Harit Bharat FUND

CITIZEN SCIENCE APP
User Manual | 2024

1. Citizen Science App

Citizen Science App: Streamlining Restoration Efforts

The Citizen Science App (CSA) is a powerful field data collection tool designed to record, map, and assess the progress of restoration initiatives. This versatile app allows Champions to create custom surveys based on specific project needs.

Key Features:

- Dynamic Data Collection: Gather a variety of data, including detailed restoration site information and precise geospatial data (latitude/longitude).
- Project-Specific Surveys: Build custom surveys to capture the unique data required from each restoration initiative.
- Enhanced Mapping: Leverage geospatial data collection capability to create accurate maps of restoration sites while enabling Harit Bharat Fund to determine the total area under restoration accurately.

This app assists Harit Bharat Fund Restoration Champions in active participation in restoration data collection efforts and helps track progress.

2. Use of Citizen Science App

Detailed Site Data & Mapping

The Citizen Science App goes beyond basic data collection. It allows Champions within the Harit Bharat Fund to gather comprehensive information about restoration initiatives at each location.

This includes:

- Polygon Attributes: Capture details like restoration date, type of restoration, and other relevant information.
- Accurate Geospatial Data: Collect precise latitude and longitude coordinates to map the restoration initiatives.

This mapping capability serves three key purposes:

- Location Tracking: Accurately mark the exact location of each initiative for future reference.
- Monitoring, Reporting & Verification: Enable easy access to specific sites for ongoing monitoring reporting and verification efforts.
- For geospatial analysis: By analyzing the information collected, we can measure success based on key indicators specific to each project and identify trends across restoration types. This data-driven approach provides a clear picture of progress and helps us refine restoration strategies for the future.
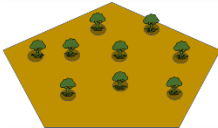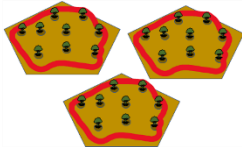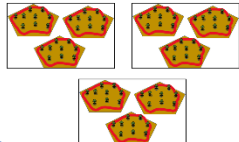
3. Access to the Citizen Science App

The app is compatible with both iOS and Android devices. It can be downloaded from the App Store and Play Store, direct link, and QR code for download to your phone are added below. The App is compatible with Android 11 and above devices and iPhone 11 and above series.

Device	Download link	QR code
Android	https://play.google.com/store/apps/details?id=com.pixelbrahma.offline_survey_flutter	
iOS	https://apps.apple.com/in/app/citizen-survey-app/id1618666526	

4. A few terms Champions need to know before they start collecting data using the Citizen Science App

To ensure a smooth data collection experience using the CSA app for the upcoming restoration project, we will first introduce the Champion to some key terminology related to the project itself. This foundation will not only help them grasp the restoration work's goals but also empower them to effectively contribute to data collection through the Citizen Science App.

Restoration area
Each separate, contiguous area where restoration work is being done. Each restoration area will be represented by either a GPS point or a polygon for use in TerraMatch.

Polygon
A closed shape that starts and ends at the same coordinate and encloses a geographically contiguous area, saved as a GIS file (like a KML or Esri Shapefile)

Site
Basic unit for organizing and reporting biophysical data on TerraMatch. It is either a single restoration area or a grouping of restoration areas

Project
Multiple sites are grouped together under a project. These are the different locations where the Cohort are planning to or doing their restoration initiatives, it can include different landcover type and different type of restoration initiatives.

4.1 Areas to restore and map

4.1.1 Restoration Area

A restoration area is the building block of a restoration project. It is a designated zone where the actual restoration work is conducted. Think of it like a specific patch of land where your group, for instance, might plant saplings to restore the local habitat.

4.1.2 Polygon

Polygons identify and define the boundary of the land under restoration. The CSA app helps us define the exact area Champions are restoring. For large areas, take multiple GPS points around the edges/perimeter of the restoration area to create a precise shape on a map, called a polygon. For smaller patches, simply collect a single GPS point in the center of the restoration area. We then create a buffer polygon around this point to estimate the restoration area. **Individual polygons need to be created for each restoration area and each restoration type.** Section 5 gives clear instructions on when to use each method (polygon vs. single point).

4.1.3 Site

Multiple restoration area composes a site. The site is the basic unit for organizing and reporting biophysical data on TerraMatch. **Before data collection using CSA, the Champion needs to create a site on TerraMatch (nomenclature instructions given on TerraMatch doc provided to Champion).** The name of the site should be unique as it will be used to relate the data collected through CSA to TerraMatch. **Site name is one of the inputs for CSA so keep it handy when data collection commences.**

> **!** To simplify reporting, Champions should focus their efforts on one restoration site per vicinity. Since site reports are required every 6 months, managing reporting on multiple geographically close sites can become cumbersome.

4.1.4 Project

Multiple sites where restoration work is being conducted are grouped together under a single project. Each project is separate for each Champion, this helps us identify the total restoration work done by each Champion.
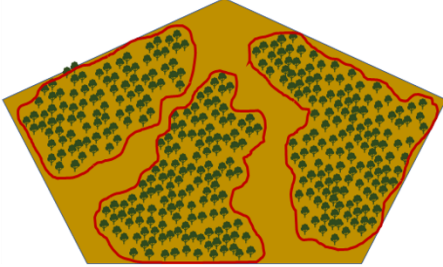
4.2 Types of projects

Projects are categorized into 3 major categories depending on the type of restoration conducted. This is mostly related to Plantation-based restoration, but CSA also collects data on water-based restoration initiatives. 3 major categories of projects are:

a) Concentrated
b) Distributed
c) Hybrid

Concentrated	**Distributed**
• Larger restoration areas, where each restoration area > ~3 ha. • When you have fewer (< 50) of this type of restoration area.	• Typically, projects that collaborate with many smallholder farmers. • On average, the restoration areas are small (< ~3 ha). • You will have many (> 50) of this type of restoration area.

Walk the boundary of each individual restoration area to create a polygon.
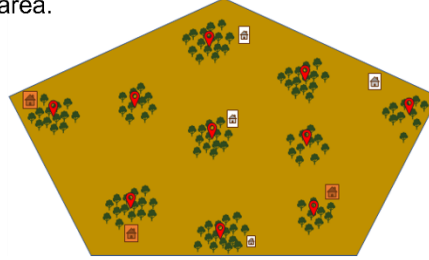
Go to the center of each restoration area, collect a GPS point, then provide the estimated size.

