

Location Data Collection and Reporting for Malaria Surveillance Activities

(Adopted from Smart Surveillance for Malaria Elimination Project)
12th March 2020

Prepared by: Dr Frank Kagoro, MSc,

<https://www.wwarn.org/about-us/governance-people/dr-frank-kagoro>

<http://www.tropmedres.ac/frank-kagoro>

Training goals

Goals

- Raise knowledge on the basic concepts in **describing location and direction**.
- To understand the minimum requirements of **case/household identifiers** to be able to find a **case's household**.
- To raise knowledge **on settings and calibration of GPS devices/tablets**, obtain **correct coordinates** and troubleshoot **frequent location queries**.
- To raise the quality of recording location information in the surveillance forms and understand their use.

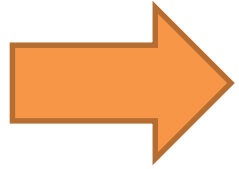
Outcome

Each surveillance officer to be able to perform all tasks of location data collection independently and at the highest accuracy

Training goals

Outline

- 1. Aim and importance of location for malaria programmes (10 mins)**
- 2. Get a coordinate & tell us about it (20 mins)**
- 3. Let us learn together (40mins)**
- 4. Let us try again (20 mins)**
- 5. Feedback (20 mins)**



- 1. Aim and importance of location for malaria programmes**
- 2. Get a coordinate & tell us about it**
- 3. Let us learn together**
- 4. Let us try again**
- 5. Feedback**

South Africa – Notified Cases (2018)

This map on the right side is displaying coordinates of malaria case households in South Africa

- Note the cases in Moz, Swaz and in the OCEAN!!
- Why do you think this happened?



A local case

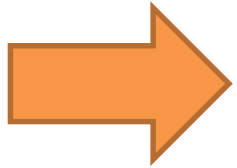


An imported case



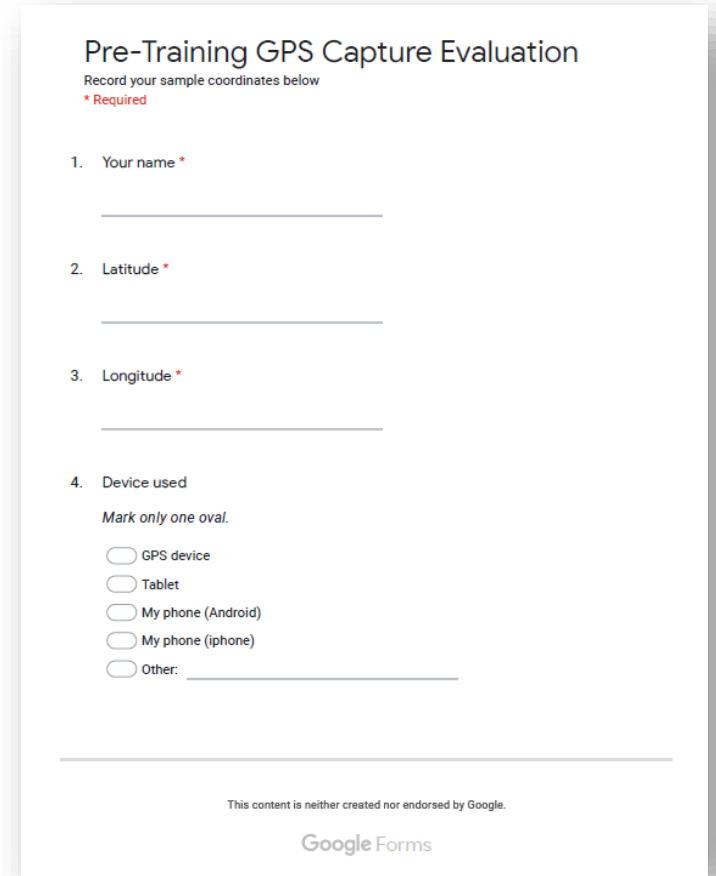
What do you think is the advantage of getting the correct location of a malaria case or breeding sites?

1. Aim and importance of location for malaria programmes
2. Get a coordinate & tell us about it
3. Let us learn together
4. Let us try again
5. Feedback



Get a coordinate of the field - 1

- Use the form named 'Pre-Training GPS Capture Evaluation' (Document #3) and ask participants to obtain a coordinate of a field/building/any important landmark nearby.
- Visualise what participants obtained by plotting the coordinates on Google Maps using instructions from 'part 3' of the trainers' manual.



