IJPS INTERNATIONAL JOURNAL OF PLANT SCIENCES
ISSN-0973-1547 Volume 16 | Issue 1 | January, 2021 | 73-76
DOI: 10.15740/HAS/IJPS/16.1/73-76
Visit us - *www.researchjournal.co.in*

RESEARCH ARTICLE

Use of dexcel map method for mapping of soil fertility status in Itagi village of Ranebennur Taluk, Karnataka

■ G. R. Rajakumar, J.K. Sarojani and J. S. Hilli

SUMMARY

It is possible to prepare soil fertility maps by use of MS office (word / Excel / power point) using village land map with survey numbers in excel sheet. The village Itagi is a part of Ranebennur taluk, Karntaka, India which has major soil types black clay soil and red sandy loam soil. Problem cause analysis indicated the low soil fertility status and unscientific use of fertilizers as the reasons for low crop yields. In 86 random locations (on selected survey numbers) soils are sampled, labeled and processed. Samples are analyzed for soil pH, electrical conductivity (EC), organic carbon, macro nutrients and micro nutrients. The status of soil for each property is classified into three classes. Looking to each survey number on the excel sheet, the polygons are filled with colours for respective classes (low, medium and high). The results revealed that 69 per cent of samples belong to alkaline pH and oil salinity is medium in the area. Available nitrogen and phosphorous are low (59 % and 48 %) and available potash is medium (70 %). Organic C belongs to medium to low category. B belongs to low category, while majority of the soils have low status of other micronutrients except Cu. The DEXCEL maps prepared for pH, Av. NPK and organic C indicate the status of soil properties in the village land on respective survey numbers. Which side of the village, the particular soil parameter belongs to low category can be observed and suitable measure can be adopted for the management.

Key Words : Dexcel map, Method for mapping, Soil fertility status

How to cite this article : Rajakumar, G.R., Sarojani, J.K. and Hilli, J.S. (2021). Use of dexcel map method for mapping of soil fertility status in Itagi village of Ranebennur Taluk, Karnataka. *Internat. J. Plant Sci.*, **16** (1): 73-76, **DOI: 10.15740/HAS/IJPS/16.1/73-76,**

Article chronicle : Received : 30.08.2020; **Revised :** 17.11.2020; **Accepted :** 18.12.2020

MEMBERS OF THE RESEARCH FORUM

Author to be contacted :
J.S. Hilli, Seed Technology, University of Agricultural Sciences, **Dharwad (Karnataka) India**
Email : hillijs@uasd.in

Address of the Co-authors:
G.R. Rajakumar, Agriculture Colleges, **Dharwad (Karnataka) India**

J.K. Sarojani, University of Agricultural Sciences, **Dharwad (Karnataka) India**

What is DEXCEL map? It is Dharwad's excel format soil fertility map. You can prepare the maps by using excel sheet. It is possible to create 'excel-freeform-shapes-from-polygons' on any map photo (Anonymous, 2015 and Rajakumar and Patil, 2017).

The preparation of soil fertility maps using GIS is not affordable to everybody and the softwares are high priced. Moreover, these can be handled only by the

trained experts. So, In order to have village soil fertility map even by fertilizer dealer and the interested, an easy and MS office based (word. Excel. Power point), particularly excel sheet based DEXCEL map has been developed (Rajakumar and Patil, 2017).

Only few technical persons those who have the knowledge of GIS software are able to prepare the soil fertility maps. So, in-order to prepare these maps can we use any ordinary method? It should be prepared by a person who knows only MS Office (word/excel/power point). In this context, the article aims at preparation of soil fertility maps by anyone including non-technical and educated rural youths without the costlier software.

To prepare such soil fertility maps, the sophisticated software such as Erdas / ArcGIS v 10 (Antharyami *et al.,* 2014; Prabhavathi *et al.,* 2015 and Dhayalan *et al.,* 2016) are used for geo-referencing.