4.2.1 Concentrated Projects

These projects focus on restoring vast, continuous areas exceeding 3 hectares. Imagine planting saplings across a large swathe of land with a uniform cover. This extensive restoration approach involves a limited number of restoration areas (under 50). These zones are mapped as polygons within the CSA application. To capture the exact boundaries of the restoration zone, the Champion needs to collect multiple latitude and longitude points using the CSA. These data points, when connected, form a polygon that represents the total area undergoing restoration. This polygon helps visualize and identify the land being restored within the CSA app.

4.2.2 Distributed Projects

These projects target numerous, scattered areas smaller than 3 hectares. Think of planting saplings around a pond or along a bund. Restoration involves multiple, smaller zones (over 50) where work is conducted. Unlike large-scale projects, these zones are mapped using a single latitude and longitude point within the CSA application. To capture the restoration area for these dispersed zones, the Champion needs to visit the center of each restoration area and collect:

- A single GPS point (latitude and longitude)
- A photograph of the restoration zone

The CSA app then creates a buffer zone around this central point. This buffer zone estimates the total area undergoing restoration for that specific location.

4.2.3 Hybrid Projects

These projects are fewer in number but are involved in both large-area plantations (concentrated) and small-patch plantations (distributed). These two-plantation project models are involved in these projects. Thus, here the Champion needs to collect multiple points (polygons) for areas of plantation greater than 3 hectares and single point for areas that are restored which are less than 3 hectares.

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The Champion should collect separate polygons or points for distinct restoration types and locations.

5. Methods of collecting data

In year one, Harit Bharat Fund will focus on the data collected using CSA solely for sapling and water-based restoration projects. However, Harit Bharat Fund aims to map all active restoration areas during this first year. Therefore, the Champion needs to identify the types of restoration being undertaken by them and determine the most suitable mapping method for each initiative. The provided information on concentrated, distributed, and hybrid projects (section 4.2) serves as a guide for collecting geospatial data using CSA for specific restoration types. Below is a list of some of the restoration initiatives commonly listed among the Harit Bharat Fund Champion, along with their corresponding mapping/ data collection methodologies.

	Restoration Type	Point or Polygon	Comments
	Plantation-based Restoration		
1	Plantation in an area greater than 3 Hectares (Concentrated)	Polygon	Multiple Latitude longitude around the area
2	Plantation in an area less than 3 Hectares (Distributed)	Point	Single Latitude longitude at the center of the location
3	Roadside plantation	Line/ polygon	Multiple latitude longitude points are taken along the road where the plantation is done from the start to the endpoint and multiple Lat and Long data are collected along the path between the start and end point.
4	Riparian Plantation	Polygon	Multiple Latitude longitudes around the area
5	Bund Plantation	Point	Photo and single Latitude longitude at the edge or near the water body
6	Assisted Natural Regeneration	Point or Polygon	Depending on the size of the restoration area choose the appropriate method
	Water-based Restoration		
7	Small water bodies like a pond	Point	Photo and single Latitude longitude at the edge or near the water body
8	Large water reservoir	Point	Photo and single Latitude longitude at the edge or near the water body
9	Water conservation structures like check dams and gully plugs	Point	Photo and single Latitude longitude at the edge or near the water body
10	Areas where trenches are built for water conservation	Polygon	Multiple Latitude longitudes around the area also add total trenches built in the area in the comments section of the CSA survey form

6. Things to remember before you start your data collection

Champions need to keep in mind a few things before they start the data collection process. These steps are crucial for efficient and accurate data collection.

> ❗ The socio-economic reporting and information on other restoration practices in the field will be reported on TerraMatch directly on the site and the project report that champions will submit every 6 months.

6.1 Create a site profile on TerraMatch

(Refer to section 4.1.3)

Before data collection using CSA, the Champion needs to create a site on TerraMatch (nomenclature instructions given on TerraMatch doc provided to Champion). The name of the site should be unique as it will be used to relate the data collected through CSA to TerraMatch. Site name is one of the inputs for CSA so keep it handy when data collection commences.

6.2 When to collect data

Data collection methods vary depending on the restoration project's size:

- Concentrated Restoration Projects (> 3 Ha): For large, concentrated projects exceeding 3 hectares, data collection should occur after the plantation is complete. This data is typically gathered as a polygon encompassing the entire restored area's perimeter.
- Distributed Restoration Projects (< 3 Ha): For smaller, distributed projects less than 3 hectares, data collection can be done as soon as a planting location is chosen. In these cases, data is collected as a point representing the center of the designated restoration area.

> ❗ Here is a simple rule of thumb: collect data as points for small areas of restoration/ planting as soon as possible, while data for larger restoration areas (represented by polygons) should be collected after the restoration work is complete.

6.3 Phone compatibility

The Citizen Science App is designed to be inclusive and accessible to a wide range of Champions. While compatible with both Android and iOS operating systems, it requires a minimum software version to ensure optimal functionality. For Android devices, Android 11 or above is necessary, and for iOS Champions, an iPhone 11 or newer model is recommended. To confirm compatibility before installation, simply search for "Citizen Science App" in the respective app stores: Google Play Store (Android) or Apple App Store (iOS). If your device meets the system requirements, proceed with downloading and installing the app. Upon successful installation, you can log in using your phone number. We are actively working on adding email login functionality, which will be available soon. Download links for your convenience can be found in Section 3.

6.4 Location and camera permission on the phone

For a seamless data collection experience with the Citizen Science App, granting camera and location access permission is crucial from phone settings.

- Camera Access: This allows the app to capture any necessary visual data points for the survey.
- Location Access: This ensures accurate location collection in your survey forms. To guarantee precise location data, please keep your phone's location services enabled throughout the data collection period, ideally starting an hour before the actual survey to allow GPS stabilization.

By granting these permissions and keeping location services on, you contribute to the quality and accuracy of the data collected by the CSA.

6.5 Plan your data collection

Once the Champion has determined the data collection method (appoint a point or polygon), it is essential to prepare for efficient data gathering, especially when working with large restoration sites.

- **Planning Your Route**: Plan your walk beforehand to collect multiple latitude and longitude points across a vast area. Ideally, the path should cover the entire perimeter of the restoration area to ensure comprehensive data capture.
- **Continuous Data Collection:** If mapping a large area, aim to collect all latitude and longitude points in one session. Leaving data collection unfinished can lead to inconsistencies.
- **Staying on Track:** Maintain focus on the planned perimeter route to avoid gathering data points outside the restoration area.
- **Prioritizing Safety:** Remember to prioritize your well-being throughout the data collection process. Stay hydrated, wear sun protection, and dress comfortably to avoid compromising your health.
- **Ensuring Data Accuracy:** For each location point collection, wait at least 30 seconds before adding it to the CSA map. This allows the GPS signal to stabilize and ensures accurate data recording.

By following these guidelines, you can efficiently collect high-quality data within a reasonable timeframe.

