Field Landslide Inventory Mapping (FLIM) Mobile App

User field guide

National Remote Sensing Centre, Indian Space Research Organisation, Hyderabad

The FLIM mobile app is developed by NRSC/ISRO. It aimed to be used by SDMAs/DDMAs/Govt. organizations/researchers with reasonable knowledge on landslides. The main purposes of this app are as follows:

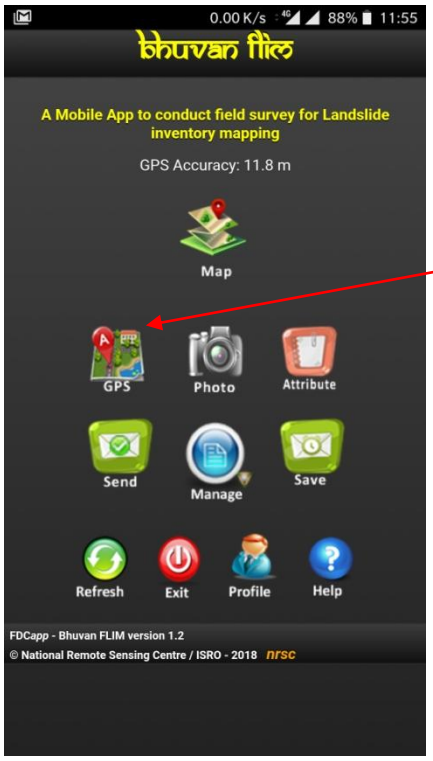
- To collect data of landslides from the field.
- To develop a landslide warning system for the region using the collected field landslide data.

The data collected and sent from the field using this app will be uploaded in the BHUVAN and NDEM servers for analysis and visualization. Hence, the app will help the state agencies as incident reporting system for landslide disasters. The '**date of landslide'** and '**rainfall amount during the landslide'** is vital information which is required for development of a landslide early warning system.

A. Step-by-step procedure for landslide data collection using FLIM mobile app

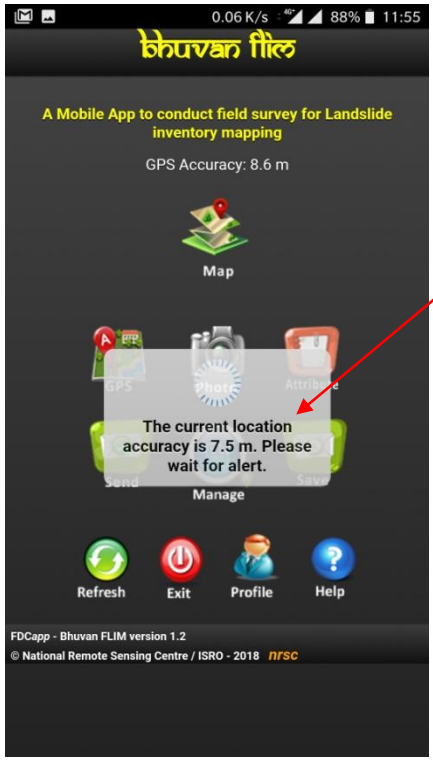
Install the app in your android mobile and follow the guidelines/instructions as shown below.

1.



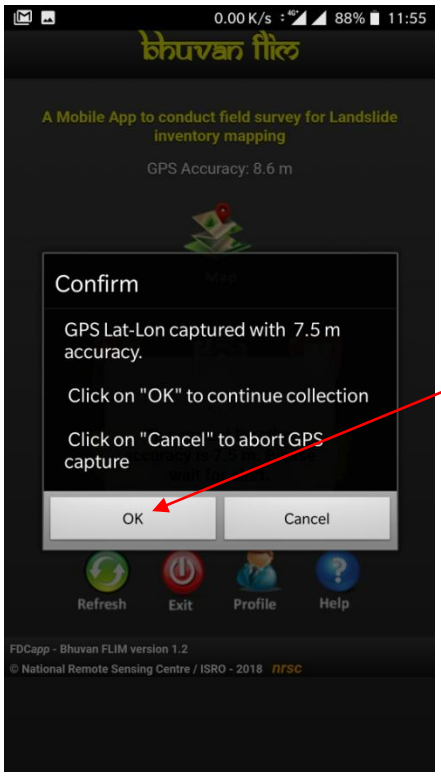
Click the GPS button

2.



