasting in nature. Poor soil cover, scanty vegetation, flighty precipitation and absence of soil dampness portray the region for most piece of the year. Repeating dry season combined with increment in groundwater misuse brings about decrease the groundwater level. For nitty gritty review we utilized Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) information for planning Digital Elevation Model (DEM) and slant maps, Geographical data framework (GIS) was utilized as a part of assessment of direct, areal and help parts of morphometric parameters. After then topology working of the waste layer in GIS programming, from these parameters different seepage qualities are computed, for example, bifurcation proportion, seepage thickness, stream recurrence circulatory proportion, and extension proportions for bowl development considers. The comprehension of streams in a seepage framework constitutes the waste example, which thus duplicates for the most part auxiliary/lithologic controls of the basic rocks. The advancement of stream portions in the bowl zone is pretty much influenced by precipitation. The morphometric parameters are processed utilizing Arc Map 10.2 variant GIS programming. It is presumed that remote detecting and GIS have been ended up being proficient instruments in waste outline and updation. Help proportion demonstrates that the release capacity of these watersheds is high and the groundwater potential is pitiful. These reviews are to a great degree helpful for arranging water collecting and watershed administration. Remotely detected high spatial determination information together with geographical information based examination strategies, have turned out as exceptionally powerful apparatus to comprehend and deal with the regular assets. It gives the close continuous and exact data identified with unmistakable geographical arrangement, landforms and helps in recognizable proof of waste channels, which are modified by regular strengths and human exercises. GIS is a compelling apparatus to break down spatial and non-spatial information on waste, topography, landforms parameters to comprehend their interrelationship. Bowl morphometry is a methods for numerically breaking down or scientifically evaluating different parts of seepage channel and its attributes that can be measured for correlation which incorporates, the number, length, waste thickness and bifurcation of waterways and additionally shape, zone, alleviation and incline of the bowl.

5. RESULTS AND DISCUSSIONS

A. DEVELOPMENT OF COMMAND AREA AND MORPHOMETRY

Morphometry is the estimation and scientific examination of the arrangement of the earth surface, shape and measurements of its landforms. The morphometric examination is helped out through estimation of direct, areal and alleviation parts of the bowl and slant. The estimation of different morphometric parameters in particular stream arrange, stream length (Lu), mean stream length (Lsm), stream length proportion (RL), bifurcation proportion (Rb),mean bifurcation ratio(Rbm), help proportion (Rh) waste thickness (D), stream recurrence (Fs) seepage fixture (Rt), from component (Rf), circulatory proportion (Rc), prolongation proportion (Re) length of overland stream (Lg) has been done and the information are introduced in Table 1 .

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Sr. No.	Morphometric Parameters	Formula	Reference
1	Stream Order	Heirachial rank	Strahler (1964)
2	Stream Length(Lu)	Length of the Stream	Horton (1945)
3	Mean Stream Length (Lsm)	$L_{sm} = \frac{L_u}{N_u}$ Where, L_{sm} = Mean Stream Length; L_u =Total Stream Length of order 'u'; N_u = Total no. of stream segments of order 'u'	Schumn(1956)
4	Stream Length ratio (RL)	$RL = \frac{L_u}{L_{u-1}}$ Where, RL =Stream Length ratio; L_u =Total stream length of the order 'u'; L_{u-1} =The total stream length of its next order	Horton (1945)
5	Bifurcation ratio(R_b)	$R_b = \frac{N_u}{N_{u+1}}$, Where, R_b = Bifurcation ratio N_u =Total no. of stream segments of order 'u' N_{u+1} =Number of segments of the next, higher Order	Schumn(1956)
6	Mean Bifurcation ratio	R_{bm} =Average of Bifurcation ratios of all orders	Strahler(1957)
7	Relief ratio(R_f)	$R_h = \frac{H}{L_b}$ Where, R_h = Releif ratio, H = Total Relief (Relative Relief) of the basin (km), L_b =Basic length	Schumn(1956)
8	Drainage Density (D)	$D = \frac{L_u}{A}$, Where, D = Drainage Density L_u =Toatl stream length of all orders, A = Area of the basin(km^2)	Horton (1945)
9	Stream Frequency(F_s)	$F_s = \frac{N_u}{A}$ Where, F_s = Stream Frequency, N_u =Toatl no.of streams of all orders, A = Area of the basin(km^2)	Horton (1932)
10	Drainage Texture(R_t)	$R_t = \frac{N_u}{P}$ Where, R_t =Drainage Texture, N_u =Total no.of streams of all orders, P =Perimeter(Km)	Horton (1945)
11	Form Factor(R_f)	$R_f = \frac{A}{L_b^2}$ Where, R_f =Form Factor, A =Area of the basin(km^2), L_b^2 = Square of Basin length	Horton (1932)
12	Circulatory Ratio (Rc)	$R_c = \frac{4 \cdot \pi \cdot A}{P^2}$ Where , R_c =Circulatory ratio, π = π value i.e., 3.14 A = Area of the basin(km^2), P^2 =Square of the	Miller(1953)

