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Use of GIS in Land Records Management Systems

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ABSTRACT

Land is an asset and connected to day to day life. Entire activities are linked to land. In India, there is general trait and lack of transparency within the land market. This can be characterized by multiple sales of residential parcels, land encroachments and haphazard development. Since 1921, no survey is done in India for land. Land records is that the bases of all land reforms and so it needs regular online update. It has been seen that the village maps are not geo-referenced. The present system is not good which creates problems in our system and we suffer from great loss. Lack of land records in India has been suffering 2% loss in GDP. This leads to demand a system which keep the proper record of lands and it is available in time. For land records GIS is a effective tool. GIS technology is having capability of capturing, storing, analyzing and displaying geographically referenced information which is needed in present scenario. The objective of using GIS for land records system is to provide transparent, quick and secure access to land registration and land records through internet and other devices. The workload of the land registration offices will reduce and it will de-centralize the land registration process. This paper brings out GIS as a tool which can be effectively used in land records. The study brings out a user-friendly web-based land records which authorized users and subscribers can visualize and access a secured land records in the country. The new system will bring transparency and improve the way land records are maintained and administered in the country. The system will not only simplify the process of land registration and land records keeping, but also provide many collateral benefits.

***Keywords*: Geographic Information System (GIS), Land Administration, Land Information, Land Records, Land Registration.**

I. INTRODUCTION

Land is the most important resource for human beings and it plays a vital role in residential, agricultural and environmental advancement of the country. As land holds importance in many spheres, it is required to have a system to gather, distribute and update information of land records. Nowadays; everybody needs more detailed land information than it has been traditionally available. Lack of proper land records, poor records keeping and inefficient judiciary makes concerning system vulnerable to high loss and its demands a system that keeps the accurate record of lands and makes it available in time. We are still dependent on the age-old methods of creating and maintaining the land records. This system of manual surveys, cloth bound cadastral maps, non-uniform structures of record of rights, each state maintaining this database as a hard copy register created in

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their individual languages, lack of dedicated and qualified people who can maintain and update these records both in the record of rights as well as the cadastral maps, cannot meet the objective of being an efficient one. Computerization is natural solution for all those problems. The land records are maintained by the district administration for deciding ownership and boundaries of land. There is no proper land management system which covers detailed information of each and everything. There is still dependency on the old methods of maintaining and creating land records. By using computers the solution to the problem can be given. In India, the government has already taken initiative to computerize land records. The scheme is being implemented in many districts for fast and easy working of the government. Due to inefficient judiciary, poor records keeping and lack of proper land records management demanded in a high demand of a system that keeps the accurate record of lands. There has to be a basic planning for the project to be executed at macro and micro levels. To do this task firstly the basic land information which is correct and available in time is required. The linking of the attribute data with village maps through GIS should be done.

II. MATERIALS & METHODS

2.1 Study Area

Shindewadi is a medium size village located in MulshiTaluka of Pune District, Maharashtra. Village area is 117.42 hectares. The grampanchayat of Shindewadi is Kasaramboli. The population of the village is 321 with 164 male and 157 female as per 2011 census. There are about 81 houses in Shindewadi village.