The image shows a Google Form titled "Pre-Training GPS Capture Evaluation". Below the title, it says "Record your sample coordinates below" and "Required" in red. The form contains four numbered questions:

1. Your name * (text input field)
2. Latitude * (text input field)
3. Longitude * (text input field)
4. Device used
Mark only one oval.
☐ GPS device
☐ Tablet
☐ My phone (Android)
☐ My phone (iphone)
☐ Other: _____

At the bottom, there is a disclaimer: "This content is neither created nor endorsed by Google." and the "Google Forms" logo.

Pre-training assessment & feedback

- Use the pre-training assessment form (Document #4)

Pre-training assessment on the knowledge and usage of GPS devices for capturing location

* Required

Introduction

1. Age

2. Sex

Mark only one oval.

☐ Female

☐ Male

☐ Prefer not to say

☐ Other: _____

3. What is your role in the Malaria Programme

Location description

Location description

Getting a place's location (Georeferencing)

- Methods used

- It's name (eg. Nsabwe Sun Resort)
- Physical Address (R536, Hazyview, 1242, Mbombela, Mpumalanga)
- Nearby landmarks (river, church, mall etc)
- Location's coordinates (latitude and Longitude)



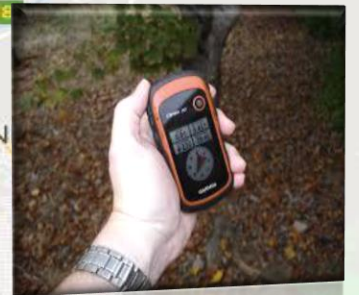
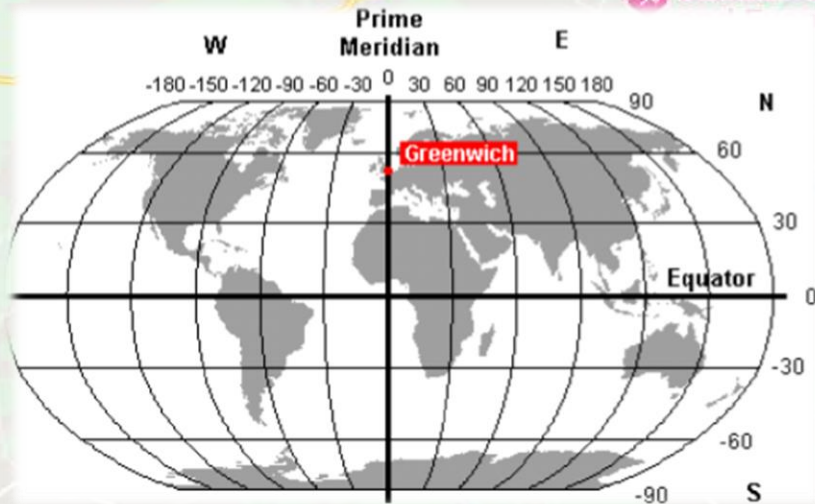
Getting a place's location(Georeferencing)

Coordinates

- A universally most robust method
- Use longitudes and latitudes
- Easily collected by handheld mobile devices

31.113811

-25.039017

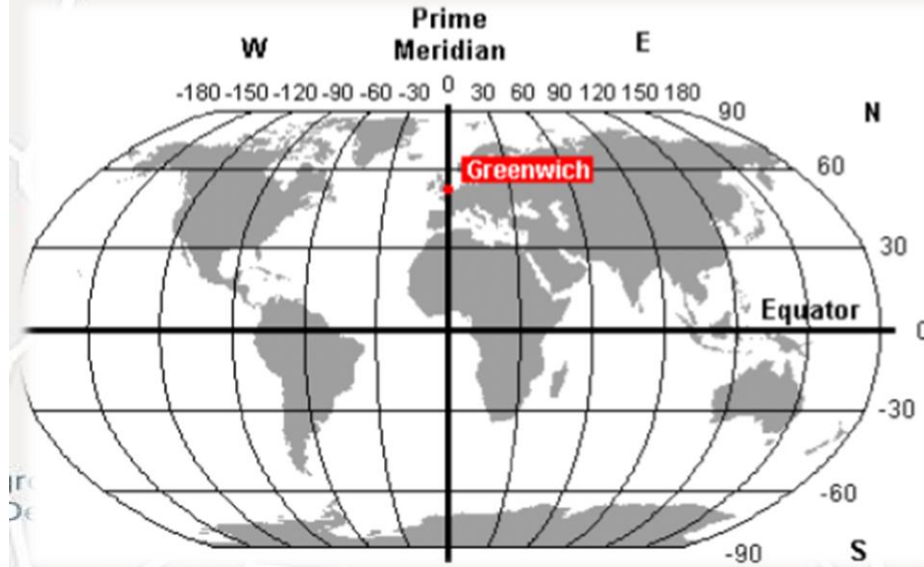


What are coordinates?

