International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 4 July-Aug 2023, pp: 2036-2042 www.ijprajournal.com ISSN: 2249-7781

A Comparison of GPS and Manual Calculations for Measuring Watershed Area of DBSKKV, Dapoli

N.D. Patil[1],P.R. Kolhe[2],M.H.Tharkar[3]A.A. Kale[4], S.B. Gavit[4], Y.S. Tsopoe[4]
[1]*M.Tech, College of Agriculture Engineering and Technology, Dr. BSKKV, Dapoli Maharashtra, India*
[2]*Associate Professor (CAS), College of Agriculture Engineering and Technology, Dr. BSKKV, Dapoli Maharashtra, India*
[3]*Assistant Professor , College of Agriculture Engineering and Technology, Dr. BSKKV, Dapoli Maharashtra, India*
[4]*M.Tech, College of Agriculture Engineering and Technology, Dr. BSKKV, Dapoli Maharashtra, India*

Submitted: 15-08-2023 Accepted: 25-08-2023

ABSTRACT
Accurate measurement of agricultural land is crucial for efficient land management, resource allocation, and decision-making in the agricultural sector. Traditionally, manual methods have been employed to measure land areas, relying on physical measurements and calculations. However, the advent of Global Positioning System (GPS) technology has introduced a new approach to land measurement, offering the potential for improved accuracy, efficiency, and data integration. This study aims to compare the accuracy, time efficiency, and practicality of using GPS technology versus manual calculations for measuring agricultural land.The research methodology involves the measurement of agricultural land parcels using both GPS devices and manual methods. A sample of agricultural plots will be selected, and their dimensions will be recorded using traditional manual techniques, such as tape measures and compasses. Simultaneously, the same plots will be measured using GPS devices capable of capturing precise location data. The collected measurements will be compared to evaluate the discrepancies, if any, between the two methods.The analysis will consider factors such as measurement accuracy, ease of use, time required for data collection, and potential sources of error for each approach. Additionally, the study will explore the compatibility of GPS data with existing Geographic Information Systems (GIS) for seamless integration and analysis. This comparison will provide insights into the strengths and limitations of both GPS and manual calculations, helping farmers, land surveyors, and agricultural professionals to make informed decisions regarding land measurement techniques.

I. INTRODUCTION

Google Earth Pro was developed by Google and is well known for its powerful mapping and visualization tool. It is a modified or advanced version of the Google Earth application, offering additional features and capabilities for professional use.With Google Earth Pro, you can virtually travel to any location on Earth and view it from various perspectives. Google Earth Pro allows users to explore the world through high-resolution satellite imagery, aerial photography, and three-dimensional terrain models.The software provides a seamless and immersive experience, giving users the ability to explore both natural and man-made wonders, famous landmarks, cities, and remote areas. You can zoom in and out, tilt and rotate the view, and navigate through different layers of information. It also provides tools for measuring distances, areas, and heights, making it useful for a wide range of professional applications such as urban planning, architecture, and environmental analysis. One of the key features of Google Earth Pro is its powerful search functionality. You can search for specific addresses, landmarks, cities, or even coordinates to instantly fly to that location.Google Earth Pro offers a variety of overlays and layers that provide additional information on top of the satellite imagery. It also supports importing and overlaying your own data, such as spreadsheets or GIS files, to further enhance your analysis and presentations.These include roads, borders, 3D buildings, weather patterns, and even historical imagery, allowing you to compare changes over time.

II. REVIEW OF LITERATURE

The Global Positioning System(GPS) and Geographic Information System (Civilians) are two

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 4 July-Aug 2023, pp: 2036-2042 www.ijprajournal.com ISSN: 2249-7781

distinct but nearly affiliated technologies that allow for the collection, storehouse, operation, analyses, and display of spatial data. The two technologies shouldn't be confused — a GPS is a system for collecting spatial data, a Civilians is a system for managing and assaying spatial data — and a Civilians may ormay not involve GPS data.