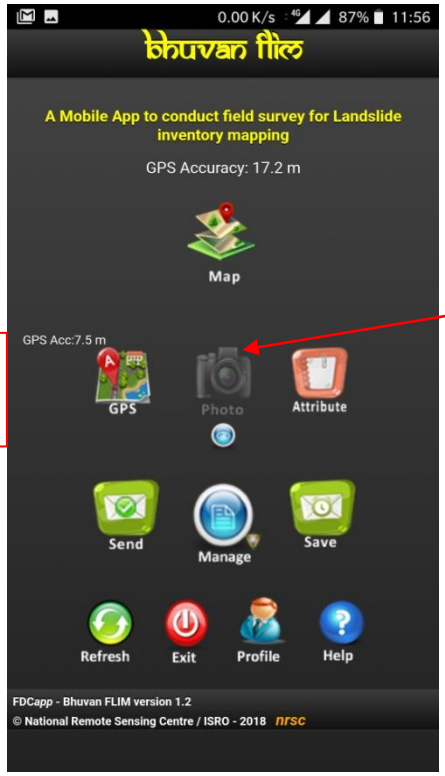
Wait for alert message

3.



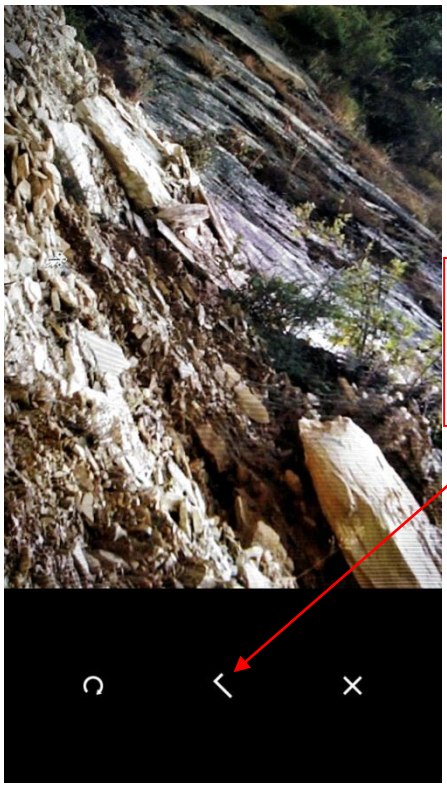
Click the OK button

4.



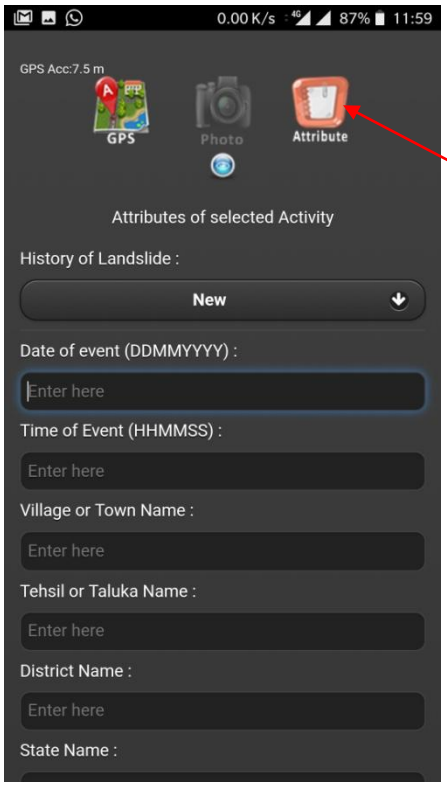
Click the Photo button and take 2 pictures

5.



