

Monitoring Proposal of New Road In Block R Udayagiri, Gajapati

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ABSTRACT

Road networks are an important factor in the economic growth of any country. It is important to develop planned and sustained expansion and adequate maintenance of these networks to ensure quality connectivity between the different regions of the country. In India, the importance of a good road system for the development of the nation was recognised very early. In order for the rural people to have access to markets, healthcare facilities, and educational institutions, a rural road network must be established. Lack of accessibility is seen as a key perpetuating factor of poverty, so rural roads serve as gateways to poverty alleviation. Lack of access is considered a major factor in perpetuating poverty, so rural roads serve as gateways to poverty alleviation. In this study, the whole process revolves around monitoring and proposing potential new roads for the R-Udaigiri block area in Gajapati district, from which statistics can be produced from which road plans for the new R-Udaigiri block can be proposed. For the overall study, the data year considered is 2022. The monitoring is mainly focused on statistical analysis of road length and network flow across blocks until 2022. The ultimate goal of solving this system is to provide road links within the block with adequate maintenance levels to serve as much of the population as possible.

KEYWORDS

1. PMGSY
2. ARC GIS
3. Google Earth
4. Digitization
5. KML
6. U.T.M Projection
7. W.G.S 1984
8. C.B.D
9. RUdaygiri

INTRODUCTION

The district of Gajapati bears the name of Maharaja Sri Krushna Chandra Gajapati Narayan Deo, the first prime minister of the state of Odisha and the former Raja Sahib of the Paralakhemundi estate, who is credited with helping to establish a separate province for Odisha and include the Paralakhemundi estate within it..

R.udayagiri is a town in the Indian state of Odisha's Gajapati District, R.udayagiri Tehsil. It is located 5 KM south of Paralakhemundi, the district headquarters. The Tehsil headquarters are there. R.Udayagiri's postal head office is located there, and its pin code is 761016. The nearest villages to R.udayagiri include Abarsing (10 KM), Nuagada (14 KM), Mahendragada (17 KM), and Marlaba (17 KM). R. Udayagiri is flanked by the tehsils of R. Udayagiri to the east, Gumma to the south, Rayagada to the south, and Gunupur to the west. The cities that are close to R.udayagiri include Gunupur, Parlakhemundi, Ichchapuram, and Berhampur.

This survey is conducted through R Udaigiri. The block is in the northwest of the county. Satellite imagery is first examined in this block. Survey year for satellite imagery is 2022. First, the block begins the road mapping portion of the village boundaries and performs a trace of the existing roads. First, the road network of R-Udaigiri block such as NH, SH, MDR, ODR, PMGSY and other roads connecting different villages of the block should be mapped with road dimensions and statistical observations. New road proposals will be introduced where road connections are lacking inside the block. Due to the hilly and forested terrain of the Gajapati district, there are inland villages where the mainframe road network is still pristine. Using GIS software and various topographical and spatial data to monitor the existing road network until 2022, introduce new roads within the block to improve transport and growth, and the ongoing development growth of Gajapat district increase the rate.

OBJECTIVE

The objective of my study is to

- Identification & tracing of PMGSY and other roads within the Rudaygiri block boundary.
- Finding out the remaining road network after tracing major roads including PMGSY roads, village roads and other roads.
- Find out the existing road connectivity in R udaygiri district by the help of official data collected from Panchayat Office as well as the satellite images so that new road connectivity to the villages having no access to their locality can be proposed.
- The area of land required and the running length for the proposed roads is to be calculated from my survey.

METHODOLOGY

- AOI (Area of Interest) mapping.
- 2022 data tracking and mapping and statistical interpretation of different road types.
- Statistical and dimensional analysis of existing road network plans.
- Proposed new road plan including villages and main roads.
- Statistical design and area allocation for new street plans.

Data to be used

Satellite imagery:

Artificial Satellites are one of the key elements that helped our generation to study our Earth in various aspects. It may be ocean observation, forest mapping, earth monitoring, or navigation. Satellites in their orbit continuously give images of Earth that are being used in various industries. Satellite images can be obtained in various resolutions. These images go through various processing techniques before being available for general use.

