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Recognizing Outlet Points Description on Watershed in Ottanchatram Taluk by GIS

R. Chandramohan, N. Siva Vignesh

Abstract*: Groundwater becomes mandatory in day-to-day routine life without any limitation; we were using groundwater for irrigation, domestic and industrial needs. Unlimited groundwater pumping has decreased groundwater levels in some areas of the review region. The purpose of this document is to present the description of the outlet points of the river basin. This document explains the method of revealing the DEM-based basin outlet point. With Geographic Information System (GIS) support, river boundary basins and drainage areas are discharged into an area where a pumping station can be installed in the Ottanchatram district of Dindigul, Tamilnadu. To provide easy flow of wastewater to a treatment plant or river basin. Using an environmental GIS hydrology module, the watersheds for Ottanchatram taluk have been illustrated. The result of this experiment indicates that this method can effectively solve the problem of parallel routes and the main channel out of its natural position. In flat, mountain and landscape areas this method can reveal pour point by using DEM.

Keywords: Outlet points, pour points, Watershed, Fill, Accumulation, GIS, Ottanchatram taluk

I. INTRODUCTION

A basin is a low lying area that drains water and other material transported from surface water to a common outlet such as concentrated drainage. Other common terms for a basin are the river basin, the watershed and the area that contributes. The contributing area is generally defined as the total area contributing to the flow of water to a particular outlet, also called a pour point or outlet points. An outlet, or pour point, is the point where water leaves an area. It is the lowest point along the boundary of the basin, Manish and Chapna (2013). Cells in the source raster are used as sliders beyond which the contributing area is determined. Source cells can be features such as dams or flow meters for which you want to determine the characteristics of the contributing area. Adjusts the "slope" of a watershed in the cell with the highest flow accumulation within a neighborhood. Avoid accidental creation of small basins on the slopes of the canal. The outlet point is the point on the surface where the water comes out of an area. It is the lowest point along the boundary of a basin.

II. MATERIALS AND METHODS

The methodology for identifying pour points has illustrated in “Fig 1”.

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***** Correspondence Author
Dr. R. Chandramohan*, Department of Civil Engineering, RVR & JC College of Engineering, Guntur, India. Email: cmindia2020@gmail.com.
N. Siva Vignesh, Geo analyst, ARS Geomatics, Dindigul, Tamil Nadu, India. Email: sivavignesh.n@gmail.com.

The DEM satellite image was obtained from Cartosat – I satellite image[1] - [4]. By using GIS raster tool the study area was clipped for further analysis has illustrated in “Fig 2” [5] - [8]. By using spatial analysis tool Fill, Flow direction and Flow accumulation of the study area has obtained has shown in “Fig 3” [5] – [6]. With the help of flow accumulation tool the outlet points of the Watershed basin of Ottanchatram taluk has created.

