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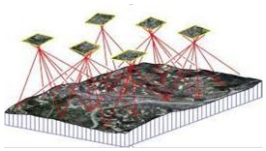
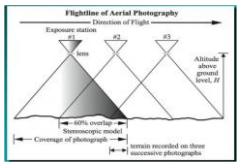
Ministry of Labor and Skills

Rural Land Administration

Level – III

Based on March 2022, Version- II Occupational Standard





Module Title: Basic Image Reading and Interpretation

LG Code: AGR RLA 3 M05 LO (1-2) LG (12-13)

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Introduction to the Module

This module covers the knowledge, skills and attitude required to interpret information from various types of image data. It requires the ability to identify, analyze, calculate and evaluate image data to fulfill project requirements within organizational standards.

LG #13 LO #1- Measurement and Calculation

Instruction sheet-1

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Understanding of basic image data
- Determining scale of image data
- Measuring and calculating data
- Assigning information

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Determine scale of image data
- Perform measurements and calculation
- Allocate calculated information

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1

1.1.Understanding of basic image data

The basic understanding of image data was described in detail under level two modules 07 and 08.But here are some notes which was not mentioned there.

1.1.1. Principles of Image Data in the context of Survey project and area

The basic principles of image data involve understanding the characteristics and properties that make up an image. Some of the key principles of image data include:

1. Pixels: Images are made up of small units called pixels, which are the smallest elements in an image. Each pixel contains a value representing its color and intensity.
2. Resolution: The resolution of an image is the number of pixels it contains. Higher resolution images have more pixels, resulting in greater detail and clarity.
3. Color space: The color space of an image determines the range of colors that can be represented in the image. Different color spaces can affect the appearance of an image and how it is displayed on different devices.
4. File format: The file format of an image determines how the image data is stored and compressed. Different file formats have different advantages and disadvantages, depending on the intended use of the image.
5. Compression: Image compression is the process of reducing the file size of an image by removing some of the data. Compression algorithms can be lossless or lossy, and can impact the quality and clarity of the image.
6. Metadata: Image metadata includes information about the image, such as its creation date, author, and location. Metadata can be embedded in the image file and used for organization and search purposes.
7. Image processing: Image processing involves manipulating and analyzing image data to enhance or extract useful information. This can involve techniques such as filtering, segmentation, and feature extraction.
8. Survey area: The characteristics of the survey area, such as its size, terrain, and vegetation, can impact the selection and use of image data.

Understanding these basic principles is important for working with and manipulating image data, whether for analysis or display purposes. By understanding the characteristics and properties of image data, you can make informed decisions about file formats, compression methods, and processing techniques that will help you achieve your desired outcomes.

1.1.2. Image Data formats

For rural cadaster there are two major types of spatial data, one is vector and the second one is raster. Here are presented raster data formats.

Image data formats are data formats used for representing and storing digital images. Here are some common image data formats:

1. JPEG: JPEG (Joint Photographic Experts Group) is a widely-used image format that uses lossy compression to reduce the file size of an image. It is commonly used for photographs and other images with complex color and shading.
2. PNG: PNG (Portable Network Graphics) is a raster image format that uses lossless compression to reduce the file size of an image. It is commonly used for images with transparency, such as logos and icons.
3. TIFF: TIFF (Tagged Image File Format) is a widely-used raster image format that can be used with or without compression. It is commonly used for high-quality print graphics and photographs.
4. GIF: GIF (Graphics Interchange Format) is a raster image format that uses lossless compression and supports animation. It is commonly used for simple animations and graphics, such as logos and icons.
5. BMP: BMP (Bitmap) is a raster image format that is widely supported by many software applications. It is commonly used for Windows-based graphics and icons.
6. RAW: RAW is a file format used by many digital cameras to capture unprocessed image data. It retains all of the original data captured by the camera's sensor, providing the greatest flexibility for post-processing.
7. PSD: PSD (Photoshop Document) is a proprietary file format used by Adobe Photoshop for storing image data, including layers and other editing information. It is commonly used for creating and editing graphics and images.

8. HEIF: HEIF (High Efficiency Image Format) is a newer image format that uses advanced compression techniques to reduce file sizes while maintaining high quality. It is becoming increasingly popular for use on mobile devices and is supported by many modern operating systems.

9. WEBP: WEBP is a newer image format developed by Google that uses both lossy and lossless compression techniques. It is designed to load faster than other image formats and is becoming increasingly popular for use on the web.

These are just a few examples of the many image data formats that are available. The choice of format will depend on the intended use of the image, the desired level of compression, and the software and tools being used to work with the image.

1.1.3. Constraints of Image Data

There are several common constraints that can affect image data, including:

1. Resolution: The resolution of an image is the number of pixels that it contains. Low-resolution images may appear blurry or pixelated, while high-resolution images can be very large and take up a lot of storage space.

2. Color space: The color space of an image determines the range of colors that can be represented in the image. Common color spaces include RGB (red, green, blue) and CMYK (cyan, magenta, yellow, key/black). Different devices and software may use different color spaces, which can affect the appearance of an image.

3. Compression: Image compression is the process of reducing the file size of an image by removing some of the data. Lossy compression algorithms can result in a loss of image quality, while lossless compression algorithms maintain the original quality but may result in larger file sizes.

4. Aspect ratio: The aspect ratio of an image is the ratio of its width to its height. Different devices and platforms may require images with specific aspect ratios, which can affect how the image is displayed.

5. Noise: Image noise can be caused by a variety of factors, including sensor limitations, low light conditions, and compression artifacts. Noise can reduce the clarity and detail of an image.

6. Lighting: Lighting conditions can have a significant impact on the appearance of an image. Poor lighting can result in low contrast, washed-out colors, or shadows that obscure important details.

7. Orientation: The orientation of an image refers to its rotation. Some devices and platforms may require images to be in a specific orientation, which can affect how the image is displayed.

These are just a few examples of the common constraints that can affect image data. Other factors, such as file format, metadata, and image sensor type, can also play a role in how image data is stored, processed, and displayed.

1.2.Determine scale of image data

This modules discuss about determination of scale weather in digital or analogue image, however scale was briefly discuss on level two module 7.

Therefore to determine the scale of image data, you can use various sources such as:

1. Image metadata: Many image file formats, such as JPEG, PNG, and TIFF, include metadata that provides information about the image, including its dimensions, resolution, and color space.

2. Image editing software: You can use image editing software, such as QGIS, Adobe Photoshop or GIMP, to open the image and view its dimensions, resolution, and other properties.

3. Command-line tools: You can use command-line tools, such as Image Magick or Exif Tool, to extract metadata from the image file.

4. Web-based tools: There are many web-based tools that allow you to upload an image and view its properties, such as dimensions, resolution, and file size. Some examples include Pixlr, PicResize, and TinEye.

5. Programming libraries: If you're working with image data in a programming language, such as Python or Java, there are many libraries available that provide functions for reading image metadata and properties. Some popular examples include Pillow, OpenCV, and Java Advanced Imaging (JAI).

By using one or more of these sources, you can determine the scale of image data and gain a better understanding of its properties.

In rural land Administration Scale should be understood in deferent scenarios

1. **For preparing field map digitally**

To prepare field map first it is important to determine the scale to be and the size of the paper size in digital map composer.

So based on this we try to see by to deferent scales 1/2000 and 1/1500 on A3 size paper.

For the 1/2000 =420 or 297/Ground distance.

The result of this will bring us Ground distance = 2000*420 or 2000*297=840000 or 594000 see below.

Here is presented a field map preparation on A3 size paper.