Table 1: Formulae adopted for computation of Morphometric parameters

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Stream length (Lu)

The length of stream system has been measured utilizing GIS strategies. Stream length is measured independently for each stream arrange and those has been processed in view of the law proposed by Horton (1945) for every one of the watersheds of the review territory. Typically the aggregate length of stream section is most extreme for the principal arrange streams and reductions as the stream arrange increment. In the present case, watershed 2 (Chakravi) and watershed 3 (Pim) demonstrate variety from general perception (Table 2). This might be because of streaming of streams from high elevation, change in shake sort and tolerably soak slants and likely inspire over the bowl (Singh and Singh, 1997; Vittala et al., 2004 and chopra et al., 2005). The aggregate total of stream lengths of watershed V is bigger than watershed I to IV plainly showing more infiltration in the watershed I to IV.

Mean Stram Length

Mean stream length (Lsm) is a trademark legitimately identified with the waste system parts and its related bowl surfaces. After calculation It is seen that, Lsm values show variety from 0.67 to 24.15.

Bifurcation proportion (Rb)

The term bifurcation proportion (Rb) is utilized to express the proportion of the quantity of floods of any offered request to the quantity of streams in the following higher request (Schumn, 1956). The Bifurcation proportions typically run in the vicinity of 3.0 and 5.0 for bowls in which the geologic structures don't bend the seepage design.

Alleviation proportion

The most extreme help to even separation along the longest measurement of the bowl parallel to the rule seepage line is named as alleviation proportion. In the review region, the estimations of help proportion are extending from 7.02 to 10.17

Waste thickness (Dd)

It is measured as an aggregate of the channel lengths per unit territory and acquired by partitioning the aggregate stream length by aggregate zone of the bowl. Waste thickness is controlled by the sort of arrangements in the bowl regions with impenetrable developments will have higher seepage thickness than those with pervious arrangements The seepage thickness in watersheds of the review range demonstrates variety from 0.84 to 4.30 for every km² recommending low to direct waste thickness

Stream recurrence/Channel recurrence

The aggregate number of stream fragments of all requests per unit zone is known as stream recurrence. It is noticed that the estimations of Fs change from 0.67 to 4.38

Waste surface

It is the aggregate number of stream arrangement of all requests per border of that territory. The estimations of waste surface proportion of study region shift from 1.99 to 9.41

Shape calculate

Shape element might be characterized as the proportion of the zone of the bowl and square of bowl length. The estimation of frame component would dependably be more noteworthy than 0.78 for a flawlessly round bowl. Littler the

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estimation of shape component, more extended will be the bowl. It is noticed that the Rf values differ from 0.15 to 0.98. The qualities in every one of the watersheds demonstrate that they are prolonged to sub-roundabout fit as a fiddle.

Circulatory proportion

The circulatory proportion is predominantly worried with the length and recurrence of streams, geographical structures, arrive utilize/arrive cover, atmosphere, help and incline of the bowl. It is the proportion of the region of the bowls to the zone of circle having an indistinguishable circuit from the edge of the bowl. In the review territory, the Re qualities are running from 0.36 to 0.70. All watersheds are observed to be extended to sub round fit as a fiddle.

Lengthening proportion

Lengthening proportion is the proportion between the width of the hover of an indistinguishable region from the waste bowl parched the most extreme length of the bowl. The extension proportion estimations of the watersheds differ from 0.43 to 1.11 .