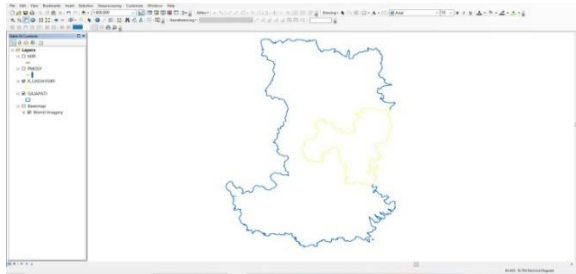
Tehsil authenticated village boundary

The first step in any planning is to acquire authenticated boundaries from authorised organisations. In our country the organisation which is responsible for this task is Tehsil. It is the responsibility of tehsil to keep records and to provide those data to respective parties. For updating of land records in the country, tehsil authorities along with other governmental organizations perform various survey for the accuracy of these records. In present time all these records are being kept in digital formats.

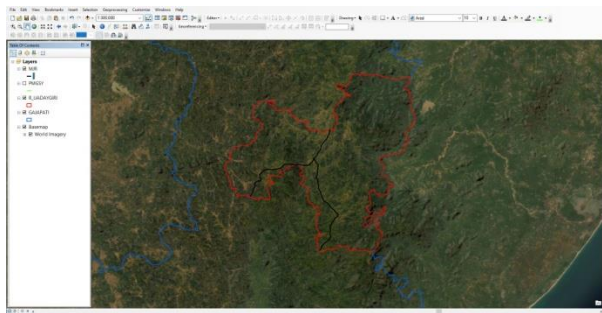
Google earth (to markout important features)

Google Earth is a tool that allows users to see the entire Earth in their finger tip. Previously it is known as Keyhole EarthViewer. A user can view both 2D and 3D representation of Earth. This is basically based on satellite imagery that are collected from various satellites. Google Earth enables to search for any place on earth. Users can, zoom, pan, rotate, and tilt the view of the Earth. It also enables users to create new data in form of layers (point, path, polygon). It also offers to view historical satellite images. It saves data in KML(Keyhole Markup Language) file extension.

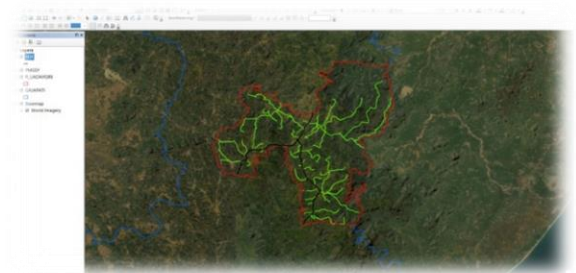
Analysis of Boundary Shape files over satellite image in ArcMap 10.3 Interface



Street tracking is done through 2022 satellite imagery. By digitizing with ArcGIS, different types of roads are tracked, such as district streets, PMGSY streets, Pucca, Kucha, and village streets such as sidewalks. Road features are mapped to polyline features in the 45 UTM projection. Analysis of Major Roads



Identification of Major Roads in R Udaygiri Block in ArcMap Environment using polyline shape file and various digitization tools.

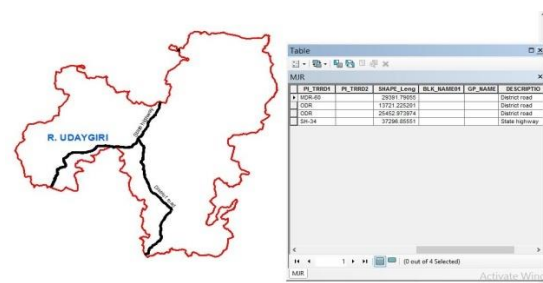


FROM THE MAPPING:

Major Roads Present Inside The Block Are

3 DISTRICT ROADS

1 STATE HIGHWAY



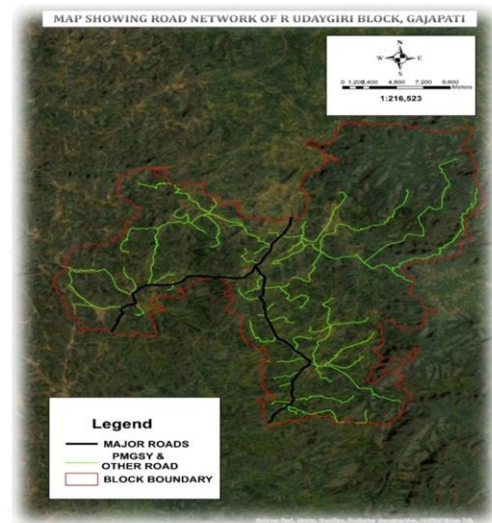
Geometrical Calculations were done using “Calculate Geometry” Tool in ArcMap within Attribute Table using coordinate system WGS1984 UTM Zone 45N.

MAJOR ROADS IN R UDAYGIRI BLOCK					
FID	Shape *	RD_type	PL_TTRD1	DESCRIPTION	SHAPE_Length
0	Polyline	4	MDR-60	District road	29391.79055
1	Polyline	4	ODR	District road	13721.2252
2	Polyline	4	ODR	District road	25452.97397
3	Polyline	3	SH-34	State highway	37296.85551
Total in Mtrs.					105862.8452

Total major roads including major district roads, other district roads & state highways within R Udaygiri boundary after calculation is 105862.8452 Mtrs. or 105.862 Kms.

Analysis of PMGSY & Other Roads

Identification & Tracing of PMSGY and other roads within the block boundary using ArcGIS 10.3.



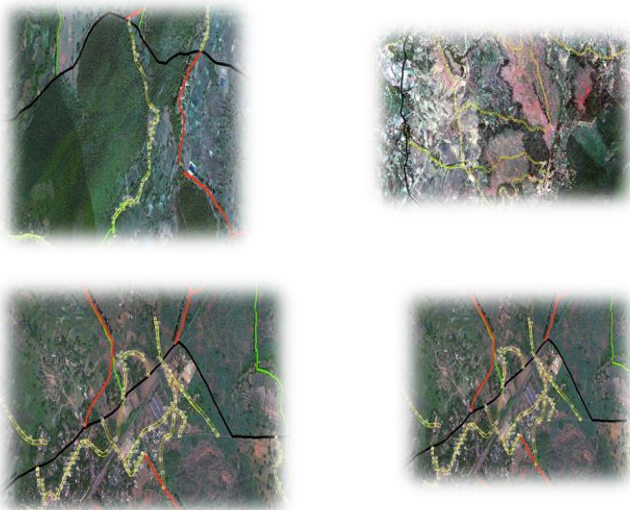
Street tracking is done through 2022 satellite imagery. By digitizing with ArcGIS, different types of roads are tracked, such as district streets, PMGSY streets, Pucca, Kucha, and village streets such as sidewalks. Road features are mapped to polyline features in the 45 UTM projection.

Proposal of new road plans with the villages and with major roads.

Selection of new roads for proposal of new roads are allotted to the presence of road network in that area as well as the road network density over the block. The road planning is done by using a software called GIS where the left out parts of the region are found out and the connectivity to that area is given by using digitisation technique.

The satellite imagery of worldview 2 is used for analysing the distance as well as for finalising the shape files. Villages are connected with that of polylines, which are later converted into polygons for creating the area quad falling out of new road. The area calculated is found calculating the plots involved in the acquisition. The whole process is carried out by keeping the satellite imagery of wv-2 natural colour composite and the the layout done involves the process of digitization and geometric calculation where the area of the plots are calculated for the newly added plots. The dimensions of the road is 12 meters and the type of road is pucca as it is an interlinking road plan. New additions of road can help increase in transportation as improvement of socio economic activities like Jobs of the area can rapidly increase the per capita income with respect to increase in the transportation the livelihood of the people of the area can be developed in a better way by which the development in the area will cause a rapid growth in the block.

Statistical design and area allotment of new road plan.