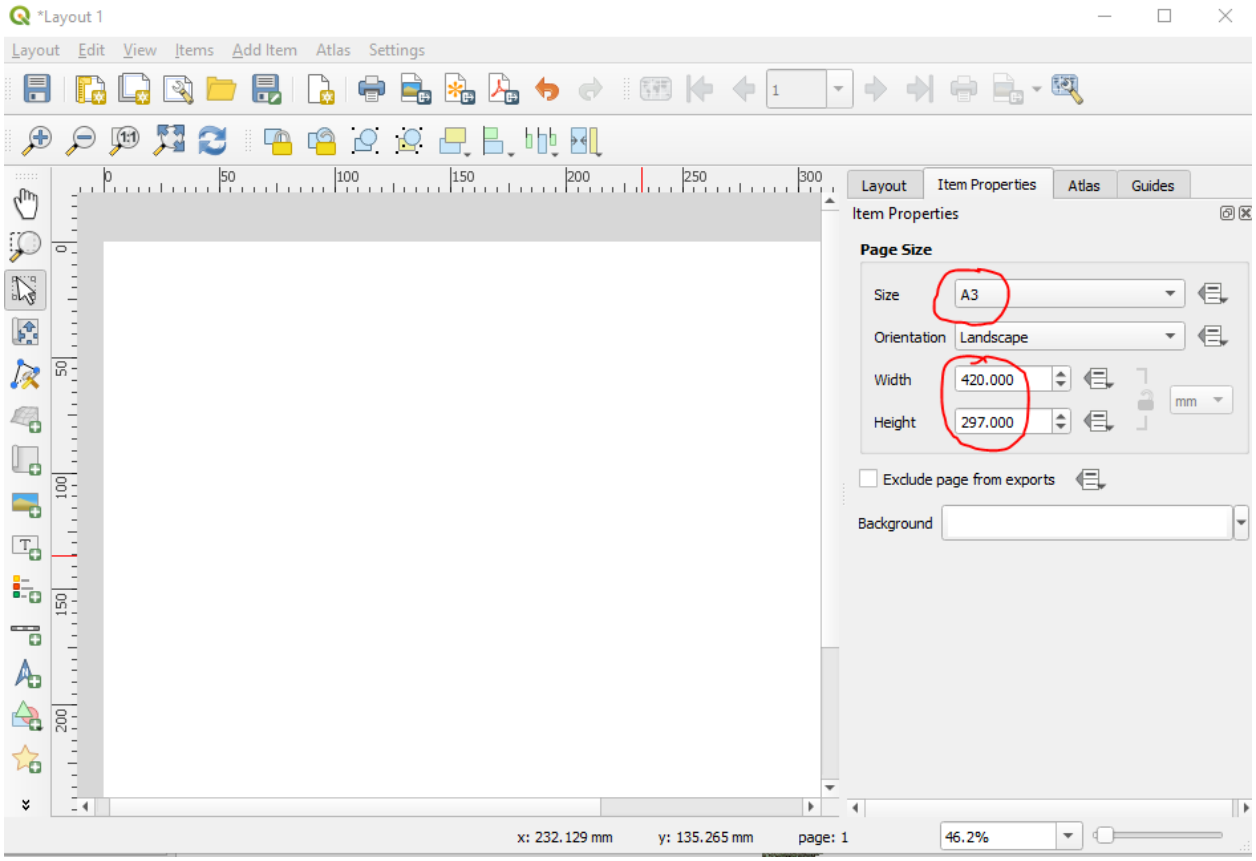

Figure 1:-A3 Size paper indicator

The field map can be prepared in deferent scales here is presented 1/2000 scale.

Therefore the calculation would be 1/2000=420 mm or 297 mm on the above picture over the ground distance the ground distance in this case presented below.

Table 1:-1/2000 Scale on A3 Size determination

Scale	W	H	
1			
2000	420	297	M.D
	840000	594000	G.D

The above explanation is represented in the millimeter and it represents map distance, but when we come to grid the distance represents ground distance and should be converted to meter.

So the above 840000 and 594000 is represented in millimeter when we convert it to meter the result should be 840meter and 594 meters. This is the whole A3 paper size represents on the ground. But when the distance represents on the map some margin should be left, horizontally that margin is horizontally 840-630=90 and vertically 594-445=149 the following horizontal and vertical spacing is marked based on this principle.

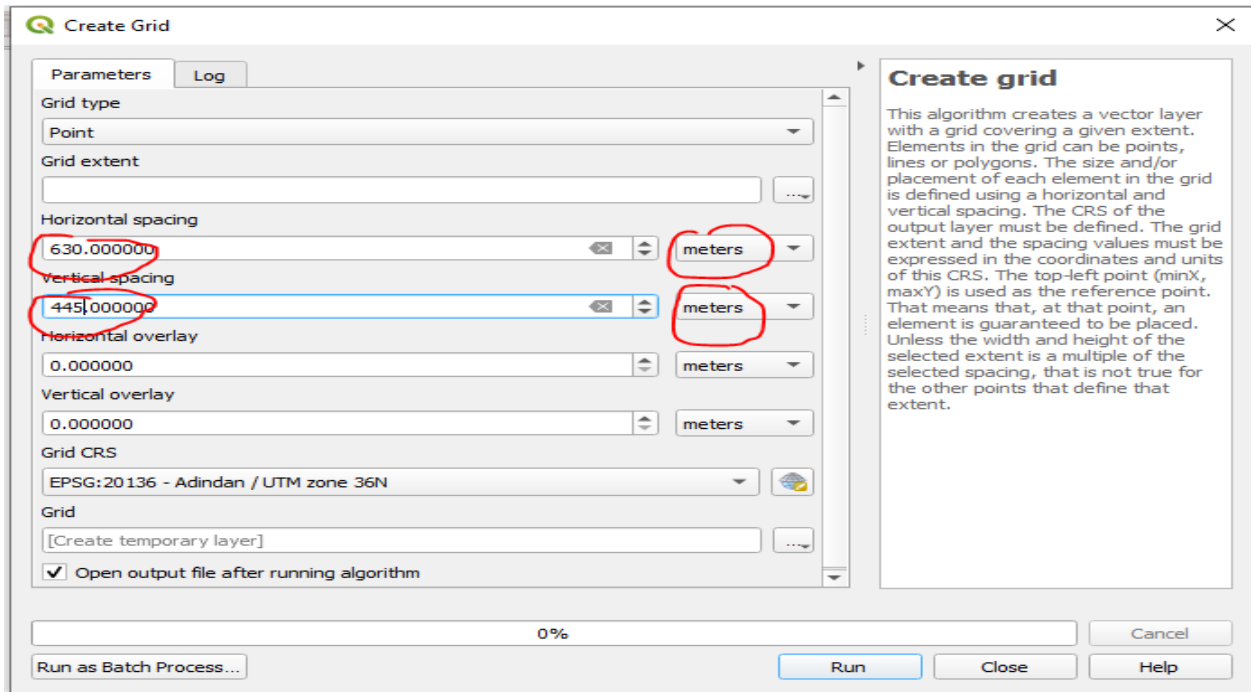

Figure 2:-A3 Size Ground representation

2. **For preparing Public display map digitally**

Deferent paper size can be use, but here is A0 size Paper is presented for public display map on the following digital map.

For public display map rural land administration in Ethiopia the size of the paper is usually A0 and should be adjusted based on the following display.

The calculation follows the same fashion.

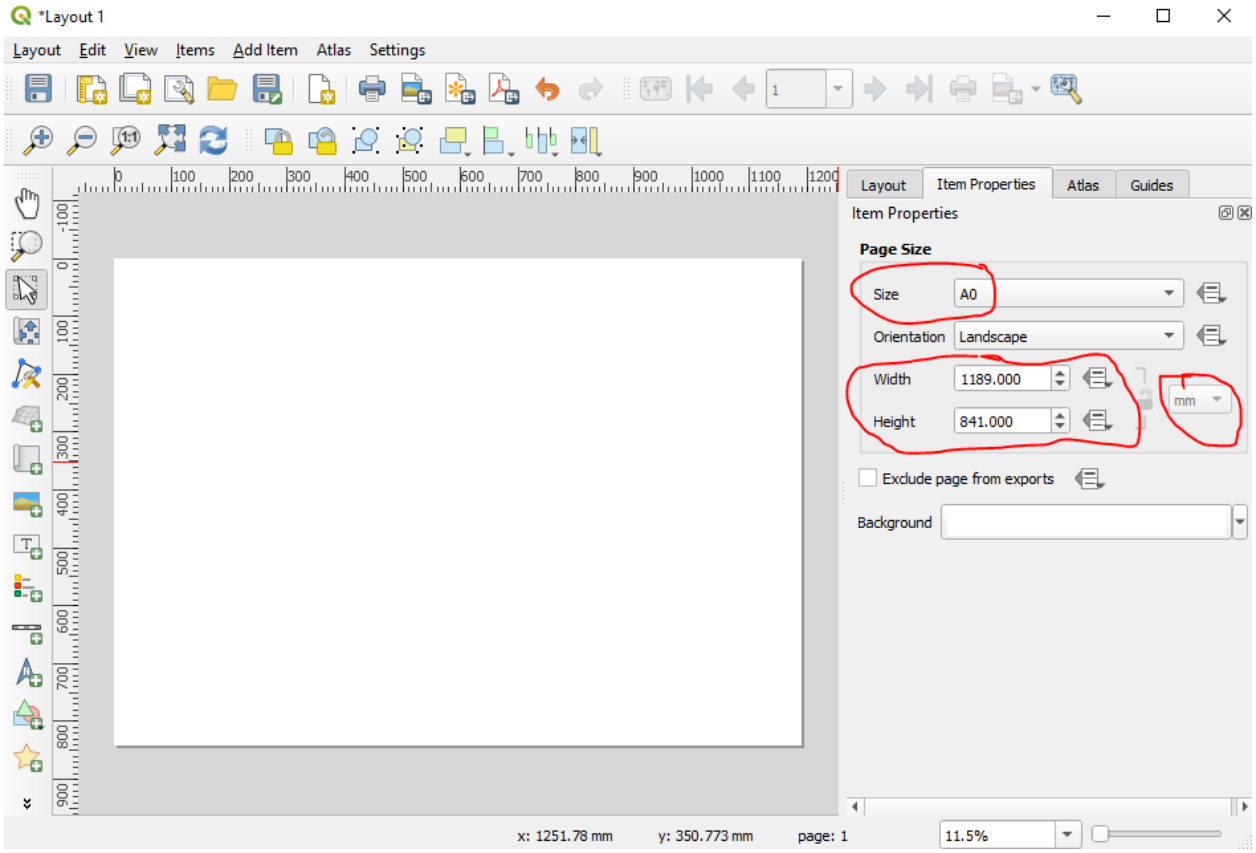

Figure 3:-A0 Size paper indicator

Table 2:-1/2000 Scale on A0 Size determination

For A0 Paper

Scale	W	H	
1			
2000	1189	841	M.D
	2378000	1682000	G.D

The size is automatically changed.