Longitudinal Extent : 73°39‟30”E to 73°31‟45”E,

Latitudinal Extent : 18°31‟17”N to 18°31‟45”N

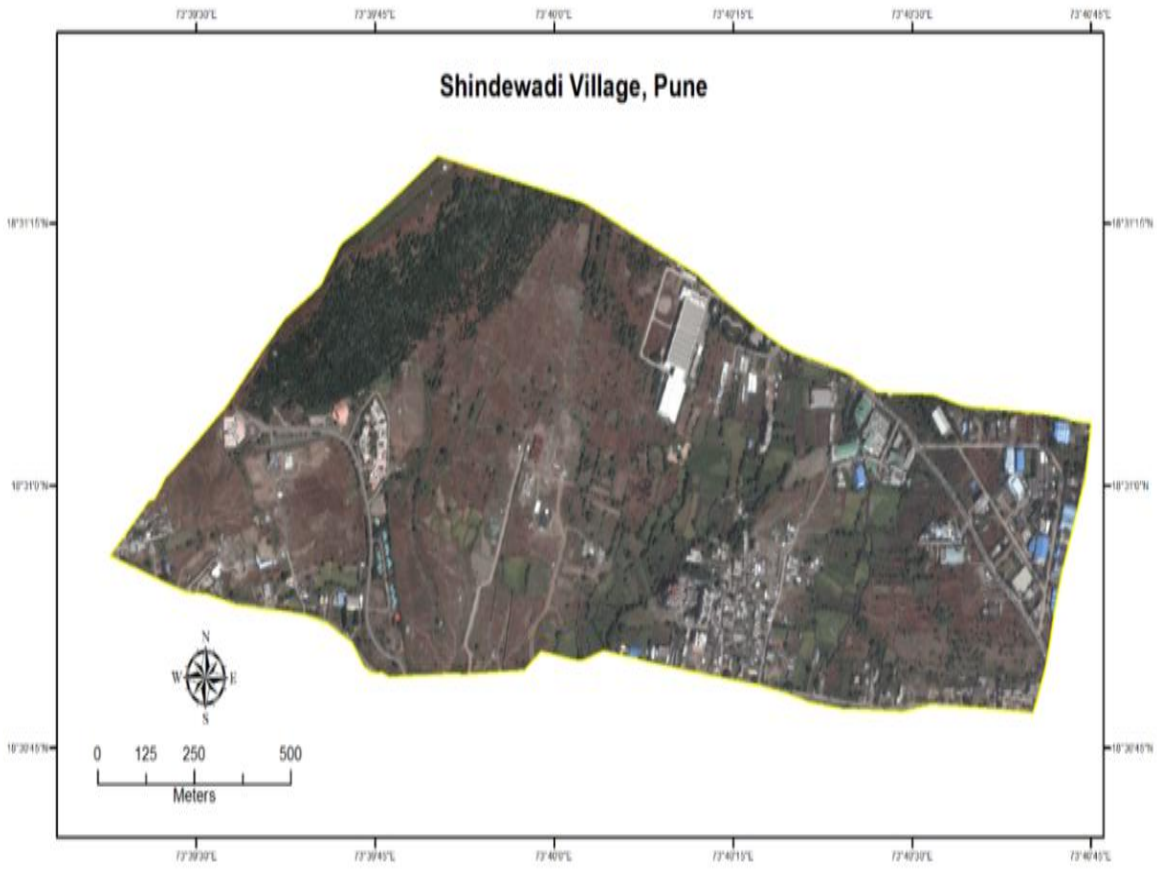

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Fig. No.1: Study Area Map

2.2 Methodology

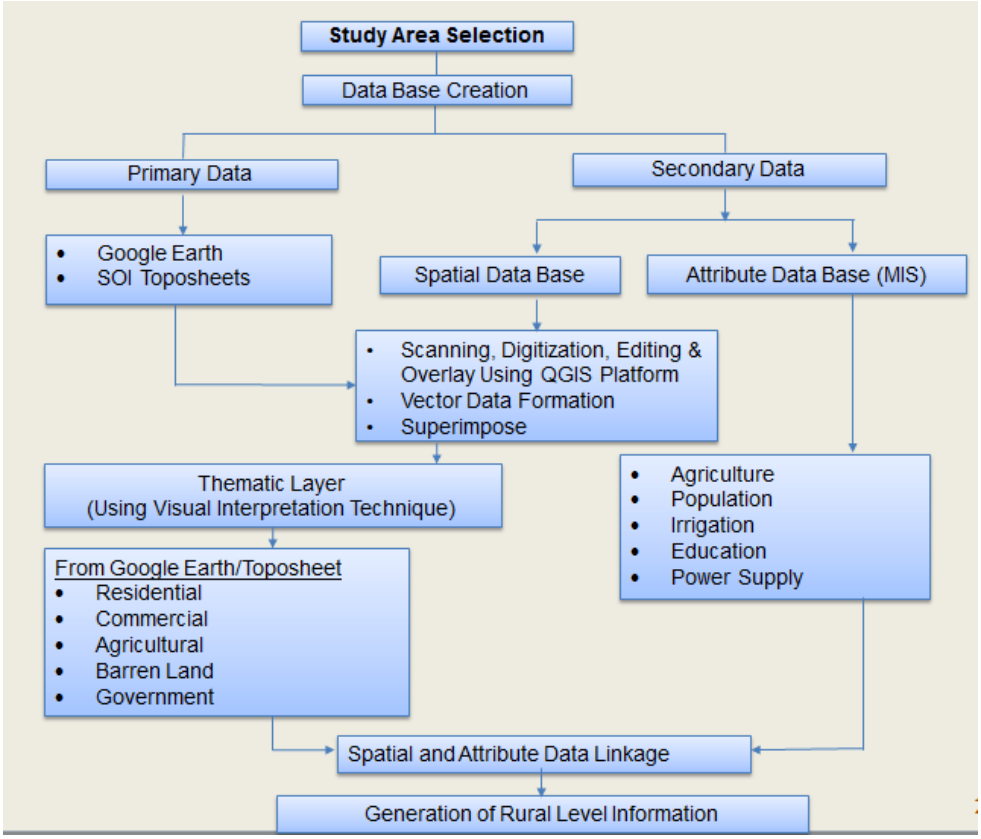

Fig.No.2 :Flowchart of Methodology

2.3 Cost/Benefit Analysis

Table No. 1 Shows the Details of the Tax as per 7/12

Sr. No.	Survey Nos.	Actual Area in HE.R.C.M	Conversion into R.	Actual Rate of Plot in R.	Total Cost According To Actual
1	34	0.42400	42.40000	0.82000	34.76800
2	46	0.59800	59.80000	2.42000	144.71600
3	35	0.16200	16.20000	0.66000	10.69200
4	36	0.31000	31.00000	0.44000	13.64000
5	169	0.15200	15.20000	1.29000	19.60800
6	67	0.47000	47.00000	0.39000	18.33000
7	38	0.11100	11.10000	0.19000	2.10900
8	56	0.04400	4.40000	0.03000	0.13200
9	68	0.32000	32.00000	0.27000	8.64000

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10	60	0.22000	22.00000	0.19000	4.18000
11	44	0.04000	4.00000	1.15000	4.60000
12	47	0.13200	13.20000	0.16000	2.11200
13	49	0.31000	31.00000	0.23000	7.13000
14	42	0.04000	4.00000	0.29000	1.16000
15	43	0.28000	28.00000	0.36000	10.08000
16	51	0.11000	11.00000	0.07000	0.77000
17	62	0.28000	28.00000	0.15000	4.20000