7. Step-by-step instructions for the Citizen Science App

This section explains how to access the Citizen Science App used to collect data for Harit Bharat Fund. The app features specially designed survey forms that cater to the needs of all participants, particularly in mapping plantation and water-based restoration efforts. As the Harit Bharat Fund (Harit Bharat Fund) initiative progresses, new forms will be added, or existing ones will be updated to capture a wider range of information about the restoration initiatives under Harit Bharat Fund. This will ensure accurate monitoring of the project's progress and reporting on achievements. The survey app are designed to collect mostly geospatial and attribute data and report them. **The**

socio-economic reporting and information on other restoration practices in the field will be reported on TerraMatch directly on the site and the project report that champions will submit every 6 months.

7.1 Open the app and access the forms

- Open the CSA on your phone.
- Select: Attend survey
- Select: Harit Bharat Fund survey form folder

There are two forms in the folder select the forms that are suitable for mapping your restoration initiative:

- For Plantation-based restoration, select: Plantation-based restoration monitoring form for the Harit Bharat Fund.
- For water-based restoration, select: Water-based restoration monitoring form for the Harit Bharat Fund.
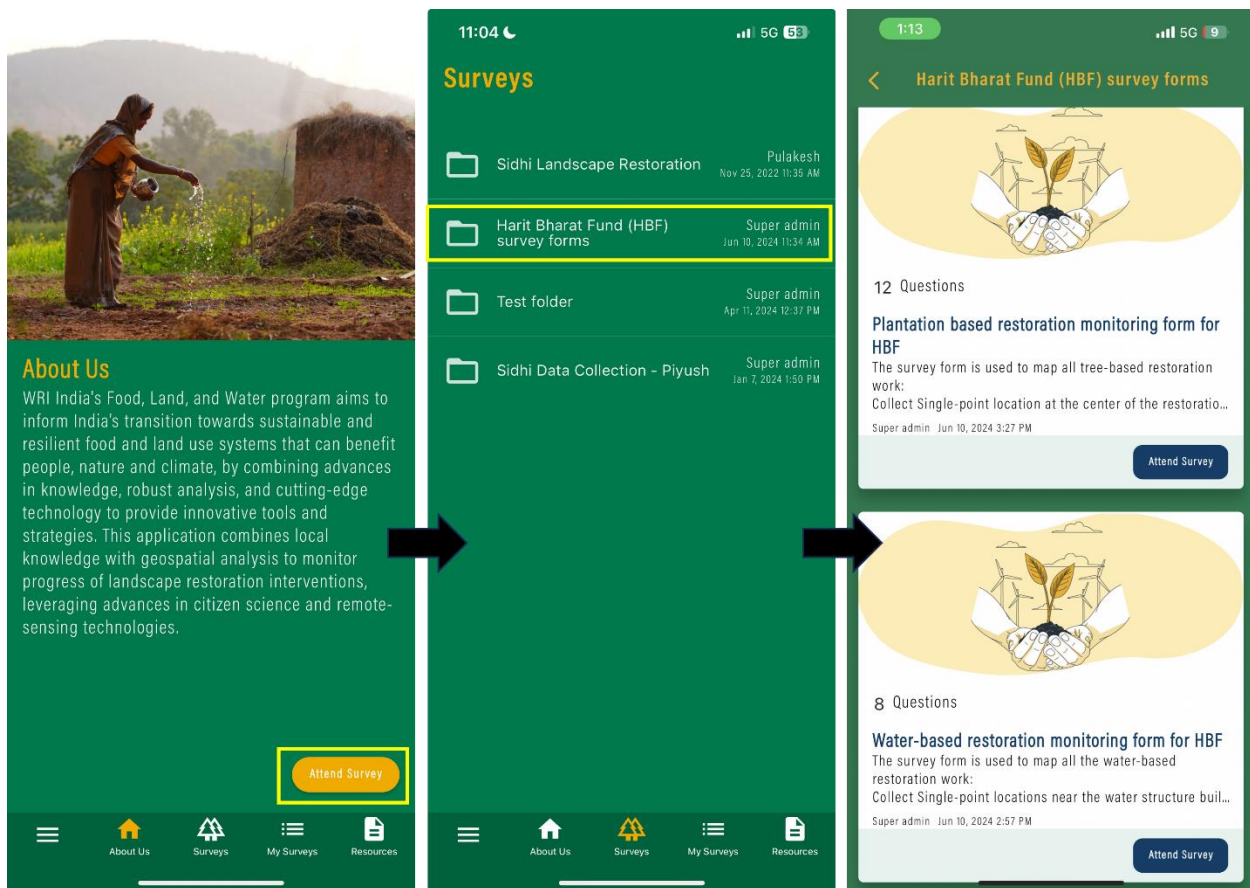
7.2 Form for Plantation-based restoration

The "Plantation-based restoration monitoring form for Harit Bharat Fund" has a list of 11 questions, in this section we will explain what input Champion needs to enter for each question in the survey form.

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This form applies to all plantation types, including trees, shrubs, grasses, and any other vegetation planted for the project.

7.2.1 Site name

(As created on TerraMatch)

Champion needs to enter text in this section, the Site name is very crucial as it helps link the data collected from CSA to the site profile made on TerraMatch for Monitoring, Reporting, and Verification (MRV) purposes (Refer to section 4.1.3). **The site name entered needs to be the same as the one created on TerraMatch.**

7.2.2 Polygon name

Polygon names can be entered by the Champion as they wish, but make sure it makes sense, like if you are working in a certain village called "XYZ," the polygon name can be "XYZ_1", "XYZ_2" and so on.

7.2.3 Organization name

Enter the name of the Champion organization. It needs to be a full name, not an acronym.

7.2.4 Start date of plantation

This is the date when the plantation starts in the restoration area, not the planning or prep data but the date when you plant the first sapling. Enter the date using the calendar option.

7.2.5 End date of plantation

This is the date when the plantation ends in the restoration area when you have planted the last sapling. Enter the date using the calendar option.

7.2.6 Restoration practices adapted

This section lets you select the types of restoration activities you are carrying out in the designated area. You can choose multiple options!

Here are the available options:

- **Sapling plantation:** Planting young saplings grown in nurseries.

- **Direct seeding:** Sowing seeds directly into the soil.

- **Assisted natural regeneration:** Encouraging the natural growth of native trees and shrubs by removing invasive plants or controlling competition, or by building fences to avoid grazers.

- **Other:** If the Champion is using a different Plantation-based restoration method not listed above, select "Other" and enter a brief description in the provided field.