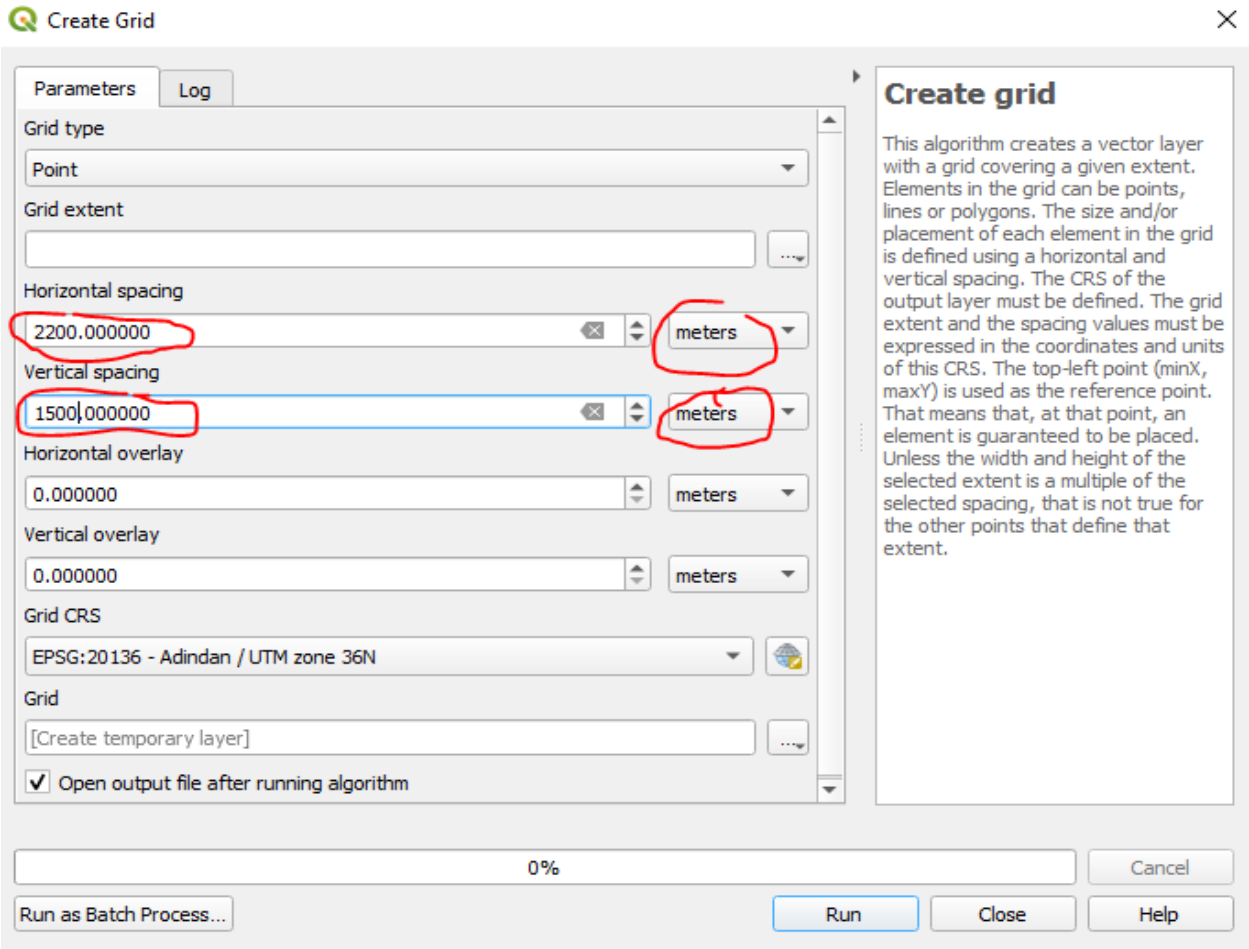

Figure 4:-A0 Size Ground representation

The above diagram shows the ground distance in meter.

3. For preparing parcel map digitally

Parcel map can be prepared in deferent scale in digital map, and it is printed in deferent paper size. On QGIS we first inter deferent size of scale depending the size of the kebele map predicted by map producers. See the following diagram.

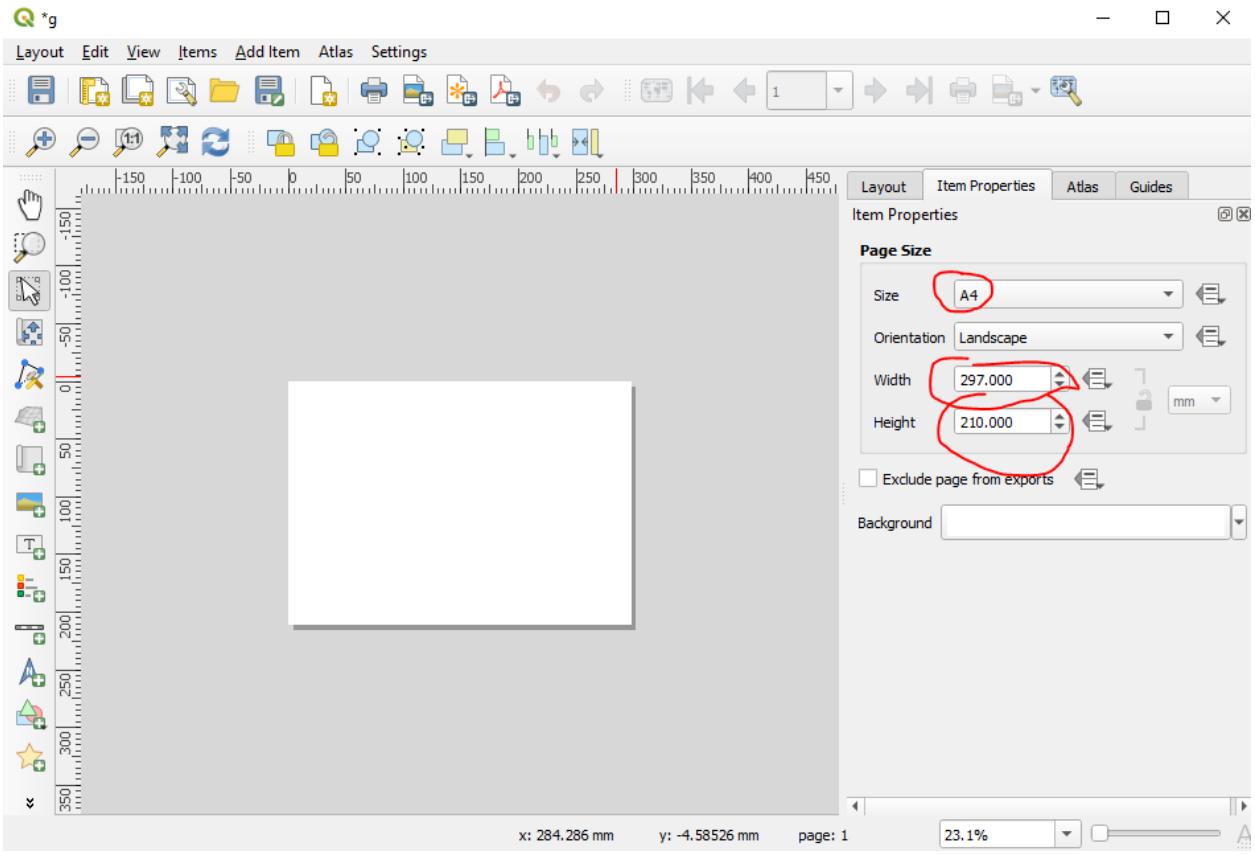

Figure 5:-A4 Size paper indicator

Then on the QGIS setting select Option and add deferent scales, so that the QGIS automatically select the fitted scale for deferent parcel maps. See the following diagrams.

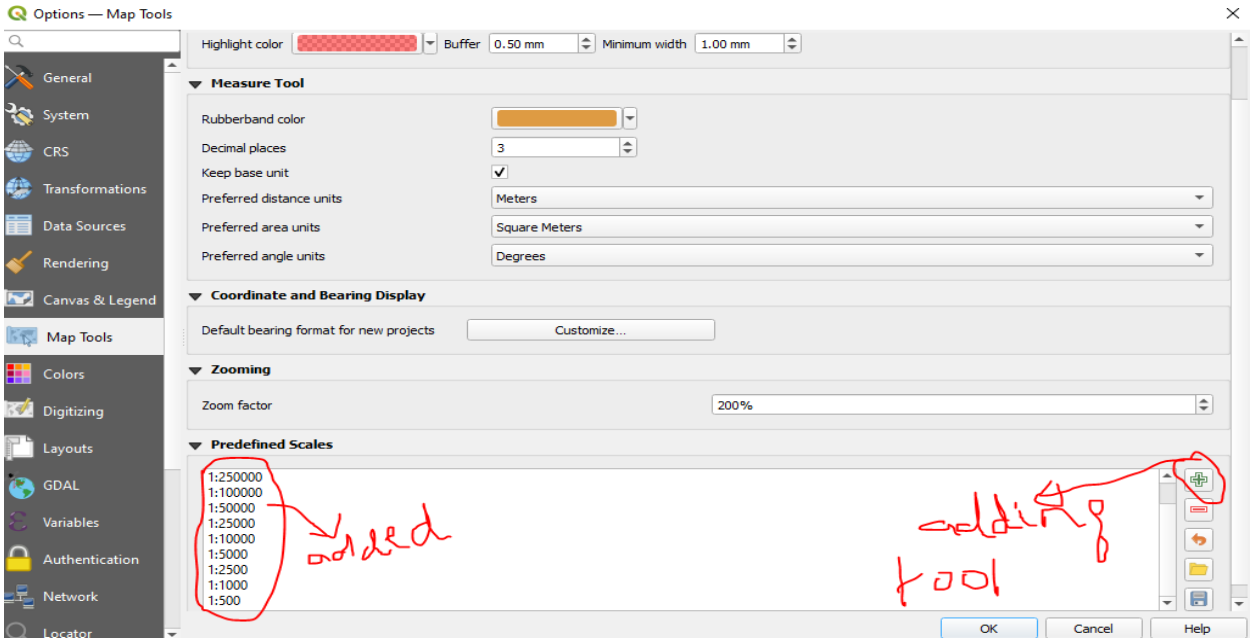

Figure 6:-Scale options for Parcel maps

As you see the scale is already predefined in the above setting then the predefinition of the map should be marked as follow.