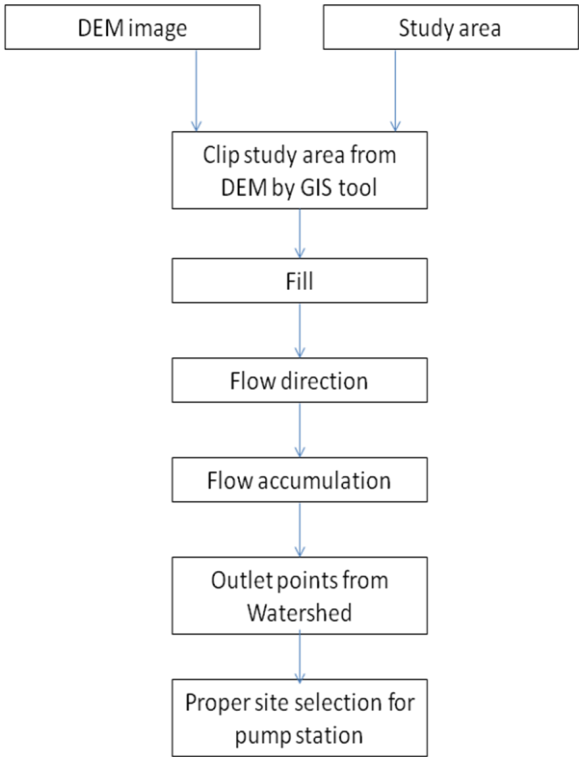

Fig. 1. Methodology for identifying Pour points by using DEM and GIS

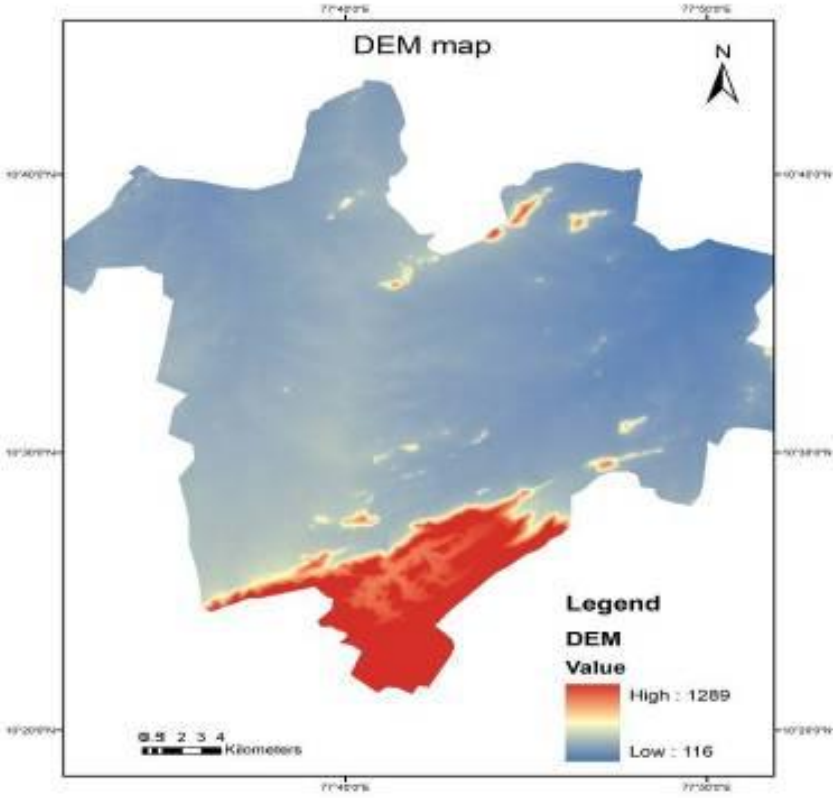

Fig. 2. Digital Elevation Model

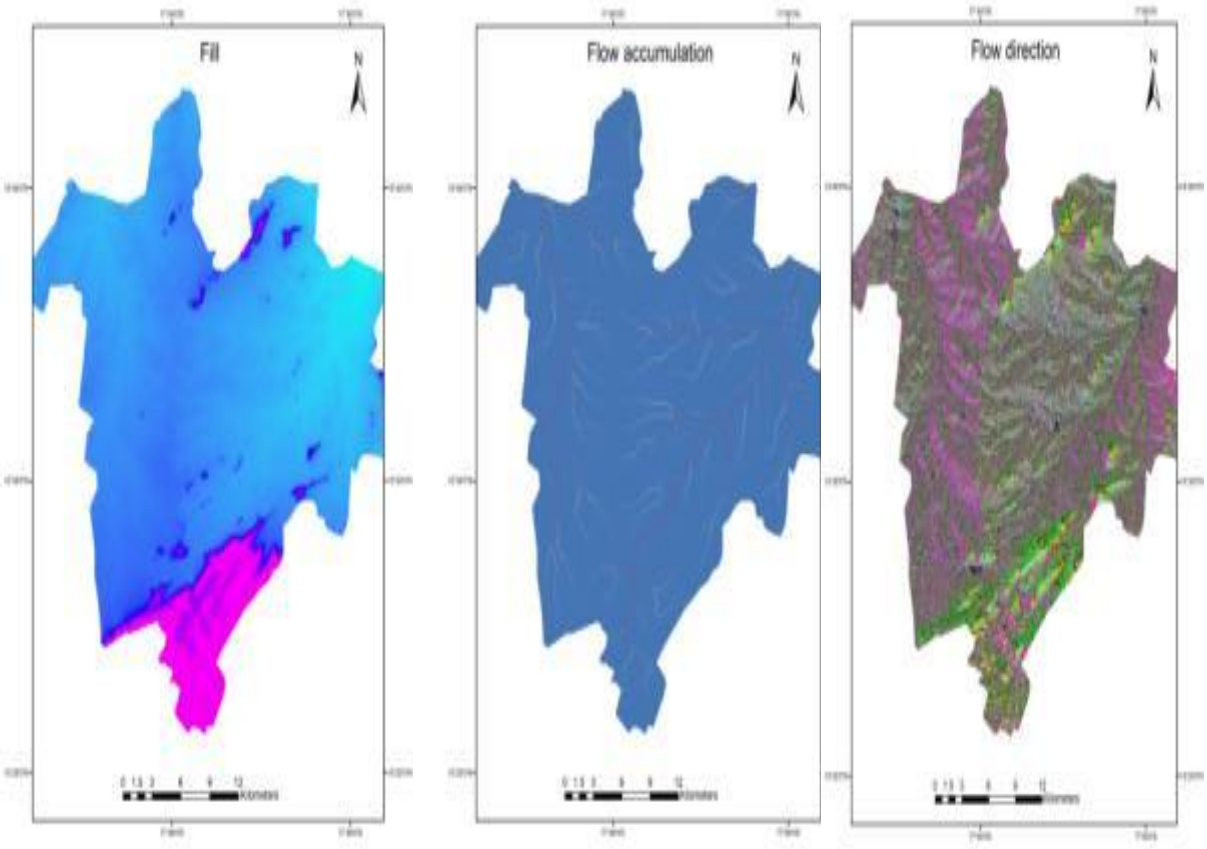

Fig. 3. Fill, Flow direction, Flow accumulation map

III. RESULTS AND DISCUSSION

After obtaining fill, flow direction, flow accumulation with the help of GIS tool Outlet points of watershed of the study region has obtained and it has shown in "Fig 4". Totally, there are 220 pour points where available in that area. Table-I gives few pour points coordinates details for the pour points. By using this coordinates we can install the pump station.