18	61	0.16000	16.00000	0.22000	3.52000
19	63	0.28000	28.00000	0.24000	6.72000
20	64	0.19000	19.00000	0.15000	2.85000
21	50	0.11000	11.00000	0.09000	0.99000
22	53	0.06000	6.00000	4.00000	24.00000
23	54	0.43000	43.00000	0.51000	21.93000
24	37	0.30700	30.70000	0.48000	14.73600
25	66	0.12000	12.00000	0.10000	1.20000
26	45	0.21000	21.00000	0.18000	3.78000
27	48	0.08010	8.01000	0.09000	0.72090
28	198	0.22000	22.00000	0.15000	3.30000
29	137	0.38000	38.00000	0.25000	9.50000
Sr. No.	**Survey Nos.**	**Actual Area in HE.R.C.M**	**Conversion into R.**	**Actual Rate of Plot in R.**	**Total Cost According To Actual**
30	138	0.18000	18.00000	0.09000	1.62000
31	139	0.22000	22.00000	0.23000	5.06000
32	33	0.11100	11.10000	0.24000	2.66400
33	32	0.28200	28.20000	0.29000	8.17800
34	102	0.24300	24.30000	0.24000	5.83200
35	91	0.92000	92.00000	0.51000	46.92000
36	109	0.86800	86.80000	10.19000	884.49200
37	144	2.30000	230.00000	12.19000	2803.70000
38	140	0.26400	26.40000	0.24000	6.33600
39	160	0.10600	10.60000	0.25000	2.65000
40	159	0.09600	9.60000	0.25000	2.40000
41	152	0.25300	25.30000	0.35000	8.85500
42	106	2.73000	273.00000	11.70000	3194.10000
43	104	1.09000	109.00000	10.70000	1166.30000
44	150	0.01000	1.00000	0.25000	0.25000