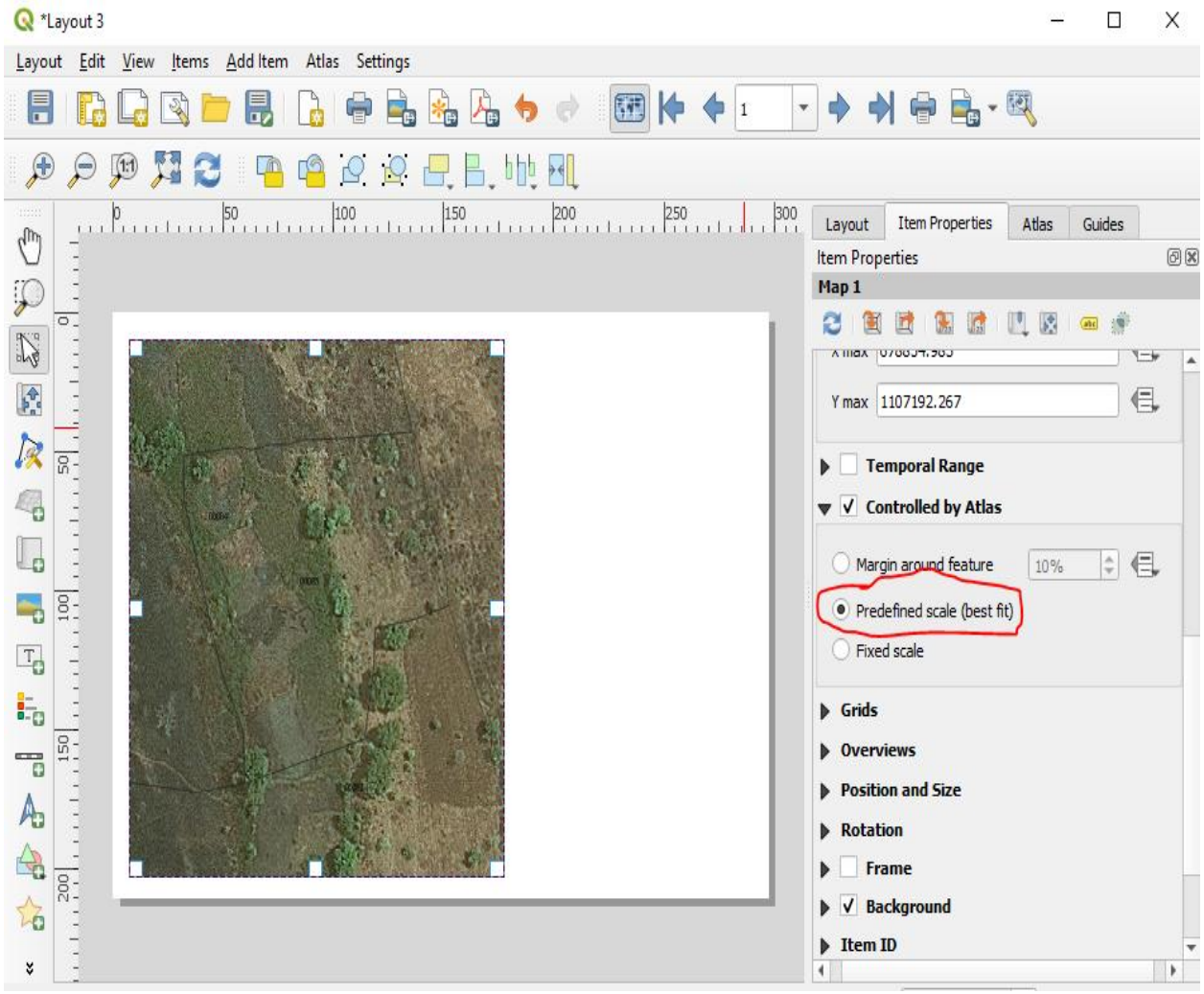

Figure 7:-Pre definition of scale in parcel map

So when the predefinition of the map apply the scale we represented graphically or fractionally as follow.

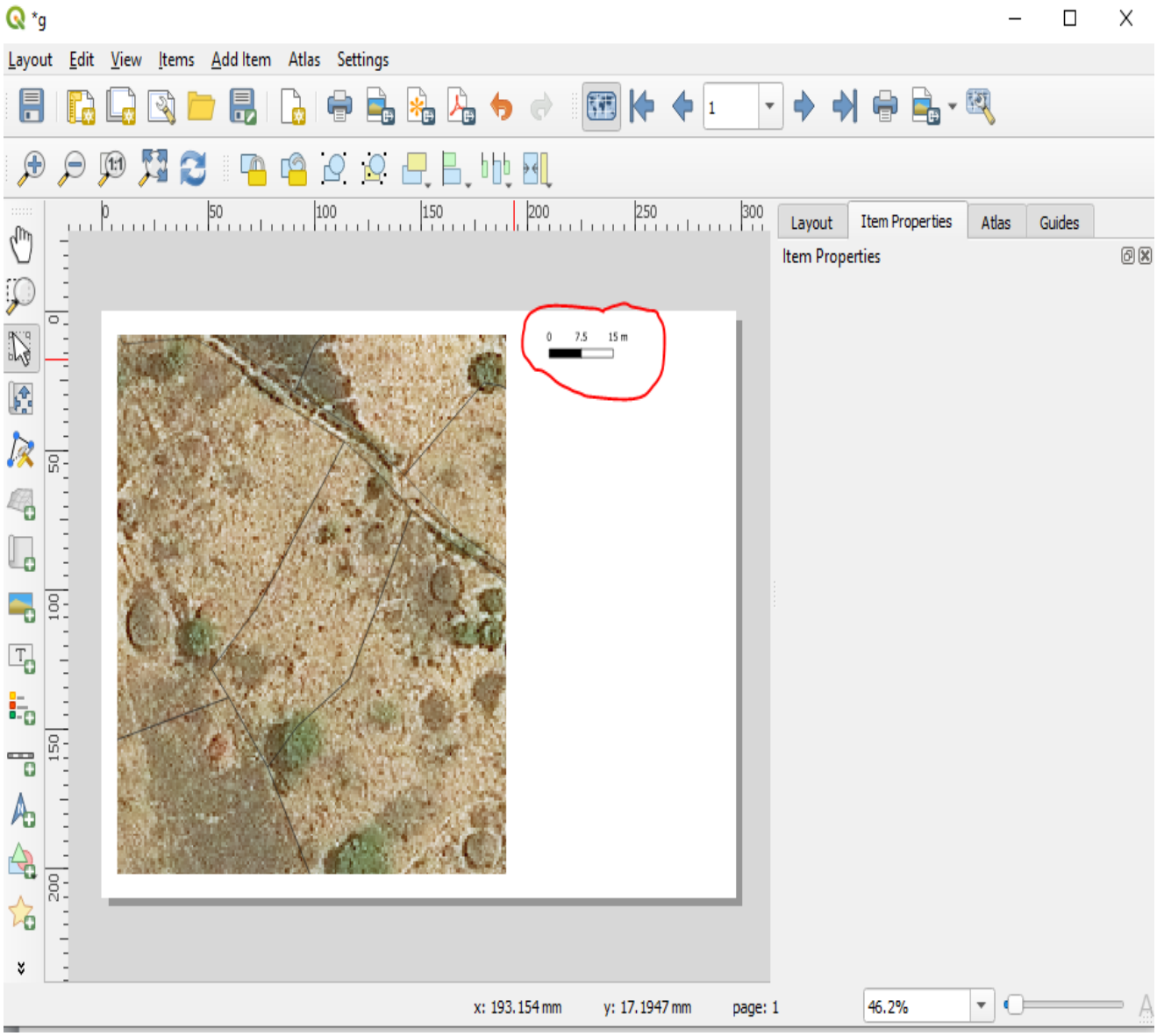

Figure 8:-Graphical Scale in Parcel Map

This graphical representation considered on the ground as 15 m that is 15000 mm. On the following diagram the same map on the fractional representation is 1/500 so we can easily calculate the map distance. That is 1/500=M.D/15000=30

Figure 9:-Fractional Scale in Parcel Map

So the above parcel map relates scale calculation based on Map distance over Ground distance from fractional scale to graphical scale.