Coordinates

- A universally most robust method
- Use longitudes and latitudes
- Collected by handheld mobile devices

-25.039017, 31.113811

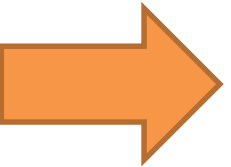


Sabi River Sun Resort

Sabi River Eco Estate
Hoyohoyo Holiday...

R536



1. Aim and importance of location for malaria programmes
2. Get a coordinate & tell us about it
-  3. Let us learn together
4. Let us try again
5. Feedback

SOP 1 and exercise

Activity 1: Using GPS Device for data collection

- Part 1: Participants in groups of 2-3 people, go through the SOPs
- Part 2: Obtain indoor coordinates and compare between devices

Planning

- A. Plan your day:
Turn your GPS machine on and off to make sure there is enough battery for the day.
- B. At your facility, identify the cases you will be investigating for the day and plan your site visits
- C. When you arrive at the site for obtaining the GPS coordinates, first, identify and write down the name or address (stand/street number/ward/subdistrict), then, follow through the procedures below;

Menu>Setup>System

1. Find an **open space** and turn the GPS device on.
2. Click twice on the **menu** button on the left of the device to get to the menu page.
3. Scroll down the menu page using the thumbstick, until the "**Setup**" icon is highlighted. Next, press the thumbstick to access the Setup sub-menu.



4. roll down the menu page using the thumbstick, until the "System" icon is highlighted. Next, press the thumbstick to access the **System** sub-menu.



*Menu>Position,
Map Datum, Map
Spheroid*

10. Use the thumbstick again until the "**Position Format**" icon is highlighted. Next, press the thumbstick to access the Units sub-menu.



11. Set the "**Position Format**," "**Map Datum**," and "**Map Spheroid**" as presented here:

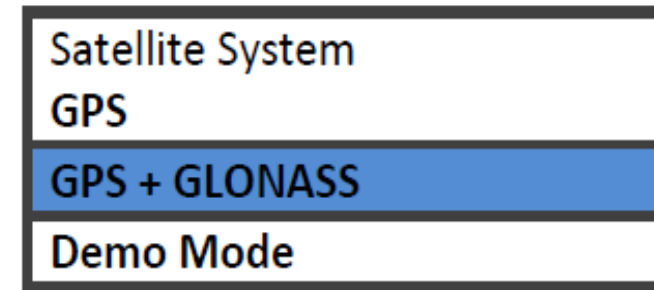
Position Format
hddd.ddddd
Map Datum
WGS84
Map Spheroid
WGS84

12. Click on the **back** button twice to return to the menu page

Menu>Setup>System>Satellite System..

5. Under "Satellite System" highlight the **"GPS+GLONASS"** option and press the thumbstick to save the selection.

This will allow you to use both the GPS and GLONASS constellations of satellites as shown here



6. Press the **back** button on the right of the device to return to the Setup sub-menu.

Menu>Setup>Units>Distance and Speed, Elevation...

7. Use the thumbstick again to arrive at the "**Units**" icon is highlighted. Next, press the thumbstick to access the Units submenu



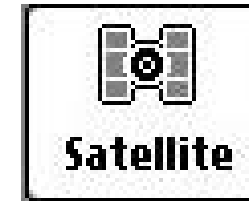
8. Set both the "**Distance and Speed**" as well as "**Elevation**" items to the metric system as shown here:

Distance and Speed Metric
Elevation (Vertical Speed) Metric(m/min)

