Landuse (LU) Analysis of Villages AroundKrishna SahakariSakhareKarkhaneNiyamit, Athani

Dr. Pradip A. Saymote
Assist. Professor
P. G. Diploma in Geoinformatics
Department of Geography
Shivaji University, Kolhapur, Maharashtra.

Introduction

The study of land use is an analysis of relationship between man and land. The land is utmost resource for flora and fauna. It is been used for various purposes that may be agriculture, grazing, urban, mining and many more. According to Mayer (1995) l*and use* is the way in which, and the purposes for which, human beings employ the land and its resources e.g. farming, mining, lumbering, etc. Comprehensive information of land use and land cover is the basic pre-requisite for all developmental activities, land resource evaluation, management, planning and environmental assessment. The assessment of land use / land cover is important to comprehend both the positive as well as negative impacts on particular region. In this section a highlight is made on different landuse class found in study area and its mapping.

Data

Landuse/land cover classification is carried out in different levels i.e. general landuse, urban landuse, agriculture landuse, etc. Different kinds of data is essential for analysis and it is depend on the level on which study is been carried out. The landuse data published in census is one of the authentic data which is utilized here. The quantification of land under forest, agriculture uses, fallow land, etc. is made systematically for year 2011.

The computer aided digital analysis having capabilities of remote sensing data to identify, map and quantify the landuse classes. The satellite dataset is used here to check the Landuse / Landcover condition of study area.

Methodology

The general landuse data from 2011 census is collected, tabulated and arranged in Microsoft Excel. The manipulation and required updation is carried out on tabulated data. The graphical represents of important aspect is made with different graphs. At necessary places these tables and graphs are inserted and its interpretation is carried out.As pointed earlier the satellite images are used for land use/ land cover mapping. Hence in second phase digital landuse / landcover mapping is carried out with the help of satellite images. The available different bands of a satellite image are stacked together and final image is produced. The supervised image classification technique is used for mapping landuse / landcover of the study area. Finally the quantification of generated landuse class is carried out and interpretation is made for derived results.

General Landuse

The general landuse categories are varying from user to user. Table No 1 represents nine categories of general landuse as well as area under it. The totall and of villages under study area is 56499.68 ha. The lowest landuse class is forest i.e. 155.33 ha. and net sown area is the highest category which is occupied 49336.95 ha.land.

Table – 1:Summary of General Landuse of Study Area

Landuse Category	Land (in Ha)	Percentage
Forest Area (in Hectares)	155.33	0.27
Area under Non-Agricultural Uses	1818.58	3.22
Barren & Un-cultivable Land Area	578.54	1.02
Permanent Pastures & Other Grazing Land	596.83	1.06
Land Under Miscellaneous Tree Crops etc.	586.29	1.04
Culturable Waste Land Area (in Hectares)	453	0.80
Fallows Land other than Current Fallows Area	423.1	0.75
Current Fallows Area (in Hectares)	2551.06	4.52
Net Area Sown (in Hectares)	49336.95	87.32
Total	**56499.68**	**100.00**

Source: District Census Handbook, 2011

Table 1 and Figure 1 is the summary of general landuse. All landuse classes are having comparatively very small share as compare with Net Sown Area. There are three classes which are having percentage below 1% those are forest(155 Ha, 0.27%), Cultivable waste (453 Ha, 0.80%) and fallow land (423 Ha, 0.75%). Rest five categories are ranging within 5% i.e. Non-agricultural use (1818 Ha, 3.22%), Barren and Uncultivable land (578 Ha, 1.02%), Pasture and grazing land (596 Ha, 1.06%), Land under miscellaneous tree (586 Ha, 1.04%), Current fallow (2552 Ha, 4.52%). As mentioned at outset Net sown area is covering majority of share i.e. 49336 Ha land which comprise 87.32%to total cropped area.