After print out the map look like

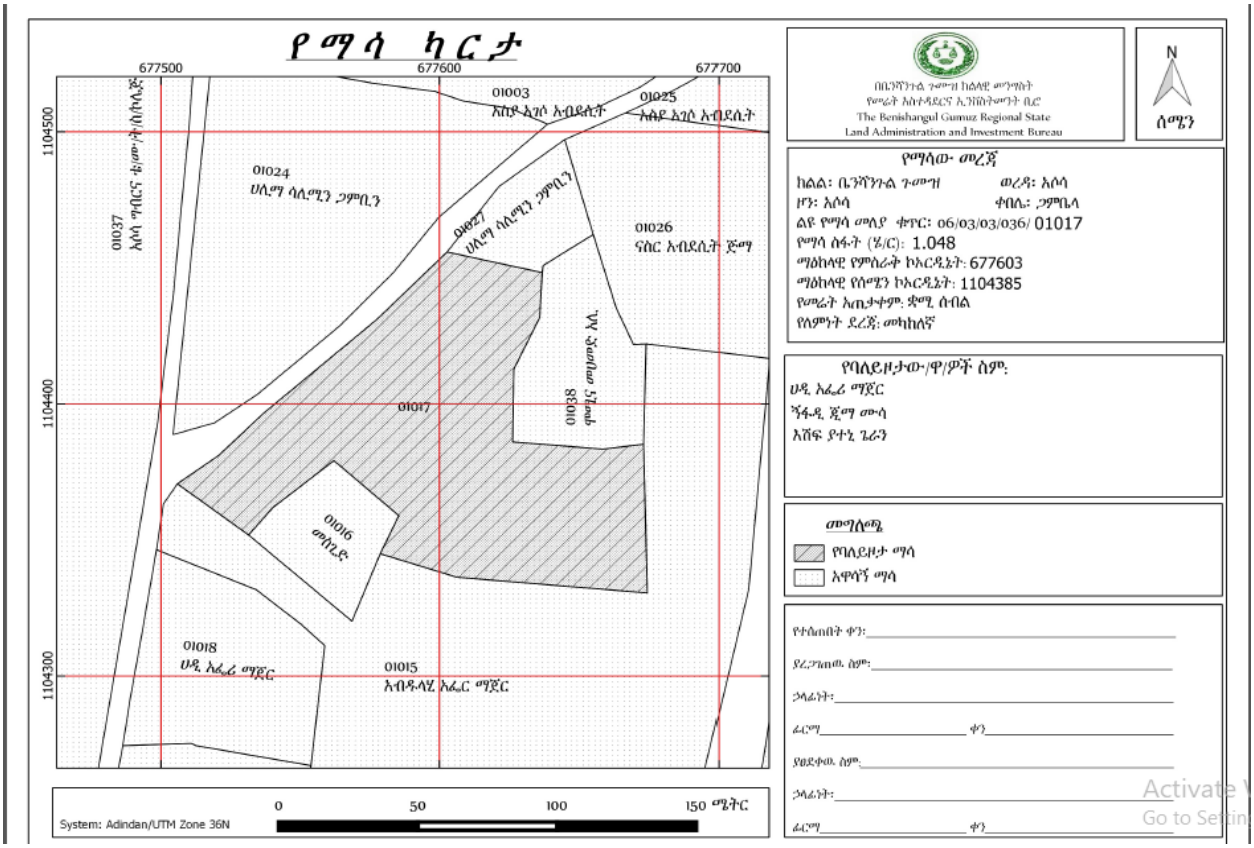

Figure 10:-Parcel Map Certificate

4. Scale in analog map

It is understood based on the relationship between the scale map and the rural interface. And the detail is described below on the perform measurement part.

1.3.Perform measurements and calculation

To perform measurements and calculations on image data, you will need to use appropriate software and tools. Here are some examples of software and tools that you can use:

1. Image editing software: Image editing software such as Adobe Photoshop, GIMP, or Paint.NET can be used to measure the dimensions of an image, such as its width and height, and to calculate the area and perimeter of shapes within the image.

2. Measurement tools: You can use measurement tools, such as a ruler or caliper, to measure objects within the image. These measurements can then be used to calculate the size and scale of the objects.

3. Image analysis software: Image analysis software, such as ImageJ or Fiji, can be used to perform more advanced measurements and calculations on image data, such as quantifying the intensity of specific regions within an image or measuring the distance between two points.

4. Programming libraries: If you are working with image data in a programming language, such as Python or Java, there are many libraries available that provide functions for performing measurements and calculations on images. For example, the OpenCV library provides functions for measuring distances between points, calculating the area of shapes, and performing object detection.

When performing measurements and calculations on image data, it is important to ensure that the image is properly calibrated and that any distortions or variations in lighting are accounted for. Additionally, be sure to document your methods and sources for future reference.

Performing distance measurement is common to work in analogue map in Ethiopian rural land administration so for measuring distance in analog map has deferent scenario .It could be 1/300,1/250,1/400,1/200,1/500,1/100.

Here we can measure any scaled map by the above scaled ruler. Here 1/2000 and 1/1500 maps will be presented.

The 1/2000 scale map when measured by deferent scale the result will be as follow.

- 1/300*1/x=1/2000 which implies X= 6.6
- 1/250*1/x=1/2000 which implies X = 8
- 1/400*1/x=1/2000 which implies X= 5
- 1/200*1/x=1/2000 which implies X= 10
- 1/500*1/x=1/2000 which implies X=4
- 1/100. *1/x=1/2000 which implies X=20

When the map scale is changed to 1/1500 scale map when measured by deferent scale the result will be as follow.

- 1/300*1/x=1/1500 which implies X=5
- 1/250*1/x=1/1500 which implies X = 6
- 1/400*1/x=1/1500 which implies X=3.75
- 1/200*1/x=1/1500 which implies X =7.5

- 1/500*1/x=1/1500 which implies X =3
- 1/100. *1/x=1/1500 which implies X=15

On the same fashion deferent scaled map vary its representation accordingly.

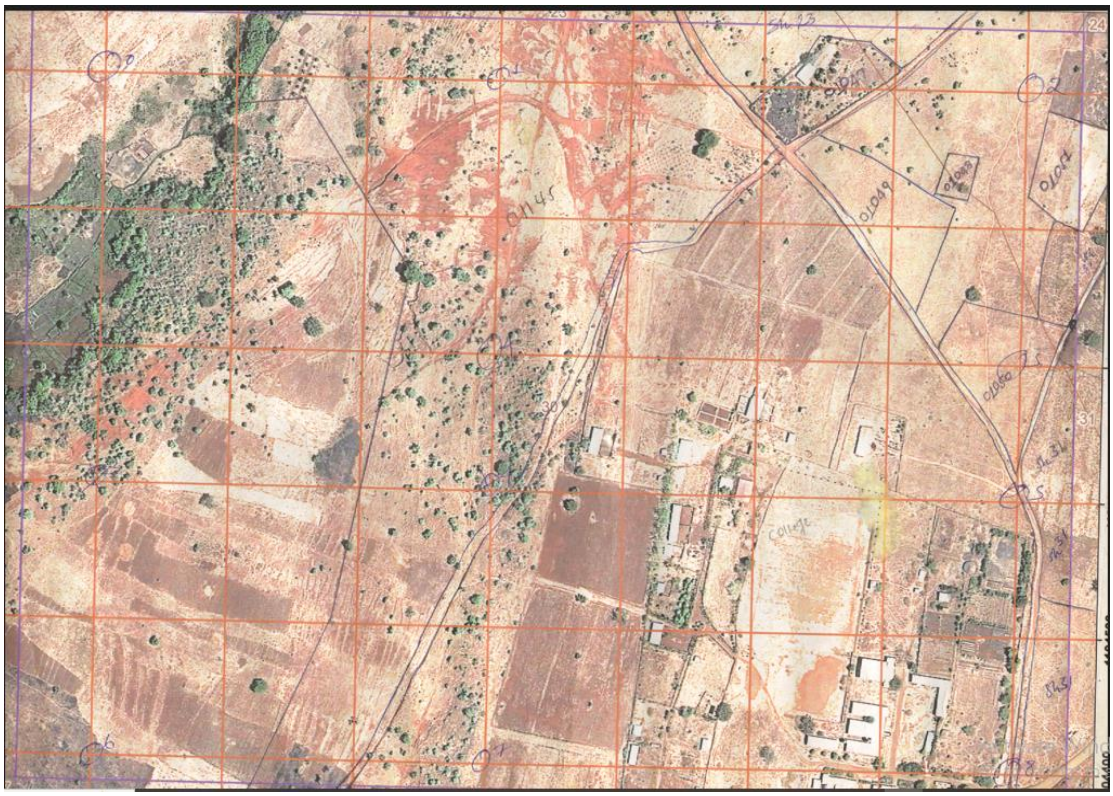

Figure 11:-Analogue Field map

Figure 12:-Scaled Ruler

To perform measurement it is important to adjust the measurement scale with field map.

1.4.Allocate calculated information

Allocation of the calculated in formation from the given map based on 1/2000 scale is presented below.

- 1/300*1/x=1/2000 the allocation of any single unit in the map should be multiplied by 6.6 the allocation for single friction is 1.32. Meter.
- 1/250*1/x=1/2000 the allocation of any single unit in the map should be multiplied by 8 the allocation for single friction is 1.6. Meter.
- 1/400*1/x=1/2000 the allocation of any single unit in the map should be multiplied by 5 the allocation for single friction is 2.5. Meter.
- 1/200*1/x=1/2000 the allocation of any single unit in the map should be multiplied by 10 the allocation for single friction is 2. Meter
- 1/500*1/x=1/2000 the allocation of any single unit in the map should be multiplied by 4 the allocation for single friction is 2. Meter.
- 1/100. *1/x=1/2000 the allocation of any single unit in the map should be multiplied by20 the allocation for single friction is 4. Meter.

When the map scale is changed to 1/1500 scale map when measured by deferent scale the result will be as follow.