823.8025 ACRES OF LAND FOR NEW PROPOSAL, AND
7045 NO. OF PLOTS IN TOTAL

At first proposed roads to be traced on the satellite imagery using "Editing" feature in ArcMap software by considering various parameters. Then the plots on which these new roads are to be constructed, those plots should be mapped out from the tehsil approved revenue maps by vector digitization method. This process involves a variety of spatial techniques and methods. You will then need to perform geometry calculations on these roads and parcels using the Calculate Geometry function of your GIS software. Roads should be calculated in km and parcels should be calculated in acres.

NEW PLAN 5 STATISTIC 5			
ROAD NAME	LENGTH (KM)	ROAD NAME	LENGTH (KM)
1	3.815	59	1.237
2	0.001	60	0.741
3	0.117	61	0.288
4	0.013	62	0.102
5	0.381	63	1.695
6	1.165	64	0.327
7	0.125	65	3.048
8	0.101	66	0.813
9	0.538	67	0.811
10	6.48	68	1.847
11	4.913	69	1.452
12	2.223	70	0.6
13	4.537	71	0.959
14	5.622	72	0.252
15	0.062	73	3.895
16	2.318	74	1.244
17	0.679	75	0.448
18	0.191	76	0.436
19	2.912	77	1.949
20	1.977	78	1.171
21	1.911	79	1.587
22	0.272	80	0.347
23	0.28	81	3.954
24	0.692	82	1.789
25	0.613	83	3.204
26	0.761	84	1.427
27	1.27	85	0.846
28	2.651	86	0.255

29	4.39	87	2.242
30	0.577	88	0.219
31	0.654	89	1.166
32	1.828	90	0.592
33	1.534	91	0.53
34	2.374	92	0.845
35	1.048	93	0.742
36	1.559	94	0.676
37	1.011	95	0.99
38	3.079	96	1.269
39	2.09	97	0.313
40	0.281	98	0.127
41	3.584	99	2.042
42	1.187	100	1.832
43	4.909	101	2.973
44	2.587	102	1.384
45	5.858	103	0.925
46	0.861	104	2.145
47	2.834	105	2.259
48	0.568	106	0.783
49	0.433	107	0.127
50	0.693	108	0.918
51	0.199	109	1.748
52	1.201	110	0.428
53	1.616	111	0.764
54	2.46	112	1.284
55	0.281	113	0.299
56	1.674	114	0.266
57	1.741	115	0.601
58	0.511	TOTAL AREA	00.242

List of villages where new roads are to be proposed of R Udayagiri Block

SL.N O.	VILLAGE NAME.	HABITATION (COUNT)
1	Abarsing	550
2	Alara	53
3	Alising	391
4	Ambagan	216
5	Ameda	213
6	Anagan	207
7	Anasahi	342
8	Andharsingi	318
9	Anjaikana	183
10	Anjaraba	184

11	Antili	165
12	Antili	222
13	Anuguru	594
14	Anukumpa	416
15	Aradi	231
16	Arakhapada	157
17	Atarasing	922
18	Atilima	434
19	Badapur	232
20	Badapur	501
21	Bagari	253

22	Baghasingsahi	309
23	Bahadapada	295
24	Baharatampa	62
25	Bailapadara	240
26	Balisahi	139
27	Baraba	124
28	Baradanga	420
29	Bariamera	98
30	Bastariguda	452
31	Bayaguda	158
32	Belagam	4
33	Beleikuan	90
34	Betarasing	116
35	Betrasingi	457
36	Bhaliaganda	45
37	Bhaliasahi	337
38	Bhitaratampa	5
39	Bimanapur	160
40	Budhisila	120
41	Buripadar	319
42	Buruduguda	199
43	Burukapeta	141
44	Burusingi	265
45	Chadiapada	185
46	Chadiapada	97
47	Chelagada	1,668
48	Chheligarh	2,758
49	Dabaraguda	572
50	Dalimbapur	269
51	Damba	446
52	Dambadiha	335
53	Deraba	682
54	Deupala	3
55	Dhanabada	147
56	Dhepiriguda	135
57	Dolikata	70
58	Dumba	127
59	Duranga	143