As utmost questions in primate behavioral ecology involve a spatial element, both GPS and Civilians are an necessary part of the primatologist's toolkit. still, despite the exponential increase in the advancement and vacuity of GPS/ Civilians technology in the early twenty-first century and their wide use in ecology, these tools particularly Civilians — remain underutilized in primatology GPS and Civilians are important tools for understanding primate behavioral ecology. The exemplifications handed in this encyclopedia entry are a small sample of the types of operations for these technologies in primatology. still, as mentioned over, primatologists have yet to employ the full eventuality of Civilians for addressing abecedarian questions in primate socioecology, particularly for thesis testing. This will bear that primatologists suppose creatively about how these tools can be applied to similar questions and to expand their ideas about what constitutes a spatial question.

Materials AndMethodology

A. Materials

Accoutrements For measuring the distance manually, plastic tape recording is used having length of 100 bases. Chaining the check line for measuring the distance, ranging rods are used to make the chain line straight. optic forecourt is used to assuring the perpendicular of equipoises- measured on both side of chain line. Global Positioning System GPS) of interpretation German GPS was used for measuring the equals at each station point. Base camp software installed in computer for bridging the GPS with computer, to transfer the measured equals. Google Earth Pro software is used to detect the observed equals on specified ground and measure the distance and area of chosen ground.

B. Methodology

Measured results are given in Table 1.

Methodology espoused for measuring the vertical distance area of flat ground in both way- manually using chain check and using software Google Earth and also comparison is made for both results. Vertical ground (Entry Test Ground) is named first, which is located at Mehran UET Jamshoro, Sindh. For measuring the distance 1000feet chain line was decided and also ranging of chain line was done for making the chain line straight. Total 20 intermediate stations (C00 to C1000; where ABC shows chainage and number represent distance in bases) were marked with the help of measuring tape recording and sword arrows at each 50feet distance throughout chain line. After establishing the stations on chain line, equals of each station was measured with the help of GPS with uniqueness. C00, C50, C100etc. likewise, six vertical equipoises (three on left side OL00, OL600 and 1000; three on right side OR00, OR600 and OR1000; where OL is neutralize left side, OR is neutralize right side and number represent position of chain line where neutralize was taken). equipoises having 100feet length on both sides- left wing and right side of chain line were measured at chainage of C00, C600 and C1000. equipoises were drawn manually by right angle tringle system and also ranging rods are drawn in to a ground at neutralize position. Cross check is done with the help of optic forecourt for assuring the perpendicular of equipoises and GPS equals are measured at these equipoises for having blockish type of enclosed boundary, to measure the area. Completing field work, measured equals of GPS are transferred to the Google Earth Pro with the ground of Base camp- the connecting software, used to connect the GPS to computer for transferring the measured equals.

III. RESULTS AND DISCUSSION

A. Total Area Measurement

Area is measured on flat ground using "Add Polygon" tool of Google Earth Pro. In first trial area is measured by specifying only four corner points i.e. OR00, OR1000, OL1000 and OL00 as shown in Figure 2(a). In second trial similar measurement is done by specifying six points i.e. OR00, OR600, OR1000, OL1000, OL600 and OL00 This measured area, then compared with standard area of (48,825 m²).

Table No. 1 Total Area of DBSKKV

S. No	Description	Distance (m)	Error (m)
1	Standard area	72785.49	-
2	Perimeter using tape	1185	0.3%
3	Perimeter of campus using aerial image	1,155.83	30

Figure 1. Location of total area of DBSKKV allocation of space measurement on Google Earth Pro

When number of points are lower than there's advanced delicacy in area results is observed and vice versa, as number of points increases. Google Earth Pro measured area is lower than standard area, when many points are specified. While, measured area is advanced than standard, when further points are specified.

