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Time 1

Flora Survey

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# POPULATION AND ECOLOGY RESEARCH LABORATORY POPULATION AND ENVIRONMENT STUDY

*Rampur, Chitwan*



## TIME 1 COMMON LAND PLOT FORM

This form has been designed to obtain information about the conditions or state of common land based on observing (and monitoring) growth, composition and species diversity, vegetative cover soil quality research plot. A research plot is defined as 10 X 10 square meter (Sq.m.) randomly selected point in the common land referred to by sampled Neighborhood and identified by POPENV team.

Response on this form should be based on the observations that the field researchers make in a research plots. One **Common Land Plot Form** should be filled out for each research plot.

Research ID: PERL/POENV

Country: NEPAL

Site ID: \_\_\_\_\_

Name of person filling out this form: \_\_\_\_\_

Date (Day, month and year) \_\_\_\_\_

Plot identification Number: \_\_\_\_\_



**B. CONDITIONS OF THE PLOT**

B1. Describe the soil with in the plot

If possible, include a discription of the location of the topographically, surface and depth of humus layer, color, texture and hardness of soil in the research plot. The checklist are :

- B1a. Location of plot topoghraphically \_\_\_\_\_
- B1b. Surface description & depth of humus \_\_\_\_\_
- B1c. Soil color and drainage \_\_\_\_\_
- B1d. Soil texture \_\_\_\_\_
- B1e. Aspect of the plot \_\_\_\_\_

B2. Is there evidence of active soil erosion in the plot? Mark only one answer

- a. \_\_\_\_\_ No
- b. \_\_\_\_\_ Yes, minor erosion; surface vegetation and humus layer is absent
- c. \_\_\_\_\_ Yes, major erosion; Large gully are present in barren soil

B3. What is the type of this common land? Mark only one answer

- |                          |                           |                     |
|--------------------------|---------------------------|---------------------|
| _____ Adjacent to forest | _____ River side          | _____ Canal way     |
| _____ Road way           | _____ Community           | _____ School ground |
| _____ Community managed  | _____ Any other (specify) |                     |

B4. What is the present condition of this common land? Such as degree of used

- |   |   |
|---|---|
| _____ Heavily used                                    | _____ Seasonally used for grazing animals |
| _____ Not used for grazing but used for grass cutting |   |

B5. Did you observe grazing animals during the day of study ?

- \_\_\_\_\_ yes                      \_\_\_\_\_ No

B6. If yes, write the type of animals that you observed ?

\_\_\_\_\_

B7. Is this plot located within a section of the specific grass land management ?

- a. \_\_\_\_\_ yes                      b. \_\_\_\_\_ No

B7a. If yes how many years has it been under the current management practice?

\_\_\_\_\_ years

B7b. Who owns this section of common land ?

- a. \_\_\_\_\_ Community      b. \_\_\_\_\_ Government      c. \_\_\_\_\_ IAAS

B8. Write additional information about the plot if necessary such as existance of tree/s, shrub/s etc

\_\_\_\_\_

\_\_\_\_\_



**Draw a sketch map showing direction to locate the plot**

**Draw a sketch map that best explain the plot**

**POPULATION AND ECOLOGY RESEARCH LABORATORY  
POPULATION AND ENVIRONMENT STUDY  
RAMPUR, CHITWAN**



**TIME 1 FOREST PLOT FORM**

This form has been designed to obtain information about the condition or state of forest based on observing (and monitoring) tree growth, forest composition and species diversity, vegetative cover presence of livestock, soil quality and pest damage in research plot. A research plot is defined as 10 X 10 square meter (Sq.m.) randomly selected point in the forest decided on the basis of the 1992 aerial map.

Ground cover and seedling are sampled from 1 X 1 Sq. m. (Smallest plot size), shrub and tree saplings in the 3 X 3 Sq. m. (middle-sized plot) and tree in the 10 X 10 Sq.m. plot (largest plot).

Response on this form should be based on the observations that the field researchers make in a specific forest. For each of the research plots, one Forest Plot Forms should be filled out.

Research ID: PERL/POENV

Country: NEPAL

Site ID: \_\_\_\_\_

Name of person filling out this form: \_\_\_\_\_

Date (Day, month and year) \_\_\_\_\_

Plot identification Number: \_\_\_\_\_





## **B. CONDITIONS OF THE PLOT**

B1. Describe the soil with in the forest plot

If possible, include a discription of the location of the topographically, surface and depth of humus layer, color, texture and hardness of soil in the research plot. The checklist are :

- B1a. Location of plot topographically \_\_\_\_\_  
B1b. Surface description & depth of humus \_\_\_\_\_  
B1c. Color/Soil Drainage \_\_\_\_\_  
B1d. Texture of Soil \_\_\_\_\_

B2. Is there evidence of active soil erosion in the forest plot? Mark only one answer

- a. \_\_\_\_\_ No  
b. \_\_\_\_\_ Yes, minor erosion; surface vegetation and humus layer is absent  
c. \_\_\_\_\_ Yes, major erosion; Large gully are present in barren soil

B3. Is there evidence of livestock/wild animals use within the forest plot? Mark only one answer

- a. \_\_\_\_\_ No                      b. \_\_\_\_\_ Yes

B.4 Is there evidence of extreme damage by insects/pests within the forest plot? Mark only one

- a. \_\_\_\_\_ No                      b. \_\_\_\_\_ Yes

B5. Is this plot located within a section of the forest that is set aside for specific forest mgmt?

- a. \_\_\_\_\_ No                      b. \_\_\_\_\_ Yes

B5a. If yes how many years has it been since this section of the forest was subject to major harvesting effort?

\_\_\_\_\_ Years

B5b. If yes what is the name of this unit                      Name \_\_\_\_\_

Information for the following three questions is resquested for each plot so that eventually it may be recorded on a GIS map of the forest. Information about the species and sizes of trees may be related to the elevation of the plot, the direction towards which the plot faces (e.g. primarily south facing or north facing), and the steepness of the plot (normally measured in terms of the number of meter rise over a ten meter distance, expressed as percentage).