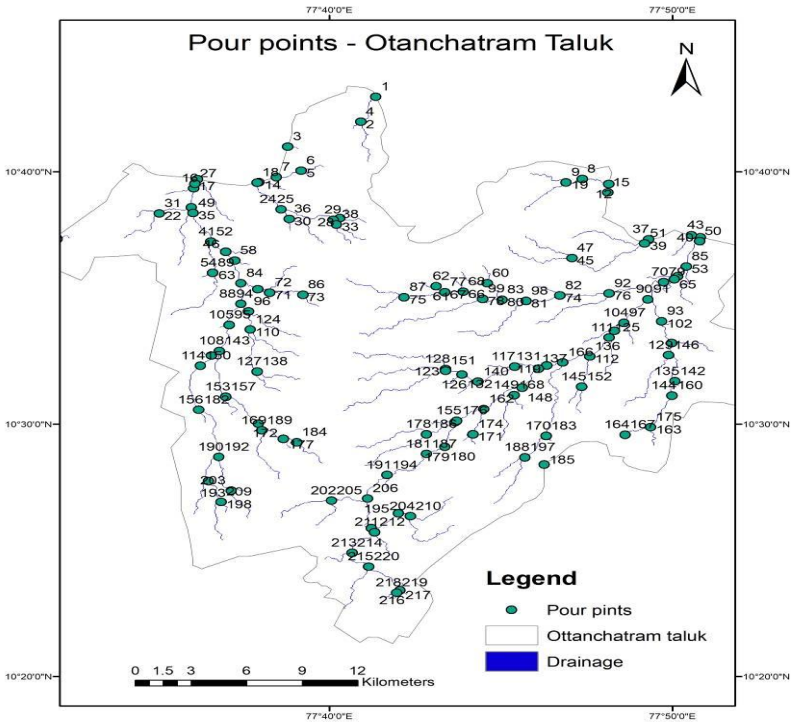

Fig. 4. Pour points map

Table-I: Coordinates of Pour points

Pour point ID	POINT_X	POINT_Y
1	77.689	10.716
2	77.682	10.700
3	77.647	10.683
4	77.682	10.700
5	77.653	10.668
6	77.653	10.668
7	77.641	10.663
8	77.789	10.662
9	77.782	10.660
10	77.789	10.662
11	77.603	10.662
12	77.802	10.659
13	77.601	10.659
14	77.633	10.660
15	77.802	10.653
16	77.601	10.656
17	77.601	10.656
18	77.632	10.660
19	77.782	10.660
20	77.600	10.643
21	77.600	10.643
22	77.584	10.639
23	77.672	10.636
24	77.643	10.642
25	77.643	10.642

26	77.669	10.635
27	77.601	10.659
28	77.672	10.636
29	77.669	10.635
30	77.647	10.636
31	77.584	10.639
32	77.535	10.623
33	77.670	10.632
34	77.847	10.623
35	77.601	10.639
36	77.647	10.636
37	77.822	10.622
38	77.670	10.632
39	77.820	10.619
40	77.846	10.621
41	77.609	10.621
42	77.616	10.614
43	77.843	10.625
44	77.535	10.622
45	77.784	10.610
46	77.616	10.614
47	77.784	10.610
48	77.621	10.608
49	77.601	10.639
50	77.846	10.621
51	77.820	10.619
52	77.609	10.621
53	77.840	10.604
54	77.610	10.600
55	77.836	10.598
56	77.836	10.598
57	77.834	10.596
58	77.621	10.608
59	77.743	10.593
60	77.743	10.593
61	77.719	10.591
62	77.719	10.591
63	77.624	10.593
64	77.632	10.589
65	77.834	10.596
66	77.732	10.588
67	77.723	10.587
68	77.732	10.588
69	77.632	10.589
70	77.829	10.594
71	77.638	10.587
72	77.638	10.587
73	77.654	10.586
74	77.779	10.585
75	77.703	10.584
76	77.803	10.586
77	77.723	10.587
78	77.741	10.583
79	77.829	10.594
80	77.751	10.582
81	77.762	10.581
82	77.779	10.585
83	77.751	10.582
84	77.624	10.593

85	77.840	10.604
86	77.654	10.586
87	77.703	10.584
88	77.624	10.579
89	77.610	10.600
90	77.821	10.583
91	77.821	10.583
92	77.803	10.586
93	77.828	10.568
94	77.624	10.579
95	77.618	10.566
96	77.628	10.574
97	77.810	10.567
98	77.762	10.581
99	77.741	10.583
100	77.628	10.574
101	77.805	10.562
102	77.828	10.568
103	77.805	10.562
104	77.810	10.567
105	77.618	10.566
106	77.833	10.554
107	77.833	10.554
108	77.613	10.548
109	77.609	10.545
110	77.628	10.563
111	77.803	10.557
112	77.793	10.545
113	77.772	10.539
114	77.604	10.539
115	77.609	10.545
116	77.780	10.541
117	77.757	10.538
118	77.768	10.537
119	77.772	10.539
120	77.892	10.537
121	77.892	10.537
122	77.723	10.536
123	77.723	10.535
124	77.628	10.563
125	77.803	10.557
126	77.731	10.533
127	77.632	10.535
128	77.723	10.536
129	77.831	10.546
130	77.739	10.528
131	77.757	10.538
132	77.731	10.533
133	77.901	10.526
134	77.905	10.526
135	77.834	10.528
136	77.793	10.545
137	77.768	10.537
138	77.632	10.535
139	77.901	10.526
140	77.739	10.528
141	77.760	10.524
142	77.834	10.528
143	77.613	10.548