! Champions can choose both "Sapling plantation" and "Assisted natural regeneration" if they are planting saplings and promoting natural growth in the same area.
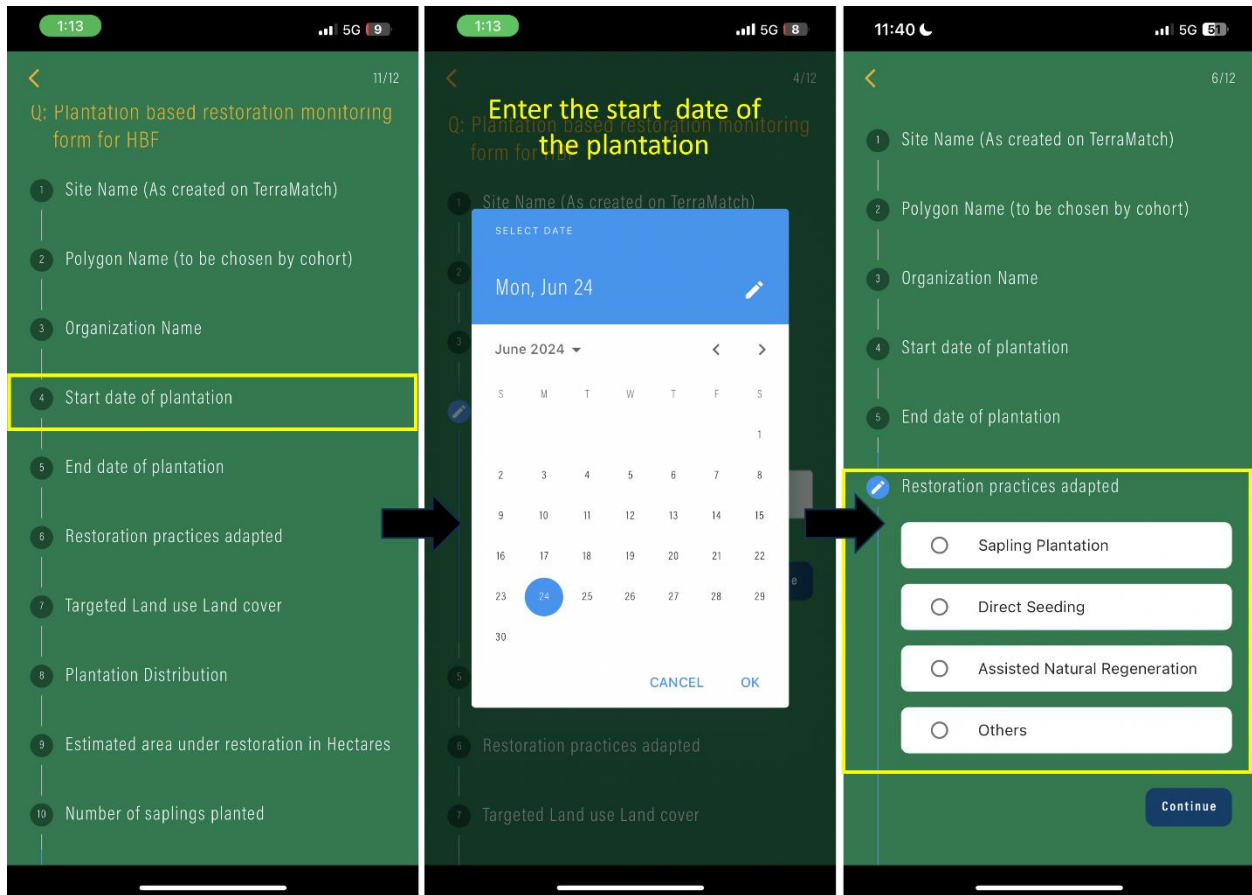
7.2.7 Targeted land use land cover

This section asks Champions to choose the expected land use/cover type for the area after six years of restoration efforts. This should ideally be the similar selection you made for the site profile on TerraMatch.

Here are the available options:

- Agroforest: Land used for combined production of crops and trees.
- Natural Forest: Land dominated by native trees with minimum human intervention.
- Riparian Area: Land bordering a stream or river with unique vegetation.
- Silvopasture: Land used for integrated production of trees and grazing animals.
- Woodland: Open land with scattered trees and shrubs.
- Other: If the Champion's target land use is not listed here, choose "Other" and enter a brief description in the provided field.

! Choose the option that best reflects your restoration goals for the area. Align your selection with the choice made on TerraMatch for consistency.

7.2.8 Plantation distribution

In this section Champions will choose the type of sapling planting they will be conducting in the restoration area. Select one option that best describes your approach:

- **Full Area Plantation:** Plant saplings throughout the entire restoration area to create a dense forest cover.
- **Partial Plantation:** Plant saplings in designated sections of the area, allowing for features like small "Nutri-gardens" that promote beneficial insect populations.

- **Linear Plantation:** Plant saplings in a single line, often used for creating borders along bunds (embankments) or roadsides.

7.2.9 Estimated area under restoration in hectares

In this section, the Champion should enter the estimated area of the specific location where you are carrying out restoration activities. This should be the area you are collecting data for, not the entire site area. We need this information in hectares (ha). For example, if the restoration zone you are focusing on is roughly the size of a football field, that is about 0.7 hectares.

7.2.10 Number of saplings planted

In this section, the Champion needs to enter the total number of saplings that they planted in the restoration area.

7.2.11 Comments from Champion if any

This section is optional, but we encourage you to use it! Here you can share details about any restoration activities you are conducting in the area beyond just planting saplings.

This could include practices like:

- Controlled Grazing: Managing the grazing of animals to promote specific plant growth and reduce invasive species.
- Weed Removal: Removing unwanted plants that compete with desired vegetation.
- Mulching: Covering the soil with organic material to retain moisture and suppress weeds.