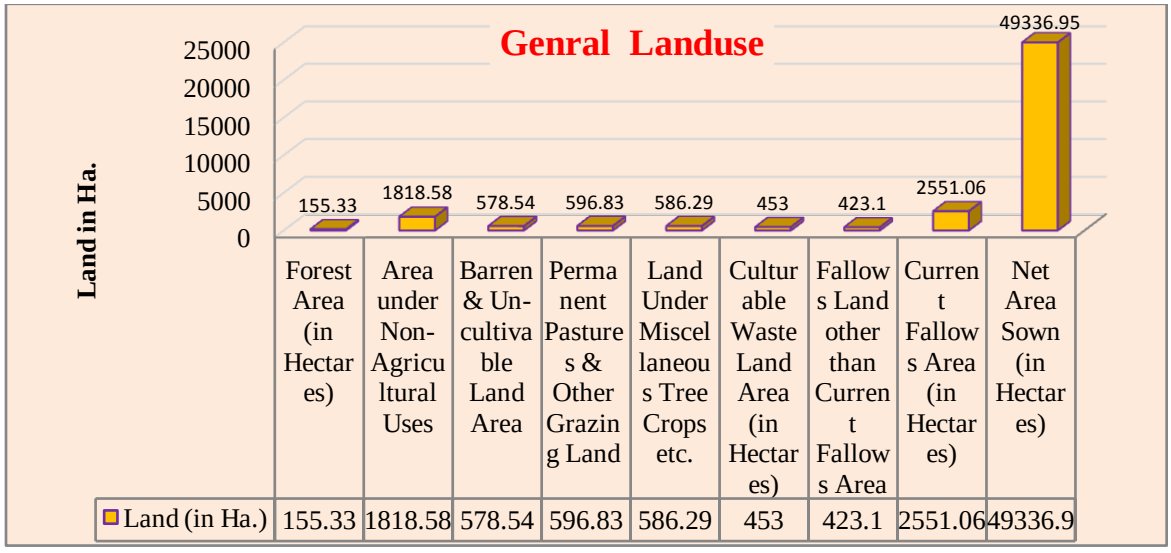

Fig. 1

Village wise General Landuse of Study Area

There are total 25 villages coming under 10 km radius, out of which only 12 villages are laying completely within this radius whereas rest 13 villages have occupied land from 3% to 85%. Although these 25 villages are not fully coming under 10km radius but since its more or less part is coming under 10 km hence for this study all are taken in to consideration.

Table – 2:Village wise General Landuse of Study Area

Village Name	Forest Area (in Hectares)	Area under Non-Agricultural Uses (in Hectares)	Barren & Un-cultivable Land Area (in Hectares)	Pastures and Grazing Land Area (in Hectares)	Land Under Miscellaneous Tree Crops etc. Cultivable Waste Land Area (in Hectares)	Land than other Current Fallows (in Hectares)	Current Fallows Area (in Hectares)	Net Area Sown (in Hectares)
Ainapur	0	556.24	0	101	0	20	0	0	5457
Avarkhod	0	34	12	32.09	0	0	0	8	1067
Athani (rural)	130.7	80.5	66.97	101.96	0.6	0	27.5	0	11132.27
Badachi	0	50.44	30	58	0	0	0	81	1466
Darur	12.63	59.33	6.25	64.87	563.69	0	275.6	530	250
Dodwad	0	62	3	0	0	0	0	0	222.02
Ghatanatti	0	8	99.78	0	0	0	120	63	510
Halyal	0	27	29	31.42	0	0	0	16	1089
Hulagabali	0	98	9	4.49	0	0	0	0	2461
Nadi-Ingalgaon	0	41.39	3	0	0	0	0	0	976
Katageri	0	22	12.05	15	0	0	0	50	905
Katral	0	10.98	0	18	0	0	0	0	395
Khavatkoppa	0	43.55	4	0	0	0	0	0	1075
Mole	0	99.66	77	28	0	0	0	438	4299
Muragundi	0	50.78	30	4	0	0	0	40	899
Naganur P.K.	0	42	4.03	0	0	0	0	0	743
Nandagaon	0	43.46	92	107	0	0	0	182	3440
Sankaratti	0	20.9	0	7	0	0	0	0	1021
Saptasagar	0	44	31	9	0	0	0	12	876.66
Satti	0	123	0	0	22	433	0	746.75	2300
Savadi	12	138	34.46	0	0	0	0	0	4581
Shegunshi	0	83	29	2	0	0	0	319.31	2638
Shinal	0	15.16	4	10	0	0	0	20	438
Tangadi	0	47.09	2	0	0	0	0	40	629
Teerth	0	18.1	0	3	0	0	0	5	467
	155.33	**1818.58**	**578.54**	**596.83**	**586.29**	**453**	**423.1**	**2551.06**	**49336.95**

Source: District Census Handbook, 2011

Table No 2 represents village wise landuse of nine categories for the study area. The data is available for all villages. Athani is tahisl headquarter and it is having both rural as well as urban part

hence in this study its rural area is considered. It is observed that for many categories data is null hence it is mentioned as zero.