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 4 July-Aug 2023, pp: 2036-2042 www.ijprajournal.com ISSN: 2249-7781

Figure 2. Main Building of DBSKKV

Table No. 2 Main Building of DBSKKV

S. No	Description	Distance (m)	Error (m)
1	Standard area	4632.43m²	-
2	Perimeter using tape	313	0.4%
3	Perimeter of campus using aerial image	273.81	40
4	Remaining Space Excluding Main Building of DBSKKV	68153.06	

Figure 3. Library Building

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 4 July-Aug 2023, pp: 2036-2042 www.ijprajournal.com ISSN: 2249-7781

Table No. 3 Library Building

Sr. No	Description	Distance (m)	Error (m)
1	Standard area	2016.50m²	-
2	Perimeter using tape	189 m	0.1%
3	Perimeter of campus using aerial image	179.39m	10
4	Remaining Space Excluding College Building	70768m	

Figure 4. Space Allocated for Farm Pond

Table No. 4 Total Area of Farm Pond

S. No	Description	Distance(m)	Error(m)
1	Standard area	1128.91 m²	-
2	Perimeter using tape	155m	0.2%
3	Perimeter of campus using aerial image	135.64m	20
4	Remaining Space Excluding College Building	71656.58m	

Figure 5. Space Allocated for Poly-house

Table No. 5 Total Area of Poly-house

S. No	Description	Distance(m)	Error(m)
1	Standard area	3711.85 m²	-
2	Perimeter using tape	275m	0.3%
3	Perimeter of campus using aerial image	245.36 m	30
4	Remaining Space Excluding College Building	69073.64 m	

Figure 6. Space Allocated for Farm

Table No. 6 Total Area for Farm

S. No	Description	Distance (m)	Error (m)
1	Standard area	4570.05 m²	-
2	Perimeter using tape	282m	0.2%
3	Perimeter of campus using aerial image	272.80m	10
4	Remaining Space Excluding College Building	68215.44m	

IV. CONCLUSION

1. Why? To calculate the error rate between satellite image and human calculation rate using meter tape. The area calculated using meter tape and the areal footage the hardly difference is approximately 5 to 10 m.
2. How? Among all GIS and GPS Apps the reliable source of satellite images (real time) is google map/google earth.
3. What? To differentiate between the allocation of space in watershed using aerial view.
4. Where? DBSKKV Campus – College of agriculture engineering and technology dapoli.
5. Who? Nikita Dhondiba Patil, Yibeni Shantio Tsopoe, P.R. Kolhe,Sagar Bajirao Gavit.

REFRENCES

[1]. A.A. Kale, P. R. Kolhe, B. R. Gujar, M.M. Khatal, A.D. Salvi, A. Kumar, S.V. Pathak, M.H. Tharkar (2023). A Comparison of GPS and Manual Calculations for Measuring Agricultural Land, International Journal of Pharmaceutical Research and Applications Volume 8, Issue 2, pp: 1572-1578.

[2]. Farah and D. Algarni, “Positional accuracy assessment of Google Earth in Riyadh”, artificial satellites, Vol. 49, No. 2, 2014.

[3]. N. Mohammed, A. Ghazi and H. Mustafa, “Positional accuracy testing of Google Earth”, International Journal of Multidisciplinary Sciences and Engineering, Vol. 4, No. 6, JULY 2013.

[4]. D. Potere, "Horizontal positional accuracy of Google Earth's high-resolution imagery archive", Sensors 2008, vol. 8, pp.7973-7981, DOI: 10.3390/s8127973, ISSN 1424-8220.
[5]. Ahmed, E.M. (2012). Performance Analysis of the RTK Technique in an Urban Environment, Australian Surveyor, 45:1, 47-5
[6]. International Journal of Engineering Research & Technology (IJERT) ISSN: 2278- 0181.
[7]. Potere, D. 2008. Horizontal Positional Accuracy of Google Earth's High-Resolution Imagery Archive. Sensors, 8, 7973-7981
[8]. Google, Inc. Press Release, "Introducing Google Earth outreach", Mountain View, California, USA, June 2007.
[9]. T. Ubukawa, "An evaluation of the horizontal positional accuracy of google and Bing satellite imagery and three roads' data sets based on high resolution satellite imagery". Center for International Earth Science Information Network (CIESIN), March 2013.
[10]. Google Maps, http://maps.google.com/ (Accessed from December 2012 to February 2013).