- 1/300*1/x=1/1500 the allocation of any single unit in the map should be multiplied by 5
- 1/250*1/x=1/1500 the allocation of any single unit in the map should be multiplied by 6
- 1/400*1/x=1/1500 the allocation of any single unit in the map should be multiplied by3.75
- 1/200*1/x=1/1500 the allocation of any single unit in the map should be multiplied by 7.5
- 1/500*1/x=1/1500 the allocation of any single unit in the map should be multiplied by 3
- 1/100. *1/x=1/1500 the allocation of any single unit in the map should be multiplied by15

Self-check 1	Written test

Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Choose the best answer (4 point)

1. …… is the ratio between Ground distance and map distance.
   A. Scale
   B. Image
   C. Camera
   D. None
2. In any map it is possible to calculate all except-------?
   A. Elevation
   B. Width
   C. A and B
   D. None
3. **Which one is best Scale for measurement in 1/2000 Scale map.**
   A. 1/200
   B. 1/300
   C. 1/500
   D. None
4. **Which one is best Scale for measurement in 1/1500 Scale map.**
   A. 1/200
   B. 1/300
   C. 1/500
   D. None

Test II: Short Answer Questions

1. Explain what scale mean----------

   ----
2. What is the deference focal length/Height and Map Distance /Ground Distance----------
   ----

Operation Sheet -1

1.1.Techniques/Procedures/Methods for fixing the scale side.

A. Tools and equipment's

I. Orth photo/Image /Field Map:-
II. Scales
III. Map boards with clips
IV. Pens& pencils
V. Erasers
VI. A4 size paper.

B. Procedures/Steps/Techniques for fixing the scale side.

- **Set** the Orth photo/Image /Field map/ on the board keep the North direction to the front and fixing it.
- **Align** our faces to the north directions in the real world.
- **Put** the scales and papers on the fixed boards.
- **Follow** the X or Y lines by scale (by six sides) and measure single grid.
- **Pick up** the scale and record on the paper the scale distance (map distance) over the ground distance (Grid distance on the map) for each side and multiply each by scale factors.
- **Find the factor** and multiply the scale reading to find the distance in meter.
- **Repeat** the measurement by deferent scale sides (Six sides).
- **Compare** the measurements it should be nearly equal.
- **Select** the easiest and simplest one.

1.2.Techniques/Procedures/Methods of measuring distance and area.

A. Tools and equipment's

I. Orth photo/Image /Field Map:-
II. Scales
III. Meter tapes
IV. Map boards with clips
V. Pens& pencils
VI. Erasers

B. Procedures/Steps/Techniques for measuring distance and area.

- **Set** the Orth photo/Image /Field map/ on the board keep the North direction to the front and fixing it.
- **Align** our faces to the north directions in the real world.
- **Visualize** the image.
- **Apply** elements of Image interpretation
- **Understand** the image.

To interpret the map based on the size add the following steps

- **Select** location on the map
- **Measure** known distances on the map.
- **Measure** that known distances on the ground by meters.

The guide line, management and operation is guided by operations manual for imagery based systematic 2nd level land registration of rural areas in Ethiopia

LAP TEST-1	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task-1 Determine each scale side amount of measurement for Field map scaled 1:100

Task-2 Measure and calculate area.

LG #14	LO #2- Image data Interpretation

Instruction sheet 2

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Image interpretation
- Solving image data problems
- Finalize and report

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Carryout image interpretation
- Solve image data problems
- Apply quality assurance and analysis
- Identify Constraints related with image data

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
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Information Sheet 2

2.1 Elements of image interpretation

This part detail explained in the level two modules 7, here it presented to highlight the issues and some steps are added to understand more.

Image interpretation is the process of examining an image and extracting information from it. The following are some of the key elements of image interpretation:

1. Tone/color: The tonal variations and color patterns in an image can provide important information about the objects and features within it. For example, variations in the green color of vegetation can indicate differences in plant species or health.
2. Texture/pattern: The texture or pattern of an object or feature in an image can help to identify it. For example, the texture of a road surface can distinguish it from surrounding vegetation.
3. Shape/form: The shape or form of an object or feature can also help to identify it. For example, the shape of a building can indicate its function or use.
4. Size/scale: The size and scale of objects in an image can provide important information about their relative importance or significance. For example, a large building may be more important than a small one in a particular context.
5. Shadow/shade: The presence or absence of shadows or shades in an image can provide important information about the shape, form, and location of objects and features.
6. Context: The context in which an image was taken, such as the location, time of day, weather conditions, and other surrounding features, can provide important clues for interpreting the image.
7. Spectral characteristics: The spectral characteristics of an image, such as the wavelengths of light that were captured, can provide information about the materials or substances that makeup the objects and features within the image. For example, certain wavelengths of light are absorbed differently by different types of vegetation, which can help to distinguish different plant species.
8. Spatial relationships: The spatial relationships between objects and features in an image can provide important information about their relative positions and interactions. For

example, the spatial arrangement of roads, buildings, and other features can indicate the layout and function of an urban area.

9. Temporal changes: Changes in an image over time can provide important information about the dynamics of the objects and features within it. For example, changes in the color and texture of vegetation over a growing season can indicate changes in plant health or growth.
10. Expert knowledge: The interpretation of images often relies on the expertise of individuals who are familiar with the objects and features within them. This can include knowledge of the local environment, cultural or historical context, or specialized technical knowledge related to the image capture process or analysis techniques.

2.2 Solving image data problems

Solving image data problems typically involves performing various tasks on the images such as classification, segmentation, object detection, and image recognition. These tasks can be achieved using various techniques and tools in the field of computer vision and machine learning.

Here are some common techniques and tools used for solving image data problems:

1. Convolutional Neural Networks (CNNs): CNNs are a type of deep learning model that are commonly used for image classification and object detection tasks. They are designed to learn spatial hierarchies of features from the input image data.
2. Transfer Learning: Transfer learning involves using a pre-trained model as a starting point for solving a new problem. This approach can reduce the amount of training data needed and improve the performance of the model.
3. Data Augmentation: Data augmentation involves generating new training data by applying transformations to the existing images. This can improve the robustness of the model and reduce overfitting.
4. **Image Preprocessing:** Image preprocessing techniques such as normalization, resizing, and cropping are often used to improve the quality of the input data and make it easier to process.
5. Open CV: Open CV is an open-source computer vision library that provides a wide range of tools for image processing and analysis.
6. Tensor Flow and PyTorch: Tensor Flow and PyTorch are popular deep learning frameworks that provide tools for building and training neural networks for image analysis.
7. Cloud-based services: There are several cloud-based services such as Amazon Recognition, Google Cloud Vision, and Microsoft Azure Cognitive Services that provide pre-built APIs for image recognition and analysis. These services can be used to quickly build applications that require image analysis capabilities.

To solve image data problems, it's important to have a good understanding of the task at hand and the available techniques and tools. Additionally, having a good dataset that is representative of the problem is crucial for training and evaluating the performance of the models.

Hire we will present only Image processing techniques only and presented as follow.

Image Preprocessing

Image preprocessing techniques are a set of operations that are applied to an image to enhance its quality, improve its visual appearance, and extract useful information from it. These techniques can be used to solve a variety of problems in image data, such as noise reduction, image enhancement, image segmentation, object detection, and recognition.

Here are some common image preprocessing techniques that can be used to solve image data problems:

1. Image resizing: This technique is used to change the size or resolution of an image. It can be useful when dealing with large images that are computationally expensive to process.
2. Image cropping: This technique involves removing a portion of an image to focus on a particular region of interest. It can be used to remove unwanted background or to zoom in on a specific object.
3. Image filtering: This technique is used to remove noise or unwanted artifacts from an image. Common types of filters include median, Gaussian, and bilateral filters.
4. **Image normalization**: This technique is used to adjust the brightness and contrast of an image. It can be used to improve the visual appearance of an image or to prepare it for further processing.
5. Image segmentation: This technique involves dividing an image into multiple segments or regions based on their properties, such as color, texture, or intensity. It can be used for object detection, recognition, or tracking.
6. Image registration: This technique involves aligning two or more images that have been acquired at different times or using different modalities. It can be used to compare images or to create composite images.
7. Image augmentation: This technique involves generating new images by applying random transformations to existing images. It can be used to increase the size of a training dataset or to improve the robustness of a machine learning model.

By using these preprocessing techniques, it is possible to solve a wide range of image data problems and improve the performance of image-based applications.

Here are some references to support the above statements about image preprocessing techniques:

Image normalization

Image normalization is a technique used to adjust the brightness and contrast of an image to improve its visual appearance or prepare it for further processing. Normalization is an essential step in many image processing pipelines, particularly when dealing with images from different sources or under varying lighting conditions.

The goal of image normalization is to ensure that the pixel values in an image fall within a specific range. This can be achieved using different techniques, such as:

1. Min-max normalization: This method scales the pixel values of an image to fall within a specific range, typically between 0 and 1. The formula used for min-max normalization is:

   normalized_image = (image - min_value) / (max_value - min_value)

Where min_value and max_value are the minimum and maximum pixel values in the image, respectively.

2. Z-score normalization: This method scales the pixel values of an image to have a mean of 0 and a standard deviation of 1. The formula used for z-score normalization is:

normalized_image = (image - mean_value) / std_dev_value

where mean_value and std_dev_value are the mean and standard deviation of the pixel values in the image, respectively.

3. Histogram equalization: This method adjusts the distribution of pixel values in an image to improve its contrast. Histogram equalization works by stretching the intensity range of an image to cover the entire range of pixel values. This can be done using the cumulative distribution function (CDF) of the pixel values in the image.

There are also various variants of histogram equalization, such as adaptive histogram equalization (AHE) and contrast limited adaptive histogram equalization (CLAHE), which can be more effective in certain cases.