MATERIAL AND METHODS

The soil fertility status has been studied for the village Itagi. It is located in the Southern part of Ranebennur taluk, Karntaka, India which falls in between north latitudes 14° 33.75' and 14° 31.50' and east longitudes 75° 39' and 75° 42'. The major soil types in this village are black clay soil (towards south west) and red sandy loam soil (towards north east). Climate of the area is with average maximum temperature of about 38° C in April and average minimum temperature of about 20° C in December. The normal rainfall is about 560 mm. The crops grown are maize, cotton, jowar, groundnut, onion, garlic, Bengal gram, soybean, banana, chilli and tomato. Average crop yields are low to medium. Problem cause analysis indicated the soil fertility status and unscientific use of fertilizers as the reasons. This has necessitated the preparation of soil fertility map of the village as a whole.

To prepare dexcel map, it is required to have the village land map (with survey numbers and boundaries). The JPEG photo of map has been obtained through camera phone and later downloaded to computer. Then as per the procedure given by Rajakumar and Patil, 2017, the maps have been prepared for understanding the soil fertility status of the village.

The soil samples are collected from each plot (for selected survey numbers) in *zig-zag* paths by using a spade by digging a V-shaped hole to sample depth 0-20 cm and then a thin slice of soil is taken from one side of the pit. The samples collected from every pit are mixed, reduced to about half-a-kg and labeled as sample no.1. In similar manner 86 random locations (on selected survey numbers) are sampled and labeled. Then the soil samples are dried and sieved in order to remove other particles. Samples were analyzed for soil pH, electrical conductivity (EC), organic carbon, macro nutrients and micro nutrients by using the standard procedures (Jackson, 2012). The status of soil for each property is classified into three classes. The soil pH is classified into acidic (7.5); the EC of soil is divided into low (0.4 dS/m), medium (0.4 - 4.0) and saline (>4.0). The organic carbon and available nutrients have been grouped into low, medium and high classes.

In dexcel map, the soil pH has been indicated with red, green and blue colours for acidic, neutral and alkaline categories. The EC classes have been indicated with yellow, green and red for low, medium and saline categories. Organic C, major and micro nutrients classes have been given with red, yellow and green for low, medium and high status of soil. At the top the title of the soil fertility map of the village should appear (merge three to four lines from on the top left side to right side of the photo for typing title; font size : 18). And at the bottom index is given for different classes (font size: 16). If possible, class values may be indicated at any leftover outside place (font size: 8) in the map otherwise indicate along with the index.

The analytical data is used for knowing the status of soil properties of village as a whole. And the map is used for interpreting which side of the village is having critical nutrient status and other soil properties for efficient management plans.

RESULTS AND DISCUSSION

The results of soil analysis, as indicated in the Table 1, revealed that 69 per cent of samples belong to alkaline

Table 1 : Number of soils belonging to different classes of soil properties in Itaga village **(n=86)**

Class	Soil pH	EC	Av. N	Av.P_2O_5	Av.K_2O	Av. S	Org.C	Av.B	Av. Zn	Av. Mn	Av. Fe	Av. Cu
Low	3	1	59(69)	48(56)	15(17)	34	86(100)	56(65)	72(84)	71(83)	82(95)	0
Med	24(28)	82(95)	26(30)	38(44)	60(70)	50(58)	0	30(35)	14(16)	15(17)	3(4)	86(100)
High	59(69)	3	1	0	11	2	0	0	0	0	1	0