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45	107	1.24500	124.50000	12.70000	1581.15000
46	224	0.28000	28.00000	0.07000	1.96000
47	225	0.06000	6.00000	0.11000	0.66000
48	170	0.18700	18.70000	0.50000	9.35000
49	142	0.05100	5.10000	0.45000	2.29500
50	143	0.22500	22.50000	0.25000	5.62500
51	83	0.85000	85.00000	1.25000	106.25000
52	87	0.18000	18.00000	0.65000	11.70000
53	88	0.25000	25.00000	1.25000	31.25000
54	89	0.32000	32.00000	1.00000	32.00000
55	90	0.38000	38.00000	4.02000	152.76000
56	92	0.11000	11.00000	0.50000	5.50000
57	94	0.29000	29.00000	0.50000	14.50000
58	95	0.65000	65.00000	8.90000	578.50000
59	99	0.05100	5.10000	0.55000	2.80500
60	101	0.24000	24.00000	0.70000	16.80000
61	100	0.15200	15.20000	0.26000	3.95200
62	93	0.12000	12.00000	0.09000	1.08000
Sr. No.	**Survey Nos.**	**Actual Area in HE.R.C.M**	**Conversion into R.**	**Actual Rate of Plot in R.**	**Total Cost According To Actual**
63	86	0.87400	87.40000	0.55000	48.07000
64	85	0.08000	8.00000	0.09000	0.72000
65	84	0.12100	12.10000	0.12000	1.45200
66	111	0.54000	54.00000	0.25000	13.50000
67	114	0.06000	6.00000	0.01200	0.07200
68	113	0.07000	7.00000	0.01200	0.08400
69	115	0.24000	24.00000	0.29000	6.96000
70	116	0.12000	12.00000	0.15000	1.80000
71	112	0.52000	52.00000	0.50000	26.00000
72	176	0.19000	19.00000	0.25000	4.75000
73	175	0.23000	23.00000	0.25000	5.75000
74	174	0.12000	12.00000	0.55000	6.60000
75	173	0.04000	4.00000	0.40000	1.60000
76	172	0.21000	21.00000	0.47000	9.87000
77	171	0.19000	19.00000	0.44000	8.36000
78	165	0.11000	11.00000	0.25000	2.75000
79	231	0.03000	3.00000	0.25000	0.75000

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80	232	0.06500	6.50000	0.35000	2.27500
81	233	0.02300	2.30000	0.01600	0.03680
82	223	0.46000	46.00000	0.25000	11.50000
83	203	0.57000	57.00000	0.28000	15.96000
84	208	0.01000	1.00000	0.34000	0.34000
85	209	0.01200	1.20000	0.22000	0.26400
86	180	0.01000	1.00000	0.14400	0.14400
87	185	0.07100	7.10000	0.21000	1.49100
88	70	0.05000	5.00000	0.24000	1.20000
89	69	0.05000	5.00000	0.25000	1.25000
90	52	0.65000	65.00000	0.23000	14.95000
91	71	0.32000	32.00000	0.27000	8.64000
92	81	1.65000	165.00000	10.17000	1678.05000
93	155	1.01000	101.00000	12.45000	1257.45000
94	158	0.27300	27.30000	0.25000	6.82500
		Total Cost as per 7/12 (Taxation Amount)			**13,849.76**