Image normalization is commonly used in many image-based applications, such as computer vision, medical imaging, and remote sensing. It can help to reduce the effects of lighting variations, improve the quality of images for human perception, and enhance the performance of machine learning models.

Here is an example for image normalization in QGIS for rural cadaster in Ethiopia.

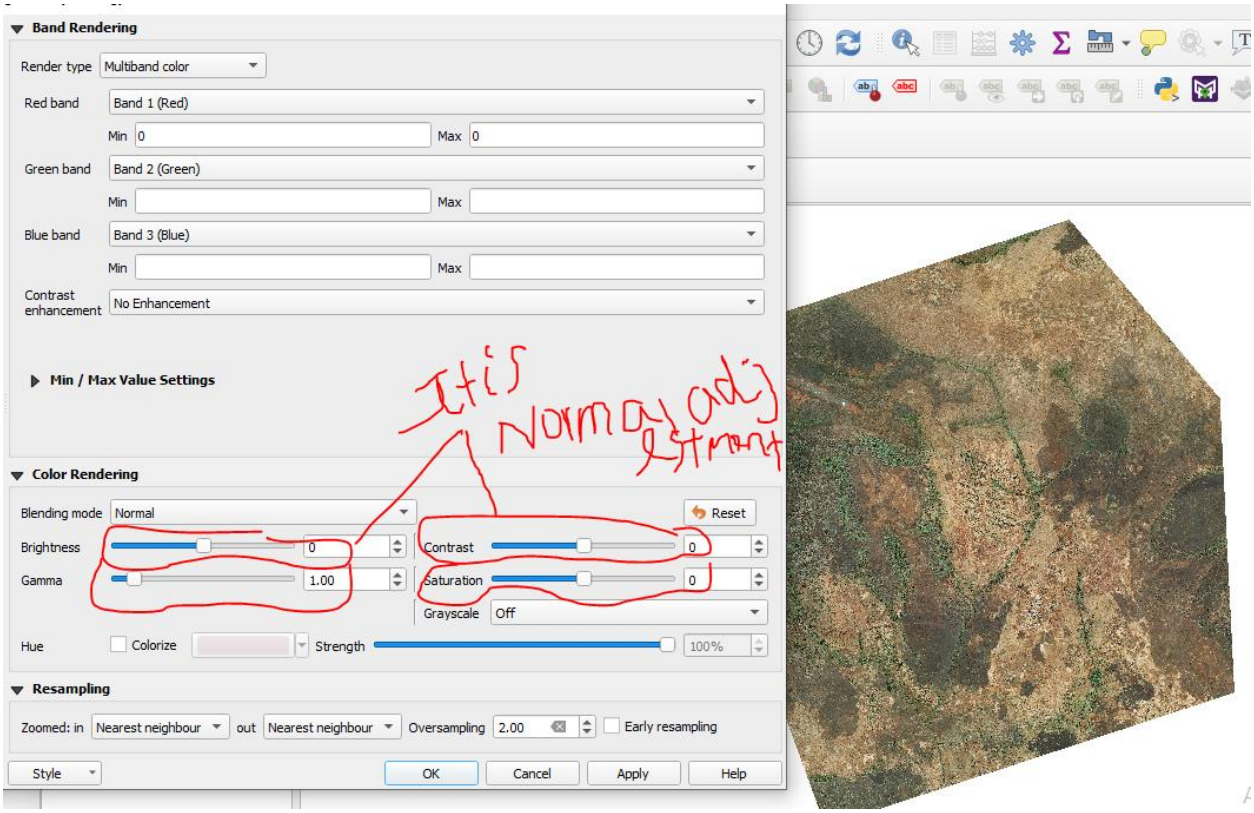

Figure 13:-The normal status of image enhancement

But if anybody likes to improve this image can change the brightness, Gama, Contrast and saturation. See the following deference

The following figure shows the brightness improvement

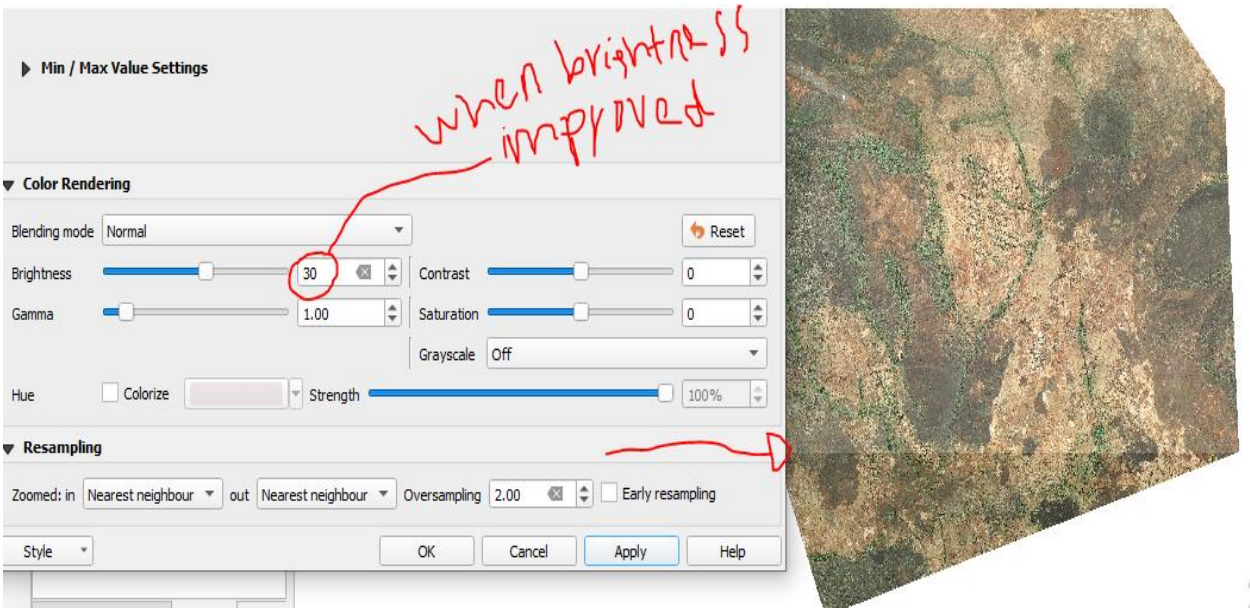

Figure 14:-Improved Brightness

The following image shows reduction of gamma value.