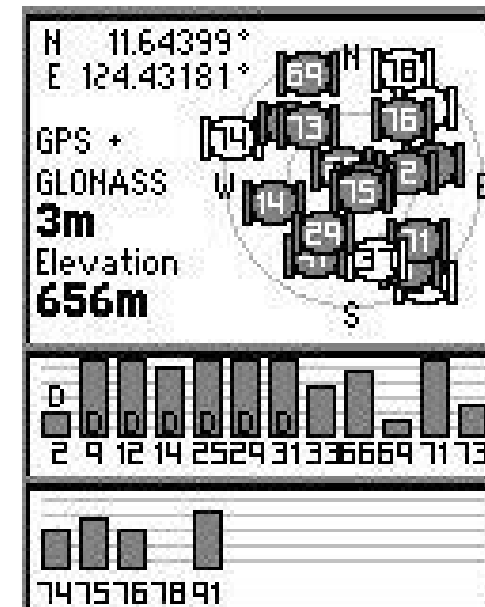
9. Click on the **back** button on the right of the device to return to the Setup sub-menu.

>Menu>Satellite...

13. Hold the GPS device horizontally in front of you, use the thumbstick to scroll down the menu page until the "**Satellite**" icon is highlighted:



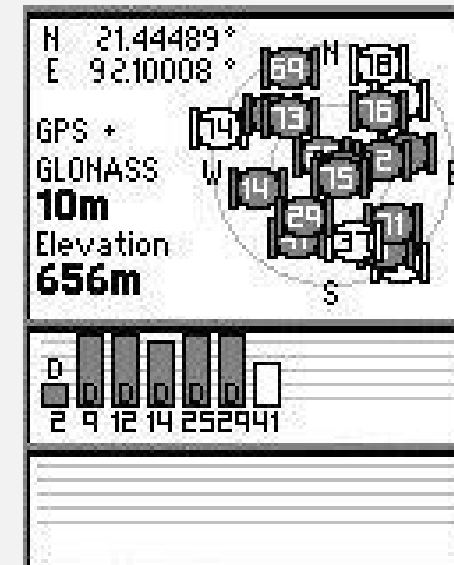
14. Next, press the thumbstick to access the "**Satellite page**" which looks as follows:



Menu>Satellite...

15. Wait for the accuracy value to become less than **15 metres** with at least **4 satellite signals** received (number of grey bars at the bottom of the page). Stay for at least one minute at the same spot to allow for the best reading possible.

In the example shown here, the accuracy is 10 m with 6 satellite signals received (the transparent bar is not counted).



16. If there is **no fixing** of the satellite signal, make sure you are under open sky and take a few (2 or 3) steps and repeat step 15

Menu>Satellite...

17. Once the accuracy value is below 15 metres with at least 4 satellite signals, **temporarily write down** the number of satellite signals and the accuracy measure on a piece of paper.

18. Mark the waypoint by pressing and holding the thumbstick. This will take you to the “**Mark Waypoint**” page as seen here:

TRAMsoft
Note
Location N 21.44489° E 92.10008°
Elevation 656m
Map
Go

19. If this is not the case, this means that the coordinates fall outside the ranges. **Recheck** the units and position format of the device (see steps 7 to 11 above).

Menu>Satellite...

20. **Note** the final number of satellite signals and accuracy to make sure there is a minimum of 4 satellites and the accuracy is within 15m.

21. Record the **coordinates** with 5 decimals in the case investigation form.

e.g. *Latitude (decimal degrees)*

Longitude (decimal degrees)

-	2	5	.	4	7	9	0	8
0	3	0	.	9	7	2	9	4

Completing data collection activity

22. **Check.** Go back through the form and complete any missing fields.

23. Move to the next household and start again from step A. **IMPORTANT:** Turn off the GPS device by holding down the '**on/off**' button until you are at the next point to be collected.

SOP 2 and exercise

Activity 2: Using Android App for data collection

- Part 1: Participants in groups of 2-3 people, go through the SOPs
- Part 2: Obtain indoor coordinates and compare between devices

Shortened version

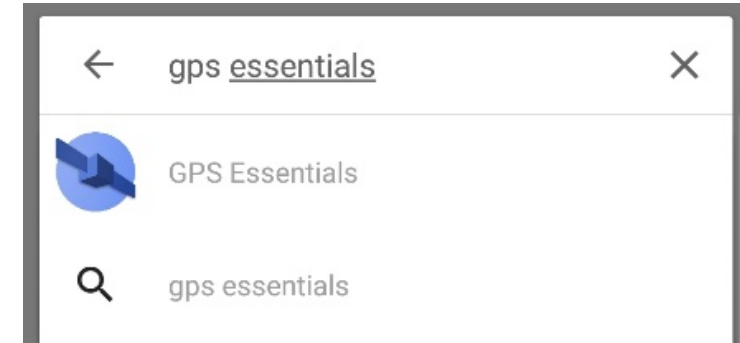
- i. Download 'GPS Essentials' App from 'Google Play Store'
- ii. Customise the settings to; "Units" – meters (SI), "Position Datum" – World Geodetic System 1984, "Position format" – Decimal
- iii. Open "Satellites", the App will display coordinates, satellites and accuracy.
- iv. Select "Dashboard" and add items you want to be displayed every time you are collecting coordinates.