Table No.2 Shows the Details of the Tax by Using GIS

Sr. No.	Survey Nos.	Enclosed Area (sqkm) as in GIS	Conversion of Area into He.R.C.M	Conversion of Area into R	Actual Rate of Plot in R	Total Cost According To GIS
1	34	0.00346	0.34560	34.56000	0.82000	28.33920
2	46	0.00864	0.86400	86.40000	2.42000	209.08800
3	35	0.00155	0.15500	15.50000	0.66000	10.23000
4	36	0.00326	0.32580	32.58000	0.44000	14.33520
5	169	0.00127	0.12720	12.72000	1.29000	16.40880
6	67	0.00436	0.43570	43.57000	0.39000	16.99230
7	38	0.00225	0.22530	22.53000	0.19000	4.28070
8	56	0.00085	0.08450	8.45000	0.03000	0.25350
9	68	0.00318	0.31800	31.80000	0.27000	8.58600
10	60	0.00348	0.34800	34.80000	0.19000	6.61200
11	44	0.00047	0.04682	4.68200	1.15000	5.38430
12	47	0.00129	0.12850	12.85000	0.16000	2.05600
13	49	0.00305	0.30480	30.48000	0.23000	7.01040
14	42	0.00054	0.05370	5.37000	0.29000	1.55730
15	43	0.00220	0.21990	21.99000	0.36000	7.91640
16	51	0.00168	0.16830	16.83000	0.07000	1.17810
17	62	0.00274	0.27380	27.38000	0.15000	4.10700

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18	61	0.00169	0.16870	16.87000	0.22000	3.71140
19	63	0.00373	0.37280	37.28000	0.24000	8.94720
20	64	0.00289	0.28920	28.92000	0.15000	4.33800
21	50	0.00181	0.18060	18.06000	0.09000	1.62540
22	53	0.00035	0.03465	3.46500	4.00000	13.86000
23	54	0.00426	0.42640	42.64000	0.51000	21.74640
24	37	0.00286	0.28570	28.57000	0.48000	13.71360
25	66	0.00081	0.08050	8.05000	0.10000	0.80500
26	45	0.00349	0.34910	34.91000	0.18000	6.28380
27	48	0.00098	0.09810	9.81000	0.09000	0.88290
28	198	0.00235	0.23480	23.48000	0.15000	3.52200
29	137	0.00430	0.42960	42.96000	0.25000	10.74000
30	138	0.00190	0.18970	18.97000	0.09000	1.70730
31	139	0.00314	0.31420	31.42000	0.23000	7.22660
Sr. No.	**Survey Nos.**	**Enclosed Area (sqkm) as in GIS**	**Conversion of Area into He.R.C.M**	**Conversion of Area into R**	**Actual Rate of Plot in R**	**Total Cost According To GIS**
32	33	0.00111	0.11090	11.09000	0.24000	2.66160
33	32	0.00394	0.39360	39.36000	0.29000	11.41440
34	102	0.00315	0.31450	31.45000	0.24000	7.54800
35	91	0.00919	0.91900	91.90000	0.51000	46.86900
36	109	0.01695	1.69500	169.50000	10.19000	1727.20500
37	144	0.02355	2.35500	235.50000	12.19000	2870.74500
38	140	0.00203	0.20290	20.29000	0.24000	4.86960
39	160	0.00121	0.12090	12.09000	0.25000	3.02250
40	159	0.00148	0.14780	14.78000	0.25000	3.69500
41	152	0.00266	0.26600	26.60000	0.35000	9.31000
42	106	0.02254	2.25400	225.40000	11.70000	2637.18000
43	104	0.01035	1.03500	103.50000	10.70000	1107.45000
44	150	0.00085	0.08530	8.53000	0.25000	2.13250
45	107	0.01993	1.99300	199.30000	12.70000	2531.11000
46	224	0.00310	0.31040	31.04000	0.07000	2.17280
47	225	0.00074	0.07400	7.40000	0.11000	0.81400
48	170	0.00217	0.21710	21.71000	0.50000	10.85500
49	142	0.00040	0.04013	4.01300	0.45000	1.80585
50	143	0.00253	0.25340	25.34000	0.25000	6.33500
51	83	0.00923	0.92300	92.30000	1.25000	115.37500
52	87	0.00183	0.18300	18.30000	0.65000	11.89500