By providing these details, you help Harit Bharat Fund gain a more comprehensive understanding of your restoration efforts and their impact on the area.
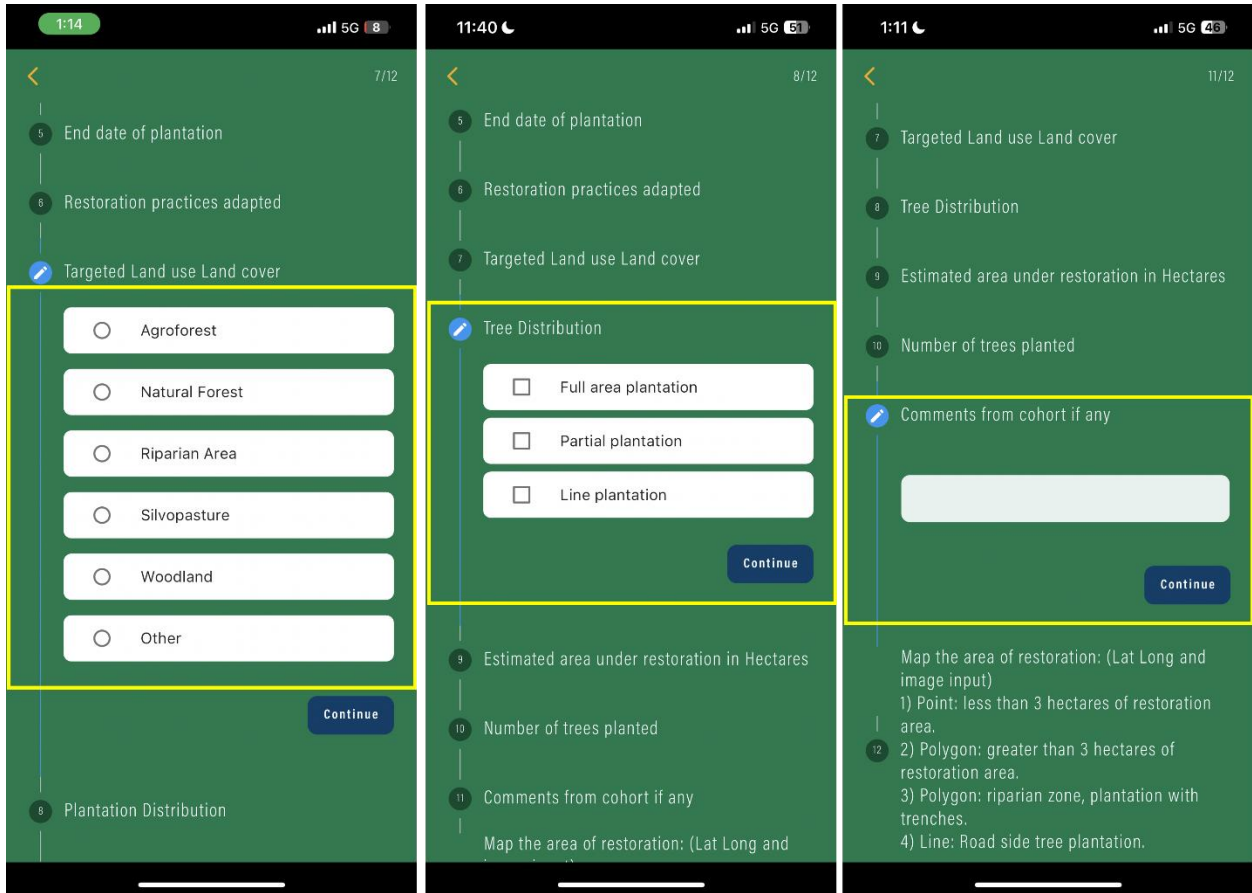
7.2.12 Map the area of restoration:

(Latitude longitude and image input)

> 1) Point: Less than 3 hectares of the restoration area
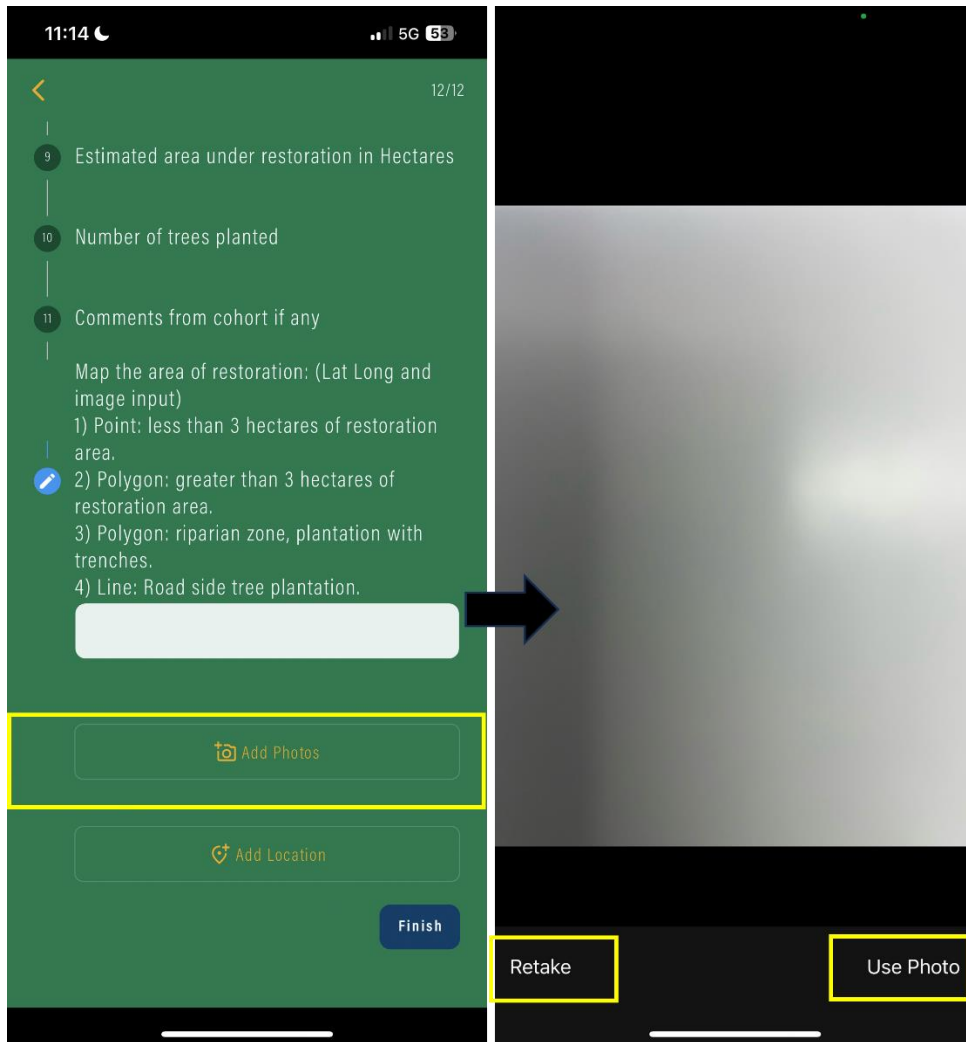> 2) polygon: greater than 3 hectares of the restoration area
> 3) Polygon: riparian zone, plantation with trench
> 4) line: roadside plantation

In this section, Champions will begin data collection here in the form of photos taken on-site and GPS locations. Entering points (Single Latitude longitude value) or polygons (multiple latitude longitude values) based on their restoration work type (detailed in Section 5). Section 5 provides a reference for different restoration practices and their corresponding data collection methods. The data collection process itself is quite straightforward.

Adding photos:
Champions can add photos of the restoration area by clicking the "Add Photos" button. This will launch the camera app, allowing them to capture a picture. Two options appear: "Use Photo" and "Retake." If the first attempt is not perfect, simply "Retake" the photo. Once satisfied, select "Use Photo" to add it to the form.