60	Engarsing	48
61	Gadapadar	211
62	Gadara	631
63	Gamangapada	71
64	Gandili	72
65	Gandipadar	81
66	Gangapur	177
67	Ghatisahi	232
68	Gobindapur	56
69	Goli	384
70	Gotha	90
71	Guruda	209
72	J.B.-17	38
73	Jada	52
74	Jadapani	83
75	Jalara	542
76	Jamaguda	176
77	Jamukonia jungle block-157	14
78	janapada	198
79	Jang jang	117
80	Janisahi	62
81	Jarigidua	164
82	Jhadarandiva	230
83	Jhatikabadi J.B.No- 157	39
84	Jhola	171
85	Jhuntasahi	145
86	Jiranga	326
87	Joniamba	62
88	Jungle BlockNo-9	14
89	JungleBlock No-19	291
90	Jungleblock No-6	23
91	JungleblockNo-41	121
92	Kadamalli	87
93	Kaithadhepa	90
94	Kakatabandha	165
95	Kakili	188
96	Kamalapur	109

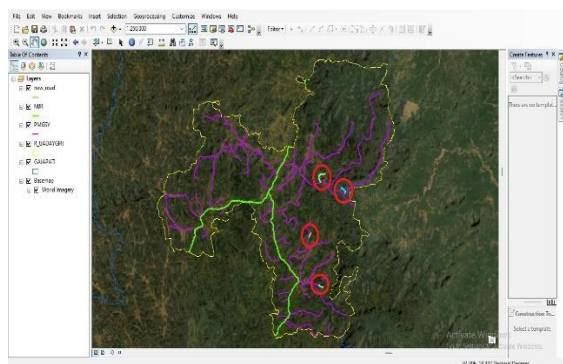
97	Kamalasing	91	135	Kurma	201
98	Kanakata	194	136	Kuruba	52
99	Kanchimal	297	137	Kurudamba	47
100	Kanda	132	138	Kurutala	173
101	Kandhadiha	111	139	Kusapalli	527
102	Kandulu	151	140	Lakhari	272
103	Kanikipadar	422	141	Lakijhol	2
104	Kanjamera	105	142	Lambaguda	85
105	Kankada	106	143	Lanja	180
106	Kankadaguda	465	144	Laphalanga	173
107	Kankarada	562	145	Lathar	358
108	Kapilipadara	79	146	Latingi	136
109	Karanjasahi	391	147	Lenge	354
110	Karanjasahi	97	148	Liaba	582
111	Katama	96	149	Libiriguda	459
112	Katangapada	177	150	Litiguda	169
113	Katarnisa	34	151	Luburusing	428
114	Kedipadar	585	152	Luhaba	153
115	Kendusing	177	153	Luhakhunti	162
116	Kere	280	154	Luhanagar	402
117	Keredanga	788	155	Luhasing	257
118	Ketunga	300	156	Machhaghara	142
119	Ketungpada	339	157	Mahendragada	2,195
120	Khaliasahi	30	158	Mahulapada	286
121	Khamarisahi	465	159	Majhisahi	119
122	Khamarnuasahi	54	160	Makapada	107
123	Khilanga	249	161	Malasindhaba	56
124	Khumbikhal	29	162	Mandalsahi	107
125	Kijang	222	163	Mandidi	592
126	Kirama	392	164	Mandima	78
127	Kisangapur	321	165	Manidhiha	36
128	Kodeda	159	166	Manikpur	548
129	Kristnapur	256	167	Marama	87
130	Kuanpada	261	168	Marlaba	214
131	Kudinda	112	169	Munigadiha	62
132	Kujapanga	332	170	Munigadiha	21
133	Kulapathar	85	171	Munisingi	229
134	Kumutipankal	72	172	Muri	199