IRRIGATION AND LANDUSE

The irrigation is most importantaspectin socio-economic transformation for any region. Most the land is irrigated and it is made possible because different means of irrigation are available now days. As a result most of the land is occupied by sugarcane crop. There is very close relationship between irrigation and landuse. If irrigation is developed state then several transformations are taking place in that area ultimately the economic condition of farmer is enhancing. The river passing through study area is providing source of water for the agriculture.

Table – 3:Summary of Irrigated and Un-Irrigated Land

Category	Land (in Ha)	Percentage
Total Unirrigated Land Area (in Hectares)	15779.66	31.98
Area Irrigated by Source (in Hectares)	33557.29	68.02
Total	**49336.95**	**100.00**

Source: District Census Handbook, 2011

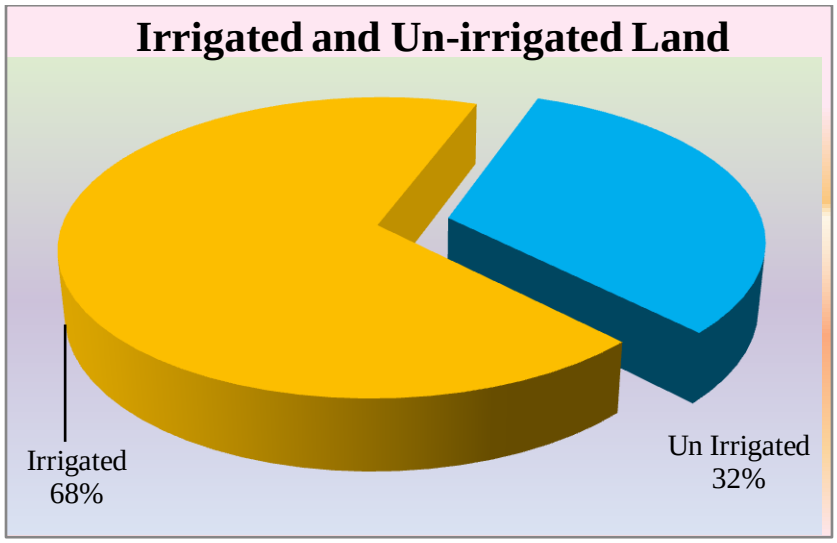

Fig. 2

Figure – 2 represents the summary of total irrigated and un-irrigated land of total 25 villages of study area. Total agricultural land of study area is 49336.95ha., out of which total irrigated land is 33557.29 ha. (68%). Whereas 32% i.e. 15779.66 Ha. land is un-irrigated.

Source of Irrigation

The total irrigated area is 33557.29 ha.bydifferent sources such as canal, well/tube well, tank, etc. The highest land is irrigated by well/tube well and other sources i.e. irrigation schemes whereas tanks and lakes are having very less area i.e. 192.2 Ha. (0.57%) and there is not irrigation through waterfall. The canals are irrigating 1064.8 Ha land. The well and tube well are providing water to 8863.87 Ha land which become 26.41% to total irrigated land. The irrigation schemes are having highest share i.e. 69.84% i.e. 23436.42 Ha.

Table – 3:Source of Irrigation

Category	Land (in Ha)	Percentage to Total Irrigated Land
Canals Area (in Hectares)	1064.8	3.17
Wells/Tube Wells Area (in Hectares)	8863.87	26.41
Tanks/Lakes Area (in Hectares)	192.2	0.57
Waterfall Area (in Hectares)	0	0.00
Other Source (specify) Area (in Hectares)	23436.42	69.84
Total	**33557.29**	**100.00**