iv. Select "Dashboard" and add items you want to be displayed every time you are collecting coordinates.

Extended version

1. To download this App you will need;
 - a. An internet connection through WIFI or using data via your mobile subscriber.
 - b. A 'Play Store account', you can proceed with steps below if you already have an account. If you do not have it, open 'Google Play Store' and follow instructions on registering an account or proceed with the instructions below if you already have an account to download applications.

2. In the Play Store, click on the search window and type 'GPS Essentials'



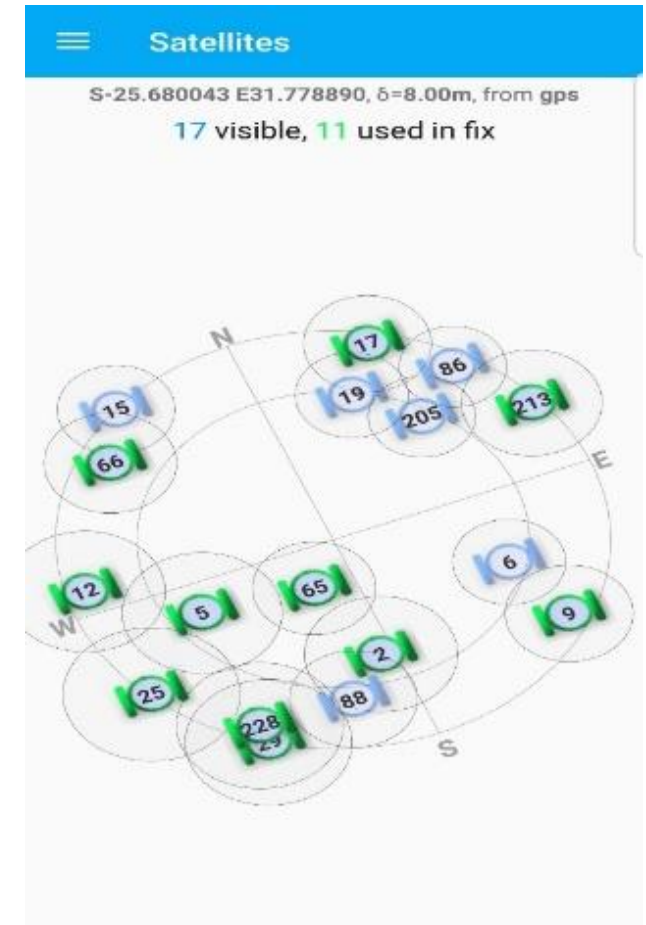
Installing the App

3. Select the App and choose 'INSTALL' for it to be installed in your advice.
4. If you get a warning "Cannot download App from unknown sources", go to settings>>allow downloads from unknown resources>>select to it to allow (on).
5. Wait for a few minutes, the App will download and install automatically. After the installation select 'OPEN' to have the app displayed in your tablet/phone. It will show the App menu as below.