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53	88	0.00253	0.25320	25.32000	1.25000	31.65000
54	89	0.00213	0.21250	21.25000	1.00000	21.25000
55	90	0.00449	0.44910	44.91000	4.02000	180.53820
56	92	0.00181	0.18100	18.10000	0.50000	9.05000
57	94	0.00247	0.24720	24.72000	0.50000	12.36000
58	95	0.00839	0.83900	83.90000	8.90000	746.71000
59	99	0.00049	0.04861	4.86100	0.55000	2.67355
60	101	0.00248	0.24780	24.78000	0.70000	17.34600
61	100	0.00278	0.27820	27.82000	0.26000	7.23320
62	93	0.00126	0.12590	12.59000	0.09000	1.13310
63	86	0.00659	0.65900	65.90000	0.55000	36.24500
64	85	0.00124	0.12350	12.35000	0.09000	1.11150
65	84	0.00308	0.30810	30.81000	0.12000	3.69720
Sr. No.	**Survey Nos.**	**Enclosed Area (sqkm) as in GIS**	**Conversion of Area into He.R.C.M**	**Conversion of Area into R**	**Actual Rate of Plot in R**	**Total Cost According To GIS**
66	111	0.00478	0.47820	47.82000	0.25000	11.95500
67	114	0.00087	0.08660	8.66000	0.01200	0.10392
68	113	0.00068	0.06780	6.78000	0.01200	0.08136
69	115	0.00258	0.25790	25.79000	0.29000	7.47910
70	116	0.00148	0.14780	14.78000	0.15000	2.21700
71	112	0.00540	0.54000	54.00000	0.50000	27.00000
72	176	0.00165	0.16510	16.51000	0.25000	4.12750
73	175	0.00237	0.23720	23.72000	0.25000	5.93000
74	174	0.00068	0.06760	6.76000	0.55000	3.71800
75	173	0.00086	0.08610	8.61000	0.40000	3.44400
76	172	0.00103	0.10270	10.27000	0.47000	4.82690
77	171	0.00070	0.07040	7.04000	0.44000	3.09760
78	165	0.00304	0.30360	30.36000	0.25000	7.59000
79	231	0.00045	0.04495	4.49500	0.25000	1.12375
80	232	0.00070	0.07000	7.00000	0.35000	2.45000
81	233	0.00031	0.03050	3.05000	0.01600	0.04880
82	223	0.00481	0.48050	48.05000	0.25000	12.01250
83	203	0.00132	0.13230	13.23000	0.28000	3.70440
84	208	0.00019	0.01944	1.94400	0.34000	0.66096
85	209	0.00011	0.01133	1.13300	0.22000	0.24926
86	180	0.00027	0.02711	2.71100	0.14400	0.39038
87	185	0.00088	0.08820	8.82000	0.21000	1.85220

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88	70	0.00071	0.07090	7.09000	0.24000	1.70160
89	69	0.00081	0.08100	8.10000	0.25000	2.02500
90	52	0.00400	0.40020	40.02000	0.23000	9.20460
91	71	0.00347	0.34740	34.74000	0.27000	9.37980
92	81	0.01678	1.67800	167.80000	10.17000	1706.52600
93	155	0.01101	1.10100	110.10000	12.45000	1370.74500
94	158	0.00411	0.41090	41.09000	0.25000	10.27250
			Total Cost as per GIS (Taxation Amount)			**15,422.58**

The benefit to cost ratio will be calculated by using the formula:-

$$\mathbf{BCR = PV_B / PV_C}$$

where, PV_B is the present value of benefit

PV_C is the present value of the cost

BCR = 15,422.58 / 13,849.76

$$\mathbf{BCR = 1.114}$$

The calculated value of BCR is greater than 1.

III. CONCLUSION

This study bring out the importance of land records management system in India. It would serve the correct and timely information of land records. From the literature review it has been seen that in the international market the land record system is being used. By using GIS the information of the various areas is available in minutes. In India, there is a big problem of land dealing. The land is being sold illegally and then the problems of land duplication comes. To reduce all this the land records are to be managed properly. For this a system is required which helps in maintaining the record. GIS is a tool which can reduce the work and keep the record effectively. It will benefit the land owners, planners, decision makers and land administrators by improving the effectiveness and efficiency of land records management. This project will effectively help the people who wants to know the information of a particular land before purchasing it. By using QGIS software the record for the Shindewadi village could be done. There are numerous benefits of land record management system which will help to make better and judicious use of land resources. To calculate taxes the use of GIS is very much useful. The government can be benefited by using GIS. The exact tax for the particular area can be collected and the GDP loss to government can be recovered to a certain extent.

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