Source: District Census Handbook, 2011

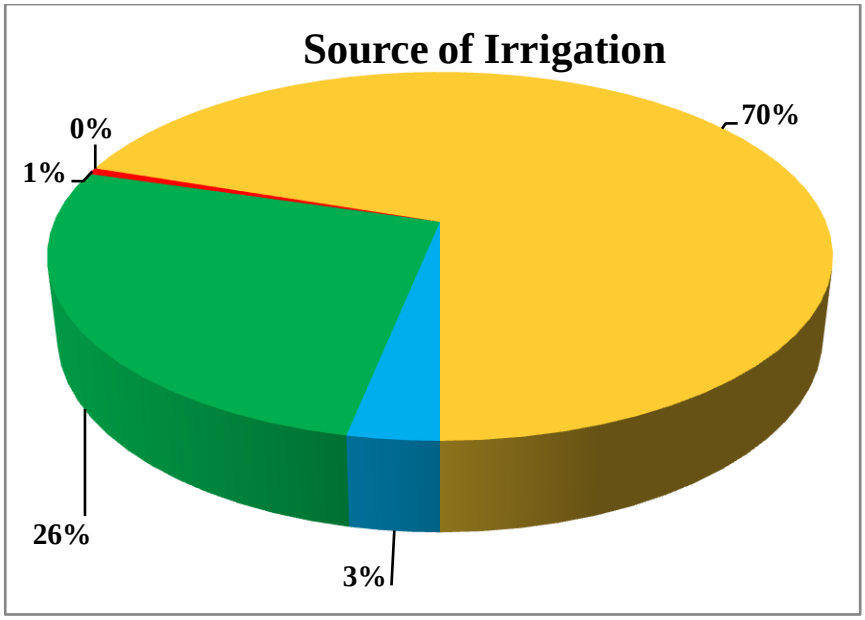

Fig.3

Village wise General Landuse of Study Area

Table No 4 represents village-wise irrigation status of study area. The canal irrigation is available for only two villages i.e. Ainapur and Ghatanatti. The tank irrigation is available for only one village Tangadi. As stated earlier the waterfall irrigation is not available in the study area. The wells and Tube-well irrigation is available in seven villages which is 8863.87 Ha. area. There are total 17 villages where irrigation is provided by irrigation schemes. Few villages are having more than one source of irrigation.

Table No - 4: Village-wise Irrigation Status of Study Area

Village Name	Canals Area (in Hectares)	Wells/Tube Wells Area (in Hectares)	Tanks/Lakes Area (in Hectares)	Waterfall Area (in Hectares)	Other Source (specify) Area (in Hectares)
Ainapur	984.8	1523	0	0	0
Avarkhod	0	0	0	0	1067
Athani (rural)	0	6015.77	0	0	1405.74
Badachi	0	202	0	0	0
Darur	0	0	0	0	0
Dodwad	0	0	0	0	222.02
Ghatanatti	80	0	0	0	430
Halyal	0	0	0	0	1089
Hulagabali	0	0	0	0	2461
Nadi-Ingalgaon	0	0	0	0	976
Katageri	0	215.3	0	0	0
Katral	0	0	0	0	0
Khavatkoppa	0	0	0	0	1075
Mole	0	0	0	0	0
Muragundi	0	0	0	0	0
Naganur P.K.	0	0	0	0	743
Nandagaon	0	320	0	0	2796
Sankaratti	0	0	0	0	1021
Saptasagar	0	0	0	0	876.66
Satti	0	495	0	0	1560
Savadi	0	0	0	0	4581
Shegunshi	0	0	0	0	2638
Shinal	0	0	0	0	28
Tangadi	0	92.8	192.2	0	0
Teerth	0	0	0	0	467
	1064.8	**8863.87**	**192.2**	**0**	**23436.42**

Source: District Census Handbook, 2011

LANDUSE STUDY WITH SATELLITE DATA

The first thing people ever used to meet their basic needs was land – to feed them, to move around and to settle. Hence, the relationship of people with land is as old as man. When the users of land decided to utilize it for different purposes, land use / land cover change occurs producing both desirable and undesirable impacts. The study of land use / land cover change is essentially the analysis of changing relationship between people and land. The use to which we put land could be grazing, agriculture, urban development, and mining among many others. Land use is the way in which, and the purposes for which, human beings employ the land and its resources e.g. farming, mining, lumbering, etc. Land cover describes the physical state of the land surface i.e. cropland, forests, wetland, water

bodies among others (Meyer, 1995). In this section landuse condition is studied with help of satellite image.

In below given figure, the village boundary is overlaid on 1 meter spatial resolution dataset.The Google satellite dataset is used to understand village wise landuse condition. The image clearly depicts the roads, river, land parcel, crop land and other features of study area.