B6. Plot elevation in meters \_\_\_\_\_

B7. If the plot is on a slope, what direction does the plot face? Mark only one answer

- |                    |                    |
|--------------------|--------------------|
| a. _____ North     | e. _____ South     |
| b. _____ Northeast | f. _____ Southwest |
| c. _____ East      | g. _____ West      |
| d. _____ Southern  | h. _____ Northwest |

B8. What is the steepness of the slope in degree ? \_\_\_\_\_

B9. Provide any other observations that pertain to plot conditions, e.g. tree falls, charcoal burning fire damage, Storm damage,etc.

\_\_\_\_\_

B10. What is the percentage of tree crown cover in this plot ?

\_\_\_\_\_

B11. Are epiphytes    a. \_\_\_\_\_ Absent                      b. \_\_\_\_\_ Few                      c. \_\_\_\_\_ Abundant



**D. SHRUB, SAPLING, WOODY AND HERBACEOUS CLIMBER INFORMATION**

Record the local and botanical names of each shrub, sapling, woody, and/or herbaceous climber found in the 3x3 sq. Record maximum diameter and height in metric units.

Starting at the center of the plot, create a square with 3x3 meter. For each sapling, shrub, woody, and/or herbaceous climber species in this area, answer the questions below. Remember that a sapling is defined as a young tree with a stem diameter greater than 2.5 cm but less than 10 cm (7 to 35 cm.in circumference).

Collection Number			Nos	Cover	Is this shrub Shrub sapling, or climber	Maximum stem dia. of the shrub or sapling in cm.	Estimated height of the shrub or sapling in meter but not climber
	Botanical Name	Local Name					

Write "B" for Shrub, "P" for Sapling, "W" for woody and "R" for herbaceous



**Draw a sketch showing direction to locate the Research Plot.**

**Draw a sketch that best explain the Research Plot**

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Time 2

Flora Survey

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PLOT ID **CL** \_\_\_\_\_

Population and Ecology Research Laboratory  
Rampur, Chitwan

Population and Environment Study

Flora Survey Form

Common Land Plots

This form has been designed to obtain information about plant species diversity and common land composition in the common land plots used by the Population and Environment Study at Time 1 (1996). The common land plots are defined as the 10 x 10 meter plot used at Time 1. The directional data, sketch maps and other plot characteristic data gathered at Time 1 will be provided to you or made available to consult before going off to the common land site.

All flora data must be entered on this form while at the common land plot site. For each common land plot complete each of the sections (on plot characteristics, and the grass and herb species).

Research ID: PERL-POPENV

Country ID: NEPAL

Site ID: \_\_\_\_\_

Name of person(s) filling out this form: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date: \_\_\_\_\_





## **SECTION B**

### **Finding the Common Land Plot at Time 2**

Follow the directions to the common land plot taken from Section A and B at Time 1. Record below all decisions made about determining the location of the common land plot and where appropriate provide additional information.

**B1. Was the first control point (the origin point for the journey to the common land plot) location easily found?** Yes \_\_\_\_\_

No \_\_\_\_\_

**B2. If No, please provide additional information and a sketch map that will help save time during any future data collection. For example, is there an easier bearing one could follow to reach exactly the same point? Can we make a back-bearing from the common land plot to an easy to see feature (e.g. a building, a path or a ghole)?**

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The Sketch map must be drawn with North at the top. Use the digital compass to orient yourself correctly before drawing the map.

After following all directions and distance instructions up to the last control point you should find yourself at the common land plot location. Review your route through the control point and discuss among yourselves whether or not there was any point on the journey at which a small error may have been made in the bearing or distance calculations and also carefully review the information collected at Time 1 (e.g., notes, sketch maps). Because no common land plot was tagged it may be impossible to confirm that your team is at the correct location. However, review the plot characteristic information in Section A (above) and all other material.

Follow the guidelines of one of the three options below.

- (a) **If the plot characteristics at Time 1 match the characteristics of the area immediately around the last control point then consider using this location as your common land plot area.**  
Alternatively, use the same information to identify the most likely common land plot location (within a distance of 25 meters) that matches exactly the information in Section A.
- (b) **If the characteristics of the area within 25 meters do not match the information in Section A but you are confident that you are in the correct location then the most likely explanation is that land use in the larger area in which the plot is located has changed.**  
For example, new household residence areas may have been built on common land, or a common land became part of bari land. There are many possible changes that may have taken place since Time 1 data collection.
- (c) **If the characteristics of the area within 25 meters do not match the information in Section A and you are not confident about your exact location then please do not collect any flora data at this time.**  
For example, you may not be confident about your location because of a poor sketch map at time 1 or contradictory information in notes and directions. **In this instance, return to the PERL office at Rampur and report the problem to a senior PERL supervisor.**

To assist the PERL supervisors and their colleagues in the US please provide as much detailed information as possible about the site, the route through the forest, across farmers fields, etc. Please answer the following questions.



**Plot Characteristics at Time 2**

**B7. Has the location of common land plot changed land use category? (That is, has a common land area at time 1 become something else at time 2 (e.g. khet land? plantation? school? household? bari land? etc).**

Yes \_\_\_\_\_ No \_\_\_\_\_

**B8. If the common land area has changed land use category, what category of land use was it at:**

**a) Time 1 (1996)?**

\_\_\_\_\_

**b) Time 2 (2000) TODAY?**

\_\_\_\_\_

**B9. Is there any evidence of the following having occurred at the common land plot location:**

a) livestock damage Yes \_\_\_\_\_ No \_\_\_\_\_

b) wild animal damage Yes \_\_\_\_\_ No \_\_\_\_\_

c) extreme damage by insects Yes \_\_\_\_\_ No \_\_\_\_\_

d) fire damage Yes \_\_\_\_\_ No \_\_\_\_\_

e) storm damage Yes \_\_\_\_\_ No \_\_\_\_\_

f) flooding Yes \_\_\_\_\_ No \_\_\_\_\_

g) tree falls Yes \_\_\_\_\_ No \_\_\_\_\_

h) dead trees at the plot Yes \_\_\_\_\_ No \_\_\_\_\_

**B10. Is there evidence of active soil erosion at the common land plot location?**

No \_\_\_\_\_

Yes-minor (surface vegetation and/or soil humus absent) \_\_\_\_\_

Yes-major (gullies, barren soils, etc.) \_\_\_\_\_

## SECTION C

### Ground Cover and Seedling Information

For each flora plot on common land we are gathering data on grasses and herbs from THREE 1 x 1 meter plots within the larger 10 x 10 meter plot. In each plot we are interested in gathering information on the number (count) of each species and their ground coverage.