* indicate significance of value at P=0.05

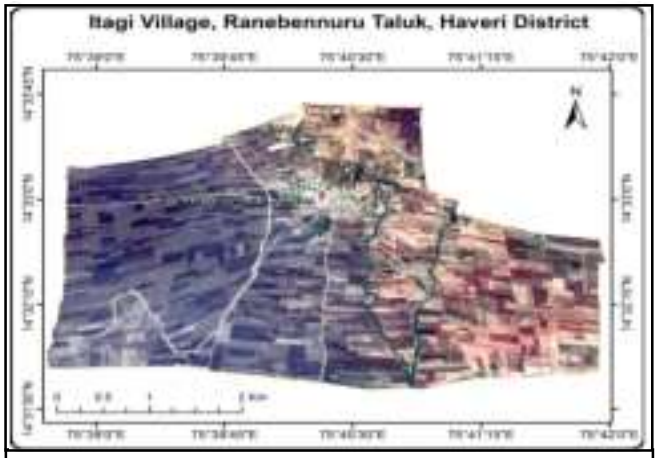

Fig. 1: Itagi village, Ranebennuru Taluk, Haveri district

pH and 28 pe rcent of the samples belong to neutral range of pH of soils. However, the soil salinity is medium in the area. Available nitrogen is low (59 %) and medium (30 %). Available phosphorous is low (48 %) and medium (44 %). Available potash is low (15 %) and medium (70 %). Fifty eight per cent of the samples for organic C belong to medium category and forty per cent of the samples for organic C belong to low category. All the samples for available B belong to low category. While majority of the soils have low status of other micronutrients except Cu. The following DEXCEL maps prepared for pH, Av. NPK and organic C indicate the status of soil properties in the village land on respective survey numbers. Which side of the village, the particular