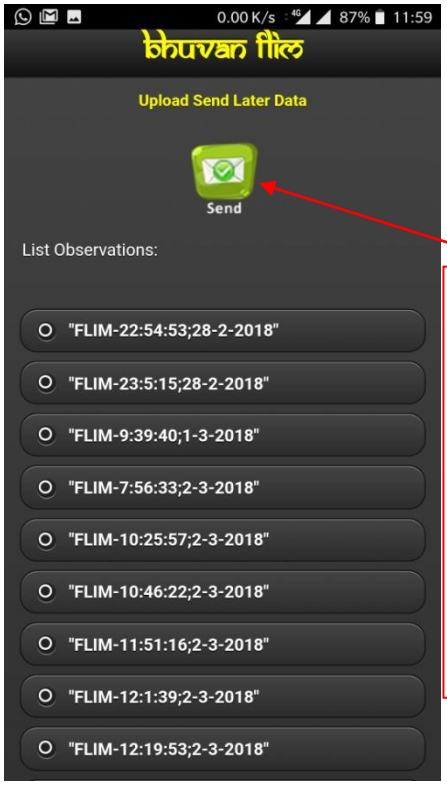
Click the tick after taking pictures

6.



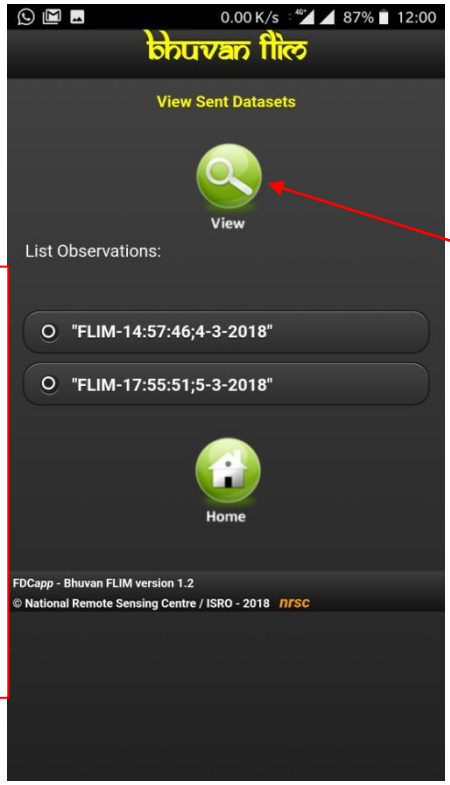
Click the attribute button to enter field data. Details of attribute are explained in section B. Click save button now.

7.



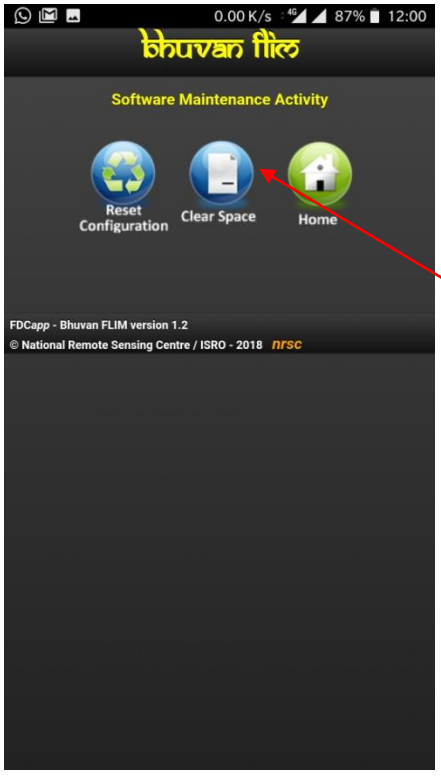
Click the manage button and View all the saved data, then select, verify and send the field data

8.