144	77.833	10.519
145	77.789	10.525
146	77.831	10.546
147	77.878	10.511
148	77.760	10.524
149	77.756	10.519
150	77.604	10.539
151	77.723	10.535
152	77.789	10.525
153	77.616	10.518
154	77.742	10.510
155	77.729	10.502
156	77.603	10.509
157	77.616	10.518
158	77.632	10.500
159	77.728	10.501
160	77.833	10.519
161	77.632	10.500
162	77.742	10.510
163	77.823	10.498
164	77.810	10.493
165	77.728	10.501
166	77.780	10.541
167	77.810	10.493
168	77.756	10.519
169	77.634	10.496
170	77.772	10.492
171	77.736	10.493
172	77.644	10.490
173	77.651	10.488
174	77.736	10.493
175	77.823	10.498
176	77.729	10.502
177	77.644	10.490
178	77.714	10.493
179	77.723	10.485
180	77.723	10.485
181	77.714	10.480
182	77.603	10.509
183	77.772	10.492
184	77.651	10.488
185	77.771	10.473
186	77.714	10.493
187	77.714	10.480
188	77.762	10.478
189	77.634	10.496
190	77.613	10.478
191	77.695	10.466
192	77.613	10.478
193	77.619	10.456
194	77.695	10.466
195	77.685	10.451
196	77.608	10.463
197	77.762	10.478
198	77.614	10.449
199	77.700	10.441
200	77.608	10.463
201	77.700	10.441
202	77.668	10.449

203	77.619	10.456
204	77.706	10.439
205	77.668	10.449
206	77.685	10.451
207	77.687	10.431
208	77.687	10.431
209	77.614	10.449
210	77.706	10.439
211	77.689	10.429
212	77.689	10.429
213	77.678	10.415
214	77.678	10.415
215	77.686	10.406
216	77.701	10.390
217	77.701	10.390
218	77.699	10.389
219	77.699	10.389
220	77.686	10.406

IV. CONCLUSION

Ottanchatram taluk DEM data is used to get the pour point details, where pump station could be installed and its provide the shortest route of sewerage into a treatment plant or a river basin. In this paper, appropriate longitude and latitude details of pump stations for Ottanchatram Taluk, was shown in Table 1, which lead to install pump station in exact coordinate. The result of this study specify that by constructing pump station in pour points can solve the difficulty of parallel stream and channel which leave its natural position.

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AUTHORS PROFILE

Dr. R. Chandramohan, I completed my PhD in REMOTE SENSING and GIS in 2018 at Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai and completed my M.Tech REMOTE SENSING in 2008 at PSNA College of Engineering and Technology, Dindigul. I have 8 years of teaching experience and 1 year of industrial experience. My PhD thesis work is related to groundwater studies. As of now I have published 5 Scopus indexed journal, 4 conferences, and published 5 books in Remote sensing and GIS domain. My publication reflects my research work like groundwater studies like groundwater potential zone, Geophysical method, groundwater fluctuations, groundwater artificial recharge zone and structures, Land use Land cover classification, and Land Information System and etc.

N. Siva Vignesh, I have finished my M.Tech REMOTE SENSING(Gold Medal) and BE Civil Engineering at College of Engineering, Guindy. Master's Thesis on Mapping of Groundwater contaminate vulnerable zones using DRASTIC approach (Study Area : Amaravathi New capital Andhra Pradesh). The whole area is classified as per susceptibility to pollution.

Project done at Deltaic Regional Center, National Institute of Hydrology - Kakinada.
Published 6 Scopus indexed journals and 4 books in Remote sensing and Geographical Information System (GIS) domain. My research works mainly covers groundwater studies such as groundwater potential zones, artificial recharge zones, groundwater fluctuations and urban morphology such as Land use and Land cover change detections which reflects in my publications.