Using data gathered at Time 1 we observed some species more frequently than others. We have entered their names directly below (and at the top of the next page). Please note that just because they are listed here does not mean that they will be present in the specific plot. The names of species observed in the plot but not listed below should be written in the blank lines in the table on the next page.

If a grass species cannot be identified, then select a leaf or stem and tag it. Write down the "identification" number in the column below and on the sample bag.

Species Name	Quadrat 1		Quadrat 2		Quadrat 3		Specimen number
	N	C	N	C	N	C	
Amala jhar ( <i>Phyllanthus urinaria</i> )							
Badampate ( <i>Evolvulus nummularius</i> )							
Banso ( <i>Brachiaria distachya</i> )							
Chanya banso ( <i>Eragrostis tenella</i> )							
Chariamilo ( <i>Oxalis corniculata</i> )							
Chariamilokomausi ( <i>Des. triflorum</i> )							
Chiurebanso ( <i>Eragrostis unioides</i> )							
Dalle mothe ( <i>Cyperus brevifolius</i> )							
Dubo ( <i>Cynodon dactylon</i> )							
Dudhe ( <i>Euphorbia hirta</i> )							
Gandhe ( <i>Ageratum houstonianum</i> )							
Ghode dubo ( <i>Hemarthria compressa</i> )							
Ghod tapre ( <i>Centella asiatica</i> )							
Jhupepyauli ( <i>Medicago lupulina</i> )							
Karauti ( <i>Leersia hexandra</i> )							
Kash ( <i>Saccharum spontaneum</i> )							
Kodejhar ( <i>Eleusine indica</i> )							
Kuro ( <i>Chrysopogon aciculatus</i> )							





## SECTION D

### Flora Plot Sketch Map

Below you will find an outline for the flora plot for which you have just completed data entry. **Please mark** on the diagram below the approximate location of:

- a) **the direction and route** used to enter and find the plot (e.g. from the North).
- b) **all trees** over 5 meters in height (indicated by a circle drawn in approximate proportion to their size)
- c) **key reference features in or near the plot** (e.g., within 25 meters - e.g., a ghole, a walking path, a canal, a culvert, etc.).
- d) **Please add information in the table** below on a distance and bearing between **ALL** corners of the plot and at least one key feature (e.g., standing at the NE corner there is a pathway at 25m on a bearing of 84 degrees).

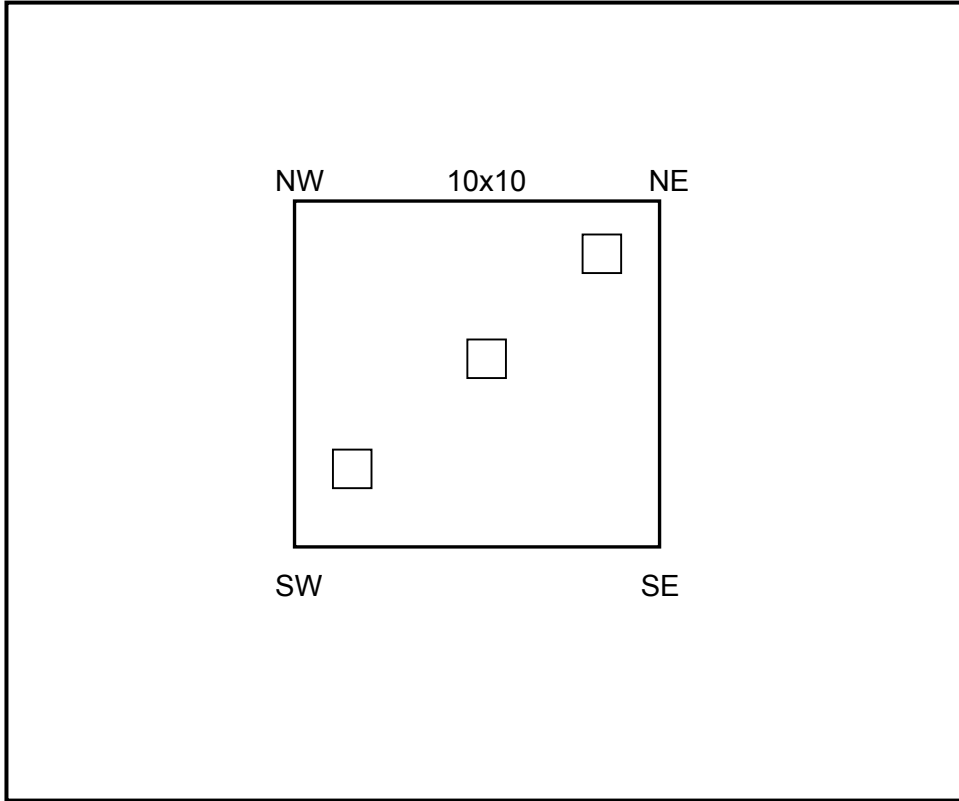
When making the measurements from the corners you can use an object more than once but **DO NOT** use the same object for all four corners. Indeed, **you must use a minimum of two different objects for each PLOT (a minimum of two objects for every four corners).**

Corner	Object(s)	Distance	Bearing
NE			
SE			
SW			
NW			



Sketch Map of Plot \_\_\_\_\_

20 x 20 meters



PLOT ID   **A**  

Population and Ecology Research  
Laboratory  
Rampur, Chitwan

Population and Environment Study

Flora Survey Form

Forest Plots

This form has been designed to obtain information about plant species diversity and forest composition in the forest plots used by the Population and Environment Study at Time 1 (1996). The forest plots are defined as the 10 x 10 meter plot used at Time 1. The directional data, sketch maps and other plot characteristic data gathered at Time 1 will be provided to you or made available to consult before going off to the forest site.