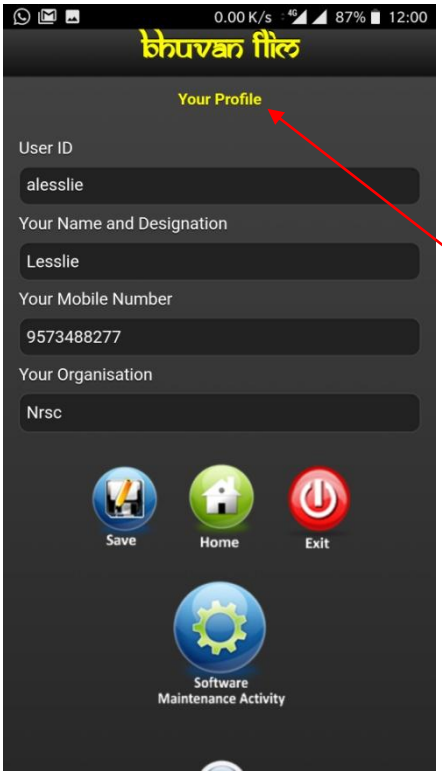
View all the sent data from your mobile

9.



Clear space from your mobile by deleting all landslide data

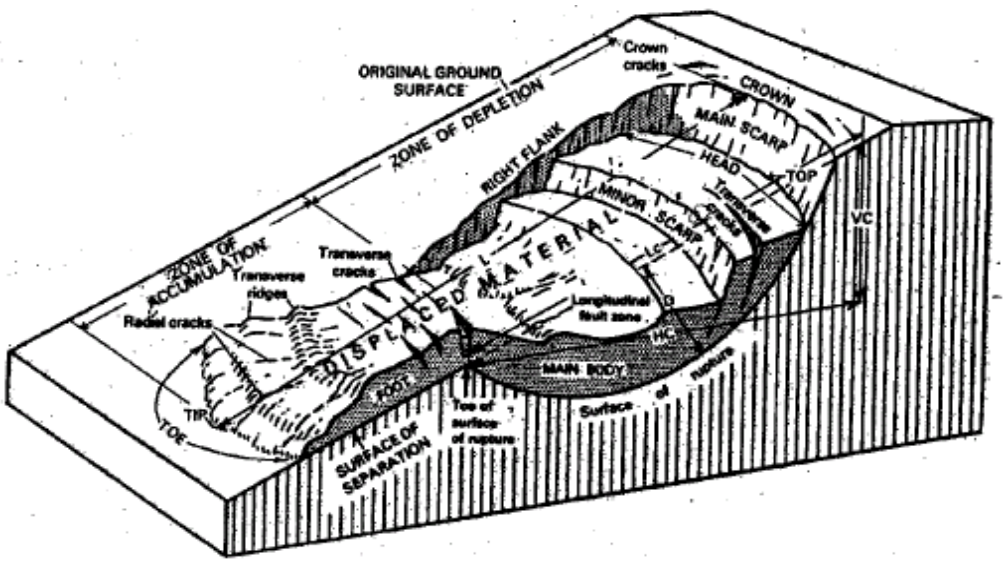
10.



Update your profile if required

B. Attribute details of landslide

Landslides are frequent natural disaster in mountainous areas. In order to fill the ground data correctly, users are requested to refer the following diagram to have a better understanding of various features of a landslide.



(Schematic diagram showing features of a landslide: Source-WEB)

Following are the details to be filled up by the user:

1. **History of landslide**
    a. New - A landslide that has occurred very recently
    b. Old – A landslide that has occurred long back but still identifiable on the ground
2. **Date of event** – The date of occurrence of the landslide. It is applicable only to new landslides
3. **Time of event** - The time of occurrence of the landslide. It is applicable only to new landslides
4. **District name** – The administrative district where the landslide occurred
5. **State name** – The Indian state where the landslide occurred
6. **Length (m)** – Length of the landslide from crown to tip. In case of large landslide, it is difficult to measure it on the ground. In such case, approximate length estimation should be filled.
7. **Width (m)** – Width of the landslide from left to right flank at the centre of the landslide body. In case of large landslide, it is difficult to measure it on the ground. In such case, approximate width estimation should be filled.
8. **Height (m)** –Vertical Height of the landslide from crown to tip measured perpendicular to ground surface from tip of slide. In case of large landslide, it is difficult to measure on the ground. In such case, approximate height estimation should be filled. Height from GPS or toposheet may be helpful. In this case, Height = Altitude of crown – Altitude of tip
9. **Type of landslide** (You may see examples shown in this document)
    a. Debris slide – The crown is located in a weathered zone and the landslide happened to sliding of the debris down slope