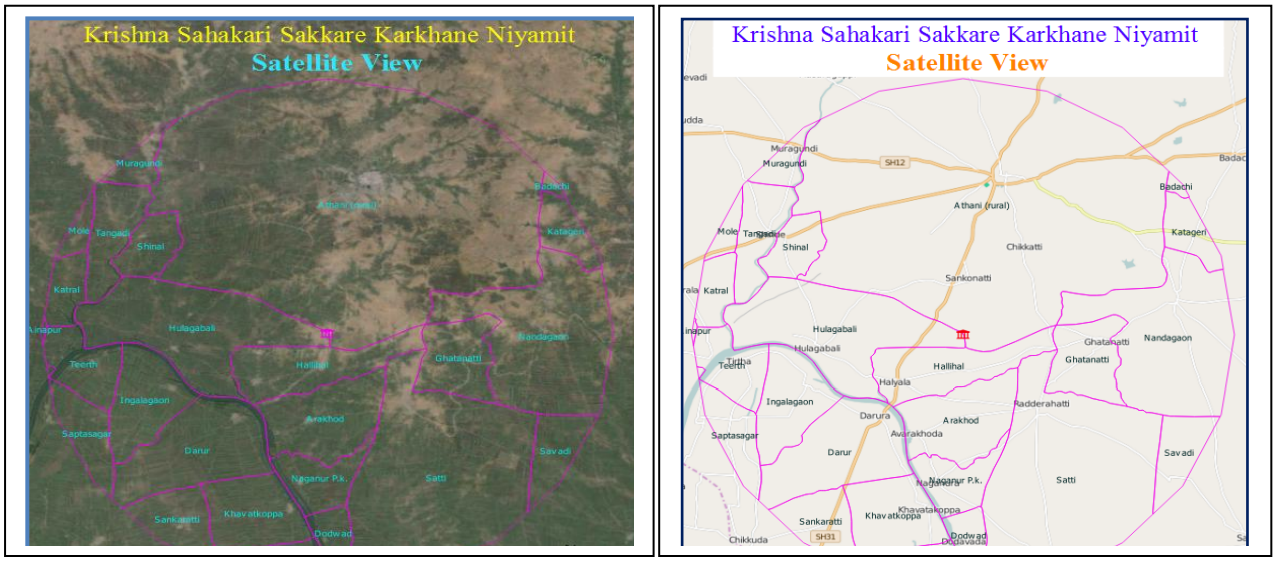

Fig. 5

Figure 6 is represents the output of image classification. The dataset is derived from Indian Remote Sensing satellite which is having LISS-III sensor is utilized in this study. The supervised image classification method is applied in this study.

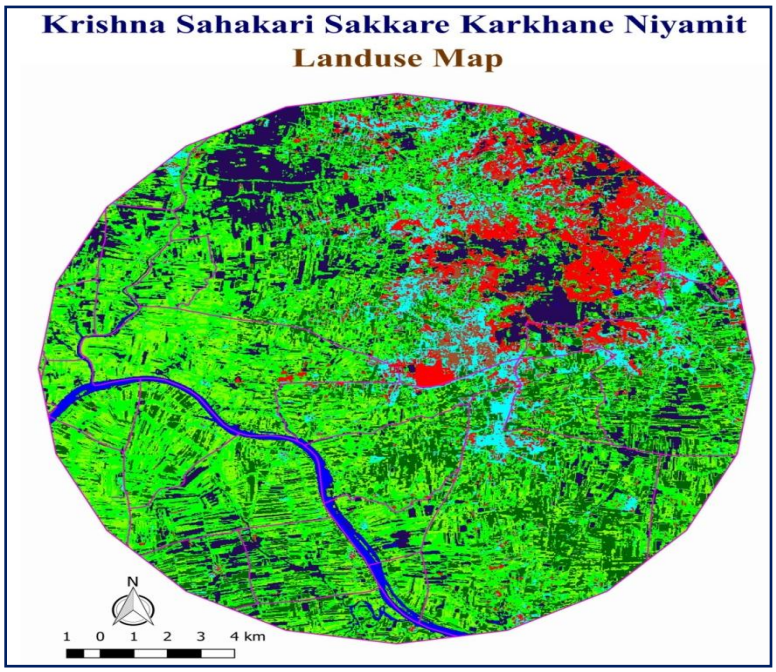

Fig. 6

Conclusion

There are total 25 villages coming under 10 km radius, out of which only 12 villages are laying completely within this radius whereas rest 13 villages have occupied land from 3% to 85%. There are total 25 villages coming under 10 km radius, out of which only 12 villages are laying completely within this radius whereas rest 13 villages have occupied land from 3% to 85%. The total irrigated area is 33557.29 ha. by different sources such as canal, well/tube well, tank, etc. The highest land is irrigated by well/tube well and other sources.The canal irrigation is available for only two villages i.e. Ainapur and Ghatanatti. The tank irrigation is available for only one village Tangadi. As stated earlier the waterfall irrigation is not available in the study area. The area derived from satellite image and census statistics is not matching. The area derived from satellite image is geometrical and having fixed share whereas the census statistics is sum of all 25 villages. The spectral signature of satellite image is having problem which put limitation on image classification process.