All flora data must be entered on this form while at the forest plot site. For each forest plot complete each of the sections (on plot characteristics, tree species, shrub/saplings, and grasses/herbs).

Research ID: PERL-POPENV  
Country ID: NEPAL  
Site ID: \_\_\_\_\_

Name of person(s) filling out this form: \_\_\_\_\_

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Date: (Day/month/year) \_\_\_\_\_

## **SECTION A**

### **Directional and Other Plot Data Collected at Time 1**

Use the directions to plot and sketch maps recorded at Time 1 to identify the flora plot location.

**Please follow the established protocols before collecting any flora data.**

To assist you in locating the plot we require that you consult Section B of the Time 1 forest plot forms and answer the following questions.

**A1. Is the plot level, on a gentle slope or on a steep slope?**

\_\_\_\_\_

**A2. In what direction does the plot slope?**

\_\_\_\_\_

**A3. What was the color of the soil at Time 1?**

\_\_\_\_\_

**A4. What was the texture of the soil at Time 1?**

\_\_\_\_\_

**A5. Using both the sketch maps and Section B what are some of the important characteristics of the condition of the plot at Time 1. For example, what was the surface description of the plot? (e.g., dry, swamp, etc.). Is the plot near a walking path, road or ghole?**

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## **SECTION B**

### **Finding the Forest Plot at Time 2**

Follow the directions to the forest plot taken from Section A and B at Time 1. Record below all decisions made about determining the location of the forest plot and where appropriate provide additional information.

**B1. Was the first control point (the origin point for the journey to the forest plot) location easily found?**

Yes \_\_\_\_\_ No \_\_\_\_\_

**B2. If No, please provide additional information and a sketch map that will help save time during any future data collection. For example, is there an easier bearing one could follow to reach exactly the same point? Can we make a back-bearing from the forest plot to an easy to see feature (e.g. a building, a path or a ghole)?**

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The Sketch map must be drawn with North at the top. Use the digital compass to orientate yourself correctly before drawing the map.

After following all directions and distance instructions up to the last control point you should find yourself at the forest plot location. In many cases you should be able to see the PERL metal plate attached to a nearby tree. If you cannot see a tagged tree, have one person on the team remain at the control point while the other members of the team search within a radius of 25 meters. Usually any measurements will be to the left or right of the bearing, not the distance measured in to the forest. If after 15 minutes and the 25 radius search the team has not found the forest plot then re-assemble at the last control point. Review your route through the forest and discuss among yourselves whether or not there was any point on the journey at which a small error may have been made in the bearing or distance calculations and also carefully review the information collected at Time 1 (e.g., notes, sketch maps).

Because not all forest plots were tagged or because some tags may have been removed it may be impossible to confirm that your team are at the correct location. However, review the plot characteristic information in Section A (above) and all other material. If the plot characteristics at Time 1 match the characteristics of the area immediately around the last control point then consider using this location as your forest plot area. Alternatively, use the same information to identify the most likely forest plot location (within a distance of 25 meters) that matches exactly the information in Section A. If the characteristics of the area within 25 meters do not match the information in Section A then please do not collect any flora data at this time. Return to the PERL office at Rampur and report the problem to a senior PERL supervisor.

To assist the PERL supervisors and their colleagues in the US please provide as much detailed information as possible about the site, the route through the forest etc. Please answer the following questions.

If there were problems in finding the Forest Plot or the Plot was not found

**B3. Did you have problems following the directions to the plot using the point-to-point distance and bearing measurements taken from Time 1?**

Yes \_\_\_\_\_ No \_\_\_\_\_

**B4. What problems did you encounter? Please be very specific.**

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**Assuming you found the Forest Plot**

**B5. Was the forest plot easy to find?** Yes \_\_\_\_\_ No \_\_\_\_\_

**B6. Was the metal plate attached to the tree easily visible?**  
Yes \_\_\_\_\_ No \_\_\_\_\_

**B7. Did the sketch map and extra notes help to identify the plot?**  
Yes \_\_\_\_\_ No \_\_\_\_\_

**Plot Characteristics at Time 2**

**B8. Is there any evidence of the following having occurred at the forest plot location ?:**

a) animal damage Yes \_\_\_\_\_ No \_\_\_\_\_

b) extreme damage by insects Yes \_\_\_\_\_ No \_\_\_\_\_

c) fire damage Yes \_\_\_\_\_ No \_\_\_\_\_

d) storm damage Yes \_\_\_\_\_ No \_\_\_\_\_

e) flooding Yes \_\_\_\_\_ No \_\_\_\_\_

f) tree falls Yes \_\_\_\_\_ No \_\_\_\_\_

g) dead trees at the plot Yes \_\_\_\_\_ No \_\_\_\_\_

**B9. Is there evidence of active soil erosion at the forest plot location?**

No \_\_\_\_\_

Yes-minor (surface vegetation +/- or soil humus absent) \_\_\_\_\_

Yes-major (gullies, barren soils, etc.) \_\_\_\_\_

**B10. What is the percent of tree crown cover in this plot?** \_\_\_\_\_

## SECTION C

### Tree and Woody Climber Information

For each flora plot we are gathering data from a 10 x 10 meter plot. In each plot we are interested in gathering information on the number (count) and cover of each species.

Using data gathered at Time 1 we observed some species more frequently than others. We have entered their names directly below. Please note that just because they are listed here does not mean that they will be present in the specific plot. The names of species observed in the plot but not listed below should be written in the blank lines at the bottom of the table.

If a species cannot be identified, then select a twig from the tree or woody climber and tag it. Write down the "specimen" number in the column below and keep it in the sample bag.