173	Musadali	30	211	Polambasahi	180
174	N.Baradanga	421	212	Pujaribila	62
175	N.jhalarasing	1,405	213	Purunadiha	221
176	Nagidi	138	214	Purunapani	250
177	Naudipadara	116	215	Puspanga	562
178	Nidhigudi	728	216	Puturupada	362
179	Nuagada	2,823	217	Raibada	121
180	Nuagan	134	218	Ramagiri	56
181	Nuagan	240	219	Ramaguda	52
182	Nuagan	83	220	Ramapur	545
183	Nuagan	104	221	Ranalai	1,664
184	Nuasahi	162	222	Randiba	750
185	Ora	189	223	Rangamunda	311
186	Padamapur	234	224	Ratanga	9
187	Paikaantarada	657	225	Rebidi	559
188	Paikarai	342	226	Ringisingi	102
189	Palapur	603	227	Rogaisingi	468
190	Paleri	365	228	Rubal	74
191	Panasapadar	133	229	Rubudising	575
192	Paradhola	373	230	Rugudiguma	233
193	Paraji	175	231	Rumunda	305
194	Paribheta	408	232	Rupasingi	334
195	Parimal	757	233	Sabalada	144
196	Partipanga	225	234	Sailanga	660
197	Patangapadar	174	235	Saladasingi	204
198	Patapani	74	236	Salankui	112
199	Pateiguda	251	237	Salapjhola	53
200	Patilada	138	238	Sambalapur	784
201	Patrabasa	377	239	Saralapadar	282
202	Pedikapadar	175	240	Satar	262
203	Phatachanchada	538	241	Satyanagar	140
204	Pilisuguba	51	242	Sauraantarda	35
205	Pitakhari	77	243	Sialilati	903
206	Pitapanasa	125	244	Sikabadi	201
207	Podaguma	220	245	Simiri	136
208	Podasing	39	246	Sinising	165
209	Poipadara	75	247	Subalada	249
210	Poipani	146	248	Sugada	560

249	Suguba	268
250	Suluba	67
251	Sundaraba	761
252	Sundardanga	559
253	Sureikhamar	310
254	Tabarada	1,483
255	Tabaraput	178
256	Tai	122
257	Taila	132
258	Tamula	61
259	Tandarang	472
260	Tandiguda	687
261	Tangiasahi	216
262	Tangili	562
263	Taraba	315
264	Tarabanga	240

265	Tarabanga	133
266	Taramagada	107
267	Tataranga	361
268	Tedugu	142
269	Termenda	228
270	Tikamala	1,001
271	Tiligan	275
272	Tilikara	292
273	Tuburusingi	608
274	Tuburuva	239
275	Tuman	274
276	Tunguru	156
277	Uama	248
278	Udayaguda	311
279	Udayapura	394
280	Ukarasing	

Newly added roads over satellite imagery for new proposals



Length of the roads calculated by ARCGIS

FID	Mt	km
0	26.440208	0.02644
2	1179.146971	1.179147
3	812.827637	0.812828
4	531.698155	0.531698
1	2048.439721	2.04844



Coordinates of the villages nearby the proposed roads :-

VILLAGE NO.	COORDINATE
01	84.315, 19.207
02	84.316, 19.211
03	84.324, 19.212
04	84.303, 19.142

RESULTS

From the research above, it looks like 209.425 km. The existing road network is inadequate for proper development of R Udaygiri block. New 115 roads with a length of 100,242 km. Roads (including main roads, PMGSY roads and village roads) should be built expeditiously to facilitate economic and social development of R Udaigiri block. As the area is of great ecological importance, these new roads are not only beneficial to mankind, but also very useful for bioconservation programs. These new roads will not only open the door to economic growth, but also help monitor and protect the environment.



CONCLUSION

One of the best tools for addressing current transportation issues is road network analysis. It fixes network issues effectively, is dependable, and is user-friendly. In the area of transportation planning, origin and destination research, it turned out to be the helping hand. In a network, it has a high potential for analysing the closest facilities and service regions. By diverting traffic along less-traveled, shorter routes, information regarding the shortest route might help drivers and other road users cut down on travel expenses, save time, and avoid traffic jams on commuter routes. To provide maximum flow and prevent delay, signal timing needs to be appropriate for the intersecting shortest routes.

1. Reduce traffic on the current single routes
2. To prevent entering the Central Business District, improve communication between the rural and urban areas and the major road (CBD).

Overall, it is also possible to draw the conclusion that GIS has many uses, both directly and indirectly, in the sector of transportation, as research into current road network issues and the remedies to them can significantly improve a locality's economy. Utilizing cutting-edge technologies can help maintain sustainability, and transportation-related GIS jobs should be chosen for improved results in the future.

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