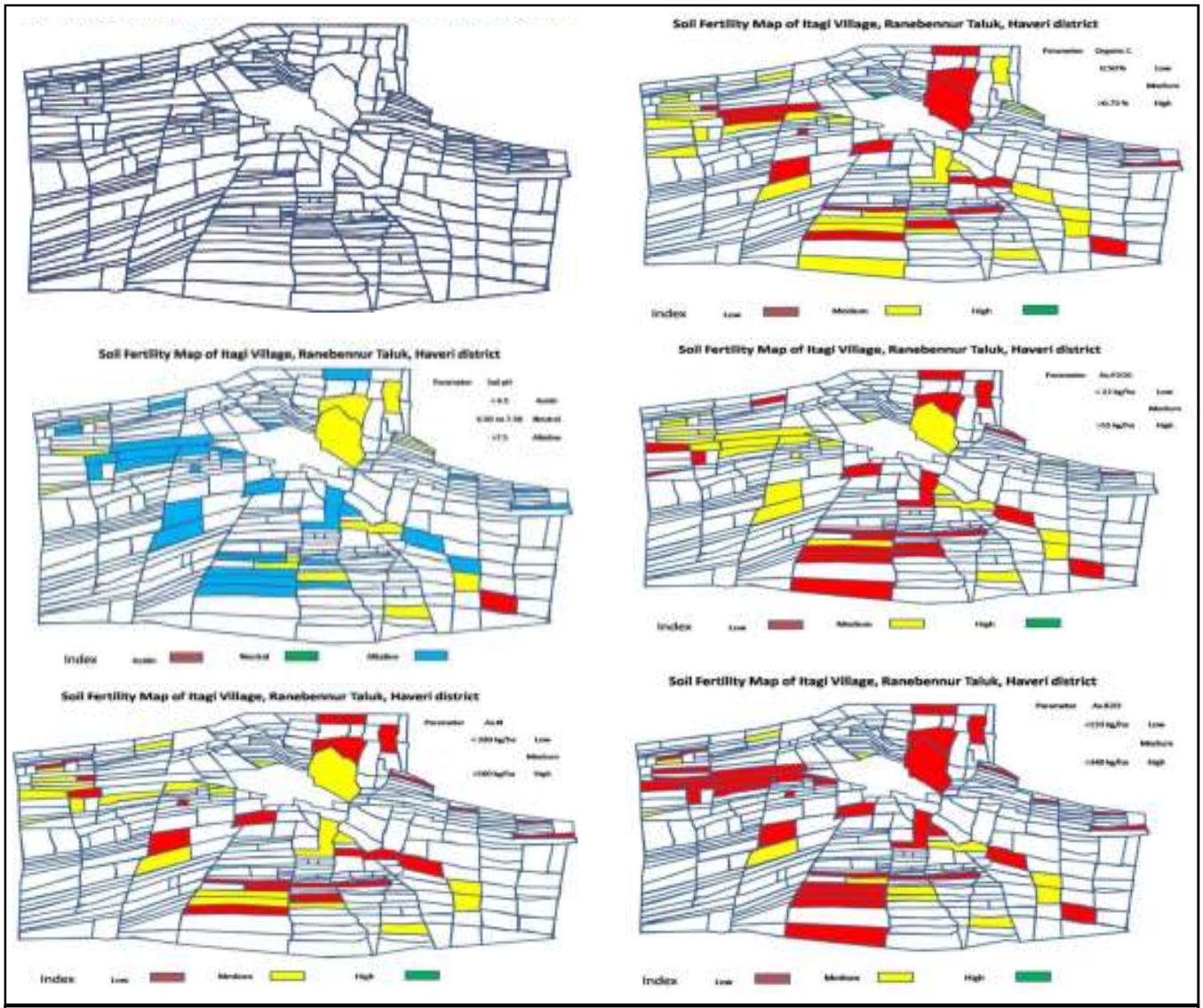

Fig. 2: Itagi village map with boundary lines to each survery number

soil parameter belongs to low category can be observed and suitable measure can be adopted for the management. These results indicate that there is a need of complete management of soils for the improvement of their properties. The gypsum needs to be applied to reduce the pH (Giovanna *et al*., 2012). Available nitrogen has to be increased through organic means as the soils are completely fall under low category of organic C besides application of 25 per cent more quantity than RDF. Soils having low status of P and K also needs applied with 25 per cent more quantity than RDF. Wherever, the micro nutrients are deficient, there is a need of application to the extent of 10 kg/ha or as recommended dosage.

Similar to these maps any other map can be prepared and if all the samples from all the survey numbers are drawn and analysed for the soil properties, all the plots can be seen with colours. In conclusion, the preparation of soil fertility maps using GIS is not affordable to everybody and the softwares are high priced. Moreover, these can be handled only by the trained experts. So, In order to have village soil fertility map even by fertilizer dealer an easy and MS office based (word. Excel. Power point), particularly excel sheet based DEXCEL map has been developed.

REFERENCES

Dhayalan,V., Muthu Selvam, M. and Ramaraj, M. (2016). Mapping and analysis of soil fertility using remote sensing and GIS; A case sStudy of Tharangambadi Taluk, Nagappatinam district. *International Journal of Engineering Research & General Science*, **4** (3) : 218 - 230.

Giovanna, Cucci, Giovanni, Lacolla, Mauro, Pallara and Rocco, Laviano (2012). Reclamation of saline and saline-sodic soils using gypsum and leaching water. *African J. Agric. Res.,* **7** (48) : 6508-6514.

Mishra, Antaryami, Pattnaik, Truptimayee, Das, D. and Das, Mira (2014). Soil fertility maps preparation using GPS and GIS in Dhenkanal district, Odisha, India, *Internat. J. Plant & Soil Sci*., **3**(8): 986-994.

Prabhavati, K. and Dasog, G. S. and Patil, P. L. and Sahrawat, K. L. and Wani, S. P. (2015). Soil fertility mapping using GIS in three sgro-climatic zones of Belgaum district, Karnataka. *J. Indian Society of Soil Sci.*, **63** (2):173-180.

Rajakumar, G.R. and Patil, S.V. (2017). DEXCEL map – A new approach to prepare soil fertility map. *Int. J. Curr. Microbiol. App. Sci*., **6** (7) : 738-744.

WEBLIOGRAPHY

Anonymous, 2015, Create-excel-freeformshapes-from-polygons. *http://www. clearlyandsimply.com/clearly_and_simply/2015/04/create-excel-freeformshapes-from-polygons.html.*