Collecting GPS location data

1. Click "Add Location" to open a map view with a satellite image centered on your current location.
2. Wait 30 seconds for the location to stabilize (a red location marker will appear on the map to show your current location) and select the "Add location" button on the map page to add the location.
3. For distributed projects: This single point at the center is sufficient. Click "Add Location" once to save it and return to the survey.
4. For concentrated sites: Repeat step 1,2 to collect multiple points along the restoration area boundary as you walk across. Use the satellite image to track your progress and ensure complete coverage. Once all boundary points are collected, return to the survey page.
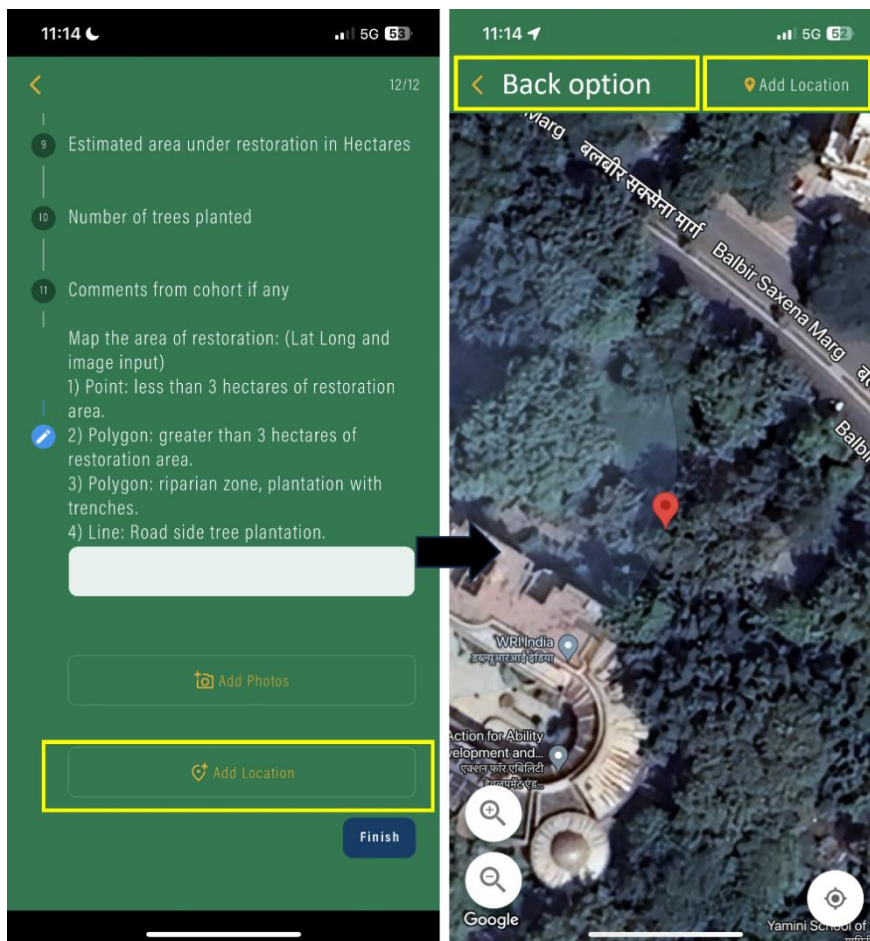
After entering all your information, Champions can review your answers one last time. Simply navigate back through each section to double-check and make any edits. Once confident with the responses, click the "Finish" button at the end of the survey to submit it.

7.3 Form for water-based restoration

The "Water-based restoration monitoring form for Harit Bharat Fund" has a list of 8 questions, in this section we will explain what input Champion needs to enter for each question in the survey form.

7.3.1 Site name

(As created on TerraMatch)

Champions need to enter text in this section, the Site name is very crucial as it helps link the data collected from CSA to the site profile made on TerraMatch for Monitoring, Reporting, and Verification (MRV) purposes (Refer to section 4.1.3). **The site name entered needs to be the same as the one created on TerraMatch.**

7.3.2 Organization name

Enter the name of the Champion organization. It needs to be a full name, not an acronym.

7.3.3 Date of water conservation structure created or restoration initiative

For water conservation structure construction, enter the date of intervention, or if construction took multiple days, the final day. For restoration projects like pond revival, enter the final date of restoration work using the calendar input.

7.3.4 Capacity of water structure in liters

Champions need to enter the estimated capacity of the water structure in liters, be it a pond that they rejuvenated or other water structures they created to conserve water. In the case of construction of structures that are not meant for water like gully plugs, they can skip this question.

7.3.5 Water conservation structure created

Champions need to enter the water conservation structure they have constructed or that they have rejuvenated. In case the options are not listed in the given list others can enter the type of structure they are working on in the "Others" option as a text. The options in the survey form are listed below.

- **Bunds:** Raised embankments of earth or other materials constructed to create a water storage area or control the flow of water.
- **Terraces:** Earth embankments constructed across a slope to create a series of level steps. Terraces reduce water runoff and soil erosion, and they can be used for agriculture.
- **Gully Plugs:** Small dams built across a gully to slow down the flow of water, reduce erosion, and encourage rainwater infiltration.
- **Check Dams:** Small barriers constructed across a waterway to slow down the flow of water, reduce erosion, and raise the water level upstream. Check dams can be used for irrigation, recreation, and flood control.
- **Storage Tanks:** Reservoirs used to store water for later use. Storage tanks can be built above ground or below ground, and they can be made from a variety of materials, such as concrete, steel, or plastic.
- **Ponds:** Small, bodies of water created to store water for irrigation, livestock watering, or other purposes.
- **Contour Trenches:** Ditches dug along the contour of a slope to intercept runoff and encourage rainwater infiltration.
- **Trenches:** Linear ditches dug to collect, divert, or store water. Trenches can be used for various purposes, including drainage, irrigation, and erosion control.
- **Doha:** A traditional, underground water harvesting structure commonly found in desert regions. Dohas are typically conical or cylindrical pits lined with stones or other materials to prevent water loss through seepage.
- **Percolation Tanks:** Earthen embankments constructed across drainage channels to store water and allow it to slowly infiltrate the ground. Percolation tanks help to recharge groundwater supplies.
- **Large Water Reservoirs: Large lakes or impoundments were created to store water for various purposes, including irrigation, drinking water supply, hydroelectric power generation, and flood control.**
- **Others:** If the water conservation is not listed above Champions can enter the option here.

7.3.6 Estimated restoration area in hectares only for areas where trenches are built

In case Champions are making multiple trenches or percolations pits over a large area of land for the water conservation structures, they need to enter the total hectares that they restored in Hectares, essentially the area covering the trenches. This is a question for specific Champions working on trenches, the rest of the Champions can skip this question.