Length of overland stream

The length of overland stream (Lg) roughly equivalents to half of equal of waste thickness. It is the length of water over the ground before it gets moved into clear stream channels. The Lg estimations of the review territory demonstrate variety from 0.11 to 0.58. The estimations of Lg are low in all watersheds demonstrating general high alleviation in range.

B ENROUTING OF WARDHA RIVER BY USING ERDAS

Out of five, watersheds 1(Kotha) and 4(Savar) have add up to 4 (1 to 4) stream arranges each while watershed 2 (Chakravati) and watershed 3 (Pim) has five stream arranges each (1 to 5) and the watershed 5 (Ralegaon) has add up to 6 stream orders (1 to 6).

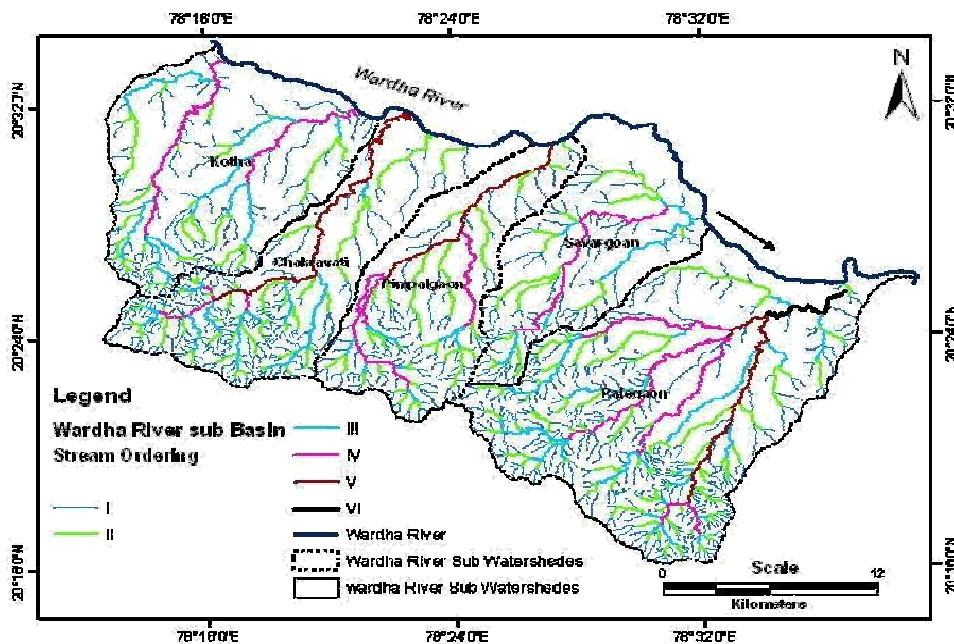


FIG NO 05 ENROUTING OF WARDHA RIVER BY USING ERDAS

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VI. CONCLUSION

The quantitative investigation of morphometric parameters is of enormous utility in stream bowl assessment, watershed examination for soil and water protection and normal asset administration at smaller scale level. The morphometric parameters assessed utilizing GIS comprehended different territory parameters, for example, nature of bedrock, invasion limit, overflow, and so forth. The review uncovers that seepage system of the bowl is basically dendritic sort demonstrative of homogeneity in surface and absence of auxiliary control. The seepage bowl is as a rule as often as possible chose as a perfect geomorphological unit. Watershed as a fundamental unit of morphometric investigation has put on significance in light of its topographic and hydrological solidarity. Waste thickness and stream recurrence are the most helpful basis for the morphometric order of seepage bowls which absolutely control the overflow design, silt yield and other hydrological parameters of the seepage bowl. The seepage thickness in watersheds of the review zone indicates variety from 0.84 to 4.30 for each km² recommending low to direct waste thickness eventually portraying significantly penetrable sub-soil all through the review range. It is noticed that the Rf values in every one of the watersheds show that every one of the watersheds are pretty much prolonged to sub-roundabout fit as a fiddle. The estimations of Lg are low in all watersheds demonstrating general impressively high alleviation in region. Alleviation proportion shows that the release ability of these watersheds is high. ASTER information gives the chance to separating rise data from nadir and toward the back pictures. The synchronous along-track stereo information kills radiometric varieties brought about by multi-date stereo information securing while enhancing picture coordinating execution and it is valuable for geomorphological mapping particularly at medium scales.

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