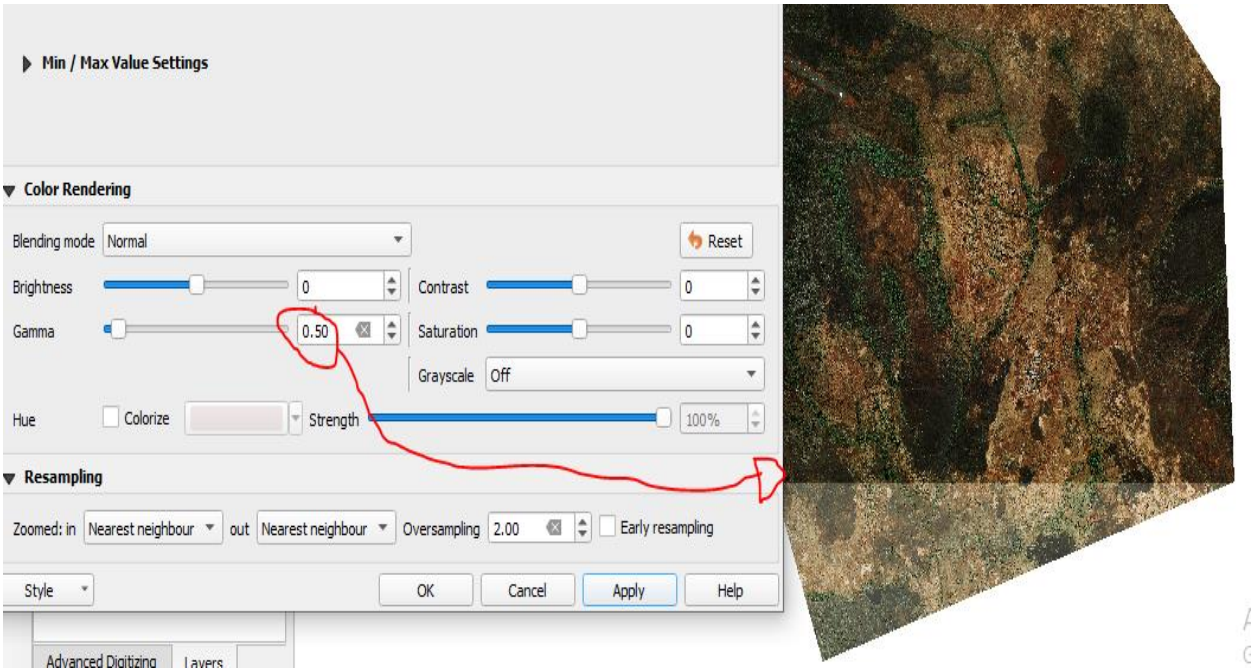

Figure 15:-Improved Gamma

The following image shows the improvement of contrast

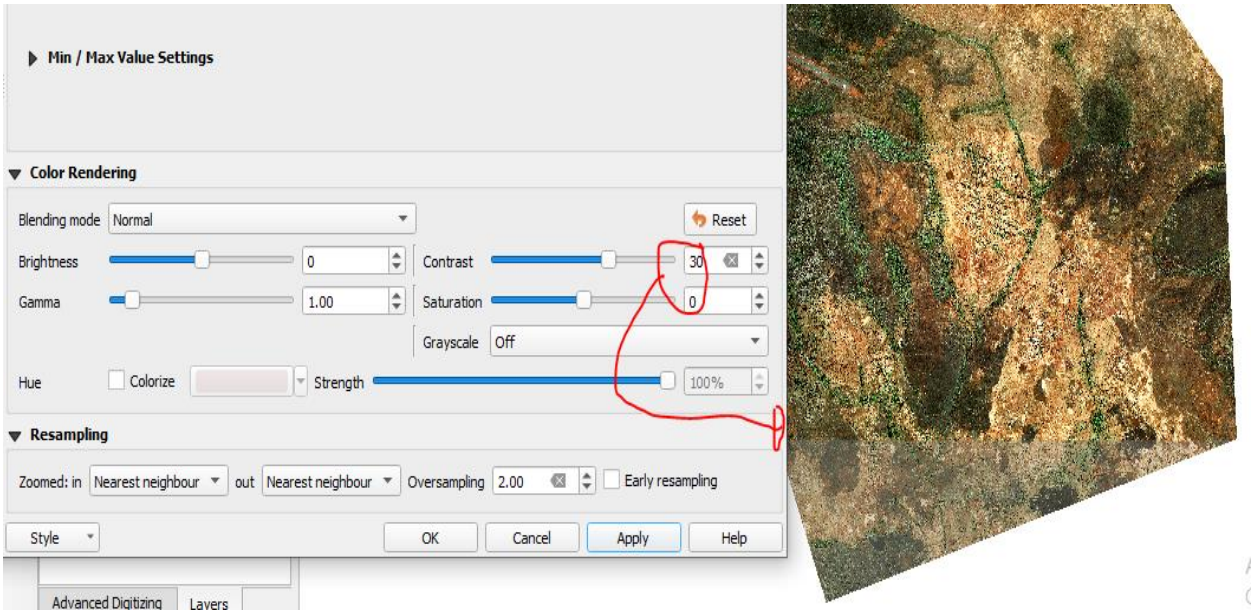

Figure 16:-Improved Contrast

The following image shows the improvement of saturation

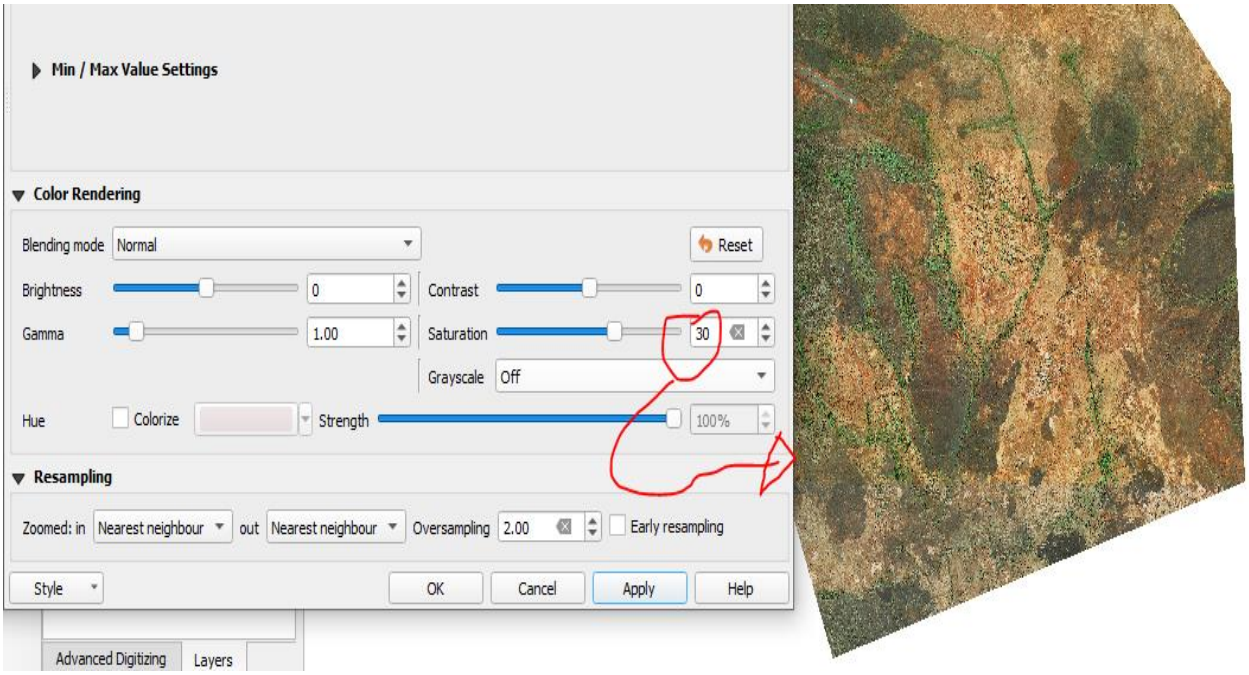

Figure 17:-Improved Saturation

2.3 Finalize and Document

Field maps, public display maps, and parcel maps are important documents used in rural land administration and property development. Here are some steps to finalize and document these maps:

1. **Conduct a final review**: Before finalizing the maps, it is important to conduct a final review to ensure that all the information is accurate and up-to-date. Check for errors, omissions, and inconsistencies.
2. **Incorporate feedback:** If the maps have been reviewed by stakeholders or the public, incorporate any feedback or suggestions that were received.
3. **Get approval:** Once the maps are finalized, they should be reviewed and approved by relevant authorities or stakeholders before being made public.
4. **Publish the maps:** Once the maps are approved, they can be published and made available to the public. This can be done through a website, a public display, or by distributing printed copies.
5. **Keep the maps updated**: It is important to keep the maps updated as new information becomes available. This may require periodic reviews and updates to ensure that the maps remain accurate and useful.
6. **Include parcel information:** For parcel maps, it is important to include information such as parcel numbers, lot sizes, and zoning designations. This information is important for property owners, real estate professionals, and local government officials.
7. **Follow legal requirements:** In some jurisdictions, there may be specific legal requirements for creating and documenting parcel maps. Be sure to follow these requirements to ensure that the maps are legally valid.

Overall, the process of finalizing and documenting field maps, public display maps, and parcel maps requires attention to detail and a clear understanding of their intended use. By following these steps, the maps can be created and shared in a way that is informative, accurate, and accessible to all users.

In rural cadaster of Ethiopia, report and documentation are important for recording and managing land ownership, use, and transfers. Here are some key elements that should be included in a report and documentation for rural cadaster in Ethiopia:

1. Property identification: Each property should be identified with a unique identifier, such as a parcel number, to ensure that it can be easily located and tracked.
2. Property boundaries: The boundaries of each property should be clearly defined and documented, using maps and other survey data as appropriate.
3. Ownership information: The report should include information on the current owner of each property, including their name, contact information, and any relevant ownership documents.
4. Land use information: The report should include information on how each property is being used, such as for agriculture, grazing, or residential purposes.
5. Transfer history: The report should include information on the transfer history of each property, including any sales, leases, or other transfers of ownership.
6. Legal documentation: The report should include any legal documentation related to each property, such as deeds, titles, or other ownership documents.
7. Survey data: The report should include any survey data related to the properties, such as maps, field notes, and other survey documentation.
8. Supporting documentation: The report should include any other supporting documentation that may be relevant to the properties, such as tax records, zoning information, or environmental assessments.
9. Data management: The report should include information on how the details being managed, stored, and updated, including any software or tools being used.
10. Recommendations: The report should include any recommendations for improving the cadaster system, such as updating survey data, improving data management procedures, or implementing new policies or regulations.

It is important to note that the report and documentation should be accurate, comprehensive, and up-to-date, as they serve as the foundation for managing land ownership and use in rural areas of Ethiopia. The report and documentation should be accessible to relevant stakeholders, such as landowners, government officials, and other interested parties.

Self-Check – 2	Written test

-Name…… ID…… Date…….

Directions: Answer all the questions listed below.

Test I: Multiple choice

1. ……refers to the situation in the terrain or in relation to its surrounding. A forest in the mountains is different from a forest close to the sea or near the river in the lowland.
   A. Association
   B. Field map
   C. A and B
   D. None
2. Which one of the following is the interconnected concept of tone, pattern, shadow, and some other elements to understand the real world in the image?
   A. Association
   B. Image board
   C. Brightness
   D. All
3. ----------is relates to the frequency of tonal change.
   A. Tone
   B. Texture
   C. Size
   D. All

Test II: Short Answer Questions

1. ----------is typically involves performing various tasks on the images such as classification, segmentation, object detection, and image recognition.
2. ---------- are a set of operations that are applied to an image to enhance its quality, improve its visual appearance, and extract useful information from it.
3. ----------is a technique used to adjust the brightness and contrast of an image to improve its visual appearance or prepare it for further processing.

You can ask you teacher for the copy of the correct answers.

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Operation Sheet -2

2.1 Techniques/Procedures/Methods for fixing image data problems.

A. Tools and equipment's

I. Computer
II. QGIS Soft wear
III. Satellite Image data

B. Procedures/Steps/Techniques for fixing image data problems.

- **Set** Install QGIS in window operating system
- **Align** Open QGIS and align the layers of image data
- **Put** the layers on the first row
- **Pick up** the property of the image and identify the brightness, saturation and contrast
- **Deeside and Settle** the value of brightness, saturation and contrast.

LAP TEST-2	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

Task-1 Cheng the brightness, Contrast, Gamma and Saturation to enhance an image.

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