Species Name	Number (count)	Specimen number
Barkamle		
Bhalayo (Semecarpus anacardium)		
Kyamun (Cleistocalyx operculatus)		
Peepal (Climber)		
Saj (Terminalia alata)		
Sal (Shorea robusta)		









## SECTION F

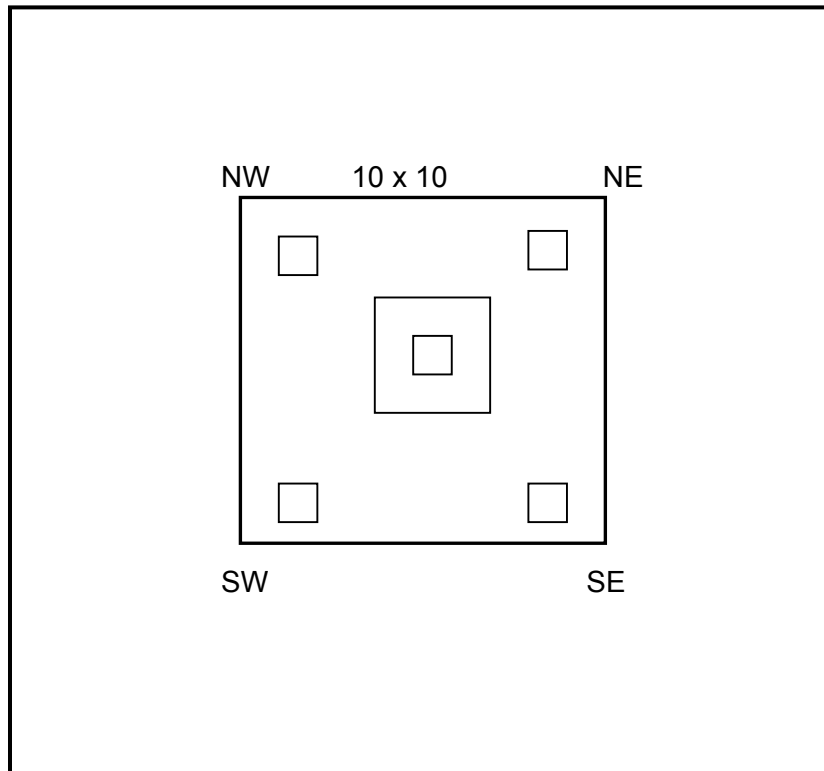
### Flora Plot Sketch Map

Below you will find an outline for the flora plot for which you have just completed data entry. **Please mark** on the diagram below the approximate location of:

- the direction and route** used to enter and find the plot (e.g. from the North).
- all trees** over 5 meters in height (indicated by a circle drawn in approximate proportion to their size)
- key reference features in near vicinity of the plot** (e.g., within 25 meters - e.g., a ghole, a walking path, a canal, a culvert, etc.)

Sketch Map of Plot     **A**    

20 x 20 meters



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Time 3

Flora Survey

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**Institute for Social and Environmental Research  
Fulbari, Chitwan**

**Population and Environment Study**

**Time-3; Flora Survey Form**

**Common Land Plots**

This form has been designed to obtain information about plant species diversity and common land composition in the common land plots used by the Population and Environment Study at Time 1 (1996). The common land plots are defined as the 10 x 10 meter plot used at Time 1. The directional data, sketch maps and other plot characteristic data gathered at Time 1 and Time 2 will be provided to you or made available to consult before going off to the common land site.

All flora data must be entered on this form while at the common land plot site. For each common land plot complete each of the sections (on plot characteristics, and the grass and herb species).

Research ID: PERL-POPENV

Country ID: NEPAL

Site ID: \_\_\_\_\_

Name of person(s) filling out this form: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date: (Month/Day/Year) \_\_\_\_\_

## **SECTION A**

### **Directional & Other Plot Data Collected at Time 1 and Time 2**

Use the directions to plot and sketch maps recorded at Time 1 to identify the flora plot location.

**Please follow the established protocols before collecting any flora data.**

To assist you in locating the plot we require that you consult Section B of the Time 1 forest plot forms and answer the following questions.

**A1. Is the plot level, on a gentle slope or on a steep slope? \_\_\_\_\_**

**A2. In what direction does the plot slope? \_\_\_\_\_**

**A3. What was the color of the soil at**

**Time 1? \_\_\_\_\_ and Time 2? \_\_\_\_\_**

**A4. What was the texture of the soil at**

**Time 1? \_\_\_\_\_ and Time 2? \_\_\_\_\_**

**A5. Using both the sketch maps and Section B what are some of the important characteristics of the condition of the plot at Time 1. For example, what was the surface description of the plot? (e.g., dry, swamp, etc.). Is the plot near a walking path, road or ghole?**

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**A6. Using both the sketch maps and Section B what are some of the important characteristics of the condition of the plot at Time 2.**

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## **SECTION B**

### **Finding the Common Land Plot at Time 3**

Follow the directions to the common land plot taken from Section A and B at Time 1. Record below all decisions made about determining the location of the common land plot and where appropriate provide additional information.

**B1. Was the first control point (the origin point for the journey to the common land plot) location easily found?** Yes \_\_\_\_\_  
No \_\_\_\_\_

**B2. If No, please provide additional information and a sketch map that will help save time during any future data collection. For example, is there an easier bearing one could follow to reach exactly the same point? Can we make a back-bearing from the common land plot to an easy to see feature (e.g. a building, a path or a ghole)?**

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The Sketch map must be drawn with North at the top. Use the digital compass to orient yourself correctly before drawing the map.

After following all directions and distance instructions up to the last control point you should find yourself at the common land plot location. Review your route through the control point and discuss among yourselves whether or not there was any point on the journey at which a small error may have been made in the bearing or distance calculations and also carefully review the information collected at Time 1 and Time 2 (e.g., notes, sketch maps). Because no common land plot was tagged it may be impossible to confirm that your team is at the correct location. However, review the plot characteristic information in Section A (above) and all other material.

Follow the guidelines of one of the three options below.