b. Debris flow – The crown is located in the weathered zone and the landslide happened due to flow of debris saturated with water.
c. Rock fall – This happened due to free fall of rock material in steep slope conditions
d. Rock slide – This happened due to sliding of material along one plane (could be joint plane or bedding plane)
e. Others – Any type of landslide other than the above categories

10. Material involved

a. Rock – Crown is located on rocks
b. Overburden – Crown is located on weather material or soil
c. Both – both of the above

11. Occurrence

a. Road cutting – On the slope due to the cut during construction of road
b. River bank – Left or right bank of the river and happened due to natural cut of the toe of the slope
c. Natural hill slope – On the face of the slope
d. Opposite valley –You can see it from a distance but cannot reach there to collect the location of the landslide
e. Others – Landslide occurred near a location of importance and known well to the people in general

12. Structure affected

a. Road or railway line – Landslide caused damage to the road or railway line
b. Houses – Landslide damaged the building partially or fully
c. Land (barren or cultivated) – Landslide affected only land
d. Forest – Landslide affected the forest area and uprooted several trees
e. Civil project – Landslide affected dams, factories, hospitals etc.
f. Others – Any other not in the above categories

13. Casualties

a. Human – Death of people
b. Livestock – Death of animals
c. Both – Death of both

14. Number of casualties – No. of deaths of people and/or animals

15. Trigger of landslide

a. Rainfall – The landslide is triggered by rainfall, mostly during monsoon season
b. Earthquake – The landslide is triggered by earthquake
c. Others – Landslides triggered due to toe cutting by river and other man made causes such as road construction, blasting etc.

16. Rainfall

a. No rainfall – There is no rainfall condition
b. Cloudburst – Heavy rainfall in short duration triggered the landslide
c. 24 hrs – Landslide triggered due to rainfall since 24 hrs
d. One week – Persistent rainfall since one week
e. Others – Other than the above categories

17. **Amount of rainfall (mm)** – The amount of rainfall during the occurrence of landslides. This information is crucial for development of a landslide early warning system. The rainfall available from the rain gauze station (mainly in district or taluk head quarters or AWS stations) nearest to the landslide should be filled here.
18. **Cause of landslide** – A brief description on the landslide has happened at that particular location from the field assessment. The cause could be natural (e.g. steep slope with loose rock material) or manmade (e.g. road or house construction etc.)
19. **Remedial measures** – Gabion wall, geotextiles, channelization etc. which may improve the stability of the slope and help in mitigation of that landslide.

Frequently asked questions (FAQs)

i. How to send the data from field if there is no internet connectivity?

You can save the data in field and send it afterwards (may be from your office/other places)

ii. Can I see and download the sent data?

Authorisation to view and download the data sent by you in your area can be provided by NRSC upon request.

iii. Do I need to fill all attribute details as desired by app?

Some attribute fields are mandatory and remaining is optional. However, it is desired to send all details of landslide from a given point.

iv. Can I share this FLIM app with others?

You are encouraged to do so. It can be downloaded from App store of BHUVAN. More details about landslide will strengthen the incidence reporting mechanism and future landslide early warning.

v. Why is the app not getting installed in my mobile?

Go to settings --> security --> Device administrators --> toggle on "unknown sources" (allow installation of apps from unknown sources). Retry installation.

vi. Is my location accurate?

Ensure GPS is turned on in your mobile. Check drop down from Top pane and toggle on "location".

vii. In case of doubt/difficulty, whom to contact?

You can contact Project Manager-Landslide, ISRO-DMSP at NRSC, Hyderabad through e-mail: **dsc_landslide@nrsc.gov.in**

Examples of Types of landslide

Debris flow

Rock fall

Debris slide

Rock slide

Debris slide

Rock fall