7.3.7 Comments

This section is optional, but we encourage you to use it! Here you can share details about any restoration activities you are conducting in the area beyond construction or rejuvenation of water conservation structures.

This could include practices like:

- **Habitat improvements:** Removing invasive plants like water hyacinth to promote native vegetation.
- **Water quality management:** Removing debris or sediment from the water structure.
- **Number of trenches built in the areas:** In the case of large areas where trenches are built Champions can report on the number of trenches they built within the restoration area.

By sharing these details, you will help us gain a deeper understanding of your comprehensive restoration efforts and their impact.

7.3.8 Map the restoration initiatives

(Latitude longitude and image input)

- Point: For water conservation structures like ponds and large water reservoirs.
- Polygon: Perimeter of the area where the trenches are built for water conservation.

In this section, Champions will begin data collection here in the form of photos taken on-site and GPS locations. Entering points (Single Latitude longitude value) or polygons (multiple latitude longitude values) based on their restoration work type (detailed in Section 5). Section 5 provides a reference for different restoration practices and their corresponding data collection methods. The data collection process itself is quite straightforward.

Adding photos:

Champions can add photos of the restoration area by clicking the "Add Photos" button. This will launch the camera app, allowing them to capture a picture. Two options appear: "Use Photo" and "Retake." If the first attempt is not perfect, simply "Retake" the photo. Once satisfied, select "Use Photo" to add it to the form.

Collecting GPS location data

1. Click "Add Location" to open a map view with a satellite image centered on your current location.

2. Wait 30 seconds for the location to stabilize (a red location marker will appear on the map to show your current location) and select the "Add location" button on the map page to add the location.
3. For most structures, a single photo and a GPS location near the water structure are enough.
4. Only for areas where trenches and percolation pits are built Repeat steps 1,2 to collect multiple points along the restoration area boundary as you walk across. Use the satellite image to track your progress and ensure complete coverage. Once all boundary points are collected, return to the survey page.

After entering all your information, Champions can review your answers one last time. Simply navigate back through each section to double-check and make any edits. Once confident with the responses, click the "Finish" button at the end of the survey to submit it.

7.4 Reviewing and submitting survey forms

After completing a survey and collecting data, Champions can review and submit their work within the "My Surveys" section of the app. This section provides two key areas: Drafts and Submitted.

Drafts:

This section displays all surveys that have been filled out but not yet submitted. Champions can access any draft survey by simply selecting it from the list. Once opened, Champions can thoroughly review the information they have entered. If there are any mistakes or changes needed, Champions can easily edit their responses directly within the draft form. For surveys that are no longer needed, Champions can delete the entire draft and begin collecting data again from scratch by returning to the initial survey form. Once Champions are satisfied with the data collected, they can select the "Submit" button to submit the survey form to Harit Bharat Fund.

Submitted:

This section houses all surveys that have been successfully uploaded and sent to Harit Bharat Fund. Once submitted, these forms become locked and cannot be further edited.
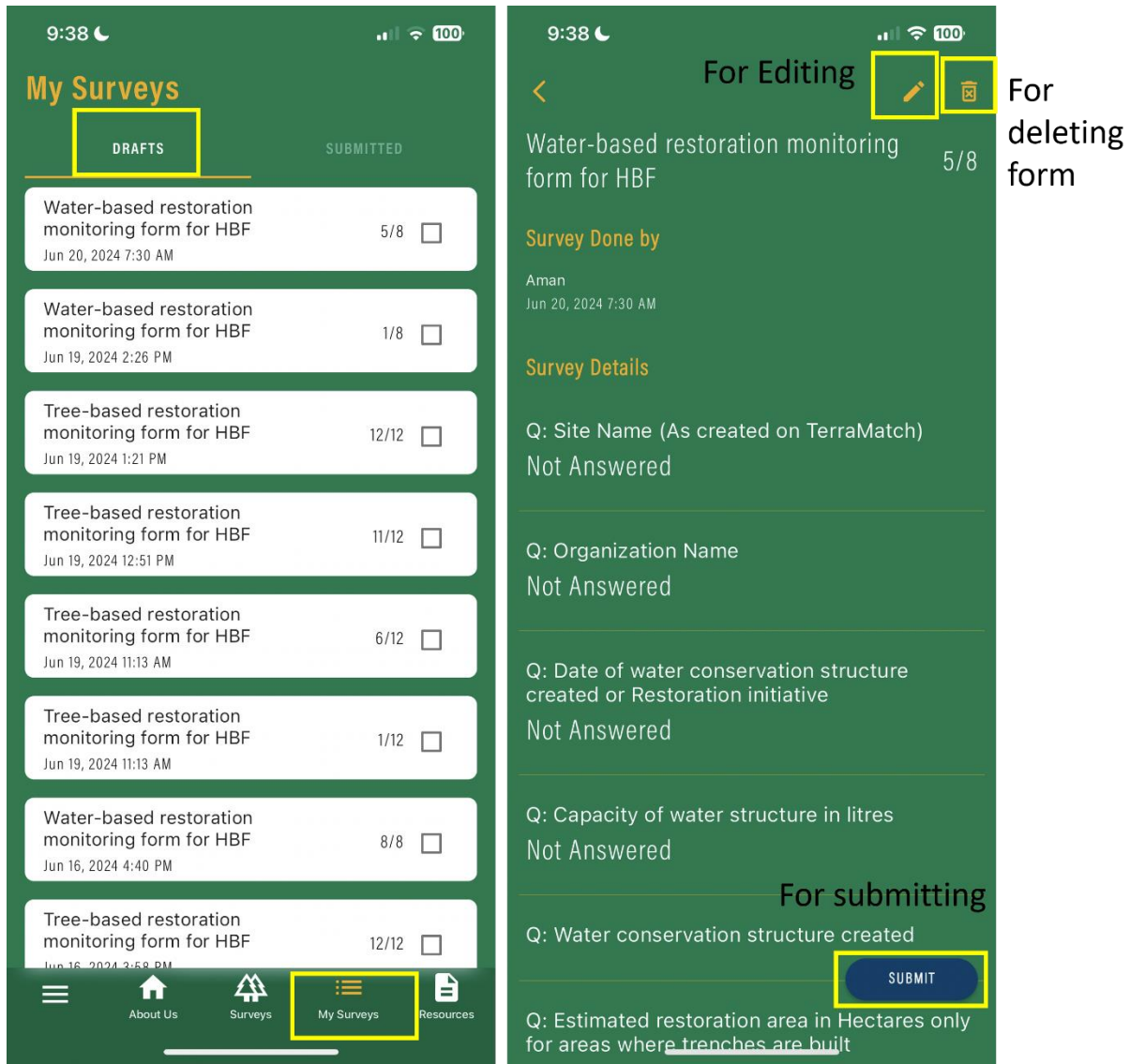
Offline functionality of the app

The app understands that internet access may not always be available. Here is what you can do when offline:

- Complete Surveys: Champions can finish surveys even without an internet connection.
- Initial Review: Champions can first review their completed survey within the app from the draft section.
- Submission: Once the Champions are in an area where they have internet connectivity, they can make the submissions.