- (a) **If the plot characteristics at Time 1 match the characteristics of the area immediately around the last control point then consider using this location as your common land plot area.**  
Alternatively, use the same information to identify the most likely common land plot location (within a distance of 25 meters) that matches exactly the information in Section A.
- (b) **If the characteristics of the area within 25 meters do not match the information in Section A but you are confident that you are in the correct location then the most likely explanation is that land use in the larger area in which the plot is located has changed.**  
For example, new household residence areas may have been built on common land, or a common land became part of bari land. There are many possible changes that may have taken place since Time 1 data collection.
- (c) **If the characteristics of the area within 25 meters do not match the information in Section A and you are not confident about your exact location then please do not collect any flora data at this time.**  
For example, you may not be confident about your location because of a poor sketch map at time 1 or contradictory information in notes and directions. In this instance, return to the PERL office at Fulbari and report the problem to a senior PERL supervisor.

To assist the PERL supervisors and their colleagues in the US please provide as much detailed information as possible about the site, the route through the forest, across farmers fields, etc. Please answer the following questions.

If there were problems in finding an appropriate Common Land Plot





**Plot Characteristics at Time 3**

**B7. Has the location of common land plot changed land use category? (That is, has a common land area at Time 1 and Time 2 become something else at Time 3 (e.g. khet land? plantation? school? household? bari land? etc).**

Yes \_\_\_\_\_ No \_\_\_\_\_

**B8. If the common land area has changed land use category, what category of land use was it at:**

a) Time 1 (1996)? \_\_\_\_\_

b) Time 2 (2000)? \_\_\_\_\_

c) Time 3 (2006) TODAY? \_\_\_\_\_

**B9. Is there any evidence of the following having occurred at the common land plot location:**

a) livestock damage Yes \_\_\_\_\_ No \_\_\_\_\_

b) wild animal damage Yes \_\_\_\_\_ No \_\_\_\_\_

c) extreme damage by insects Yes \_\_\_\_\_ No \_\_\_\_\_

d) fire damage Yes \_\_\_\_\_ No \_\_\_\_\_

e) storm damage Yes \_\_\_\_\_ No \_\_\_\_\_

f) flooding Yes \_\_\_\_\_ No \_\_\_\_\_

g) tree falls Yes \_\_\_\_\_ No \_\_\_\_\_

h) dead trees at the plot Yes \_\_\_\_\_ No \_\_\_\_\_

**B10. Is there evidence of active soil erosion at the common land plot location?**

No \_\_\_\_\_

Yes-minor (surface vegetation and/or soil humus absent) \_\_\_\_\_

Yes-major (gullies, barren soils, etc.) \_\_\_\_\_

## SECTION C

### Ground Cover and Seedling Information

For each flora plot on common land we are gathering data on grasses and herbs from THREE 1 x 1 meter plots within the larger 10 x 10 meter plot. In each plot we are interested in gathering information on the number (count) of each species and their ground coverage.

Using data gathered at Time 1 and Time 2 we observed some species more frequently than others. We have entered their names directly below (and at the top of the next page). Please note that just because they are listed here does not mean that they will be present in the specific plot. The names of species observed in the plot but not listed below should be written in the blank lines in the table on the next page.

If a grass species cannot be identified, then select a leaf or stem and tag it. Write down the "identification" number in the column below and on the sample bag.

Species Name	Quadrat 1		Quadrat 2		Quadrat 3		Specimen Number
	N	C	N	C	N	C	
Amala jhar ( <i>Phyllanthus urinaria</i> )							
Badampate ( <i>Evolvulus nummularius</i> )							
Bale banso ( <i>Setaria pallide-fusca</i> )							
Belauti jhar ( <i>Rotala indica</i> )							
Chariamilo ( <i>Oxalis corniculata</i> )							
Chariamiloko mausi ( <i>Des. triflorum</i> )							
Chhanya banso ( <i>Eragrostis tenella</i> )							
Chitre banso ( <i>Digitaria ciliaris</i> )							
Chiure banso ( <i>Eragrostis uniolooides</i> )							
Dalle mothe ( <i>Cyperus brevifolius</i> )							
Dubo ( <i>Cynodon dactylon</i> )							
Dudhe jhar ( <i>Euphorbia hirta</i> )							
Gandhe ( <i>Ageratum houstonianum</i> )							
Ghod tapre ( <i>Centella asiatica</i> )							
Ghode dubo ( <i>Hemarthria compressa</i> )							
Jhupepyauli ( <i>Medicago lupulina</i> )							
Kans ( <i>Saccharum spontaneum</i> )							
Karauti ( <i>Leersia hexandra</i> )							
Kodejhar ( <i>Eleusine indica</i> )							
Kuro ( <i>Chrysopogon aciculatus</i> )							
Kutil kosa ( <i>Vicia angustifolia</i> )							
Mane banso ( <i>Pasp. scrobiculatum</i> )							
Mothe ( <i>Cyperus rotundus</i> )							
Mulapate ( <i>Emilia sonchifolia</i> )							





## SECTION D

### Flora Plot Sketch Map

Below you will find an outline for the flora plot for which you have just completed data entry. **Please mark** on the diagram below the approximate location of:

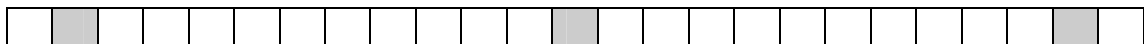
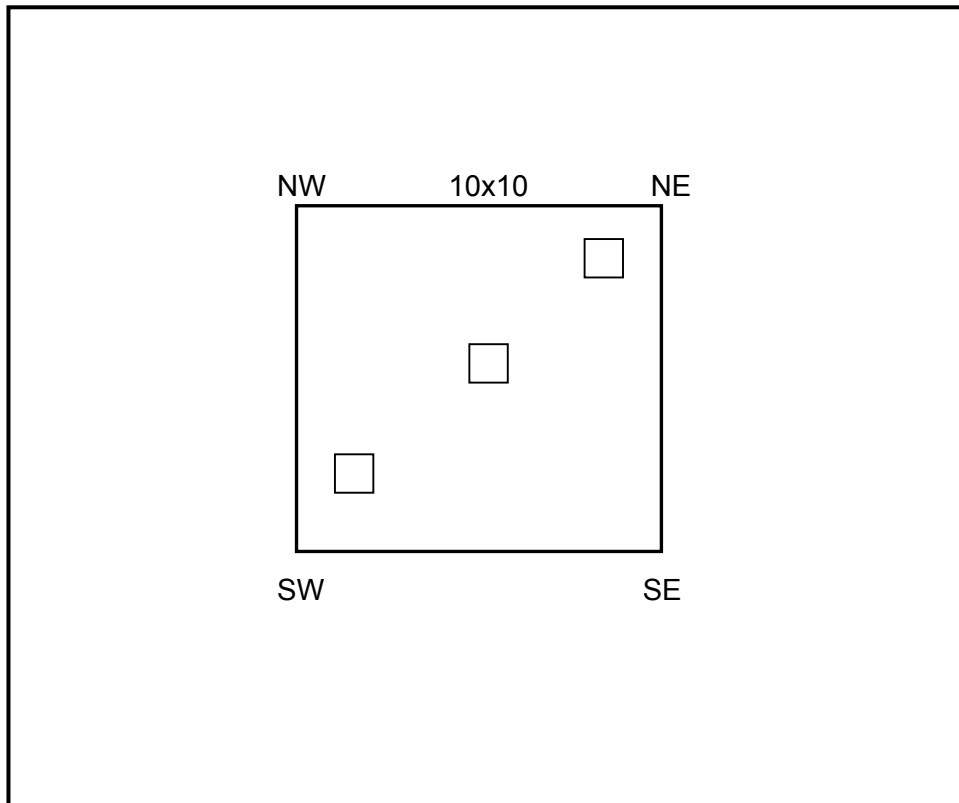
- a) **the direction and route** used to enter and find the plot (e.g. from the North).
- b) **all trees** over 5 meters in height (indicated by a circle drawn in approximate proportion to their size)
- c) **key reference features in or near the plot** (e.g., within 25 meters - e.g., a ghole, a walking path, a canal, a culvert, etc.).
- d) **Please add information in the table** below on a distance and bearing between **ALL** corners of the plot and at least one key feature (e.g., standing at the NE corner there is a pathway at 25m on a bearing of 84 degrees).

When making the measurements from the corners you can use an object more than once but **DO NOT** use the same object for all four corners. Indeed, **you must use a minimum of two different objects for each PLOT (a minimum of two objects for every four corners).**

Corner	Object(s)	Distance	Bearing
NE			
SE			
SW			
NW			

Sketch Map of Plot \_\_\_\_\_

20 x 20 meters



Plot in the canal ways or roadsides in the commonlands of western Chitwan (1 x 25 sq m)

PLOT ID   **A**  

**Institute for Social and Environmental Research  
Fulbari, Chitwan**

**Population and Environment Study**

**Time-3; Flora Survey Form**

**Forest Plots**

This form has been designed to obtain information about plant species diversity and forest composition in the forest plots used by the Population and Environment Study at Time 1 (1996). The forest plots are defined as the 10 x 10 meter plot used at Time 1. The directional data, sketch maps and other plot characteristic data gathered at Time 1 and Time 2 will be provided to you or made available to consult before going off to the forest site.

All flora data must be entered on this form while at the forest plot site. For each forest plot complete each of the sections (on plot characteristics, tree species, shrub/saplings, and grasses/herbs).

Research ID: PERL-POENV

Country ID: NEPAL

Site ID: \_\_\_\_\_

Name of person(s) filling out this form: \_\_\_\_\_

\_\_\_\_\_  
Date: (Day/month/year) \_\_\_\_\_



# **SECTION A**

## **Directional and Other Plot Data Collected at Time 1 and Time 2**

Use the directions to plot and sketch maps recorded at Time 1 to identify the flora plot location.

**Please follow the established protocols before collecting any flora data.**

To assist you in locating the plot we require that you consult Section B of the Time 1 forest plot forms and answer the following questions.

**A1. Is the plot level, on a gentle slope or on a steep slope?**

\_\_\_\_\_

**A2. In what direction does the plot slope?**

\_\_\_\_\_

**A3. What was the color of the soil at**

**Time 1?** \_\_\_\_\_ **and Time 2?** \_\_\_\_\_

**A4. What was the texture of the soil at**

**Time 1?** \_\_\_\_\_ **and Time 2?** \_\_\_\_\_

**A5. Using both the sketch maps and Section B what are some of the important characteristics of the condition of the plot at Time 1. For example, what was the surface description of the plot? (e.g., dry, swamp, etc.). Is the plot near a walking path, road or ghole?**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**A6. Using both the sketch maps and Section B what are some of the important characteristics of the condition of the plot at Time 2.**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **SECTION B**

### **Finding the Forest Plot at Time 3**

Follow the directions to the forest plot taken from Section A and B at Time 1 and Time 2. Record below all decisions made about determining the location of the forest plot and where appropriate provide additional information.

**B1. Was the first control point (the origin point for the journey to the forest plot) location easily found?**

Yes \_\_\_\_\_ No \_\_\_\_\_

**B2. If No, please provide additional information and a sketch map that will help save time during any future data collection. For example, is there an easier bearing one could follow to reach exactly the same point? Can we make a back-bearing from the forest plot to an easy to see feature (e.g. a building, a path or a ghole)?**

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The Sketch map must be drawn with North at the top. Use the digital compass to orientate yourself correctly before drawing the map.

After following all directions and distance instructions up to the last control point you should find yourself at the forest plot location. In many cases you should be able to see the PERL metal plate attached to a nearby tree. If you cannot see a tagged tree, have one person on the team remain at the control point while the other members of the team search within a radius of 25 meters. Usually any measurements will be to the left or right of the bearing, not the distance measured in to the forest.

If after 15 minutes and the 25 meter radius search the team has not found the forest plot then re-assemble at the last control point. Review your route through the forest and discuss among yourselves whether or not there was any point on the journey at which a small error may have been made in the bearing or distance calculations and also carefully review the information collected at Time 1 (e.g., notes, sketch maps).

Because not all forest plots were tagged or because some tags may have been removed it may be impossible to confirm that your team are at the correct location. However, review the plot characteristic information in Section A (above) and all other material. If the plot characteristics at Time 1 match the characteristics of the area immediately around the last control point then consider using this location as your forest plot area. Alternatively, use the same information to identify the most likely forest plot location (within a distance of 25 meters) that matches exactly the information in Section A. If the characteristics of the area within 25 meters do not match the information in Section A then please do not collect any flora data at this time. Return to the PERL office at Fulbari and report the problem to a senior PERL supervisor.