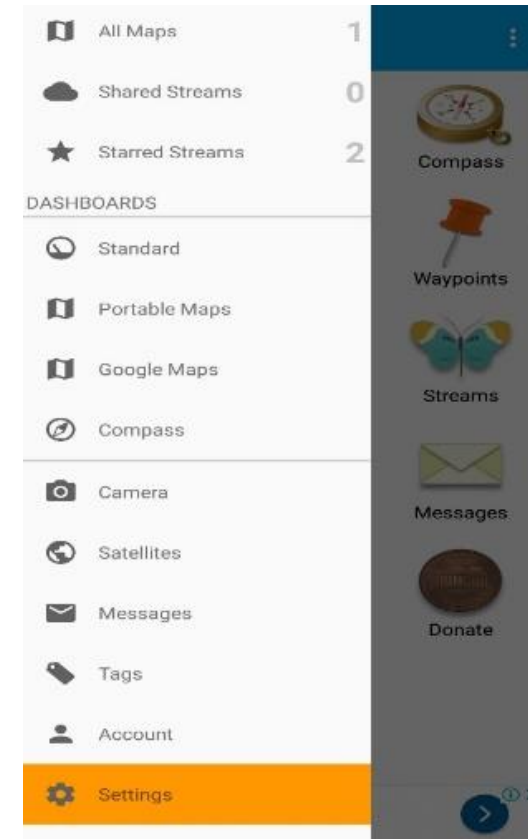
Home>GPS Essentials>Satellites

6. Select “Satellites” and coordinates, precision and number of satellites will be displayed as below in two linesw



Menu>GPS Essentials>Settings

7. Select the 3 lines on the left side corner to open the sliding submenu and scroll down to “Settings”.

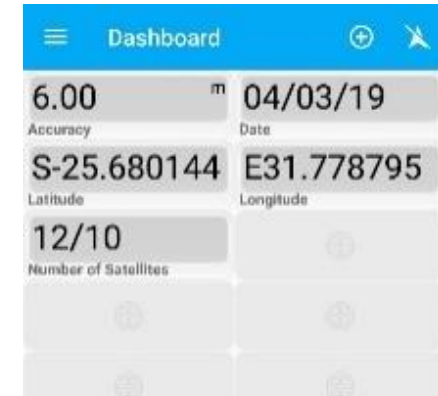


8. In settings, scroll down to “**Presentation**” and select;
 - a. **Units** and set this to ***Meters (SI)***
 - b. **Position Datum** and set it to ***World Geodetic System 1984***
 - c. **Position format** and set it to ***Decimal***
9. Click the back arrow to get back to the main Menu and select “**Dashboard**”. Here we will add a dashboard to display our readings as follows: select the plus ‘+’ item on the right upper side of the screen to open the dashboard submenu with the items to select.
 - a. ***Accuracy***
 - b. ***Date***
 - c. ***Latitude***
 - d. ***Longitude***
 - e. ***Number of Satellites***

Note on the left side the colour highlights on the left side when an item gets selected. Then choose ‘close’ to end the submenu window

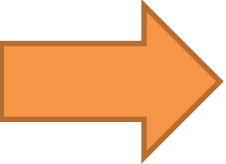
Menu>GPS Essential>Dashboard

10. Your dashboard will be ready with the five items to display always when collecting coordinates.



When you arrive at the point for collecting coordinates. Open the 'GPS Essentials' and select dashboard to get the reading. Record the coordinates on your paper forms.

Outline

- 1. Aim and importance of location for malaria programmes**
- 2. Get a coordinate & tell us about it**
- 3. Let us learn together**
-  **4. Let us try again**
- 5. Feedback**

Get a coordinate of the field - 2

- Use the form named 'Post-Training GPS Evaluation' (Document #7) and ask participants to obtain a coordinate of a field/building/any important landmark nearby.
- Visualise what participants obtained by plotting the coordinates on Google Maps using instructions from 'part 3' of the trainers' manual.

Activity 3: Using GPS Device & Android Tablet for data collection

- Part 1: Go outside in teams of 2-3, capture location of a building/structure and complete the information as below

Write your findings as below	
Name of the building	
Country it is located	
City it is located	
Locality it is located	
Location	Longitude.....Latitude.....
Any comments?	

- Part 2: Recording coordinates on paper and how they are displayed on a map

How best can we collect and record coordinates data?

Challenges

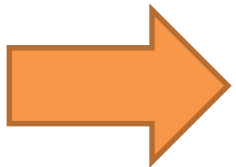
- Reading and recording different coordinates formats recorded
- Incorrect coordinates
- Untraced patients

How can case investigators/EHPs and supervisors help to solve capture of wrong coordinates?



Outline

- 1. Aim and importance of location for malaria programmes**
- 2. Get a coordinate & tell us about it**
- 3. Let us learn together**
- 4. Let us try again**
- 5. Feedback**



Post training assessment & feedback

- Use the post-training assessment (Document #8)

Post-training assessment on the knowledge and usage of GPS devices for capturing location

Introduction

1. Age

2. Sex

Mark only one oval.

☐ Female

☐ Male

☐ Prefer not to say

☐ Other:

3. What is your role in the Malaria Programme

3. What is your role in the Malaria Programme

Thank you