While data collection can be done offline, submitting completed surveys to Harit Bharat Fund requires a stable internet connection.

7.5 Downloading the forms created by the Champion

Upcoming Feature: The app is being improved to allow Champions to download submitted forms directly from the Citizen Science app. This functionality will be available in the next app update. The download button will appear near the submitted survey forms and Champions will be able to download their submitted form for themselves.

8. QA (Quality Assurance) and verification

8.1 Common Errors

Bad Quality Polygon

A bad-quality polygon occurs when the Champion does not collect enough location points while tracing the boundary of the restoration area. This results in a distorted polygon that does not accurately represent the actual area being restored.

How to Avoid Bad Quality Polygons:

- Diligent Data Collection: Champions should be thorough when collecting location data.
- Frequent Points: Multiple location points should be collected around the entire boundary of the restoration area. Aim for a close interval, like every 5 meters.

By collecting frequent location points, the resulting polygon will be a more accurate reflection of the actual restoration area. This ensures no significant portions of the restored area are excluded. This is important as the area captured within the polygon is used to verify the area Champion's report as part of their restoration efforts. Accurate data collection helps ensure your restoration work is properly documented.

Good Quality polygon   Bad Quality polygon with only 3 points

Creating one single polygon for multiple restoration types and restoration areas

To ensure an accurate representation of restoration efforts, Champions should create separate polygons for each distinct restoration initiative. For example, areas undergoing the current plantation should have a unique polygon, separate from a nearby path where the plantation happened two weeks ago. Combining all restoration areas, regardless of type or timing, into a single polygon should be avoided.

Multi Intervention Site

Multi-intervention polygon, one area with different interventions, needs to have each discrete intervention area delineated. Boundaries of each area need to be collected separately even if they are connected.

Duplicate or overlapping polygon

During data collection, Champions should be mindful of their starting point to avoid accidentally creating duplicate polygons for the same restoration area. A good practice is to review survey forms thoroughly before submitting them, keeping track of previously mapped areas to ensure all restoration efforts are captured within a single, accurate polygon.

Duplicate/overlapping polygons
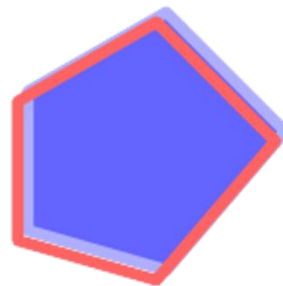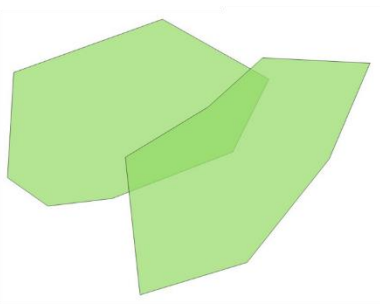
Incomplete polygon

When collecting multiple GPS locations to define a restoration area polygon, Champions should remember their starting point. It is important to return to that point to "close the loop" and ensure

a complete polygon is created. Failing to do so might result in an incomplete polygon that does not capture the entire restoration area.

Incomplete polygons
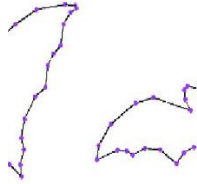
Spikes

Spikes appear when Champions collect location data that is far from the actual restoration area. To create a precise polygon representing the restoration area, Champions should:

1. Plan your path: Before data collection, plan the route you will follow around the restoration area boundary. This minimizes the risk of accidentally collecting points outside the actual site.
2. Wait for stabilization: When capturing GPS location points, wait for 30 seconds before confirming each point. This allows the GPS signal to stabilize, reducing the chance of capturing inaccurate points far from the restoration area that might cause distortions (spikes) in the final polygon.

Spikes
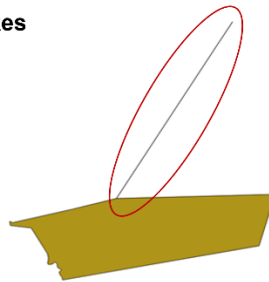
Sliver polygon

When collecting polygon data for restoration areas that are close together, Champions should be mindful of potential overlap (sliver polygon) between the resulting polygons. While minor overlaps can occur and may be adjusted later, it is important to be as accurate as possible during data collection.

- Focus on capturing each boundary accurately: Prioritize tracing the actual boundary of each restoration area to minimize overlap with its neighbor.
- Minimize data collection errors: Following best practices like planning your path and waiting for GPS stabilization (mentioned previously) will help ensure accurate data collection and minimize accidental overlap.

Sliver polygons
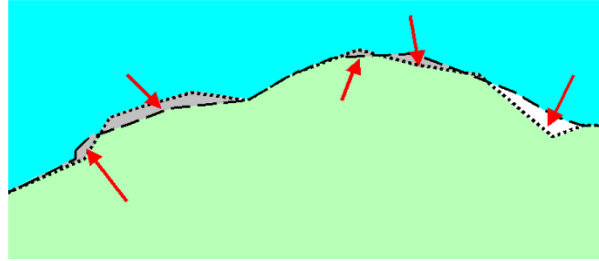
8.2 QA Process

To ensure the accuracy and completeness of your data, we have a two-step process:

1. **Data Gap Identification:** We will review your data for any missing information or low-quality polygons.

2. **Collaborative Correction:**

    a. **Missing Attributes:** If any attribute is missing, our Landscape Managers (WRI India) will reach out to the Champion for information. Once confirmed, we will fill in the missing data.

    b. **Poor-Quality Polygons:** For polygons that do not accurately reflect the restoration effort, we may request the Champion to refine/redo the polygon boundary data collection.

8.3 Support from the Harit Bharat Fund team

Throughout this process, you will receive support from your Landscape Managers, and the Harit Bharat Fund team. Please reach out if you have any questions or need assistance with data collection.

-   **Contact your Landscape Manager:** They are your go-to resource for any data collection questions or issues. Stay connected with your corresponding Landscape Manager and in case of any issue, feel free to contact them, and they will give you the necessary help.
-   **Do not worry about mistakes:** We understand getting it right the first time can be challenging. Just reach out to your landscape manager, and we will connect you or provide you with the right support.
-   **Data Collection Refresher:** Whether you need a quick refresher or in-depth assistance, we are happy to provide it.
-   **Contact:** haritbharatfund@wri.org