To assist the PERL supervisors and their colleagues in the US please provide as much detailed information as possible about the site, the route through the forest etc. Please answer the following questions.

If there were problems in finding the Forest Plot or the Plot was not found

**B3. Did you have problems following the directions to the plot using the point-to-point distance and bearing measurements taken from Time 1?**

Yes \_\_\_\_\_ No \_\_\_\_\_

**B4. What problems did you encounter? Please be very specific.**

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**Assuming you found the Forest Plot**

**B5. Was the forest plot easy to find?** Yes \_\_\_\_\_ No \_\_\_\_\_

**B6. Was the metal plate attached to the tree easily visible?**  
Yes \_\_\_\_\_ No \_\_\_\_\_

**B7. Did the sketch map and extra notes help to identify the plot?**  
Yes \_\_\_\_\_ No \_\_\_\_\_

**Plot Characteristics at Time 3**

**B8. Is there any evidence of the following having occurred at the forest plot location ?:**

a) animal damage Yes \_\_\_\_\_ No \_\_\_\_\_

b) extreme damage by insects Yes \_\_\_\_\_ No \_\_\_\_\_

c) fire damage Yes \_\_\_\_\_ No \_\_\_\_\_

d) storm damage Yes \_\_\_\_\_ No \_\_\_\_\_

e) flooding Yes \_\_\_\_\_ No \_\_\_\_\_

f) tree falls Yes \_\_\_\_\_ No \_\_\_\_\_

g) dead trees at the plot Yes \_\_\_\_\_ No \_\_\_\_\_

**B9. Is there evidence of active soil erosion at the forest plot location?**

No \_\_\_\_\_

Yes-minor (surface vegetation +/- or soil humus absent) \_\_\_\_\_

Yes-major (gullies, barren soils, etc.) \_\_\_\_\_

**B10. What is the percent of tree crown cover in this plot?** \_\_\_\_\_



## SECTION D

### Shrub, Sapling (of woody plants), and Herbaceous Climber Information

For each flora plot we are gathering data on shrubs, saplings (of woody plants), and herbaceous climber from a 3 x 3 meter plot found at the center of the larger 10 x 10 meter plot. In each plot we are interested in gathering information on the number (count) and cover of each species.

Using data gathered at Time 1 and Time 2 we observed some species more frequently than others. We have entered their names directly below. Please note that just because they are listed here does not mean that they will be present in the specific plot. The names of species observed in the plot but not listed below should be written in the blank lines at the bottom of the table.

If a species cannot be identified, then select a twig from the shrub, sapling or climber and tag it. Write down the "specimen" number in the column below and keep it in the sample bag.

Species Name	Number (count)	Cover	Maximum stem circumference of shrub or sapling in cm	Estimated height of shrub or sapling in meter but not climber	Specimen collection number
Asare ( <i>Murraya koenigii</i> )					
Baghe lahara					
Banmara ( <i>Eupatorium odoratum</i> )					
Barkamle					
Barro ( <i>Terminalia bellirica</i> )					
Bhanti ( <i>Clerodendrum viscosum</i> )					
Bhatmas jhar					
Botdhairo ( <i>Lagerstroemia parviflora</i> )					
Desibayer ( <i>Ziziphus nummularius</i> )					
Kalikath					
Kyamun ( <i>Cleistocalyx operculatus</i> )					
Lathikath					
Madane ( <i>Spatholobus parviflorus</i> )					
Mainkanda ( <i>Xeromphis spinosa</i> )					
Saj ( <i>Terminalia alata</i> )					
Sal ( <i>Shorea robusta</i> )					



## SECTION E

### Ground Cover and Seedling Information

For each flora plot we are gathering data on grasses and herbs from FIVE 1 x 1 meter plots within the larger 10 x 10 meter plot. In each plot we are interested in gathering information on the number (count) of each species and their ground coverage.

Using data gathered at Time 1 and Time 2 we observed some species more frequently than others. We have entered their names directly below. Please note that just because they are listed here does not mean that they will be present in the specific plot. The names of species observed in the plot but not listed below should be written in the blank lines in the table on the next page.

If a grass species cannot be identified, then select a leaf or stem and tag it. Write down the "identification" number in the column below and on the sample bag.

Species Name	Quadrat 1		Quadrat 2		Quadrat 3		Quadrat 4		Quadrat 5		Specimen number
	N	C	N	C	N	C	N	C	N	C	
Asare ( <i>Murraya koenigii</i> )											
Bale banso ( <i>Setpal</i> )											
Batulopate( <i>St . elegans</i> )											
Bhanthi ( <i>Cle. viscosum</i> )											
Bhatmas jhar											
Chariamilo ( <i>Oxacorn</i> )											
Dhotipate											
Kuro ( <i>Chry. aciculatus</i> )											
Latikath											
Mainkanda ( <i>X. spinosa</i> )											
Mothe ( <i>Cyperus spp.</i> )											
Mulapate ( <i>E. sonchifolia</i> )											
Saj ( <i>Terminalia alata</i> )											
Sal ( <i>Shorea robusta</i> )											
Saraudi ( <i>Run. parviflora</i> )											
Siru ( <i>Imperata cylindrica</i> )											
Thakal ( <i>Phoe. humilis</i> )											
Tite banso ( <i>B. distachya</i> )											
Torigande ( <i>Blum. flava</i> )											





## SECTION F

### Flora Plot Sketch Map

Below you will find an outline for the flora plot for which you have just completed data entry. **Please mark** on the diagram below the approximate location of:

- the direction and route** used to enter and find the plot (e.g. from the North).
- all trees** over 5 meters in height (indicated by a circle drawn in approximate proportion to their size)
- key reference features in near vicinity of the plot** (e.g., within 25 meters - e.g., a ghole, a walking path, a canal, a culvert, etc.)

Sketch Map of Plot     **A**    

20 x 20 meters

